NORTH MARIN WATER DISTRICT
AGENDA - REGULAR MEETING
July 19, 2022 – 6:00 p.m.
Location: Virtual Meeting
Novato, California

Information about and copies of supporting materials on agenda items are available for public review at 999 Rush Creek Place, Novato, at the Reception Desk, or by calling the District Secretary at (415) 897-4133. A fee may be charged for copies. District facilities and meetings comply with the Americans with Disabilities Act. If special accommodations are needed, please contact the District Secretary as soon as possible, but at least two days prior to the meeting.

ATTENTION: This will be a virtual meeting of the Board pursuant to the authorizations provided by Government Code section 54953(e).”

There will not be a public location for participating in this meeting, but any interested member of the public can participate telephonically by utilizing the dial-in information printed on this agenda.

Video Zoom Method

CLICK ON LINK BELOW:

Go to: https://us02web.zoom.us/j/82191971947

Password: 466521

OR

SIGN IN TO ZOOM:

Meeting ID: 821 9197 1947

Password: 466521

Call in Method:

Dial:
+1 669 900 9128
+1 253 215 8782
+1 346 248 7799
+1 301 715 8592
+1 312 626 6799
+1 646 558 8656

Meeting ID: 821 9197 1947#

Participant ID: #

Password: 466521#

For clarity of discussion, the Public is requested to MUTE except:

1. During Open Time for public expression item.
2. Public comment period on agenda items.

Please note: In the event of technical difficulties during the meeting, the District Secretary will adjourn the meeting and the remainder of the agenda will be rescheduled for a future special meeting which shall be open to the public and noticed pursuant to the Brown Act.

All times are approximate and for reference only.
The Board of Directors may consider an item at a different time than set forth herein.

 Date Posted: 7/14/2022

Est. Time	Item	Subject
6:00 p.m.		***CALL TO ORDER***
	1.	***APPROVE MINUTES FROM REGULAR MEETING –*** June 21, 2022
	2.	***APPROVE MINUTES FROM REGULAR MEETING*** - June 28, 2022
	3.	***GENERAL MANAGER'S REPORT***
	4.	***OPEN TIME: (Please observe a three-minute time limit)***

This section of the agenda is provided so that the public may express comments on any issues not listed on the agenda that are of interest to the public and within the jurisdiction of the North Marin Water District. When comments are made about matters not on the agenda, Board members can ask questions for clarification, respond to statements or questions from members of the public, refer a matter to staff, or direct staff to place a matter of business on a future agenda. The public may also express comments on agenda items at the time of Board consideration.

5. ***STAFF/DIRECTORS REPORTS***

CONSENT CALENDAR

The General Manager has reviewed the following items. To his knowledge, there is no opposition to the action. The items can be acted on in one consolidated motion as recommended or may be removed from the Consent Calendar and separately considered at the request of any person.

6. ***Consent - Approve:*** Contract Amendment for Consulting Services – Scott Foster Engineering
7. ***Consent - Approve:*** Re-Authorizing Meetings by Teleconference of Legislative Bodies of North Marin Water District — Resolution

ACTION ITEMS

8. ***Approve:*** Local Water Supply Enhancement Study Final Report - Acceptance

INFORMATION ITEMS

9. TAC Meeting – June 6, 2022
10. NBWRA Meeting – June 27, 2022
11. NBWA Meeting – July 1, 2022
12. ***MISCELLANEOUS***

Disbursements – Dated June 30, 2022
Disbursements – Dated July 7, 2022
Disbursements – Dated July 14, 2022
MONTHLY PROGRESS REPORT w/Customer Service Questionnaire
EPA - National Lakes Assessment 2022: A Fact Sheet for Communities
NBWA One Water Initiative – Land Use and Water Infrastructure Virtual Workshop Summary – June 2, 2022
Approved FY 2022-23 Budget

<u>News Articles</u>:
Marin IJ – Smart' meters proliferate
Marin IJ – Progress iffy on state's water use despite arid era – DROUGHT
Marin IJ – Inflation biting into new projects – INFRASTRUCTURE
Marin IJ – Grand jury report rips water supply planning – Main Municipal blamed for 2021 drought emergency
Point Reyes Light – Marin details raft of housing programs

Est. Time	Item	Subject
		Marin IJ – Editorial – State pulls plug on ability to fight housing Marin IJ – Diving deep: New water sources are on the table Point Reyes Light – Crop values battered by drought Marin IJ- Editorial – Grand jury put tight focus on water district Point Reyes Light – Seats open on local boards Point Reyes Light – New restroom, parking lot planned for Point Reyes Marin IJ – Drought-driven deep cuts in water affect thousands of farms Marin IJ – Californians miss targets for saving water again Novato Advance – Alarm bells: COVID returns at higher levels -NEW SUB VARIANTS DEFEAT VACCINE Eureka Times – PG&E plans to decommission Potter Valley Project Capitol Weekly – Desalination: Should California use the ocean to quench its thirst? <u>Social Media Posts:</u> NMWD Web and Social Media Report – June 2022
8:30 p.m.	13.	***ADJOURNMENT***

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DRAFT
NORTH MARIN WATER DISTRICT
MINUTES OF REGULAR MEETING
OF THE BOARD OF DIRECTORS
June 21, 2022

CALL TO ORDER

President Petterle announced that due to the Coronavirus outbreak and pursuant to the Brown Act as modified by Assembly Bill 361, this was a virtual meeting. President Petterle called the regular meeting of the Board of Directors of North Marin Water District to order at 6:00 p.m. and the agenda was accepted as presented. President Petterle added that there was not a public location for participating in this meeting, but any interested members of the public could participate remotely by utilizing the video or phone conference dial-in method using information printed on the agenda. President Petterle announced that in the event of technical difficulties during the meeting, the District Secretary will adjourn the meeting and the remainder of the agenda will be rescheduled for a future special meeting which shall be open to the public and noticed pursuant to the Brown Act.

President Petterle welcomed the public to participate in the remote meeting and asked that they mute themselves, except during open time and while making comments on the agenda items. President Petterle noted that due to the virtual nature of the meeting he will request a roll call of the Directors. A roll call was done, those in remote attendance established a quorum. Participating remotely were Directors Jack Baker, Rick Fraites, Jim Grossi, Michael Joly and Stephen Petterle.

President Petterle announced that all public attendees will be invited to speak and will need to use the raised hand icon in Zoom or dial *9 to be called upon.

Mr. Williams performed a roll call of staff, participating remotely were Tony Williams (General Manager), Terrie Kehoe (District Secretary), Julie Blue (Auditor-Controller), Eric Miller (Assistant General Manager/Chief Engineer), Pete Castellucci (Interim Construction/Maintenance Superintendent), Robert Clark (Operations/Maintenance Superintendent), Pablo Ramudo (Water Quality Supervisor) and Ryan Grisso (Water Conservation Coordinator). Also participating remotely was IT consultant Clay Smedshammer (Core Utilities).

President Petterle requested that for those joining the virtual meeting from the public to identify themselves. Participating remotely was Littie Nash.

MINUTES

On motion of Director Joly seconded by Director Baker, the Board approved the minutes from the June 7, 2022 Regular Board Meeting by the following vote:

AYES: Director Baker, Fraites, Grossi, Joly and Petterle

NOES: None

ABSTAIN: None

ABSENT: None

GENERAL MANAGER'S REPORT

Mr. Williams announced that he was happy to have Eric Miller as the new Assistant General Manager/Chief Engineer, noting it was his first week at NMWD.

Mr. Williams updated the Board on the Local Water Supply and Enhancement Study (LWSES). He stated that the report is complete, staff are performing some evaluations of Stafford backfeeding and will include that analysis in the final report. Mr. Williams stated that he will bring the final report to the Board in July for acceptance.

Mr. Williams apprised the Board that staff had a pre-construction meeting on June 21st with D. L. Falk, the contractor for the Administration and Laboratory Upgrade. He noted that he expected to start onsite work on July 5th and the District has one last referral on the building permit. Mr. Williams reported that staff will be moving out of the office on June 23rd and 24th and will be operating out of the Wood Hollow office as of June 27th.

President Petterle asked if the Directors had any questions or comments.

Director Joly asked if there was an estimated date as to when construction will begin on the renovation project. Mr. Williams replied that there will be preliminary prep work the week of July 5th and baring any complications the demolition should start a week or two after that.

President Petterle asked if there were any comments or questions from the public and there was no response.

OPEN TIME

President Petterle asked if anyone from the public would like to speak and there was no response.

STAFF/DIRECTORS REPORTS

President Petterle asked if any Directors or staff wished to bring up an item not on the agenda and the following were discussed.

Mr. Clark updated the Board on a recent fire that occurred the previous Thursday night by the Armaroli Tank site. Mr. Clark reported that upon inspection he found out that the Novato Fire Protection District (NFPD), had multiple trucks on site, three of which were on top of the tank. He added that traffic loads on the tank is limited to 8,000 pounds, and even though there were multiple signs posted, the NFPD was unaware of the weight limit. Mr. Clark stated that he has been in contact with the Fire Marshal and there will be some training to avoid this issue in the future. Additionally, Mr. Clark noted that upon inspection there did not appear to be any damage.

President Petterle asked if there were any comments or questions from the Directors.

Director Joly asked if NFPD notified the District about the fire. Mr. Clark replied that he became aware of the fire through a community chat that was forwarded on to him. He added that he later spoke with the Fire Marshal.

Director Joly asked Mr. Castellucci if he had an update on the leak he reported at the June 7th meeting. Mr. Castellucci replied that the leak was repaired that morning, the NMWD subcontractor also repaired the sidewalk and the homeowner submitted a claim to get her landscape repaired.

MONTHLY PROGRESS REPORT

The Monthly Progress Report for May was reviewed. Mr. Williams reported on key areas such as water production, local and regional lake/reservoir capacity, COVID-19 financial impact, delinquent bill impacts, customer complaints and service orders. He also recognized the Consumer Services Department for doing a great job to decrease the number of delinquent bills.

Mr. Williams noted an anomaly that occurred from the SCWA billing is being reviewed by District and SCWA staff. He also reported that under Water Bill Delinquency Impacts, this May had the lowest amount since COVID and was partially due to the shutoff policy being reinstated. Additionally, under Summary of Complaints & Service Orders, there was an increase of service orders, because there was one less Field Service Representative a year ago, and also due to AMI reporting and the drought, consumers are more aware of their water use which resulted in better reporting. Mr. Williams reminded the Board he will move this report to Miscellaneous in July.

Ms. Blue summarized the Monthly Report of Investments for May 2022. She noted that the interest rates are coming back up, which will help build up the District's portfolio.

President Petterle asked if there were any comments or questions from the Directors.

Director Joly noted that the lake levels in the Monthly Progress Report was different than what was on the SCWA website. Mr. Williams replied that it is because there was a 16-day difference between the time data was compiled for the May report and today. Director Joly asked about reporting the category in acre feet. Mr. Williams replied that he was reporting in million gallons, in order to be consistent with Stafford levels. Director Joly stated that Lake Sonoma is now in better shape than it was at this time in 2021. Mr. Williams replied that it has to do with the control of releases into the lake.

Director Petterle commented on the leaks reported, stating that the District will often times notify the consumer of leaks which is different from leaks on the District side. Mr. Williams noted people are getting leak notices through the AMI system, confirming that this is different than District leaks on the main lines.

Director Joly thanked the Administration group for doing a good job on the bill reductions.

President Petterle asked if anyone from the public would like to speak and there was no response.

<u>CONSENT CALENDAR</u>

On the motion of Director Fraites, and seconded by Director Joly the Board approved the following items on the consent calendar by the following vote:

AYES: Director Baker, Fraites, Grossi, Joly and Petterle

NOES: None

ABSTAIN: None

ABSENT: None

<u>RE-AUTHORIZING MEETINGS BY TELECONFERENCE OF LEGISLATIVE BODIES OF NORTH MARIN WATER</u>

The Board approved Re-Authorizing Meetings by Teleconference of Legislative Bodies of North Marin Water District. Resolution 22-20 will extend the continuation of teleconference meetings effective June 21, 2022 through July 21, 2022 pursuant to Brown Act provisions.

<u>ACTION CALENDAR</u>

<u>CONSULTING SERVICES AGREEMENT WITH PES ENVIRONMENTAL</u>

Mr. Williams informed that the Board that PES did a Hazardous Building Materials Survey for the Administration and Lab Building Project. He reported that building materials containing asbestos will need to be monitored upon removal. Mr. Williams noted that an amendment of the contract is now needed for the project. monitoring.

President Petterle asked if there were any comments or questions from the Directors and there was no response.

President Petterle asked if anyone from the public would like to speak and there was no response.

On the motion of Director Baker, and seconded by Director Joly the Board authorized the General Manger to amend the Consulting Services Agreement with PES Environmental in the amount of $25,000 by the following vote:

AYES: Director Baker, Fraites, Grossi, Joly and Petterle

NOES: None

ABSTAIN: None

ABSENT: None

REVISED INTER-AGENCY AGREEMENT FOR RECYCLED WATER BETWEEN LAS GALLINAS VALLEY SANITATION DISTRICT AND NORTH MARIN WATER DISTRICT

Mr. Williams updated the Board on the revisions for the Inter-Agency Agreement for Recycled Water between Las Gallinas Valley Sanitation District (LGVSD) and North Marin Water District. He noted that the revised agreement contains revisions with the primary intent of clarifying how the Recycled Water Capital Replacement and Expansion Fund is funded and how the funds are divided between the two agencies. Mr. Williams added that the agreement was reviewed by legal counsel and noted that the Inter-Agency Agreement with Novato Sanitary District will also come back to the Board at a later date.

President Petterle asked if there were any comments or questions from the Directors.

Director Joly stated he did not fully understand what the agreement revision was all about. Mr. Williams replied that originally the agreement established any excess revenue generated from the sale of recycled water would be shared among both agencies to replace infrastructure on either side in need of repair. He noted that the revised language separates the fund into two separate accounts, so when one agency has a need to expand or do a repair they can pull from their own fund. Director Joly asked if legal counsel looked at the agreement and Mr. Williams confirmed. Mr. Williams also noted that he discussed the agreement with Ms. Blue and she is aware of the reporting requirements. Director Petterle asked about the rebuilding of the LGVSD facility since LGVSD sells recycled water to both NMWD and MMWD. Mr. Williams replied that the facility is owned by LGVSD and they sell recycled water to both agencies. Mr. Ramudo stated that the one LGVSD treatment plant serves both systems (NMWD and MMWD) and a previous separate MMWD-owned facility no longer operates.

President Petterle asked if anyone from the public would like to speak and there was no response.

On the motion of Director Joly, and seconded by Director Fraites the Board authorized Revision 2 (dated June 2022) to the Inter Agency Agreement between Las Gallinas Valley Sanitary District and North Marin Water District by the following vote:

AYES: Director Baker, Fraites, Grossi, Joly and Petterle

NOES: None

ABSTAIN: None

ABSENT: None

INFORMATION ITEMS

2022 DROUGHT UPDATE AND DISTRICT RESPONSE

Mr. Williams. Gave an update on the drought and reviewed the District responses, which included a request to form an Ad Hoc Drought Committee. Additionally, Mr. Grisso gave an update on Administrate fine limits.

Mr. Williams stated that the value in forming an Ad Hoc Drought Committee will be that it will allow two Board members to work offline with staff. He added that a similar committee was used for the West Marin Rate Study and the process was very effective. Mr. Williams noted that if the Board is interested in forming this committee no formal action is needed, other than to identify the members for the committee. He apprised the Board that key staff, which included Mr. Grisso and himself, would be part of this committee for up to a year, until at which time the committee would be dissolved.

President Petterle asked if there were any comments or questions from the Directors and if there was a consensus to form an Ad Hoc committee for drought response. Director Grossi stated that he thought it was a good idea, it would be a more efficient approach and would allow for a better consensus with staff. Directors Fraites and Director Joly both agreed the committee would be useful. Director Baker stated that he thought Director Grossi would be a good asset to have on the committee. Director Petterle stated that he is highly interested in being part of this committee as he has had many years of conservation and drought experience. Director Petterle asked if any other Board members were interested. Directors Petterle and Grossi were then identified as the new Ad Hoc Drought Committee members. Mr. Williams stated that in mid-July he will schedule a meeting via zoom, and he looks forward to doing a deeper dive into drought related issues.

Mr. Grisso reported that after additional discussion with legal counsel the $1,000 fine was the highest enforceable legal limit based on the water code. Director Fraites asked if it could be $1,000 the first time and then a higher rate for a repeat offender. Director Joly stated that the trouble is with public perception is that consumers are asked to conserve in a drought, and then they see someone filling their pool. Director Joly added that we should not allow this to occur at all, someone with more money should not have the right to flagrant use. Director Petterle stated that $1,000 is a lot of money to some, but not to everybody. He stated that we should stand as leaders, but not as an agency that penalized people. Director Petterle asked if we could install flow restrictors and charge them an excess tier rate for the water used. Director Petterle added that the District's AMI system allows access to see how much water is used on a daily basis which is helpful to track an abundance of use. He added that he would also like to continue to advocate that the billing be monthly rather than bimonthly at it is currently. Director Petterle noted that most other bills are monthly and now that the meters are read remotely it should not be a problem to consider changing the billing schedule. Director Petterle stated that people often have no concept of water use, and suggested allowing the filling of pools only in winter or early spring and work with the City of Novato to enforce this. Mr. Grisso noted that there is not a large volume of customers that this may apply to, and suggested staff can circle back to the Board to discuss further refinements and reasonable actions to take if needed. He added that the new Ad Hoc Drought Committee can also have father discussion on this as well.

President Petterle asked if anyone from the public would like to speak and there was no response.

FY 2021/2 THIRD QUARTER PROGRESS REPORT WATER QUALITY

Mr. Ramudo reported on the third quarter FY 2021-22 progress report for Water Quality. He updated the Board on the Novato, Point Reyes and Novato Recycled Systems. He reported that both Novato and Point Reyes Station met the primary and secondary water quality goals.

Mr. Ramudo apprised that the Board that Stafford Lake continues to have blue green algae issues. He noted that algae was non-detectable in the drinking water and the concern is with recreational exposure. He added that staff also continues to monitor and follow the state's advisory program, noting blue green alae is increasing with climate change and will likely never go away.

Mr. Ramudo stated that in West Marin there was still concern with salinity intrusion in the Coast Guard wells. He added that the water use demand was down the last three months and Gallagher Well No. 1 continues to be a stable supply of good water. Mr. Ramudo reported that Gallagher Well No. 2. is underway and he hopes to have all the permitting documentation within a month after completion.

President Petterle asked if there were any comments or questions from the Directors.

Director Joly asked other than dogs, how does the algae toxins impact recreational use. Mr. Ramudo noted that swimming is not allowed in the lake but noted that if the toxins get high enough it is possible toxins could become present in the fish, adding this is monitored weekly in order to change the advisory if needed.

Director Fraites stated that he has been reading about forever chemicals that are present all over the world and that they don't break down. He asked if NMWD was in danger of these chemicals. Mr. Ramudo replied that Forever chemicals are industrial man-made chemicals that once they make their way into the environment they do not go away. He added that they can be found in plants, animals, the ground and surface water. Mr. Ramudo stated that staff had done some monitoring and had no detections in Stafford Lake, most likely since our water supply has no industrial influence. He added that the EPA is working on future regulations and he should have more information on this in the next two years as it is an emerging concern. Mr. Williams noted that Mr. Ramudo is on the AWWA Water Quality Committee and working on this very issue. Mr. Ramudo added that currently forever chemicals are not a problem in our water sources, however if there are more action level goes from the state he will bring it back to the Board. Director Fraites thought it was fantastic that Mr. Ramudo is taking part of the committee.

President Petterle asked if anyone from the public would like to speak and there was no response.

MISCELLANEOUS

The Board received the following miscellaneous items: Disbursements – Dated June 9, 2022, Disbursements – Dated June 16, 2022, Point Reyes Light – NMWD Public Hearing Notice – West Marin Water Service Area, Point Reyes Light – NMWD Public Hearing Notice – Oceana Marin Sewer Service, Marin IJ – NMWD Public Hearing Notice – Novato and FY22/23 Insurance Renewal.

The Board received the following news articles: Marin IJ – Novato set to overhaul service fees – SEPT. 1 START; Marin IJ – System delivers modest rain to parched region – BAY AREA; Marin IJ – Lawmakers weigh buying out farmers to save water – STATE LEGISLATURE; Mendocino County Public Broadcasting – Requested variance would result in drastic curtailments; Mendo County Water News – PG&E Requests Variance from FERC for Lake Pillsbury Diversions; Marin IJ – Editorial -Smart meters a key tool for conservation; Marin IJ – California water use ignores drought – URBAN AREAS; Marin IJ – Spread of virus still up, but flat; Marin IJ – Biologists: Late-2021 rains were big boost for salmon – WEST MARIN; Marin IJ – Editorial – Agricultural water waste must be curbed; Novato Advance – Drought stalks Marin once again – Marin County; Marin IJ – Opinion – MMWD incumbents address water supply question and Marin IJ – Opinion – Agricultural water waste must be curbed.

President Petterle asked if there were any comments or questions from the Directors.

Director Joly stated that the article on PG&E and the Potter Valley Project (PVP) caught his eye. Mr. Williams stated that it was a dynamic story, adding he and the attorney have access to FERC who is working with PG&E on the surrender of the license, noting the focus is on the documents to see what it means. Mr. Williams stated he will have a call next week about PVP with FERC to discuss the documents submitted and the variance requested. He noted that there is pushback from the stakeholders to be sure they do the right thing. Director Joly asked if the variance will affect our Russian River water. Mr. Williams replied that it will affect what is diverted to Lake Mendocino. Director Joly asked if they are doing the diversion now, and Mr. Williams replied that, not until FERC approval. Director Joly stated that it is important to stay on top of it.

President Petterle asked if anyone from the public would like to speak and there was no response.

President Petterle reminded the Board that the next NMWD Board of Directors meeting will be on June 28, 2022. He noted that since there were three meetings in June, the first meeting in July will be skipped.

ADJOURNMENT

President Petterle adjourned the meeting at 7:14 p.m.

Submitted by

Theresa Kehoe
District Secretary

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DRAFT
NORTH MARIN WATER DISTRICT
MINUTES OF REGULAR MEETING
OF THE BOARD OF DIRECTORS
June 28, 2022

CALL TO ORDER

President Petterle announced that due to the Coronavirus outbreak and pursuant to the Brown Act as modified by Assembly Bill 361, this was a virtual meeting. President Petterle called the regular meeting of the Board of Directors of North Marin Water District to order at 6:00 p.m. and the agenda was accepted as presented. President Petterle added that there was not a public location for participating in this meeting, but any interested members of the public could participate remotely by utilizing the video or phone conference dial-in method using information printed on the agenda. President Petterle announced that in the event of technical difficulties during the meeting, the District Secretary will adjourn the meeting and the remainder of the agenda will be rescheduled for a future special meeting which shall be open to the public and noticed pursuant to the Brown Act.

President Petterle welcomed the public to participate in the remote meeting and asked that they mute themselves, except during open time and while making comments on the agenda items. President Petterle noted that due to the virtual nature of the meeting he will request a roll call of the Directors. A roll call was done, those in remote attendance established a quorum. Participating remotely were Directors Jack Baker, Rick Fraites, Michael Joly and Stephen Petterle. Director Grossi was absent.

President Petterle announced that all public attendees will be invited to speak and will need to use the raised hand icon in Zoom or dial *9 to be called upon.

Mr. Williams performed a roll call of staff, participating remotely were, Tony Williams (General Manager), Eric Miller (AGM/Chief Engineer), Julie Blue (Auditor-Controller), Terrie Kehoe (District Secretary, Robert Clark (Operations/Maintenance Superintendent), Pablo Ramudo (Water Quality Supervisor), and Pete Castellucci (Interim Construction/Maintenance Superintendent). Also participating remotely were Carl Nelson (Legal Counsel) and IT consultant Clay Smedshammer (Core Utilities).

President Petterle requested that for those joining the virtual meeting from the public to identify themselves. Participating remotely were Emily Larsen, Gloria Larsen, Becca McGiven, Mr. Gborchar (as shown on Zoom).

GENERAL MANAGER'S REPORT

Mr. Williams updated the Board on the move to the new temporary office at 100 Wood Hollow Road, Suite 300. He reported that staff are still working out logistical issues before opening to the public, therefore at this time the public can be seen by appointment only.

Mr. Williams reminded the Board that the next NMWD Board of Directors Meeting will be on July 19th.

President Petterle asked if there were any questions or comments from the Board and there were none.

OPEN TIME

President Petterle asked if anyone from the public wished to bring up an item not on the agenda and there was no response.

STAFF/DIRECTORS REPORTS

President Petterle asked if Directors or staff wished to bring up an item not on the agenda.

Director Baker stated that he received a letter from a customer about problems he had sending a letter and he asked if anyone else knew of the letter. Mr. Williams stated that he acknowledged the receipt of the letter and emailed the individual. Director Baker stated that he has done business with the individual when he worked at the County of Marin, and wanted to be sure his letter was received and staff made outreach.

PUBLIC HEARING/APPROVE CONSIDER PROPOSED NOVATO SERVICE AREA WATER RATE INCREASE

President Petterle opened the public hearing at 6:07 p.m.

Ms. Blue asked the Board to consider the proposed 6% increase for the Novato service area effective July 1, 2022. She noted that all the customers were sent a hearing notice on May 13, 2022 and it was published in the Marin IJ on June 14th. Additionally, she reminded the Board that the proposed increase is structured as a 6% rate increase to both the commodity rate and the bimonthly service charge rate for Novato Water and Recycled Water customers. Ms. Blue reported protests must be 50%+1 of the total customers, and as of June 20th there were seven official protests, no emails, and eight phone calls with general questions. She reminded the Board that this increase was established when the Board accepted the 2020 Rate Study as well as the FY 22-23 financial plan. Additionally, the Board approved the Drought Surcharge Review on March 15, 2022 in which the surcharge is an added percentage per 1,000 gallons for all water used during a Board declared Stage 2 or higher water shortage.

Mr. Williams shared his PowerPoint presentation and went through the history of the recent 2020 rate study, drought surcharge review and the factors leading up to the rate increase of 6% this year.

President Petterle asked the Board if they had any questions or comments.

Director Joly stated that he appreciated the PowerPoint presentation as it was very helpful. He noted that he did not remember seeing the $300M replacement value for all water infrastructure assets and Mr. Williams replied that the amount is shown in the 2018 Master Plan (Novato Service Area). He added that the Master Plan will be updated in the coming fiscal year to see if this replacement value will change. Director Joly noted that cost difference between treating our local supply and purchasing water from SCWA, and Mr. Williams replied that it is an economy of scale. He noted that there is the cost of chemicals, operations and power from PG&E to run the treatment plant, which is much different than the cost of water from SCWA.

President Petterle asked if there were any questions or comments from the public.

Emily Larsen asked several questions and concerns including whether the District labor force was union or non-union, and that her fixed charges were exceeding consumption charges because of reduced usage. Ms. Larsen also asked if Novato Fire Protection District (NFPD), could help with the cost of the piping and hydrants and also noted that she saw large areas being watered in Sonoma County. She stated that she sees people watering in the middle of the day which is not productive. Mr. Williams thanked Ms. Larsen for saving water as it is very important during this time of drought. He stated that NMWD's employees are not union, but have an employee association. Mr. Williams added that the cost of living increase does not impact the rate increase and it is the general cost to pay staff. He noted that the NFPD has the burden of painting and keeping the hydrants functional; but NMWD performs the testing and responds if someone hits a hydrant. Director Joly thanked Ms. Larsen for her questions and for saving water. He also asked when the next labor contract negotiations will take place. Director Joly noted that the Directors will also pay the increase in rates as they are also water customers in Novato. He added that NMWD does not charge fire districts to use water to fight fires, noting the last big fire in Point Reyes was paid by the rate payers as their public duty. Ms. Blue stated that NMWD's MOU will expire in September of 2023, adding the cost of living adjustment is based on CPI. Director Petterle also thanked Ms. Larsen for her participation, noting it is always nice when the public attends. He added that he knows it is a burden to look at the agenda or review the minutes, however many of these questions have been discussed throughout the year. Director Petterle welcomed Ms. Larsen's participation in the future.

Mr. Gborchar asked how much the District is spending on consulting, including the rate studies and wondered why staff are not doing this work themselves. He noted that this was the third rate increase in two years and the District needs to start managing their budget and stop using the rate payers as their ATM machine. Mr. Williams replied that no consultants were participating in tonight's hearing and he does not recall the amount paid for the Rate Studies. Mr. Gborchar stated he was familiar with cost of consultants as he worked at a Fortune 100 company, and suggested the District should hire more people. Director Petterle stated that Mr. Gborchar comments have been noted.

President Petterle thanked the public for their comments and the hearing was closed at 6:29 p.m. He asked the Board if there was any further discussion.

Director Joly stated that the average billing increase will be $4.50 per month, which includes the drought surcharge. Ms. Blue responded that the $4.50 does not include the drought surcharge, which will be5%. Director Joly pointed out that there is a rate calculator on the NMWD website, that can calculate for each customer how much they will pay with the rate increase. He added that the Board hates to raise rates especially during the time people are cutting back on water use.

On motion of Director Joly, seconded by Director Baker the Board approved Resolution No. 22-21 amending Regulation 54 pertaining to Water Rates and Charges to reflect a 6% global revenue increase for customers in the Novato service area, effective July 1, 2022 by the following vote:

AYES: Director Baker, Fraites, Joly and Petterle

NOES: None

ABSTAIN: None

ABSENT: Director Grossi

PUBLIC HEARING /APPROVE: PROPOSED WEST MARIN WATER RATE INCREASE

President Petterle declared the public hearing for the West Marin Water Rate increase opened at 6:33 p.m.

President Petterle opened the public hearing at 6:07 a.m.

Ms. Blue asked the Board to consider the proposed 6% increase effective July 1, 2022. She noted that all the customers were sent a hearing notice on May 13, 2022 and it was published in the Point Reyes Light on June 9th. Additionally, she reminded the Board that the proposed increase is structured as a 6% rate increase to both the commodity rate and the bimonthly service charge rate for West Marin Water customers. Ms. Blue reported protests must be 50%+1 of the total customers, and as of June 20th the District received no official protests against the proposed increase. There were no emails as of June 20th and one call with general questions regarding the rate increase. She reminded the Board this increase was established when the Board accepted the 2021 Rate Study as well as the FY 22-23 financial plan. Additionally, the Board approved the Drought Surcharge Review on March 15, 2022 in which the surcharge as an added percentage per 1,000 gallons for all water used during a Board declared Stage 2 or higher drought.

Mr. Williams shared his PowerPoint presentation and went through the history of the recent 2021 Rate Study, drought surcharge review and the factors leading up to the rate increase of 6% this year.

President Petterle asked the Board if they had any questions or comments.

Director Joly commended Mr. Williams for a good presentation and asked if Gallagher Well No. 2 was on target for completion and when it can be expected to be fully operational. Mr. Williams replied that there was a three day well test that started June 28th by the well driller. Mr. Ramudo negotiated a favorable testing program that was accepted by the State Division of Drinking Water which requires thirty days of water quality testing and evaluation. In the meantime, the District's construction crew will work to finish the well mound, complete the pipeline to the well head and install the pump. Mr. Ramudo reported that he expects the well will be in production by early to mid-August. He stated that this will depend on the Division of Drinking Water's timely review of the application and granting the permit.

President Petterle opened up the hearing to the public for questions and comments and there was no response.

President Petterle closed the hearing at 6:43 p.m.

On motion of Director Fraites, seconded by Director Joly the Board approved Resolution No. 22-22 amending Regulation 54 pertaining to Water Rates and Charges to reflect a 6% global revenue increase for customers in the West Marin service area, effective July 1, 2022 by the following vote:

AYES: Director Baker, Fraites, Joly and Petterle

NOES: None

ABSTAIN: None

ABSENT: Director Grossi

PUBLIC HEARING/APPROVE CONSIDER PROPOSED OCEANA MARIN SEWER RATE INCREASE

President Petterle declared the public hearing for the Oceana Marin Sewer Rate increase opened at 6:44 p.m.

Ms. Blue announced the ordinance in front of the Board is for the Oceana Marin proposed 5% rate increase that will be put on the Marin County Property Tax Bills.

Ms. Blue continued the discussion noting there are 235 customers in Oceana Marin. She reported the District complied with the Prop. 218 notification procedures by mailing individual letters on May 13, 2022 and the Public Hearing notice was also published in the Point Reyes Light newspaper. Ms. Blue stated that this increase will provide $14,000 in revenue, and there were no official protests received. Ms. Blue added that the need for the increase was reviewed by the Board during the financial plan and budget review. Additionally, Ms. Blue stated that when looking at the 2022 Coastal Area Sewer Cost Comparison, Oceana Marin was the highest among the six surveyed. She noted that however, Oceana Marin is a unique small system.

Mr. Williams informed the Board that the treatment and storage ponds rehab project cost will be $1.2M and there is a $700,000 award from FEMA to offset the cost. Director Joly commended staff for a getting such a large grant from FEMA.

President Petterle asked if anyone from the public had any questions or comment and there was no response.

President Petterle declared the public hearing closed at 6:48 p.m.

On motion of Director Baker, seconded by Director Joly the Board approved Ordinance 43 electing to have the Oceana Marin sewer charges be collected on the tax roll of the County of Marin and approved Resolution No. 22-23 amending Regulation 109, effective July 1, 2022, to increase the Oceana Marin Sewer Service Rate to $1,296 per dwelling unit per year by the following vote:

AYES: Director Baker, Fraites, Joly and Petterle

NOES: None

ABSTAIN: None

ABSENT: Director Grossi

CONSENT ITEMS

On the motion of Director Fraites, and seconded by Director Baker the Board approved the following items on the consent calendar by the following vote:

AYES: Director Baker, Fraites, Joly and Petterle

NOES: None

ABSTAIN: None

ABSENT: Director Grossi

ANNUAL WATER QUALITY REPORT - NOVATO

The Board approved the text for the annual Water Quality Report for Novato. The Safe Drinking Water Act requires water suppliers to publish and distribute a report of water quality information to its customers annually.

ANNUAL WATER QUALITY REPORT – POINT REYES AREA

The Board approved the text for the annual Water Quality Report for the Point Reyes area. The Safe Drinking Water Act requires water suppliers to publish and distribute a report of water quality information to its customers annually.

AMENDMENT 1 TO UTILITY AGREEMENT BETWEEN THE STATE OF CALIFORNIA AND NORTH MARIN WATER DISTRICT FOR CALTRANS' MSN B2

The Board authorized the General Manger to execute the First Amendment to Utility Agreement No. 1779.5 between the State of California and North Marin Water District for the MSN B2 Caltrans project with a $110,000 cost share reimbursement. This amendment to the Utility Agreement is for an additional Caltrans cost share amount of $110,000 that will allow the District to invoice Caltrans for related expenses incurred by NMWD. These expenses include design review, field inspection, construction support and additional easement reviews incurred during the project, including the closeout process over the last several years.

ACTION ITEMS

NOVATO AND WEST MARIN SERVICE AREAS FY 22/23 BUDGETS

Ms. Blue provided a presentation on the Fiscal Year 22/23 budget review for the Novato and West Marin service areas. She apprised that the Board on key assumptions; consolidated budget, capital improvement projects, the equipment budget, studies and special projects, outstanding debt and a Novato water summary. Ms. Blue stated that key assumptions included water sales; rate increases, Stafford Treatment Plant water production, SCWA cost to purchase water and personnel costs. She reviewed the budget sources (revenue and reserves) and budget uses (expenditures). Ms. Blue provided a list of two-year Capital Improvement Projects, an equipment budget, a breakdown of studies and special projects. Additionally, she reported on the District's total outstanding debt as of June 30, 2022. Ms. Blue provided a Novato Water Financial Forecast Chart that provided estimates through FY 2026/27. Lastly, she reviewed the budget and rate hearing schedule.

President Petterle asked if any Directors had any questions or comments.

Director Joly thanked Ms. Blue for the wonderfully detailed report. He asked if the reserve tap next year is at 7% and if that was inline or higher than normal. Ms. Blue replied that last year is was lower at around 4%, noting it depends on the capital plan and funding provided any given year. Director Joly stated that the grant money is very meaningful to the budget, and thanked staff again for their good work.

President Petterle asked if anyone from the public had any questions or comments and there was no response.

On the motion of Director Baker, and seconded by Director Joly the Board approved the Novato and West Marin service areas FY 22/23 Budgets by the following vote:

AYES: Director Baker, Fraites, Joly and Petterle

NOES: None

ABSTAIN: None

ABSENT: Director Grossi

MISCELLANEOUS

The Board received the following miscellaneous item: Disbursements – Dated June 23, 2022.

President Petterle asked if the Directors had any questions or comment and there was no response.

President Petterle asked if there were any questions or comments from the public and there was no response

ADJOURNMENT

President Petterle adjourned the meeting at 7:00 p.m.

Submitted by

Theresa Kehoe
District Secretary

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Item #6

NORTH MARIN
WATER DISTRICT

MEMORANDUM

To: Board of Directors July 19, 2022

From: Eric Miller, Assistant GM / Chief Engineer EM

Re: Contract Amendment for Consulting Services – Scott Foster Engineering
R:\NON JOB No ISSUES\Consultants\Scott Foster Engineering\BOD Memos_Agmt\Scott Foster Eng Contract Amend 1 BOD Memo 7-22.doc

RECOMMENDED ACTION: Authorize General Manager to amend the Consulting Services Agreement with Scott Foster Engineering, Inc.

FINANCIAL IMPACT: $10,000 (no budget augmentation necessary)

Background

At the June 22, 2021 meeting, the Board authorized a new Consulting Services Agreement between the District and Scott Foster Engineering, Inc. (SFE) for specialized hydraulic pressure surge analysis services. A cost breakdown for the $20,000 contract by task is summarized as follows:

Starting Contract Amount	$20,000
Projects (expended to date)	
Kastania & Ignacio Pump Station Pressure Surge Analysis	<$19,380>
Remaining Balance on Contract	$620

Expenditures

SFE expenditures currently total $19,380 leaving a balance of $620 on the contract. Although the contract amount has not been completely expended, the level of effort required to develop the system's computer model for the surge analysis has been greater than what was anticipated during the scoping process. District staff also anticipates that additional surge analysis is still required to further explore impacts to the Novato distribution system. For this reason, a contract amendment is needed in the amount of $10,000, resulting in a new contract total of $30,000.

RECOMMENDATION

That the Board authorize the General Manager to amend the Consulting Services Agreement with Scott Foster Engineering, Inc. in the amount of $10,000.

Approved by GM ________

Date 7/14/2022

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Item #7

NORTH MARIN
WATER DISTRICT

MEMORANDUM

To: Board of Directors July 19, 2022

From: Tony Williams, General Manager TW

Subject: Re-Authorizing – Meetings by Teleconference of Legislative Bodies of North Marin Water District
t:\gm\bod misc 2022\board of directors meetings by teleconference 7.19.22 final.doc

RECOMMENDED ACTION: Adopt Resolution No. 22-XX: "Resolution Finding Proclaimed State of Emergency, That Local Officials Continue to Recommend Physical Distancing, and that Meeting in Person Would Present Imminent Risks to the Health or Safety of Attendees; and Re-Authorizing Meetings by Teleconference of Legislative Bodies of North Marin Water District from July 19, 2022 through August 18, 2022 Pursuant to Brown Act Provisions".

FINANCIAL IMPACT: None

As authorized by the Governor's Executive Order N-29-20, Board meetings have been held virtually since March 17, 2020 to protect attendees, including members of public, District employees, and Board members, from potential exposure to the novel coronavirus disease 2019 ("COVID-19"). On June 11, 2021, the Governor issued Executive Order N-08-21 which rescinded these temporary modifications to the Brown Act, effective September 30, 2021. On September 16, 2021, the Governor signed Assembly Bill 361 (2021) ("AB 361") amending the Brown Act to allow local legislative bodies to continue to conduct meetings virtually under specified conditions and pursuant to special rules on notice, attendance, and other matters. AB 361 took full effect on October 1, 2021.

AB 361 authorizes the Board of Directors to meet virtually during declared states of emergency without noticing the location of individual Board Members or requiring such locations to be open to the public if certain findings are made and certain procedures are followed. Where a virtual meeting is held pursuant to AB 361, the members of the public must be able to observe and participate during the meeting.

The Governor's March 4, 2021 declaration of a State of Emergency remains in effect. On

Approved by GM TW

Date 7/14/2022

December 15, 2021, the State reinstated a universal masking requirement for all individuals while indoors to help combat the surge in COVID-19 cases due to the Omicron variant. On December 30, 2021, Marin County Health and Human Services issued new guidance changing the local rules on masking to align with the State mandate. On February 7, 2022, the State issued a new health order, effective February 16, 2022, which limits indoor masking requirements to specified indoor settings and unvaccinated individuals. However, both the State and Marin County Health and Human Services continue to recommend wearing masks while indoors. CDC, OSHA, and Cal/OSHA continue to recommend mask wearing and physical distancing of at least six feet while indoors to protect against transmission of COVID-19. Therefore, the current circumstances support a determination by the Board that meeting in person would continue to present imminent risks to the health and safety of attendees.

On October 5, 2021, the Board adopted Resolution 21-22, thereby finding a proclaimed state of emergency, that local officials continue to recommend physical distancing, and that meeting in person would present imminent risks to the health or safety of attendees; and authorizing meetings by teleconference of legislative bodies of North Marin Water District from October 5, 2021 through November 4, 2021 pursuant to Brown Act provisions.

On November 2, 2021, November 16, 2021, December 7, December 21, 2021,January 18, 2022, February 15, 2022, March 15, 2022, April 5, 2022, May 3, 2022, May 17, 2022, June 7, 2022 and June 21, 2022 the Board adopted Resolutions 21-26, -27, -28, -30, 22-01, -04, -05, -06, -12, -15, -17, -20 respectively, thereby finding a proclaimed state of emergency, that local officials continue to recommend physical distancing, and that meeting in person would present imminent risks to the health or safety of attendees; and re-authorizing meetings by teleconference of legislative bodies of North Marin Water District for 30 days pursuant to the Brown Act provisions.

If adopted, Resolution No. 22-XX will allow the Board to continue to meet virtually for another 30 days, after which the Board will need to reconsider its findings and confirm the need to hold virtual meetings. This reconsideration and confirmation will need to occur every thirty days until the Board determines it is safe to meet in person.

<u>RECOMMENDED ACTION</u>:

Adopt Resolution No. 22-XX: "Resolution Finding Proclaimed State of Emergency, That Local Officials Continue to Recommend Physical Distancing, and that Meeting in Person Would

Present Imminent Risks to the Health or Safety of Attendees; and Re-Authorizing Meetings by Teleconference of Legislative Bodies of North Marin Water District from July 19, 2022 through August 18, 2022 Pursuant to Brown Act Provisions".

RESOLUTION NO. 22-XX

RESOLUTION OF THE BOARD OF DIRECTORS OF NORTH MARIN WATER DISTRICT FINDING PROCLAIMED STATE OF EMERGENCY, THAT LOCAL OFFICIALS CONTINUE TO RECOMMEND PHYSICAL DISTANCING, AND THAT MEETING IN PERSON WOULD PRESENT IMMINENT RISKS TO THE HEALTH OR SAFETY OF ATTENDEES; AND RE-AUTHORIZING MEETINGS BY TELECONFERENCE OF LEGISLATIVE BODIES OF NORTH MARIN WATER DISTRICT FROM JULY 19, 2022 THROUGH AUGUST 18, 2022 PURSUANT TO BROWN ACT PROVISIONS

WHEREAS, all meetings of the legislative bodies of the North Marin Water District ("District") are open and public, as required by the Ralph M. Brown Act ("Brown Act"), Government Code Section 54950, *et seq*, and any member of the public may observe, attend, and participate in the business of such legislative bodies; and

WHEREAS, on March 4, 2020, Governor Newsom declared a State of Emergency as a result of the rapid spread of the novel coronavirus disease 2019 ("COVID-19"); and

WHEREAS, on March 10, 2020, the Board of Supervisors of the County of Marin ratified proclamations of health and local emergency due to COVID-19; and

WHEREAS, on March 16, 2020, the City Council of the City of Novato ratified and confirmed a proclamation of local emergency due to COVID-19;

WHEREAS, on March 17, 2020, in response to the COVID-19 pandemic, Governor Newsom issued Executive Order N-29-20 suspending certain provisions of the Brown Act in order to allow local legislative bodies to conduct meetings telephonically or by other means, after which District staff implemented virtual meetings for all meetings of legislative bodies within the District; and

WHEREAS, on June 11, 2021, Governor Newsom issued Executive Order N-08-21, which terminated the provisions of Executive Order N-29-20 that allows local legislative bodies to conduct meetings telephonically or by other means effective September 30, 2021; and

WHEREAS, on September 16, 2021, Governor Newsom signed Assembly Bill 361 (2021) ("AB 361"), which amended the Brown Act to allow local legislative bodies to continue to conduct meetings by teleconference under specified conditions and pursuant to special rules on notice, attendance, and other matters; and

WHEREAS, AB 361 took full effect on October 1, 2021, and makes provisions under Government Code section 54953(e) for remote teleconferencing participation in meetings by members of a legislative body, without compliance with the requirements of Government Code section 54953(b)(3), subject to the existence of certain conditions; and

WHEREAS, a required condition is that a state of emergency is declared by the Governor pursuant to Government Code section 8625, proclaiming the existence of conditions of disaster or of extreme peril to the safety of persons and property within the state caused by conditions as described in Government Code section 8558; and

WHEREAS, it is further required that state or local officials have imposed or, local officials have recommended, measures to promote social distancing, or, the legislative body must find that meeting in person would present imminent risks to the health and safety of attendees; and

WHEREAS, on October 5, 2021, the Board of Directors previously adopted Resolution No. 21-22, finding that the requisite conditions exist for the legislative bodies of North Marin Water District ("District") to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, on November 2, 2021, the Board of Directors previously adopted Resolution No. 21-26, reaffirming the finding that the requisite conditions exist for the legislative bodies of North Marin Water District to continue to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, on November 16, 2021, the Board of Directors previously adopted Resolution No. 21-27, reaffirming the finding that the requisite conditions exist for the legislative bodies of North Marin Water District to continue to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, on December 7, 2021, the Board of Directors previously adopted Resolution No. 21-28, reaffirming the finding that the requisite conditions exist for the legislative bodies of North Marin Water District to continue to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, on December 21, 2021, the Board of Directors previously adopted Resolution No. 21-30, reaffirming the finding that the requisite conditions exist for the legislative bodies of North Marin Water District to continue to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, on January 18, 2022, the Board of Directors previously adopted Resolution No. 22-01, reaffirming the finding that the requisite conditions exist for the legislative bodies of North Marin Water District to continue to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, on February 15, 2022, the Board of Directors previously adopted Resolution No. 22-04, reaffirming the finding that the requisite conditions exist for the legislative bodies of North Marin Water District to continue to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, on March 15, 2022, the Board of Directors previously adopted Resolution No. 22-05, reaffirming the finding that the requisite conditions exist for the legislative bodies of North Marin Water District to continue to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, on April 5, 2022, the Board of Directors previously adopted Resolution No. 22-06, reaffirming the finding that the requisite conditions exist for the legislative bodies of North Marin Water District to continue to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, on May 3, 2022, the Board of Directors previously adopted Resolution No. 22-12, reaffirming the finding that the requisite conditions exist for the legislative bodies of North Marin Water District to continue to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, on May 17, 2022, the Board of Directors previously adopted Resolution No. 22-15, reaffirming the finding that the requisite conditions exist for the legislative bodies of North Marin Water District to continue to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, on June 7, 2022, the Board of Directors previously adopted Resolution No. 22-17, reaffirming the finding that the requisite conditions exist for the legislative bodies of North Marin Water District to continue to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, on June 21, 2022, the Board of Directors previously adopted Resolution No. 22-20, reaffirming the finding that the requisite conditions exist for the legislative bodies of North Marin Water District to continue to conduct remote teleconference meetings without compliance with paragraph (3) of subdivision (b) of section 54953; and

WHEREAS, as a condition of extending the use of the provisions found in section 54953 (e), the Board of Directors must reconsider the circumstances of the state of emergency that exists in the District, and the Board of Directors has done so; and

WHEREAS, emergency conditions continue to persist in the District, specifically, the State of Emergency for the State of California declared by Governor Newsom as a result of the COVID-19 pandemic remains in effect; and

WHEREAS, the Centers for Disease Control and Prevention ("CDC) recommends physical distancing of at least six feet from unvaccinated individuals while indoors; and

WHEREAS, "Protecting Workers: Guidance on Mitigating and Preventing the Spread of COVID-19 in the Workplace," promulgated by the Occupational Safety and Health Administration ("OSHA") under the United States Department of Labor, provides that "[m]aintaining physical distancing at the workplace for unvaccinated and at-risk workers is an important control to limit the spread of COVID-19" and recommends that employers train employees about the airborne nature of COVID-19 and importance of exercising multiple layers of safety measures, including physical distancing, and that employers implement "physical distancing in all communal work areas for unvaccinated and otherwise at-risk workers," including physical distancing from members of the public, as a "key way to protect such workers"; and

WHEREAS, Title 8, Section 3205, subdivision (c)(5)(D) of the California Code of Regulations, promulgated by the Division of Occupational Safety and Health of the California Department of Industrial Relations ("Cal/OSHA"), requires employers to provide instruction to employees on using a combination of "physical distancing, face coverings, increased ventilation indoors, and respiratory protection" to decrease the spread of COVID-19; and

WHEREAS, the Board of Directors recognizes the recommendations by state and local officials to use physical distancing as a layer of protection against COVID-19 and desires to continue to provide a safe workplace for its employees and a safe environment for the open and public meetings of the District's legislative bodies; and

WHEREAS, due to the continued threat of COVID-19, the District continues to implement multiple layers of protection against COVID-19, including physical distancing, for the safety of employees and members of the public; and

WHEREAS, while the District believes District work-related activities may be conducted safely in person through imposition of various safety protocols, Board meetings continue to present a unique challenge due to their being open to the public generally, with limited space in the boardroom, and no ability to verify vaccination status or to provide contact tracing for potentially exposed individual attendees; and

WHEREAS, the Board of Directors hereby finds that the presence of COVID-19 and the increase of cases due to the Omicron variant has caused, and will continue to cause, conditions of concern to the safety of certain persons within the District, including older and immunocompromised individuals that are likely to be beyond the control of the services, personnel, equipment, and facilities of the District, and, therefore, continues to present imminent risks to the health or safety of attendees, including members of the public and District employees, should meetings of the District's legislative bodies be held in person; and

WHEREAS, as a consequence of the local emergency persisting, the Board of Directors does hereby find that the legislative bodies of North Marin Water District shall continue to conduct their meetings without compliance with paragraph (3) of subdivision (b) of Government Code section 54953, as authorized by subdivision (e) of section 54953, and that such legislative bodies shall continue to comply with the requirements to provide the public with access to the meetings as prescribed in paragraph (2) of subdivision (e) of section 54953; and

WHEREAS, the District will continue to conduct meetings for all meetings of legislative bodies within the District virtually (i.e. through the use of Zoom, or similar virtual meeting provider) and/or telephonically, in conformance with requirements under the Brown Act.

THEREFORE, BE IT RESOLVED by the Board of Directors of the North Marin Water District as follows:

1. The above recitals are true and correct and hereby incorporated into this Resolution.

2. In compliance with the special teleconference rules of Section 54953 of the Government Code, as established by Assembly Bill 361 (2021), the Board of Directors hereby makes the following findings:

   a. The Board of Directors has considered the circumstances of the state of emergency; and

   b. The states of emergency, as declared by the Governor, continue to impact directly the ability of the District's legislative bodies, as well as staff and members of the public, to safely meet in person;

c. The CDC, and Cal/OSHA continue to recommend physical distancing of at least six feet to protect against transmission of COVID-19; and

d. Meeting in person would continue to present imminent risks to the health and safety of members of the public, members of the District's legislative bodies, and District employees due to the continued presence and threat of COVID-19.

3. The District's legislative bodies may continue to meet remotely from July 19, 2022 through August 18, 2022 in compliance with the special teleconference rules of Section 54953 of the Government Code, as amended by Assembly Bill 361 (2021), in order to protect the health and safety of the public.

4. The Board of Directors will review these findings and the need to conduct meetings by teleconference within thirty (30) days of adoption of this resolution.

* * * * *

I hereby certify that the foregoing is a true and complete copy of a resolution duly and regularly adopted by the Board of Directors of NORTH MARIN WATER DISTRICT at a regular meeting of said Board held on the 19th day of July 2022 by the following vote:

AYES:

NOES:

ABSENT:

ABSTAINED:

Theresa Kehoe, Secretary
North Marin Water District

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Item #8

NORTH MARIN WATER DISTRICT

MEMORANDUM

To: Board of Directors Date: July 19, 2022

From: Tony Williams, General Manager

Subject: Local Water Supply Enhancement Study Final Report

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RECOMMENDED ACTION: That the Board Accept the Final Local Water Supply Enhancement Study Report

FINANCIAL IMPACT: $286,333

SCWA Regional Study

The Regional Water Supply Resiliency Study (Resiliency Study) led by Sonoma County Water Agency (SCWA) seeks to identify the key factors impacting regional water supply resiliency and identify promising opportunities for SCWA and its retail contractors, including the District, to improve regional resilience. The Resiliency Study includes the development of a Decision Support Model (DSM) to evaluate various risks to water supply including wildfire, earthquakes, flooding, and drought. Due to the extreme drought that has been present since 2020 in the Russian River watershed, the Project Team (SCWA, Water Contractors and Jacobs) accelerated a portion of the Resiliency Study to prioritize the resiliency assessment for the drought risk scenarios. Various presentations during the development of the drought resiliency portion of the Resiliency Study, currently known as the *2021-2022 Drought Resiliency Analysis Technical Memorandum* (Technical Memo), are summarized below:

- November 1, 2021 WAC/TAC meeting
- November 16, 2021 Presentation to District BOD
- December 6, 2021 TAC meeting
- February 7, 2022 WAC TAC meeting
- February 15, 2022 Presentation to District BOD
- May 2, 2022 WAC/TAC meeting: Final Technical Memo

The Technical Memo (Attachment 1) provides Drought Management Options for drought risk scenarios in four main categories: 1) Increase Supply, 2) Reduce Demand, 3) Improve Operations, and 4) Modify Policy and Regulations. Using available historical hydrology data (1910-2017) as well as current storage conditions for Lake Pillsbury, Lake Mendocino, Lake

Sonoma, and MMWD reservoirs, the hydrology of water year 1976-1977 period represents the most severe two-year extended drought scenario. Therefore, the various Drought Management Options were evaluated using the current 2020-2021 drought followed by the future period of 2022-2026 represented by the dry hydrological sequence of 1976-1980. Based on this analysis, the several near-term drought resiliency options were developed. These actions and the current status of their implementation regionally and District-specific are summarized in the table below:

Regional Near-Term Drought Management Options

Resiliency Option	Status
Maximize Delivery of Natural Flows in the Russian River (RR)	NMWD purchased available RR water to backfeed Stafford Lake in 2021-22
Kastania Pump Station Rehabilitation	MMWD completed construction in January 2022; NMWD and MMWD working closely on operations; consistent operations throughout June 2022.
Increase Groundwater Production (SCWA)[1]	SCWA's Santa Rosa Plain Drought Resiliency Project includes 3 wells (Todd Rd, Sebastopol Rd and Occidental Rd); Todd Rd well went online in October 2021. **1.4 MGD available now, additional 4.1 MGD by year end**
Regulatory Flexibility (through TUCPs)	TUCO issued in December 2021 and again on June 17, 2022 lowering minimum instream flows for RR. Resulting 20% allocation reduction to water contractors
Water Conservation and Water Use Efficiency	NMWD Ord No. 41 in place with 20% mandatory reductions

Table Footnote:
1. Tech Memo also identified increased groundwater production for other SCWA water contractors with wells.

The Technical Memo also evaluated other long-term Drought Management Options including regional groundwater banking, aquifer storage and recovery (ASR), flood managed aquifer recharge (FloodMAR), expanding recycled water, water transfers and interconnections with Bay Area Water Agencies, ocean desalination and brackish groundwater desalting, and expanded water conservation and water use efficiency.

NMWD Local Supply Study

Staff released a Request for Proposal (RFP) document for a study to evaluate a list of potential water supply alternatives and associated evaluation criteria on July 28, 2021 for the NMWD Local Water Supply Enhancement Study (Local Supply Study) with the intent to be a companion study to the Resiliency Study. The Local Supply Study focuses on the Novato Water

System only. In September 2021, after a comprehensive review and evaluation of the consultant proposals received, the Board approved an agreement for the work with West Yost. The primary goal of the study was to identify potential local supplies that could provide at least 1,000 acre-feet (AF) and potentially as much as 2,000 AF of water supply. The evaluation of the following alternative water supplies was performed:

- Aquifer storage recovery (ASR) in the "Novato Valley Basin" aquifer
- Recycled water system expansion
- Indirect Potable Reuse (IPR) water use options
- Improve Stafford Treatment Plant Process Water Recapture Efficiency
- Capture and Conveyance of Stormwater into Stafford Lake from nearby watersheds
- Increasing Stafford Lake water storage capacity
- Desalination using brackish groundwater or bay water supplies

The Board held a Public Workshop on January 25, 2022 and the District's consultant West Yost provided a detailed overview of the water supply alternatives listed above. In addition, the proposed evaluation criteria were presented: a) Water Supply Yield and Reliability; b) Cost; c) Operational Impacts; d) Regulations and Permitting; e) Public and Institutional Considerations; and f) "other" considerations. The Board held another Public Workshop on April 26, 2022 to review the evaluations of the various supply alternatives. The draft Local Supply Study report was posted on the District's website in mid-April 2022 ahead of the April Workshop.

Several water supply alternatives have been deemed not feasible on a local level based on the evaluation criteria established. However, these alternatives are potentially more promising under a regional approach and partnership with other agencies. The following table summarizes the infeasible alternatives for the District to pursue alone.

Infeasible Local Water Supply Alternatives for the District

Supply Alternative	Evaluation
Aquifer Storage and Recovery (ASR)	ASR in the Novato Valley Basin (the local groundwater basin) is very limited based on the aquifer characteristics and other factors with an estimated yield of only 50-100 AF.
Indirect Potable Reuse (IPR)	IPR, which has two associated storage options, groundwater recharge or surface water storage, is also very limited. This determination is based on the conditions within the Novato Valley Basin described above and the limited capacity of Stafford Lake and the distance to existing wastewater treatment facilities (NSD or LGVSD).

Infeasible Local Water Supply Alternatives for the District

Supply Alternative	Evaluation
Desalination	Desalination was evaluated under the Tech Memo; was previously evaluated by Marin Municipal Water District (MMWD); and is currently being re-evaluated by MMWD. Desalination is expensive, has specific siting requirements for discharge of brine reject water, and would not be prudent for the District to pursue alone.

Expansion of the District's recycled water system, was another alternative carefully evaluated in the Local Supply Study. This alternative is not currently recommended due to the high cost of new pipelines relative to the volume of potable water offset ($13.1M capital cost for an offset of 63 AFY). However, new development that occurs adjacent to or near the District's existing recycled water distribution system is being considered for recycled water use and staff will continue to explore other opportunities for recycled water expansion, including offsetting or reducing the overall cost.

The draft Local Supply Study report was revised after input received at the April 26, 2022 Workshop and an extended public comment period that ended on May 6, 2022. The Final Report is being presented to the Board for acceptance. Based on Board input, the Executive Summary of the report provides water volumes expressed in both million gallons as well as acre-feet. A new graphic is also included depicting the volume represented by an acre-foot using a football field as a visual representation. In addition, a similar graphic has been added to the District's website: to help explain the commonly used volume unit of an acre-foot when describing water supply and overall demand: https://nmwd.com/what-is-an-acre-foot/.

The Final Report (Attachment 2) identifies three alternatives that scored high using the established evaluation criteria, including overall cost and weighted qualitative scoring:

Potential Local Water Supply Alternatives for the District

Supply Alternative	Estimated Capital Cost	Annual Yield
Improve Stafford Treatment Plant Efficiency (process water recapture – pretreatment modifications, raw water intake modifications	$70,000 - $2,700,000	20 - 70 AF (7 - 23MG)
Increase Stafford Lake Storage Capacity - Spillway Notch Slide Gate	$944,000	726 AF (237 MG)
Divert Captured Stormwater into Lake Stafford	$2,460,000 - $13,640,000	245-788 AF (80 – 257 MG)

Stafford Lake Backfeeding

The Stafford Dam Spillway Notch Slide Gate alternative, if implemented, could be effective in increasing Lake Stafford capacity by either direct rainfall runoff, in a wet year; or by backfeeding the lake with purchased Russian River water in a dry year. Backfeeding of Stafford Lake during dry year periods dates back to 1976-1977 drought and has been executed more recently in 1988, 1989, 1991, 2009, 2014, 2018, 2021, and earlier this year. Included in the Appendix of the Local Supply Study report is a technical memorandum that evaluated the backfeeding operations under various scenarios. Staff felt this analysis was an important supplemental effort to include in the Local Supply Study and took advantage of recent hydraulic modeling efforts under the District on-call agreement with Kennedy-Jenks. The primary purpose of this evaluation was to identify any system improvements (distribution lines, pump stations, STP, etc.) that could improve the backfeeding operation either in conjunction with or independent of a supply enhancement project. The preliminary results of this analysis in provided in a draft technical memorandum dated July 8, 2022 which includes potential long-term improvements to the distribution system and the San Marin Pump Station. Staff are reviewing the proposed improvements provided in the technical memo in conjunction with other future capital improvements.

Public Outreach

Staff have performed significant public outreach efforts to date related to the Local Supply Study, including advertisement for the public workshops held in January and April of this year. A summary of outreach activities is provided below:

- New Water Supplies "News Story" - September 16 2021
- New Water Supplies Second Website "News Story" - September 30, 2021:
- Fall 2021 Waterline Newsletter (Novato) - October 2021.
- Marin IJ Op-Ed (Marin Voice) - October 1, 2021
- New Water Supplies Webpage: Originally posted November 2021
- Marin IJ "Did You Know" Water Supply Advertisement Campaign:
    - Weekly ads (6 total) placed from November 2021 through January 2022
    - 7th advertising the January 25th workshop.
- Social Media "Did You Know" campaign"
    - 7 similar to the Marin IJ ads but customized for Facebook, Instagram and Twitter.
    - Ran concurrently (weekly) with the IJ ads from November to January

  - Versions published both before and after the workshop.
  - Link to the power point presentation from the January 25th workshop provided
- Marin IJ article (Will Houston) - January 30, 2022
- Marin IJ Workshop Advertisement April 22, 2022
- New Water Supplies Webpage: Updated before (advertising) and after (recapping) the April 2022 Workshop
- New Water Supplies Third Website "News Story" – April 2022.
  - Versions published before (advertising) and after (recapping) the April workshop
- Social Media Posts Advertising the April 2022 Workshop
  - Two social media posts in April, both boosted for deeper reach and resonated for the entire month of April leading up to the workshop.
- Novato Spring 2022 Waterline Article on the Water Supply Enhancement Studies

Capital Improvement Projects

The recently approved District Budget for FY2022-2023 includes two Capital Improvement Projects related to the Local Supply Study as well as two items in the Special Study/Special Project as summarized in the table below. The intent of these projects is to further develop the scope and impacts of the potential supply improvements related to the treatment plant and the dam spillway alternatives discussed in the Local Supply Study. Depending on the outcome of these efforts, future design and construction projects will be planned and implemented.

FY2022-23 CIP – Supply Enhancements[1.]

Project #	**Project Name**	**FY23 Budget**
1.6610.23	Water Supply Enhancements – STP Modifications	$50,000
1.6610.24	Water Supply Enhancements – Dam	$50,000
4XXX.	Stafford Dam Master Plan	$25,000
-	Drought Contingency Plan (NBWRA)	$9,000

Table Footnote:
1. CIP projects 1.6610.22, 1.6610.xx, and 1.6600.97 ($125,000 total) could also include supply enhancement efforts.

A short slide presentation providing an overview of the details discussed above will be presented to the Board at the meeting and is provided as Attachment 3.

RECOMMENDATION

The Board accept the Final Local Water Supply Enhancement Study Report.

JACOBS

Sonoma Water Regional Water Supply Resiliency Study

Accelerated 2021-2022 Drought Resiliency Analysis

FINAL DRAFT

April 27, 2022

Sonoma Water

ATTACHMENT 1

Contents

1. Introduction

Sonoma Water, in conjunction with its retail customers[1], is developing a forward-looking study of the resilience of the regional water system (Resiliency Study). The Resiliency Study seeks to identify the key factors impacting regional water supply resiliency, evaluate the current levels of resiliency, develop a decision support framework model and process, and identify promising opportunities for Sonoma Water and its retail customers to improve regional resilience in the future.

During the phase of the Resiliency Study focusing on building the Decision Support Model (DSM) and outlining risk scenarios, the project team decided to pivot the Resiliency Study to temporarily focus on the on-going drought risks in 2021-2022. This technical memorandum provides an overview of the accelerated drought analysis that is being conducted to identify future risks associated with on-going dry watershed conditions and an evaluation of near- and long-term options to improve drought resilience. Substantial improvements and near real-time modeling updates have occurred since November 2021 to track the changing hydrological conditions. Early findings on the severity and probability of drought, and the effectives of various resilience options are provided at this time. It is anticipated that additional findings and recommendations will be provided in the next revision of this memorandum.

[1] Retail customers include City of Santa Rosa, Town of Windsor, Marin Municipal Water District, City of Cotati, City of Sonoma, City of Rohnert Park, Valley of the Moon Water District, City of Petaluma, and North Marin Water District.

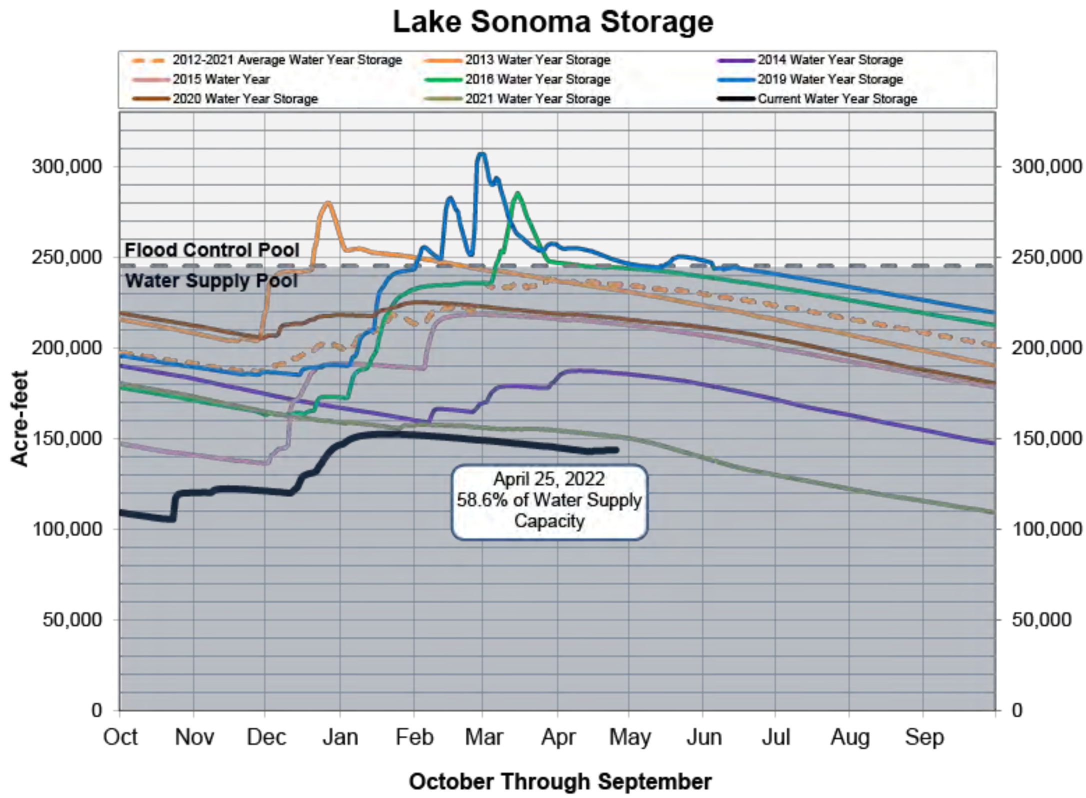
2. Current Drought Conditions

The Sonoma and Marin County region is experiencing it third consecutive dry year of historical significance. The water year (October 1 – September 30) of 2020 ranks as the fifth driest year on record over the last 126 years for this region. The following 2021 water year (WY) was even drier and ranks as the second driest year on record. When considering all two-year periods since 1896, only the 1976-1977 water year period represents a drier condition than the 2020-2021 period. Due to the extreme drought conditions, storage levels in Lake Mendocino, Lake Sonoma, and Marin Municipal Water District reservoirs all reached record lows in October 2021 (Figure 1). While storms in December of 2021 have improved the storage conditions, the remainder of the winter and early spring 2022 precipitation has been substantially below normal. The current outlook for remainder of spring 2022 suggests that precipitation may continue to be below normal.

Reacting to the growing drought conditions, Governor Newsom signed a State of Emergency Proclamation for Sonoma and Mendocino counties in April 2021. In early 2021, Sonoma Water received approval to reduce water releases again from Lake Mendocino through a Temporary Urgency Change Order approved by the State Water Resources Control Board (SWRCB). At the same time, the Sonoma Marin Saving Water Partnership launched an aggressive public outreach campaign to emphasize the need to save water by highlighting actions customers can take to reduce water use and improve water use efficiency. This is in addition to the Partnership's year-round conservation campaign efforts. The Partnership's current regional water use represents a 37 percent reduction in water use, well ahead of the State's required 20 percent reduction in per capita per day water use by 2020. And in June 2021 the SWRCB issued an order that limited Sonoma Water cumulative diversions from July 1 through the end of the order (December 10) to 20 percent below 2020 diversions over the same period. Sonoma Water customers have enacted the appropriate stage of their respective Water Shortage Contingency Plans. Actions taken by Sonoma Water customers have reduced Russian River diversions by 22.7% during this period, thus exceeding the 20% reduction mandate.

The water year total precipitation and average annual temperature in Sonoma County for 1896-2021 are shown in Figure 2 and Figure 3, respectively. Interannual precipitation in the region is highly variable. The wettest year on record occurred in 1983, while the driest year on record occurred in 1977. The most severe droughts generally persisted for two years (e.g.,1976-1977 and 2014-2015), while some less severe droughts persisted for longer than 5 years (e.g., 1986-1992 and 1928-1934). Similar to statewide trends, the region has experienced a considerable warming trend since at least the 1970s, and the most recent 10 years represent the warmest in the record. Figure 4 shows the relative anomaly (difference from long-term mean) in annual average temperature and total precipitation for each year from 1886 through 2021. The wettest years are indicated with blue dots, while the most significant acute periods are indicated in red. The 1976-1977 drought period is the most severe in the record, followed by 2020-2021 and 2014-2015 periods. Of significance, is the finding that the most recent droughts have not only been the result of reduced precipitation but also of a warmer atmosphere. These exceptional warm and dry periods represent the most significant climatic challenge to water management. These periods are exemplified by a lower occurrence of spring storms, prolonged summer and multi-year dry conditions, increased wildfire risks, declining groundwater levels and groundwater contributions to streamflow, greater challenges in sensitive species management, and changes in watershed vegetation.

Figure 1. Lake Sonoma and Lake Mendocino Storage through April 25, 2022.



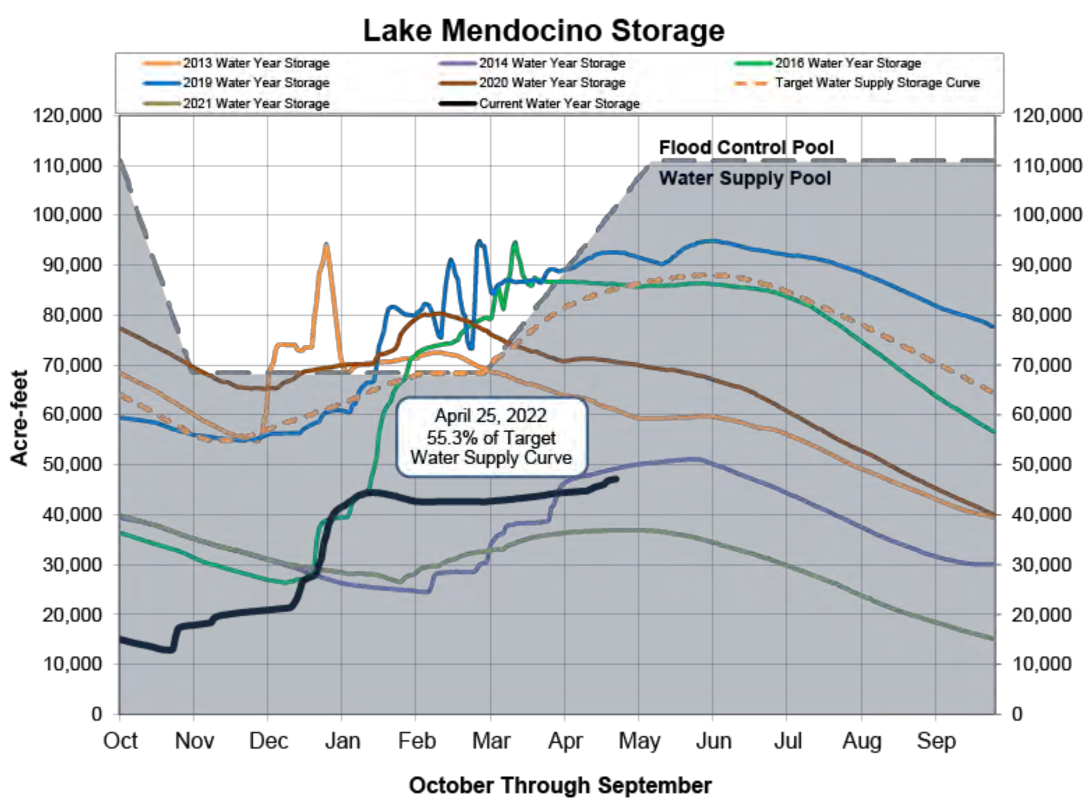
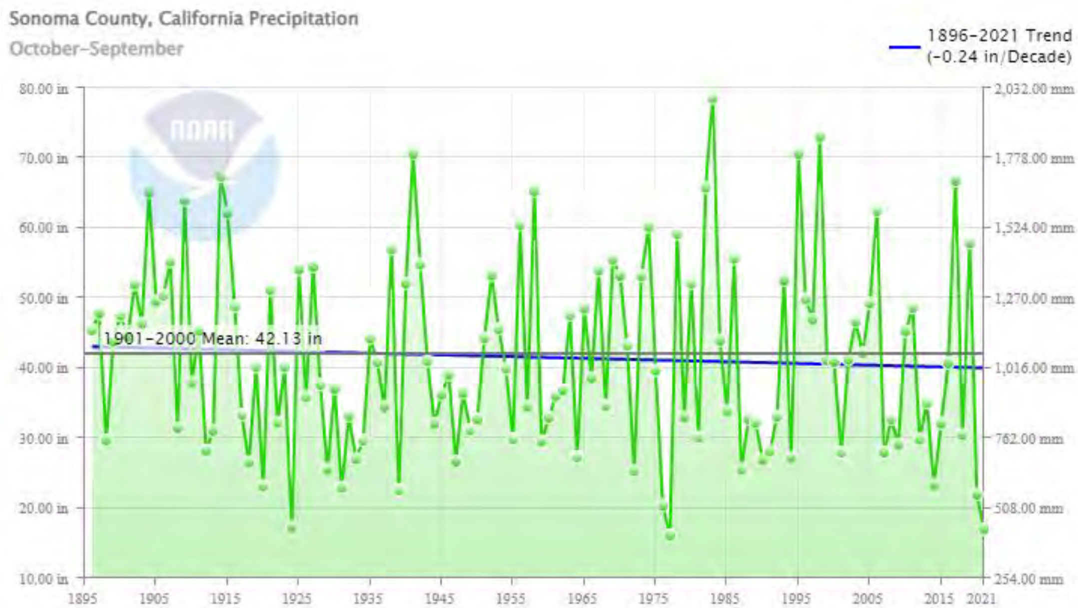


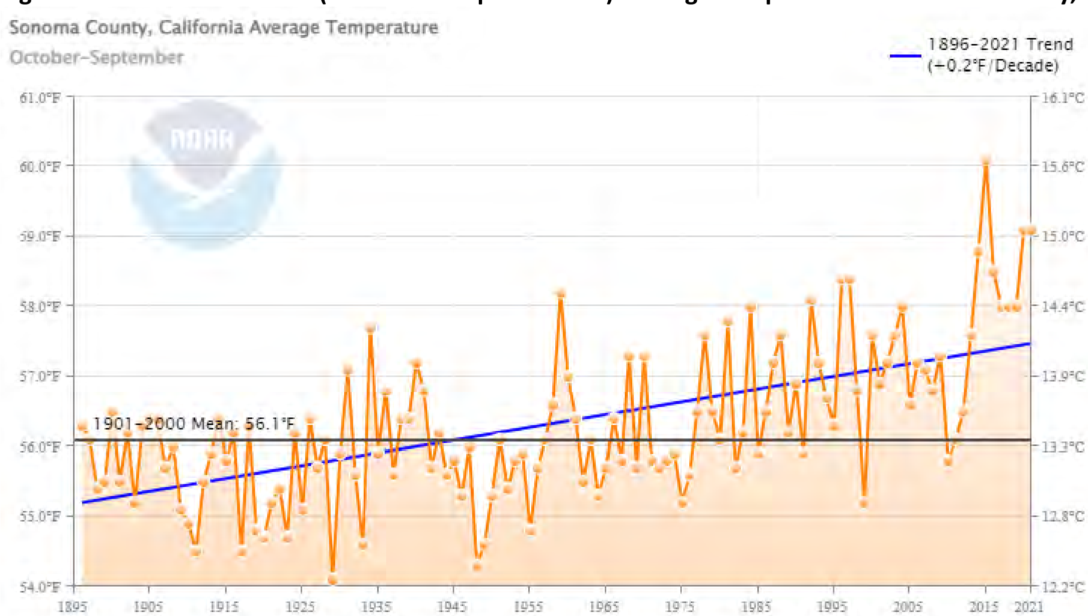
Figure 2. Annual Water Year (October 1- September 30) Precipitation in Sonoma County, 1896-2021.



Source: NOAA National Centers for Environmental information, Climate at a Glance: County Time Series, published January 2022, retrieved on February 4, 2022 from https://www.ncdc.noaa.gov/cag/

Note: Grey line represents 1901-2000 mean; blue line represents trend over 1896-2021. Data represent county average based on station observations and gridded approach conducted by NOAA.

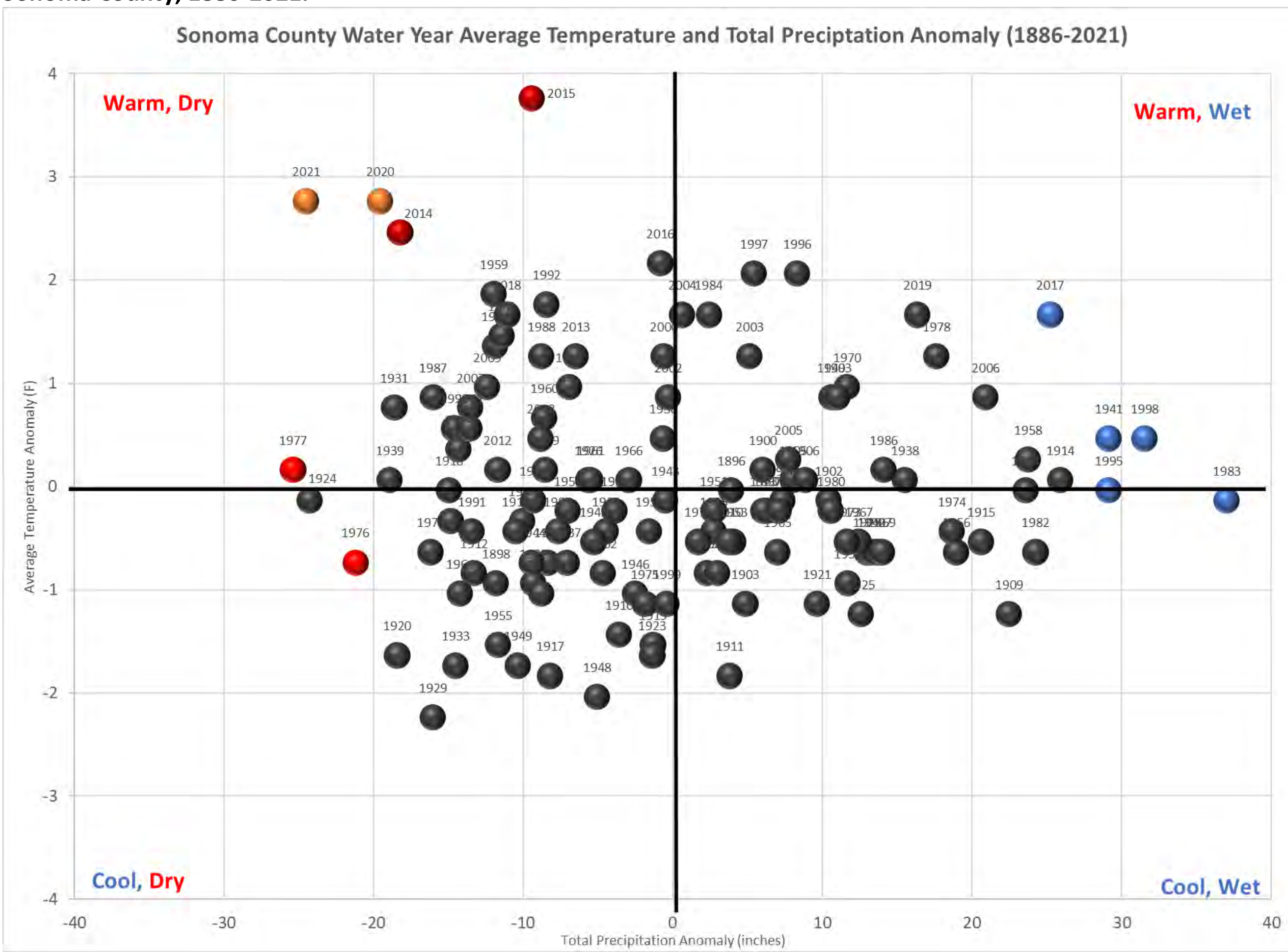
Figure 3. Annual Water Year (October 1- September 30) Average Temperature in Sonoma County, 1896-2021.



Source: NOAA National Centers for Environmental information, Climate at a Glance: County Time Series, published January 2022, retrieved on February 4, 2022 from https://www.ncdc.noaa.gov/cag/

Note: Grey line represents 1901-2000 mean; blue line represents trend over 1896-2021. Data represent county average based on station observations and gridded approach conducted by NOAA.

Figure 4. Annual Water Year (October 1- September 30) Average Temperature and Total Precipitation Anomaly in Sonoma County, 1886-2021.



Note: Yellow and red dots highlight specific extended dry periods (e.g. 1976-1977, 2014-2015, 2020-2021); blue dots highlight particularly anomalous wet years.

3. Decision Support Model

The Sonoma Water Decision Support Model (DSM) serves as a model for evaluating future supply reliability and resiliency of Sonoma Water's and its retail customer's regional water supply system. The DSM integrates the water balance and operations of the Russian River system, Sonoma Water transmission system, and retail customer systems to assess water supply reliability of the regional supply system to its customers. A simplified schematic of the DSM representation of the system is shown in Figure 5.

The Upper Russian River system in DSM includes logic based on Sonoma Water's existing HEC-ResSim and Matlab models. This includes storage and release operations for Pillsbury, Van Arsdale, Mendocino and Sonoma reservoirs. Rules for releases from these reservoirs include releases for various Russian River demands, minimum instream flow requirements, flood, and emergency releases. The Potter Valley Project (PVP) operations included in the model links the Eel River to the Russian River with a minimum instream flow requirement in the East Fork Russian River and deliveries to the Potter Valley Irrigation District (PVID). Discretionary flows are not included in the simulations discussed in this report due to these operations currently not being implemented. Additional Russian River water balance logic include reach depletions for Calpella, Redwood Valley, Hopland, Cloverdale, Healdsburg, Healdsburg Dry Creek Wells, Dry Creek, Healdsburg Fitch Mountain Wells, Town of Windsor, Hacienda, and Russian River County Water District. Each of these demands are input to the model as a daily time series.

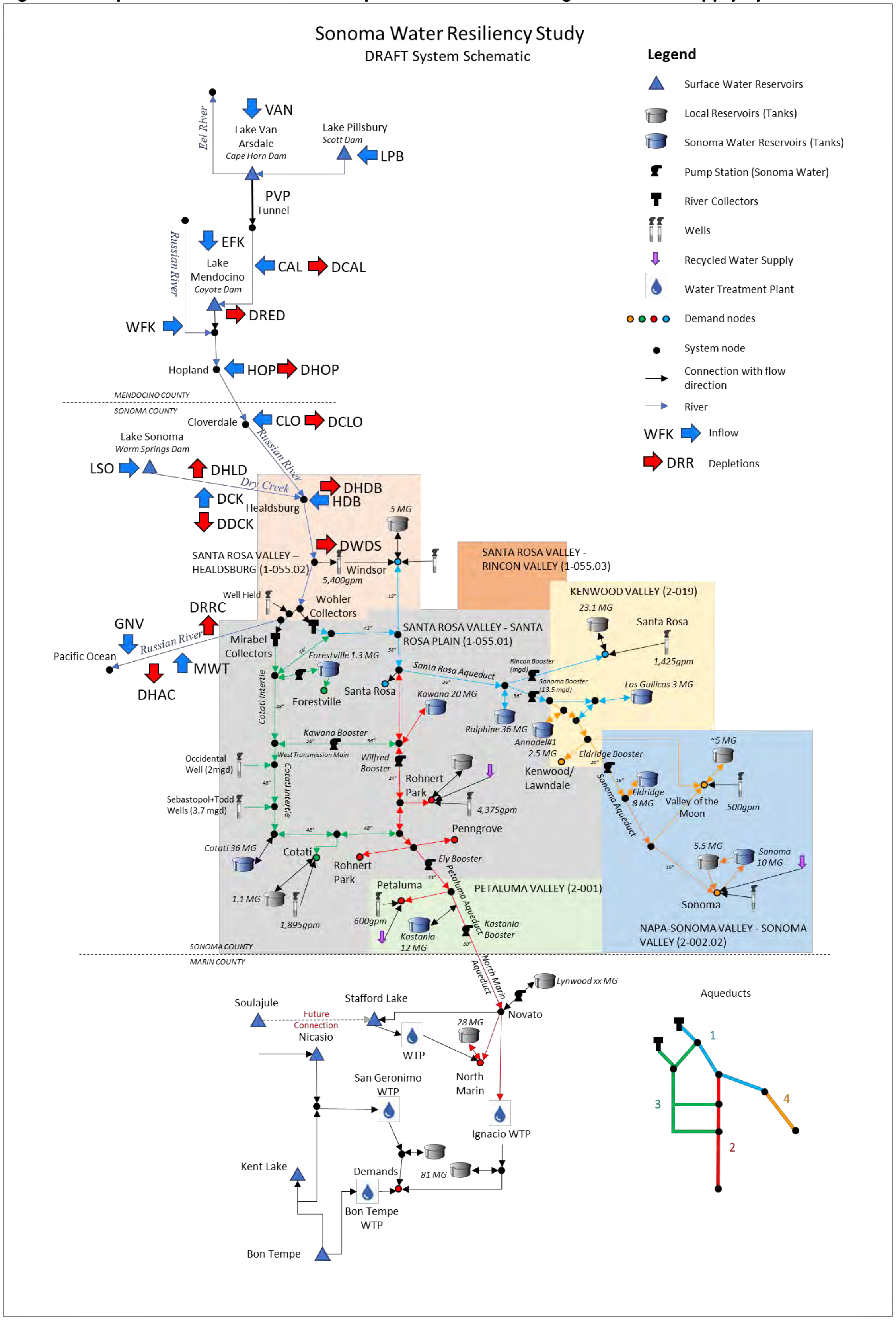
The Sonoma Water transmission system includes operations associated with the Mirabel and Wohler Russian River diversion facilities, Santa Rosa Plain groundwater wells, and transmission system which includes pipelines, pump stations, storage tanks, and aqueduct turnouts to Sonoma Water's retail customers. Facility capacities and operations were derived from Sonoma Water facility guides, review of existing models, and through meetings with Sonoma Water staff.

Finally, simplified representations of each retail customer system and operations were developed. Jacobs met with each retail customer engineering and operation staff, reviewed existing water system plans, and developed the level of detail necessary for the resiliency assessment. For each retail customer, model elements are included for each water source (aqueduct, local groundwater, recycled water, and local surface water) available in the service area. For most retail customers, the Sonoma Water deliveries through the aqueduct is the primary water source. However, for other customers, local surface supplies or groundwater make up a significant portion of the supplies to meet customer demands. For North Marin Water District (NMWD) and Marin Municipal Water District (MMWD), elements are included to simulate the operations of Lake Stafford (NMWD) and Soulajule, Nicasio, Kent and Phoenix (MMWD) reservoirs. For each retail customer, demands consistent with the projections included in the 2020 Urban Water Management Plan (UWMP) are set as total retail customer demand. Priorities and maximum delivery of each water source are then set in the model to indicate the water operation preferences for each retail customer. In general, during dry years recycled water and local groundwater are delivered at priority to satisfy the demand, followed by local surface water and aqueduct supplies.

The DSM simulates operations on a daily timestep for the desired period set in the model control. A historical validation simulation was conducted for the period of 2009-2017. For the validation simulation, model demands were set equal to actual historical deliveries. The model was then simulated with historical recycled water and groundwater supplies, historical surface hydrology, and historical reservoir and project operations criteria. Model simulated storage levels at Lake Mendocino, Lake Sonoma, and Marin reservoirs, simulated Russian River diversion at Mirabel and Wohler facilities, and delivery of water by source for each retail customer were compared to historical reported values and to HEC-ResSim simulated storage levels. Review of the initial simulations led to subsequent improved representations of the PVP, instream flows, and transmission system capacities and storage operations. Final validation simulations compare very well to storage levels, river diversions, and delivery to member agencies.

A more complete discussion of the DSM development, validation, and simulations will be included in the full Resiliency Study report.

Figure 5. Simplified Schematic of DSM Representation of the Regional Water Supply Systems



4. Future Drought Scenarios

As part of the Resiliency Study, the risks to the regional water supply system associated with future droughts is to be addressed along with opportunities improve the system resiliency in response to these conditions. In October/November of 2021, the project team was asked to accelerate the development of the DSM in order to address the immediate drought risk that was growing throughout the summer and fall. The ability to investigate the risks to the regional water supply system under a range of potential hydrological conditions for 2022 and beyond was desired. Longer-term drought risks and opportunities to improve resilience to droughts beyond the near-term will be covered in the final Resiliency Study.

To address the near-term need, the team began preparing the DSM for monthly, near real-time projections of future conditions using the actual storage conditions and future plausible hydrological conditions for the five-year period represented by water years 2022-2026. The historical hydrology for the period of record 1910-2017 was compiled and incorporated into the DSM. Storage conditions for Lake Pillsbury, Lake Mendocino, Lake Sonoma, and MMWD reservoirs were updated with actual November 1, 2021 storage levels, and subsequently updated for December 1, 2021 and January 1, 2022 levels. For the purpose of this memorandum, the modeling results primarily focus on the simulations with January 1, 2022 initial conditions.

The DSM was simulated using 108 traces of hydrology sampled from the historical hydrological period of 1910-2017. For example, one trace includes hydrology derived from the 5-year hydrological period of 1928-1932, another derived from the historical period of 1976-1980, and another from 2012-2016. Stochastic simulations using a technique called the index sequential method allow sampling of all 108 traces while maintaining the hydrological sequences of the past. In doing so, the probability of low storage and delivery shortage conditions can be derived from the ensemble of simulations.

The historical hydrology was reviewed and compared to the hydrological sequences found using climate change projections. Based on early simulations, it was found that the hydrology of the water year 1976-1977 period represents the most severe two-year extended drought scenario. Droughts of duration longer than two years have been identified in both the historical record and future projections, but the severity of the 1976-1977 period make it particularly challenging to water management. Thus, a stress test hydrology scenario was derived that includes the effects of the current 2020-2021 drought and then assumes that 2022-2026 is represented by the dry hydrological sequence of 1976-1980. This stress test hydrology is then used for evaluating the resilience of the regional water supply system and effectiveness of various drought management options.

5. Baseline Simulations and Results

Baseline model simulations represent the future in which "no action" is taken to mitigate drought impacts. The baseline is useful to describe the scale of the drought problem and better understand the timing of risks. This simulation is also the reference for the subsequent evaluation of water management option effectiveness (e.g. how much each option reduce the drought water shortage?).

The initial conditions, hydrology, and local water supply and demand assumptions are described below. The results of both the stochastic simulations and the stress test hydrology simulations are subsequently presented.

5.1 Initial Conditions

Since the storage conditions were evolving rapidly during the course of this analysis, the DSM was updated with new initial conditions for Lake Pillsbury, Lake Mendocino, Lake Sonoma, and MMWD reservoirs each month starting with November 1, 2021 storage levels. These were subsequently updated for December 1, 2021 and January 1, 2022 levels. Table 1 shows the actual storage in Lake Mendocino, Lake Sonoma, and MMWD reservoirs for these three dates. The storms of December significantly increased the storage conditions in all reservoirs. For the purpose of this memorandum, the modeling results primarily focus on the simulations with January 1, 2022 initial conditions.

Table 1. Storage Conditions for Lake Mendocino, Lake Sonoma, and MMWD Reservoirs

Date	Lake Mendocino	Lake Sonoma	MMWD Storage
Nov 1, 2021	17,895 AF	120,152 AF	41,077 AF
Dec 1, 2021	20,882 AF	121,069 AF	45,841 AF
Jan 1, 2022	41,430 AF	146,680 AF	73,176 AF

5.2 Hydrology

Based on early simulations, it was found that the hydrology of the water year 1976-1977 period represents the most severe two-year extended drought scenario. Thus, a stress test hydrology scenario was derived that includes the effects of the current 2020-2021 drought and then assumes that 2022-2026 is represented by the dry hydrological sequence of 1976-1980. This stress test hydrology is then used for evaluating the resilience of the regional water supply system and effectiveness of various drought management options.

5.3 Water Supply and Demand Assumptions

The primary assumptions for water supply and demands for the future period were derived from published data sources in the UWMPs. However, during retail customer meetings and correspondence some of the groundwater well production numbers were revised based on updated information and that the wells are, in some cases operated seasonally or for only partial days. Table 2 presents the local supplies available to each retail customer. Surface water supplies available to North Marin WD and Marin Municipal WD are simulated dynamically in the DSM and vary depending on hydrology and local reservoir storage condition.

Table 2. Existing Local Supplies Available to Sonoma Water's Retail Customers

Retail Customer	Groundwater Well Production (AFY)	Recycled Water (AFY)	Surface Water (AFY)
Town of Windsor	50	396	0
City of Santa Rosa	1157	140	0
Valley of the Moon WD	604	0	0
City of Sonoma	235	0	0
City of Cotati	448	0	0
City of Rohnert Park	2577	1,004	0
City of Petaluma	785	393	0
North Marin WD	0	658	Varies (dynamic)
Marin Municipal WD	0	750	Varies (dynamic)

Table 3 presents the water demands for each retail customer. The demand estimates for 2025 are derived from the 2020 UWMPs for each customer. No demand reductions are assumed in the baseline simulation.

Table 3. Retail Customer Existing and Future Water Demands (AFY, 2020 UWMPs)

Retail Customer	2020	2025
Town of Windsor	4,288	4,910
City of Santa Rosa	19,387	21,660
Valley of the Moon WD	2,236	2,897
City of Sonoma	2,168	2,331
City of Cotati	950	1,021
City of Rohnert Park	6,755	6,829
City of Petaluma	8,007	8,705
North Marin WD	8,206	10,084
Marin Municipal WD	27,450	26,726

Notes:

(1) 2020 Values obtained from actual demands reported on chapter 4 of the 2020 UWMPs

(2) 2025 Values based on projections reported in chapter 7 of the 2020 UWMPs

(3) Excludes demand for environmental stream releases from MMWD reservoirs

5.4 Reservoir Storage Results

Under the stochastic mode of simulation, 108 different outcomes are generated based on sampling of the historical hydrology. From this ensemble of outcomes, probabilities can be derived to estimate the approximate likelihood of a certain storage condition occurring. Figures 6, 7, and 8 show the resulting storage probabilities for Lake Mendocino, Lake Sonoma, and MMWD reservoirs, respectively.

For the purposes of this report, we define critical storage levels as those which will indicate a water delivery shortage to downstream water uses (Lake Mendocino storage below 20,000 AF, Lake Sonoma storage below 25,000 AF, and MMWD combined reservoir storage below 10,000 AF). The modeling results suggest that the probability of reaching these critical storage levels is relatively low in all reservoirs but remains a possibility in the coming year(s). Results indicate a one percent probability of low point storage in 2023, and five percent probability in 2024, 2025, 2026 in Lake Mendocino; a one percent probability of low storage in 2023 for Lake Sonoma; and up to five percent probability of low storage in 2025 and 2026 for MMWD reservoirs. It should be noted that the near-term critical conditions simulated in the DSM are associated with the 1976-1980 hydrologic sequence (primarily 1976 and 1977). We use this 5-year hydrological period as a stress test and present the results of this sequence in Figures 9, 10, and 11.

Figure 6. Projected Lake Mendocino Storage Probabilities Based on Stochastic Simulations

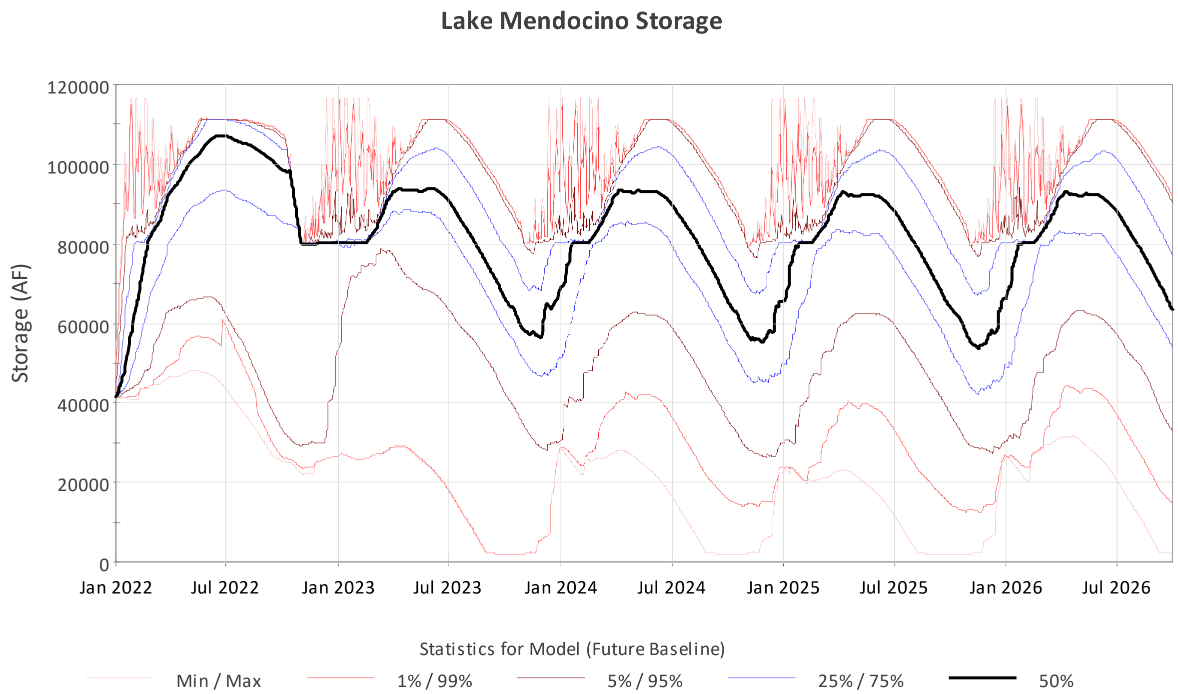


Figure 7. Projected Lake Sonoma Storage Probabilities Based on Stochastic Simulations

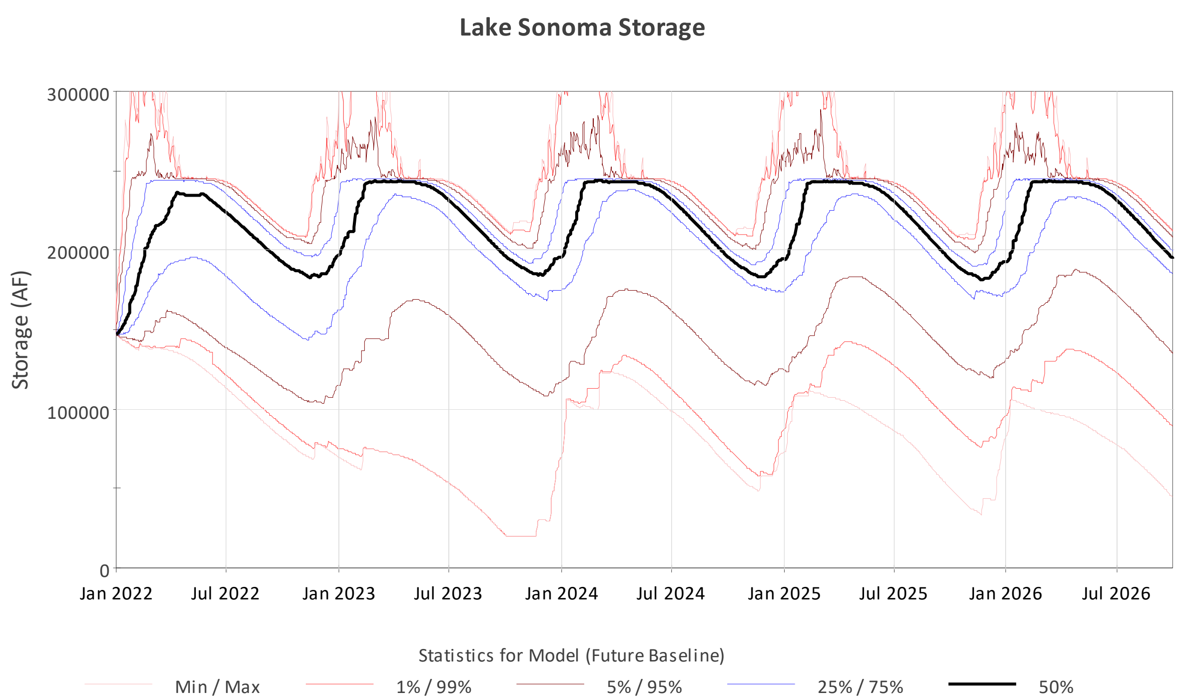


Figure 8. Projected MMWD Reservoir Storage Probabilities Based on Stochastic Simulations

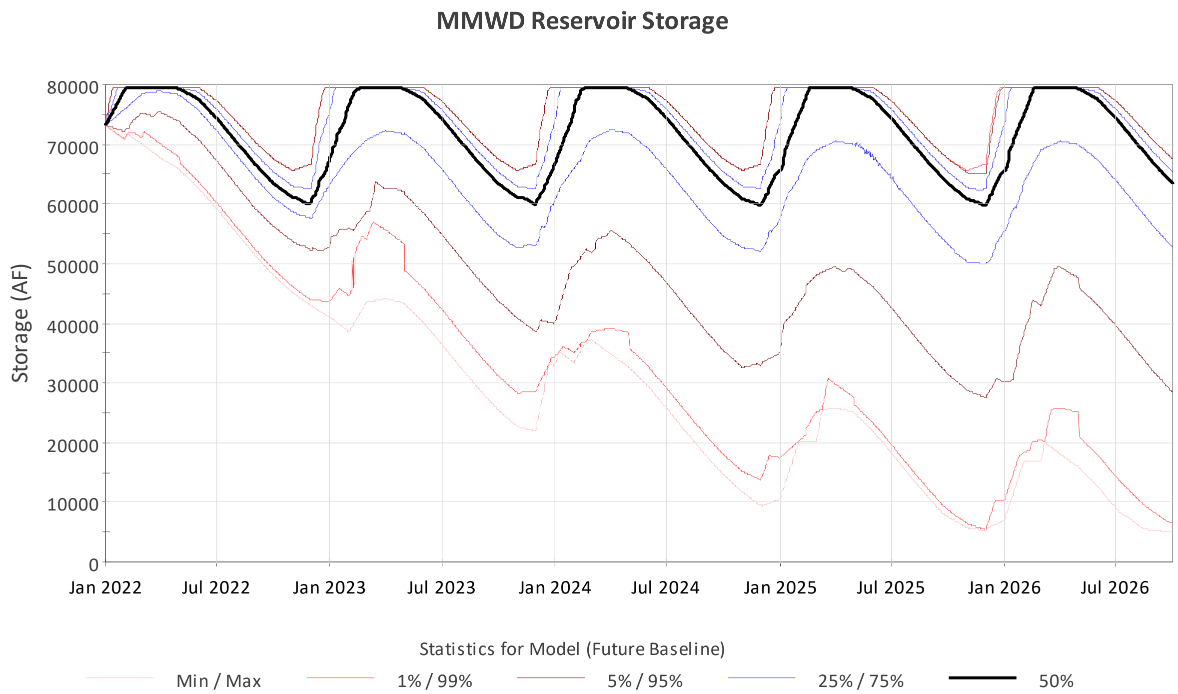


Figure 9. Projected Lake Mendocino Storage using Stress Test Hydrology

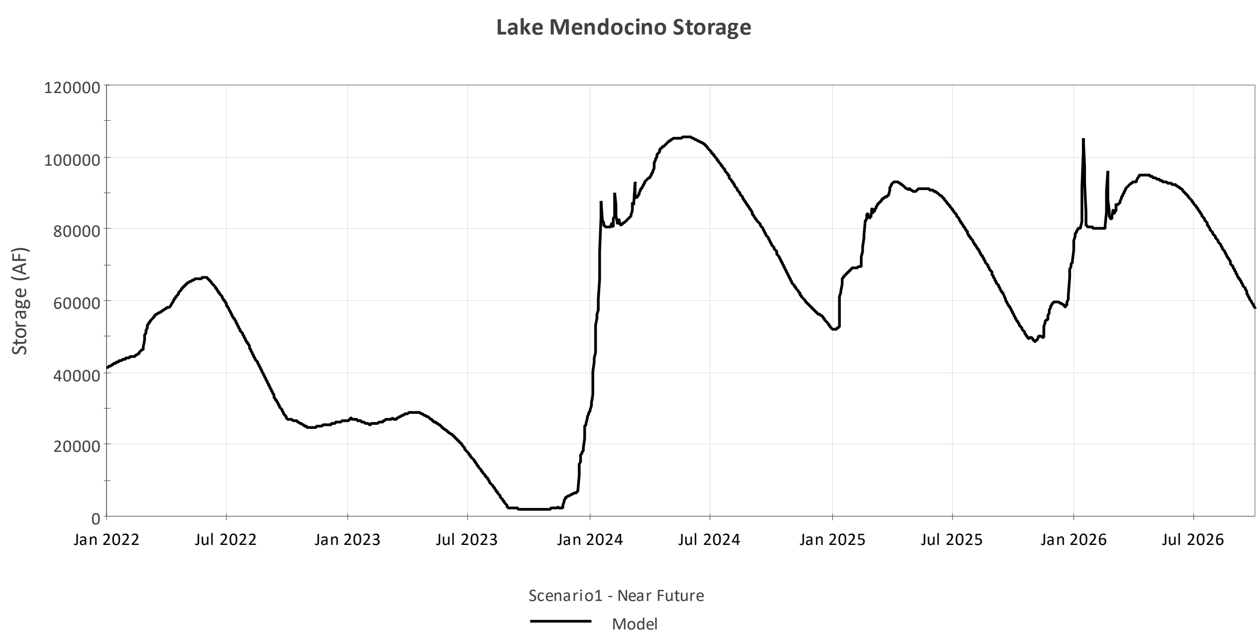


Figure 10. Projected Lake Sonoma Storage using Stress Test Hydrology

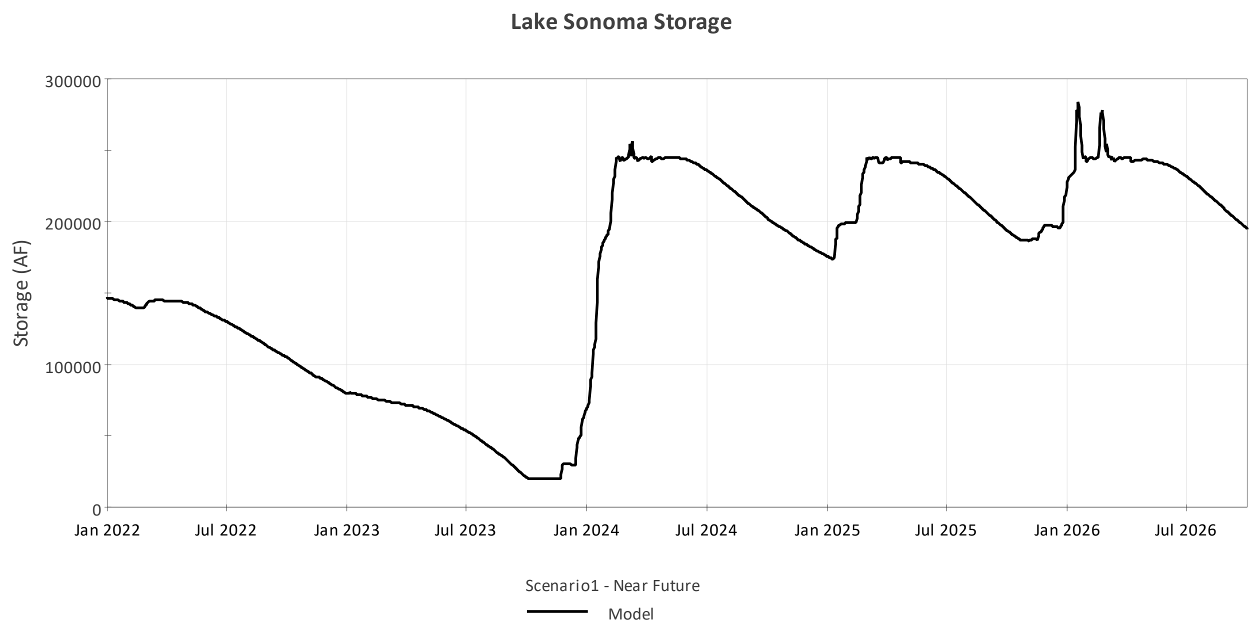
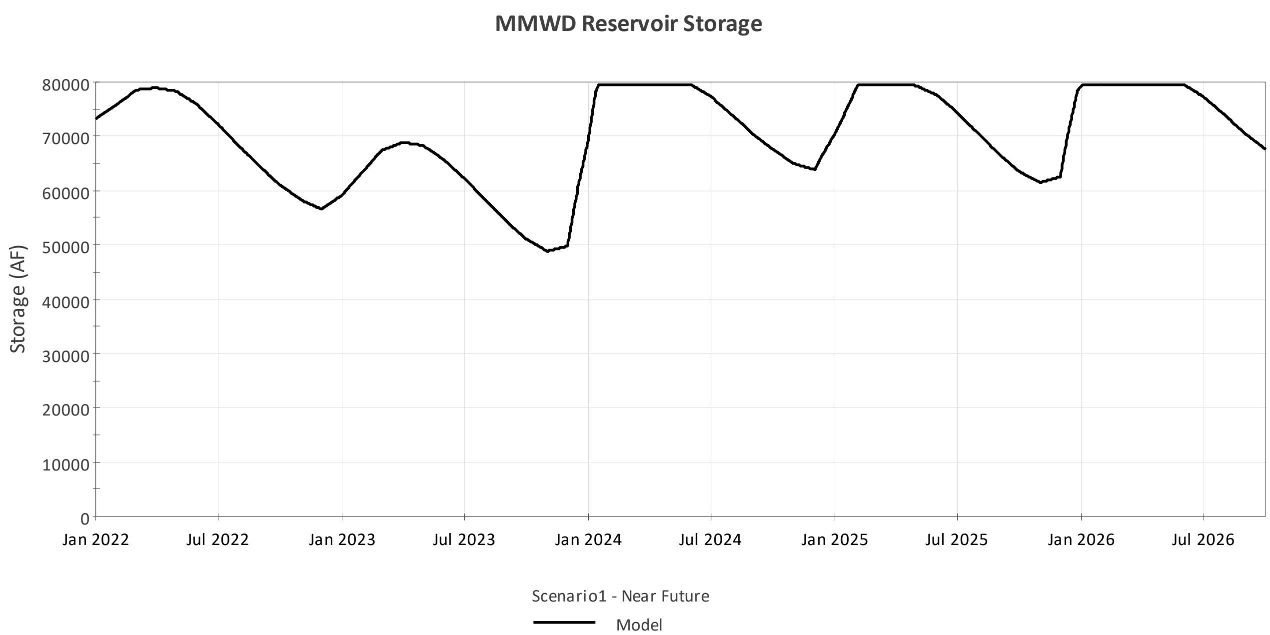


Figure 11. Projected MMWD Reservoir Storage using Stress Test Hydrology



5.5 Shortage Results

The current modeling results suggest the probability of retail customer delivery shortage is also very low. Results indicate a one percent probability of shortage in 2023 and 2024 under the baseline assumptions. The results for magnitude of shortage under the stress test hydrology for November, December, and January initial conditions are shown in Table 4. The December 2021 storms greatly reduced the magnitude of potential shortage from the conditions that were projected in November and early December. The most recent update of storage conditions indicates that shortages will likely not exceed 7,000 AF. This magnitude of potential shortage represents approximately 7 percent Sonoma Water delivery over the two years in which shortages occur.

Table 4. Projected Delivery Shortage to Retail Customers under Stress Test Hydrology

Initial Storage Conditions	NO ACTION Projected 5-Year Shortage Total	Shortage as % of Sonoma Water Delivery*	Shortage as % of Total Water Demand*
Nov 1, 2021	25,600 AF	25%	13%
Dec 1, 2021	23,200 AF	23%	12%
Jan 1, 2022	6,900 AF	7%	4%

6. Potential Drought Management Options

As part of this accelerated drought resiliency planning effort, Jacobs met with most retail customers to develop ideas on the range of drought management options that should be considered in the near- and long-term. These potential drought management options were organized into 4 major categories that include (1) options that increase water supply, (2) options that reduced water demand, (3) options that improve operations, and (4) options that modify policy and regulations. Examples of potential drought management options in each of the categories are listed below:

1. **Increase Supply**
   - Increase groundwater production (new or rehabilitated wells)
   - Winter water diversion (from Russian River)
   - Regional groundwater bank
   - Alexander Valley Flood-Managed Aquifer Recharge (FloodMAR)
   - Sonoma Developmental Center water supply
   - Expand recycled water supply
   - Ocean desalination and/or brackish water desalination
   - Water transfers and interconnection with other Bay Area supplies
2. **Reduce Demand**
   - Water conservation and water use efficiency in municipal, CII, and agricultural sectors
3. **Improve Operations**
   - Kastania Pump Station improvements
   - Expand surface storage of existing reservoirs
   - Lake Sonoma Forecast Informed Reservoir Operations (FIRO)
   - Increase recycled water storage
   - Improve and integrate regional storage operations
   - Lake Mendocino variable gates and outlet channel improvements
4. **Modify Policy and Regulations**
   - Regulatory flexibility through Temporary Urgency Change Permits (TUCPs)
   - Change in Russian River hydrologic index for instream flow setting

Table 5 lists each drought management option and a brief description for those that were carried forward and analyzed in the drought resilience assessment. The table also indicates whether the option should be considered “near-term” or “long-term” to reflect the speed at which the project could be active and begin delivery of drought resilience benefits. In general, “near-term” options are expected to begin delivering benefits by 2024, and “long-term” options could begin delivering benefits beyond 2024.

Table 5. Potential Drought Management Options Considered in the Analysis

Drought Management Option	Option Description	Near-Term/ Long-Term
Baseline	Future Baseline without drought management options	
Increase Groundwater Production (Sonoma Water)	Increase/rehabilitate groundwater production wells in the Santa Rosa Plain including Todd Road Well (1.4 mgd) by December 2021, Sebastopol Road Well (2.1 mgd) by May 2022, and Occidental Road Well (2.0 mgd) by August 2022.	Near-term
Increase Groundwater Production (Retail Customers)	Additional new or rehabilitated well production to be considered for Windsor (0.32 by 2024, 0.97 mgd, six months operation by 2026), Valley of the Moon (0.5 mgd), City of Sonoma (0.12 mgd by 2024), City of Cotati (1.25 mgd), City of Petaluma (0.78 mgd by 2022).	Near-term
Winter Water Diversion (with Kastania PS Improvements)	Excess winter water would be diverted from Russian River collectors and delivered directly to retail customers. Retail customers would prioritize receiving Sonoma Water supplies during this winter period and preserve (or augment) local supplies (particularly for MMWD and NMWD) in storage for use in subsequent dry season(s). This option utilizes existing infrastructure and within current diversion rights. Work toward developing an annual risk management and operations plan for this operation.	Near-term
Regional Groundwater Bank	This project concept would create and manage groundwater banks in three areas: Santa Rosa Plain, Sonoma Valley, and Petaluma Valley. Excess winter water would be recharged into available storage in these groundwater basins, stored, and subsequently extracted for dry year use. Winter water extraction would be limited to Sonoma Water Russian River rights and diversion infrastructure. New ASR wells would be constructed for both recharge and extraction. In-lieu recharge with recycled water supply delivery could also be considered. Assume that up to 1,500 to 5,000 acre-feet of storage could be made available in Santa Rosa Plain, Sonoma Valley, and Petaluma Valley groundwater basins. Extraction water would be used for either direct delivery in the overlying service areas (in-lieu) or pumped into the Sonoma Water transmission system for regional delivery.	Long-Term

Drought Management Option	Option Description	Near-Term/ Long-Term
Alexander Valley FloodMAR	This project proposes to capture Russian River peak flows for subsequent diversion onto Alexander Valley agriculture land for aquifer recharge. Wells on the Jackson Family Wines (JFW) property will pump Russian River underflows during flood periods into a new pipeline that will convey water to properties throughout Alexander Valley. Existing on-farm irrigation and frost protection infrastructure will be used to apply water to the land. Ultimately, the water will infiltrate to groundwater. This project could reduce summer and fall Russian River depletions and allow for either increased storage or retain more water in the channel for downstream water supply uses. Sonoma Water recently received $400k from the County of Sonoma to evaluate flood-MAR viability in Alexander Valley and potentially develop a pilot scale system. Assume water delivery can be applied to 2,000 acres with maximum application/recharge rate of 0.5 feet per day.	Long-Term
Sonoma Developmental Center Water Supply	SDC's main potable water system is served by a conventional surface water treatment plant with a design capacity of 1.8 mgd. Treated water has consistently produced high quality exceeding permit requirements. Current production for SDC use is less than 0.56 mgd. This project concept would increase the production to original design capacity and use the additional supply for either recharge in Sonoma Valley groundwater basin or for direct use in Valley of the Moon or City of Sonoma service areas. Use of existing 2.05 million gallon water storage tanks would allow for temporary regulatory storage.	Long-Term
Expand Recycled Water Supply	Increase delivery and use of recycled water for non-potable purposes. Assume implementation of North Bay Water Reuse Program Phase 2 Projects which increase contractors' recycled water availability as: NMWD (Novato Sanitary District, 326 AFY), MMWD (153 AFY), Petaluma (223 AFY). Excludes increases in delivery to wetlands, agriculture, or for uses not in service area. Assume 10% increase in UWMP recycled water delivery estimates for all other contractors.	Long-Term
Ocean Desalination (low)	Emergency desalination of 3.6 mgd ocean desalination production (available package plants) in Marin County. Assume delivery of emergency desalination water would be delivered to MMWD.	Long-Term
Ocean Desalination (high)	Expanded ocean desalination of up to 10 mgd. Assume expanded desalination supply could be delivered to MMWD and NMWD.	Long-Term
Petaluma Brackish Groundwater Desalter	Brackish groundwater desalter in lower Petaluma Valley. Assumed at capacity of 3.6 mgd. Assume delivery of groundwater supply to Petaluma, NMWD, and MMWD.	Long-Term

Drought Management Option	Option Description	Near-Term/ Long-Term
Water Transfers and Interconnection with Bay Area Water Agencies	Drought year water transfers would be negotiated and purchased from Central Valley water agricultural users and conveyed through interconnections with Bay Area water agencies (EBMUD or City of Vallejo). Based on current MMWD reports, assume 8 mgd could reliably be delivered.	Long-Term
Expanded Water Conservation and Water Use Efficiency (10%)	Expand programs for water conservation in municipal and CII sectors. Assume a 10 percent reduction in total water use from 2020 UWMP demands could be achieved in each of these sectors. Reductions limited to ensure that health and safety demands are always satisfied.	Near-term
Expanded Water Conservation and Water Use Efficiency (20%)	Expand programs for water conservation in municipal and CII sectors. Assume a 20 percent reduction in total water use from 2020 UWMP demands could be achieved in each of these sectors. Reductions limited to ensure that health and safety demands are always satisfied.	Near-term
Expanded Water Conservation and Water Use Efficiency (30%)	Expand programs for water conservation in municipal and CII sectors. Assume a 30 percent reduction in total water use from 2020 UWMP demands could be achieved in each of these sectors. Reductions limited to ensure that health and safety demands are always satisfied.	Near-term
Expanded Water Conservation and Water Use Efficiency (high + RR)	Expand programs for water conservation in agricultural, municipal, and CII sectors. Assume a 30 percent reduction in total water use could be achieved in these sectors. This action includes a 30 percent reduction in Russian River on-river depletions in addition to a 30 percent reduction to the in the municipal and CII sectors.	Near-term
Kastania Pump Station Improvements	MMWD proposes to rehabilitate and operate the Kastania Pump Station to address the emergency drought conditions. Minor modifications include refurbishment and operation of one of the existing pump sets, installation of approximately 100 linear feet of 30-inch yard piping and a 6-foot by 8-foot flowmeter vault and resurfacing of existing driveway. The modifications would increase the operable capacity to deliver aqueduct water to MMWD by about 6.5 mgd. Improvements could be completed by the early 2022.	Near-term
Expand Surface Storage	Capacity and rule curve changes to reflect increase in water conservation pool storage due to Lake Stafford Adjustable Weir. Increases in storage capacity at Lake Stafford of 700 AF.	Long-Term
Lake Sonoma Forecast Informed Reservoir Operations (low)	The process for viability assessment at Lake Sonoma is in process. This option is relatively small deviation that includes a 9,500 AF increase in storage in the conservation pool during October 1 through February 28 and 19,000 AF increase during March 1 through September 30.	Near-term/ Long-term
Lake Sonoma Forecast Informed Reservoir Operations (high)	The process for viability assessment at Lake Sonoma is in process. This option involves a larger deviation that includes a 19,000 AF increase in storage in the conservation pool during October 1 through February 28 and 38,000 AF increase during March 1 through September 30.	Near-term/ Long-term

Drought Management Option	**Option Description**	**Near-Term/ Long-Term**
Regulatory Flexibility through TUCPs	Reduce minimum instream flow requirements in the Russian River to approximately 50-70 cfs consistent with actions taken in 2021 due to drought conditions.	Near-term

Several near-term drought resiliency options were either in progress or were believed to be implementable in a relative short time. These options, listed below, were combined into a near-term package and simulated to test the ability of these measures to address the immediate drought risks.

- Maximize delivery of natural flows from Russian River system
- Kastania Pump Station rehabilitation
- Increase groundwater production (Sonoma Water)
- Increase groundwater production (Retail Customers)
- Regulatory flexibility through TUCPs
- Water conservation and water use efficiency (Retail Customers and diverters)

Near-term package simulations were conducted with a variable 10, 20, and 30 percent retail customer conservation as compared to 2020 UWMP demands to test the sensitivity. Figures 12, 13, and 14 show the resulting simulated storage conditions for Lake Mendocino, Lake Sonoma, and MMWD reservoirs.

For all reservoirs, the “near-term” package of options provides sufficient capability to address the critically low storage conditions. For Lake Mendocino, the “regulatory flexibility through TUCPs” and “Russian River depletion reductions” provides the greatest increase in storage. For Lake Sonoma, the “regulatory flexibility through TUCPs”, “increase groundwater production”, and “water conservation” options all support higher storage. For MMWD reservoir storage, the “winter water” and “water conservation” options support significantly increased storage.

The projected shortage that was present in the baseline simulation is also resolved with implementation of the “near-term” package of options. Figure 15 shows the shortage using the stress test hydrology for the baseline (in black), individual options (in blue), and the near-term package (in green). Water conservation, TUCPs, and increasing groundwater production all reduce the projected shortage individually, and, when combined in a package, provide sufficient capability to resolve all projected shortages in the simulations. Water conservation levels offer additional capability to bolster storage should the drought be more severe than that simulated. It is anticipated that reductions in Russian River diversions would likely be necessary to show good faith when requesting for continuing flexibility in TUCPs.

Figure 12. Projected Lake Mendocino Storage with Near-Term Package using Stress Test Hydrology

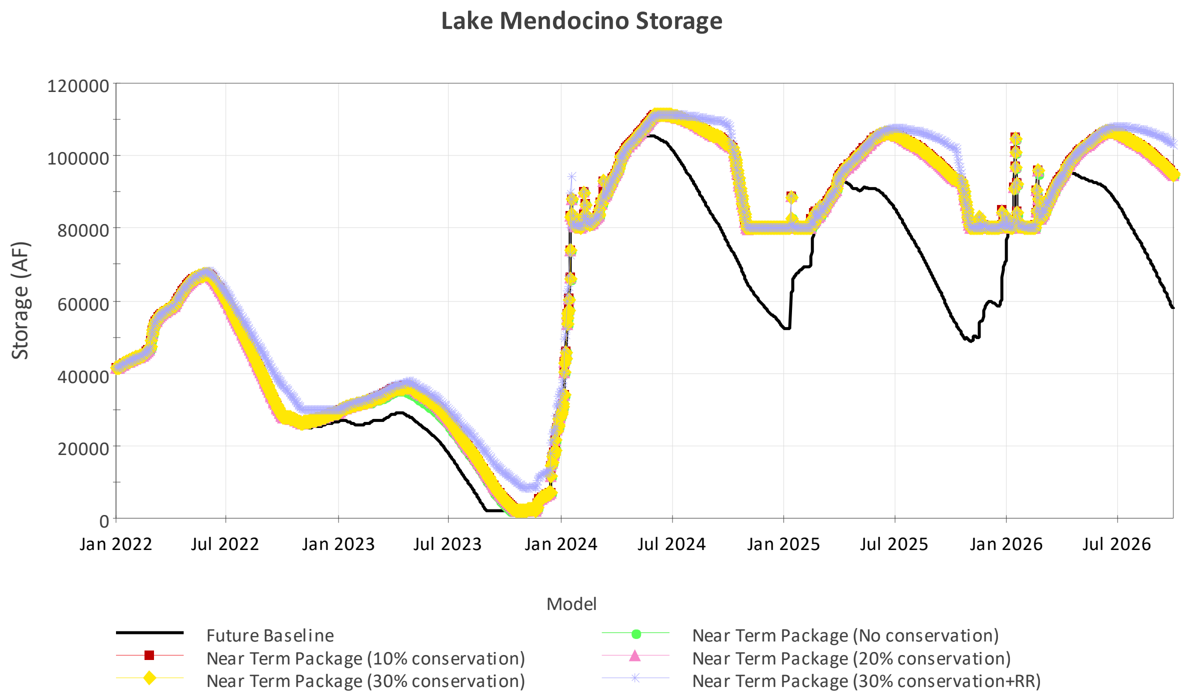


Figure 13. Projected Lake Sonoma Storage with Near-Term Package using Stress Test Hydrology

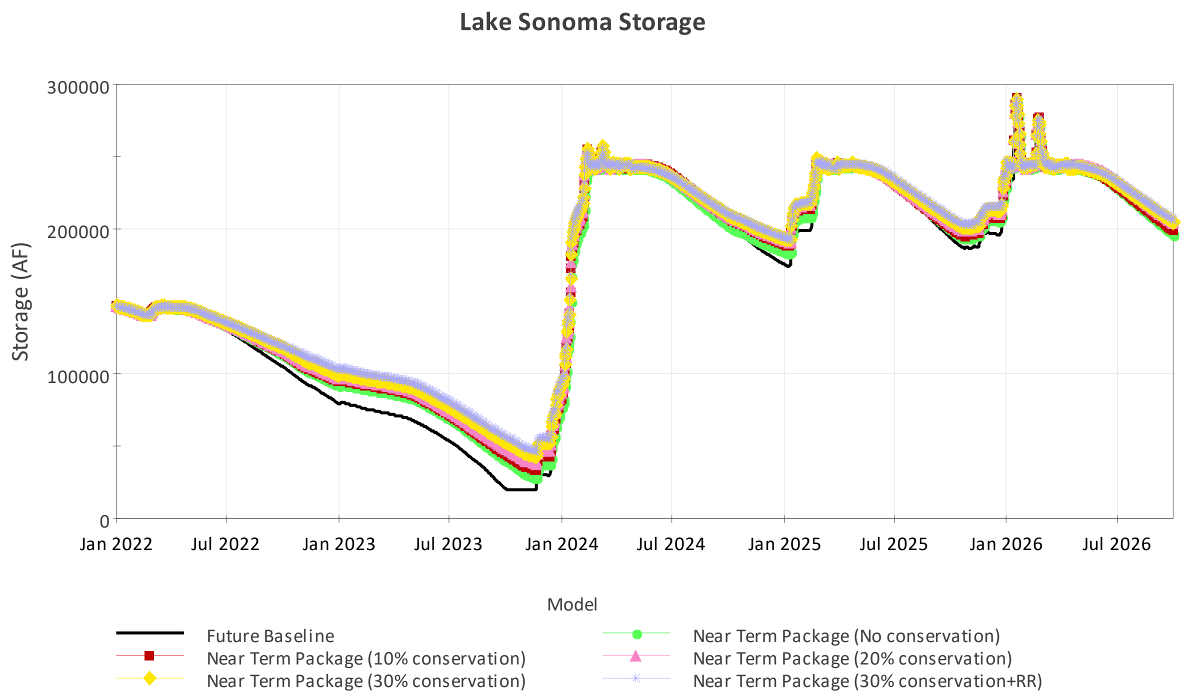


Figure 14. Projected MMWD Reservoir Storage with Near-Term Package using Stress Test Hydrology

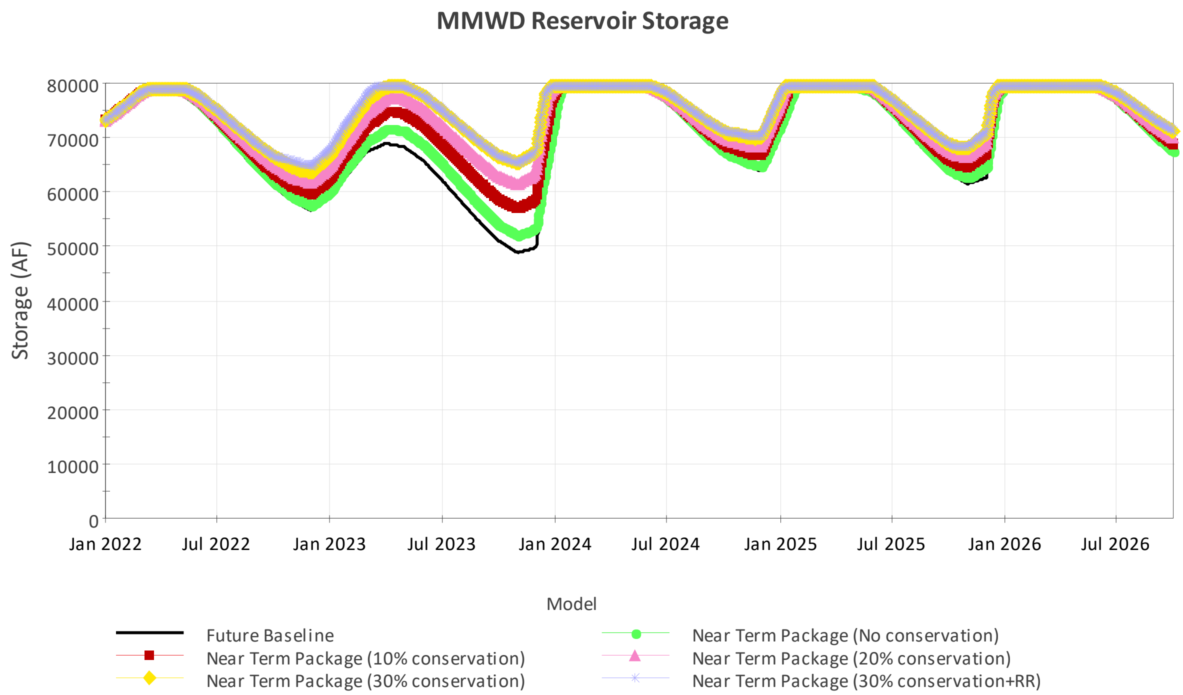
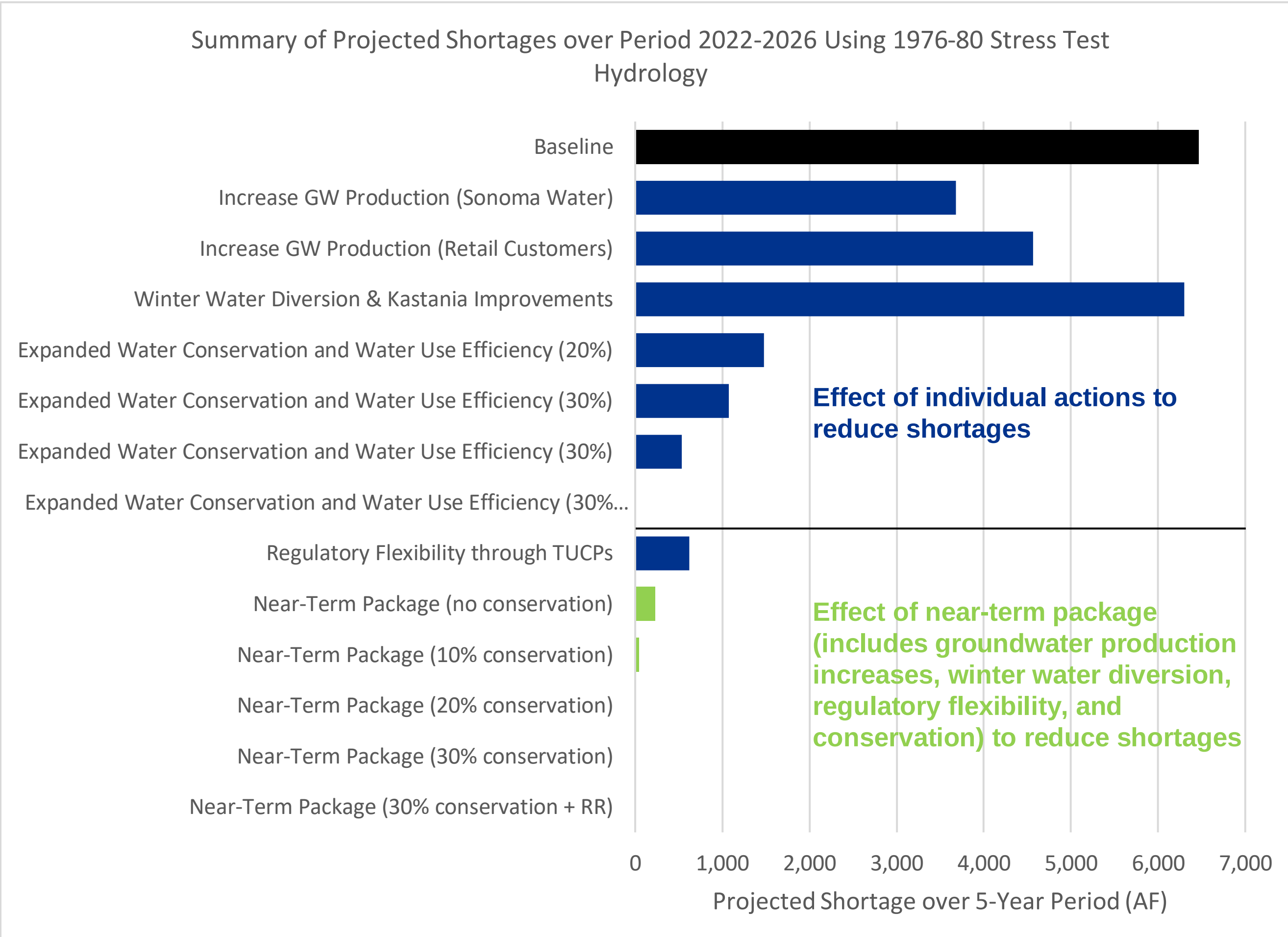


Figure 15. Projected Shortage with Baseline and Near-Term Package Options using Stress Test Hydrology



7. Evaluation of Drought Management Options

After compiling and evaluating the potential drought management options, an evaluation was performed on each in order to provide a characterization with respect to criteria such as cost, feasibility, implementation timing and complexity, permitting, legal, environmental, and jurisdiction. The complete list of evaluation criteria is shown in Table 6. For each criterion, a rating scale of 1 through 5 was used to characterize the concept related to the specific measure. The characterization of drought management options in this fashion is designed to allow Sonoma Water and its retail customers to begin to evaluate promising options for further study or implementation.

Table 7 shows the draft results of the application of the criteria to each drought management option. The anticipated drought benefit for the near-term stress test and future drought are shown in the first columns. Only the options that were included in the near-term package have results for the near-term stress test, while all options have estimated benefits in terms of either shortage reductions or storage improvements for the future drought period. The benefits for most options are larger in the future drought period for two reasons. First, some of the options like the regional groundwater banks and Lake Sonoma FIRO require a preceding wet sequence to build the storage before providing benefit in subsequent drought years. And second, the future drought period benefit includes substantial storage increase benefits that are derived from actions like water conservation that was not accounted for in the near-term drought analysis which only considered contribution to shortage reductions.

Timing for implementation was estimated based on discussions with team members or from available documentation. Costs are estimated as the capital and O&M costs for the particular option divided by the expected supply increase or demand reduction. For options that are anticipated to be regional in nature and provide water through the Sonoma Water transmission system, O&M costs were estimated at $615 per acre-foot per year based on Sonoma Water rate schedules for prime contractors. Other per acre-foot charges included in Sonoma Water standard water rates are not currently included. Drought management options that are considered sub-regional or local in that the supply provided may not enter the Sonoma Water transmission system does not include Sonoma Water O&M rates, but has an estimated separate O&M rate. All costs should be considered draft and will be updated with a range in the next revision.

Table 6. Evaluation Characterize Drought Management Options

		Rating				
Criteria	**Description**	**1**	**2**	**3**	**4**	**5**
Cost	Estimate of capital and annual costs.	Cost per acre-foot of supply or demand reduction. ($/AFY)				
Timing	Estimate of time required before project could be implemented considering planning, design, permitting, and implementation.	Year in which project could be implemented (Year)				
Environmental	Anticipated impacts on the natural environment	Significantly positive impacts are likely to exist, and negative impacts are not readily apparent	Moderately positive impacts are anticipated at some locations while other locations may or may not have negative impacts of a lesser degree	Option does not have an impact or impacts are expected to be neutral	Moderately negative impacts are anticipated at some locations while other locations may or may not have positive impacts of a lesser degree	Significant negative impacts are likely to exist, and positive impacts are not readily apparent.
Feasibility	Maturity of the concept and technical ability to implement.	Regularly implemented in USA at scale proposed	Occasionally implemented somewhere in the world at similar scale	Regularly implemented but at smaller scales	Occasionally implemented somewhere in the world or has not been done, but peer review articles indicate promise	Has not been done and no peer review articles exist or they indicate challenges.
Energy	Estimated change in energy required to implement and operate.	Requires no additional energy, or results in net positive generation	Minor increases in energy use (less than 5%).	Modest increases in energy use (less than 15%).	Large increases in energy use (less than 30%).	Major changes in energy use (greater than 30%)
Permitting/Legal	Anticipated permitting and legal challenges	Does not require an EIR or other major permits	Requires an EIR or other major permits, but similar projects of this scale have been approved in the past 20 years	Requires an EIR or other major permits, but similar projects of smaller scale have been approved in the past 20 years	Requires an EIR and no precedent exists for the option.	Requires an EIR and similar options have been declined during the permit process
Social	Description of positive or negative socioeconomic effects.	Significantly positive impacts are likely to exist, and negative impacts are not readily apparent	Moderately positive impacts are anticipated at some locations while other locations may or may not have negative impacts of a lesser degree	Option does not have an impact or impacts are expected to be neutral	Moderately negative impacts are anticipated at some locations while other locations may or may not have positive impacts of a lesser degree	Significant negative impacts are likely to exist, and positive impacts are not readily apparent.

Jurisdiction	Primary jurisdiction for implementation	Primarily involves Sonoma Water facilities and control	Requires Sonoma Water and other County department actions	Requires Sonoma Water Contractor actions	Requires utility or state agency/ federal actions	Requires private citizens and landholder actions

Table 7. Potential Drought Management Options Considered in the Analysis

Drought Management Option	Drought Benefit, Near-Term Stress Test (AF)	Drought Benefit, Future Drought (AF)	Cost ($/AFY)	Timing	Environmental	Feasibility	Energy	Permitting/ Legal	Social	Jurisdiction
Increase Groundwater Production (Sonoma Water)	2400	2100	$700	2022	3	1	3	1	3	1
Increase Groundwater Production (Retail Customers)	2100	1300	$500-$3,000	2022	3	1	3	1	3	3
Winter Water Diversion (with Kastania Improvements)	500	6800	$650	2021	3	1	3	1	3	3
Regional Groundwater Bank		8300	$800-$900	2025	3	2	3	3	4	5
Alexander Valley FloodMAR		100	$600-$700	2023	3	3	3	2	3	4
Sonoma Developmental Center Water Supply		100	$800-$1,000	2025	3	3	3	3	3	4
Expand Recycled Water Supply		1200	$2,300-$3,000	2025	2	2	3	3	3	4
Ocean Desalination (low)		8200	$3,200-$3,500	2022	4	3	3	4	3	5
Ocean Desalination (high)		25700	$3,200-$3,500	2025	4	4	4	5	4	5
Petaluma Brackish Groundwater Desalter		8200	$1,500-$2,000	2025	3	3	3	3	3	4
Water Transfers and Interconnection with Bay Area Water Agencies		18100	$2,400	2023	4	4	3	3	4	4
Expanded Water Conservation and Water Use Efficiency (low)	5400	27000	$350	2021	1	1	1	1	2	5
Expanded Water Conservation and Water Use Efficiency (high)	6200	41600	$450	2021	2	2	1	1	4	5
Expanded Water Conservation and Water Use Efficiency (high + RR)	6800	58600	$500	2021	2	2	1	1	4	5

Expand Surface Storage (Lake Stafford weir)		100	$550	2022	3	3	2	2	3	3
Lake Sonoma Forecast Informed Reservoir Operations (low)		9700	$30	2022	3	2	1	2	2	4
Lake Sonoma Forecast Informed Reservoir Operations (high)		26400	$30	2023	3	2	1	3	2	4
Regulatory Flexibility through TUCPs	6300	61600	$30	2021	4	1	1	2	3	4
Notes:			Estimate of capital and annual costs. Projects with * indicate that SW O&M included for regional transmission.	Estimate of time required before project could be implemented.	Anticipated impacts on the natural environment	Maturity of the concept and technical ability to implement	Estimated increase in energy required to implement and operate	List of permits required and status if option has begun permitting process.	Description of positive or negative socioeconomic effects.	Primary jurisdiction for implementation

8. Summary and Recommendations

The accelerated drought resiliency analysis presented in this memorandum has helped meet the need of the moment to characterize the risk and potential solutions for the possibility of continuing dry conditions. Droughts are a way of life in most of California and robust drought planning should be considered a normal water management practice. The recent drought has challenged the regional water system and raised awareness of water managers to work collaboratively and seek integrated solutions for proactive drought planning.

The DSM has undergone substantial improvements during this accelerated drought analysis and is now well situated to address additional risks. The major modeling accomplishments are listed below:

- Russian River, Transmission System, and Retail Customer Systems have been interconnected
- DSM has been validated for system water supply and operations
- Representation of retail customer systems is adequate for this level of analysis
- DSM can simulate individual years or stochastic simulations involving ensemble of hydrology

Through this interactive engagement process, the DSM has been used to help identify near-term and long-term drought risks; Specifically,

- Existing hydrologic conditions continue to be challenging
- December storms have altered near-term drought outlook, but have not eliminated the risk
- Unlikely, but possible risk to Lake Mendocino storage and Lake Sonoma storage (2023), and delivery (2023-24)
- Stress test hydrology of WY 1976-1980 is used to test drought options

A range of drought management options have been evaluated in this accelerated study. Despite the conceptual nature of this analysis some significant findings can be stated:

- For all reservoirs, the “near-term” package of options including increasing Sonoma Water and retail customer groundwater production, increasing diversion of winter water with Kastania PS improvements, regulatory flexibility through TUCPs, and water conservation provides sufficient capability to address the potential for critically low storage conditions.
- For the scenarios analyzed, the near-term package of options eliminates stress-test shortages with moderate levels of water conservation
- Winter water diversions, water conservation, and groundwater production helps reduce shortages and can bolster or save storage in reservoirs
- Conservation and regulatory flexibility under TUCPs are the most important in bolstering Lake Sonoma and Mendocino storage
- Longer-term actions of regional groundwater bank and Lake Sonoma FIRO will provide significant benefit for future droughts but require initial wet period to begin storage phase

- Larger alternative supply options need further evaluation and adequate comparisons to Russian River options and water conservation

Based on the results of this accelerated drought resiliency analysis, several recommendations are provided. To address the acute and on-going drought in 2022, it is important to ***accelerate implementation of the actions identified as near-term drought management options***. Increasing groundwater production at both Sonoma Water and retail customer wells will add a temporary “new” supply to the regional water system, while increasing winter water diversion of Russian River supply will reduce the need for withdrawal of water from local reservoirs. Continuing water conservation efforts and regulatory flexibility on reservoir releases for instream flows will both help close the gap between supply and demand and increase storage in reservoirs for the potential of a prolonged drought. State and federal drought resiliency grant opportunities exist to move these actions forward.

The 2020-2022 drought is providing a real-time stress test of the regional water management system. And while the focus is on resolving this near-term challenge, it is important to recognize that droughts are a natural part of the hydroclimate of the region. This drought will eventually be broken and followed by a period of wet years, until yet another drought occurs. Planning for both the current and future droughts is important. For ***future droughts, we have the ability to plan more effectively and ensure activation of drought management options that are more regional in nature***. Forecast-Informed Reservoir Operations at Lake Sonoma has the potential to increase reservoir storage in the years just preceding the onset of drought and provide additional storage for an extended drought. Similarly, a regional groundwater bank could provide opportunities for underground storage of wet year/season supply for use in drought years and provide a mechanism for in-lieu exchanges to occur throughout the region. Developing integrated operations of Russian River storage, Marin storage, and groundwater storage could lead to synergies that increase the effective storage for the region and increase the region’s resilience. Finally, the development and expansion of water reuse, desalination, and water purchase options needs to be further explored.

Along with all of these water supply and operational improvements, water conservation needs to be a foundational tool to help manage the water demand in the long-term and during acute periods of drought. These longer-term options will be further explored in the Resiliency Study and related efforts by Sonoma Water and its retail customers and additional recommendations will be put forward in late 2022.

FINAL REPORT | JULY 2022

2022 Local Water Supply Enhancement Study

Novato Water Service Area

PREPARED JOINTLY BY

NORTH MARIN WATER DISTRICT

WEST YOST
Water. Engineered.

ATTACHMENT 2

2022 Local Water Supply Enhancement Study
Novato Water Service Area

Prepared for

North Marin Water District

Project No. 861-60-21-04

REGISTERED PROFESSIONAL ENGINEER
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Project Manager: Rhodora Biagtan	July 2022 Date
QA/QC Review: Elizabeth Drayer	July 2022 Date

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LIST OF ACRONYMS AND ABBREVIATIONS

µm	Micrometer (or micron)
AACE	Association for the Advancement of Cost Engineering
ABAG	Association of Bay Area Governments
AF	Acre-Feet
AFY	Acre-Feet per Year
AOP	Advanced Oxidation Process
ASR	Aquifer Storage Recovery
BIL	Bipartisan Infrastructure Law
Board	NMWD Board of Directors
BRIC	Building Resilient Infrastructure and Communities
CalOES	California Office of Emergency Services
CAP	Climate Action Plan
CDFW	California Department of Fish & Wildlife
CEQA	California Environmental Quality Act
cfs	Cubic Feet Per Second
City	City of Novato
CY	Cubic Yards

DDW	State Water Resources Control Board's Division of Drinking Water
desal	Desalination
DSOD	Division of Safety of Dams
DWR	Department of Water Resources
EIR	Environmental Impact Report
FAT	Full Advanced Treatment
FEMA	Federal Emergency Management Agency
fps	Foot Per Second
GAC	Granular Activated Carbon
GHG	Greenhouse Gas Emissions
gpm	Gallons Per Minute
HMP	Hazard Mitigation Plan
HMPG	Hazard Mitigation Grant Program
I-Bank	California Infrastructure and Economic Development Bank
IJ	Independent Journal
IPR	Indirect Potable Reuse
IRWN	Integrated Regional Water Management
ISRF	The Infrastructure State Revolving Fund
IVGC	Indian Valley Golf Course
LF	Linear Feet
LGVSD	Las Gallinas Valley Sanitary District
MC	Million Gallons
MCPOSD	Marin County Parks and Open Space District
MFR	Multi-Family Residential
mg/L	Milligrams Per Liter
MGD	Million Gallons Per Day
MMWD	Marin Municipal Water District
NEPA	National Environmental Policy Act
NMWD	North Marin Water District
NOI	Notice of Intent
Novato Valley Basin	Novato Valley Groundwater Basin
NPV	Net Present Value
NSD	Novato Sanitary District
O&M	Operations and Maintenance
PDM	Pre-Disaster Mitigation
PHD	Peak Hour Demand
psi	Pounds Per Square Inch
PVC	Polyvinyl Chloride
Resiliency Study	Sonoma Water's Regional Water Supply Resiliency Study
RHNA	Regional Housing Needs Allocation
RO	Reverse Osmosis
RWC	Recycled Water Contribution

RWF	Recycled Water Facility
SF Bay	San Francisco Bay
SF Bay RWQCB	San Francisco Bay Regional Water Quality Control Board
SFR	Single Family Residential
Sonoma Water	Sonoma County Water Agency
State Water Board	State Water Resources Control Board
Study	Local Water Supply Enhancement Study
STP	Stafford Treatment Plant
TM	Technical Memorandum
TOC	Total Organic Carbon
U.S.	United States
USBR	United States Bureau of Reclamation
US-EPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UV	Ultraviolet
UWMP	Urban Water Management Plan
WIFIA	Water Infrastructure Finance Innovation Act
WIIN	Water Infrastructure Improvements for the Nation
WWTP	Wastewater Treatment Plant

ES.1 PURPOSE AND OBJECTIVES

The North Marin Water District (NMWD) Local Water Supply Enhancement Study (Study) was prepared with the purpose to enhance NMWD's local water supplies and create a more resilient local water supply portfolio for its Novato water service area. It is intended to assist NMWD in making informed and prudent decisions towards expanding its local water supply. The Study identifies viable water alternatives based on quantitative and qualitative considerations that are important to NMWD. The Study also aligns with one of the goals of NMWD's 2018 Strategic Plan (GOAL 1. Water Supply, Quality, and Reliability).

The objective of this Study is to evaluate water supply alternatives to increase NMWD's current local water supply in its Novato service area by approximately 1,000 to 2,000 acre-feet per year (AFY) or approximately 326 million gallons (MG) to 652 MG per year. To add context and understanding, water demand and supply are provided in both AF and MG in this executive summary.

Criteria was developed as a part of this Study to evaluate each water supply alternative's feasibility. This Study builds on previous studies related to each water supply alternative. The following potential alternative water supplies have been evaluated as a part of this Study:

- Recycled Water System Expansion
- Indirect Potable Reuse
- Improve Stafford Treatment Plant (STP) Process Water Recapture Efficiency
- Divert Captured Stormwater Into Stafford Lake
- Increase Stafford Lake Storage Capacity
- Aquifer Storage Recovery in the Novato Basin
- Desalination

ES.2 PROJECTED WATER DEMANDS

NMWD's projected water demand through 2045 is summarized in Table ES-1. NMWD's water demand is expected to increase by 2,300 AF or 749 MG (an approximately 26 percent increase) over the next 25 years, primarily due to an increase in its service area population.

Table ES-1. Current and Projected Water Demands

Water Type	2020		2025		2030		2035		2040		2045	
	AF	MG	AF	MG	AF	MG	AF	MG	AF	MG	AF	MG
Potable	7,992	2,604	9,866	3,215	10,031	3,269	10,245	3,338	10,254	3,341	10,284	3,351
Raw	202	66	218	71	218	71	218	71	218	71	218	71
Recycled	658	214	595	194	508	166	622	203	636	207	650	212
Total	**8,852**	**2,884**	**10,679**	**3,480**	**10,757**	**3,505**	**11,085**	**3,612**	**11,108**	**3,620**	**11,152**	**3,634**

Source: North Marin Water District. June 2021. 2020 Urban Water Management Plan. Table 4-1, Table 4-4, and Table 4-8.

NMWD is seeking to increase local water supply by a minimum of 1,000 AF (326 MG) to improve the resiliency of its current water supply portfolio and help meet projected water use shown in Table 2-3. NMWD's current and projected water supply portfolio is further discussed in Chapter 3.

ES.3 OVERVIEW OF POTENTIAL WATER SUPPLY ALTERNATIVES

This Study evaluates potential water supply alternatives to enhance NMWD's local water supply by approximately 1,000 to 2,000 AFY (326 to 652 MG per year). Each alternative is evaluated in the subsequent chapters. The water supply alternatives include the following:

- Aquifer Storage Recovery in Novato Valley Basin
- Recycled Water System Expansion
- Indirect Potable Reuse
- Improve STP Process Water Recapture Efficiency
- Divert Captured Stormwater into Stafford Lake
- Increase Stafford Lake Storage Capacity
- Desalination

Each of these alternatives was evaluated using criteria developed with NMWD and detailed in Chapter 4. The alternatives were scored and ranked for feasibility of enhancing NMWD's local water supply portfolio. Findings and recommendations are provided in Chapter 12.

ES.4 EVALUATION METHODOLOGY

Each potential water supply alternative presents benefits and challenges, both quantitative and qualitative. The following six criteria were used to evaluate each alternative.

1. Water Supply Yield and Reliability
2. Cost per acre-foot
3. Operational Impacts
4. Regulations and Permitting
5. Public and Institutional Considerations
6. Other Considerations

To identify and prioritize feasible water supply alternatives for NMWD, the evaluation criteria were prioritized and scored. In this planning-level study, water supply yield and costs were evaluated quantitatively, while the other criteria were evaluated qualitatively, with the exception of other considerations. Some considerations are unique to each water supply alternative and are discussed in the Study, but not scored

The scoring methodology selected for the qualitative criteria is a 5-point rating scale assigning 1 through 5 to the criteria listed above. Each criterion has its own measurement but is scored using 1 (least advantageous) through 5 (most advantageous) based on the likelihood of success for the water supply alternative with respect to the criteria.

NMWD staff was asked to prioritize the qualitative criteria to identify the most important requirements for providing service to customers. A weighted scoring system was developed based on NMWD priorities. The weighted scores were used in addition to the water supply yield and cost criteria to rank each alternative to identify feasible projects.

ES.5 AQUIFER STORAGE RECOVERY

The potential for a local Aquifer Storage Recovery (ASR) program to store and recover treated surface water from the Novato Valley Groundwater Basin (Novato Valley Basin) was evaluated. Based on information available at this time, a local ASR program appears to be infeasible primarily due to the limited pumping and injection capacity of wells constructed in the basin and the limited storage capacity of the basin. Both of these limitations are a consequence of the limited saturated thickness of aquifer sediments and their low permeability. The limited capacity of potential ASR wells would result in a very low yield in comparison to the cost of a local ASR program.

ASR may be a viable alternative for providing supplemental supply to NMWD, if feasible in other nearby groundwater basins capable of storing treated surface water provided by Sonoma Water or other local agencies. The Sonoma Water Regional Water Supply Resiliency Study (Resiliency Study) includes an evaluation of ASR in the Santa Rosa Plain, Petaluma Valley and Sonoma Valley Basins. NMWD should continue to coordinate with Sonoma Water to stay current with the findings, conclusions and recommendations of the Resiliency Study and other regional studies pertinent to ASR, groundwater banking and conjunctive use. If feasible alternatives are identified, NMWD should consider participating in scoping and planning sessions with Sonoma Water and other local agencies as a next step towards developing projects and programs to improve regional water supply resiliency and reliability.

ES.6 RECYCLED WATER SYSTEM EXPANSION

The potential to expand the use of recycled water to offset the volume of potable water used for non-potable application was evaluated. Maximizing the use of recycled water for non-potable use would free up limited potable water resources. NMWD may expand its recycled water program by extending its recycled water distribution system and by expanding the potential uses for recycled

Expanding NMWD’s recycled water system could provide a potable water offset of up to 63 AFY (21 MG per year) if all proposed extension projects were constructed. This equates to a total potable water offset of 1,881 AF (613 MG) over 30 years. Four pipeline extensions were identified for an estimated cost of $13.1 million. The estimated total cost, including capital cost and operations and maintenance (O&M) cost, over a 30-year operating cycle is $7,900 per AF.

At this time, expansion of the recycled water distribution system is not recommended due to the high cost of new pipelines relative to the volume of potable water offset. NMWD should continue to explore opportunities to increase recycled water use from its existing system and to pursue opportunities to offset the cost of new recycled water pipelines.

ES.7 INDIRECT POTABLE REUSE

Indirect potable reuse of potentially available surplus wastewater effluent was evaluated to enhance NMWD's local water supply. Potable water from wastewater that has been treated through an advanced treatment process could be stored in the local Novato Valley Basin for groundwater replenishment or stored in Stafford Lake for surface water augmentation. The California Division of Drinking Water (DDW) has established clear regulations for surface water source augmentation and groundwater replenishment—indirect potable reuse (IPR) storage options.

Neither of the two indirect potable reuse classifications (groundwater replenishment and surface water source augmentation) are found to be viable for NMWD when considering both locally available storage options, namely groundwater aquifers within NMWD's boundaries and Stafford Lake. Groundwater replenishment may be a viable water supply option should NMWD have regional storage available. The infrastructure requirements and costs for groundwater replenishment should be further reviewed if and when a viable aquifer storage option is identified.

The Sonoma Water Resiliency Study did not specifically identify indirect potable use as a Drought Management Option but did include ASR, groundwater banking and conjunctive use. If indirect potable reuse is identified in the future as a regional option, NMWD should consider participating in scoping and planning sessions with Sonoma Water and other local agencies as a next step towards developing project and programs to improve regional water supply resiliency and reliability if a viable aquifer storage option is identified.

ES.8 IMPROVE STP EFFICIENCY PROCESS WATER RECAPTURE EFFICIENCY

The potential for producing additional potable water from NMWD's STP by making efficiency improvements to the recapture of process water was evaluated. This water supply enhancement option is potentially viable. Additional plant-scale study is needed to confirm the feasibility of this alternative, which entails modifying the STP pretreatment process to reduce wastewater discharged to the collection system and thus allow for additional hours of STP operation to produce additional potable water from stored water in Stafford Lake. Relatively minor changes are needed to implement this alternative.

The recommended performance testing for the pre-treatment units are provided in Chapter 8. Should the performance testing confirm the feasibility of this alternative, NMWD could potentially realize an estimated additional water supply yield of 20 AFY (7 MG per year) (in dry years) to 70 AFY (23 MG per year) (in wet years) at a unit cost of $70 to $240 per AF over a 30-year operating cycle, including capital cost and O&M. Even during a dry year, the higher yield may be achieved when the water supply to Stafford Lake is augmented – for instance, with imported water from Sonoma Water.

Should the performance testing indicate that implementing the pretreatment modifications would not be prudent, NMWD could explore other alternatives for STP process efficiency. West Yost's 2019 study identified four other alternatives apart from modifying the pretreatment units. NMWD is recommended to revisit these alternatives, specifically rehabilitating the reactor clarifier, should the performance testing of the pretreatment modifications confirm that the current alternative is not feasible.

ES.9 DIVERT CAPTURED STORMWATER INTO STAFFORD LAKE

The potential for diverting captured stormwater into Stafford Lake from the adjacent Leveroni Canyon and Bowman Canyon watersheds was evaluated. Five options, with variations, to capturing stormwater runoff from Leveroni Canyon and Bowman Canyon watersheds were considered under this water supply enhancement alternative. Further studies are required to explore the options and variations presented in this alternative. Costs for the options are comparably low relative to other water supply options evaluated in this Study. However, capturing water from Leveroni Canyon and Bowman Canyon presents challenges in regulations and permitting and has multi-faceted public and institutional considerations.

The five options include:

- **Option 1 - Leveroni Canyon:** Water from Leveroni Canyon would be captured and pumped to Stafford Lake.
- **Option 2 - Bowman Canyon:** Water from Bowman Canyon would be captured upstream of the confluence with Novato Creek and pumped to Stafford Lake.
- **Option 3 - Novato Creek (Leveroni and Bowman Canyons):** Water from both Leveroni and Bowman Canyons would be captured downstream of the confluence Bowman Canyon and Novato Creek and pumped to Stafford Lake.
- **Option 4 – Leveroni Canyon Dam:** Water from Leveroni Canyon would be captured with the use of a dam across Leveroni Canyon, just north of Novato Boulevard.
- **Option 5 – Bowman Canyon Dam:** Water from Bowman Canyon would be captured with the use of a dam across Bowman Canyon, approximately 300 feet north of Novato Boulevard.

All of the options require major infrastructure. Based on the assumptions used for this alternative, Options 1, 2, and 3 require a pump station and a 12-inch or 15-inch diameter force main. A basin could also be included to increase the captured stormwater runoff. Options 1, 2, and 3 could supply 93 to 629 AFY (30 to 205 MG per year) on average, without the basin; and 316 to 788 AFY (103 to 257 MG per year), with the basin. This supply could be impacted by future climate change, but still would be relatively reliable. The estimated total cost, including capital cost and O&M cost over a 30-year operating cycle, ranges from $330 to $960 per AF for Options 1, 2, and 3.

Options 4 and 5 would require an earthen dam, pump station, 12-inch diameter force main, and any other facilities associated with a dam or reservoir. Option 4 would provide an estimated yield of 175 AFY (57 MG per year) and Option 5 would provide an estimated yield of 753 AFY (245 MG per year). The estimated total cost, including capital cost and O&M cost over a 30-year operating cycle, is $1,700 per AF for Option 4 and $800 per AF for Option 5.

Further study is needed to identify the optimum stormwater capture and diversion option that can provide needed supply under various operational rules, Stafford Lake capacity limitations, and STP operational limitations. NMWD may consider expanding the study to evaluate combining this alternative with the expansion of Stafford Lake.

ES.10 INCREASE STAFFORD LAKE STORAGE CAPACITY

Two potential options to increase the Stafford Lake Storage Capacity were evaluated—the installation of an adjustable slide gate in the downstream Stafford Lake spillway notch, and sediment removal from the reservoir. This alternative would allow NMWD to store more water from runoff as well as water supplies from other sources, including Sonoma Water, and other potential water supply alternatives discussed in this Study.

The option to install a spillway notch slide gate to increase Stafford Lake storage capacity does not constitute major new infrastructure. It would provide approximately 726 AF (237 MG) of increased storage volume in Stafford Lake. The estimated total cost for this option, including capital cost and O&M cost over a 30-year operating cycle, is $90 per AF.

This option for sediment removal would provide up to about 551 AF (180 MG) of increased storage volume in Stafford Lake. The estimated total cost for this option, including capital cost over a 30-year operating cycle, is about $2,600 per AF. No annual O&M cost is required.

NMWD will need to coordinate closely with Marin County Parks and Open Space District during implementation of either option. Because Stafford Lake is a recreational area, both of the options will attract general public and stakeholder attention.

ES.11 DESALINATION

Local production of desalinated water from either brackish groundwater or the San Francisco Bay (SF Bay) water has been conceptually evaluated for this Study and found to be infeasible for NMWD. For desalinated water supply to be a viable option, NMWD would need to consider participating in a regional project.

As a water supply option, desalination (also referred to as desal) would have the benefit of providing a relatively reliable water supply to NMWD. However, the relatively small scale of a facility to supplement NWMD's water needs would likely result in a relatively high unit cost of water production. Further, a local desal facility would require NMWD-controlled access for both a raw water intake and membrane reject (brine) discharge; NMWD does not have sites available near the SF Bay for such a facility.

Any pursuit by NMWD of desal as a water supply alternative is recommended to be pursued as part of a long-term regional partnership with other agencies. However, other recent water supply studies in the region have not found desal to be an economical water supply alternative. Therefore, continued evaluation of desalination is recommended only if other, less expensive water supply alternatives are found to be infeasible.

ES.12 FINDINGS AND RECOMMENDATIONS

The purpose of this Study is to enhance NMWD's local water supplies and create a more resilient local water supply portfolio for its Novato service area, with the objective to increase NMWD's current local water supply by approximately 1,000 to 2,000 AFY (326 to 652 MG per year). The potential water supply alternatives were evaluated quantitatively and qualitatively.

A summary of the evaluation of the seven local water supply enhancement alternatives considered in this Study is provided in Table ES-2. Variations were developed for several water supply alternatives to explore potential implementation and yield. For the purposes of this study, the net present value (NPV) of total costs were calculated as dollars per AF.

Three of the water supply alternatives were eliminated as infeasible options as detailed in their respective chapters: ASR, IPR, and Desalination. These water supply alternatives may be viable for NMWD through a regional partnership. MMWD and Sonoma Water are other water agencies in the region that have recently evaluated or are currently evaluating regional water supply reliability projects. Sonoma Water's Resiliency Study is in progress at time of preparation of this Study. NMWD is encouraged to continue coordinating with Sonoma Water to stay current with the findings, conclusions and recommendations of the Resiliency Study and other regional studies pertinent to ASR, IPR, and desal.

Table ES-3 summarizes the local water supply enhancement alternatives that may be feasible for NMWD based on the unit cost over the 30-year project period, estimated annual yield, and the qualitative weighted score. Implementation of these feasible water supply projects could potentially provide NMWD 991 AF to 1,584 AF (323 to 516 MG) of additional local water supply.

Should NMWD choose to pursue any of these alternatives, further studies are highly recommended as discussed in the respective chapters of each water supply alternative. Because most of these projects present significant capital investment, funding options are provided in Chapter 12.

Table ES-2. Summary Evaluation of Local Water Supply Alternatives

Local Water Supply Alternative			Quantitative Criteria: NPV of Total Cost, dollars per AF	Quantitative Criteria: Annual Yield, AFY	Quantitative Criteria: Annual Yield, MG per Year	Qualitative Criteria: Water Supply Reliability	Qualitative Criteria: Operational Impacts	Qualitative Criteria: Regulations & Permitting	Qualitative Criteria: Public and Institutional Considerations	Qualitative Criteria: Weighted Qualitative Score
Local ASR[a]			11,000	15	5	3	3	2	2	2.7
Recycled Water System Expansion[b]		*Segment N-1*	5,300	17	6	5	4	4	5	**4.5**
Recycled Water System Expansion[b]		*Segment N-2*	6,600	23	326	5	4	4	5	**4.5**
Recycled Water System Expansion[b]		*Segment C-1*	22,000	4	1	5	4	4	5	**4.5**
Recycled Water System Expansion[b]		*Segment C-2*	8,600	19	6	5	4	4	5	**4.5**
Local Indirect Potable Reuse[c]			3,000	1,000 - 3,100	326 - 1,010	5	1	1	1	2.6
Improve Stafford Treatment Plant Process Water Recapture Efficiency[d]		*Pretreatment Modification*	70 - 240	20 - 70	7 - 23	4	5	5	5	4.6
Improve Stafford Treatment Plant Process Water Recapture Efficiency[d]		*Pretreatment Modification and Ancillary Improvements[e]*	1,500 - 5,200	20 - 70	7 - 23	5	5	5	5	**5**
Divert Captured Stormwater Into Stafford Lake[f]	*Without Basin[g]*	*Option 1. Leveroni Canyon*	710	245	80	3	4	2	4	3.2
Divert Captured Stormwater Into Stafford Lake[f]	*Without Basin[g]*	*Option 2. Bowman Canyon*	470	433	141	3	4	2	4	3.2
Divert Captured Stormwater Into Stafford Lake[f]	*Without Basin[g]*	*Option 3. Novato Creek*	330	628	205	3	4	2	4	3.2
Divert Captured Stormwater Into Stafford Lake[f]	*With Basin[g]*	*Option 2. Bowman Canyon*	960	593	193	4	3	2	3	3.2
Divert Captured Stormwater Into Stafford Lake[f]	*With Basin[g]*	*Option 3. Novato Creek*	730	788	257	4	3	2	3	3.2
Divert Captured Stormwater Into Stafford Lake[f]	*Option 4. Dam at Leveroni Canyon*		1,700	175	57	3	3	2	2	2.7
Divert Captured Stormwater Into Stafford Lake[f]	*Option 5. Dam at Bowman Canyon*		800	752	245	3	3	2	2	2.7
Increase Stafford Lake Storage Capacity[h]		*Spillway Notch Slide Gate[i]*	90	726	326	5	5	2	5	4.4
Increase Stafford Lake Storage Capacity[h]		*Sediment Removal[i]*	2,600	551	326	3	2	2	3	2.5
Desalination[j]			-	-	-	5	1	1	1	2.6

Notes:

(a) Cost estimate per ASR well.

(b) The recycled water expansion alternative received a high qualitative score of 4.5 but this score is supplemental to the quantitative criteria. This alternative is cost prohibitive and does not meet the needs of NMWD to offset enough potable water. The annual yields for the recycled water expansion are the annual volume of potable water that would be offset with each recycled water segment.

(c) Costs are provided for treatment system cost only. Does not include pipeline costs since well sites could not be identified.

(d) Costs are provided on a per treatment unit basis. Lower yield/higher costs are associated with dry years. Higher yield/lower costs are associated with typical years.

(e) The pretreatment modification plus ancillary improvements alternative received a high qualitative score of 5.0 but this score is supplemental to the quantitative criteria. This alternative is cost prohibitive due to the raw water intake modification and does not increase the annual yield compared to only implementing the pretreatment modifications.

(f) Costs do not include treatment of raw water captured into Stafford Lake. The lowest cost/highest yield for the option variation is provided.

(g) Yield and cost estimates for these options assumes that the total captured stormwater runoff is diverted to Stafford Lake and none would be lost over the Stafford Lake Spillway.

(h) This alternative increases storage capacity of Stafford Lake for improved reliability. NMWD has the ability to back feed up to 1,000 AFY (326 MG per year) of supply from Sonoma Water through NMWD's existing potable water system. This supply is available to NMWD during drought years and would allow NMWD to fully utilize the increased Stafford Lake storage capacity under this alternative. NMWD is currently evaluating infrastructure improvements to increase the volume of supply (up to 2,000 AFY or 652 MG) that can be back fed into Stafford Lake from Sonoma Water.

(i) This storage volume is assumed to be utilized 20 years of the 30-year operational cycle. Two-thirds of the 30-year operational cycle was assumed because Stafford Lake has spilled over the spillway two-thirds of the years over the last twenty-three years.

(j) This alternative water supply option was found to be infeasible as a local project. A cost estimate and annual supply yield was not determined.

Table ES-3. Feasible Local Water Supply Enhancement Alternatives				
Local Water Supply Alternative	NPV of Total Cost per AF, dollars	Annual Yield		Weighted Qualitative Score
		AFY	MG per Year	
Improve Stafford Treatment Plant Process Water Recapture Efficiency - Pretreatment Modification	70 - 170	20 - 70	7-23	4.6
Increase Stafford Lake Storage Capacity - Spillway Notch Slide Gate[(a)(b)]	90	726	240	4.4
Divert Captured Stormwater Into Stafford Lake	330 - 960	245 - 788	80 - 257	3.2

Notes:

(a) This increases storage capacity of Stafford Lake for improved reliability. NMWD has the ability to backfeed up to 1,000 AFY (326 MG) of supply from Sonoma Water through NMWD's existing potable water system. This supply is available to NMWD during drought years and would allow NMWD to fully utilize the increased Stafford Lake storage capacity under this alternative. NMWD is currently evaluating infrastructure improvements to increase the duration and the volume of supply (up to 2,000 AFY or 652 MG) that can be backfed into Stafford Lake from Sonoma Water.

(b) This storage volume is assumed to be utilized 20 years of the 30-year operational cycle. Two-thirds of the 30-year operational cycle was assumed because Stafford Lake has spilled over the spillway two-thirds of the years over the last twenty-three years.

Several established state and federal funding programs could potentially fund the recommended NMWD local water supply enhancement alternatives listed in Table 12-2. Relevant State funding programs include:

- Department of Water Resources (DWR) Integrated Regional Water Management (IRWM) Program
- DWR Drought Relief Funding Program
- SWRCB Water Recycling Funding Program
- California Infrastructure and Economic Development Bank (I-Bank) Infrastructure State Revolving Fund

Relevant federal funding programs applicable to the feasible projects include:

- Federal Emergency Management Agency (FEMA) Building Resilient Infrastructure and Communities (BRIC) Grant Program
- FEMA Hazard Mitigation Grant Program (HMPG)
- United States Bureau of Reclamation (USBR) WaterSMART Drought Response Program
- USBR Title XVI Recycled Water Funding Program
- USBR Desalination Construction Funding
- United States Environmental Protection Agency (US EPA) Water Infrastructure Finance Innovation Act (WIFIA)

State and federal grant and low interest loan programs should be considered with implementation of any of NMWD's feasible water supply enhancement projects. Grants and low-interest loans can help offset or reduce implementation costs, thus reducing impacts to ratepayers. However, competition for grants is often high and the application process can be resource intensive. Identifying potential grant opportunities early, taking steps towards positioning for the opportunity, and strategically selecting the opportunities that are most likely to be successful are key to maximize external funding.

CHAPTER 1
Introduction

1.1 BACKGROUND

The North Marin Water District (NMWD) serves a current (2020) population of approximately 62,000 people in the greater Novato area and unincorporated areas of Marin County in its Novato water service area (Figure 1-1). This population is expected to increase to approximately 69,500 people by 2045[1].

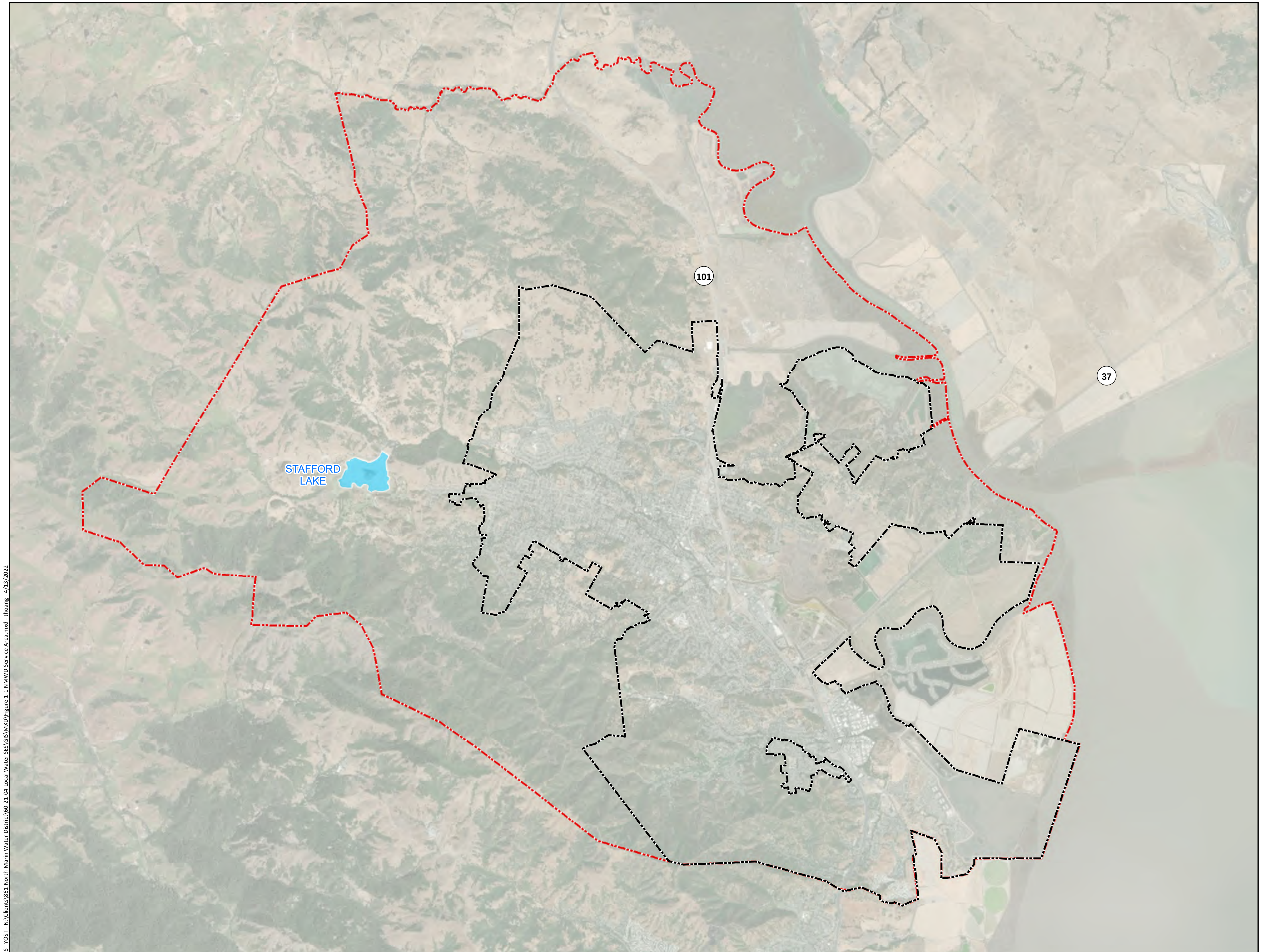
The NMWD water supply portfolio for its Novato service area consists of purchased water from the Sonoma Water County Agency (Sonoma Water) Russian River Project, local surface water from Stafford Lake, and recycled water for non-potable reuse. Purchased water from Sonoma Water supplies approximately 75 percent of the total NMWD water demand while the Stafford Lake surface water supplies approximately 20 percent. Recycled water purchased from Novato Sanitary District (NSD) and Las Gallinas Valley Sanitary District (LGVSD) provide up to 7 percent of NMWD's annual water supply for landscape irrigation and commercial automatic car washes.

Over time, NMWD has made significant investments and efforts in its water conservation program and its recycled water program to improve water resiliency. NMWD's recycled water program has helped reduce ultimate potable water demands in its Novato service area. Despite an almost 8 percent increase in population, total water use has decreased by over 25 percent since 2004.

The current drought conditions have required curtailment of water supply from the Russian River and resulted in the reduction of water supply produced from Stafford Lake. Water supply diversion from the Russian River was reduced by 20 percent in 2021 effective July 1, compared to the same period in 2020. In response, NMWD has enacted emergency water conservation ordinances and reactivated its residential recycled water fill station. Should the dry period persist for another year, Sonoma Water anticipates diversion reductions up to 30 percent. This event, in combination with the statewide drought from 2012 to 2016, has demonstrated NMWD's vulnerability to water shortage due to climate change.

This NMWD 2022 Local Water Supply Enhancement Study for the Novato Service Area (Study) has been prepared to identify viable water supply alternatives that may increase NMWD's water supply resiliency.

[1] North Marin Water District. June 2021. 2020 Urban Water Management Plan.



WEST YOST

Figure 1-1

North Marin Water District Service Area

Novato Water Service Area

North Marin Water District

Local Water Supply Enhancement Study

WEST YOST - N:\Clients\861 North Marin Water District\60-21-04 Local Water SES\GIS\MXD\Figure 1-1 NMWD Service Area.mxd - thoang - 4/13/2022

1.2 PURPOSE AND OBJECTIVE

The purpose of this Study is to enhance NMWD's local water supplies and create a more resilient local water supply portfolio for its Novato water service area. The Study was prepared to assist NMWD in making informed and prudent decisions towards expanding its local water supply. The Study identifies viable water alternatives based on quantitative and qualitative considerations that are important to NMWD. The Study also aligns with one of the goals of NMWD's 2018 Strategic Plan (GOAL 1. Water Supply, Quality, and Reliability).

The objective of this Study is to evaluate water supply alternatives to increase NMWD's current local water supply in the Novato service area by approximately 326 million gallons to 652 million gallons per year, or approximately 1,000 to 2,000 acre-feet per year (AFY).

Because of the large number of gallons discussed in this study, a bigger unit of measurement is needed that would also provide a sufficient level of data granularity. In the water industry, acre-feet is used as a unit of measurement. Acre-foot is a measure of water volume equivalent to approximately 325,851 gallons. One-acre foot of water covers one acre of land with one-foot depth of water. Figure 1-2 compares an acre foot of water to a football field.

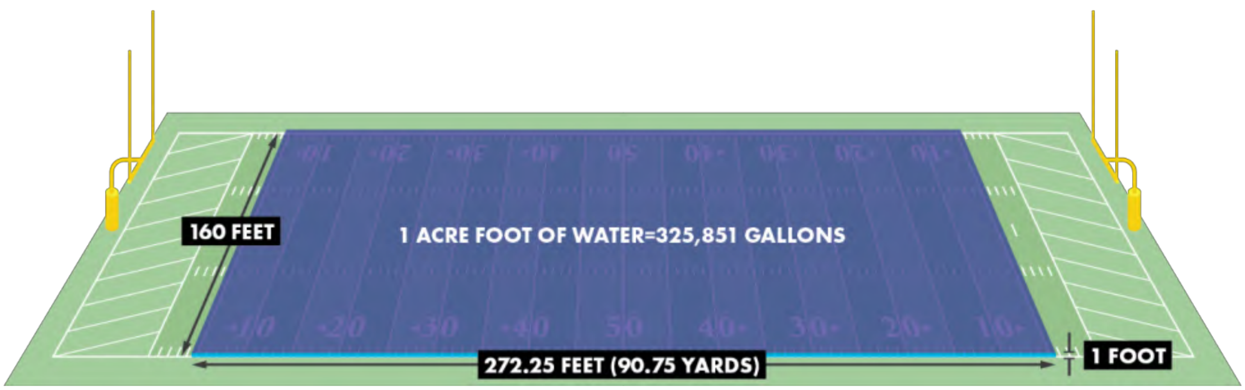


Figure 1-2. One Acre-Feet of Water

Criteria was developed as a part of this Study to evaluate the feasibility of each water supply alternative. This Study builds on previous studies related to each water supply alternative. The following potential alternative water supplies have been evaluated as a part of this Study:

- Recycled Water System Expansion
- Indirect Potable Reuse
- Improve Stafford Treatment Plant Process Water Recapture Efficiency
- Divert Captured Stormwater Into Stafford Lake
- Increase Stafford Lake Storage Capacity
- Aquifer Storage Recovery in the Novato Basin
- Desalination

1.3 COORDINATION WITH OTHER AGENCIES

During the course of the preparation of the Study, NMWD coordinated with the following agencies to develop potential water supply alternatives:

- Marin Municipal Water District – to identify partnership opportunities for desalination and for the proposed water supply pipeline across the Richmond-San Rafael Bridge
- Sonoma Water – to coordinate findings between this Study and Sonoma Water's Regional Water Supply Resiliency Study, currently in progress
- Marin County Flood Control and Water Conservation District– to identify partnership opportunities and develop a potentially multi-benefit project

NMWD has a longstanding, collaborative partnership with Sonoma Water. Sonoma Water is concurrently conducting a regional study to assess the existing and future water supply resiliency and adaption strategies. Preliminary results and recommendations from the Sonoma Water Regional Water Supply Resiliency Study[2] (Resiliency Study) have been incorporated into this Study, where applicable.

By enhancing the local water supply and partnering with other regional agencies, NMWD plans to develop a robust and resilient water supply portfolio.

1.4 PUBLIC ENGAGEMENT

During the course of the Study, NMWD ran public announcements in the Marin Independent Journal (IJ) to keep the public informed of its progress, including the public workshop. NMWD has developed a dedicated *New Water Supplies* webpage, along with periodically posting water supply news stories on its website: www.nmwd.com. Copies of the public news releases are included in Appendix A.

On January 25, 2022, NMWD conducted a duly-noticed public workshop with NMWD's Board of Directors (Board) and the general public. The workshop was held to engage the NMWD Board members and the general public in reviewing the potential water supply alternatives and in understanding the criteria used for their evaluation. The purpose of the public workshop was to obtain input from the Board members and public so that their concerns are noted and/or addressed, as allowed by the scope of the Study, prior to its completion.

On April 26, 2022, the findings and recommendations of the Study was reviewed with the Board at a duly-noticed public workshop. In the workshop, the next steps were reviewed with the Board and the general public.

Agenda items and minutes from the Board Workshops are included in Appendix B.

[2] Sonoma Water County Agency. June 2020. Sonoma Water Resiliency Study Work Plan

1.5 STUDY ORGANIZATION

The Local Water Supply Enhancement Study has been organized into the following chapters:

- Chapter 1: Introduction
- Chapter 2: Existing and Projected Water Use
- Chapter 3: Existing Water Supplies and Potential Future Water Supply Options
- Chapter 4: Evaluation Methodology
- Chapter 5: Aquifer Storage Recovery in the Novato Basin
- Chapter 6: Recycled Water System Expansion
- Chapter 7: Indirect Potable Reuse
- Chapter 8: Improve Stafford Treatment Plant Process Water Recapture Efficiency
- Chapter 9: Divert Captured Stormwater Into Stafford Lake
- Chapter 10: Increase Stafford Lake Storage Capacity
- Chapter 11: Desalination
- Chapter 12: Findings and Conclusions

Several appendices are also included to provide supplemental information collected to support the findings, conclusions, and recommendations in this Study. These appendices include the following:

- Appendix A: Public Announcements
- Appendix B: Board Workshop Presentations and Minutes
- Appendix C: Russian River Emergency Regulation
- Appendix D: November 12, 2021 Memorandum -Backfeeding Russian River Water to Stafford Lake
- Appendix E: 2019 Stafford Treatment Plant Process Efficiency Improvements Study
- Appendix F: Cost Estimates
- Appendix G: 2021 Recycled Water Program Strategy Technical Memorandum
- Appendix H: Recycled Water Demands
- Appendix I: Future Recycled Water Retrofit Opportunities
- Appendix J: Leveroni Canyon and Bowman Canyon Watersheds Stormwater Runoff Capture Calculations
- Appendix K: Slide Gate Schematic
- Appendix L: Stafford Lake Elevation-Storage Curve
- Appendix M: July 8, Draft 2022 Technical Memorandum #3 - Stafford Lake Hydraulic Modeling Evaluation

1.6 ACKNOWLEDGEMENTS

This Study was prepared jointly by NMWD and West Yost. The West Yost project team would like to thank the North Marin Water District, Marin County Flood Control staff, MMWD staff, and Sonoma Water staff for their time and effort in assisting with the development this Study. Without their assistance and contributions to this effort, this Study would not have been possible.

- North Marin Water District
  - Drew McIntyre, General Manager
  - Tony Williams, Assistant General Manager, Chief Manager, and Project Manager for the Local Water Supply Enhancement Study
  - Robert Clark, Operations and Maintenance Superintendent
  - Brad Stompe, Distribution & Treatment Plant Supervisor
  - Jeff Corda, Senior Water Distribution & Treatment Plant Operator
  - Ryan Grisso, Water Conservation Coordinator
  - Pablo Ramudo, Water Quality Supervisor
  - Tim Fuette, Senior Engineer
- Roger Leventhal, Senior Civil Engineer, Marin County Flood and Water Conservation District
- Paul Sellier, Water Resources Director, Marin Municipal Water District
- Jay Jasperse, Chief Engineer and Direct of Groundwater Management, Sonoma Water
- Marin County Parks
  - Jason Hoorn, Natural Resources Coordinator
  - Tara McIntire, Principal Landscape Architect
  - Jon Campo, Principal Natural Resources Planner

CHAPTER 2
Existing and Projected Water Demands

The purpose of this chapter is to present existing and future water demands projected through buildout of the NMWD's Novato water service area. In June 2021, NMWD completed and adopted its 2020 Urban Water Management Plan (UWMP), which summarized the existing water use and developed projected water use to 2045. The 2020 UWMP considered the impacts of climate change, population, industry, and development as part of the projected water use. Existing and future water demands are required to understand the need and feasibility of each water supply alternative. In this chapter, NMWD's existing water use and projected water use are presented. Planned and approved future development is described.

2.1 EXISTING WATER DEMANDS

Water consumption within NMWD's Novato water service area can be categorized into the following sectors:

- Single Family Residential (SFR)
- Multi-Family Residential (MFR)
- Commercial
- Institutional and Governmental
- Landscape Irrigation
- Other

The SFR sector has historically presented the largest water demand, making up approximately 56 percent of water use between 2016 and 2020. NMWD also delivers raw water from the Stafford Lake to Marin County – Stafford Lake Park and the Indian Valley Golf Course for landscape irrigation. Raw water supply made up approximately 2 percent of the NMWD's average water supply between 2016 and 2020. Table 2-1 summarizes the percentage of average water consumption by sector from 2016 to 2020.

Table 2-1. Potable Water Consumption from 2016 through 2020

Water Type	Water Consumption[(a)], percent
Single Family Residential (SFR)	56.2
Multi-Family Residential (MFR)	14.0
Commercial	10.4
Institutional/Governmental	2.9
Landscape Irrigation	9.0
Other Potable	1.2
Water Losses	4.1
Raw Water	2.3
Recycled Water Make-Up	0.34
Total	**100%**

Source: North Marin Water District. June 2021. 2020 Urban Water Management Plan. Chart 4-1B.

Notes:
(a) The percentages do not exactly sum to 100% due to rounding.

NMWD has recycled water agreements with NSD and LGVSD. Under the agreements, NSD and LGVSD produce recycled water while NMWD distributes the recycled water to its water service area for non-potable use. Non-potable water is water that is not of drinking water quality and may serve other purposes such as recycled water used for landscape irrigation or at commercial car wash facilities. By expanding the recycled water system, the demand on the potable water system is decreased. Tertiary treated recycled water from NSD is delivered to the northern and central service areas of NMWD's water service area and recycled water from LGVSD is delivered to the southern service area. Annual recycled water demand was approximately 7 percent of the total average water demand from 2016 to 2020. Recycled water supply is supplemented with potable water (Recycled Water Make-Up) to meet demands, as necessary. Recycled water demands typically peak during the summer months as they are primarily related to landscape irrigation.

In 2020, NMWD delivered 8,852 acre-feet (AF) of water supply, which consisted of 7,992 AF of potable water, 202 AF of raw water, and 658 AF of recycled water. In 2021, NMWD delivered 9,327 AF of water supply, which consisted of 8,003 AF of potable water, 516 AF of raw water, and 808 AF of recycled water.

2.2 PLANNED FUTURE DEVELOPMENT

Per NMWD's 2020 UWMP, NMWD had approximately 61,700 people within its Novato water service area in 2020. NMWD's population is expected to increase to approximately 69,432 people by 2045. The population projection was calculated by applying City of Novato (City) Association of Bay Area Governments (ABAG) 2018 growth rates to the 2020 population estimate. The projected population includes an estimated population for area served outside the City boundary and was adjusted for the new housing units per the 2023-2031 Regional Housing Needs Allocation (RHNA) Proposed Methodology for the San Francisco Bay Area (ABAG, 2020). The projected land use is expected to be relatively consistent with current land uses. Table 2-2 summarizes the projected additional development through 2035.

Table 2-2. City of Novato – New Development Through 2035

Land Use	New Development Through 2035	Units
Residential[(a)]	2,090	Dwelling Units
Commercial[(b)]	559,432	Square Feet
Industrial[(b)]	467,677	Square Feet
Office[(b)]	646,353	Square Feet

Notes:

(a) Association of Bay Area Governments. October 2020. Regional Housing Needs Allocation Proposed Methodology: San Francisco Bay Area, 2023 – 2031. Appendix 3.

(b) City of Novato. October 2020. General Plan 2035. Table GP-4 Development Projections.

In December 2021, ABAG adopted its 2023 – 2031 RHNA. Per the 2023 – 2031 RHNA, the City is expected to construct approximately 2,090 dwelling units between 2023 to 2031. This accounts for the largest increase in projected population through 2045.

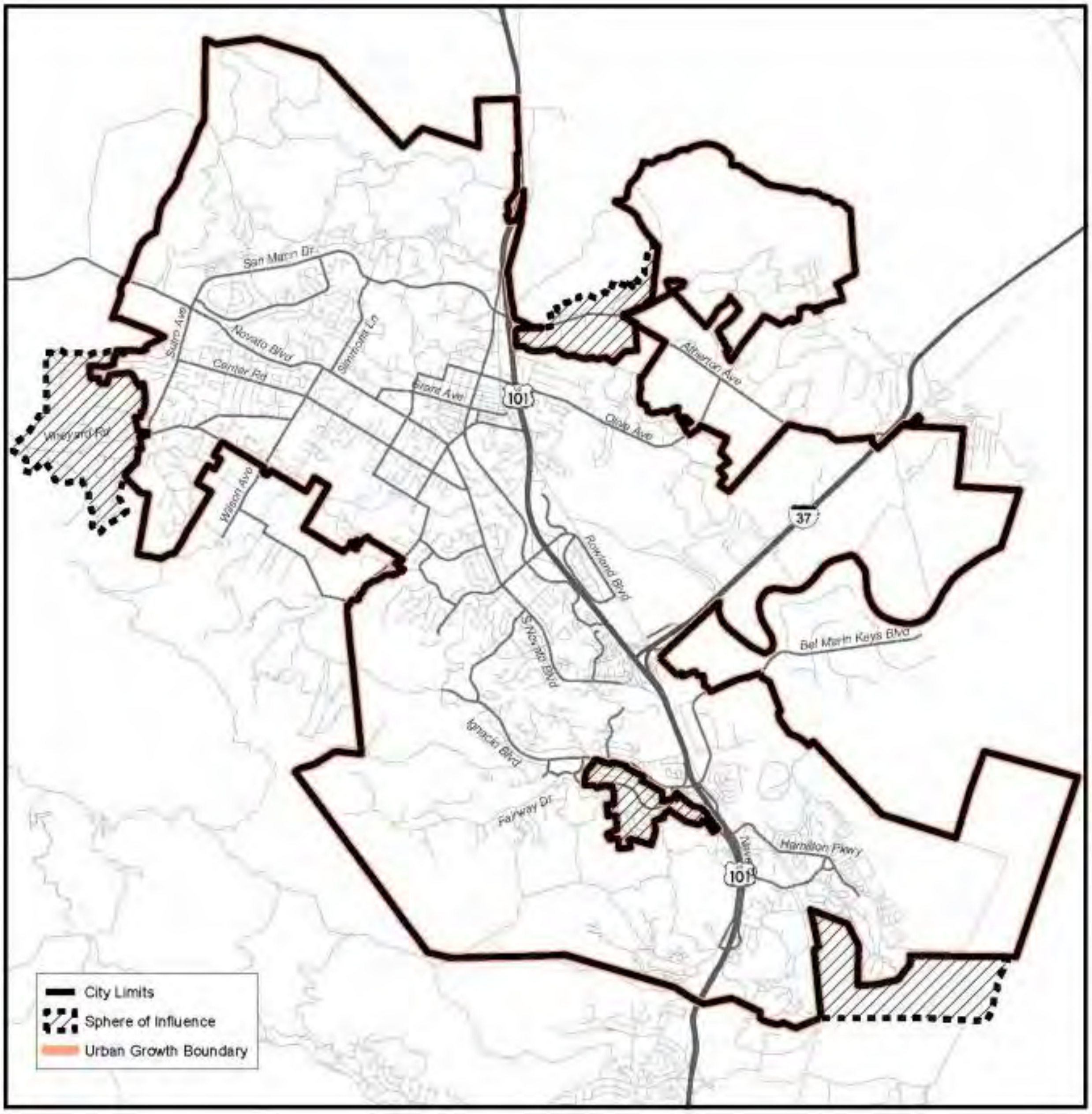


Figure 2-1. City of Novato Urban Growth Boundary and Sphere of Influence[1]

[1] City of Novato. October 2020. General Plan 2035. Figure GP-4.

2.3 PROJECTED WATER DEMANDS

The projected water demand through 2045 is summarized in Table 2-3. NMWD's water demand is expected to increase by 2,300 AF (an approximate 26 percent increase) over the next 25 years, primarily due to the projected increase in population.

Table 2-3. Current and Projected Water Demands, AF

Water Type	2020	2025	2030	2035	2040	2045
Potable Water	7,992	9,866	10,031	10,245	10,254	10,284
Raw Water	202	218	218	218	218	218
Recycled Water	658	595	508	622	636	650
Total	**8,852**	**10,679**	**10,757**	**11,085**	**11,108**	**11,152**

Source: North Marin Water District. June 2021. 2020 Urban Water Management Plan. Table 4-1, Table 4-4, and Table 4-8.

NMWD's 2020 UWMP incorporated data from the 2023 – 2031 RHNA to estimate projected residential water demands in its Novato service area. At the time of the 2020 UWMP preparation, the 2023 – 2031 RHNA had not yet been finalized. The projected water use incorporated the estimated dwelling units from a draft of the 2023 – 2031 RHNA released in October 2020. This draft projected the City would need to construct approximately 2,107 new dwelling units by 2031. The finalized 2023 – 2031 RHNA showed a 17-dwelling unit decrease from the previous draft for the City. As a result, the projected water demands would be slightly lower than those shown in Table 2-3, but not by a significant amount.

NMWD is seeking to increase local water supply by a minimum of 1,000 AF to improve the resiliency of its current water supply portfolio and help meet projected water use shown in Table 2-3. NMWD's current and projected water supply portfolio is further discussed in Chapter 3.

CHAPTER 3
Existing Water Supplies and Potential Future Water Supply Options

3.1 WATER SUPPLY OBJECTIVES

NMWD's water supply objectives are to enhance its local water supplies and create a more resilient and potentially diverse local water supply portfolio due to climate change and other factors. The objective of this Study is to evaluate water supply alternatives to increase NMWD's current local water supply by approximately 1,000 to 2,000 AFY.

Sonoma Water completed its October 2021 Climate Action Plan (CAP) to evaluate and understand the impacts of climate change on its water supply, flood management, and sanitation infrastructure and to create a road map for adaptation strategies. The CAP evaluated the historical climate trends and a range of future climate projections to develop and model scenarios of climate threats to the region. The region is susceptible to floods, droughts, wildfires, and other extreme meteorological and hydrological events.

Sonoma Water provides wholesale water supply to NMWD and other water retailers within Sonoma County and Marin County. Since NMWD obtains a significant portion of its water supply from Sonoma Water and is within close proximity to Sonoma County, NMWD's water supply portfolio is also impacted by climate change as described in the CAP.

The CAP projects the following climate change impacts to the Sonoma County region[1]:

- Increase in air temperature
- Increase in variability of precipitation
  - Increased winter precipitation
  - Decreased summer precipitation
- Increase in sea level rise
- Increase in severity and frequency of droughts
- Increase in flooding
- Increase in wildfires

The CAP summarizes adaption strategies to climate change for its water supply system as follows[2]:

- Improve water supply infrastructure resiliency
- Increase operational flexibility of water management facilities
- Improve system integration and regional resilience
- Improve watershed and natural resources management
- Advance science and technology

The CAP aids NMWD in understanding how climate change will affect its water supply portfolio and make informed decisions in enhancing its local water supplies due to the adverse effects of climate change. The

[1] Sonoma County Water Agency. October 2021. Climate Action Plan. Table 2. Synthesis of Projected Climate and Hydrologic Changes for the Russian River Watershed Region.

[2] Sonoma County Water Agency. October 2021. Climate Action Plan. Section 7 Adaptation Strategies.

proposed water supply alternatives, discussed in Section 3.3, incorporate different climate change adaptation strategies to enhance NMWD's local water supply and to create a more resilient and reliable water supply portfolio.

3.2 EXISTING WATER SUPPLIES

NMWD's existing water supply portfolio consists of purchased water from Sonoma Water, local water from Stafford Lake, and recycled water. Purchased water from Sonoma Water makes up about 75 percent of NMWD's potable water supply while supply from Stafford Lake makes up about 20 percent. NMWD is limited to receiving 14,100 AFY from Sonoma Water and is subject to curtailments when water supply from the Russian River is limited. For example, in response to the 2021 statewide drought, the State Water Resources Control Board (State Water Board) adopted an emergency regulation and issued a curtailment order (Appendix C) on June 15, 2021 to address dire drought conditions in the Russian River Watershed. The curtailment order restricted diversion of water from the Upper Russian River, except for minimum public health and safety needs and mandated a 20 percent reduction of Russian River water diversions for Sonoma Water in the lower Russian River.

Stafford Lake is considered NMWD's local water supply source. The lake captures runoff from 8.3 square miles of area, including land near the upper reaches of the Novato Creek. Stafford Lake has a capacity of 4,450 acre-feet and its water supply is dependent on rainfall and runoff into the lake.

Recycled water provides up to 7 percent of NMWD's annual water supply for landscape irrigation and commercial car wash operation. NMWD receives recycled water from NSD and the Las Gallinas Valley Sanitary District and is responsible for distributing the recycled water to customers within its water service area.

When a dry year is anticipated, NMWD has the option to purchase winter water flows from the Russian River and backfeed the water into Stafford Lake. This supplemental water, supplied by Sonoma Water for a cost of up to $400/AF, is treated water that is fed back through NMWD's potable water transmission system into Stafford Lake, and is then treated at the STP and returned to the distribution system for use during the dry season. As reported by the General Manager in a memorandum to the NMWD Board of Directors in November 2021 (Appendix D), NMWD purchased this supplemental supply seven times in the past 30 years, with volumes ranging from 130 AF to 1,100 AF. With increasing frequency of dry years due to climate change, NMWD anticipates more frequent purchase of winter water flows from Sonoma Water.

3.3 OVERVIEW OF POTENTIAL WATER SUPPLY ALTERNATIVES

This Study evaluates potential water supply alternatives to enhance NMWD's local water supply by approximately 1,000 to 2,000 AFY. Each alternative is evaluated in the subsequent chapters. The water supply alternatives include the following:

- Aquifer Storage Recovery in Novato Valley Basin
- Recycled Water System Expansion
- Indirect Potable Reuse
- Improve Stafford Treatment Plant Process Water Recapture Efficiency
- Divert Captured Stormwater into Stafford Lake
- Increase Stafford Lake Storage Capacity
- Desalination

Each of these alternatives were evaluated using criteria developed with NMWD and detailed in Chapter 4. The alternatives were scored and ranked for feasibility of enhancing NMWD's local water supply portfolio. Findings and recommendations are provided in Chapter 12.

3.3.1 Aquifer Storage Recovery in the Novato Valley Basin

ASR would allow NMWD to store water purchased from Sonoma Water, captured stormwater, or advance treated recycled water. West Yost evaluated the potential ASR water supply options by assessing the storage capacity, geochemistry, recovery rates, and the number of wells required to meet recovery objectives. The evaluation considered the use of ASR to provide water supply with quality similar to the Sonoma Water treated surface water.

Development and evaluation of this water supply option is detailed in Chapter 5.

3.3.2 Recycled Water System Expansion

Recycled water is a valuable, locally available, and sustainable water resource that plays a vital role in the NMWD's water supply portfolio. The use of recycled water offsets the volume of potable water used for non-potable application, thus freeing up limited potable water resources.

In light of the recent drought emergency, NMWD identified immediate near-term opportunities to expand recycled water use within its service area. NMWD retained West Yost to review NMWD's existing recycled water program and develop a road map and strategy for near-term actions and projects to expand recycled water use cost-effectively. This Study builds on that effort and considers opportunities for expanding recycled water use in the NMWD service area by connecting existing high-water use customers near the recycled water distribution system and looking at recycled water supply that could be used for an indirect potable reuse (IPR) program.

Development and evaluation of this water supply option is detailed in Chapter 6.

3.3.3 Indirect Potable Reuse

As part of this Study, West Yost assessed the availability of additional recycled water for developing an IPR program. IPR provides an opportunity to use highly treated recycled water to augment potable water supplies while eliminating several obstacles common with non-potable recycled water projects, such as the construction of costly storage and conveyance systems in urban areas.

While there are opportunities to add customers to the existing tertiary recycled water distribution system through in-fill, an IPR program could provide significantly more water at a competitive price, especially as it appears that most of the large water users located near the existing recycled water distribution system are already connected. This Study conceptually discusses and documents other potential potable reuse options, such as reservoir augmentation at Stafford Lake and raw water augmentation for comparison purposes.

Development and evaluation of this water supply option is detailed in Chapter 7.

3.3.4 Improve Stafford Treatment Plant Efficiency

West Yost built upon the results and recommendations made in the June 2019 Stafford Treatment Plant (STP) Efficiency Study (included as Appendix E). In the STP Efficiency Study, five different opportunities were identified to potentially increase the STP's net water production and recover water from treatment process waste streams. In this Study, one of the strategies identified in the STP Efficiency Study was further developed and evaluated in collaboration with NMWD staff. Specifically, the most significant amount of recoverable water identified in the STP Efficiency Study included the waste stream from pretreatment hydrocyclones.

Other ancillary improvements were also evaluated that would improve the reliability of the STP but not increase the water supply yield at the STP. These ancillary improvements include raw water intake modifications and replacement of the wastewater discharge pipeline.

Development and evaluation of this water supply option is detailed in Chapter 8.

3.3.5 Capture Stormwater into Stafford Lake

Capturing stormwater runoff from Bowman Canyon and Leveroni Canyon can increase the water supply from Stafford Lake. The Bowman Canyon and Leveroni Canyon watersheds are adjacent to the Stafford Lake watershed. Variations of this water supply alternative were considered, including diverting water from each watershed with and without a water supply/flood control basin, or constructing a dam at either Leveroni Canyon or Bowman Canyon to create a reservoir. The water collected in each evaluated reservoir would be pumped to Stafford Lake.

Development and evaluation of this water supply option is detailed in Chapter 9.

3.3.6 Increase Stafford Lake Storage Capacity

Expanding the capacity of Stafford Lake can provide NMWD with storage for additional water either purchased from Sonoma Water or captured local run-off. Additionally, in the future, the increased storage capacity could potentially be supplied by other local water sources, including treated groundwater, captured and treated stormwater, and/or advanced highly treated recycled water that meets potable reuse regulations and water quality requirements. For purposes of this Study, West Yost evaluated two alternatives to increase the water storage volume: (1) by the installation of a variable-level gate in the spillway notch be installed, and (2) by sediment removal.

Development and evaluation of this water supply option is detailed in Chapter 10.

3.3.7 Desalination

The potential of desalination of brackish groundwater and of Bay water for NMWD was considered at a conceptual level. This Study builds on the prior and on-going efforts of Marin Municipal Water District (MMWD) and Sonoma Water. MMWD conducted a desalination feasibility study more than 10 years ago and reviewed desalination as part of its Long-Term Water Supply Review in 2021. Sonoma Water's Resiliency Study, which evaluates the resiliency of its regional water system, is in progress. As part of the Resiliency Study, Sonoma Water assesses the feasibility of a regional project for developing desalination supply.

Because of its proximity to the NMWD, West Yost incorporated findings from the MMWD's desalination study and the Resiliency Study to evaluate the feasibility of this supply option for NMWD.

Development and evaluation of this water supply option is detailed in Chapter 11.

CHAPTER 4
Evaluation Methodology

This chapter provides a general overview of each criterion considered to evaluate the water supply alternatives. The following chapters will discuss each potential water supply alternative and evaluate each alternative using the criteria described herein. This chapter includes the following sections:

- Evaluation Criteria
- Scoring
- Prioritization

4.1 EVALUATION CRITERIA

Each potential water supply alternative presents benefits and challenges, both quantitative and qualitative. NMWD's preliminary criteria for evaluation included the following:

1. Cost
2. Hazards and risks
3. Water chemistry
4. Revenue or rate impacts
5. Water quality and treatment
6. Permitting and regulations (including water rights, environmental challenges, and California Environmental Quality Act (CEQA) Compliance requirements)
7. Public education and acceptance

These criteria were refined in collaboration with NMWD. The criteria were combined or revised as follows:

- Water Supply Yield and Reliability, discussed in Section 4.1.1, was added to address how much water each alternative could produce to meet NMWD's local water supply needs and qualitatively determine the likelihood of the alternative producing the anticipated yield. Under this criterion, the impact of climate change to the reliability of the alternative water supply is considered.
- Costs, Rate, and Revenue impacts were combined. As discussed in Section 4.1.2, capital and operating costs are evaluated together. Capital costs, replacement costs, and operating costs are translatable to rates. Revenue impacts will be relative to the volume of water generated by that water supply alternative.
- The Operational Impacts criterion, discussed in Section 4.1.3, was developed to address the impacts of each water supply alternative to the water treatment and distribution operations. The original criteria, water quality and treatment and water chemistry, were grouped together under this new criterion since those factors impact the operation of NMWD's water treatment and distribution system.
- Hazards and Risks were combined with Regulations and Permitting, discussed in Section 4.1.4, because the State has regulations and permitting requirements in place to manage hazards and risks associated with each alternative.
- Public Education and Acceptance was modified to be Public and Institutional Considerations, discussed in Section 4.1.5, to consider needed coordination, collaboration, partnerships, and support needed from other entities external to the NMWD.

- Other Considerations, discussed in Section 4.1.6, was added to discuss and document considerations that are relevant to each alternative that may not be addressed in the other criteria.

Thus, the following six criteria were used to evaluate each alternative.

1. Water Supply Yield and Reliability
2. Unit Cost
3. Operational Impacts
4. Regulations and Permitting
5. Public and Institutional Considerations
6. Other Considerations

To identify and prioritize feasible water supply alternatives for NMWD, the evaluation criteria were prioritized and scored. In this planning-level study, water supply yield and costs were evaluated quantitatively, while the other criteria were evaluated qualitatively, with the exception of other considerations. Each of the criterion are described in further detail below.

4.1.1 Water Supply Yield and Reliability

The water supply yield of each alternative was evaluated and quantified for how much it may potentially add to NMWD's local water supply portfolio. Some alternatives, such as improving the efficiency of the STP, may have limits on how much water they may add to local water supply. Some alternatives may not increase the local water supply but would reduce the demand on NMWD's potable water system. For example, expanding NMWD's recycled water system may shift irrigation demands from the potable water system to the recycled water system, decreasing the overall potable water demand.

The reliability of each water supply alternative is defined as the likelihood of that supply producing the anticipated yield and considers the risks that the alternative may not produce anticipated yield. The impacts of climate change on the reliability of each water supply alternative is considered qualitatively.

4.1.2 Unit Cost

Each water supply alternative will require new facilities or improvements to NMWD's existing facilities. A planning-level cost estimate was prepared for each water supply alternative. The total estimated cost per AF includes the capital cost, replacement cost, and operations and maintenance (O&M) cost. Estimated O&M cost includes additional labor, materials, energy, and chemicals that are needed for operation of the alternative water supply, as applicable, over a 30-year operational cycle. A net present value (NPV) analysis was performed over the 30-year operational cycle to calculate the total cost of each alternative, including the capital cost, future replacement costs and annual O&M costs. Unit costs (total cost over 30 years divided by the total supply yield over 30 years) were developed so each alternative may be objectively compared.

The Association for the Advancement of Cost Engineering (AACE) International publishes guidelines for classes of cost estimates and their expected accuracy ranges. Based on these guidelines, the preliminary cost estimate for each alternative is a Class 5 Estimate. Class 5 estimates are based on limited information and are generally prepared for strategic planning purposes, assessment of initial viability, evaluation of alternate schemes, and project screening. Typical accuracy ranges for Class 5 estimates are (-)20 to (-)50 percent on the low side and (+)30 to (+)50 percent on the high side.

The assumptions and contingencies used to prepare the cost estimates are included in Appendix F. The following general assumptions were used in estimating the project costs:

- A construction cost contingency of 40 percent was used, consistent with AACE International guidelines.
- Projects with capital costs less than $4 million are assumed to be constructed and implemented without financing.
- Projects over $4 million are assumed to be financed by NMWD at an interest rate of 3.5 percent for a 30-year period.
- An inflation rate of 3 percent was applied for future costs.
- An operational cycle of 30 years was used to estimate operating costs.

Because the water supply alternative project options vary significantly, project allowance percentage and operating contingency costs were developed specifically for each.

4.1.3 Operational Impacts

NMWD operates its facilities and system to maintain the high quality water it delivers to its customers. Under the operational impacts criterion, the impacts of the alternative supply to NMWD's water treatment and distribution system operations were evaluated. Under this criterion, the following items were considered, as applicable, for each water supply alternative:

- Challenges of potentially blending water supplies of different water quality at the treatment plant or within the distribution system;
- Need for additional chemicals to produce and maintain consistent high-quality water supply;
- The expected energy intensity of each water supply alternative; and,
- Additional staff resources and required certifications to operate proposed water supply facilities.

For example, introducing groundwater as a supply source could require additional chemicals to manage the differences in chemistry between existing surface water sources. An advanced treatment water facility may require additional staff resources with State-required certifications to operate the facility.

Operational impacts may present the need for additional resources associated with energy, chemicals, or personnel.

4.1.4 Regulations and Permitting

Applicable regulations and anticipated permitting requirements are evaluated for implementation of each water supply alternative. Depending on the water supply alternative option, construction permits, or long-term operating permits may be required for implementation and operation of a water supply project. Conformance with State regulations and permitting requirements protect the environment and public health and safety.

Under this criterion, potential environmental impacts of the alternative water supply are qualitatively considered along with conformance with CEQA. Permitting requirements and issuing agency, specific to each alternative, are also considered. For example, increasing the capacity of Stafford Lake by modifying its spillway would need review and approval by the California Division of Safety of Dams (DSOD). Implementation of an indirect potable reuse project by reservoir augmentation or groundwater augmentation would need review by the State Water Board.

Conforming with regulatory and permitting requirements can be challenging or straightforward, with potential cost and schedule impacts for projects. NMWD has established relationships with the following regulatory and permitting agencies:

- California Department of Fish & Wildlife (CDFW)
- State Water Board – Division of Drinking Water
- State Water Board – Division of Water Rights
- San Francisco Bay Regional Water Quality Control Board (SF Bay RWQCB)
- United States (U.S.) Army Corps of Engineers
- Division of Safety of Dams (DSOD)
- Department of Water Resources (DWR)

If an alternative water supply is implemented, NMWD will need to work with the relevant regulatory and permitting agencies.

4.1.5 Public and Institutional Considerations

Successful implementation of projects requires support from the public and stakeholders, and partnership and agreements with other entities. Public and institutional considerations associated with each water supply alternative may include any of the following:

- Public acceptance,
- Coordination and collaboration with other entities,
- Need for partnership or agreements with others, and
- Easements required from other entities.

Public and institutional considerations vary for each alternative. Public acceptance and support are necessary to move projects forward. For example, while public interest and acceptance have increased regarding non-potable reuse, indirect potable reuse of recycled water may still be challenging. Any of the alternative options that are perceived to have adverse environmental impacts, high energy consumption, or a large carbon footprint may face challenges from individuals or organizations.

Public and institutional considerations for projects can vary widely, along with the degree of their challenges. NMWD has developed long-standing relationships and partnerships with the following neighboring agencies through their history of coordination and collaboration:

- City of Novato
- County of Marin

- Novato Sanitary District
- Las Gallinas Valley Sanitary District
- Marin Municipal Water District
- Marin County Flood Control & Water Conservation District[1]
- Marin County Parks
  - Including Marin County Parks and Open Space District

NMWD works closely with the Marin County Community Development Agency and the City of Novato to plan for water services within its service area.

NMWD regularly participates in and is a member of the following regional entities:

- North Bay Water Reuse Authority,
- North Bay Watershed Association,
- Sonoma County Water Agency – Water Advisory Committee
  - Technical Advisory Committee

NMWD may require the support of any of these entities to implement projects associated with the selected water supply alternatives.

4.1.6 Other Considerations

Some considerations are unique to each water supply alternative, but are not addressed by any of the above criteria. Although they are part of the evaluation, they are not scored. Nonetheless, these considerations are important for the implementation of projects and are discussed in the Study.

4.2 SCORING

In Section 4.1, each of NMWD's evaluation criteria is defined. Table 4-1 summarizes the quantitative criteria, water supply yield and unit cost, which will be supported by the qualitative criteria, summarized in Table 4-2.

Table 4-1. Quantitative Scoring Criteria

Criterion	Measure	Units
Water Supply Yield	Quantitative	Annual Volume, acre-foot per year
Unit Cost	Quantitative	Dollars per acre-foot

The scoring methodology selected for the qualitative criteria is a 5-point rating scale assigning 1 through 5 to the different criterion listed in Table 4-2. Each criterion has its own measurement but is scored using

[1] A separate political subdivision of the State but staffed by County of Marin and the County Board of Supervisors serve as the District Board.

1 through 5 based on the likelihood of success for the water supply alternative with respect to the criteria. The scoring assigned to each criterion is defined as follows:

- 1 – Least advantageous
- 2 – Slightly less advantageous
- 3 – No change
- 4 – Slightly more advantageous
- 5 – Most advantageous

Table 4-2. Qualitative Criteria Scoring

Criterion	Measure	5-Point Rating Scale				
		1	2	3	4	5
Water Supply Reliability	Degree of Reliability	Least Reliable	Slightly Less Reliable	Moderately Reliable	Slightly More Reliable	Most Reliable
Operational Impacts	Operational Demands	Most Impacted	Slightly More Impacted	Moderately Impacted	Slightly Less Impacted	Least Impacted
Regulations and Permitting	Complexity	Most Complex	Slightly More Impacted	Moderately Complex	Slightly Less Complex	Least Complex
Public and Institutional Considerations	Challenges	Most Challenging	Slightly More Challenging	Moderately Challenging	Slightly Less Challenging	Least Challenging

4.3 PRIORITIZATION

During the course of this Study, NMWD staff was asked to prioritize the qualitative criteria. West Yost presented the priority of the criteria to the NMWD Board of Directors at its January 25, 2022 Public Workshop for this Study. The Board workshop also served to provide the public opportunity to comment. This process allows NMWD to make prudent decisions in meeting the most important requirements for its customers.

Table 4-3 presents the qualitative criteria which are weighted by priority and sum to 100 percent. The weighted scores were used in addition to the water supply yield and cost criteria to rank each alternative.

Table 4-3. Qualitative Criteria Priorities

Criterion	Weight, percent
Water Supply Reliability	40
Operational Impacts	30
Regulations and Permitting	20
Public and Institutional Considerations	10
Total	**100%**

CHAPTER 5
Aquifer Storage Recovery in Novato Valley Basin

This chapter presents the potential for and an evaluation of ASR in the local Novato Valley Groundwater Basin (Novato Valley Basin) to provide alternative water supply when treated surface water supplies are limited or unavailable to NMWD. As detailed herein, the feasibility of ASR is limited due to the characteristics of the groundwater basin. Consequently, consideration of new or reconditioned existing groundwater wells as a source of supply within the Novato Valley Basin is also very limited. An evaluation of this alternative has been conducted so that it may be compared with other potential water supply alternatives that may be available to NMWD.

5.1 ASR AS A WATER SUPPLY ALTERNATIVE

ASR may provide water supply with quality similar to treated surface water supplies when these supplies are limited or not available. ASR wells would be used to inject treated surface water from the distribution system into a suitable aquifer during times when surplus treated water is available. The same wells would be used to withdraw the stored water from the aquifer when the treated surface water supplies are limited or not available (Figure 5-1).

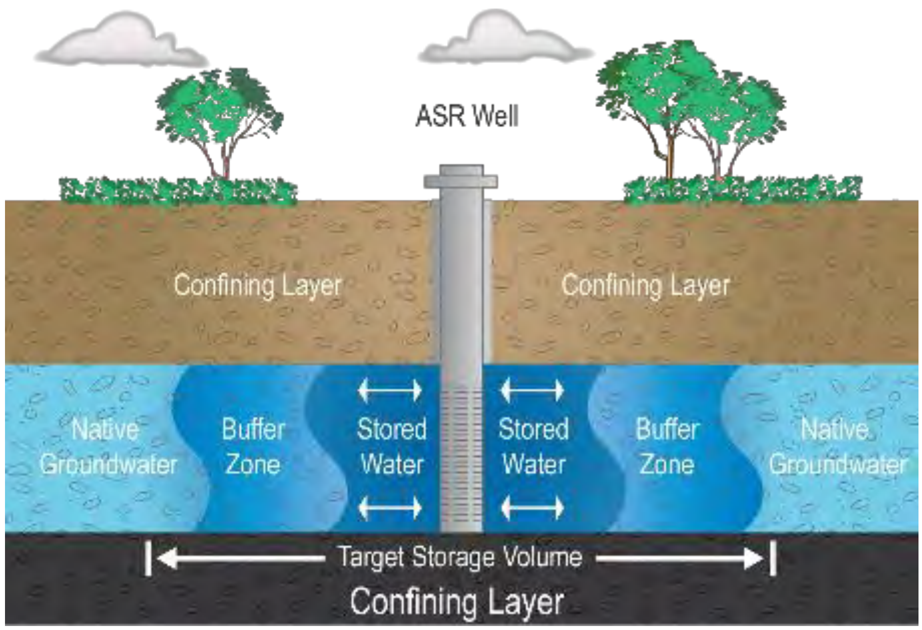


Figure 5-1. Conceptual ASR Schematic

The presence of a suitable aquifer is essential to ASR. The aquifer must have sufficient capacity to store the anticipated volume of treated surface water and sufficient permeability to enable ASR wells to operate at rates that meet storage and recovery needs and are economically feasible.

As a local water supply alternative, ASR would need to be implemented within the groundwater basin underlying the NMWD service area. Construction of ASR wells within the areas of the City of Novato overlying the groundwater basin would allow the use of existing water pipelines to convey treated water to the ASR wells and deliver water pumped from the wells to customers.

5.1.1 Novato Valley Groundwater Basin Characteristics

Figure 5-2 shows the NMWD and City of Novato service areas in relation to the underlying Novato Valley Basin (DWR Basin designation No. 2-30).[1]

The State of California designates and prioritizes 515 groundwater basins within the State and also recognizes that groundwater occurs in bedrock settings.[2] Groundwater within the designated groundwater basins exists in the pore spaces of relatively young, unconsolidated to weakly consolidated sediments deposited in the basins through sedimentary depositional processes. In bedrock settings, groundwater occurs in fractures, and less commonly, in open voids. Volumetrically, the vast majority of groundwater production in California is from designated groundwater basins.[3] Well yields in bedrock areas are unpredictable, typically very low, and susceptible to drought conditions because of the irregular nature of bedrock fractures and voids and the low storage capacity of these features. This is especially true of the Coast Range bedrock underlying NMWD's service area, which consists primarily of very low permeability rocks of the Franciscan Complex.[4]

In its 2019 groundwater basin prioritization, DWR designated Novato Valley Basin as low priority, which means that a Groundwater Sustainability Plan does not need to be prepared to guide management of the basin pursuant to the requirements of the 2014 Sustainable Groundwater Management Act.[5] The factors contributing to the low priority designation were the lack of public supply wells, low density of wells, limited irrigated area, limited groundwater use and limited potential for environmental impacts related to groundwater use. DWR's assignment of a low priority ranking reflects the limited availability and use of groundwater in the Novato Valley Basin.

The underlying aquifer is comprised of relatively young (Pleistocene to Holocene age) alluvial sediments of unconsolidated clay, silt, and sand with discontinuous lenses of gravel with reported thicknesses ranging from approximately 60 feet near the City of Novato to more than 200 feet near San Pablo Bay. Historical well production from sand and gravel layers 25 feet to 50 feet below ground surface averaged a flow rate of approximately 50 gallons per minute (gpm). Groundwater in the basin has relatively high total dissolved solids, and brackish water intrusion is a concern near San Pablo Bay. [6]

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[1] California Department of Water Resources (DWR), 2004, California's Groundwater Bulletin 118, Individual Basin Description for the Novato Valley Basin, DWR Basin Designation 2-30, February 27, 2004.

[2] DWR, 2020, California's Groundwater Update, 2020, at: https://data.cnra.ca.gov/dataset/calgw_update2020, accessed February 2, 2022.

[3] DWR, 2020b, Sustainable Groundwater Management Act 2019 Basin Prioritization Process and Results, at https://gis.water.ca.gov/app/bp-dashboard/final/, accessed February 2, 2022.

[4] United States Geological Survey (USGS), 2020, Geologic map and map database of parts of Marin, San Francisco, Alameda, Contra Costa, and Sonoma Counties, California, Miscellaneous Field Studies, MF-2337, Version 1.0, accessed at: https://pubs.er.usgs.gov/publication/mf2337, February 2, 2022.

[5] DWR, 2020b.

[6] California Department of Water Resources (DWR), 1975, Sea-Water Intrusion in California, Inventory of Coastal Ground Water Basins, Bulletin 63-5, October.

Cardwell, G.T., 1958, Geology and Groundwater in the Santa Rosa and Petaluma Valley Areas, Sonoma County California, U.S. Geological Survey Water-Supply Paper 1427.

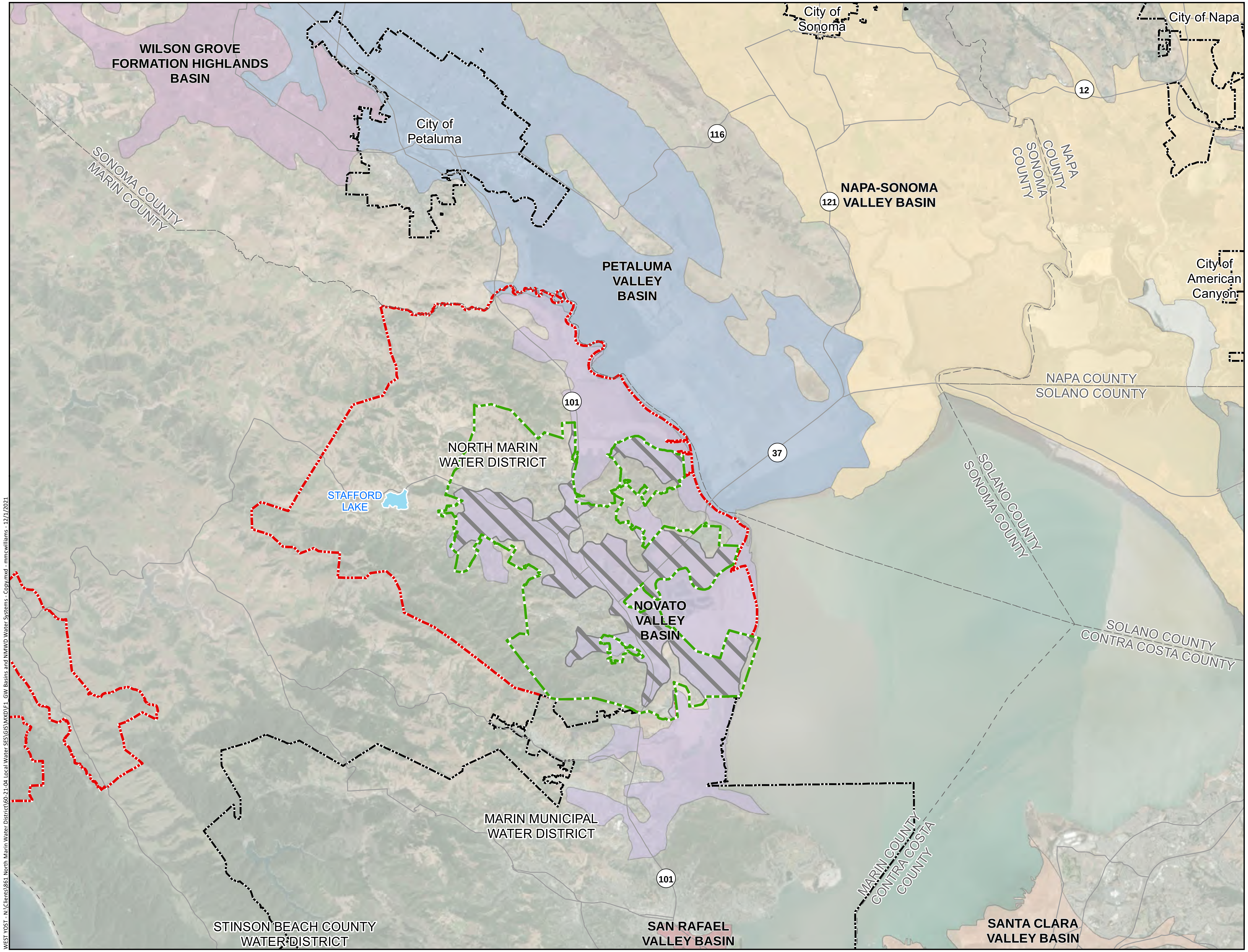

Figure 5-2

Novato Valley Groundwater Basin

North Marin Water District
Local Water Supply
Enhancement Study

Groundwater was the sole source of supply in the Novato Valley area prior to construction of Stafford Dam and completion of the STP in 1952. Prior to 1948, groundwater was pumped from private wells, some of which were owned and operated by the Novato Water Company (a privately owned public utility). Novato Water Company provided municipal water service to the unincorporated Novato area consisting of approximately 500 customers. NMWD was formed and purchased the Novato Water Company in 1948 in response to severe water shortages resulting from rapid growth and the inability of the existing private wells to provide sufficient high-quality water supplies.[7]

NMWD constructed four additional municipal supply wells in the Novato area in 1950. Use of the wells for municipal supply was terminated in 1952, when the treated surface water supply from Stafford Lake became available. The construction and historical usage records for the private and municipal wells in the Novato area document that the wells ranged from approximately 40 feet to 90 feet in depth and typically had yields ranging from 25 to 50 gpm.[8]

The median well depth for the Novato Valley Basin is approximately 55 feet.[9] These well depths are consistent with the published DWR and United States Geological Survey (USGS) references cited above and provide a good estimate of the depth of the groundwater basin in the City of Novato, because the wells are thought to terminate at the top of bedrock.

Recent (October 2019 through October 2021) measurements of the depth to groundwater in central Novato ranged from 6 to 9 feet below ground surface.[10] Using this range of depths to groundwater and assuming the 40 feet to 90 feet depth of the older Novato wells as representative of the depth of the basin, the saturated thickness of basin-fill sediments ranges from approximately 30 feet to 85 feet within the Novato area.

5.1.2 Water Supply Yield and Reliability

A local ASR program in the Novato Valley Basin does not appear to be feasible because of the limited storage capacity and low permeability of the aquifer. The low ASR injection rates are the most limiting factor. Assuming an injection rate of 30 gpm (60 percent of the typical historical 50 gpm pumping rate) and the availability of treated surface water for injection for 110 days per year (e.g., from mid-November through March), then each ASR well would be capable of injecting approximately 15 AFY into the aquifer.

The storage capacity available for a local ASR program aquifer was not quantified in this Study due to the lack of data. However, storage capacity is likely to be significantly less than 1,000 AFY because the total estimated storage volume of the entire basin is estimated to be approximately 4,000 AF.[11] Only a fraction of the total storage of the basin would be available for ASR. Limitations in the availability of suitable ASR

[7] NMWD, 2022, NMWD website at https://nmwd.com/about/history, accessed February 2, 2022.

[8] NMWD, 2010, Old Novato Wells Abandonment Study, prepared by Edith M.S. Robbins, P.E., June 28.

[9] DWR, 2021, DWR Online System of Well Completion Reports at https://water.ca.gov/Programs/Groundwater-Management/Wells/Well-Completion-Reports, accessed September 15, 2021.

[10] DWR, 2022, DWR Water Data library at https://wdl.water.ca.gov/waterdatalibrary/Map.aspx, accessed February 22, 2022.

[11] T.C. Binkley Consulting Engineer. April 1960. Water Supply and Distribution Study North Marin Water District. Chapter 4 – Sources of Water Supply.

well sites, the extent of necessary conveyance infrastructure, and the potential for adverse impacts to other beneficial uses and users of the groundwater basin present siting and operational constraints.

5.1.3 Infrastructure Requirements

As discussed in Section 5.1.2, an ASR water supply option does not appear to be feasible for NMWD due to limited storage capacity and low permeability of the aquifer. For conceptual purposes, a local ASR project would require ASR wells and transmission pipelines would be required to transport treated water supply from the NMWD's water distribution system to the ASR wells. Each ASR well would be constructed to a depth of approximately 50 feet using 10-inch diameter 304 stainless steel casing and louvered well screen. The wells were assumed to have an injection capacity of 30 gpm and an extraction capacity of 50 gpm. When needed to supplement water supplies, the stored water would be recovered from the aquifer using the proposed ASR wells and pumped back into NMWD's potable water distribution system using the ASR well pumps. No treatment except for chlorination was assumed to be needed.

5.1.4 Implementation Timing

Although not considered to be feasible, a local ASR program could be implemented in approximately four to five years, including approximately one year for planning and permitting, one year for design, one to two years for ASR facility construction, and one year for baseline testing of the constructed ASR facilities. Thereafter, additional ASR wells could be constructed in phases. Permitting, design and construction of additional ASR wells would take approximately three years per phase.

5.2 WATER SUPPLY ALTERNATIVE EVALUATION

The potential benefits of ASR include the ability to store and then recover high-quality water when treated surface water supplies are limited or unavailable, improvements in local groundwater quality, and the ability to apply conjunctive use strategies to the management of the groundwater basin. Operational advantages of ASR wells are that the treated water is recoverable at the ASR well, and operation and maintenance are simplified relative to injection only wells because the installed pumping equipment is used to reduce the plugging that typically occurs in an injection only process, thereby restoring and maintaining well capacity and efficiency.

The primary challenges of a local ASR program in the Novato Valley Basin are the limited thickness, storage capacity, and permeability of the aquifer. The aquifer thickness limits well capacities because only shallow wells with limited intakes could be constructed. Because of the limited aquifer thickness and low permeability, the estimated ASR injection rate is approximately 30 gpm, and the estimated extraction rate is approximately 50 gpm. The limited thickness of the aquifer is also the primary factor limiting the aquifer's storage capacity.

Although an ASR water supply option does not appear to be feasible for NMWD, this project is evaluated at a conceptual level to allow comparison with other water supply alternatives.

5.2.1 Cost Estimate

A planning level cost estimate for the construction and operation of a local ASR project, along with assumptions, is provided in Table 5-1. The cost estimate is per ASR well with the following alternative specific assumptions:

- Project Allowance = 35 percent
- Operating Contingency = 35 percent
- The total cost for a local ASR project is only for the construction and operation of one ASR well. The cost estimate does not include other costs, such as well siting or property acquisition, to illustrate that an ASR program is cost-prohibitive for NMWD to pursue at a local level within the Novato Valley Basin without other added costs. Including these other costs would increase the unit cost per ASR well over the 30-year project period.

Appendix F provides a more detailed cost estimate for the local ASR alternative.

The total capital cost for an ASR well is estimated to be $3.4 million including the construction contingency and project allowance. The 30-year NPV replacement cost is estimated to be $0.6 million. Table 5-2 summarizes the ASR components that were assumed to be replaced and the frequency of replacement within the 30-year project horizon. The annual O&M cost is estimated to be $35,000, including the 35 percent operating contingency, for one ASR well. The 30-year NPV O&M cost is estimated to be $1.0 million using a 3.5 percent discount rate.

The total cost (total capital cost plus NPV costs) for the local ASR alternative is estimated to be $5.01 million per ASR well. Assuming seasonal injection and recovery of approximately 15 AFY, the additional yield over a 30-year period is estimated to be approximately 450 AF. The unit cost per ASR well is estimated to be approximately $11,200 per AF over a 30-year period.

Table 5-1. Total Estimated Per Well Costs for Local ASR Program

Cost Item	Estimated Cost, million dollars
Total Capital Cost[(a)]	3.40
Total Replacement Cost	0.60
Total O&M Cost[(b)]	1.01
NPV Total Cost	**$5.01**
Total Supply over 30 years[(c)], AF	450 AF
Unit Cost over 30 years, dollars/AF[(d)]	**$11,200/AF**

Notes:

(a) A per well base construction cost is estimated to be $1.8 million and assumes 10-inch diameter well, constructed to a depth of 50 feet. Assumes all required civil, mechanical, and electrical equipment for and municipal ASR well, including masonry building, plus ASR flow control valves, piping and mechanical and controls. Assumes conveyance pipeline length of 100 feet. Cost of land purchase or lease is not included. Wellhead treatment, except for chlorination is not included. The construction contingency was estimated to be 40 percent and the project allowance for planning, permitting, engineering, legal, and administrative costs was estimated to be 35 percent.

(b) The annual O&M base cost (no operating contingency) was estimated to be $25,000 per year per well and excludes power costs. Power costs are flow dependent and were estimated based on assumed unit energy use of approximately 89 kW-hour per acre-foot during injection and 170 kW-hour per acre-foot during extraction, and an average energy cost of $0.18 per kW-hour. These assumptions equate to an annual power cost of $679 per ASR well. An inflation rate of 3.0 percent and discount rate of 3.5 percent was applied to determine the net present value of the annual O&M costs over the 30-year project horizon. An operating contingency of 35 percent was applied to the O&M cost.

(c) Annual supply yield of 15 AFY assumes an injection rate of 30 gpm, the availability of treated surface water for injection for 110 days per year and an extraction rate of 50 gpm for a duration needed recover the water injected each year.

(d) Unit Cost = NPV Total Cost divided by the total supply yield over 30 years. Unit costs rounded up to the nearest 100 dollars.

Table 5-2. Estimated Year of Replacement and Frequency for ASR Components

ASR Component	Year of Replacement/Frequency
Cl_2 Injection System	1
Chemical Pumps	2
Water Level Transducer	3
Column Tube, Foot Valve, Flow Control Valve Hydraulic Pump, Air-Vacuum Release Valve	5
Well Rehabilitation, Pump Bowls, Motor Valves, Globe Valves	10
Flow Meters	12
Injection Flow Control Valve	15

5.2.2 Operational Impacts

A local ASR program would affect NMWD operations by adding the operation and maintenance of ASR wells to the existing treated surface water system. Routine operations would include coordinating with Sonoma Water to monitor the seasonal availability of treated surface water; scheduling injection and recovery of the available treated surface water; operating the wells during injection, extraction, and backflushing cycles; monitoring injection, extraction, and backflushing volumes and water quality; and compliance reporting, including additional requirements for consumer reporting. Maintenance activities would include intra-cycle backflushing of the wells to restore capacity, and rehabilitation and replacement of the wells, pumps, motors, and associated equipment.

Additional power requirements would be relatively low due to the limited capacity of the wells and relatively shallow pumping depths. Chemical costs would also be low and limited to chlorination of the recovered water at each ASR well if needed.

5.2.3 Regulations and Permitting

An ASR program would require compliance with CEQA and preparation of an Environmental Impact Report (EIR). The EIR process would involve a comprehensive evaluation of permitting requirements and approvals. The following regulatory approvals would be needed:

1. Water rights may need to be modified to allow underground storage.
2. To test and implement an ASR program, NMWD would need to file a Notice of Intent and receive a Notice of Applicability from the RWQCB for coverage under State Board Water Quality Order 2012-0010, General Waste Discharge Requirements for Aquifer Storage and Recovery Projects that Inject Drinking Water into Groundwater.
3. Drinking water source permits would need to be issued by the State Water Board - DDW for each new ASR well.
4. Well permits would be needed from the Marin County Environmental Health Services Division.

DDW and Marin County Environmental Health Services Division well standards require a 50-foot sanitary seal in municipal supply wells. Due to the limited thickness of saturated sediments in the Novato Valley Basin, an exception to these standards would be required.

5.2.4 Public and Institutional Considerations

A local ASR program would require coordination with Sonoma Water. Sonoma Water would need to lead any required efforts to petition the State Water Board for modification of their water rights to allow underground storage in the Novato Valley Basin. An agreement and coordination with Sonoma Water would be needed to forecast and manage delivery of Sonoma Water treated surface water to be stored underground.

Other public and institutional considerations associated with a local ASR program include potential concerns over well siting, and potential environmental impacts resulting from ASR well site development and ASR operations. These potential public and institutional concerns may be addressed through selection of acceptable ASR well sites and development of acceptable monitoring and mitigation measures during the CEQA process.

5.2.5 Other Considerations

Additional concerns with regard to a local ASR program include uncertainty over groundwater flow velocities, possible geochemical reactions, and the potential for environmental impacts.

Groundwater flow could cause movement of the treated surface water away from the ASR well through which the water is injected. Variations in groundwater flow velocities caused by heterogeneity in the aquifer could also cause mixing of the stored water and native groundwater. Both of these effects could reduce the amount of recoverable, high-quality treated surface water.

Geochemical reactions during injection and storage could lead to plugging or generation of dissolved constituents, such as metals or disinfection byproducts, which could violate drinking water standards. ASR operations could also cause mobilization of existing contaminant plumes.

Potential environmental impacts due to ASR operations include impacts to stream flow and riparian habitats, decreases in the depth to groundwater and associated impacts to drainage and other infrastructure. If excessive pumping were to occur, the Novato Valley Basin may potentially experience brackish water intrusion.

5.3 FINDINGS AND CONCLUSIONS

A local ASR program involving storage and recovery of treated surface water from the Novato Valley Basin appears to be infeasible based on the information available at this time. The primary reasons are the limited pumping and injection capacity of wells constructed in the basin and the limited storage capacity of the basin. Both of these limitations are a consequence of the limited saturated thickness of aquifer sediments and their low permeability. The limited capacity of potential ASR wells would result in a very low yield in comparison to the cost of a local ASR program.

ASR may be a viable alternative for providing supplemental supply to NMWD, if feasible in other nearby groundwater basins capable of storing treated surface water provided by Sonoma Water or other local agencies. The Resiliency Study includes an evaluation of ASR in the Santa Rosa Plain, Petaluma Valley and Sonoma Valley Basins. If feasible, ASR or other groundwater banking programs would improve the resiliency and reliability of the Sonoma Water supply delivered to NMWD.

NMWD should continue to coordinate with Sonoma Water to stay current with the findings, conclusions and recommendations of the Resiliency Study and other regional studies pertinent to ASR, groundwater banking and conjunctive use. If feasible alternatives are identified, NMWD should consider participating in scoping and planning sessions with Sonoma Water and other local agencies as a next step towards developing projects and programs to improve regional water supply resiliency and reliability.

CHAPTER 6
Recycled Water System Expansion

This Chapter presents the potential for expansion and includes an evaluation of NMWD's existing recycled water system, which distributes water for non-potable use. As detailed herein, recycled water may potentially offset current and future potable water demand thus expanding NMWD's local water supply.

6.1 EXPANSION OF RECYCLED WATER TO ENHANCE WATER SUPPLY

Expanding use of recycled water, offsets the volume of potable water used for non-potable application, thus freeing up limited potable water resources. NMWD may expand its recycled water program by extending its recycled water distribution system and by expanding the potential uses for recycled water.

6.1.1 Extension of Recycled Water Distribution Pipelines

NMWD currently delivers recycled water to customers in the City for outdoor irrigation use, dust control and construction activities, and commercial car washing. NMWD's existing recycled water system includes approximately 17 miles of distribution pipelines that deliver recycled water to just under 100 connections within the City. Proposed development within the City has increased significantly over the last few years. Planned new development within Novato and the conversion of existing outdoor landscapes from potable water to recycled water provide opportunity to expand the recycled water system and further reduce reliance on limited potable water supply for non-potable uses. This alternative evaluates the potential for expanding the distribution system to reach additional City customers.

6.1.2 Other Recycled Water Use Expansion Opportunities

Since NMWD began operation of its recycled water system, several potential new or expanded uses of recycled water have been identified by NMWD staff and/or by members of the community. For instance, NMWD has an established residential fill station as well as several commercial fill stations (via designated hydrant locations). The opportunities presented would increase accessibility of recycled water for residential landscaping and commercial use. The proposed expanded use applications would increase recycled water use but would also require additional staffing for program oversight and monitoring.

In 2021, NMWD staff retained West Yost to further assess these expansion opportunities. The required program changes, staffing needs, and additional studies were identified as part of the assessment. West Yost worked with NMWD staff to prioritize consideration and additional study of these applications. A copy of the prioritization memo[1] is included with this report as Appendix G. The recycled water expansion opportunities that were identified and evaluated include the following:

- Expansion of residential fill stations
- Privately-owned recycled water storage tanks
- Delivery of recycled water to residential customers for landscape application during drought periods
- Livestock watering

[1] West Yost. November 2021. Recycled Water Program Strategy Technical Memorandum.

Increasing the availability of recycled water through fill stations, privately-owned storage tanks, and customer delivery will help reduce potable water use, however, since these are not permanent connections to the recycled water system it is difficult to quantify the long-term potable water offset. These options are addressed in the prioritization memo. Additionally, livestock watering, a recycled water use not currently permitted by NMWD, has been proposed. NMWD will continue to assess these expansion options under separate studies.

6.2 EXISTING RECYCLED WATER SYSTEM

NMWD began planning for a phased recycled water program in the 2000's with the completion of the North Bay Water Reuse Phase 1 Feasibility Study (2005) and the Recycled Water Implementation Plan (May 2006) by Nute Engineering. The phased implementation plan identified three service areas - North, Central and South. Distribution pipelines have been constructed within each service area. NMWD receives recycled water from NSD and LGVSD. This section describes the recycled water facilities and service areas.

6.2.1 Recycled Water Supply

NMWD receives recycled water from three different local recycled water facilities (RWFs). NMWD has entered into inter-agency agreements with NSD and LGVSD for the production of disinfected tertiary recycled water. NMWD is responsible for the storage and distribution of recycled water. The following provides an overview of the RWFs.

- Deer Island Recycled Water Facility: The NMWD-owned and operated Deer Island RWF is a 0.5 million gallons per day (MGD) tertiary treatment plant located within the NMWD service area. The facility receives treated secondary effluent from NSD. This facility provides recycled water primarily to the Stone Tree Golf Club and Novato Fire Protection District Station #2, as well as two commercial fill stations located in the North Service Area.
- Davidson Street Recycled Water Facility: The NSD-owned and operated Davidson Street RWF, located at NSD, is a tertiary RWF with a firm recycled water capacity of 1.7 MGD (total capacity of 2.55 MGD). The Davidson Street RWF provides recycled water supply to the North and Central Service Area distribution system. An interconnection pipeline between the Davidson Street and Deer Island RWFs provides reliability of the recycled water supplies.
- Las Gallinas Valley Sanitary District Recycled Water Facility: The Las Gallinas Valley Sanitary District RWF was recently expanded to increase recycled water production capacity from 0.7 MGD (firm capacity) to 4.0 MGD (firm capacity). The LGVSD RWF provides recycled water supply to both Marin Municipal Water District and NMWD's South Service Area. Of the total 4.0 MGD capacity, 0.7 MGD is allocated NMWD.

In the 2021 fiscal year, NSD provided 665 AF and LGVSD provided 124 AF of recycled water within NMWD's service area.

6.2.2 Recycled Water Distribution and Storage Facilities

NMWD's recycled water distribution system includes approximately 17 miles of pipelines and four storage tanks with a total approximate storage capacity of 1.5 million gallons (MG). NMWD's storage tanks are used to provide storage of recycled water produced to supply peak irrigation demands in the summer months. Currently, the NMWD system has one on-demand booster pump station in the South service area.

NMWD's three general service areas are shown on Figure 6-1 and described as follows:

- **North Service Area:** Recycled water is conveyed from the Deer Island RWF to the Stone Tree Golf Course and the Novato Fire Department. In addition, an interconnection on Atherton Avenue between the Deer Island RWF and the NSD's Davidson Street RWF was constructed to improve the reliability of recycled water supplies. Recycled water is conveyed from NSD's Davidson Street Recycled Water Facility to users including Fireman's Fund Industrial Park, Hamann Ball Field, Valley Memorial Park cemetery, and two drive-through carwash stations. Recycled water storage is provided by the Plum Street Tank that has an operational storage capacity of 0.5 MG.
- **Central Service Area:** Recycled water is conveyed from the Davidson Street Treatment Facility to private and public landscape irrigation customers, including homeowner associations, Marin Country Club, Vintage Oaks Shopping Center and one drive-through carwash station. This service area includes 5.7 miles of recycled water pipelines, a below-grade crossing of Highway 101, and recycled water storage at the Norman Tank. The Norman Tank has an operational storage capacity of 0.5 MG. The North and Central service areas are interconnected at Slade Park to allow for redundant storage.
- **South Service Area:** Recycled water is conveyed from the LGVSD Recycled Water Facility to landscape irrigation customers located in the South Service Area (also referred to by NMWD as the Hamilton Area). Recycled water storage is provided by the Reservoir Hill Tank that has an operational storage capacity of 0.5 MG.

WEST YOST - \\wya.local\Corporate\Clients\861 North Marin Water District\60-21-04 Local Water SES\GIS\MXD\Figure 6-1 Existing Recycled Water System.mxd - cplttner - 3/7/2022

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Figure 6-1

Existing Recycled Water System

North Marin Water District

Local Water Supply Enhancement Study

6.3 WATER SUPPLY YIELD AND RELIABILITY

This section describes the new recycled water demand estimated along the proposed pipeline extension and expected supply reliability.

6.3.1 New Recycled Water Demand

NMWD has identified new recycled water demand associated with planned development in Novato and with conversion of existing potable water sites to recycled water. This section provides a description of the potential new recycled water use based on new user demand information provided by NMWD[2].

New demand was categorized by customer location with each service area (North, Central, or South) and each customer location was assigned a unique identification number. Demands for existing irrigation sites located in the vicinity of planned development projects that could potentially be converted from potable water to recycled water use (also referred to as site retrofits) were also identified by NMWD. Proposed new pipeline segments to extend the recycled water distribution system to serve new development sites were developed based on the location of concentrated new customer locations.

Because the cost and effort for expanding the recycled water system could be significant, NMWD must consider the following factors when making its decision to expand[3]:

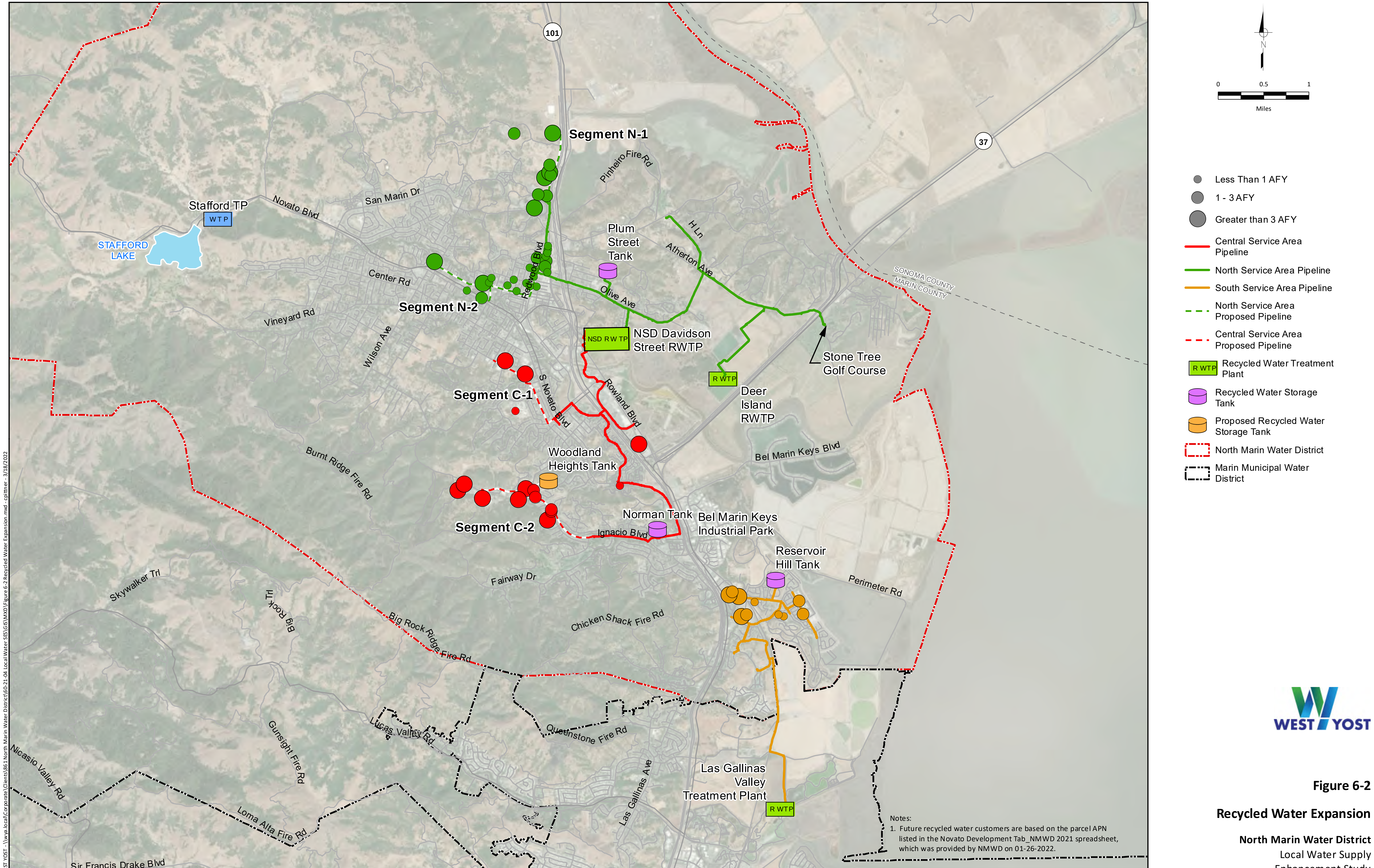
- Future customer location and proximity to the recycled water distribution system;
- Presence of substantial enough opportunities for use of non-potable water to warrant connection to recycled water distribution system; and
- Capacity of recycled water treatment facility and distribution system to meet available demand.

On Figure 6-2, the potential extension pipelines are presented. The alignments are summarized below:

- **Segment N-1:** Redwood Boulevard between Wood Hollow Drive and the Days Inn (Demand N-2)
- **Segment N-2:** Redwood Boulevard, Grant Avenue, and Virginia Avenue between Olive Avenue and Simmons Lane
- **Segment C-1:** Cambridge Street and Hill Road between South Novato Boulevard and Diablo Avenue
- **Segment C-2:** Ignacio Boulevard between Country Club Drive and the College of Marin (Demand C-3)

[2] Information provided by NMWD is primarily based on discussions with the City of Novato Planning Staff.

[3] North Marin Water District. June 2021. 2020 Urban Water Management Plan. Section 4.2.2



Notes:
1. Future recycled water customers are based on the parcel APN listed in the Novato Development Tab_NMWD 2021 spreadsheet, which was provided by NMWD on 01-26-2022.

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Figure 6-2

Recycled Water Expansion

North Marin Water District
Local Water Supply
Enhancement Study

Demands for the 57 potential customers identified by NMWD are summarized by segment in Table 6-1. Appendix H includes a summary of all potential recycled water customers and their associated demand.

Table 6-1. Summary of Recycled Water Demands by Service Area

Potential Extension Segment	ID No.	Recycled Water Demand (AFY)
North Service Area		
Segment N-1	N-1 to N-4, N-7 to N-9	17
Segment N-2	N-11 to N-18, N-26 to N-32	23
Existing Pipeline on Redwood Boulevard - New Users	N-10, N-19 to N-25	59
	North Service Area Subtotal	**99**
Central Service Area		
Segment C-1	C-13 to C-15	4
Segment C-2	C-3 to C-12	19
Existing Pipeline on Hill Street and Cambridge Street- New Users	C-1 and C-2	58
	Central Service Area Subtotal	**81**
South Service Area		
Existing Pipelines throughout Zone - New Users	S-1 to S-10	21
	South Service Area Subtotal	**21**
	Grand Total	**201**

Source: Provided in Appendix H.

AFY = acre-feet per year

6.3.1.1 Future Retrofit Opportunities

NMWD has received interest from an existing water customer located in the Bel Marin Keys Industrial Park that would like to use recycled water for its cooling system and as process water. The total estimated recycled water demand for the site is 10 AFY. The existing recycled water distribution systems do not extend to Bel Marin Keys. To reach the area, the South Service Area pipeline could be extended north and run along frontage roads parallel to Highway 101 and would then need to cross the SMART Train railroad track. Alternatively, the distribution system could be extended from the Central Service Area with an undercrossing beneath Highway 101. In either scenario, the highway and/or railroad crossing would add significant cost to a pipeline extension project serving Bel Marin Keys.

At this time, no additional potential customers have expressed interested in receiving recycled water. Due to the anticipated high construction cost that would result from the highway and/or railroad crossings, and relatively low identified demand in the area, expanding Bel Marin Keys is not included in this Study.

The City has informally discussed with NMWD a potential expansion from the existing distribution pipeline at Rowland Boulevard and Novato Boulevard to City Parks located approximately one mile north. This expansion requires the potential crossing of the Arroyo Avichi Creek. No formal planning or detailed discussions have taken place to date. This potential expansion could allow several customers identified along Segment N-2 or Segment C-2 to connect to the recycled water system.

In addition to the retrofit sites described earlier in this chapter, NMWD has identified other sites that could potentially be retrofitted in the future. These potential retrofit sites include 14 landscape irrigation sites and two car wash sites. NMWD has assessed each site and identified various challenges in connecting the sites. The status and key considerations for these sites is provided in Appendix I. NMWD will continue to consider retrofit of these sites in future analyses.

Note that as this Study is being finalized, the County of Marin has initiated the planning for the Housing Element of their General Plan Update. The City is expected to initiate their Housing Element in Spring 2022 as well. Determining new potential customers that may identified under these efforts is beyond the scope of this Study.

6.3.2 Supply Reliability

This section discusses the potential issues that could impact the availability of recycled water.

6.3.2.1 Climate Change Impact

Warmer weather, reduced rainfall, and erratic weather patterns all caused by climate change has the potential to impact recycled water supply. As a result of low rainfall and increased water demand during periods of higher temperatures, conservation measures typically increase resulting in a reduction of wastewater flows. Since recycled water is produced from highly treated wastewater, there is a direct relationship between reduced wastewater flows and available recycled water supply.

Currently recycled water demands within NMWD's service areas are approximately 10 percent of the total wastewater volume treated at NSD. Therefore, NMWD's available recycled water supply is not anticipated to be impacted by climate change.

6.3.2.2 Recycled Water Production

As described earlier in this chapter, the Davidson Street RWF provides recycled water to North and Central service areas. NSD treats a portion of wastewater from within its service area to tertiary standards. Treated wastewater that is not used for recycled water is discharged to San Pablo Bay in accordance with NSD's wastewater discharge permit. In 2020, NSD discharged 3,225 AF of treated wastewater to San Pablo Bay (NMWD 2020 Urban Water Management Plan). As recycled water demand increases, sufficient wastewater is potentially available that could be used as a recycled water supply. Coordination between NSD and NMWD would be needed.

Recent improvements at the Davidson Street RWF increased the recycled water production capacity to a firm recycled waste capacity of 1.71 MGD (total capacity of 2.56 MGD). A treatment capacity analysis should be conducted to confirm supply availability during periods of peak demand. If there are production constraints during peak demand periods, NMWD may consider increasing operational storage within the system and/or implementation of demand management strategies. Additionally, NMWD could consider supplementing recycled water supply with potable water.

The maximum daily delivery of recycled water produced by LGVSD in 2021 was 1.9 MG.

6.3.2.3 Recycled Water Distribution

NMWD's South Service Area is exclusively served by recycled water produced at LGVSD. The recycled water distribution system in the area is independent of the North and Central distribution systems. During development of this study, a new pipeline was considered to connect the South Service Area distribution system to the Central Service Area system. The pipeline would run parallel to Highway 101 and would need to cross the highway to connect to the Central Service Area pipeline.

Interconnecting the systems would increase reliability of delivery to customers in the Central Service Area by providing another system to deliver water during maintenance events or interruptions in the existing system. Constructing an inter-connecting pipeline between the systems would have constructability and permitting challenges, primarily due to the required crossing of Highway 101 as well as crossing an existing railroad that runs parallel to the highway. Since an inter-connecting pipeline would not contribute to the connection of additional recycled water customers, it is not included for evaluation in this study.

6.4 INFRASTRUCTURE REQUIREMENTS

This section describes the infrastructure requirements, including design criteria and assumptions for sizing the recycled water distribution system pipeline extensions.

Figure 6-3 through Figure 6-5 shows the potential future recycled water customers that may be served in the North, Central, and South service areas, respectively. Many future recycled water customers appear to be within proximity to the existing recycled water distribution system and would not require additional recycled water system expansion to be served.

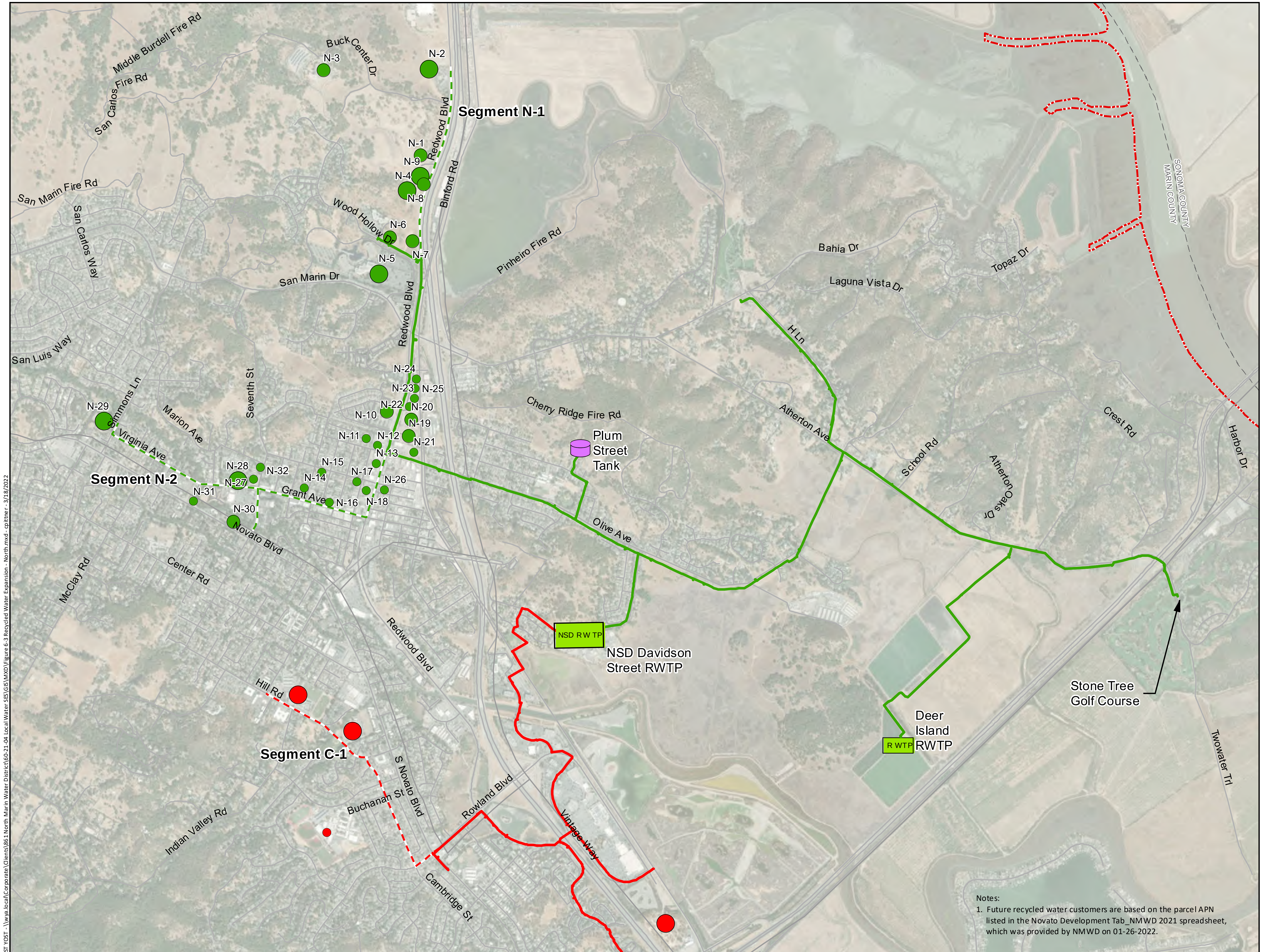

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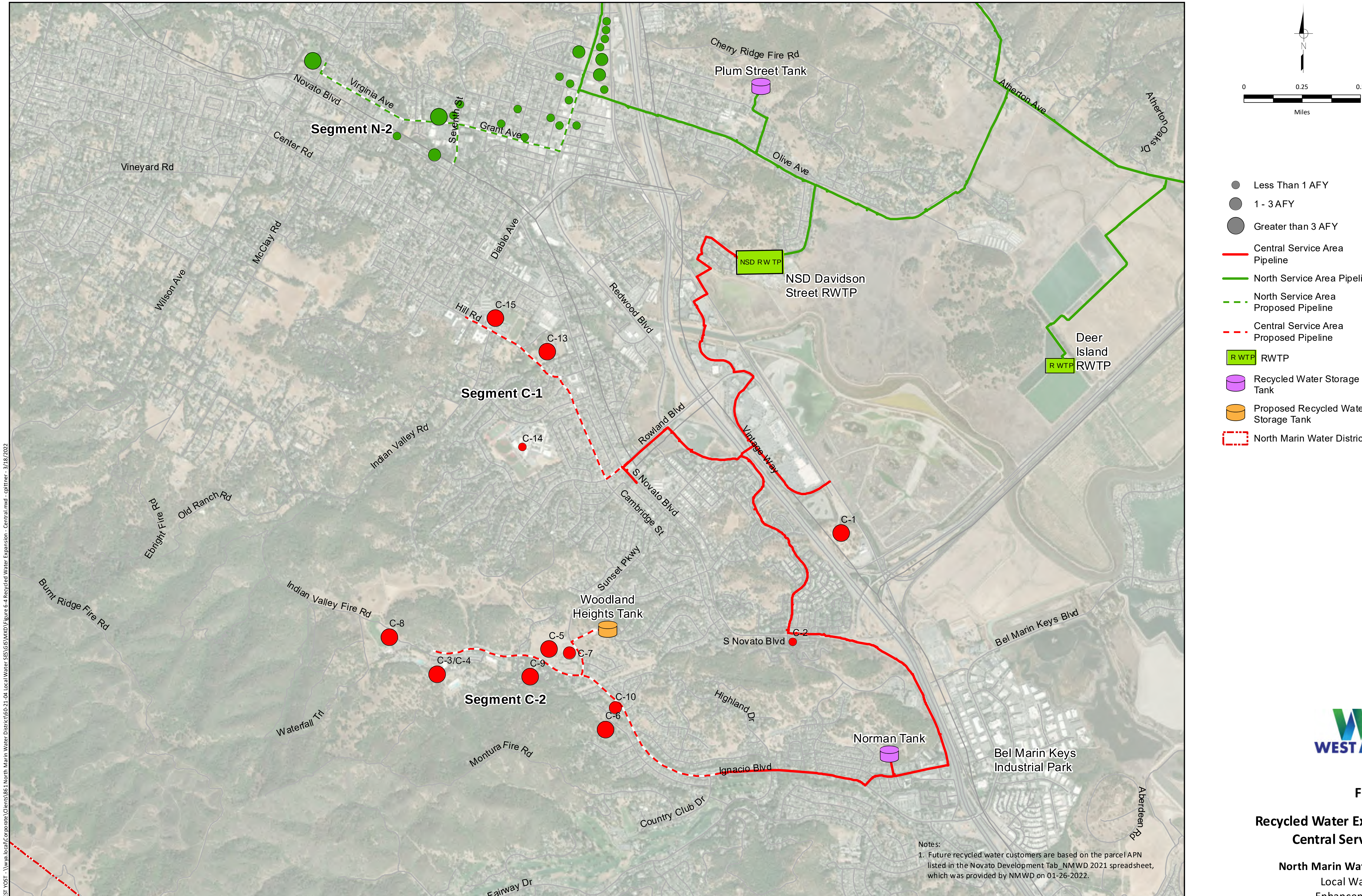
Figure 6-3

Recycled Water Expansion North Service Area

North Marin Water District
Local Water Supply Enhancement Study



Notes:
1. Future recycled water customers are based on the parcel APN listed in the Novato Development Tab_NMWD 2021 spreadsheet, which was provided by NMWD on 01-26-2022.

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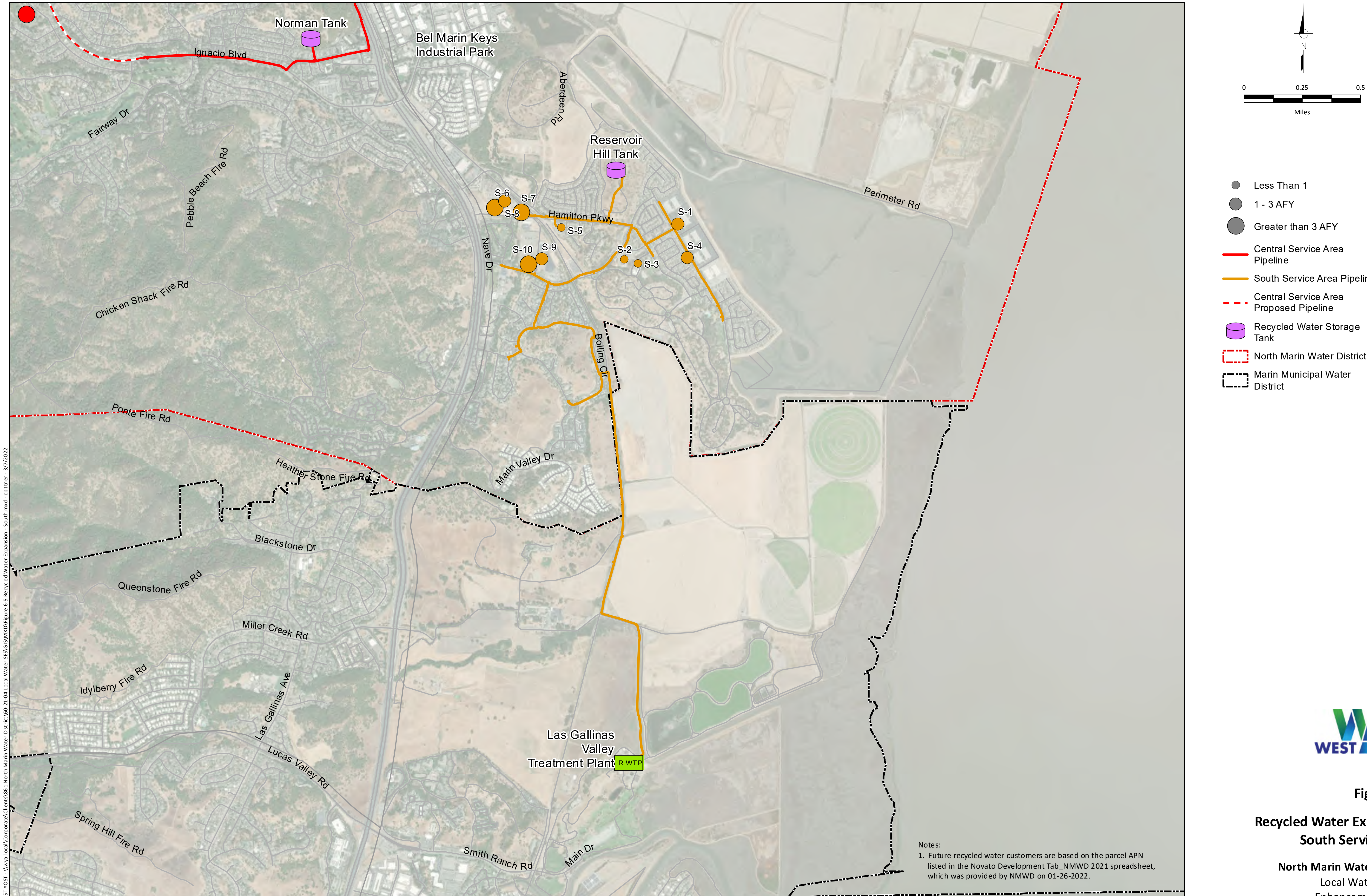
Figure 6-4

Recycled Water Expansion Central Service Area

North Marin Water District
Local Water Supply Enhancement Study



Notes:
1. Future recycled water customers are based on the parcel APN listed in the Novato Development Tab_NMWD 2021 spreadsheet, which was provided by NMWD on 01-26-2022.

WEST YOST - \\wya.local\Corporate\Clients\861 North Marin Water District\60-21-04 Local Water SES\GIS\MXD\Figure 6-5 Recycled Water Expansion - South.mxd - cpittner - 3/7/2022

Figure 6-5

Recycled Water Expansion South Service Area

North Marin Water District
Local Water Supply Enhancement Study

6.4.1 System Performance and Design Criteria

The following sections describe the system performance and design criteria for new recycled water distribution pipelines.

6.4.1.1 System Performance and Design Criteria

System performance and design criteria assumed for the proposed new pipeline segments analyzed have largely been identified in NMWD's prior planning studies as well as NMWD's specifications. The referenced documents are:

- North Marin Water District and Novato Sanitary District Recycled Water Master Plan, Nute Engineering, February 2004 (RWMP)
- Recycled Water Implementation Plan, Nute Engineering and Winzler & Kelly, May 2006
- Feasibility Study of West Ignacio Recycled Water Extension, Nute Engineering, September 2017 (2017 Feasibility Study)
- 2010 NMWD Specifications

A summary of the recycled water system performance and design criteria is provided in Table 6-2. West Yost recommends a minimum flow velocity of 1 foot per second (fps) to maintain water quality and a Hazen-Williams Roughness Coefficient of 130, which is typical of the polyvinyl chloride (PVC) pipe installed for NMWD's recycled water distribution system. PVC is the specified recycled water pipe material per NMWD standard specifications.

Table 6-2. Summary of Recycled Water System Performance and Design Criteria

Component	Criteria	Data Sources/Remarks
Distribution System Minimum Pressures (Normal Operating Conditions Peak Hour Demand)		
Minimum Pressure	40 pounds per square inch (psi)	RWMP
Maximum Pressure	60 psi	RWMP
Recycled Water Transmission and Distribution Pipeline Maximum Velocity		
Minimum Velocity	1 fps	West Yost Recommendation to improve water quality
Distribution Pipelines	4 to 8 fps	RWMP
New Pipeline Sizing		
Standard Diameter	8, 12, and 16-inch	2017 Feasibility Study
Pipeline Material	PVC, Purple	2010 NMWD Specifications
Hazen-Williams Roughness Coefficient	130	West Yost Recommendation
Demand Factors		
Peak Month Demand	20 percent of Annual Demand	2017 Feasibility Study
Average Day Peak Month Demand	Assumes 30-day Month	2017 Feasibility Study
Peak Day Demand	1.7 x Average Day Peak Month	2017 Feasibility Study
Peak Hour Demand	5 x Average Day Peak Month	2017 Feasibility Study

The analyses performed here follow the design criteria presented in the 2017 Feasibility Study. However, this Study presents an extremely conservative demand peaking factor. The combined peaking factor of 8.5 times average day peak month demand is significantly higher than the peaking factors used by other municipalities which generally range between two- and three-times average day peak month demand. Recycled water systems are generally designed to supply water during an 8-hour irrigation period between the hours of 10 PM and 6 AM to limit public contact. This high-level assumption results in a peaking factor of three times the maximum day demand.

Due to this discrepancy, West Yost recommends that NMWD conduct a system-wide demand analysis to derive current and representative demands and peaking factors for the use in sizing future NMWD facilities. NMWD is likely to determine that actual peaking factors are significantly lower than assumed in the 2017 Feasibility Study.

6.4.1.2 Peaking Factors

The design criteria demand factors presented in Table 6-2 were applied to the projected new demands to estimate the peak month, average day peak month, peak day, and peak hour demands. These peak demands are summarized in Table 6-3.

Table 6-3. Summary of Peak Demands					
Scenario	Annual (AF)	Peak Month (GPD)	Average Day Peak Month (GPD)	Peak Day Demand (GPD)	Peak Hour Demands (GPM)
North Service Area					
Existing Pipeline on Redwood Boulevard – New Demand	60.6	3,949,966	131,666	223,831	457.2
Segment N-1	17.0	1,105,938	36,865	62,670	128.0
Segment N-2	22.6	1,469,588	48,986	83,277	170.1
Total North Demand	**100.1**	**6,525,492**	**217,516**	**369,778**	**755.3**
Central Service Area					
Existing Pipeline on Hill Street and Cambridge Street - New Demand	4.1	265,243	8,841	15,030	30.7
Segment C-1	19.0	1,238,234	41,274	70,167	143.3
Segment C-2	57.8	3,764,231	125,474	213,306	435.7
Total Central Demand	**80.8**	**5,267,707**	**175,590**	**298,503**	**609.7**
South Service Area					
Total South Demand	**21.1**	**1,371,833**	**45,728**	**77,737**	**158.8**

6.4.2 Infrastructure Sizing

The following sections assess the capacity of NMWD's recycled water distribution system for the proposed new pipeline segments by service area. This analysis calculates velocity and head loss based on the assumed peak hour demand conditions by segment calculated above in Table 6-3. For example, velocity and head loss along Segment N-1 is calculated based on the peak hour demand (PHD) of 128 gpm which is the PHD for that segment. These calculated velocity and head losses will provide an estimate of expected pressure drop on the analyzed pipe segment and can be used to identify system capabilities and potential deficiencies which may need to be addressed. Results of the analysis were used to determine the recommended pipe sizing for each proposed new pipe segment.

6.4.2.1 Infrastructure Sizing Assumptions

The hydraulic assessment conducted for this study used design and criteria performance presented in Table 6-2.

This analysis was conducted under future flow conditions assuming the existing system is able to provide acceptable pressures at the proposed points of connection. No specific pipe, elevation, system pressure, or operations information was included as a part of this analysis. West Yost recommends that NMWD develop a more extensive hydraulic analysis of the recycled water system to confirm if adequate delivery pressures can be achieved with expansion of the system, and to identify any pumping and storage needs. Further, NMWD is recommended to develop a hydraulic model of the system to facilitate efficient analysis as the system at it expands.

6.4.2.2 North Service Area

The North Service Area is split between the Deer Island RWF which serves the Stone Tree Golf Course, and the NSD Davidson Street RWF which serves the remainder of demands in the area. Proposed future demands for the Northern Service Area are allocated along two proposed recycled water system segments referred to in this study as Segment N-1 and Segment N-2.

The first proposed extension, Segment N-1, entails construction of 4,230 linear feet (LF) of pipe along Redwood Boulevard and includes a nominal 128 gpm increase in peak hour demand which is not expected to cause velocity or pressure drop related issues if designed as an 8-inch diameter pipeline.

The second extension, Segment N-2, entails 8,525 LF of pipe along Grant Avenue. includes a nominal 170 gpm increase in peak hour demand which is not expected to cause velocity or pressure drop related issues if designed as an 8-inch diameter pipeline.

6.4.2.3 Central Service Area

Proposed future demands for the Central Service Area are allocated along two proposed recycled water system extension segments referred to in this study as Segment C-1 and Segment C-2.

The first extension, Segment C-1, entails construction of 5,500 LF of pipe along Cambridge Street. The projected annual demand of 19 AFY along this extension results in a nominal 143 gpm increase in peak hour demands which is not expected to cause velocity of pressure drop related issues if designed as an 8-inch diameter pipeline.

The second extension, Segment C-2, entails construction of 9,425 LF of pipe along Ignacio Boulevard. This extension was analyzed in the 2017 Recycled Water Feasibility Study. Recommendations from the 2017 Recycled Water Feasibility Study includes creation of a new pressure zone with a booster pump station installed at the intersection of Ignacio Boulevard and Country Club Drive, and a new or refurbished storage tank (NMWD's Woodland Heights Tank). The Woodland Heights Tanks should be inspected to determine the cost of rehabilitation. Pipe sizing and hydraulic assessment from the 2017 Recycled Water Feasibility are assumed for this study. Based on recommendations of the 2017 study, the increase in peak hour demands of 435 gpm is not expected to cause velocity of pressure drop related issues if designed as an 8-inch diameter pipeline. If NMWD plans to not create a new pressure zone to serve this area, additional hydraulic analysis is recommended to confirm the expected delivery pressures.

6.4.2.4 South Service Area

Potential new demand in the South Service Area is located in close proximity to existing recycled water pipelines. Based on the estimated new demand and hydraulic calculations, the peak hour demands would increase nominally by 158 gpm and is not expected to impact delivery. Therefore, the existing pipeline is anticipated to be sufficient to serve the new demand.

6.4.3 Implementation Timing

NMWD's approach to expanding the distribution system is dependent upon several factors that include, but is not limited to the following considerations:

- Timing of the demand to be served
- Ability of users to connect to the system
- Availability of staff resources to facilitate connection of new customers and on-going monitoring
- Cost-effectiveness of the extension in comparison to the anticipated potable water offset

NMWD should continue to monitor development in the area and determine the pipeline that should be extended and develop the implementation timeline accordingly. At this time, the soonest that implementation of any of the pipeline extensions would occur is five years from the date of this Study. This would allow the time to affirm demand in the area, work with customers to prepare for recycled water connection, identify and secure potential funding sources and/or funding partners, conduct additional study and develop design plans, and initiate regulatory and environmental approvals. If external funding assistance for expanding the recycled water system are available to NMWD, then NMWD may consider accelerating implementation of one or more of the proposed new pipeline segments to connect additional customers and increase potable water offset.

6.5 WATER SUPPLY ALTERNATIVE EVALUATION

This section provides an evaluation of the recycled water expansion alternative and is comprised of the following sections:

- Cost Estimate
- Operational Impacts
- Regulations and Permitting
- Public and Institutional Considerations

6.5.1 Cost Estimate

A planning-level cost estimate for the construction of the four identified pipeline extensions, along with assumptions, is provided in Table 6-4. The cost estimate includes following alternative specific assumptions:

- Project Allowance = 30 percent
- Pipeline Unit Construction Cost[4] = $260 per linear feet

[4] Pipeline unit cost is based on the Feasibility Study of West Ignacio Recycled Water Extension (September 2017). The pipeline unit cost of $260 per linear foot was scaled to January 2022 using the Engineering News Record (ENR) Construction Cost Index (CCI) for San Francisco of 14301. The pipeline unit cost is for an 8-inch diameter pipeline.

The pipeline unit cost is assumed to include pipeline materials, trenching, placing, and jointing pipeline, valves, fittings, service connections, placing imported pipeline bedding, native backfill material, and asphalt pavement replacement, if required. Replacement costs were not included since the estimated pipeline lifespan is 50 years and exceeds the 30-year operational cycle.

Annual O&M costs are based the level of NMWD staff effort per one-hundred recycled water customers. NMWD estimated that it takes approximately one-quarter of the standard hours worked in a year for one NMWD staff member to complete the required recycled water O&M tasks such as required reporting, inspection, and maintenance per every one-hundred recycled water customer. This estimated level of effort was scaled proportionally based on the number of additional recycled water customers that each pipeline segment would add. An operating allowance was not included since the annual O&M cost is based off of the historical level of effort NMWD has experience with operating its recycled water system. Appendix H details the additional recycled water customers added per pipeline segment and Appendix F provides a more detailed cost estimate for the recycled water pipeline extensions.

The total capital cost for Segment N-1 is estimated to be approximately $2.0 million. The annual O&M cost is estimated to be $22,750 and the 30-year NPV O&M cost is estimated to be $657,000. The total cost (total capital cost plus NPV costs) for constructing all recycled water pipeline segments is estimated to be $2.7 million. Segment N-1 is estimated to offset the potable water supply by 17 AFY. Over the 30-year operational cycle, Segment N-1 is estimated to offset a total of 510 AF from the potable water system. The unit cost over 30 years for Segment N-1 is $5,300 per AF.

The total capital cost for Segment N-2 is estimated to be approximately $4.0 million. The annual O&M cost is estimated to be $14,790 and the 30-year NPV O&M cost is estimated to be $427,000. The total cost (total capital cost plus NPV costs) for constructing all recycled water pipeline segments is estimated to be $4.5 million. Segment N-2 is estimated to offset the potable water supply by 22.6 AFY. Over the 30-year operational cycle, Segment N-2 is estimated to offset a total of 678 AF from the potable water system. The unit cost over 30 years for Segment N-2 is $6,600 per AF.

The total capital cost for Segment C-1 is estimated to be approximately $2.6 million. The annual O&M cost is estimated to be $3,420 and the 30-year NPV O&M cost is estimated to be $99,000. The total cost (total capital cost plus NPV costs) for constructing all recycled water pipeline segments is estimated to be $2.7 million. Segment C-1 is estimated to offset the potable water supply by 4.1 AFY. Over the 30-year operational cycle, Segment C-1 is estimated to offset a total of 123 AF from the potable water system. The unit cost over 30 years for Segment C-1 is $22,000 per AF.

The total capital cost for Segment C-2 is estimated to be approximately $4.5 million. The annual O&M cost is estimated to be $13,650 and the 30-year NPV O&M cost is estimated to be $394,000. The total cost (total capital cost plus NPV costs) for constructing all recycled water pipeline segments is estimated to be $4.9 million. Segment C-2 is estimated to offset the potable water supply by 19 AFY. Over the 30-year operational cycle, Segment C-2 is estimated to offset a total of 570 AF from the potable water system. The unit cost over 30 years for Segment C-2 is $8,600per AF.

Appendix F provides a more detailed cost estimate for the recycled water pipeline extensions.

Table 6-4. Estimated Capital Cost for Recycled Water Pipeline Expansion Segments

Segment[a]	Pipeline Installed (LF)	Total Capital Cost[b] ($)	30-Year NPV O&M Cost ($)	Total Potable Water Offset over 30 years (AF)	Unit Cost over 30 years[c] ($ per AF)
Segment N-1	4,230	2,002,000	657,000	510	5,300
Segment N-2	8,525	4,036,000	427,000	678	6,600
Segment C-1	5,500	2,603,000	99,000	123	22,000
Segment C-2	9,425	4,462,000	394,000	570	8,600
Total	**27,680**	**13,103,000**	**1,577,000**	**1,881**	**7,900**

Notes:

(a) Connection of customers within the South Service Area would require lateral connections to existing recycled water pipelines. a new recycled water distribution pipeline is not anticipated to be required. As such, capital costs for connection of customers in the South Service Area is not included.

(b) The construction contingency was estimated to be 40% and the project allowance for planning, permitting, engineering, legal, and administrative costs was estimated to be 30%. Pipeline diameter was assumed to by 8 inches with a pipeline unit cost of $260 per linear foot. The cost does not include replacement costs or O&M costs.

(c) Unit Cost = Total Capital Cost divided by the total potable water offset over 30 years for each pipeline segment. Unit costs are rounded up to the nearest $100.

6.5.2 Operational Impacts

The recycled water system expansion option will require some additional NMWD resources to administer and monitor additional recycled water use sites. Additionally, the expansion would present additional operational impacts to NSD related to increased recycled water production. This section describes potential operational impacts to NMWD. Operational impacts to NSD are anticipated to be reflected in its charges to NMWD for producing recycled water.

6.5.2.1 Operations and Maintenance

The connection of new recycled water customers will require additional NMWD staff resources to approve the connection, as well as annual site inspections once connected.

The level of additional operations and maintenance needs will vary based on the selected recycled water pipeline alignment. Operations and maintenance needs related to new pipelines and potential pumps, power requirements, and demand management are discussed in this section.

The operations and maintenance requirements of new recycled water pipelines are anticipated to be minimal. However, if booster pumps are added to the system, additional operations and maintenance resources will be required. Pumping may be required to deliver recycled water to customers at adequate pressures. Previous studies identify the need for a booster pump station to serve customers along the Ignacio Boulevard recycled water pipeline alignment (referred to as Segment C-2 in this study). Additional hydraulic analysis is required to determine if additional pumping is needed along other future new recycled water pipeline extensions. New pumping within the system will increase power requirements for the system as well as the need for additional staff time for operations and maintenance of new pumps.

During peak irrigation periods, recycled water demand may exceed supply. As noted earlier in this chapter, improvements made at the NSD RWTF have increased recycled water production capacity. However, if the recycled water distribution is expanded and additional customers are connected, recycled water demand could exceed supply during peak use periods. NMWD may consider supplementing the recycled water supply with potable water on occasion, during peak demand days for example. Recycled water supply shortfalls persist over longer periods, NMWD may consider implementation of an irrigation demand schedule or recycled water demand management measures. Such a demand management scenario would require additional NMWD staff resources to oversee.

6.5.2.2 Operational Considerations for Indoor Recycled Water Use

Additional NMWD staff time to coordinate regulatory approval of the dual-plumbed site and increased monitoring and reporting will be required. Also, dual-plumbed sites will require a cross-connection test once every four years that NMWD staff must oversee.

Additional factors must be considered when using recycled water indoors for toilet flushing and urinal uses. Supply reliability as well as color and odor of recycled water will be important factors for indoor use. State regulations for indoor recycled water use require additional monitoring and testing that NMWD must conduct.

When providing recycled water for toilet flushing, reliable service and supply will be paramount. Unlike the potable water system, the recycled water distribution system is not a looped system. A line break or maintenance activity along the main distribution line of the recycled water system could interrupt service. To mitigate the risk of service interruption, an on-site back-up potable water supply should be considered. This connection must be through either a potable water air gap tank, or through a swivel-ell connection.[5] Any connection to the potable water system must be in accordance with the State's Title 17 regulations and approved by the State Water Resources Control Board's Division of Drinking Water (DDW). At the time of preparation of this study, the State is developing a Cross-Connection Control Policy Handbook which may replace relevant regulations.[6]

Aesthetic issues, specifically color and odor, have been associated with recycled water for toilet flushing. The composition of the recycled water supply and low turnover of water within the distribution system can increase color and odor issues. However, several water agencies throughout California are successfully providing recycled water for toilet flushing use (such as nearby MMWD). Additional on-site treatment, such as granulated activated carbon filters, or boosting chlorine residual in the recycled water distribution system, could help reduce or eliminate color and odor. Flushing of the recycled water lines during the winter season when recycled water demands are low to remove stagnated water could also help reduce color and odor. Additional study of the recycled water quality and testing of the recycled water at points along the distribution system should be conducted to confirm the need for color and odor reduction, and to identify potential solutions if needed.

For indoor recycled water use, State regulations require more monitoring and cross connection testing compared to outdoor recycled water use. A visual inspection of the site must be conducted annually to confirm that no visual connections between the potable and recycled water systems have been made. A

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[5] A swivel-ell connection assembly consists of a reduced pressure principle backflow prevention assembly combined with a changeover piping such that the potable and recycled water sources are not connected, but allows for water to be supplied to the distribution system.

[6] California State Water Resources Control Board, Cross-Connection Control Policy Handbook, https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/cccph.html, accessed March 16, 2022.

cross connection test is required once every four years to confirm the absence of cross connections between the water systems. These additional requirements will require more NMWD personnel time for testing and reporting.

6.5.3 Regulations and Permitting

This section describes the regulations and permitting associated with this alternative.

6.5.3.1 Recycled Water Pipelines Expansion

Expansion of the recycled water system would require installation of pipelines and construction of ancillary structure. Pump stations may also be needed to provide service to some locations. These activities would be subject to environmental review under CEQA. Pipeline construction would involve excavation and filling in existing right-of-way and possibly in undisturbed land. Construction-related impacts could include increased noise, air quality and greenhouse gas emissions (GHG), soil erosion, and disturbance of biological and cultural resources. This alternative water supply option would expand an existing recycled water system and, depending on project design, CEQA review may be accomplished under a variety of categorical or statutory exemptions as follows:

- CEQA Sec. 15301 – Class 1 Minor alteration of existing public or private structure
- CEQA Sec. 15303 – Class 3 Small Facilities
- CEQA Sec. 25304 – Class 4 Minor Alteration of Land
- CEQA Sec. 15282 (k) – New or repair of an existing pipeline of less than 1 mile

Regional expansion of the recycled water system to include large new areas with a substantial expansion in capacity may trigger the need to prepare a Mitigated Negative Declaration of Environmental Impact Report. NMWD may need to coordinate with the City (or the County in some areas) to address extension of recycled water pipelines and service to new development projects under the proposed projects' CEQA studies.

If future pipeline alignments disturb sensitive biological resources such as wetlands, creeks, or habitat for endangered species permits may be required from the natural resource agencies, including U.S. Army Corps of Engineers, Regional Water Quality Control Board, California Department of Fish and Wildlife, or U.S. Department of Fish and Wildlife. If project activities are planned in the vicinity of culturally sensitive areas consolation with local tribes, construction monitoring, and documentation of artifacts may be required.

Connection of recycled water to new customers or use type must be in accordance with the State's Title 17 and Title 22 regulations and approved by the DDW and may require an update of NMWD's Recycled Water Engineer's Report.

Regulatory constraints for alternative are considered moderately complex because extensive regulatory agency review and/or CEQA analysis could be required depending on final design. Many impacts may be avoided if biological and cultural resource assessments inform project design, pipeline alignments and location of project facilities.

6.5.3.2 Dual Plumbing for Indoor Use

Dual plumbed building for indoor recycled water use will require preparation of a separate Recycled Water Engineer's Report for review and approval by DDW. Recycled water pipelines and appurtenances must be identified and labeled in accordance with Title 22 regulations. Before recycled water can be delivered to the building, a cross connection test must be performed to confirm the absence of any cross connections between the potable and recycled water systems.

6.5.4 Public and Institutional Considerations

Successful expansion of NMWD's recycled water system require support from the public and stakeholders, and partnership and agreements with other entities. The following sections discuss the considerations listed below:

- Public acceptance
- Inter-Agency coordination
- Financial partnerships
- NMWD Recycled Water Regulations (Regulation 18)

6.5.4.1 Public Acceptance

Recycled water use is widely accepted within NMWD's service area. This is evidenced by interest in customers wanting to connect to the system and by NMWD's commercial and residential truck fill programs.

6.5.4.2 Inter-Agency Coordination

NMWD and NSD have a strong partnership in developing and providing recycled water to the community. Since the early 2000's, NMWD and NSD have cooperated in recycled water development beginning with the Deer Island RWTF and the delivery of recycled water to the Stone Tree Golf Course and Novato Fire Protection District Station No. 2. In development of the Davidson Street RWTF to provide recycled water to the North and Central areas of Novato, NMWD and NSD revised their "Inter Agency Agreement for Recycled Water Between Novato Sanitary District and North Marin Water District". The agreement establishes roles and responsibilities for NMWD (distributor of recycled water) and NSD (produce of recycled water). Similarly, NMWD has an inter-agency agreement for recycled water with LGVSD.

NMWD coordinates regularly with NSD and LGVSD in recycled water planning. In accordance with NMWD's inter-agency agreements for recycled water with NSD and LGVSD, NMWD provides annual projections of recycled water needs for the upcoming year and provides updates and expansion plans. Through these existing agreements and coordination efforts, NMWD will continue to work with NSD and LGVSD for additional recycled water supply as new customers are connected and if the recycled water system is expanded.

NMWD regularly coordinates with the City to extend its potable and recycled water service, from planning to construction. NMWD will continue to work with the City as it implements expansion of its recycled water system.

6.5.4.3 Financial Partnerships

As development occurs, NMWD may seek opportunity to partner and cost-share with developers for the construction of new recycled water distribution pipelines. NMWD should continue to explore opportunities for financial partnerships as new development is reviewed.

NMWD has successfully obtained state and federal grant funding for construction of existing recycled water facilities. NMWD joined the North Bay Water Reuse Authority, an organized regional entity working together to pursue funding for recycled water projects that benefit both local and regional water supply. NMWD should continue to monitor and pursue state and federal grants for recycled water projects.

6.5.4.4 District Recycled Water Regulations

NMWD encourages the future expanded use of recycled water through District Regulation No. 18. District Regulation 18 includes a mandatory use requirement for recycled water service when connection to the recycled water system is deemed to be feasible. District Regulation No. 18 applies to both existing customers and new development within NMWD's recycled water service areas.

6.6 FINDINGS AND CONCLUSIONS

Expanding NMWD's recycled water system could provide a potable water offset of up to 63 AFY if all proposed extension projects were constructed. This equates to a total potable water offset of 1,881 AF over 30 years. The total estimated capital cost for the four identified pipeline extensions is estimated to be $13.1 million and the 30-year NPV O&M cost is estimated to be $1.6 million. The total cost (total capital cost plus NPV costs) is estimated to be $14.7 million and the unit cost over 30 years is $7,900 per AF.

At this time, expansion of the recycled water distribution system is not recommended due to the high cost of new pipelines relative to the volume of potable water offset. NMWD should continue to explore opportunities to increase recycled water use and to pursue opportunities to offset the cost of new recycled water pipelines.

The following considerations should be made as NMWD considers expanding recycled water pipelines in the future:

- Review and update NMWD's design and performance criteria to reflect current and planned operations (e.g., recycled water systems design criteria, recycled water balance analyses, pump station operations, and storage operations).
- Perform a system-wide demand analysis to determine system specific peaking factors to ensure facilities are properly sized.
- Develop a more extensive hydraulic analysis of the recycled water system to confirm if adequate delivery pressures can be achieved with expansion of the system, and to identify any pumping and storage needs. Develop a hydraulic model of the system to facilitate future analysis as the system is expanded.
- Conduct a treatment capacity analysis to confirm capacity to meet increased demand during peak use periods. Continue to identify and explore partnership with developers to fund new recycled water pipelines.
- Monitor and pursue opportunities for grants through local, state, and federal programs.
- Update Regulation 18 to reduce administrative and financial constraints on NMWD and to further encourage and facilitate new recycled water connections.

CHAPTER 7
Indirect Potable Reuse

This Chapter presents the potential for and an evaluation of producing potable reuse water from available surplus wastewater supply to enhance NMWD's local water supply. As detailed herein, indirect potable reuse is determined to be non-viable for NMWD at this time due to lack of adequate storage availability. Since indirect potable reuse was determined to be infeasible for NMWD, a detailed planning-level cost estimate was not prepared as part of this Study. Nevertheless, relevant information is documented in this Chapter to support additional work that could be done in the future to support production of a potable reuse supply for NMWD should the identified impediments be overcome.

7.1 OVERVIEW OF POTABLE REUSE

Potable reuse involves producing potable water from wastewater that has been processed through an advanced treatment process. Potable reuse thus requires a source of available wastewater, as well as dedicated treatment process equipment.

The DDW is responsible for establishing regulations for potable reuse in California. Existing DDW regulations identify four potable reuse classifications, as follows:

- **Surface Water Source Augmentation**: A potable reuse water supply is added to an untreated drinking water supply storage reservoir at a blending ratio of no more than 10 percent potable reuse supply and stored for a minimum of 60 days. The combined supply would then be processed through a potable water treatment plant before distribution.
- **Groundwater Replenishment**: A potable reuse water supply is combined with groundwater either via surface application (spreading) or subsurface application (direct injection). After receiving substantial mixing and dilution with groundwater and receiving soil aquifer treatment, the injected water would be directed to a treated water supply distribution system.
- **Raw Water Augmentation**: A potable reuse water supply is blended with other raw water supplies, and the combined flows are processed through a potable water treatment plant prior to distribution.
- **Treated Water Augmentation:** A potable reuse water supply – processed through an advanced treatment system – is discharged directly to a potable water distribution system.

To date, DDW has established clear regulations for groundwater replenishment and surface water source augmentation systems—indirect potable reuse storage options. Regulations for raw and treated water augmentation are under development and are therefore currently not readily permittable.

The potential treatment and storage of recycled water for potable reuse considered in this Study is illustrated on Figure 7-1.

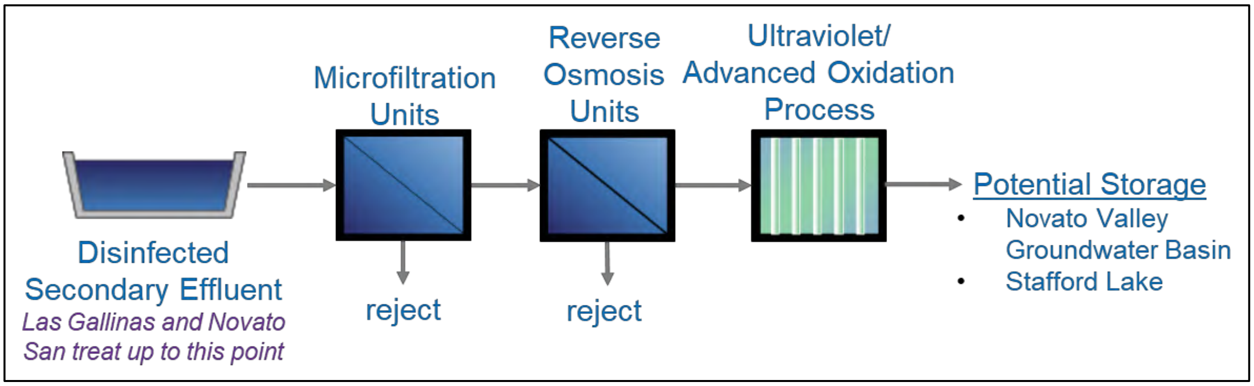


Figure 7-1. Potential Full Advanced Treatment and Storage for Potable Reuse

7.2 INDIRECT POTABLE REUSE AS A WATER SUPPLY ALTERNATIVE

This section provides a description of indirect potable reuse as a water supply for NMWD, organized by the following sections:

- Potential Potable Reuse Strategy
- Water Supply Yield and Reliability
- Infrastructure Requirements
- Implementation Timing

7.3 POTENTIAL POTABLE REUSE STRATEGY

One major benefit of potable reuse as a water supply is that the water source (wastewater) is relatively consistent and not directly subject to climatic fluctuations, such as drought. However, a wastewater supply will have some seasonal variability that does not match the seasonality of potable water demands because storm- and groundwater-driven inflow and infiltration leads to higher wastewater flows in the winter and spring. One benefit of either groundwater replenishment or surface water source augmentation is that the seasonal variability of the supply can be mitigated to better match potable water demands by coupling the production of potable recycled water with a long-term storage option: a groundwater aquifer or surface water reservoir, respectively.

For NMWD, the most cost-effective potable reuse strategy would involve a treatment system that is sized for continuous production of recycled water coupled with some type of storage because NMWD's water supply shortfalls are intermittent and variable. Continuous operation with storage would reduce the capital costs for treating effluent to potable reuse standards by minimizing the required size of the treatment facilities. Moreover, maintaining continuity of operations (and therefore staffing) is logistically simpler than having to bring on staff for each operational period since the operations staff needed for a potable reuse treatment facility require highly specialized skills and certification.

Of the different potable reuse classifications discussed above, both groundwater replenishment and surface water source augmentation allow for continuous operation with storage. The groundwater replenishment and surface water source augmentation are often referred to as "indirect potable reuse" options whereas raw and treated water augmentation are often referred to as "direct potable reuse."

For purposes of this Study, only the indirect potable reuse classifications have been evaluated. As the regulatory pathway for direct potable reuse becomes clearer, NMWD may wish to further consider the direct potable reuse options, especially because these would not be limited by storage availability.

7.3.1 Potential for Surface Water Augmentation

Of the indirect potable reuse options, surface water source augmentation can be dismissed as not viable within NMWD's service area because of challenges associated with achieving required minimum retention time and an economy of scale. The only current available surface water storage location is Stafford Lake.

A blending ratio of no more than 10 percent recycled water is generally required for surface water source augmentation, and a minimum of 60 days retention time in a reservoir is required under all conditions. Achieving the minimum 60-day retention time in any given year may be difficult for NMWD based on several factors. One factor is the timing of adding recycled water to Stafford Lake. Recycled water could be added early in the winter to maximize the time prior to start of seasonal STP operation. NMWD may risk having to spill some of the recycled water before it could be treated through the STP. If recycled water is added in the spring after the winter rainy season, the minimum retention time may not be achieved prior to the seasonal start of STP operation.

Another factor is that predicting the actual retention time is complicated by the recycled water likely having a different temperature than lake water, which would impact the travel path of the added recycled water. Additional evaluation would be needed to evaluate these factors and confirm what retention time is feasible, especially during a dry year when a longer STP operation window may be needed or preferred.

The minimum working volume of NMWD's surface water reservoir Stafford Lake is about 1,000 AF, which would allow at most 100 AF of reuse water storage. That volume is not considered large enough for surface reservoir augmentation to be cost effective. The capital cost for a pipeline to convey treated recycled water to Stafford Lake is estimated to be $26 million, as detailed later in Section 7.2.1. Even if NMWD were able to add 100 AFY to Stafford Lake over 30 years, the unit capital cost for the pipeline alone would be $9,000 per AF.

7.3.2 Potential for Groundwater Replenishment

Groundwater replenishment with in-ground storage of potable recycled water was considered for viability. The envisioned groundwater replenishment project is illustrated on Figure 7-2, and would involve injecting highly treated recycled water at a continuous rate year-round into the groundwater aquifer for storage via one or more injection wells. The stored water would then be removed using a dedicated extraction well or wells when needed to meet water supply demands. The extracted water would go directly into NMWD's water supply distribution system, requiring no further treatment beyond addition of disinfectant to ensure adequate residual in the water system.

A local groundwater replenishment strategy would rely on the same local groundwater aquifer evaluated for ASR in Chapter 5, the Novato Valley Basin. As further detailed in Chapter 5, the Novato Valley Basin has limited storage capacity and low permeability. Moreover, the injection and extraction rates are relatively low, estimated at 30 gpm and 50 gpm per well, respectively. A groundwater replenishment strategy with potable reuse water would be distinct from an ASR program in that the injection and extraction wells would need to be geographically separated to allow for adequate retention time. Nevertheless, the same aquifer limitations would apply to groundwater replenishment.

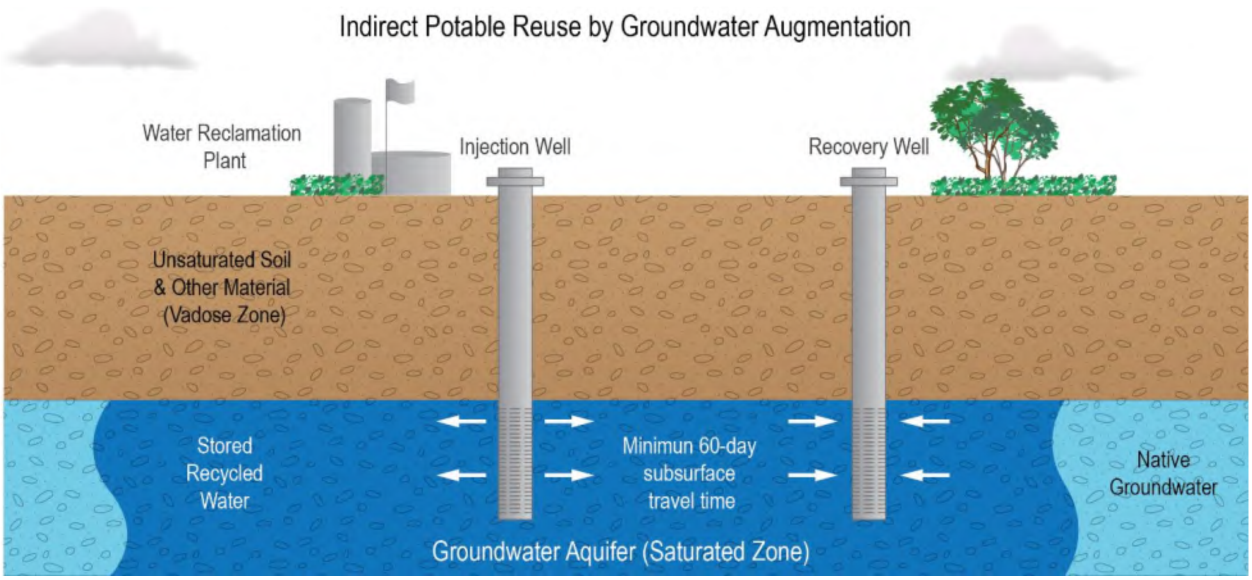


Figure 7-2. Potential Groundwater Replenishment

Due to limited local groundwater storage availability, a *local* groundwater replenishment option is determined to be non-viable. NMWD is engaged in the Resiliency Study that is evaluating various regional water supply options and may identify regional groundwater storage options. The rest of this Chapter provides additional information on a groundwater replenishment project should an adequate storage option be identified.

7.3.3 Water Supply Yield and Reliability

NMWD receives tertiary treated effluent from the NSD wastewater treatment plant (WWTP) for recycled water use. NMWD also receives recycled water from LGVSD for use within NMWD's service area. However, LGVSD's WWTP is further from potential recycled water conveyance and/or storage sites. Because of its proximity to the NMWD service area, and because influent to the NSD WWTP is substantially from NMWD's service area, the NSD WWTP is evaluated a the potential source for IPR.

NSD currently discharges secondary treated effluent into the San Francisco Bay. This effluent may potentially be available for beneficial reuse for IPR. Diversion of additional wastewater supply for IPR use would need to be discussed and confirmed with NSD to confirm existing and future discharge obligations that NSD may have that would limit the availability of wastewater supply for IPR use.

The limiting factors for potable reuse via groundwater replenishment would be the injection rates into and storage capacity of the aquifer of interest. Each injection well into the Novato Valley Basin has been estimated to allow for injecting water at a rate of 30 gpm, as noted above and detailed in Chapter 5. For a year-round injection (365 days per year), this rate equates to 48 AFY per injection well. The storage capacity available has not been quantified for this Study due to lack of data, but is estimated in Chapter 5 to be significantly less than 1,000 AFY.

Regarding the reliability of potable reuse as a water supply, wastewater is relatively consistent and not directly subject to climatic fluctuations, as noted above. Wastewater flows are thus highly reliable, and if coupled with some form of storage, an expected average wastewater volume can be estimated year-to-year for meeting baseline water supply demands.

7.3.4 Infrastructure Requirements

DDW established statewide regulations for groundwater replenishment via subsurface application in 2014. These requirements specify both treatment standards and retention time/blending requirements, which are summarized below, followed by a discussion of the infrastructure that would be needed for a groundwater replenishment system to meet these requirements.

7.3.4.1 Treatment Standards

DDW treatment standards for groundwater replenishment are established to ensure adequate removal of organic and inorganic contaminants found in secondary treated wastewater effluent and removal/inactivation of pathogens (e.g., virus, Giardia and Cryptosporidium). The regulations specifically include pathogen reduction requirements defined in terms of orders of magnitude (logarithm base 10, or "log") reduction/inactivation of organisms. The regulations also include resiliency requirements that further define the configuration of the treatment system. A summary of the applicable treatment standards and resilience requirements is provided in Table 7-1.

Table 7-1. Treatment Requirements for Groundwater Replenishment

Category	Value
Treatment Standards	
Enteric viruses	12-log reduction
Giardia cysts	10-log reduction
Cryptosporidium oocysts	10-log reduction
Total Organic Carbon (TOC)	Maximum 0.25 milligrams per liter (mg/L) in 95 percent of samples[(a)] Maximum 0.5 mg/L in 20-week running average
Total Nitrogen	10 mg/L
Treatment Resiliency Requirements	
Separate treatment processes	3 for each pathogen
Maximum credit for each process and pathogen	6-log reduction
Processes requiring at least 1.0-log reduction credit[(b)]	3

Note:
(a) Within first 20 weeks.
(b) A single treatment process is allowed to receive log reduction credits for more than one pathogen.

For subsurface (e.g., groundwater aquifer) application projects, DDW also specifically requires the use of a full advanced treatment (FAT) process that includes:

- **Primary treatment and secondary (oxidation) processes**: There are no specific requirements for these treatment processes, as the downstream membrane filtration and reverse osmosis (RO) treatment processes will ensure the total nitrogen and TOC limitations listed in Table 7-1 are achieved. However, agencies that operate FAT systems have documented that secondary treatment systems that provide extended aeration for nitrification produce water that has lower levels of the organics that can lead to fouling in downstream membrane filtration systems. Therefore, secondary treatment systems that provide nitrification upstream of the membrane filtration process can require less maintenance and may perform better over time. The secondary treatment system at the NSD WWTP is designed to provide at least partial nitrification.

- **Membrane filtration**: Membrane filtration may be achieved by either microfiltration, which has a pore size that ranges from 0.1 to 5 micrometers (µm), or ultrafiltration, which has a pore size that ranges from 0.01 to 0.1 µm. Although not specifically defined in DDW regulations, this treatment step is needed to provide particle removal upstream of a RO membrane process.
- **RO Process**: RO is a separation process like the membrane filtration processes but with membranes that have a nominal pore size ranging from 0.001 to 0.0001 µm. Therefore, the RO process can remove smaller particle size pollutants, including small dissolved organic compounds and monovalent ions that pass through larger pore membrane filtration processes. RO membranes also generate a concentrated reject brine stream that must be treated and disposed of separately.
- **Advanced Oxidation Process (AOP):** An AOP uses or combines two or more oxidizing agents to create hydroxyl radicals, which serve as an oxidant for elimination of organic pollutants while also providing inactivation/destruction of viruses, bacteria, and other pathogens. Common AOP options involve adding ozone to water with a high pH, adding ozone to water that is also exposed to ultraviolet (UV) light energy, adding hydrogen peroxide to water that is also exposed to UV light energy, or adding ozone to water in combination with hydrogen peroxide.

The FAT process meets the resiliency requirements of at least three separate treatment processes with each process credited with no more than 6-log reduction per pathogen (virus, Giardia, Cryptosporidium) and at least three processes credited with no less than 1.0-log reduction. The FAT process should generally be capable of providing 10-log removal for Cryptosporidium, Giardia, and viruses. However, additional removal credit would likely be needed to meet the 12-log virus reduction standards.

The amount of additional virus removal credit required would need to be determined and demonstrated through equipment-specific validation testing. DDW allows for one virus log removal credit for each month of groundwater retention time. Additional discussion regarding groundwater retention time credits is provided in the next subsection, in which retention time/blending requirements are addressed. Most projects that employ the FAT process must rely on groundwater retention time credits to meet between 1-log and 3-log of the required virus removal credits.

In addition to validation testing, performance of the RO and AOP systems must be documented prior to full-scale system operation. Finally, ongoing monitoring and demonstration is required after the facilities are online to confirm performance.

7.3.4.2 Retention Time/Blending Requirements

DDW regulations for groundwater replenishment via subsurface application require that the recycled water have a minimum two-month "response retention time" in the groundwater aquifer prior to being recovered from the nearest downgradient extraction well. The response retention time is intended to provide an additional level of safety for the purpose of protecting public health. The response retention time, which can also be applied toward meeting the log-removal credit requirements, must ultimately be validated using a tracer study.

During project planning and/or until completing the required tracer study is possible, DDW will only grant a retention time credit for a portion of the retention time demonstrated through other approved non-tracer study methods. Specifically, if the retention time is demonstrated to be eight months using a numerical modeling analysis, DDW will grant four months of retention time credit; and if retention time is demonstrated to be eight months using an analytical model (e.g., Darcy's Law), DDW will grant two months of retention time credit.

The regulations also specify a maximum fraction of recycled water that can be injected relative to the total recharge water volume. The fraction of recycled water is referred to as the Recycled Water Contribution (RWC). The remaining diluent (dilution) water must generally be a DDW-approved drinking water source with nitrate and nitrite concentrations below the State's Maximum Contaminant Levels applicable to potable water supplies. DDW will grant the RWC for each project based on a review of the project applicant's engineering report, which documents both the treatment system reliability and the log-removal validation process, and demonstration that the treatment processes will reliably achieve a TOC concentration of 0.5 mg/L or less. The regulations do allow an initial RWC up to 100 percent to be approved (i.e., with no dilution water required). However, it may be difficult to provide all the demonstrations needed to obtain an RWC of 100 percent prior to project implementation. DDW can also approve an increase to the RWC after project implementation.

7.3.4.3 Infrastructure Components

The major facilities required to support a groundwater replenishment system consist of the following:

- **FAT System:** Membrane filtration, RO and AOP.
- **Potable Reuse Supply Pipeline:** For conveyance of secondary effluent from the NSD WWTP to the new FAT system. If the advanced treatment facility were co-located at the WWTP, (assuming there is space available), this pipeline may be a relatively small component of the project.
- **Injection and Extraction Wells:** For conveyance of the potable water supply into the receiving groundwater aquifer and recovery of the stored water. Injection and extraction wells cannot be co-located because a retention time through the aquifer would be needed to meet DDW requirements.
- **Injection Water Supply and Extraction Water Delivery Pipelines:** For conveyance of the potable water supply to the injection wells and from the extraction wells to the NMWD's potable water system, respectively.
- **Monitoring Wells:** DDW requires monitoring wells downgradient of the injection wells and upgradient of the extraction wells and other drinking water wells.

In addition, management of the brine (centrate) from the RO process and solids from the other filtration processes would need to be considered. While these may not require significant capital infrastructure, long-term disposal costs could be significant, particularly for brine management.

7.3.5 Implementation Timing

NMWD's timing for implementing potable reuse as a water supply option depends on if and when potable reuse becomes a viable water supply alternative. If a feasible injection and storage option were found, such as for a regional aquifer, or if raw or treated water augmentation were pursued, once regulations more readily support those options, implementing potable reuse would require two major initiatives. First, the planning and permitting of an advanced treatment facility would need to be completed. Second, the facility and associated conveyance infrastructure would need to be designed and constructed.

Design and construction of the conveyance infrastructure is estimated to require 12 to 18 months. The planning and permitting of an advanced treatment facility is estimated to require at least 1 year and possibly up to 3 to 10 years prior to design and construction. The longer end of the range would be needed for raw or treated water augmentation because significant planning work would be needed to support more direct conveyance of potable recycled water, including public outreach and coordination with DDW.

7.4 WATER SUPPLY ALTERNATIVE EVALUATION

Given the uncertainty of a local potable reuse project for NMWD at this time, a detailed evaluation of this alternative has not been completed. This section provides a high-level assessment of the water supply alternative.

7.4.1 Cost Estimate

If viable storage were available, a potable reuse supply for NMWD would be able to provide between 1,000 and 3,100 AFY of additional water supply. This alternative would require an advanced treatment facility with a capacity of between 1 and 3 MGD. Advanced treatment facilities that are at least twice the upper end of this range have been estimated to have per acre-foot unit lifecycle costs between $1,000 and $2,400. These lifecycle costs account for constructing and operating an advanced treatment facility over a 30-year time period. Because of the relatively small scale of a District potable reuse project, unit lifecycle costs for an advanced treatment facility for production of potable water for NMWD are estimated to be at least $3,000 per AF[1]. For the purposes of comparing water supply alternatives under this Study, the total cost is estimated to be $3,000 per AF for the IPR alternative.

The lifecycle unit costs mentioned above do not account for management of the RO reject brine stream. Additional study would be needed to determine feasible RO reject brine management alternatives and their costs. The costs associated with RO reject brine management may be cost prohibitive given possible disposal options. Such options would include trucking of brine waste to a pre-established ocean discharge point, construction of a brine disposal pipeline to the coast, or deep injection of brine waste. There are current efforts underway in the State to identify a potable reuse treatment train that meets DDW objectives but does not rely on RO treatment. If such an approach is developed and accepted by DDW, the treatment-related costs could be significantly reduced, and the RO reject brine stream management requirements would be eliminated.

[1] Estimated unit cost for IPR is based on industry standards. Because IPR was determined to not be viable for NMWD, a detailed planning-level cost estimate was not prepared.

Additional costs would be incurred for needed groundwater injection or extraction equipment, as well as conveyance equipment, such as pump stations and pipelines.

One possible direct potable reuse option would include storing reuse water in Stafford Lake for subsequent processing through the STP. In that case, the source water is still assumed to be from the existing NSD WWTP. A conveyance pipeline of approximately 28,000 linear feet would be needed for conveyance from the NSD WWTP to Stafford Lake. The capital costs alone of the pipeline is estimated to be $26 million. Depending on the annual production of highly treated effluent, this capital cost equates to a unit cost of $280 to $870 per AF over the 30-year project horizon, for 3,100 and 1,000 AFY, respectively. The pipeline costs would be in addition to treatment costs, such as for a FAT system and beyond at the NSD WWTP for delivery of treated water.

7.4.2 Operational Impacts

Production of potable reuse water would require a new advanced treatment facility, most likely located at or near the existing NSD WWTP and thus not co-located with current NMWD facilities. The advanced treatment facility would require chemical and energy resources, along with dedicated staff, who are adequately certified for operating the advanced facility. If some kind of aquifer storage were combined with potable reuse production, additional NMWD staff time would be needed for operation and maintenance of injection and extraction well infrastructure. Further, additional chemical and energy resources would be needed at the Stafford Treatment Plant to accommodate a similar increase in water production. These resources were not determined as the effort is beyond the scope of the current evaluation, particularly for an alternative that is not considered viable at this time.

Potable reuse water would also have a different chemical quality than NMWD’s current source water to the STP. If stored in a groundwater aquifer, potable reuse water being added to NMWD’s potable water distribution system would be expected to have a chemical quality related to the storage aquifer, which would likely have a different mineral content in addition to possibly higher salinity than NMWD’s potable water. Prior to introducing extracted potable reuse water and/or adding into NMWD’s potable water distribution system, extensive analytical testing would be needed to determine what, if any, impacts would be expected from blending in the new water supply. Potential impacts include higher calcium carbonate scaling or the opposite of leaching materials from the distribution system if a large pH or alkalinity difference is achieved.

7.4.3 Regulations and Permitting

The regulations for achieving adequate quality in the potable reuse water have been detailed above with the discussion of the infrastructure requirements for potable reuse. In addition, a Wastewater Change Petition would need to be submitted to the State Water Board. A change petition would be needed prior to diverting wastewater that is currently being discharged to surface water for a different use, such as a recycled water or potable reuse supply source. The change petition process is meant to protect existing water rights holders downstream of the existing discharge. Since NSD’s effluent discharge is to San Pablo Bay, water rights concerns would be most likely be minimal to non-existent.

The standard CEQA environmental analysis would also be needed to support development of any infrastructure project.

7.4.4 Public and Institutional Considerations

Implementation of a potable reuse project, whether for indirect or direct reuse, is subject to heightened public scrutiny because of the nature of the source water despite State regulations and other similar projects being in place.

In addition, an agreement would be needed with NSD for construction and operation of the advanced treatment facility assuming it would be constructed adjacent to the existing WWTP. Additional agreements would be needed with property owners along the conveyance pipeline alignment, as well as for land needed for aquifer injection and extraction wells.

7.5 FINDINGS AND CONCLUSIONS

Neither of the two indirect potable reuse classifications (groundwater replenishment and surface water source augmentation) are found to be viable for NMWD when considering locally available storage options, namely groundwater aquifers within NMWD's boundaries and Stafford Lake, respectively. Groundwater replenishment may be a viable water supply option should NMWD have regional storage available. The infrastructure requirements and costs for groundwater replenishment should be further reviewed if and when a viable aquifer storage option is identified. The Resiliency Study did not specifically identify indirect potable use as a Drought Management Option but did include ASR, groundwater banking and conjunctive use. If indirect potable reuse is identified in the future as a regional option, NMWD should consider participating in scoping and planning sessions with Sonoma Water and other local agencies as a next step towards developing project and programs to improve regional water supply resiliency and reliability if a viable aquifer storage option is identified.

Direct potable reuse via raw or treated water augmentation has not been evaluated in detail at this time due to the emerging nature of the regulations and projects for direct potable reuse. NMWD is recommended to review these reuse options as the State regulations and public acceptance progress over the next several years. State regulations for direct potable reuse are expected to be finalized by December 2023[2].

[2] Assembly Bill 574 requires the State Water Board to adopt uniform water recycling criteria for direct potable reuse through raw water augmentation by December 31, 2023, with provisions for extension of the deadline.

CHAPTER 8
Improve Stafford Treatment Plant Process Water Recapture Efficiency

This Chapter presents the potential for and evaluation of producing additional potable water from NMWD's STP by making efficiency improvements to the recapture of process water and related raw water intake and wastewater discharge modifications. As detailed herein, improvements to STP processes may potentially provide additional water supply for NMWD.

8.1 STP EFFICIENCY IMPROVEMENTS TO ENHANCE WATER SUPPLY

NMWD treats water stored in Stafford Lake through the STP to supplement purchased water supply from Sonoma Water. The STP has a nominal production capacity of 6 MGD. The quantities treated during each year depend on a combination of demand in NMWD's service area and the amount of source water available in Stafford Lake. Following intake and pumping from Stafford Lake, the raw water is treated through various treatment processes, and treated water is pumped to NMWD's potable water distribution system.

The STP treatment process consists of the following unit processes:

- Oxidation with chlorine dioxide, augmented with chlorine dosing
- Coagulation with polyaluminum chloride, ferric chloride and a coagulant aid polymer
- Pretreatment clarification and filtration through three, modular Actiflo™ clarifier and granular media filter units
- Filtration through granular activated carbon (GAC) contactor-filter units for enhanced removal of taste and odor compounds and disinfection byproduct precursors
- Disinfection with chlorine
- pH and corrosion control with sodium hydroxide addition

These processes result in the following process waste streams:

- Actiflo filter-to-waste
- Hydrocyclone return waste from the Actiflo units
- Centrifuge centrate
- Centrifuge area washdown
- Reclamation pond cleaning
- GAC contactor spent backwash water
- pH analyzer and lab sink sample drain

The STP also includes handling facilities for liquid waste streams from the treatment processes and sludge solids management facilities for dewatering of solids. Several process waste/recycle streams are returned at various points upstream in the process. Liquid waste streams that cannot be recycled through the STP process are discharged to NSD's sanitary sewer collection system.

NMWD's wastewater discharge to the NSD collection system is subject to restrictions in a discharge permit. The discharge permit with NSD includes several flow and volume restrictions, which are summarized in Table 8-1.

Table 8-1. Wastewater Discharge Permit Restrictions

Category	Period	Value	Units
Daily Flow Limit	December through April	40,000	gallons per day (gpd)
	May through November	150,000	
Instantaneous Flow Limit	year-round	100[(a)]	gallons per minute (gpm)
Narrative Limit	year-round	Discharge shall cease when any significant rainfall event[(b)] commences.	--

Note:
(a) The instantaneous flow limit of 100 gpm equals 144,000 gpd if expressed on a total daily basis.
(b) "Significant rainfall events" are not defined in the discharge permit.

Current STP operations generate more wastewater than can be discharged under the NSD permit. The instantaneous flow limit of 100 gpm, in particular, limits production during the peak water demand period (i.e., summer months). As a result, NMWD must regularly stop potable water production for the day after several hours of operation to stay within the discharge permit limits.

8.1.1 Overview of STP Efficiency Improvements

NMWD may potentially increase its water supply yield by making efficiency improvements at its STP. During the course of this Study, the following separate items have been identified to enhance NMWD's water supply:

- Pretreatment unit modifications
- Raw water intake modifications
- Replacement of wastewater discharge pipeline

The raw water intake modifications and replacement of the wastewater discharge pipeline are ancillary improvements identified during this Study. These two improvements would not specifically increase the yield of the STP, but would improve the reliability of the STP water supply yield.

8.1.1.1 Pretreatment Unit Modifications

In 2019, West Yost conducted a Process Efficiency Improvements Study for the STP and evaluated five alternative treatment or operating improvements that could potentially allow NMWD to increase production at the STP. Eliminating or reducing the current operational constraint related to the wastewater discharge permit restrictions would provide the greatest benefit to STP operational flexibility and production.

A revised discharge restriction during the summer months would allow for increased daily production during peak demand periods. For purposes of the current evaluation, the sewer flow restriction is assumed to be unchanged at this time and that the most effective method to allow for additional potable water production is reducing the waste flow rates or volumes.

If the flow rate/volume of the waste streams could be reduced, NMWD could operate the STP longer each day, thus producing additional daily water supply. Therefore, the 2019 study focused on alternatives that would reduce and/or recycle greater portions of the process waste streams that are currently discharged to the sewer.

The bulk of process waste stream flow is contributed by the hydrocyclone return stream related to the Actiflo clarification process. West Yost's 2019 study resulted in a Technical Memorandum (TM) with a recommendation that NMWD conduct a performance test of modifying the hydrocyclone return. The 2019 TM is included as Appendix E of this Study and provides additional details on the previous alternatives.

The purpose of the recommended performance test was to determine the impacts on the main process and feasibility of long-term modifications that could be made to reduce the hydrocyclone return waste stream, thus allowing for additional potable water production. STP operations staff conducted a brief performance test of such modifications after the prior West Yost study was completed. However, documentation of the performance testing was limited, and additional performance testing would be needed to confirm the feasibility of long-term modifications to the STP. This chapter discusses what additional yield could be realized by permanent modifications to the hydrocyclone return, and recommendations for additional study to confirm the waste reduction.

8.1.1.2 Raw Water Intake Modifications

With or without the pretreatment modifications described above, STP operation would be enhanced with modifications to the raw water intake structure to allow the STP operations staff to preferentially draw water from a water level that avoids excess algal or manganese.

The raw water quality has significant impacts on efficient operation of the STP, in particular raw water turbidity and manganese. High turbidity can be caused by algal growth near the surface of the lake. High manganese concentrations can be caused by anaerobic biological activity in the lakebed sediment. When manganese concentrations are relatively high, STP operations staff have found it difficult to add sufficient oxidant (chlorine dioxide) to the treatment process to meet the oxidant demand for both organics and inorganics while also maintaining compliance with the maximum contaminant level regulatory limit for chlorite in treated water. The specific manganese concentration threshold that causes these issues should be explored as part of a subsequent study.

Raw water is taken into the STP via an intake tower in Stafford Lake that has two primary intake gates with a 16-foot elevation difference between them.[1] The higher gate is typically used early in the production season and closed when the lake elevation reaches a point that results in undesirable water quality, such as from debris near the lake surface. The lower gate is used when conditions are not favorable for the higher gate. The raw water turbidity can fluctuate widely depending on the intake elevation relative to the lake surface elevation. Generally, an intake elevation closer to the surface elevation draws in more algae, but use of the lower intake gate can draw in water with lower dissolved oxygen concentrations and correspondingly higher manganese concentrations.

Several air diffusers are also located near the intake tower along the bottom of the lake to prevent lake stratification. Based on recent discussions with NMWD staff, the air diffusers have helped NMWD achieve

[1] NMWD, 2016. Stafford Water Treatment Plant Operations Plan.

higher dissolved oxygen concentrations through deeper strata of the lake, such that the main concern with the current intake are related to the algae concentrations. However, the diffusers also can introduce additional nutrients from the bottom sediment to the top layers of the lake, encouraging algal growth.

Aeration alternatives are available that allow NMWD to achieve adequate dissolved oxygen concentrations in Stafford Lake without enhancing mixing and thus encouraging algal growth. Evaluation of those alternatives is beyond the scope of the current Study but mentioned here for NMWD consideration should additional raw water improvements be of interest with or without the raw water intake modification discussed above.

8.1.1.3 Replacement of Wastewater Discharge Pipeline

NMWD staff have identified that this alternative should also account for replacing the 4-inch diameter discharge pipeline to the NSD collection system. This replacement is not strictly required to implement the main focus of this alternative, the pretreatment unit modifications. However, the existing discharge pipeline requires relatively frequent maintenance, including a recent replacement of a section of broken pipeline. A new pipeline would thus be expected to reduce NMWD's maintenance efforts and allow more consistent operation of the STP, aligning with the main objective of this alternative.

8.1.2 Water Supply Yield and Reliability

As discussed above, pretreatment unit modifications may provide additional treated water supply yield, which could reduce needed yield from other water supply alternatives. The raw water intake modifications and discharge pipeline replacement are not expected to specifically allow for an increased yield from the STP. Those improvements nevertheless are expected to improve the reliability of STP operation.

As indicated above and detailed in the 2019 TM, the hydrocyclone waste accounts for 80 to 90 percent of the total sewer discharge. The TM provided an estimate of additional daily STP potable water production that could be realized with a reduction in the hydrocyclone waste, for both wet season and dry season days, which have different sewer restrictions as detailed in Table 8-1. The estimate also relied on assuming operation of the STP at its full capacity of 6 MGD for up to 24 hours a day. In theory, the daily additional water supply estimates could be multiplied by the total days in each respective season, totaling 365 days a year. However, assuming maximum capacity production over the entire year would result in an overly generous estimate of additional potable water production because the raw water supply is not adequate to support production at that level.

In addition, the available raw water supply is dependent on rainfall and thus can be much smaller during dry years. For purposes of the current evaluation, seasonal, raw water supplies for 2013 through 2021 have been reviewed to estimate additional water supply that could be produced during a typical water year and a dry year. The estimated water supply yields are 20 to 70 AFY for a dry year and typical year, respectively.

These estimated yields are based on the following assumptions:

- Regardless of the water year, the following could be realized:
  - A reduction in hydrocyclone return waste
  - Additional daily production of 2.0 MGD during the wet season and 2.8 MGD during the dry season

    - Corresponding daily hours of operation would increase from 2.3 to 10.2 hours during the wet season and from 12.8 to 24 hours during the dry season (for days of operation)
- Based on the 2021 dry year, about 490 acre-feet (160 million gallons) was treated in the dry season and no water was treated in the wet season. Thus, potable water yield for this alternative is assumed to be produced only in the dry season during a dry year.

Additional yield closer to the 70 AFY could be realized during a dry year if NMWD were to obtain supplemental water supply that could be stored in Stafford Lake or otherwise have a higher raw water supply available. As discussed in Section 3.2, NMWD has the option to purchase winter water flows from the Russian River and backfeed the water into Stafford Lake. Although this supplemental water supply would undergo a second round of potable water treatment through the STP and present additional treatment cost, it bolsters NMWD's supply during dry periods. Further, as part of this Study, NMWD explored the potential for increasing stored water in Stafford Lake as discussed in Chapters 9 and 10. These actions have the potential to increase the raw water supply available even in dry years, making full use of the improvement presented herein.

The STP improvements discussed in this Chapter would have the benefit of allowing NMWD to treat any additional raw water supply more efficiently and at relatively low cost, as detailed later in this chapter. This alternative therefore increases the reliability of having additional water supply from the STP.

The 20 to 70 AFY additional water supply estimate is based on a spreadsheet analysis of reduced waste discharge, not actual operating data with the STP modifications. Should NMWD want to evaluate this alternative further, additional performance testing of the STP with the recommended hydrocyclone modifications is strongly recommended to confirm how much recycle of the hydrocyclone discharge could be achieved with minimal operating impacts to the STP. The reliability of this water supply option is therefore relatively uncertain until additional performance testing has been completed.

Additional uncertainty is introduced by the fact that this water supply assessment relies on data for past raw water supply into Stafford Lake. Climate change could result in even drier periods than have been experienced in the recent past.

8.1.3 Infrastructure Requirements

The following infrastructure requirements have been identified related to this alternative and are detailed below:

- Pretreatment unit modifications
- Raw water intake modifications
- Replacement of wastewater discharge pipeline

8.1.3.1 Pretreatment Unit Modifications

The STP has three existing Actiflo units used for the main treatment upstream of the GAC filters. Each modular treatment unit has two sludge collection hoppers at the bottom, where microsand-ballasted flow-sludge slurry settles and accumulates. Each hopper has a dedicated sand pump that withdraws the settled slurry and sends it to a dedicated hydrocyclone. The Actiflo units thus have two dedicated hydrocyclones each. The hydrocyclones separate the microsand from the sludge solids. The separated microsand is recycled back to the injection tank of the respective Actiflo unit, and the sludge solids waste stream is discharged to a 500-gallon hydrocyclone waste collection tank and pumped from this tank to the solids thickener for settling of solids. Clarified water from the solids thickener is discharged at a controlled rate to NSD's collection system.

West Yost proposed modifications in the 2019 TM to the hydrocyclone return from the hoppers. Reduction of the hydrocyclone sludge waste stream could be achieved by returning a portion of the waste sludge stream from the hydrocyclones to the injection tank of the respective Actiflo unit where the microsand is currently reintroduced and/or added. The current Actiflo system supplier, Veolia, offers an Actiflo unit with a High Concentration Sludge system that is similar in concept to the proposed modification. However, recent discussions with Veolia indicate that this concept has not been implemented at other water treatment facilities to date.

The specific modification proposed is modifying and reconfiguring the discharge pipeline of one of the two hydrocyclone units for each Actiflo unit to return the waste stream. This modification would provide a reduction in the liquid waste flow rate.

The modifications could be implemented by NMWD staff relatively easily, both for the initial performance testing and, if performance testing proves successful, for the long-term modification. The sand pumps are configured to operate within a specific back pressure range that provides the desired microsand-sludge slurry flow rate that is recommended to keep the settling microsand from settling, accumulating, and impairing the outlet connection of the sludge hopper. Therefore, the modifications to the discharge pipeline(s) should be configured to provide a similar backpressure on the sand pumps as the current configuration provides. The recommended piping reconfiguration to return 50 percent of the hydrocyclone liquid waste stream into the injection tank is as follows:

- On one of the two hydrocyclone units (per Actiflo unit), disconnect the stainless-steel vent assembly where it connects to the hydrocyclone liquid waste pipeline (by disconnecting the flanged connection adjacent to the increaser and loosening the Victaulic connection at the top of the hydrocyclone)
- Rotate the vent assembly 180 degrees and install Unistrut or a similar support system to support the vent assembly's new location
- Reconnect the sludge discharge assembly to the hydrocyclone at the Victaulic connection
- Connect piping to vent assembly at the flange connection to direct the hydrocyclone liquid waste stream back into the Actiflo unit's injection tank

Additional piping and valving could be added to allow readily switching between returning and wasting the sludge or returning only a portion of the sludge on the second hydrocyclone.

The above configuration was developed for the purposes of preparing a cost estimate for this study. Other alternative configurations could be considered to meet NMWD's needs and evaluated in subsequent studies.

8.1.3.2 Raw Water Intake Modifications

NMWD staff have identified a Water Selector available from Ixom Watercare as a possible equipment system that could be installed to allow for adjustable intake elevations. The Water Selector could potentially be retrofit over the existing intake gates to add additional intake locations at different water levels.

Ixom was not able to provide a full cost proposal at this time for the Water Selector for two reasons. First, the system is not typically installed on cylindrical intake tower like NMWD's. Second, Ixom's engineering staff were experiencing complications with a similar unit already installed and were not confident in suggesting the equipment for NMWD's application.

For purposes of this Study, it is assumed that the equipment or similar could be successfully retrofitted to NMWD's existing intake tower. The major additional equipment that would be attached to the intake tower is a rectangular, stainless-steel structure with a series of small metal gates positioned along the depth profile. The gates are opened via hydraulic power from an air compressor. In addition, a shore-based control panel and multi-parameter analytical probe are used to monitor water quality along the depth profile in real-time and inform the choice of gates to open.

8.1.3.3 Replacement of Wastewater Discharge Pipeline

The existing 4-inch diameter discharge pipeline to the NSD collection system could be replaced in-kind with 4-inch diameter pipeline. As a force main, the existing pipeline does not include any access structures (e.g., manholes), but the pipeline does include some bends.

NMWD staff have indicated that some of the maintenance requirements of the existing pipeline may be related to waste polymer buildup on the force main interior, which restricts flow over time. A larger diameter pipeline could be installed to reduce the concerns with polymer buildup. However, maintaining adequate scour velocity in the pipeline is recommended to prevent solids buildup generally. For purposes of the current evaluation, therefore, replacing in-kind with a 4-inch diameter pipeline is assumed.

8.1.4 Implementation Timing

There are two, critical path schedule items for the implementation of the pretreatment unit modifications as a permanent modification at the STP:

- First, NMWD would need to conduct performance testing to confirm that the proposed modifications would have overall positive benefits, specifically allowing for increased potable water production while having limited impacts on treatment performance.
- Second, NMWD would need to receive approval of the DDW of modifications to the STP operating permit.

The performance testing is estimated to require three to four months total, comprising the following:

- One month of planning
- One month of conducting the testing
- One to two months to analyze the results and prepare a performance testing report

The timing of DDW approval of modifications to the operating permit is uncertain but could reasonably require 6 to 12 months, including time for NMWD to prepare the modification application.

The performance testing would be conducted with temporary modifications to the hydrocyclones, so additional time would be needed following the performance testing and DDW approval of a permit modification to install the permanent capital changes. Installation of the permanent capital changes to the hydrocyclone is estimated to require only 1 to 2 months, allowing for time to order necessary equipment and for NMWD staff to make the modifications.

These components and the total estimated implementation period are provided Table 8-2 for modifying the pretreatment units.

Table 8-2. Summary of Estimated Implementation of Pretreatment Unit Modifications

Action	Estimated Timing, months
Complete Performance Testing	3-4
Receive DDW Approval for Operating Permit Modification	6-12
Implement permanent capital changes	1-2
Total Implementation Period[(a)]	**13-22**

Note
(a) Total range is calculated as the sum of the lower and higher ends of each component range, respectively (e.g. 13 = 3+6+4).

The other two capital components of this alternative – raw water intake modification and replacement of the wastewater discharge pipeline – would likely require shorter implementation periods. While the design and construction periods would be longer, these improvements would not require performance testing or a permit modification and corresponding DDW approval. The implementation timing is estimated to be 6 to 12 months for the raw water intake modification and discharge pipeline replacement, which could proceed concurrently or separately.

8.2 WATER SUPPLY ALTERNATIVE EVALUATION

This section provides an evaluation of the water supply alternative, grouped by the following sections:

- Cost Estimate
- Operational Impacts
- Regulations and Permitting
- Public and Institutional Considerations

8.2.1 Cost Estimate

A planning level cost estimate for the modification and operation of the improvements for the STP process water recapture efficiency and the ancillary improvements, along with assumptions, is provided in Table 8-2 and Table 8-3. Appendix F provides a more detailed cost estimate for this alternative. For this water supply alternative, a project allowance of 25 percent is used to account for planning, permitting, engineering, legal, and administrative costs. A separate cost is listed for performance testing.

Implementing this alternative would require some capital and implementation costs, as well as impact the STP operating costs. Three specific types of capital improvements have been identified for this alternative: pretreatment unit modifications, raw water intake modifications and replacement of the wastewater discharge pipeline.

Raw water intake modifications and replacement of the wastewater discharge pipeline are ancillary to pretreatment unit modifications and are not correlated with specific increases of the STP yield. NMWD may opt to implement a project that would only modify the pretreatment unit alone, or it may opt to implement the primary and ancillary modifications and replacement together. To provide NMWD a range, two cost estimates are provided herein - one for modifications to the pretreatment unit alone (on a per unit basis), and one for modifications per pretreatment unit along with ancillary modifications and improvement.

Appendix F provides further details on the cost estimating assumptions associated with this alternative. The cost estimates are summarized in Table 8-3 and 8-4 below.

Table 8-3. Total Estimated Cost for the Pretreatment Modification

Cost Item	Estimated Cost, dollars
Total Capital Cost	
Pretreatment Modification[(a)]	10,000
Performance Testing[(b)]	60,000
Total Replacement Cost[(c)]	70,000
Total O&M Cost[(d)]	-
NPV Total Cost	**$140,000**
Total Supply over 30 years[(d)], AF	**600 – 2,100**
Unit Cost over 30 years[(e)] (dollars/AF)	70 - 240

Notes:

(a) The construction contingency was estimated to be 40 percent and the project allowance for planning, permitting, engineering, legal, and administrative costs was estimated to be 25 percent.

(b) Performance testing is estimated to be $60,000 and assumes the performance testing would be led by an engineering consultant with assistance and supervision from NMWD staff. The engineering consultant would work with NMWD staff and the manufacturer to develop a work plan, collect data, among other efforts.

(c) It is estimated that the valving equipment will need to be replaced every 5 years. An inflation rate of 3.0 percent and discount rate of 3.5 percent was applied to determine the net present value of the replacement costs over the 30-year operational cycle. The construction contingency was estimated to be 40 percent and the project allowance for planning, permitting, engineering, legal, and administrative costs was estimated to be 35 percent.

(d) It is anticipated that overall O&M costs would remain the same or be slightly lower but cannot be determine without additional information that is not readily available.

(e) Annual supply yield of 20 AFY is assumed to be available during all years equating to 600 AF over 30 years. The modification could treat up to an additional 70 AFY, if available. This equates to 2,100 AFY over 30 years.

(f) Unit Cost = NPV Total Cost divided by the total supply yield over 30 years.

Table 8-4. Total Estimated Cost for the Pretreatment Modification and Ancillary Improvements

Cost Item	Estimated Cost, dollars
Total Capital Cost	
Pretreatment Modification[(a)]	10,000
Performance Testing[(b)]	60,000
Raw Water Intake Modifications[(c)]	2,700,000
Wastewater Discharge Pipeline Replacement[(d)]	442,000
Total Replacement Cost[(e)]	70,000
Total O&M Cost[(f)]	**(180,000)**
NPV Total Cost	**$3,102,000**
Total Supply over 30 years[(g)](AF)	**600 – 2,100**
Unit Cost over 30 years[(h)] (dollars per AF)	1,500 – 5,200

Notes:

(a) The construction contingency was estimated to be 40 percent and the project allowance for planning, permitting, engineering, legal, and administrative costs was estimated to be 25 percent.

(b) Performance testing is estimated to be $60,000 and assumes the performance testing would be led by an engineering consultant with assistance and supervision from NMWD staff. The engineering consultant would work with NMWD staff and the manufacturer to develop a work plan, collect data, among other efforts.

(c) The capital cost for the raw water intake modification is a high-level cost based on discussions with the manufacturer, Ixom. The capital cost does not account for any contingencies.

(d) The construction contingency was estimated to be 35% and the project allowance for planning, permitting, engineering, legal, and administrative costs was estimated to be 25%. The construction contingency was reduced from 40 percent to 35 percent due to the wastewater pipeline being a pipeline replacement (no CEQA, no easements, no property rights etc.).

(e) For the pretreatment modification, it is estimated that the valving equipment will need to be replaced every 5 years. An inflation rate of 3.0 percent and discount rate of 3.5 percent was applied to determine the net present value of the replacement costs over the 30-year operational cycle. The construction contingency was estimated to be 40 percent and the project allowance for planning, permitting, engineering, legal, and administrative costs was estimated to be 35 percent. Replacement costs for the ancillary improvements were not included.

(f) For the pretreatment modification, it is anticipated that overall O&M costs would remain the same or be slightly lower but cannot be determine without additional information that is not readily available. For the raw water intake modification, O&M costs are likely to be similar or slightly lower after implementation of the pretreatment unit modifications, but whether they would be significantly lower and by how much cannot be determined without additional information that is not readily available at this time. NMWD spends an estimated $9,000 per year to perform maintenance on the existing wastewater discharge pipeline. If the existing pipeline were replaced, annual O&M costs are anticipated to be reduced by $9,000 every year. Over a 30-year period, NMWD O&M costs is estimated be reduced by a total NPV of $180,000.

(g) Annual supply yield of 20 AFY is assumed to be available during all years equating to 600 AF over 30 years. The pretreatment modification could treat up to an additional 70 AFY, if available. This equates to 2,100 AFY over 30 years. The ancillary improvements would not increase the local water supply but increase the reliability of the STP operations.

(h) Unit Cost = NPV Total Cost divided by the total supply yield over 30 years.

8.2.1.1 Pretreatment Unit Modifications

The total capital cost for the pretreatment unit modifications is estimated to be $70,000. The pretreatment unit modifications are estimated to cost at most $10,000 for small piping and valving equipment and includes the construction contingency and 25 percent project allowance. The performance testing is estimated to be approximately $60,000 and assumes the performance testing would be led by an engineering consultant with assistance and supervision from NMWD staff. The engineering consultant would work with NMWD staff and the manufacturer to develop a work plan, collect data, among other efforts.

The 30-year NPV replacement cost is estimated to be $70,000. The valving equipment is assumed to require replacement approximately every 5 years.

Overall, O&M costs are likely to be similar or slightly lower after implementation of the pretreatment unit modifications, but whether they would be significantly lower and by how much cannot be determined without additional information that is not readily available at this time. For purposes of determining a unit cost, no changes to operational costs are assumed associated with this component. Performance testing is recommended to estimate the impacts to the STP O&M costs, including quantifying the reduction of chemical usage and costs.

The total cost (total capital cost plus NPV costs) for the pretreatment unit modifications is estimated to be $140,000. It is estimated that an additional annual yield of 20 AFY would be achieved in all years, equating to 600 AF over 30 years, with the pretreatment modifications. During a typical year, it is estimated that approximately 70 AFY would be available, equating to 2,100 AF over 30 years. The unit cost would range from $1,500 to $5,200 over 30 years.

Should the region experience dry years and NMWD decides to purchase winter water flows from the Russian River, the supplemental water supply is estimated to cost up to $400 per AF. Due to the unpredictability of dry seasons and the volume of water to be purchased, the cost of this water supply is excluded from the cost estimate. However, this additional cost must be noted by NMWD.

8.2.1.2 Raw Water Intake Modifications

Although a site-specific budgetary cost is not available at this time, Ixom provided a high-level cost estimate of about $2 million for the equipment and $700,000 for installation cost, not accounting for any contingencies. This estimate is based on a similar-sized Water Selector that had been recently installed elsewhere.

Overall, O&M costs are likely to be similar or slightly lower after implementation of the pretreatment unit modifications, but whether they would be significantly lower and by how much cannot be determined without additional information that is not readily available at this time.

8.2.1.3 Wastewater Discharge Pipe Replacement

The total capital cost for the wastewater discharge pipeline replacement is estimated to be $442,000. The construction contingency was reduced from 40 percent to 35 percent for this pipeline replacement. A project allowance of 25 percent was used. The pipeline was assumed to have a life cycle of 50 years. Since the Study’s operational cycle is less than 50 years, no replacements were assumed to be required. This capital cost would be expected to be offset by reduced NMWD operational and maintenance costs.

NMWD spends an estimated $9,000 per year to perform maintenance on the existing wastewater discharge pipeline. If the existing pipeline were replaced, annual O&M costs are anticipated to be reduced by $9,000 every year. Over a 30-year period, NMWD O&M costs is estimated be reduced by a total NPV of $180,000.

8.2.2 Operational Impacts

This section describes specific operational impacts potentially associated with implementing each component of this alternative. In Section 8.3, performance testing is recommended. The performance testing could have short-term operational impacts and would be used to better gauge long-term operational impacts.

8.2.2.1 Projected Operational Impacts of Pretreatment Unit Modifications

Based on discussions with Veolia, two primary operational risks are possible with implementing the proposed pretreatment unit modifications. One risk is buildup of solids within the Actiflo unit, which could potentially impact the effluent (clarified water) quality. Another risk is increasing the percent solids of the sludge-microsand slurry to be processed by the hydrocyclone, which may result in reduced sand separation efficiency (i.e., increased microsand loss).

Buildup of solids within the Actiflo unit pretreatment process would be a pertinent concern when treating water with high solids concentration. The original Actiflo treatment process was developed to clarify secondary wastewater effluent that typically has a higher solids concentration than STP source water. Most of the time, the STP is treating water with relatively low turbidity (< 10 Nephelometric Turbidity Units). Because the STP raw water turbidities are typically very low, returning a portion of the hydrocyclone waste may actually improve floc formation in the Actiflo unit by reintroducing more and larger pre-formed floc solids that enhance particle collisions and agglomeration.

Veolia has indicated that the solids concentration in the sand-sludge slurry fed to the hydrocyclone should not exceed than 12 to 15 percent (including the microsand) to avoid impacting the hydrocyclone efficiency. The sludge waste stream has very low concentration of dry solids (typically between 0.1 and 0.3 percent) and is a small fraction of the dry solids in the sand-sludge slurry. Doubling the sludge solids concentration by returning 50 percent of the waste stream back into the Actiflo process should not significantly increase the sand-sludge slurry's dry solids concentration.

Additionally, since the wet sludge from the hydrocyclones would be recirculated to the Actiflo unit, the microsand enmeshed in the wet sludge slurry would be returned and would not be lost.

Recycling a portion of the waste sludge would be expected to reduce chemical (i.e. polymer) use by returning some of the chemical in the settled microsand-sludge slurry ahead of the Actiflo maturation zone. One objective of the performance testing would be to evaluate what reductions in chemical use could be achieved with the modifications.

Finally, the increased hours of STP operation discussed above with the yield estimates would require fewer days of operation overall and essentially the same total hours of operation each year. Therefore, this alternative would change the timing of STP staffing but not the overall staff hours required.

8.2.2.2 Projected Operational Impacts of Ancillary Improvements

Both the raw water intake modifications and wastewater discharge pipeline should allow for more reliable operation of the STP and reduce STP staff time for either managing variable raw water intake quality or replacing broken sections of the pipeline, respectively.

8.2.3 Regulations and Permitting

This alternative would require modification of existing pipelines, hydroclones and ancillary facilities but minimal construction at the STP. Each of the alternative components are likely to be exempt from CEQA in accordance with CEQA Section 15301 – Class 1 Minor alteration of existing public or private structure. Implementation of changes to the STP's existing water treatment process could affect water quality but monitoring, operational adjustments and treatment options would ensure that all drinking water standards are met.

Facilities and operational changes at the STP are likely to require amendment of the STP operating permit and approval of the DDW, specifically for the pretreatment unit modifications. Any performance testing results will need to be documented to support the modification request to the DDW. Facilities and operational changes at the STP should be reviewed for consistency with Filter Backwash Recycling Rule and California Cryptosporidium Action Plan.

This alternative involves alteration to the existing water treatment process and is the least complex from a regulatory standpoint. Minimal, if any, CEQA analysis would be required, and the project could be implemented with DDW review and approval.

8.2.4 Public and Institutional Considerations

The public and institutional considerations for this alternative are considered to be minor, based on the following:

- Any modifications at the STP would need to allow for continued compliance with drinking water standards. No public opposition to these relatively minor modifications are anticipated.
- The proposed modifications would impact operations at the STP, but additional study of the modifications is recommended before committing to permanent implementation of the modifications. One overarching goal of the additional study would be to work through any operational concerns that arise during the study, if possible.
- Implementing this alternative would not require coordination with outside entities (e.g., for obtaining easements or developing partnerships) apart from minor coordination with the Actiflo vendor (Veolia) as part of the performance testing.

8.3 FINDINGS AND CONCLUSIONS

No items intrinsic to the alternative have been identified that would prevent it from being successfully implemented. In other words, no fatal flaws to this alternative have been identified that should preclude NMWD from considering this alternative. The two riskiest aspects of implementing this alternative are: (1) potential impacts to treated water quality; and (2) achieving DDW approval for implementing the pretreatment unit modifications.

Additional plant-scale study is needed to confirm the feasibility of this alternative, which entails modifying the STP pretreatment process to reduce wastewater discharged to the collection system and thus allow for additional hours of STP operation to produce additional potable water from stored water in Stafford Lake. The capital change to implement this component of the alternative is relatively minor.

The recommended performance testing for the pre-treatment units is provided in Section 8.3.1. Should the performance testing confirm the feasibility of this alternative, a reasonable estimate of the additional water supply yield that could be realized is 20 to 70 AFY. Closer to 20 AFY is more likely when the raw water supply is a limiting factor, such as during a dry year, not the wastewater discharge permit. Even during a dry year, the upper end of the yield may be achievable if the water supply to Stafford Lake could be augmented – for instance, with imported water from Sonoma Water.

Should the performance testing indicate that implementing the pretreatment modifications would not be prudent, NMWD could explore other alternatives for STP process efficiency. West Yost's 2019 study identified four other alternatives apart from modifying the pretreatment units. One of those alternatives would require operating fewer than all three Actiflo units at one time, to reduce wastewater from starting and stopping the multiple units. Additional staff resources or modifications to the STP control systems would be required to implement this alternative. The three remaining alternatives would require significantly more capital investment, with estimated construction costs ranging between $1.6 and $2.2 million. The least expensive of those entailed modifications to the solids settling process. Specifically, the facility currently being used as a solids thickener could be rehabilitated, retrofitted and returned to its original use as a reactor clarifier. The restored functionality would allow NMWD to recover the supernatant from that process as another recycle stream, thus reducing some portion of the STP wastewater.

Further evaluation of these other alternatives is beyond the scope of the current evaluation. NMWD is recommended to revisit these alternatives, specifically rehabilitating the reactor clarifier, should the performance testing of the pretreatment modifications confirm that the current alternative is not feasible.

8.3.1 Recommended Performance Testing

Prior to implementing long-term modifications of the pretreatment units, additional performance testing is recommended at a plant-scale to determine the impacts of implementing the modifications. Based on discussions with NMWD staff, all three Actiflo units are assumed to continue operation during the testing period. To limit operational impacts of the testing, hydrocyclone modifications should be initiated for only one of the Actiflo units. The other units would operate normally, at least initially, to serve as an evaluation test control and provide operating data for comparison with the test unit's data.

The preparation of a performance testing plan is strongly recommended in coordination with Veolia and an engineering consultant prior to conducting the additional testing to ensure that adequate data and information is collected and documented during the performance testing. The data and information gathered would help NMWD make an informed decision on whether long-term modifications are operationally feasible and desirable. Additional details to describe the performance testing would be developed as part of the testing plan.

Should the results of the initial performance testing prove positive and have limited or beneficial operational impacts, the testing could be expanded to two of the Actiflo units while still leaving one unit unmodified to serve as a control.

CHAPTER 9
Divert Captured Stormwater Into Stafford Lake

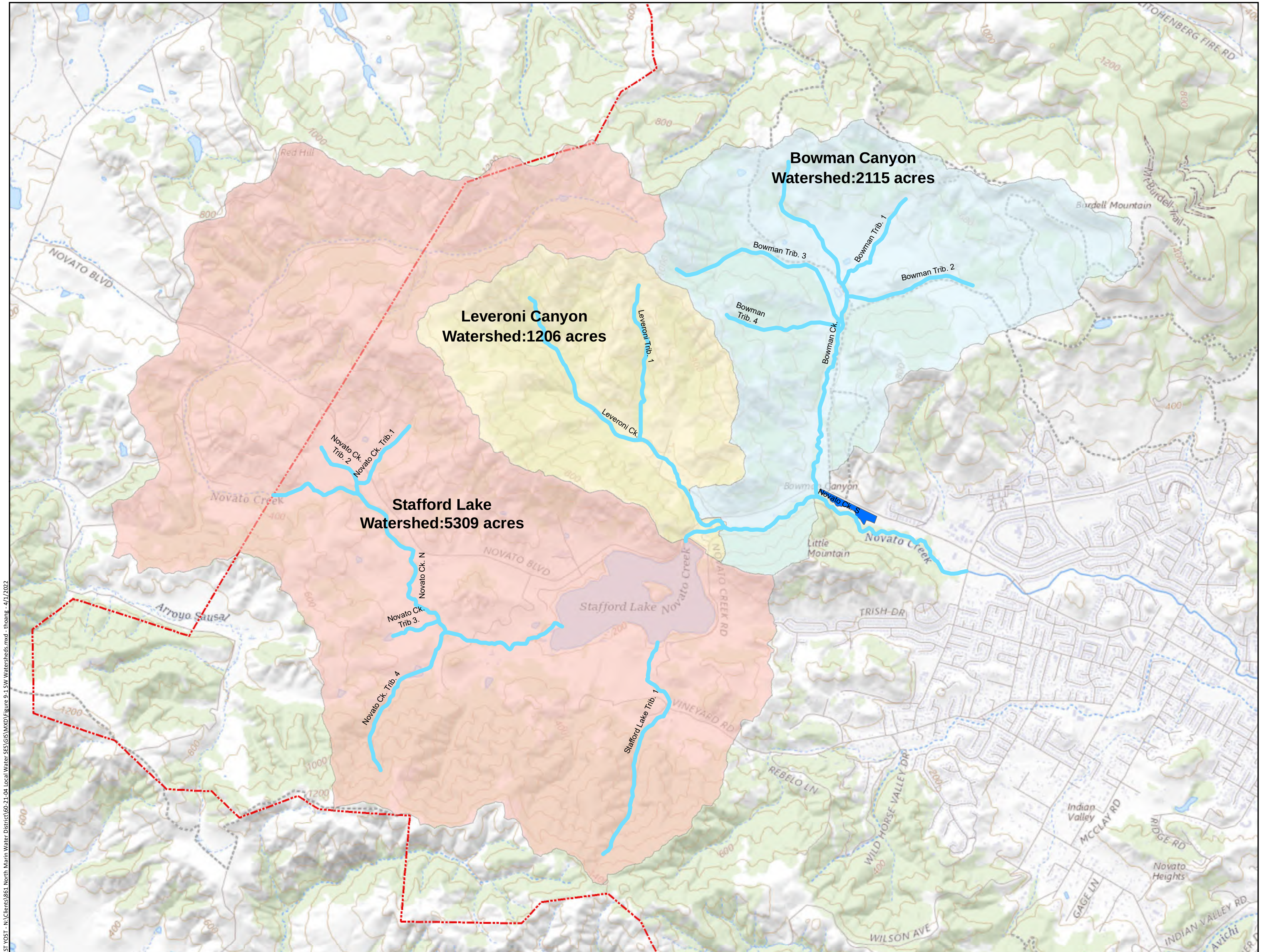
This Chapter presents the potential for and an evaluation of diverting captured stormwater from Leveroni Canyon and/or Bowman Canyon into Stafford Lake. Five options to capturing stormwater runoff from Leveroni Canyon and Bowman Canyon watersheds were considered under this water supply enhancement alternative. As detailed herein, these options may potentially be implemented by NMWD, but with some challenges associated with regulations and permitting and public and institutional considerations.

9.1 CAPTURE STORMWATER TO ENHANCE WATER SUPPLY

Leveroni Canyon and Bowman Canyon watershed areas are adjacent to the Stafford Lake watershed area, as shown on Figure 9-1. In this Chapter, the alternative to capture stormwater runoff from Leveroni Canyon and/or Bowman Canyon is considered. The captured water would be pumped into Stafford Lake to increase the local water supply for NMWD. Five options for this alternative were evaluated:

- **Option 1 - Leveroni Canyon:** Water from Leveroni Canyon would be captured and pumped to Stafford Lake. The required infrastructure would be a pump station and a transmission main , all of which are located on NMWD property.
- **Option 2 - Bowman Canyon:** Water from Bowman Canyon would be captured upstream of the confluence with Novato Creek and pumped to Stafford Lake. The required infrastructure would be a pump station and a transmission main . A basin could also be included to increase the annual water supply volume.
- **Option 3 - Novato Creek (Leveroni and Bowman Canyons):** Water from both Leveroni and Bowman Canyons would be captured downstream of the confluence Bowman Canyon and Novato Creek and pumped to Stafford Lake. The required infrastructure would be a pump station and a transmission main . A basin could also be included to increase the annual water supply volume.
- **Option 4 – Leveroni Canyon Dam:** Water from Leveroni Canyon would be captured with the use of a dam across Leveroni Canyon, just north of Novato Boulevard. This option would also require a pump station, transmission main , all located on land that is currently on private property.
- **Option 5 – Bowman Canyon Dam:** Water from Bowman Canyon would be captured with the use of a dam across Bowman Canyon, approximately 300 feet north of Novato Boulevard. This option would also require a pump station and transmission main , all located on land that is currently on private property.

Options 4 and 5 were evaluated to estimate how much of the captured water could be used by the STP and how much of the captured water would subsequently overflow the Stafford Lake spillway. These evaluations are based on four fiscal years, July 1, 2016 through June 30, 2020. During this period annual rainfall ranged from above average rainfall (40.7-inches of rain) to below average rainfall (18.40-inches). NMWD may enhance the evaluation of Options 1, 2, and 3 similarly in future studies.



N

0 1,375 2,750
Feet

Symbology

Watershed:

- Bowman Canyon Watershed
- Leveroni Canyon Watershed
- Stafford Lake Watershed

Stormwater Project Area

- Water Supply / Flood Control Basin
- Creeks

Retailers

- North Marin Water District

WEST YOST

Figure 9-1

Stafford Lake Area and Adjacent Area Watersheds

North Marin Water District
Local Water Supply Enhancement Study

For Options 1 to 3, the benefit of a potential multi-benefit use water supply/flood control basin (water supply basin/basin) was considered to increase the annual water supply volume.[1] For Options 4 and 5, a dam is proposed in the Leveroni Canyon and Bowman Canyon watersheds.[2]

9.1.1 Option Variations Considered

The water supply yield for the above-described options could vary depending on pumping capacity and use of a basin for Options 1 through 3 and operational rules for Options 4 and 5. Variations to the options were developed and analyzed to identify volume of stormwater that could be captured and delivered to NMWD's distribution system.

The method and assumptions used to estimate stormwater runoff and the variations analyzed is provided in Appendix J.

9.1.1.1 Variations to Options 1 Through 3

Stormwater runoff supply volumes that could be potentially captured and diverted for Options 1, 2, and 3 are provided in Table 9-1 using cumulative rainfall per year during 2016 to 2020 fiscal years. Scenarios with and without the use of an 80 AF water supply basin in combination with pumping to Stafford Lake was considered. The 80 AF water supply basin was sized to fit the site considered and is detailed in Section 9.2.1.1. The use of a water supply basin for Leveroni Creek (Option 1) is not feasible because of space limitations on the NMWD property at Leveroni Canyon.

Pumping captured stormwater runoff into Stafford Lake is assumed to occur in the typically wet part of the year. Pumping rates were varied from 2 cubic feet per second (cfs) to 10 cfs to determine the time needed to vacate the water supply basin and transfer the water to Stafford Lake. The water supply basin could be vacated in 20 days with a 2 cfs pumping rate, and in 4 days with a 10 cfs pumping rate. Further studies are required to size pumps appropriate for the changing climate in NMWD.

Table 9-1. Summary of Potential Water Supply Volumes Captured for Diversion

Pumping Rate, (cfs)	Option 1 Leveroni Canyon, AFY	Option 2 Bowman Canyon, AFY	Option 3 Novato Creek , AFY
Per Year, On Average, With No Water Supply Basin			
2	93	156	211
4	155	254	363
6	198	323	474
8	224	385	558
10	245	433	628

[1] A basin is an offline water structure where water is diverted from the creek for use. For this study, water is envisioned to be pumped to Stafford Lake.

[2] A dam is structure that goes across a creek channel or canyon and blocks all the water for storage and use. For this study, water is envisioned to be pumped to Stafford Lake.

Table 9-1. Summary of Potential Water Supply Volumes Captured for Diversion

Pumping Rate, (cfs)	Option 1 Leveroni Canyon, AFY	Option 2 Bowman Canyon, AFY	Option 3 Novato Creek , AFY
Per Year, On Average, with 80 AF Water Supply Basin Used Twice Per Year			
2	-	316	371
4	-	414	523
6	-	483	634
8	-	545	718
10	-	593	788

The evaluation of Options 1, 2, and 3 identifies the total volume of stormwater that could be captured. Further analysis is required to quantify the fraction of the captured water that would generate an increase of the spill over at the Stafford Lake spillway and ultimately not be available as a new usable water supply. This limitation may affect the maximum stormwater that could be captured and used by NMWD. It would also affect cost estimates provided in Section 9.3.1 for these options.

9.1.1.2 Variations for Options 4 and 5

Operational rules were developed for Options 4 and 5 to evaluate the construction of a dam at either Leveroni Canyon or at Bowman Canyon. For the purposes of this Study, the following potential operation rules were identified and used for analysis.

- Option 4, Leveroni Canyon Dam, is assumed to have a required fish flow of 0.4 cfs. Option 5, Bowman Canyon Dam, is assumed to have a required fish flow of 0.5 cfs. The fish flow would occur all year if water is available in the Leveroni or Bowman Canyon reservoirs.
- Pumping from the Leveroni or Bowman Canyon reservoirs would occur only from March 1st through September 30th of each water year[3].
- The new water supply to the STP would be used year-round. No water is spilled over the Stafford Lake spillway.

An analytical tool was developed to provide a high level of flexibility for evaluating different operational rules for Options 4 and 5. Further study is recommended to understand water supply availability under different operational rules, including:

- Increasing pumping periods to year-round, instead of partial-year;
- Adjustments considering future climate change impacts; and,
- Benefits of increasing Stafford Lake capacity, as discussed in Chapter 10.

[3] A water year is defined as the period from October 1st to September 30th of the following year.

9.2 WATER SUPPLY YIELD AND RELIABILITY

Water supply yields were estimated for the five options, described in Section 9.1, and are based on four years of rain data (Fiscal Years 2016 – 2017 through 2019 – 2020). For this analysis, the fiscal year data corresponds to the water year data . Two of these rainfall years are considered wet years (at 40.1 and 40.7-inches) and two of the years are considered dry years (at 18.4 and 19.3-inches). Table 9-2 summarizes the estimated annual water supply yields for Options 1 to 3. Table 9-3 summarizes the estimated annual water supply yields for Options 4 and 5.

Table 9-2. Annual Water Supply Yields for Options 1, 2, and 3

Option	Description	Yield, AFY	
		Without Basin	With Basin
1[a]	Leveroni Canyon	93 – 245	-
2	Bowman Canyon	156 – 433	316 - 593
3	Novato Creek	211 - 628	371 - 788

Notes:
(a) This option does not include a proposed basin.
AFY = acre-feet per year

Table 9-3. Annual Water Supply Yields for Options 4 and 5

Option	Description	Yield, AFY
4	Leveroni Canyon Dam[a]	175
5	Bowman Canyon Dam[b]	752

Notes:
(a) Option 4 would require a 3.5 cfs pump station.
(b) Option 5 would require a 2.5 cfs pump station.

The future reliability of these estimated water supply yield values is dependent on rainfall. The recent four-year period analyzed has either been very wet years or very dry years, representative of the changing climate. For the purposes of this Study, rainfall over these years is assumed to be representative of future rainfall. Continued climate change could reduce the future annual rainfall, which could reduce the annual water supply yields; or increase the amount of rain that falls in infrequent large storm events. A large storm event could result in more of the rainfall spilling over the Stafford Lake spillway and not being available as annual water supply yield. Even with climate change, this increase in water supply is expected to be relatively reliable.

Combining one of these options with increasing Stafford Lake storage capacity, as presented in Chapter 10, could increase the water supply yield and the reliability of this alternative. Should NMWD consider combining these two alternatives, further analysis is recommended.

9.2.1 Infrastructure Requirements

The infrastructure requirements for Options 1, 2 and 3, where stormwater runoff is collected using an intake facility or basin and diverted to Stafford Lake, differ from the infrastructure requirements for Options 4 and 5, where stormwater is dammed. In all of the options, the pipeline alignments considered would allow NMWD the flexibility to divert water to directly to Stafford Lake or to the STP. The proposed facilities described below are all standard water supply type facilities.

9.2.1.1 Infrastructure to Collect and Divert Stormwater Runoff from Watersheds

Options 1, 2 and 3 provide alternative ways to capture stormwater runoff from watersheds adjacent to Stafford Lake and divert Stafford Lake. The infrastructure requirements for Options 1, 2 and 3 include a pump station, and a transmission main to collect runoff and deliver it into Stafford Lake. A basin was considered for Options 2 and 3 to maximize stormwater runoff capture; a basin was not considered for Option 1 because a feasible site for a basin was not found for NMWD. An intake structure would be installed in the creek if a basin is not installed.

The required infrastructure is shown on Figure 9-2 and described below.

- **Basin (Multi-benefit Use)** – This facility is shown on Figure 9-2. It has a surface area of about 8.3 acres. The basin would be connected to Novato Creek with a 24-inch diameter culvert near the west end of the basin. The culvert would have a flap gate at the end of the basin to allow flow into the basin from Novato Creek, but block flow from the basin back to Novato Creek. Because the culvert is above the creek bottom, it would allow fish flows to pass without being diverted into the basin.

  The basin would include a berm along the south side that would separate the water supply basin from Novato Creek. A flood control weir is proposed to direct flood flows out of the creek and into the basin. The basin would have a bottom area of about 4.3 acres. The water supply volume of the basin would be about 80 AF. The flood control volume of the basin would be about 46 AF. The flood control benefit that could be achieved from 46 AF has not been evaluated for this Study.[4]

- **Pump Station** – This facility would pump water from the proposed basin into a new transmission main. The pump station capacity could range from 2 cfs to 10 cfs.
- **Transmission Main** - A transmission main is proposed from the pump station to Stafford Lake. For Option 1, the transmission main would go from the respective proposed pump station at Leveroni Canyon, cross under Novato Boulevard and into Stafford Lake. For Option 2 and Option 3, the proposed transmission main alignment would start at the respective proposed pump station location and the pipeline would be located just south of Novato Boulevard and follow the same general alignment before going to Stafford Lake. The transmission main would be 12 inches in diameter for a 2, 4, or 6 cfs pump station and would be 15 inches in diameter for either an 8 or 10 cfs pump station.

From Leveroni Canyon to Stafford Lake (Option 1), the transmission main would be approximately 1,700 feet long. From Bowman Canyon to Stafford Lake (Option 2), the transmission main would be

[4] The County Flood District is completing a similar basin in Fairfax: https://www.marinwatersheds.org/resources/projects/san-anselmo-flood-risk-reduction-safrr-project

approximately 4,500 feet long. Use of the existing potable water transmission main from the STP to the City was considered instead of constructing a new transmission main. However, the existing transmission main is used to distribute potable water. The stormwater runoff collected is raw water that must be treated prior to entering the distribution system. If the existing transmission main is used, it would need to be isolated from the potable water distribution system, require annual clearing of sediment and debris, and require disinfection before it is used for the potable water supply.

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Figure 9-2

Proposed Infrastructure for Options 1, 2, and 3

North Marin Water District
Local Water Supply
Enhancement Study

9.2.1.2 Infrastructure to Capture Stormwater Runoff in Dams

Options 4 and 5 present possibilities for the installation of a dam to capture stormwater runoff from Leveroni Canyon or Bowman Canyon, respectively. The infrastructure requirements for each option vary slightly because of topography and the proximity of the watersheds to Stafford Lake. Diverting and storing stormwater in the Leveroni Canyon or Bowman Canyon watersheds would require acquisition of water rights from the SWRCB Division of Water Rights. In the case of Bowman Canyon watershed, the acquisition of water rights could potentially inundate the trailheads for MCOSD lands on the East side of the canyon.

9.2.1.2.1 Leveroni Canyon Dam

The infrastructure requirements for Option 4, a dam at Leveroni Canyon, includes an earthen dam, pump station, and transmission main to collect runoff from Leveroni Canyon and deliver it into Stafford Lake. The required infrastructure is shown on Figure 9-3 and described below.

- **Earthen Dam Across the Outlet of Leveroni Canyon** - A dam is proposed to run adjacent to the elevated section of Novato Road, with an impermeable liner between the dam fill and the road fill. The dam would have a spillway elevation of 174 feet and would provide 3 feet of freeboard below the buildings at the north end of the proposed Leveroni Canyon reservoir. At an elevation 174 feet, the reservoir would provide 80 AF of storage.
- **Pump Station** - The capacity of the pump station of 3.5 cfs was determined to maximize the water supply that could be pumped to Stafford Lake. For pump station capacities greater than 3.5 cfs, the Leveroni Canyon reservoir would empty more quickly, but water supply would not increase.
- **Transmission Main** - The 12-inch diameter transmission main would run from the pump station, cross under Novato Road, along Indian Valley Road to the Stafford Lake Spillway channel, would be mounted on the inside of the channel wall (to avoid a pressure pipe in the earthen dam fill), and would discharge into Stafford Lake, just upstream of the old spillway. The total length of the transmission main is estimated to be 1,500 feet.

9.2.1.2.2 Bowman Canyon Dam[5]

The infrastructure requirements for Option 5, a dam at Bowman Canyon, includes an earthen dam, pump station, and transmission main to collect runoff from Bowman Canyon and deliver it into Stafford Lake. The required infrastructure is shown on Figure 9-4 and described below.

- **Earthen Dam Across the Outlet of Leveroni Canyon** - The dam would have a spillway elevation of 170 feet and would provide 3 feet of freeboard below the buildings at the north end of the proposed reservoir. At an elevation 170 feet, the reservoir would provide 640 AF of storage.
- **Pump Station** - The capacity of the pump station of 2.5 cfs was determined to maximize the water supply that could be pumped to Stafford Lake. For pump station capacities greater

[5] Dam at Bowman Canyon has been previously evaluated multiple times by the District beginning in 1949. In 1978, after a joint study conducted with the MCFCWCD, the District decided to withdraw any interest in a dam for water supply in Bowman Canyon.

than 2.5 cfs, the Bowman Canyon reservoir would empty more quickly, but the water supply would not increase.

- Transmission Main - The 12-inch diameter transmission main would run from the pump station, adjacent to Novato Road, cross Novato Road, along Indian Valley Road to the Stafford Lake spillway channel, would be mounted on the inside of the channel wall (to avoid a pressure pipe in the earthen dam fill), and would discharge into Stafford Lake just upstream of the old spillway. The total length of the transmission main would be 5,700 feet.

N

0 100 200

Feet

Proposed Force Main

Option 4

Proposed Pump Station

Option 4

Proposed Leveroni Canyon Reservoir

Proposed Leveroni Canyon Dam

Road Realignment

Creeks

WEST YOST

Figure 9-3

Proposed Infrastructure for Option 4 Leveroni Canyon Dam

North Marin Water District

Local Water Supply Enhancement Study

WEST YOST - N:\Clients\861 North Marin Water District\60-21-04 Local Water SES\GIS\MXD\Figure 9-3 SW Leveroni Dam.mxd - thoang - 4/13/2022

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Figure 9-4

Proposed Infrastructure for Option 5 Bowman Canyon Dam

North Marin Water District
Local Water Supply Enhancement Study

WEST YOST - N:\Clients\861 North Marin Water District\60-21-04 Local Water SES\GIS\MXD\Figure 9-4 SW Bowman Dam.mxd - thoang - 4/13/2022

9.2.2 Implementation Timing

The implementation timing for this alternative is dependent on the time for land acquisition, permitting, design, and construction. Table 9-4 summarizes the estimated implementation timing for each option under this alternative.

Table 9-4. Implementation Timing

<table>
<tr><th rowspan="2">Implementation Category</th><th colspan="5">Estimated Time, years</th></tr>
<tr><th>Option 1 Leveroni Canyon</th><th>Option 2 Bowman Canyon</th><th>Option 3 Novato Creek</th><th>Option 4 Leveroni Canyon Dam</th><th>Option 5 Bowman Canyon Dam</th></tr>
<tr><td>Land Acquisition[(a)]</td><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>Permitting</td><td>2</td><td>2</td><td>2</td><td rowspan="2">3[(b)]</td><td rowspan="2">3[(b)]</td></tr>
<tr><td>Design</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>Construction</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>Total</td><td>4</td><td>5</td><td>5</td><td>5</td><td>5</td></tr>
</table>

Notes:
(a) For Option 1, NMWD currently owns the land where the proposed pump station would be located.
(b) For Options 4 and 5, permitting and design are assumed to occur concurrently.

9.3 WATER SUPPLY ALTERNATIVE EVALUATION

This water supply alternative could potentially increase annual water supply for NMWD at costs competitive with other water supply alternatives available to NMWD. However, many of the options under this water supply alternative present challenges associated with regulations and permitting and multi-faceted public and institutional considerations.

9.3.1 Cost Estimate

A planning-level cost estimate for the construction and operation for the diverting captured stormwater into Stafford Lake, along with assumptions, is provided below. These costs do not include treatment of the raw water nor distribution of treated water. Appendix F provides a more detailed cost estimate for this water supply alternative.

Options 1, 2, and 3 were evaluated with and without a basin and with varying pump station sizes. The cost estimates summarized in this Chapter for Options 1, 2, and 3 are only for a proposed 10 cfs pump station which would provide the lowest unit cost ($ per AF over 30 years), for the purposes of comparing the unit costs of the other water supply alternatives discussed in this Study. Appendix F summarizes the cost estimate for all pump station sizes (2 cfs to 10 cfs) that was evaluated as part of this Study. The cost estimate includes the following specific assumptions for Options 1, 2, and 3:

- Project Allowance: 35 percent
- Operating Contingency: 30 percent
- No replacement costs were identified

The cost estimate includes the following specific assumptions for Option 4 and 5:

- Project Allowance: 60 percent
- Operating Contingency: 40 percent
- No replacement costs were identified

9.3.1.1 Options 1, 2, and 3: Cost Estimate Without Basin

Table 9-5 summarizes the cost estimate for diverting captured stormwater into Stafford Lake from either Leveroni Canyon, Bowman Canyon, or Novato Creek to increase local supply available to NMWD with a 10 cfs pump station and without the use of the basin. This cost estimate assumes that NMWD can use the total captured stormwater runoff, and none would be lost over the Stafford Lake spillway.

The total capital cost for Option 1 is estimated to be $2.46 million including the construction contingency and project allowance. The annual O&M cost is estimated to be $94,000 including the operating contingency. The 30-year NPV O&M cost is estimated to be $2.69 million. The total cost (total capital cost plus NPV cost) for Option 1, without a basin, is estimated to be $5.15 million. Assuming an annual yield of 245 AF, the total supply yield over a 30-year period from Leveroni Canyon is approximately 7,300 AF. The unit cost is approximately $710 per AF over a 30-year period.

The total capital cost for Option 2 is estimated to be $3.10 million including the construction contingency and project allowance. The annual O&M cost is estimated to be $100,000 including the operating contingency. The 30-year NPV O&M cost is estimated to be $2.89 million. The total cost (total capital cost plus NPV cost) for Option 2, without a basin, is estimated to be $5.99 million. Assuming an annual yield of 433 AF, the total supply yield over a 30-year period from Bowman Canyon is approximately 13,000 AF. The unit cost is approximately $470 per AF over a 30-year period.

The total capital cost for Option 3 is estimated to be $3.10 million including the construction contingency and project allowance. The annual O&M cost is estimated to be $107,000 including the operating contingency. The 30-year NPV O&M cost is estimated to be $3.10 million. The total cost (total capital cost plus NPV cost) for Option 3, without a basin, is estimated to be $6.20 million. Assuming an annual yield of 628 AF, the total supply yield over a 30-year period from Novato Creek is approximately 18,800 AF. The unit cost is approximately $330 per AF over a 30-year period.

Table 9-5. Cost Estimate for Options 1, 2, and 3 – Without Basin

Cost Item	Estimated Cost, million dollars		
	Option 1 Leveroni Canyon	Option 2 Bowman Canyon	Option 3 Novato Creek
Total Capital Cost[a]	2.46	3.10	3.10
Total Replacement Cost[b]	-	-	-
Total O&M Cost[c]	2.69	2.89	3.10
NPV Total Cost	**$5.15**	**$5.99**	**$6.20**
Total Supply over 30 years[e], AF	7,300	13,000	18,800
Unit Cost over 30 years[f], dollars per AF	**$710**	**$470**	**$330**

Notes:

(a) The total capital cost assumes the construction of a 10 cfs pump station and transmission main pipeline. For the proposed transmission main delivering supply from Leveroni Canyon to Stafford Lake, the estimated length is 1,700 feet. For the proposed transmission main delivering supply from Bowman Canyon or Novato Creek, the estimated length is 4,970 feet. The construction contingency was estimated to be 40 percent and the project allowance for planning, permitting, engineering, legal, and administrative costs was estimated to be 20 percent.

(b) No replacement costs were identified for this alternative.

(c) The annual O&M cost was estimated to be $94,000, $100,000, and $107,000 for Options 1, 2, and 3, respectively. The annual O&M costs account for NMWD staff effort, power, and pump station maintenance. An inflation rate of 3.0 percent and discount rate of 3.5 percent was applied to determine the net present value of the annual O&M costs over the 30-year operational cycle. An operating contingency of 30 percent was applied to the O&M cost.

(d) Total supply over 30 years is rounded to the nearest $100.

(e) Unit Cost = NPV Total Cost divided by the total supply yield over 30 years. Unit costs are rounded up to the nearest $10.

9.3.1.2 Options 1, 2, and 3: Cost Estimate With Basin

Table 9-6 summarizes the cost estimate for diverting captured stormwater into Stafford Lake from either Leveroni Canyon, Bowman Canyon, or Novato Creek (Options 1, 2, and 3) to increase local supply available to NMWD with a 10 cfs pump station and the use of the basin. This cost estimate assumes that NMWD can use the total captured stormwater runoff, and none would be lost over the Stafford Lake spillway. The cost estimate includes the cost of land acquisition to construct the basin. The proposed basin is the same for both Option 2 and Option 3. The diversion of stormwater runoff from Bowman Canyon (Option 2) and Novato Creek (Option 3) into the proposed would be unique to the respective creek/watershed.

No cost estimate was prepared for Option 1, Leveroni Canyon, since a basin is not associated with this option.

The total capital cost for Option 2, Bowman Canyon, is estimated to be $13.64 million including the construction contingency and project allowance. The annual O&M cost is estimated to be $114,000 including the operating contingency. The 30-year NPV O&M cost is estimated to be $3.29 million. The total cost (total capital cost plus NPV cost) for Option 2, with a basin, is estimated to be $16.93 million. Assuming an annual yield of 593 AF, the total supply yield over a 30-year period from Leveroni Canyon is approximately 17,800 AF. The unit cost is approximately $960 per AF over a 30-year period.

The total capital cost for Option 3, Novato Creek, is estimated to be $13.64 million including the construction contingency and project allowance. The annual O&M cost is estimated to be $121,000 including the operating contingency. The 30-year NPV O&M cost is estimated to be $3.49 million. The total cost (total capital cost plus NPV cost) for Option 3, with a basin, is estimated to be $17.13 million.

Assuming an annual yield of 788 AF, the total supply yield over a 30-year period from Leveroni Canyon is approximately 23,600 AF. The unit cost is approximately $730 per AF over a 30-year period.

Table 9-6. Cost Estimate for Options 1, 2, and 3 – With Basin

Cost Item	Estimated Cost, million dollars		
	Option 1[a] Leveroni Canyon	Option 2 Bowman Canyon	Option 3 Novato Creek
Total Capital Cost[b]	-	13.64	13.64
Total Replacement Cost[c]	-	-	-
Total O&M Cost[d]	-	3.29	3.49
NPV Total Cost	**-**	**$16.93**	**$17.13**
Total Supply over 30 years[e], AF	-	17,800	23,600
Unit Cost over 30 years[f], dollar per AF	**-**	**$960**	**$730**

Notes:

(a) Leveroni Canyon was not evaluated with a basin. No cost estimates associated with this option.

(b) The total capital cost assumes land acquisition for constructing the basin, construction of a 80 AF basin, 10 cfs pump station, and transmission main . For the proposed transmission main delivering supply from Bowman Canyon or Novato Creek, the estimated length is 4,500 feet. The construction contingency was estimated to be 40 percent and the project allowance for planning, permitting, engineering, legal, and administrative costs was estimated to be 30 percent.

(c) No replacement costs were identified for this alternative.

(d) The annual O&M cost was estimated to be $114,000 and $121,000 for Options 2 and 3, respectively. The annual O&M costs account for NMWD staff effort, power, and pump station maintenance. An inflation rate of 3.0 percent and discount rate of 3.5 percent was applied to determine the net present value of the annual O&M costs over the 30-year operational cycle. An operating contingency of 30 percent was applied to the O&M cost.

(e) Total supply over 30 years is rounded to the nearest $100.

(f) Unit Cost = NPV Total Cost divided by the total supply yield over 30 years. Unit costs are rounded up to the nearest $10.

9.3.1.3 Option 4: Cost Estimate

Table 9-7 summarizes the cost estimate for constructing a dam at Leveroni Canyon outlet to increase local supply available to NMWD.

The total capital cost is estimated to be $5.67million and includes the cost of land acquisition for the Leveroni Canyon reservoir. No replacement costs were identified over the 30-year project period.

The annual O&M cost was estimated to be $98,000 per year, which is significantly more than NMWD's current O&M cost of $22,000 for Stafford Dam. Operational cost includes pump station and reservoir maintenance, energy costs for pumping water to Stafford Lake, and NMWD staff effort costs. The 30-year NPV O&M cost is estimated to be $2.81 million using a 3.5 percent discount rate.

The total NPV cost (total capital cost plus 30-year O&M costs) is estimated to be $8.48 million. Assuming an annual supply yield of 175 AF, the additional yield over a 30-year period is estimated to be 5,250 AF. The unit cost is estimated to be $1,700 per AF over a 30-year period.

Table 9-7. Cost Estimate for Option 4 – Leveroni Canyon Dam

Cost Item	Estimated Cost, million dollars
Total Capital Cost[a]	5.67
Total Replacement Cost[b]	-
Total O&M Cost[c]	2.81
NPV Total Cost	**$8.48**
Total Supply over 30 years, AF	5,250
Unit Cost over 30 years[d, e], dollar per AF	**$1,700**

Notes:

(a) The capital cost includes costs for land acquisition for constructing the reservoir, earthwork, concrete spillway structures, pump station, 12-inch diameter transmission main, and other miscellaneous items associated with constructing a dam. The construction contingency was estimated to be 40 percent and the project allowance for planning, permitting, engineering, legal, and administrative costs was estimated to be 60 percent.

(b) No replacement costs were identified with this option over the 30-year operational cycle.

(c) The annual O&M cost was estimated to be $97,000 per year and includes costs for annual maintenance to the pump station and reservoir, energy use, and labor. An inflation rate of 3.0 percent and discount rate of 3.5 percent was applied to determine the net present value of the annual O&M costs over the 30-year operational cycle. An operating contingency of 40 percent was applied to the O&M cost.

(d) Unit Cost = NPV Total Cost divided by the total supply yield over 30 years. Unit cost is rounded up to the nearest $100.

(e) The unit cost for Option 4 is not comparable with the unit costs for Options 1, 2, and 3.

9.3.1.4 Option 5: Cost Estimate

Table 9-8 summarizes the cost estimate for constructing a dam at Bowman Canyon outlet to increase local supply available to NMWD.

The total capital cost is estimated to be $12.31 million and includes the cost of land acquisition for the Bowman Canyon reservoir. No replacement costs were identified over the 30-year operational cycle.

The annual O&M cost was estimated to be $139,000 per year, which is significantly more than NMWD's current O&M cost of $22,000 for Stafford Dam. An operating contingency of 40 percent was used to estimate operational costs over a 30-year period. The 30-year NPV O&M cost is estimated to be $4.00 million using a 3.5 percent discount rate.

The total NPV cost (total capital cost plus 30-year O&M costs) is estimated to be $16.31 million. Assuming an annual supply yield of 753 AF, the additional yield over a 30-year period is estimated to be 22,590 AF. The unit cost is estimated to be $800 per AF over a 30-year period.

Table 9-8. Cost Estimate for Option 5 – Bowman Canyon Dam

Cost Item	Estimated Cost, million dollars
Total Capital Cost[(a)]	12.31
Total Replacement Cost[(b)]	-
Total O&M Cost[(c)]	4.00
NPV Total Cost	**$16.31**
Total Supply over 30 years, AF	22,590
Unit Cost over 30 years[(d, e)], dollar per AF	**$800**

Notes:

(a) The capital cost includes costs for land acquisition for constructing the reservoir, earthwork, concrete spillway structures, pump station, 12-inch diameter transmission main, and other miscellaneous items associated with constructing a dam. The construction contingency was estimated to be 40 percent and the project allowance for planning, permitting, engineering, legal, and administrative costs was estimated to be 60 percent.

(b) No replacement costs were identified with this option over the 30-year operational cycle.

(c) The annual O&M cost was estimated to be $140,000 per year and includes costs for annual maintenance to the pump station and reservoir, energy use, and labor. An inflation rate of 3.0 percent and discount rate of 3.5 percent was applied to determine the net present value of the annual O&M costs over the 30-year operational cycle. An operating contingency of 40 Percent was applied to the O&M cost.

(d) Unit Cost = NPV Total Cost divided by the total supply yield over 30 years. Unit cost is rounded up to the nearest $100.

(e) The unit cost for Option 5 is not comparable with the unit costs for Options 1, 2, and 3.

9.3.2 Operational Impacts

The options considered for this water supply alternative have varying impacts. Overall, NMWD staff effort would increase but no additional skill sets, or certifications would be required. Energy demand would increase for this alternative due to the proposed pump station. Additional water supply would require treatment at the STP, resulting in increased need for chemical use, staff resources, and energy usage.

Options 1 -3 without a basin would have less operational impacts than with a basin. The options without a basin would not require additional inspections and monitoring.

The raw water quality collected from Leveroni Canyon and Bowman Canyon (Options 4 and 5) could be different than the current water quality of Stafford Lake. This could result in the need to modify the operations at the STP. If NMWD decides to pursue alternative, NMWD is recommended to conduct a study to evaluate the water quality of the runoff from either Leveroni Canyon or Bowman Canyon, prior to implementing this alternative. The recommended study would require source sampling and monitoring from both canyons.

The proposed dams (Options 4 and 5) would present additional ongoing monthly monitoring and annual inspection and reporting to the State.

9.3.3 Regulations and Permitting

Diverting captured stormwater into Stafford Lake would require construction of a basin, pump station, a new transmission main, and ancillary pipeline installation. These activities would be subject to environmental review under the CEQA. A proposed water supply/flood basin would cover several acres and would involve significant grading of undisturbed land. Pipeline installation and construction of a pump station and ancillary facilities would involve excavation and filling in existing right-of-way and possibly in undisturbed land. Construction-related impacts could include increased noise, air quality and GHG, soil erosion, and disturbance of biological and cultural resources. Potentially significant impacts in the areas of biological resources, cultural resources, hydrology, and soils are likely, and an Initial Study Negative Declaration would be required. If significant unavoidable impacts cannot be avoided an Environmental Impact Report may be required.

Construction of any of the options for this alternative would require biological and cultural resource assessments and permits from the natural resource agencies, including U.S. Army Corps of Engineers Clean Water Act Section 404 Permit, Regional Water Quality Control Board Clean Water Act Section 401 Certification, California Department of Fish and Wildlife, or U.S. Department of Fish and Wildlife Stream Bed Alteration Agreement. If project activities are planned in the vicinity of culturally sensitive areas consolation with local tribes, construction monitoring, and documentation of artifacts may be required.

Diversion of captured stormwater into Stafford Lake would trigger a DDW-required sanitary survey of the Leveroni and Bowman Canyon watersheds, and source water sampling and monitoring for total coliforms, E. coli, and possibly Cryptosporidium to determine whether adding these two new surface water sources will require increasing the STP's current pathogen reduction requirements and an additional amendment to the STP operating permit.

Unlike other alternatives, diverting and storing stormwater in the Leveroni Canyon or Bowman Canyon watersheds would require acquisition of water rights from the SWRCB Division of Water Rights. Acquiring water rights is often a complex, resource intensive, and involves a potentially lengthy public process.

The detention basin would likely fall under the California DSOD jurisdiction because the levee separating the basin from Novato Creek would be over 6 feet tall and the basin would store over 50 AF. DSOD would review all construction and operations plans and may require design and operational alterations. Monitoring, maintenance, inspection, and reporting would also fall under the DSOD jurisdiction.

Regulatory constraints for alternative are considered slightly more impactful than other alternatives because construction of major new infrastructure would require more environmental review and more involved public process.

9.3.4 Public and Institutional Considerations

Successful implementation of this alternative requires support from the public and stakeholders, and partnership and agreements with other entities. The following sections discuss the considerations listed below:

- Public Acceptance
- Joint Partnership
- Existing and Future Development
- Property Acquisition

9.3.4.1 Public Acceptance

Public outreach early in the project would be beneficial in light of recent drought events. The proposed infrastructure is very standard infrastructure (i.e., pumps, pipelines, basins, dams) that NMWD or other local agencies already use.

The installation of a dam to create a reservoir and the need for fish passage could be concerning to some members of the public. The installation of any of the proposed infrastructure would be visible. For this alternative option, NMWD may experience challenges with groups concerned about the environment. Concerns and mitigation actions could be addressed through the CEQA process.

9.3.4.2 Joint Partnership

Option 2 and Option 3 propose to construct a basin to collect stormwater runoff from Leveroni and Bowman Canyons before pumping it into Stafford Lake. The basin could serve a dual purpose by increasing NMWD's local water supply with increased stormwater runoff and acting as a flood control basin during wintertime.

Due to the flood control aspect, this alternative presents a potential partnership between NMWD and Marin County Flood Control and Water Conservation District (MCFCWCD). NMWD has developed a long-standing relationship and has a history of coordination and collaborations with MCFCWCD. The concept of a flood control basin near the confluence of Novato and Bowman Canyon creeks was previously identified in the Novato Watershed Study (2014-2016), an effort lead by the MCFCWCD in collaboration with NMWD and the City of Novato.

9.3.4.3 Existing and Future Development

The existing land use for Leveroni Canyon consists of agricultural farms and the existing land use for Bowman Canyon consists of agricultural farms and a solar farm. Currently, Bowman Canyon is categorized as open space by the City of Novato and is under the County of Marin's A60 Zoning (Agriculture), which prohibits development of the canyon.

The County of Marin is considering development of Bowman Canyon to meet RHNA housing allocations. Depending on the potential for and the location of development within Bowman Canyon, runoff from Bowman Canyon can change from natural runoff to urban runoff and therefore, impact the water quality of Stafford Lake. This may also impact the ability for NMWD to construct a reservoir at Bowman Canyon.

9.3.4.4 Property Acquisition

For Options 1, 2, and 3, NMWD does not own the land for the basin and would need to purchase the parcel before constructing the basin. The City owns some property in the Novato Creek watershed, along Novato Boulevard, from Sutro Avenue to the local dog park.

For Options 4 and 5, NMWD does not own property to construct either Leveroni Canyon or Bowman Canyon reservoirs and would need to purchase land before constructing either reservoir. Marin County Open Space District owns some land on the eastern portion of the Bowman Canyon watershed. NMWD would need to coordinate with Marin County to construct a reservoir in Bowman Canyon.

9.3.5 Other Considerations

Other considerations that are unique to this water supply alternative and that were not previously addressed in Section 9.2 and 9.3 are summarized in this section.

1. This evaluation is based on the estimated flows in the Leveroni and Bowman Canyons in relation to the estimated inflow to Stafford Lake from the Stafford Lake watershed. Actual flows in Leveroni Canyon could be measured by installing a water level sensor just upstream of the Indian Valley Road culvert. Estimated water volumes could be further refined.
2. The development of a hydrologic/hydraulic model is recommended for Stafford Lake, Leveroni Canyon, and Bowman Canyon to evaluate low flows (versus the MCFCWCD's flood flow model). The low flow model should include the system operational logic, like minimum fish flow, no diversions when there is flow over the spillway, and potential increased storage and operation of a variable level spillway gate (see Chapter 10). The model should be run for long time frames to determine the increase in water supply more accurately. For example, the current evaluation does not account for the fact that pumped/captured water early in the winter would be lost if later in the winter a large storm results in flow over the spillway.
3. Water supply yield estimates are based on recent historical rain data. Climate change will likely increase droughts and flooding. This alternative would add additional supply but also additional storage (Options 4 and 5) to capture the increased runoff.
4. Option 1 may be modified to include an in-line detention basin along Leveroni Creek in the open space just north of Novato Boulevard, a pump station near Novato Boulevard, and a transmission main to Stafford Lake (possibly mounted to the side of the spillway). This configuration could significantly increase the water supply volume over the Leveroni Canyon values presented above and lower the capital costs and power costs for the Leveroni Canyon.
5. Novato Boulevard is already raised across most of the outlet of Leveroni Canyon, so minimal earthwork would be needed to reinforce the road to serve as a dam. Detention storage at this site could be achieved by modifying the existing culvert under Novato Boulevard. However, this site is privately owned land.
6. Another potential basin site is the open space south of Novato Boulevard, just downstream of the STP. At this location, the basin could potentially be implemented as either an on-line or off-line basin. NMWD owns the parcel immediately downstream of the STP and the County of Marin owns the adjacent parcel to the east.
7. The County of Marin conducted a comprehensive study of the Novato Watershed between 2014 and 2016. A project was identified similar to Options 1, 2 and 3 that would provide a flood control benefit. A much earlier joint study conducted in 1978 showed that a project to construct a dam in Bowman Canyon with the single purpose of flood control (without water supply storage) provided the highest benefit to cost ratio.

9.4 FINDINGS AND CONCLUSIONS

This water supply alternative may increase local water supply available to NMWD. Five options, with variations, to capturing stormwater runoff from Leveroni Canyon and Bowman Canyon watersheds were considered under this water supply enhancement alternative. Further studies are required to explore the options and variations presented in this alternative. Costs for the options are comparably low relative to other water supply options evaluated in this study. However, capturing water from Leveroni Canyon and

Bowman Canyon present challenges in regulations and permitting and has multi-faceted public and institutional considerations. Implementation of any of the options could take four to five years, depending on the time to acquire property and comply with regulations and permitting requirements.

9.4.1 Infrastructure and Costs

All of the options require major infrastructure.

Based on the assumptions used for this alternative, Options 1, 2, and 3 require a pump station (ranging from 2 to 10 cfs), and a 12-inch or 15-inch diameter transmission main. The transmission main length is estimated to be 1,700 feet to 4,500 feet in length, depending on the option. A basin could also be included to increase the captured stormwater runoff. Options 1, 2, and 3 could supply 93 to 629 AFY on average, without the basin; and 316 to 788 AFY, with the basin. This supply could be impacted by future climate change, but still would be relatively reliable.

Options 4 and 5 would require an earthen dam, pump station, 12-inch diameter transmission main, and any other facilities associated with a dam or reservoir. The transmission main length is estimated to be 1,500 feet or 5,700 feet for Option 4 and 5, respectively. Option 4 would provide an estimated yield of 175 AFY and Option 5 would provide an estimated yield of 753 AFY.

The unit cost over a 30-year operating period for Options 1, 2, and 3 ranges from about $330 to $710 without the basin and from about $730 to $960 with the basin. The unit costs assumes a 10 cfs pump station is used for Options 1, 2, and 3. The unit cost over the 30-year operating period for Option 4 (Leveroni Canyon Dam) and Option 5 (Bowman Canyon Dam) is $1,700 per AF and $800 per AF, respectively.

9.4.2 Additional Studies

The options were analyzed to answer the question of how much water supply could be generated and what would the cost be for the various options.

The evaluation of Options 1, 2, and 3 identify the total volume of stormwater that could be captured. Further analysis is required to quantify usable water more accurately for NMWD, and the fraction of the captured water that would spill over the Stafford Lake spillway and ultimately not be available as a new usable water supply.

Further study is needed to identify the optimum stormwater capture and diversion option that can provide needed supply under various operational rules, Stafford Lake capacity limitations, and STP operational limitations. NMWD may consider expanding the study to evaluate combining this alternative with the expansion of Stafford Lake, as discussed in Chapter 10.

Further, diversion of captured stormwater into Stafford Lake would trigger a DDW-required sanitary survey of the Leveroni and Bowman Canyon watersheds. NMWD should consider conducting source water sampling and monitoring for total coliforms, E. coli, and possibly Cryptosporidium to determine whether adding these two new surface water sources will require increasing the current pathogen reduction requirements for STP, and an additional amendment to the STP operating permit.

CHAPTER 10
Increase Stafford Lake Storage Capacity

This chapter presents the potential for and an evaluation of increasing Stafford Lake Storage Capacity to allow NMWD to store more water from runoff as well as water supplies from other sources, including Sonoma Water, and other potential water supply alternatives discussed in this study. Two options were considered: the installation of a spillway notch gate at the reservoir and the removal of sediment in Stafford Lake. As detailed herein, one of these options may be implemented by NMWD at relatively low cost and effort.

10.1 INCREASE STAFFORD LAKE STORAGE CAPACITY TO ENHANCE WATER SUPPLY

Two options were evaluated to increase the Stafford Lake Storage Capacity, including an adjustable slide gate in the Stafford Lake spillway notch and sediment removal from the reservoir. These options are described below.

10.1.1 Spillway Notch Slide Gate

The purpose of the adjustable spillway notch slide gate is to increase the storage volume of Stafford Lake by blocking the spillway notch with a slide gate (see Figure 10-1). The slide gate is adjustable from below the notch elevation to the top of the spillway crest elevation. Four adjustable gate options were considered, as summarized below. Three options were eliminated (Options 1, 2, and 3), and the preferred Option 4 is evaluated further in this chapter.

- **Option 1 -** Inflatable bladder dam: This option was eliminated because it will permanently block some of the notch area.
- **Option 2 -** Tilting weir gate: This option was eliminated because elements of the tilting weir gate need to be embedded in the concrete, creating difficulties to retrofit the existing notch and spillway. The tilting weir gate would have drive shafts that would extend above the spillway crest and could be damaged by debris flowing over the spillway. The tilting weir gate also requires more maintenance than Option 4 due to cleaning debris from the drive shafts.
- **Option 3 -** Stop logs: This option was eliminated because it requires personnel access to the spillway notch, which would be very difficult and dangerous if/when water is spilling over the notch.
- **Option 4 -** Downward opening slide gate: This option was selected because it would not block the spillway notch area when lowered, it can be bolted onto the upstream face of the existing spillway structure, no element of the slide gate would extend above the spillway crest, and normal maintenance can be performed from the ground above the spillway. Option 4 would include a stairway and a walkway to access the slide gate (see Figure 10-2).

The downward opening slide gate is proposed to be installed on the main Stafford Lake spillway shown on Figure 10-1. A schematic of the proposed slide gate is provided on Figure 10-2. The slide gate would be installed below the spillway notch, which measures 10 feet wide and 3 feet tall. The gate would be operated from the south bank of the spillway channel. The gate drive gear boxes would be located below the gate, to avoid the installation of a cross bar at the top of the notch and minimize debris accumulation that could block flow through the notch.

Figure 10-1

Stafford Lake Spillway Location

North Marin Water District
Local Water Supply
Enhancement Study

WEST YOST

Figure 10-2

Stafford Lake Main Spillway Movable Notch Gate

North Marin Water District
Local Water Supply Enhancement Study

West Yost discussed the slide gate design with Waterman Valve, LLC[1], a manufacturer of slide gates. Waterman Valve, LLC provided a preliminary design schematic, which is provided as Appendix J. In addition to the slide gate, stairs and a catwalk would be installed as shown schematically on Figure 10-2 to provide access to the slide gate and the base of the spillway for maintenance.

Based on the Stafford Lake elevation-storage curve (Appendix K), the slide gate would increase storage from 196 feet to 199 feet elevation (NGVD29), resulting in an increase of storage volume by 726 AF, from 4,287 AF to 5,013 AF.

10.1.2 Sediment Removal

The purpose of sediment removal is to increase the storage volume of Stafford Lake by excavating sediment from the reservoir area as shown in Figure 10-3. The excavation would occur in the western end of the Stafford Lake and would take place when the lake level is low, so the excavation area is dry and exposed. The western end of the lake was chosen due to the relatively flat topography and ease of truck access. The excavation depth could range from 1-foot to 15 feet, as summarized in Table 10-1. The slope of the excavation bank would be 10H:1V. At an excavation depth of 15 feet, the excavation volume would be approximately 889,000 cubic yards (CY). Excavation to a depth of 15 feet would increase the Stafford Lake storage volume by 551 AF.

Table 10-1. Stafford Lake Sediment Removal Evaluation

Excavation Depth, ft	Area, acres	Layer Volume, cf	Cumulative Layer Volume, cf	Excavation, CY[(a)]	Increase in Storage Volume, AF
1	49.0	2,134,440	2,134,440	79,053	49
2	47.3	2,058,210	4,192,650	155,283	96
3	45.5	1,981,980	6,174,630	228,690	142
4	43.8	1,905,750	8,080,380	299,273	186
5	42.0	1,829,520	9,909,900	367,033	228
6	40.3	1,753,290	11,663,190	431,970	268
7	38.5	1,677,060	13,340,250	494,083	306
8	36.8	1,600,830	14,941,080	553,373	343
9	35.0	1,524,600	16,465,680	609,840	378
10	33.3	1,448,370	17,914,050	663,483	411
11	31.5	1,372,140	19,286,190	714,303	443
12	29.8	1,295,910	20,582,100	762,300	473
13	28.0	1,219,680	21,801,780	807,473	501
14	26.3	1,143,450	22,945,230	849,823	527
15	24.5	1,067,220	24,012,450	889,350	551

Note:
(a) The average dump truck can hold 10-15 CY of material just so the reader understands the volumes.

[1] West Yost discussed the slide gate design with Jay Belt at Waterman Valve, LLC.

Figure 10-3

Sediment Excavation Area

North Marin Water District
Local Water Supply
Enhancement Study

WEST YOST - N:\Clients\861 North Marin Water District\60-21-04 Local Water SES\GIS\MXD\Figure 10-3 SW Sediment Excavation.mxd - Lrussell - 3/9/2022

10.1.3 Water Supply Yield and Reliability

Both the spillway notch slide gate and sediment removal alternatives would allow NMWD to store more water supply from other sources and improve water supply availability during dry seasons. The estimated increased in storage volume and reliability of each alternative is discussed below:

- **Spillway Notch Slide Gate:** The slide gate is estimated to increase the storage volume of Stafford Lake by approximately 726 AF from 4,287 AF to 5,013 AF (based on the Stafford Lake elevation-storage curve). This increase in storage volume is partially reliable. During a large storm event, the slide gate would likely have to be lowered to recover the flood control storage volume of Stafford Lake (from elevation 196 to 199 feet). After the large storm has passed, the slide gate could be raised again to capture runoff from subsequent storms. The increased volume of 726 AF may not be filled if there are no subsequent storm events.
- **Sediment Removal:** The storage volume achieved from the sediment excavation would be dependent on the depth and area of the excavation but could range up to 551 AF, assuming a 15-foot excavation depth. This storage volume would be reliable because it is below the elevation of the spillway. However, over many years, sediment would deposit in the excavated area requiring for the area to be excavated again in the future.

In addition to capturing and storing local stormwater runoff, this alternative would provide NMWD the ability to store water from the other sources described below.

- Atmospheric River Runoff. Climate change is anticipated to increase in atmospheric river events and drought events. The increased storage would provide NMWD a way to capture stormwater runoff from atmospheric river events and mitigate the effects of drought by having more locally available water supply.
- Winter Water Flows from the Russian River. As discussed in Section 3.2, NMWD can purchase winter water flows from Sonoma Water to backfeed into Stafford Lake through NMWD's potable water transmission system. The increased storage capacity of Stafford Lake would allow NMWD to purchase more water supply from Sonoma Water to improve water supply availability during dry years. Even during severe droughts such as in 2021, Russian River winter water flow was available for at least 3 months allowing NMWD to backfeed approximately 1,100 AF over 72 days from mid-February to late April at an average rate of 5 MGD bringing the total storage capacity to 54 percent. An additional 1,000 AF of water could have been easily stored in Stafford Lake had NMWD not been limited in the volume of water it may backfeed into Stafford Lake due to constraints associated with potable water transmission system capacity and operations. Under a parallel effort, NMWD is evaluating the distribution system using its system hydraulic model (InfoWater) to identify restrictions or constraints to backfeeding operation. Results of that evaluation is provided in Appendix M. Regardless of whether the spillway gate alternative was implemented, NMWD should consider expansion of its transmission system to efficiently transport an increased volume of Russian River natural winter water flows from Sonoma Water into Stafford Lake depending on the outcome of the modeling analysis (by others).
- Other Alternative Sources. This Study and the Resiliency Study explores other water supply alternatives that may result in additional water supply for NMWD. This alternative provides NMWD the ability to store water supplies produced by implemented projects.

10.1.4 Infrastructure Requirements

Modifying the spillway to increase capacity would require a spillway notch slide gate as shown on Figure 10-2 and in Appendix J. The infrastructure includes a slide gate (including the gate, drive shafts, and an electric motor), stairs and walkways, and electrical lines from the STP to the slide gate.

The option of sediment removal to increase capacity does not require new infrastructure.

As discussed in Section 10.1.3, NMWD could consider improvements to its potable transmission main to efficiently transport winter water flows from Sonoma Water to Stafford Lake during the short window that the winter water flows are available. A separate, parallel evaluation is being conducted at the time of preparation of this Study.

10.1.5 Implementation Timing

The implementation timing for this alternative is dependent on the time for permitting, design, and construction. Table 10-2 summarizes the estimated implementation timing for each option under this alternative.

Table 10-2. Implementation Timing

Implementation Category	Estimated Time, Years	
	Spillway Notch Slide Gate	Sediment Removal
Land Acquisition/Easement	0	1
Permitting	2	2
Design	0.5	1
Construction	0.5	1[a]
Total	2	4

Note:
(a) Sediment removal could be completed in one year if adequate soil disposal locations are available. It is likely that excavation would be completed over several years.

10.2 WATER SUPPLY ALTERNATIVE EVALUATION

10.2.1 Cost Estimate

A planning level cost estimate for the construction and operation for the increase of Stafford Lake storage capacity, along with assumptions, is provided in the following sections for both the spillway notch slide gate and the sediment removal alternatives. These costs are only to obtain the estimated storge volume. These costs do not include treatment of the raw water nor distribution of treated water.

Appendix F provides a more detailed cost estimate for the increase of Stafford Lake storage capacity alternative.

10.2.1.1 Spillway Notch Slide Gate

Table 10-3 summarizes the cost estimate for the spillway modification by adding the spillway notch slide gate to increase the volume of Stafford Lake. The total capital cost is estimated to be $944,000, including the construction contingency and project allowance of 45 percent. The project allowance is specific to this option and includes planning, permitting, engineering, legal, and administrative costs. No replacement costs were identified over the 30-year operational cycle used for cost estimating. The annual O&M cost was estimated to be $10,200. An operating contingency of 30 percent was used to estimate operational costs over a 30-year period. Operational cost includes materials and labor. The 30-year NPV O&M cost is estimated to be $294,000 using a 3.5 percent discount rate.

The total NPV cost (total capital cost plus 30-year O&M costs) for the spillway notch slide gate is estimated to be $1.24million. Stafford Lake spilled over the spillway about two-thirds of the time (sixteen years) during the last twenty-three years. During these events and if the spillway notch slide gate was already constructed, the increased storage would have been utilized. This same ratio was applied to the 30-year operational cycle. Usable water available due to the storage increase was assumed to be available twenty out of the thirty years operational cycle.

Assuming the storage increase of 726 AFY was fully available during 20 of the 30 years, the additional volume of water supply made available to NMWD would be 14,520 AF over that time period. The unit cost for the spillway notch slide gate is estimated to be approximately $90 per AF over a 30-year period.

Table 10-3. Total Cost Estimate for Spillway Notch Slide Gate

Cost Item	Estimated Cost, dollars
Total Capital Cost[(a)]	944,000
Total Replacement Cost[(b)]	-
Total 30-year O&M Cost[(c)]	294,000
NPV Total Cost	**1,238,000**
Total Storage Increase for 20 years[(d)], AF	14,520
Unit Cost over 30 years[(e)], dollar/AF	**90**

Notes:

(a) A sluice gate, stainless steel stairway and walkway, electrical power supply and boom truck rental/operator was included in the capital cost estimate. The construction contingency was estimated to be 40 percent and the project allowance for planning, permitting, engineering, legal, and administrative costs was estimated to be 45 percent.

(b) The spillway notch slide gate alternative for increasing the storage volume of Stafford Lake does not assume any replacements are needed over the 30-year operational cycle.

(c) The annual O&M cost was estimated to be $6,000 per year. An inflation rate of 3.0 percent was applied to materials and labor and a discount rate of 3.5 percent was applied to determine the net present value of the annual O&M costs over the 30-year operational cycle. An operating contingency of 30 percent was applied to the O&M cost.

(d) The spillway notch slide gate is estimated to add an additional storage volume of 726 AFY to Stafford Lake. Assuming this storage volume would be utilized 20 years of the 30-year operational cycle, the total storage volume would equate to 14,520 AF. Two-thirds of the 30-year operational cycle was assumed because Stafford Lake has spilled over the spillway two-thirds of the years over the last twenty-three years.

(e) Unit Cost = NPV Total Cost divided by the total storage volume over 30 years. Unit cost is rounded up to the nearest 10.

10.2.1.2 Sediment Removal

Table 10-4 summarizes the cost estimate for the sediment removal to increase the volume of Stafford Lake. The cost estimate is only for an excavation depth of 15 feet to achieve the maximum storage volume increase of 551 AF in Stafford Lake. This is the minimum per unit cost that NMWD would anticipate for the sediment removal option. Appendix F provides the total capital cost for excavation depths from 2 feet to 14 feet. The total capital cost is estimated to be $41.1 million, including the construction contingency and project allowance of 10 percent. The project allowance is for planning, permitting, engineering, legal, and administrative costs. No replacement or O&M costs over the 30-year operational cycle were identified.

The following alternative specific assumptions were made:

- Cost estimate assumes an excavation depth of 15 feet on the western end of Stafford Lake.
- The excavation unit cost was assumed to be $30 per CY[2] but if the soil was not fully dry, the excavation unit cost could increase significantly.
- Over many years, the sediment would deposit back into the excavated area requiring for the area to be excavated again in the future. The cost estimate does not account for future excavation based on sediment deposits over the 30-year operational horizon.

The total NPV cost (total capital cost plus 30-year O&M costs) for the sediment removal is estimated to be $41.1 million. Stafford Lake spilled over the spillway about two-thirds of the time (sixteen years) during the last twenty-three years. During these events and if the sediment excavation at a 15-foot depth was already completed, the increased storage would have been utilized. This same ratio was applied to the 30-year operational cycle. It is assumed that the storage increase would only be available twenty out of the thirty years during this operational period. Assuming the storage increase of 551 AFY was fully available during 20 of the 30 years, then the additional volume of water made available to NMWD would be 11,020 AF. The unit cost for the sediment removal option is estimated to be approximately $3,800 per AF over a 30-year period.

[2] Excavation unit cost could vary depending on the disposal site location and could be significantly higher than $30 per CY.

Table 10-4. Total Cost Estimate for Sediment Removal

Cost Item	Estimated Cost, dollars
Total Capital Cost[(a)]	41,120,000
Total Replacement Cost[(b)]	-
Total 30-year O&M Cost[(c)]	-
NPV Total Cost	**$41,120,000**
Total Storage Increase for 20 years[(d)], AF	11,020
Unit Cost over 30 years[(e)], dollar/AF	**$3,800**

Notes:

(a) The capital cost assumes an excavation depth of 15 feet and an excavation unit cost of $30 per cubic yard. The construction contingency was estimated to be 40 percent and the project allowance for planning, permitting, engineering, legal, and administrative costs was estimated to be 10 percent.

(b) The sediment removal option for increasing the storage volume of Stafford Lake does not assume any replacements are needed over the 30-year operational cycle.

(c) The sediment removal option for increased Stafford Lake does not assume an annual O&M costs.

(d) The sediment removal at a depth of 15 feet (per Table 10-1) is estimated to add an additional storage volume of 551 AFY to Stafford Lake. Assuming this storage volume would be utilized 20 years of the 30-year operational cycle, the total storage volume would equate to 11,020 AF. Two-thirds of the 30-year operational cycle was assumed because Stafford Lake has spilled over the spillway two-thirds of the years over the last twenty-three years.

(e) Unit Cost = NPV Total Cost divided by the total storage volume over 30 years. Unit cost has been rounded up to the nearest $100.

10.2.2 Operational Impacts

For the spillway notch slide gate option, NMWD staff would need to monitor the weather forecast and operate the spillway gate consistent with a set of operation rules that would meet the flood control benefit requirements of Stafford Lake. The spillway gate would need to be exercised periodically, which would minimally increase the energy demand and NMWD staff effort. This option does not require additional skill sets or certifications for NMWD staff. This option is expected to have minimal operational impacts in the long term.

For the sediment removal option, NMWD would experience adverse impacts during the excavation to remove sediments. Removal would need to be conducted when lake levels are low, during the dry season, or preferably during a drought event. Because Stafford Lake is NMWD's primary source of local water supply during the dry season, NMWD must keep the levels up to provide service to its customers. NMWD may also have water quality concerns associated with keeping low water levels and during refilling Stafford Lake. These operational issues during implementation would be especially challenging for NMWD.

In the long term, the removal of the top layer of sediment could change the water chemistry of Stafford Lake, which could result in the need to modify the operation of the Stafford TP. No other significant operational changes or power demand changes are anticipated. This option would not require additional skill sets or certifications for NMWD staff.

The increased water supply captured at Stafford Lake would require treatment at the STP, resulting in increased need for chemical use, staff resources, and energy usage. These costs are not included in the cost analysis above.

10.2.3 Regulations and Permitting

This water supply enhancement alternative would require regulatory compliance and permits as described below.

The Spillway Notch Slide Gate option would require:

- Mitigated Negative Declaration CEQA evaluation
- Acquisition of additional water rights (potentially)
- Potential CDFW Stream Bed Alteration Agreement
- Coordination with MCFCWCD and modification of the Stafford Lake operation agreement
- Coordination with the DSOD and modification of the existing DSOD permit

The Sediment Removal option would require:

- CEQA evaluation of the impacts of the option
- CDFW Stream Bed Alteration Agreement
- USACE Clean Water Act Section 404 Permit
- RWQCB Clean Water Act Section 401 Certification
- Coordination with MCFCWCD and modification of the Lake Stafford operation agreement
- Coordination with the DSOD and modification of the existing DSOD permit

Both options would be subject to environmental review under CEQA. Potentially significant impacts in the areas of biological resources, cultural resources, hydrology, and soils are anticipated. An Initial Study Negative Declaration would likely be required.

Construction would require biological and cultural resource assessments and permits from the natural resource agencies, including U.S. Army Corps of Engineers Clean Water Act Section 404 Permit, Regional Water Quality Control Board Clean Water Act Section 401 Certification, California Department of Fish and Wildlife, or U.S. Department of Fish and Wildlife Stream Bed Alteration Agreement. If project activities are planned in the vicinity of culturally sensitive areas consolation with local tribes, construction monitoring, and documentation of artifacts may be required.

Changes to the Stafford Lake spillway would require acquisition of water rights from the SWRCB Division of Water Rights. Acquiring water rights is often a complex, resource intensive, and involves a potentially lengthy public process.

Changes Stafford Lake spillway and storage capacity would require amendment to the existing DSOD permit. DSOD would review all construction and operations plans for reservoir capacity expansion.

Regulatory constraints for this alternative are considered more impactful than other alternatives because construction of this alternative also involves review and approval by numerous regulatory agencies and the complexity of securing water rights.

10.2.4 Public and Institutional Considerations

Successful implementation of this alternative requires support from the public and stakeholders, and partnership and agreements with other entities. In addition to storing NMWD's water supply, Stafford Lake is a recreational area open to the general public.

Public acceptance is anticipated to be favorable for the spillway notch slide gate option, as construction is localized in a small area of Stafford Lake.

The sediment removal of Stafford Lake may generate concerns from local watershed organizations. Because of the visibility of the activities, NMWD may anticipate receiving complaints and concerns from the general public.

All improvements would take place on NMWD property. Thus, NMWD would not need to acquire additional property to increase the level of Stafford Lake.

Increasing the storage volume of Stafford Lake will have a temporary impact the shoreline of the local park adjacent to Stafford Lake and well as some fairway areas of the Indian Valley Golf Course (IVGC). NMWD will need to coordinate and collaborate with Marin County Parks and IVGC to address impacts.

At the time of preparation of this study, Marin County Parks and Open Space District is considering a project to construct a trail around the upstream side of Stafford Lake. Should NMWD opt to implement sediment removal, it has the opportunity to collaborate with the Marin County Parks and Open Space District for mutual benefit. The Marin County Parks and Open Space District (MCPOSD) may be able to use some of the sediment removed from the lake bottom to construct the proposed trail. Based on preliminary coordination between NMWD and MCPOSD, the proposed shoreline trail would be at an elevation 200 feet or higher.

10.3 FINDINGS AND CONCLUSIONS

Findings and conclusions associated with each option to increase Stafford Lake are summarized below. This option would help NMWD manage its water supplies as its service area is impacted by climate change. It improves the reliability of water service for NMWD by improving water availability during dry seasons. This alternative would also improve the reliability of other alternatives identified in this Study, such as diverting stormwater runoff into Stafford Lake from adjacent watersheds (Chapter 9). It would allow for greater storage capacity for the increased local water supply. Should NMWD consider combining this alternative with the alternative evaluated in Chapter 9, further analysis is recommended.

NMWD will need to coordinate closely with Marin County Parks and Open Space District during implementation of either option. Because Stafford Lake is a recreational area, either options will attract general public and stakeholder attention.

NMWD should consider improvements to its potable transmission main to maximize the benefit of additional storage and efficiently transport winter water flows from Sonoma Water to Stafford Lake during the short window that the winter water flows are available. If NMWD purchases 1,000 AFY over the 30-year operational period, the unit cost for each option would increase by $500 per AF.[3] Under a parallel effort to this Study, NMWD is evaluating the distribution system using its system hydraulic model (InfoWater) to identify restrictions or constraints of transporting winter water flows from Sonoma Water to Stafford Lake.

10.3.1 Spillway Notch Slide Gate

The option to install a spillway notch slide gate to increase Stafford Lake storage capacity does not constitute major new infrastructure. It would provide approximately 726 AF of increased storage volume in Stafford Lake.

This option is estimated to take two years to implement. The total capital cost is estimated to be approximately $944,000. The total NPV O&M cost is estimated to be approximately $294,000 over the 30-year operational period. The total present value cost is approximately $1.24 million. The cost per AF of water supply (20 of the 30 years) is approximately $90 per AF.

10.3.2 Sediment Removal

This option does not require new infrastructure and would provide up to about 551 AF of increased storage volume in Stafford Lake. This option is estimated to take four or more years to implement. The total capital cost is estimated at about $41.1 million. There would be no annual O&M cost. The cost per AF of water supply (20 of the 30 years) is about $3,800 per AF.

This option present implementation challenges for NMWD. Sediment removal would need to be conducted when lake levels are low, during the dry season, or preferably during a drought event. NMWD may also have water quality concerns associated with keeping low water levels and during refilling Stafford Lake. Because Stafford Lake is NMWD's primary source of local water supply during the dry season, NMWD must keep the levels up and maintain water quality to provide service to its customers. The juxtaposition of purposes may be difficult to reconcile.

[3] The unit cost, $500 (NPV total cost divided by total supply over 30 years) of $500 per AF to annually purchase 1,000 AF from Sonoma Water assumes a 30 percent operating contingency, 3.0 percent inflation rate, 3.5 percent discount rate, and supply is purchased at $400 per AF. Operational period is equal to 30 years.

CHAPTER 11
Desalination

Local production of desalinated water from either brackish groundwater or the San Francisco Bay (SF Bay) water has been conceptually evaluated for this Study and found to be infeasible for NMWD. For desalinated water supply to be a viable option, NMWD would need to consider participating in a regional project.

Because a local desalination (desal) project is infeasible, this Chapter does not include the same level of detail as the chapters for other alternatives. A planning-level cost estimate has not been prepared for desal at a local level.

11.1 DESALINATED WATER AS A LOCAL WATER SUPPLY SOURCE

Desal, as a water supply option, would have the benefit of providing a relatively reliable water supply to NMWD. However, the relatively small scale of a facility to supplement NWMD's water needs would likely result in a relatively high unit cost of water production. Larger desal facilities benefit from an economy of scale. They are typically designed and sized to operate on a relatively continuous basis, both to result in lower unit costs and to best utilize the experienced staff required to operate and maintain the facilities. Therefore, desal facilities are most economically used to provide baseline water supply, not supplemental, seasonal water supply.

Further, a local desal facility would require NMWD-controlled access for both a raw water intake and membrane reject (brine) discharge; NMWD does not have sites available near the SF Bay for such a facility. Potential desal facility sites near the SF Bay outside the NMWD Service Area with access for raw water intake and brine discharge, that are also not vulnerable to sea level rise, are limited or non-existent. Thus, local production of desalinated water is not feasible for NMWD.

11.2 POTENTIAL REGIONAL WATER SUPPLY OPTION

If NMWD were to pursue a desal project, it would need to be as part of a long-term regional partnership to be viable. This assertion is based on at least the following factors:

- **Geography:** As noted above, NMWD does not have viable properties available for either a water intake or brine discharge.
- **Financial:** The cumulative water supply needs of the region may provide an economy of scale for design, construction, and operation of a desal facility, compared to NMWD's water supply needs alone.
- **Environmental:** Concerns with both the supply intake (fish entrainment) and brine discharge (quality and density) make siting and implementing a desal facility challenging from a technical and regulatory standpoint. A regional effort may provide broader options to mitigate these concerns.

The discussion below is limited to summarizing information on regional desal projects that have been recently evaluated by other agencies. MMWD and Sonoma Water are other water agencies in the region that have recently evaluated or are currently evaluating desal projects.

11.2.1 Potential Collaboration with MMWD

As part of this Study, West Yost met with MMWD staff, who described the following actions related to a desal project in recent years:

- In 2004, MMWD projected a significant water supply shortfall and began considering desal as a water supply alternative.
- In 2005, MMWD started a desal pilot project to determine the best pretreatment processes and preferred reverse osmosis membranes.
- By 2007, MMWD's water supply availability had improved due to more intensive water conservation and water recycling practices.
- Additional study of desal was completed from 2008 through 2010, but MMWD decided at that time not to pursue a desal project further primarily because the acute water supply shortage had been resolved.
- In 2021, MMWD again reviewed the potential for desal, including both temporary (short-term) and long-term equipment options. Ultimately, MMWD decided not to pursue either a short- or long-term desal project further at that time for several reasons listed below:
  - The temporary solution would not provide an adequate water supply.
  - Additional logistical challenges were anticipated for either option.
  - An alternative of constructing a pipeline across the Richmond/San Rafael Bridge to connect to the East Bay Municipal Utilities District potable water system was determined to provide greater volume and reliability.
- As of January 2022, MMWD's reservoir storage levels had risen to ensure that there is adequate water supply for the next two years. MMWD has paused the proposed pipeline project across the Richmond/San Rafael Bridge. MMWD's focus has shifted to long-term resilience efforts.
  - MMWD is continuing to investigate a permanent desal facility as a future supplemental water supply option. Various potential permanent desal facility opportunities are being explored and include:
    - A desal facility serving just MMWD
    - A North Bay regional desal facility
    - A East Bay regional desal facility that the MMWD could potentially access if its proposed intertie pipeline project were constructed providing a connection.

Desal would be a relatively expensive water supply option for MMWD. Recent draft documentation for a MMWD desal project describes a 15 MGD facility with a project cost of about $230 million.[1] The facility costs alone would equate on a unit basis to between $500 and $1,000 per AF, depending on how many

[1] Kennedy Jenks and Jacobs. 2021. Draft Technical Memorandum, MMWD Desalination Supply Study. October 18, 2021.

days the facility is operated in a year. Once operating costs are accounted for, the full unit cost could be significantly higher. One analysis has estimated a full unit cost closer to $3,000 per AF.[2]

MMWD staff have indicated that desal could again be evaluated as a water supply alternative if other water supply alternatives are exhausted or a significant enough water supply shortage were otherwise projected.

11.2.2 Potential Collaboration with Sonoma Water and Partner Agencies

At the time of preparation of this Study, Sonoma Water is evaluating desal as an alternative as part of their Resiliency Study[3]. Preliminary findings from the Resiliency Study were incorporated into this chapter. Based on preliminary information available, the Resiliency Study is evaluating three types of desalination projects:

- **Ocean desal (low):** Evaluates an emergency desal plan (3.6 MGD capacity) in Marin County to deliver emergency desal water (SF Bay) to MMWD using available package plants (similar to MMWD's short-term option). Preliminary unit cost is estimated to be $3,200 to $3,500 per AFY.
- **Ocean desal (high):** Evaluates expanding ocean desal up to 10 MGD and assumes supply could be delivered to MMWD and NMWD. Preliminary unit cost is estimated to be $3,200 to $3,500 per AFY.
- **Petaluma Brackish Groundwater Desalter:** Evaluates brackish groundwater desalter (3.6 MGD capacity) in the lower Petaluma Valley and assumes supply could be delivered to the City of Petaluma, MMWD, or NMWD. Preliminary unit cost is estimated to be $1,500 to $2,000 per AFY.

Preliminary unit cost estimates in the Sonoma Water materials are based on the annual supply yield for each desal option. The unit costs for other alternatives in this Study are based on the total supply yield over the 30-year project period. Based on the preliminary information, Sonoma Water's pursuit of a long-term desal project may be unlikely.

11.3 RECOMMENDATION

Any pursuit by NMWD of desal as a water supply alternative is recommended to be pursued as part of a long-term regional partnership with other agencies. However, other recent water supply studies in the region have not found desal to be an economical water supply alternative. Therefore, continued evaluation of desalination is recommended only if other, less expensive water supply alternatives are found to be infeasible.

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[2] Freyer, James. 2009. *Sustaining Our Water Future: A Review of the Marin Municipal Water District's Alternatives to Improve Water Supply Reliability*. Food & Water Watch. Accessed at https://www.yumpu.com/en/document/read/27227786/sustaining-our-water-future-food-water-watch.

[3] Sonoma Water. March 2022. Sonoma Water Regional Water Supply Resiliency Study – Accelerated 2021 – 2022 Drought Resiliency Analysis – Review Draft.

CHAPTER 12
Findings and Recommendations

The purpose of this Study is to enhance NMWD's local water supplies and create a more resilient local water supply portfolio for its Novato service area, with the objective to increase NMWD's current local water supply by approximately 1,000 to 2,000 AFY. In this Chapter, the findings and recommendations of this Study are presented. The potential local water supply enhancement alternatives are scored and compared. Three feasible alternatives are recommended for further consideration and study. If implemented, these feasible water supply projects could potentially provide NMWD 991 AF to 1,584 AF of additional local water supply. A summary of potential funding options is provided should NMWD decide to pursue any of the feasible water supply alternatives.

12.1 ALTERNATIVES COMPARISON

As described in Chapter 4, an evaluation methodology was developed to objectively compare each alternative evaluated as part of this Study. The methodology was developed after discussions and feedback from NMWD staff and was presented to the Board of Directors at a public workshop held on January 25, 2022.The evaluation methodology included six criteria to compare the alternatives and are as follows:

- Quantitative Criteria
  - Water Supply Yield
  - Cost Estimate (Unit Cost over 30-Year project period)
- Qualitative Criteria
  - Water Supply Reliability
  - Operational Impacts
  - Regulations and Permitting
  - Public and Institutional Considerations

The qualitative criteria are meant to support the quantitative criteria in evaluating the priority of alternatives and recommending projects for NMWD to consider in the future. A 5-point rating scale was developed for each qualitative criterion as provided in Table 4-2. Each qualitative criterion was weighted based on input from NMWD on the priority of each qualitative criterion as summarized in Table 4-3. Water supply reliability was weighted the most while public and institutional consideration was weighted the least.

In Table 12-1, a summary of the evaluation of the seven local water supply enhancement alternatives considered in this Study is provided. The annual water supply yield and the weighted qualitative score and were important factors to consider in determining the most feasible local water supply alternative. Three of the water supply options were eliminated as infeasible options at the local level as detailed in their respective chapters: ASR, IPR, and Desalination. Variations were developed for the other water supply alternatives to explore potential implementation and water supply yield.

Table 12-1. Summary Evaluation of Local Water Supply Alternatives

Local Water Supply Alternative			Quantitative Criteria: NPV of Total Cost, dollars per AF	Quantitative Criteria: Annual Yield, AFY	Qualitative Criteria: Water Supply Reliability	Qualitative Criteria: Operational Impacts	Qualitative Criteria: Regulations & Permitting	Qualitative Criteria: Public and Institutional Considerations	Qualitative Criteria: Weighted Qualitative Score
Local ASR[a]			11,000	15	3	3	2	2	2.7
Recycled Water System Expansion[b]		*Segment N-1*	5,300	17	5	4	4	5	**4.5**
Recycled Water System Expansion[b]		*Segment N-2*	6,600	23	5	4	4	5	**4.5**
Recycled Water System Expansion[b]		*Segment C-1*	22,000	4	5	4	4	5	**4.5**
Recycled Water System Expansion[b]		*Segment C-2*	8,600	19	5	4	4	5	**4.5**
Local Indirect Potable Reuse[c]			3,000	1,000 - 3,100	5	1	1	1	2.6
Improve Stafford Treatment Plant Process Water Recapture Efficiency[d]		*Pretreatment Modification*	70 - 240	20 - 70	4	5	5	5	4.6
Improve Stafford Treatment Plant Process Water Recapture Efficiency[d]		*Pretreatment Modification and Ancillary Improvements[e]*	1,500 - 5,200	20 - 70	5	5	5	5	**5**
Divert Captured Stormwater Into Stafford Lake[f]	*Without Basin[g]*	*Option 1. Leveroni Canyon*	710	245	3	4	2	4	3.2
Divert Captured Stormwater Into Stafford Lake[f]	*Without Basin[g]*	*Option 2. Bowman Canyon*	470	433	3	4	2	4	3.2
Divert Captured Stormwater Into Stafford Lake[f]	*Without Basin[g]*	*Option 3. Novato Creek*	330	628	3	4	2	4	3.2
Divert Captured Stormwater Into Stafford Lake[f]	*With Basin[g]*	*Option 2. Bowman Canyon*	960	593	4	3	2	3	3.2
Divert Captured Stormwater Into Stafford Lake[f]	*With Basin[g]*	*Option 3. Novato Creek*	730	788	4	3	2	3	3.2
Divert Captured Stormwater Into Stafford Lake[f]	*Option 4. Dam at Leveroni Canyon*		1,700	175	3	3	2	2	2.7
Divert Captured Stormwater Into Stafford Lake[f]	*Option 5. Dam at Bowman Canyon*		800	752	3	3	2	2	2.7
Increase Stafford Lake Storage Capacity[h]		*Spillway Notch Slide Gate[i]*	90	726	5	5	2	5	4.4
Increase Stafford Lake Storage Capacity[h]		*Sediment Removal[i]*	2,600	551	3	2	2	3	2.5
Desalination[j]			-	-	5	1	1	1	2.6

Notes:

(a) Cost estimate per ASR well.

(b) The recycled water expansion alternative received a high qualitative score of 4.5 but this score is supplemental to the quantitative criteria. This alternative is cost prohibitive and does not meet the needs of NMWD to offset enough potable water. The annual yields for the recycled water expansion are the annual volume of potable water that would be offset with each recycled water segment.

(c) Costs are provided for treatment system cost only. Does not include pipeline costs since well sites could not be identified.

(d) Costs are provided on a per treatment unit basis. Lower yield/higher costs are associated with dry years. Higher yield/lower costs are associated with typical years.

(e) The pretreatment modification plus ancillary improvements alternative received a high qualitative score of 5.0 but this score is supplemental to the quantitative criteria. This alternative is cost prohibitive due to the raw water intake modification and does not increase the annual yield compared to only implementing the pretreatment modifications.

(f) Costs do not include treatment of raw water captured into Stafford Lake. The lowest cost/highest yield for the option variation is provided.

(g) Yield and cost estimates for these options assumes that the total captured stormwater runoff is diverted to Stafford Lake and none would be lost over the Stafford Lake Spillway.

(h) This alternative increases storage capacity of Stafford Lake for improved reliability. NMWD has the ability to back feed up to 1,000 AFY of supply from Sonoma Water through NMWD's existing potable water system. This supply is available to NMWD during drought years and would allow NMWD to fully utilize the increased Stafford Lake storage capacity under this alternative. NMWD is currently evaluating infrastructure improvements to increase the volume of supply (up to 2,000 AFY) that can be back fed into Stafford Lake from Sonoma Water.

(i) This storage volume is assumed to be utilized 20 years of the 30-year operational cycle. Two-thirds of the 30-year operational cycle was assumed because Stafford Lake has spilled over the spillway two-thirds of the years over the last twenty-three years.

(j) This alternative water supply option was found to be infeasible as a local project. A cost estimate and annual supply yield was not determined.

12.1.1 Feasible Water Supply Enhancement Alternatives

Table 12-2 summarizes the local water supply enhancement alternatives that may be feasible for NMWD based on the unit cost over the 30-year project period, estimated annual yield, and the qualitative weighted score. Implementation of these feasible water supply projects could potentially provide NMWD 991 AF to 1,584 AF of additional local water supply.

Should NMWD choose to pursue any of these alternatives, further studies are highly recommended as discussed in the respective chapters of each water supply alternative. Because most of these projects present significant capital investment, funding options are provided in Section 12.2.

Table 12-2. Feasible Local Water Supply Enhancement Alternatives

Local Water Supply Alternative	NPV of Total Cost, dollars per AF	Annual Yield , AFY	Weighted Qualitative Score
Improve Stafford Treatment Plant Process Water Recapture Efficiency - Pretreatment Modification	70 - 240	20 - 70	4.6
Increase Stafford Lake Storage Capacity - Spillway Notch Slide Gate[(a)(b)]	90	726	4.4
Divert Captured Stormwater Into Stafford Lake	330 - 960	245 - 788	3.2

Notes:

(a) This alternative increases storage capacity of Stafford Lake for improved reliability. NMWD has the ability to backfeed up to 1,000 AFY of supply from Sonoma Water through NMWD's existing potable water system. This supply is available to NMWD during drought years and would allow NMWD to fully utilize the increased Stafford Lake storage capacity under this alternative. NMWD is currently evaluating infrastructure improvements to increase the duration and the volume of supply (up to 2,000 AFY) that can be backfed into Stafford Lake from Sonoma Water.

(b) This storage volume is assumed to be utilized 20 years of the 30-year operational cycle. Two-thirds of the 30-year operational cycle was assumed because Stafford Lake has spilled over the spillway two-thirds of the years over the last twenty-three years.

ASR, IPR, and desalination are infeasible local projects. These water supply alternatives may potentially be feasible under regional efforts, as discussed in Section 12.1.2.

Although it shows that it provides water supply reliability, the pipeline expansion of the NMWD recycled water system beyond its current system boundaries is infeasible due to prohibitive costs. This Study indicates that opportunities are available to retrofit existing outdoor landscapes from potable water to recycled water and to expand service to new, planned development within the City using the existing pipeline in the North Service Area and the Central Service Area. NMWD can potentially offset almost 63 AF of potable water with these new connections to existing pipelines. NMWD should encourage customers near these existing pipelines to use recycled water for non-potable use. Should funding opportunities become available for recycled water projects, NMWD may consider expanding its recycled water system by segments.

12.1.1.1 Improve Stafford Treatment Plant Process Water Recapture Efficiency

Improving the Stafford Treatment Plant process water recapture efficiency is a feasible project because it could potentially provide NMWD with additional incremental water supply at relatively low cost, short time frame, and not significant effort. Although the annual yield is generally below the desired target, this local water supply enhancement alternative rates high in all qualitative criteria.

The option to include ancillary improvements as part of this water supply alternative was evaluated as part of this Study. Although the ancillary improvements provide increased reliability and received high qualitative scores, the option does not provide additional yield but presents significant additional cost. For this reason, the option was determined to be infeasible.

Additional plant-scale study is needed to confirm the feasibility of this alternative, which entails modifying the STP pretreatment process to reduce wastewater discharged to the NSD collection system and thus allow for extended hours of STP operation to produce additional potable water from stored water in Stafford Lake. Should the performance testing confirm the feasibility of this alternative, a reasonable estimate of the additional water supply yield that could be realized is 20 to 70 AFY. Closer to 20 AFY is more likely when the raw water supply is a limiting factor, such as during a dry year. Even during a dry year, the upper end of the yield may be achievable if the water supply to Stafford Lake could be augmented – for instance, with winter water backfed from Sonoma Water or increased supply from stormwater runoff diversion.

12.1.1.2 Increase Stafford Lake Storage Capacity-Spillway Notch Slide Gate

Increasing Stafford Lake storage capacity is a feasible project because the addition of spillway notch slide gate on the secondary spillway, as shown on Figure 10-2, could significantly improve the reliability of NMWD's water supply with the lowest costs, as compared to the other alternatives. This local water supply enhancement alternative rates high in most qualitative criteria, with the exception of regulations and permitting. This alternative would increase Stafford Lake capacity and improve NMWD's water supply reliability by allowing it to store more water supply from other sources and improve water supply availability during dry seasons.

The installation of the spillway notch slide gate is significantly lower in cost, present less significant operating impact, and provides greater capacity increase than sediment removal. Thus, the option to install a spillway notch slide gate is selected as a feasible alternative.

This water supply enhancement alternative would allow NMWD to take full advantage of its ability to backfeed winter water flows from Sonoma Water, especially in dry years. The winter water flows can currently add up to 1,000 AF of additional supply at a cost of up to $400 per AF.

NMWD is evaluating potential improvements to its potable transmission main to maximize the benefit of additional storage and efficiently transport winter water flows from Sonoma Water to Stafford Lake during the short window that the winter water flows are available. Under a parallel effort to this Study, NMWD is evaluating its distribution system using its system hydraulic model (InfoWater) to identify restrictions or constraints of transporting winter water flows from Sonoma Water to Stafford Lake.

NMWD will need to coordinate closely with Indian Valley Golf Course, Marin County Parks, and Open Space District during implementation of this alternative. Because Stafford Lake is a recreational area, this option will attract general public and stakeholder attention. This may provide NMWD the opportunity to conduct outreach regarding the value of water and promote water efficiency.

Regulatory constraints for this alternative are considered more impactful than other alternatives because construction of this alternative also involves review and approval by numerous regulatory agencies and the complexity of securing water rights.

Further, combining this water supply alternative with the diversion of captured stormwater into Stafford Lake could potentially meet NMWD's objective to enhance its current water supply by over 1,000 AFY, and reduce costs of purchasing winter water flows from Sonoma Water.

12.1.1.3 Divert Captured Stormwater Into Stafford Lake

Diverting captured stormwater into Stafford Lake by either Options 1, 2, and 3, is a feasible alternative water supply option because it can provide significant additional water supply for NMWD at comparably low cost. This local water supply enhancement alternative rates high in most qualitative criteria, with the exception of regulations and permitting. The installation of a dam at either Leveroni Canyon or Bowman Canyon are less feasible and scored lower in the qualitative criteria due to limited reliability, increased complexity in regulations and permitting, and public and institutional considerations.

Variations are available for this option that can influence supply yields. Further study is needed to identify the optimum stormwater capture and diversion option that can provide needed supply under various operational rules, Stafford Lake capacity limitations, and STP operational limitations. The study should more accurately quantify captured stormwater that is usable to NMWD and the fraction of the captured water that would spill over the Stafford Lake spillway and ultimately not be available as a new usable water supply. NMWD should consider expanding the study to evaluate combining this alternative with increasing the capacity of Stafford Lake by the installation of a spillway notch slide gate.

Regulatory constraints for this alternative are considered slightly more impactful than other alternatives because construction of major new infrastructure would require more environmental review and a more involved public process.

Capturing water from Leveroni Canyon and Bowman Canyon present challenges in regulations and permitting and has multi-faceted public and institutional considerations. NMWD may need to acquire property and comply with regulations and permitting requirements.

Diversion of captured stormwater into Stafford Lake would trigger a DDW-required sanitary survey of the Leveroni and Bowman Canyon watersheds. NMWD should consider conducting source water sampling and monitoring for total coliforms, E. coli, and possibly Cryptosporidium to determine whether adding these two new surface water sources will require increasing the current pathogen reduction requirements for the STP, and an additional amendment to the STP operating permit.

12.1.2 Potential for Regional Collaboration

ASR, IPR, and desalination are infeasible local water supply alternatives for NMWD. A local ASR program is not feasible due to the physical limitations of the Novato Valley Groundwater Basin and its very limited storage capacity. Similarly, IPR via groundwater replenishment or surface water source augmentation is infeasible for NMWD. Neither the Novato Valley Basin (groundwater replenishment) nor Stafford Lake (surface water source augmentation) have sufficient capacity.

Desalination is not feasible for NMWD to pursue at the local level. NMWD does not have the economy of scale to make desal a practical alternative. Further, a local desal facility would require NMWD-controlled access for both a raw water intake and membrane reject (brine) discharge; NMWD does not have sites available near the SF Bay for such a facility. The potential impacts of sea level rise along the undeveloped SF Bay shoreline in the Novato area adds even more challenges to this alternative.

ASR, IPR, and desal may be viable for NMWD through a regional partnership. ASR and IPR by groundwater augmentation may be a viable alternative for providing supplemental supply to NMWD, if feasible in other nearby groundwater basins. MMWD and Sonoma Water are other water agencies in the region that have recently evaluated or are currently evaluating regional water supply reliability projects. Sonoma Water's Resiliency Study is in progress at time of preparation of this Study. NMWD is encouraged to continue coordinating with Sonoma Water to stay current with the findings, conclusions and recommendations of the Resiliency Study and other regional studies pertinent to ASR, IPR, and desal.

12.2 FUNDING STRATEGY

Several established state and federal funding programs could potentially fund the feasible NMWD local water supply enhancement alternatives listed in Table 12-2. Recent passage of the Bipartisan Infrastructure Law (BIL), also known as the Infrastructure Investment and Jobs Act, authorizes $64 billion for water related projects throughout the nation. A significant portion of these funds, particularly for water infrastructure projects, are being allocated to existing state and federal funding programs and will augment existing funding to those programs.

12.2.1 State Funding Programs

This section provides an overview of the current, relevant state funding programs applicable to the feasible local water supply projects. The funding programs identified are:

- Department of Water Resources (DWR) Integrated Regional Water Management (IRWM) Program
- DWR Drought Relief Funding Program
- SWRCB Water Recycling Funding Program
- California Infrastructure and Economic Development Bank (I-Bank) Infrastructure State Revolving Fund

12.2.1.1 Integrated Regional Water Management (IRWM) Program

The DWR IRWM Program provides planning and implementation grants to implement integrated, regional water resources related projects. Funding is made available through Proposition 1 (Prop 1), Chapter 7, of the Water Quality, Supply, and Infrastructure Improvements Act of 2014. Funds are to be awarded in two funding rounds. Round 1 is complete and the final implementation round (Round 2) will award the total remaining funds for implementation grants of approximately $192 million. The final solicitation guidelines are anticipated to be released in Spring 2022. This final round will only be for implementation projects, and preferably projects that are ready to proceed in the near-term. To be eligible for this funding, projects must be included in the region's IRWM Projects List.

NMWD is part of the north subregion of the San Francisco Bay Funding Area. For NMWD's projects to be considered for inclusion in the Bay Area Region's IRWM funding applications, NMWD must follow the Subregion's and Region's process for project selection.

This process includes the submittal of conceptual descriptions of projects entered into the web-based database and attending the stakeholder meetings to discuss the needs and benefits associated with these projects.

NMWD should coordinate with the north subregion and Bay Area IRWM coordinating committees to discuss inclusion of its projects in the IRWM Plan and inclusion of its projects in the region’s Round 2 grant application.

12.2.1.2 DWR Drought Relief Funding

In 2021, DWR was authorized $500 million by the California Legislature (pursuant to the Budget Act of 2021 and its Trailer Bill Assembly Bill 148) to provide funding for projects that provide interim or immediate drought relief. $100 million of this total was allocated towards Urban Community Drought Relief, $200 million towards Multi-Benefit Drought Relief, and $200 million towards Small Community Drought Relief. Projects seeking funding through this program should achieve one of these objectives:

- Address immediate impacts on human health and safety, including providing or improve availability of food, water, or shelter;
- Address immediate impacts on fish and wildlife resources; or
- Provide water to persons or communities that lose or are threatened with the loss or contamination of water supplies.

DWR allocated the funding between Small Community Drought Relief and Urban Community Drought Relief and Multi-benefit Projects. The application period for the Urban Community Drought Relief and Multi-benefit Drought Relief funds opened in October 2021 and projects to be funded were selected in two phases. Selected Phase 1 projects for the Urban Community Drought Relief and Multi-benefit Projects Program were announced December 23, 2021, and Phase 2 projects for the Urban Community Drought Relief and Multi-benefit Projects Program were announced March 21, 2022. There is also a Phase 3 of the Urban Community Drought Relief and Multi-benefit Projects Program solicitation, which is open through April 15, 2022 but is only open to Underrepresented Communities and Native American Tribes. The Small Community Drought Relief Program, open only to small communities (i.e., less than 3,000 connections and less than 3,000 acre-feet delivered per year, has been continuously accepting applications since September 2021 and will continue accepting applications until the program funds are depleted.

All of the available funds are anticipated to be allocated by the end of the current fiscal year. Therefore, there may not be an additional phase of funding under the current DWR authorization. However, as drought conditions persist and state budget funds are available, as is expected in FY2022/2023, it is likely that there will be additional funds allocated to DWR for drought relief projects. NMWD should continue to monitor opportunities through this program that could fund any of the projects in Table 12-2.

12.2.1.3 SWRCB Water Recycling Funding Program

The purpose of the State’s Recycled Water Grants program, administered through the State Water Board, is to promote the beneficial use of treated municipal wastewater (recycled water) in order to augment fresh water supplies. Both grant and loan funds are available under this program. Construction grants are limited to 35 percent of the project costs, including design and environmental. The remainder of the project costs can be financed with a low interest loan, local cost share, or Title XVI Water Reclamation funding.

Interest rates are set at 50 percent of the State's General Bond rate (1.60 percent as of March 10, 2022) with repayment terms of 20 or 30 years. Loan repayment begins one year after construction is complete. As discussed above, principal forgiveness may be available.

Applications are continuously accepted. At the start of each calendar year, DFA ranks all of the applications received as of December 31 of the prior year. Projects are added to a Fundable List that DFA uses to catalog applications and to identify projects to be reviewed and possibly funded in the next state fiscal year. DFA will establish a cut-off score annually that takes into consideration several factors including available funding.

Federal crosscutters apply to funding originating from the U.S. Environmental Protection Agency and passed through to the State to manage and distribute. Crosscutters include some National Environmental Policy Act (NEPA) requirements during the environmental review process, also known as CEQA Plus; air quality standards; and social equality standards.

The expansion of NMWD's recycled water pipeline system is currently infeasible due to prohibitive cost. Obtaining external funding may reduce the cost barrier for NMWD. This funding opportunity is applicable to the proposed recycled water distribution pipeline expansion.

12.2.1.4 California Infrastructure and Economic Development Bank State Revolving Fund Program (I-Bank)

The California Infrastructure and Economic Development Bank (I-Bank) is a State-run financing authority, which was created in 1994 to promote economic revitalization, enable future development, and encourage a healthy climate for jobs in California. I-Bank operates pursuant to the Bergeson-Peace Infrastructure and Economic Development Bank Act contained in the California Government Code Sections 63000 et seq. The Infrastructure State Revolving Fund (ISRF) Loan Program provides financing to public agencies and non-profit corporations for a wide variety of infrastructure and economic development projects. ISRF Program funding is available in amounts ranging from $50,000 to $25,000,000, with loan terms of up to 30 years. Financing applications are continuously accepted.

Funds can be used for all project activities, including Design-Build; however, construction must be completed within 2 years of receiving funding approval. No funding can be used for costs incurred prior to the term of the agreement (i.e., planning and design).

The application process and funding requirements are similar to the DWSRF program. Interest rates are typically less than bond financing and are calculated using multiple variables. Interested applicants should contact I-Bank to determine current interest rate.

I-Bank requires a two-step application process. During the pre-application review it will be determined if the project meets the threshold requirements, at which time the applicant will be invited to submit a full application. The review period for the pre-application is typically 30 days from application submission; the review time for a full application, including environmental is between 90 to 180 days. Applicants are expected to begin construction within 6 months of receiving funding and be completed within two years.

All of the projects listed in Table 12-2 are anticipated to be eligible for I-Bank funding.

12.2.2 Federal Funding Programs

This section provides an overview of the current, relevant federal funding programs applicable to the projects listed in Table 12-2. The funding programs identified are:

- Federal Emergency Management Agency (FEMA) Building Resilient Infrastructure and Communities (BRIC) Grant Program
- FEMA Hazard Mitigation Grant Program (HMPG)
- United States Bureau of Reclamation (USBR) WaterSMART Drought Response Program
- USBR Title XVI Recycled Water Funding Program
- USBR Desalination Construction Funding
- United States Environmental Protection Agency (US EPA) Water Infrastructure Finance Innovation Act (WIFIA)

Federal funding for each program is subject to Congressional budget approvals. Although the availability of funding is subject to budget approvals, the identified funding programs have been soliciting proposals for more than 5 years, with the exception of BRIC and WIFIA, and are expected to continue. BRIC is a replacement to a similar program, Pre-Disaster Mitigation (PDM) program which was soliciting applications for well over 5 years. WIFIA is a newer loan program but has been widely successful and is expected to have future funding cycles.

12.2.2.1 FEMA Building Resilient Infrastructure and Communities (BRIC) Grant Program

BRIC supports states, local communities, tribes, and territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards. BRIC is a FEMA pre-disaster hazard mitigation program that began in 2020 replacing the previous PDM program.

The BRIC priorities are to incentivize:

- Public infrastructure projects;
- Projects that mitigate risk to one or more lifelines;
- Projects that incorporate nature-based solutions; and
- Adoption and enforcement of modern building codes.

To be eligible for this grant program, general project type or the specific project(s) must be included in a local Hazard Mitigation Plan (HMP). Marin County has a Multi-Jurisdictional Local HMP that will be valid through December 2023. NMWD is listed as a participant in this HMP so NMWD is eligible to apply for BRIC funding. The projects listed in Table 12-2 should be included in the 2023 Marin County HMP update to increase its competitiveness for this program.

Annual funding is provided by FEMA to states that submit applications on behalf of local public entities. The California Office of Emergency Services (CalOES) issues a solicitation for a call for Notice of Intent (NOI) applications typically in late summer or fall. These applications are submitted online and serve as a conceptual level description of the scope, benefits, needs, and budget. CalOES reviews the NOIs and invites only some of those applicants to submit full proposals. CalOES then selects the final projects for funding and submits these applications to FEMA for final approval. FEMA ultimately selects the projects to receive federal funding and passes the awarded funds to CalOES to distribute to the awarded projects.

Typically, 40 to 50 percent of the applicants are asked to submit full proposals. The program awards up to $50 million for implementation projects and up to $300,000 for planning projects. A 25 percent match is required.

12.2.2.2 FEMA Hazard Mitigation Grant Program

FEMA's HMGP provides funding to state, local, tribal, and territorial governments so they can rebuild in a way that reduces, or mitigates, future disaster losses in their communities. This grant funding is available after a presidentially declared disaster for specific states.

California has had frequent declared disasters over the past 8 years, averaging 3 to 4 declarations per year and making these funds frequently available in this State. It is helpful to note that while counties directly affected by the disasters receive priority for the funding, any county in the State with the declared disaster is eligible to submit an application.

Like the BRIC program, to be eligible for the HMGP program, general project type or the specific project(s) must be included in a local HMP. NMWD is eligible to apply for HMGP funding because it is listed in the Marin County Multi-Jurisdictional LHMP (MCM LHMP). The projects listed in Table 12-2 should be included in the 2023 MCM HMP update to increase its competitiveness for this program.

On August 6, 2021, the Biden Administration committed a historic $3.46 billion in Hazard Mitigation funds to increase resilience to the impacts to climate change nationwide. Every state, tribe, and territory that received a major disaster declaration in response to the COVID-19 pandemic will be eligible to receive 4 percent of those disaster costs to invest in mitigation projects that reduce risks from natural disasters. California's allocation is $484,383,864 under Disaster Release #4482 which is currently accepting NOIs. Additionally, since the new infusion of funds to the program is intended to respond to the impacts of climate change, drought mitigation may be an optional project focus.

Typically, this program does not have a maximum grant cap. The program typically has required a 25 percent non-Federal share however with the recently signed H.R. 2471, Consolidated Appropriations Act, 2022, the non-Federal cost share has decreased to 10 percent for any emergency or major disaster declaration declared from or having an incident period beginning between, January 1, 2020 and December 31, 2021.

The feasible water supply alternatives identified in Table 12-2 improve local water supply resilience and mitigate against the impacts of drought. Diversion of stormwater into Stafford Lake and the installation of the spillway notch gate provides an additional benefit for flood control. It is recommended that NMWD discuss the eligibility of the feasible water supply alternatives with CalOES.

12.2.2.3 USBR Drought Response Program

USBR's Drought Response Program supports a proactive approach to drought by providing assistance to water managers to develop and update comprehensive drought plans and implement projects that will build long-term resiliency to drought.

Program areas include:

- Contingency Planning – funding for development or updates to a drought contingency plan that complies with USBR's Drought Response Framework.[1]
- Drought Resiliency Projects – funding for projects that help prepare for and respond to drought. Projects should build resiliency to drought by increasing the reliability of water supplies; improve water management; and provide benefits to fish and wildlife and the environment.
- Emergency Response Actions – funding for emergency response actions limited to temporary construction activities and other actions authorized under Title I of the Drought Act. Other actions authorized include water purchases and use of USBR facilities to convey and store water.

The program is open annually and multiple applications for the same project may be submitted. A 50 percent cost share is required. There are two funding groups within this program. Funding Group I requires projects to be completed within two years of grant award date and has a maximum grant award of $500,000. Funding Group II requires projects be completed within three years of grant award date and has a maximum grant award of $2 million.

The feasible local water supply projects could be eligible for the Drought Resiliency Project funding as infrastructure to build resiliency to drought by increasing the reliability of water supplies, improving water management, and for contingency planning.

Each feasible water supply alternative provided in Table 12-2 should be submitted as separate projects under this grant program to maximize the grant funding and also to complete the project phases within 3-year periods. Submittal of multiple projects during the same funding cycle is allowed.

12.2.2.4 Title XVI Water Reclamation and Reuse Program

The USBR Title XVI program offers grants for projects that investigates opportunities and implements projects that reclaim and reuse wastewaters and naturally impaired ground and surface waters. Funding for Title XVI projects is available from two different programs – Title XVI projects authorized by Congress in standalone legislation and projects eligible from the Water Infrastructure Improvements for the Nation (WIIN) Act. Both programs require submittal of a feasibility study that addresses and satisfies the requirements of USBR's Directives and Standards WTR 11-01. The feasibility study must be submitted to USBR prior to release of funding opportunity announcement (FOA). The FOA includes the date by which a feasibility study must be approved by USBR. The schedule for release of FOAs for implementation projects under the Title XVI program varies but is typically in the fall/winter timeframe annually.

The program provides up to 25 percent of project costs including planning, design, and construction. The maximum eligible funding amount for each project is set by statute and is typically $20 million. The maximum eligible amount for each project under WIIN is $30 million (a recent increase from the prior maximum amount of $20 million).

[1] NMWD plans to develop a drought contingency plan as a member of the NBWRA. An effort is currently in progress to evaluate the development of a drought contingency plan for all NBWRA members without one.

The water supply alternative to expand NMWD's recycled water system could be considered for Title XVI funding. This Study finds the expansion of recycled water system infeasible due to costs. A combination of external funding from State and Federal sources may reduce costs so that this water supply alternative is feasible. If NMWD is interested in pursuing Title XVI funding, NMWD is recommended to initiate preparation of a Title XVI Feasibility Study in anticipation of the next USBR funding cycle.

12.2.2.5 USBR Desalination Construction Project

Although NMWD will not have a local desalination project, this funding opportunity would be a good match for a regional water project. NMWD would collaborate with Sonoma Water or MMWD if either agency moves forward with a regional desalination project.

12.2.2.6 Water Infrastructure and Finance Innovation Act (WIFIA)

WIFIA is a federal funding program that provides long-term, low-cost loans to communities for the planning and construction of water and wastewater projects. The program provides loans of up to 49 percent of the eligible project costs and can be used in conjunction with state grants and loans. This program is targeted at providing funds for projects greater than $20 million for large communities and $5 million for small communities (population of 25,000 or less). Interest rates are equal to or greater than the U.S. Treasury rates. Projects much comply with NEPA, Davis-Bacon, American Iron and Steel, and all other federal crosscutters. The program is competitive and requires the applicant to pay an application fee and the fees for outside consultants (e.g., finance, environmental, and legal) hired by EPA to support review of the funding application. The typical costs are in the $250,000 to $500,000 range – depending on the complexity of the project, financial review, and legal arrangements. Applicants must first submit a Notice of Intent and are then invited to submit a full funding application. Projects that are ready to proceed are typically scored higher. EPA announces when the application process is open and solicits letters of interest. The application period is dependent on when EPA has available funding for the program.

None of the feasible water supply enhancement alternatives alone would be eligible for WIFIA since they do not meet the minimum project size requirement. However, since they are needed for a common goal, to increase local water supply reliability, they may be aggregated so that the total project cost satisfies the $20 million minimum project size requirement. If NMWD is interested in pursuing WIFIA funding, it is recommended that NMWD discuss the project with WIFIA staff for fundability prior to beginning the application process.

12.2.3 Funding Strategy Recommendations

State and federal grant and low interest loan programs should be considered with implementation of any of NMWD's feasible water supply enhancement projects listed in Table 12-2. Grants and low-interest loans can help offset or reduce implementation costs, thus reducing impacts to ratepayers. However, competition for grants is often high and the application process can be resource intensive. Additionally, the open period for applying is usually very short and the applications require a significant amount of supporting information. Therefore, identifying potential grant opportunities early, taking steps towards positioning for the opportunity, and strategically selecting the opportunities that are most likely to be successful are key to maximize external funding for NMWD's projects with the least amount of out-of-pocket cost to NMWD.

Table 12-3 summarizes applicable funding programs to consider for each project.

Table 12-3. Potential Funding Programs by Project

Funding Program[a]	Improve STP Process Water Recapture Efficiency	Increase Stafford Lake Storage Capacity	Divert Captured Stormwater into Stafford Lake	Recycled Water System Expansion[b]
State Programs				
DWR IRWM	X	X	X	X
DWR Drought Relief Funding	X	X	X	X
SWRCB Water Recycling Funding				X
I-Bank (loans only)	X	X	X	X
Federal Programs				
FEMA BRIC	X	X	X	X
FEMA HMPG	X	X	X	X
USBR WaterSMART Drought Response[c]	X	X	X	
USBR Title XVI Recycled Water				X
WIFIA[d] (loans only)	X	X	X	X

Notes:
(a) Grant programs listed unless otherwise noted.
(b) This water supply alternative was found infeasible due to high cost. External funding may potentially reduce cost to make the project feasible.
(c) An approved Drought Contingency Plan is required to be eligible.
(d) If applying for WIFIA funds, several projects may need to be packaged into a single application to comply with the minimum project size requirement.

If NMWD decides to move forward with implementation of any of the feasible projects, NMWD is recommended to take the following steps in conjunction with project development to best position for future funding.

- Prepare required environmental documentation (if applying for a program with federal funds, include compliance with NEPA or federal crosscutters);
- Prepare design drawings and/or basis of design report;
- Complete a risk and hazard study if applying for FEMA funds;
- Confirm that the feasible projects are included or referenced in the MCM LHMP;
- Coordinate with the local and regional IRWM committees to include new projects in the IRWM Plan;
- Complete a feasibility study that complies with both SWRCB recycled water technical study requirements and USBR Title XVI study requirements if applying for recycled water funding;
- Identify required permits and initiate obtaining permits that have long-lead times;
- Identify supplemental sources of project funding to fund the non-grant portion of the project;
- Continue to monitor grant opportunities; and,
- Regularly track updates to the funding programs listed in this Chapter.

NORTH MARIN
WATER DISTRICT

Local Water Supply Enhancement Study

Novato Service Area

July 19, 2022

ATTACHMENT 3

Local Supply Study – Volume Units

What Is An Acre Foot?

'Acre foot' is a term commonly used in water supply planning to describe water volume. An acre foot is approximately 326,000 gallons, which is enough water to cover an acre of land about 1-foot deep. As the diagram below shows, an acre foot of water is almost enough to flood a football field 1-foot deep. In North Marin Water District, an acre foot can typically meet the annual indoor and outdoor needs of three average households.

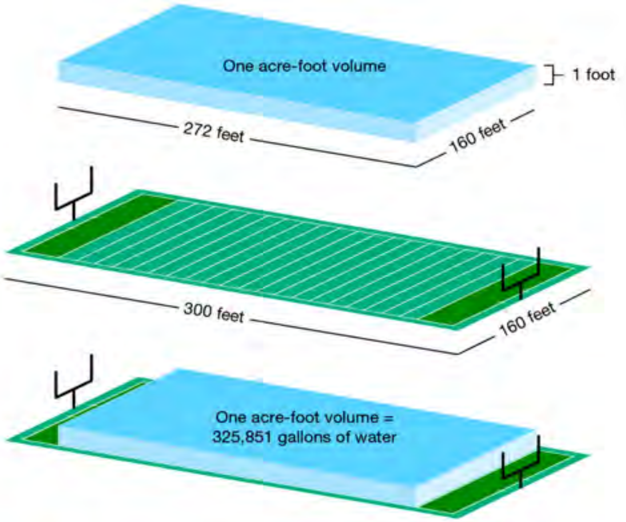


Figure 1-2. One Acre-Feet of Water

SCWA Regional Study

Near-Term Drought Management Options

Resiliency Option	**Status**
Maximize Delivery of Natural Flows in the Russian River (RR)	NMWD purchased available RR water to backfeed Stafford Lake in 2021-22
Kastania Pump Station Rehabilitation	MMWD completed construction in January 2022; NMWD and MMWD working closely on operations; consistent operations throughout June 2022.
Increase Groundwater Production (SCWA)	SCWA's Santa Rosa Plain Drought Resiliency Project includes 3 wells (Todd Rd, Sebastopol Rd and Occidental Rd); Todd Rd well went online in October 2021. *1.4 mgd available now, additional 4.1 mgd by year end*
Regulatory Flexibility (through TUCPs)	TUCO issued in December 2021 and again on June 17, 2022 lowering minimum instream flows for RR. Resulting 20% allocation reduction to water contractors
Water Conservation and Water Use Efficiency	NMWD Ord No. 41 in place with 20% mandatory reductions

Local Supply Alternatives Evaluated

- Aquifer storage recovery (ASR)
- Recycled water system expansion
- Indirect Potable Reuse (IPR) water use options
- Improve Stafford Treatment Plant Efficiency
- Capture and Conveyance of Stormwater
- Increasing Stafford Lake Capacity
- Desalination

Evaluation Criteria

Quantitative Criteria

- Cost
- Water Supply Yield

Qualitative Criteria

- Reliability
- Operational Impacts
- Regulations and Permitting
- Public and Institutional Considerations
- Other Considerations

Potential Local Supply Alternatives

Local Water Supply Alternative	Estimated Capital Cost	Annual Yield (MGY)	Annual Yield (AFY)	Weighted Qualitative Score
Improve Stafford Treatment Plant Process Water Recapture Efficiency - Pretreatment Modification	$70,000*	7 - 23	20 - 70	4.6
Increase Stafford Lake Storage Capacity - Spillway Notch Slide Gate	$944,000	237	726	4.4
Divert Captured Stormwater Into Stafford Lake	$2.46M - $13.64M	80 - 257	245 - 788	3.2

*Includes performance testing

Improve Stafford Treatment Plant Process Water Recapture Efficiency

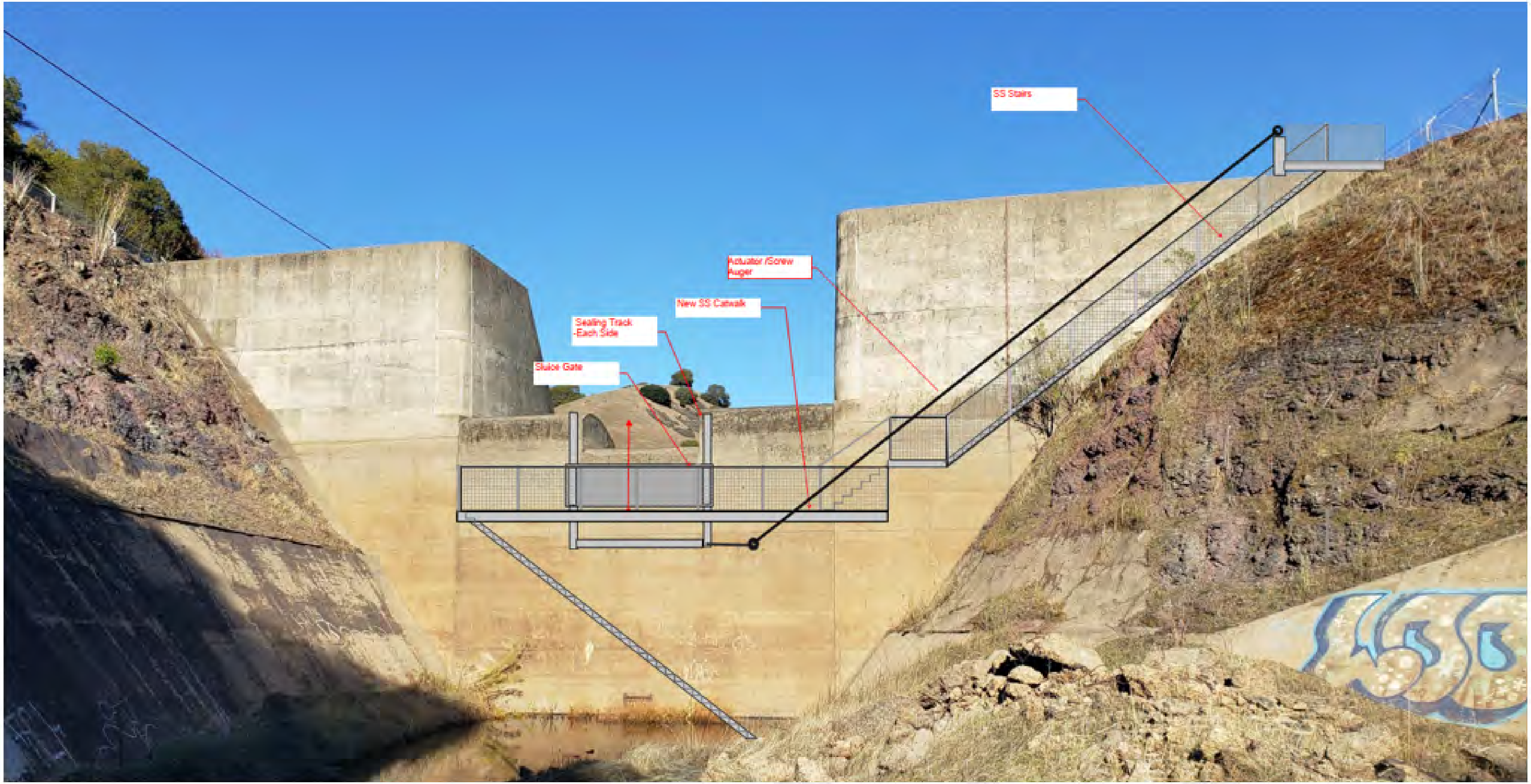
- District staff previously conducted plant-scale study of modifying hydrocyclone return to reduce reject flow volume

- Recommend additional plant-scale study of modified hydrocyclone operation with external technical support to confirm capital/operations changes needed

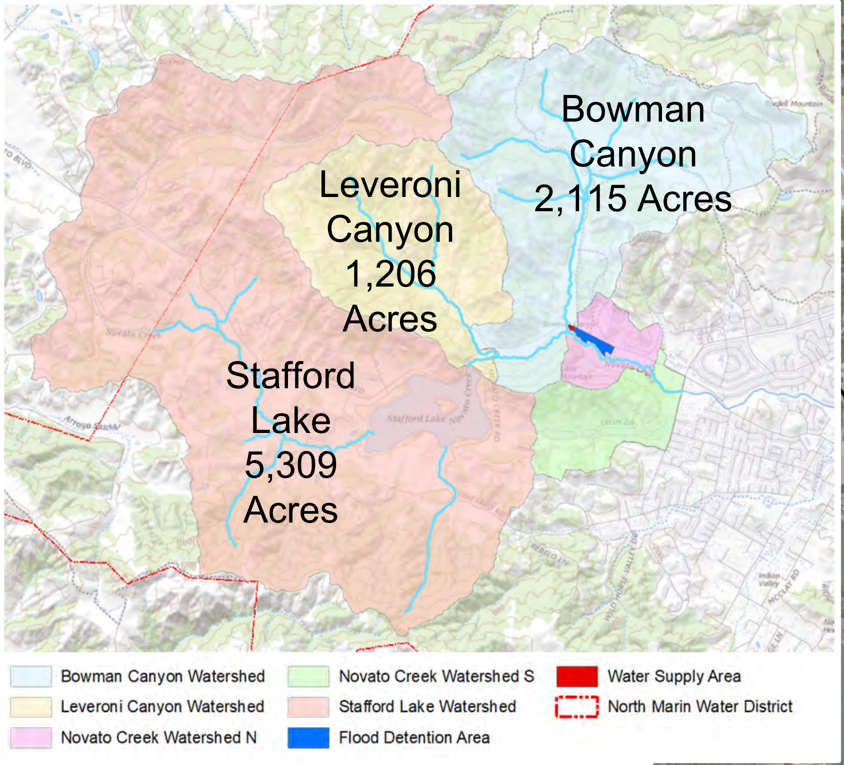
- Raw water intake also may need modifications for more consistent intake water quality

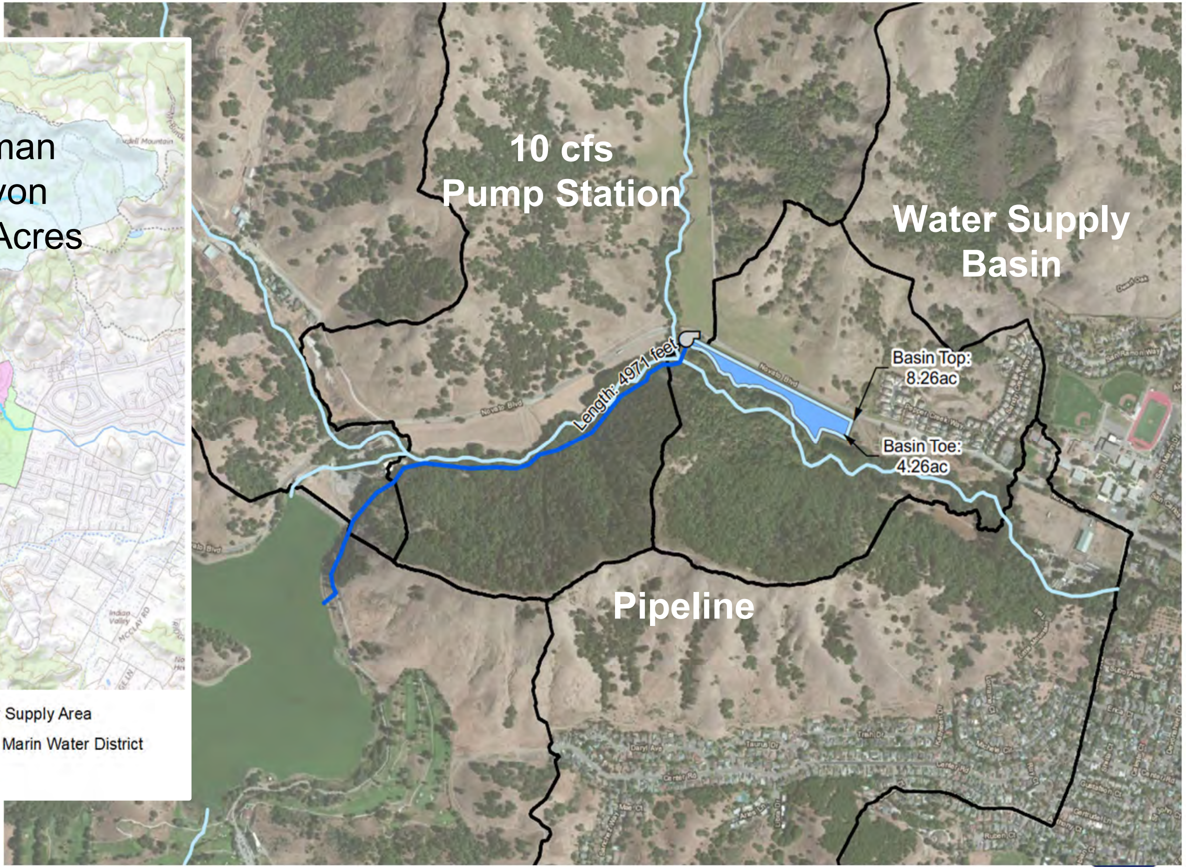
Stafford Dam Spillway Notch

Slide Gate on Spillway Notch



Divert Captured Stormwater





FY2022-23 CIP

FY2022-23 CIP – Supply Enhancements*

Project #	Project Name	FY23 Budget
1.6610.23	Water Supply Enhancements – STP Modifications	$50,000
1.6610.24	Water Supply Enhancements – Dam	$50,000
4XXX.	Stafford Dam Master Plan	$25,000
-	*Drought Contingency Plan*	*$9,000*

*CIP projects 1.6610.22, 1.6610.xx, and 1.6600.97 ($125,000 total) could also include supply enhancement efforts.

Contributors

North Marin Water District

- Drew McIntyre
- Robert Clark
- Brad Stompe
- Jeff Corda
- Tim Fuette

West Yost

- Project Manager: Rhodora Biagtan
- Project Engineer: Megan McWilliams

- Technical Experts:
  - Stormwater: Doug Moore
  - Treatment Plant Optimization: Charles Hardy
  - Funding Strategy: Monique Day

Outside Partners

- Roger Leventhal, Marin County Flood Control & Water Conservation District
- Paul Sellier, Marin Municipal Water District
- Jay Jasperse, Chief Engineer and Director of Groundwater Management, Sonoma Water

Questions?

9

*DRAFT Minutes of Technical Advisory Committee
Utilities Field Operations (UFO) Training Center
35 Stony Point Road, Santa Rosa, CA
June 6, 2022

Attendees:	Craig Scott, City of Cotati Mike Ielmorini, City of Petaluma Mary Grace Pawson, City of Rohnert Park Jennifer Burke, City of Santa Rosa Matt Wargula, City of Sonoma Cristina Goulart, Town of Windsor Matt Fullner, Valley of The Moon Water District Roberta Atha, City of Santa Rosa Dina Manis, City of Santa Rosa
Staff/Alternates:	Brad Sherwood, SCWA Jake Spaulding, SCWA Lynne Rosselli, SCWA Don Seymour, SCWA Jay Jasperse, SCWA Barry Dugan, SCWA Paul Piazza, SCWA Pam Jeane, SCWA Peter Martin, City of Santa Rosa Colin Close, City of Santa Rosa Shannon Cotulla, Town of Windsor Chelsea Thompson, City of Petaluma Vanessa Garrett, City of Rohnert Park Mike Berger, City of Sonoma
Public:	Katie Ruby, Brown and Caldwell Brenda Adelman, RRWPC Bob Anderson, United Wine Growers Margaret DiGenova, California American Water Nichole Baxter, California American Water Duane DeWitt

1. Check-in
   Jennifer Burke, TAC Chair, called the meeting to order at 9:02 a.m.

2. Public Comments

There were no public comments.

3. Water Supply Conditions and Temporary Urgency Change Order

Don Seymour, SCWA. Sonoma Water continues to manage Russian River flows and releases under the December 2021 Temporary Urgency Change Order (TUCO) which expires on June 8, 2022. Minimum instream flows in the upper Russian River are 25 cubic feet per second (cfs) and 35 cfs in the lower Russian River. Flows will increase to 75 cfs in the upper Russian River and 125 cfs in the lower Russian River if there is no new TUCO. A new Temporary Urgency Change Petition (TUCP) was filed on May 25, 2022, requesting a 180-day extension to the TUCO requirements. Filing of the TUCP was delayed due to PG&E's request for a flow variance, requiring re-evaluation by Sonoma Water staff. Lake Mendocino is currently at 50,500 acre-feet (AF) which is 16,000 AF greater than last year at this time and is gaining 100 AF per day based on natural flow in the system and higher water transfers by PG&E than last year. Lake Sonoma is currently 138,500 AF which is 1,000 AF more than last year and is losing 150 AF per day. The State Board approved new emergency regulations in May related to issuance and enforcement of curtailments on the upper Russian River after natural flows recede – likely starting in July.

Jennifer Burke, TAC Chair, asked if there was any indication of a quick response from the State Board on the TUCP. Don Seymour, SCWA, replied the Board is aware of the timeframe, but have provided no information on a response. Jennifer Burke, TAC Chair, asked about the emergency regulations on curtailments and if the State Board is looking at voluntary agreements. Don Seymour, SCWA, replied the Board is amending the curtailment regulations and developing a water-sharing program between senior and junior water right holders who enroll in the program. He also added that Sonoma Water filed comments with FERC regarding the flow variance filed by PG&E. **Public Comment:** Brenda Adelman, RRWPC, expressed concern about the low flows at Hacienda Bridge and asked why a minimum flow of 35 cfs is still required if Lake Mendocino storage is higher than last year. Don Seymour, SCWA, noted 45 cfs instream flow is above the minimum requirement and stated analyses show Lake Mendocino storage below 30,000 AF by October and storage levels in Lake Sonoma are lower than last year. **No other public comments.**

4. Sonoma Marin Saving Water Partnership

   a. Water Production Relative to 2013 Benchmark
   Jennifer Burke, TAC Chair. *(Refer to handout.)* Water usage is tallied by calendar year and, as of April 2022, there is a 22% reduction compared to the 2013 benchmark. The partners water usage continues to be significantly below prior years and the last drought. **Public Comment:** Brenda Adelman, RRWPC, expressed confusion over the different calculation methods of water savings, asked why 2013 is still used as the benchmark year and referenced continued growth and her qualms about the analysis of water availability. Jennifer Burke, TAC Chair, replied the 2013 benchmark is a holdover from the State Board benchmark from the last drought and is used for reports, although the partners use a 2020 comparison for this drought. Chair Burke referenced recent analyses showing adequate water availability for additional housing. **No other public comments.**

   b. State Water Board Emergency Drought Regulation
   Paul Piazza, SCWA. *(Refer to handout.)* The State Board adopted an emergency regulation for urban water conservation on May 24, 2022 in response to Governor Newsom's Executive Order of March 28, 2022. The emergency regulation included three requirements related to submittal of a preliminary water supply and demand assessment by June 1, 2022 and a final version by July 1, 2022, implementation of shortage response actions detailed in adopted water shortage contingency plans for a shortage level up to 20% by June 10, 2022 and a prohibition on use of potable water for irrigation of non-functional turf at commercial, industrial and institutional (CII) sites, with exceptions for continued irrigation of trees and other perennial plants and non-functional turf with a plant factor of 0.3 or less. **No public comments.**

   c. Drought Outreach Messaging
   Barry Dugan and Paul Piazza, SCWA. *(Refer to handout.)* Bilingual drought messaging ("Drought is STILL Here") continues with a focus on outdoor water use and outreach materials are provided to all partners. The online Eco-Friendly

tour of eleven gardens in several cities and towns had 5,203 views on the day of the tour and more than 7,000 view to date. Sonoma Water will continue hosting monthly Drought Town Halls and there are also plans for a SMSWP Speakers Bureau presenting a call to action to continue water savings. Peter Martin, City of Santa Rosa, asked about communication regarding the CII turf emergency regulation. Paul Piazza, SCWA, replied there is a dedicated page about drought regulations on the SMSWP website and future outreach will be coordinated amongst the partners. **Public Comment:** Brenda Adelman, RRWPC, asked where presentations are available. Barry Dugan, SCWA, replied they can be found on both the SMSWP and Sonoma Water websites. **No other public comments.**

5. Biological Opinion Status Update
   Pam Jeane, SCWA. *(Refer to handout.)*
   Fish Flow Project- Sonoma Water staff anticipate recirculating the Draft EIR in 2023.
   Dry Creek Habitat Enhancement Project
      Construction- There is no construction activity at this time although there will be some later this year.
      Habitat Monitoring and Maintenance- Environmental staff continue physical and biological surveys using a variety of tools. Field staff recently installed container plantings at existing habitat sites in the Reach 14 area of Dry Creek.
      Phases IV-VI- The Corps of Engineers opened construction bids on May 19 and is currently reviewing the five bids received and plans for construction in mid-summer.
   Fish Monitoring-Electronic tags are one tool used to monitor fish. They assist with understanding migration patterns and the number and location of smolt and adult salmon and steelhead.
   Russian River Estuary Management- The lagoon management season began on May 15, 2022 and Sonoma Water staff started fisheries and water quality monitoring, along with ongoing pinniped monitoring. A link to the 2022 Adaptive Beach Management Plan was included in the attachment.
   Interim Flow Changes- Reported on earlier in the meeting by Don Seymour, SCWA.

   Jennifer Burke, TAC Chair, asked if there was an idea of when in 2023 the Draft EIR would be recirculated. Pam Jeane, SCWA, responded it is unknown at this time. **Public Comment:** Duane DeWitt indicated Roseland Creek is part of the Russian River watershed and asked if the Biological Opinion had looked at the lack of fish in that creek since SCWA re-worked the creek in the past. Pam Jeane, SCWA, replied the Biological Opinion covers areas where Sonoma Water has flood control authority. **No other public comments.**

6. Potter Valley Project
   Pam Jeane, SCWA. The PG&E variance request was reported on earlier by Don Seymour, SCWA, and Sonoma Water staff is waiting on a decision by FERC related to operation of the Potter Valley Project for the summer. After the Two-Basin Solution decision to not pursue a license, FERC approved a one-year extension for PG&E and gave that agency 60 days to provide a plan and schedule for the license surrender process. FERC also asked PG&E to respond to a March 2022 letter submitted by NMFS requesting interim protective measures to the project operation be implemented during the annual license renewal(s) until the license is surrendered and the project is decommissioned. Jennifer Burke, TAC Chair, noted the WAC Potter Valley Project Ad Hoc that was authorized in 2018 is preparing a comment letter from the WAC supporting

the Sonoma Water comment letter related to the PG&E flow variance request. **No public comments.**

7. SCWA Government Affairs Update
   Brad Sherwood, SCWA *(Refer to handout.)* Staff summarized lobbying efforts and associated funding requests at both the Federal and State levels. The water bond coalition will be activated to generate funding for the North Coast and Bay Area Integrated Regional Water Management Plans (IRWMP). The ACWA Region 1 meeting will be held in Eureka with a tour of the Humboldt Bay Municipal Water District. A prescribed burn equivalent to approximately 300 acres is scheduled at Lake Sonoma on June 22, 2022. The five-year strategic plan effort for Sonoma Water is underway and 350 community engagement surveys and more than 100 staff responses have been received. SCWA is hosting monthly drought outreach Town Halls in collaboration with SMSWP with the next scheduled for July 7, 2022. As part of infrastructure week, Sonoma Water toured facilities with City of Santa Rosa Mayor Chris Rogers and staff would like to continue the tours with one partner Council Member each month. Jennifer Burke, TAC Chair, asked if Sonoma Water system tours for new members of the WAC and TAC are occurring. Brad Sherwood, SCWA, replied there are plans to re-start the tours but, due to COVID concerns, they are currently restricted to smaller, one-on-one tours for the ability to interact with Sonoma Water technical staff. **Public Comment:** Duane DeWitt said it can be challenging for some members of the public to get information from Sonoma Water by using the internet and asked that other methods of communication be utilized. He referenced an area on McMinn Avenue along Roseland Creek that has become a homeless encampment and is creating pollution in the creek and asked that it be addressed. **No other public comments.**

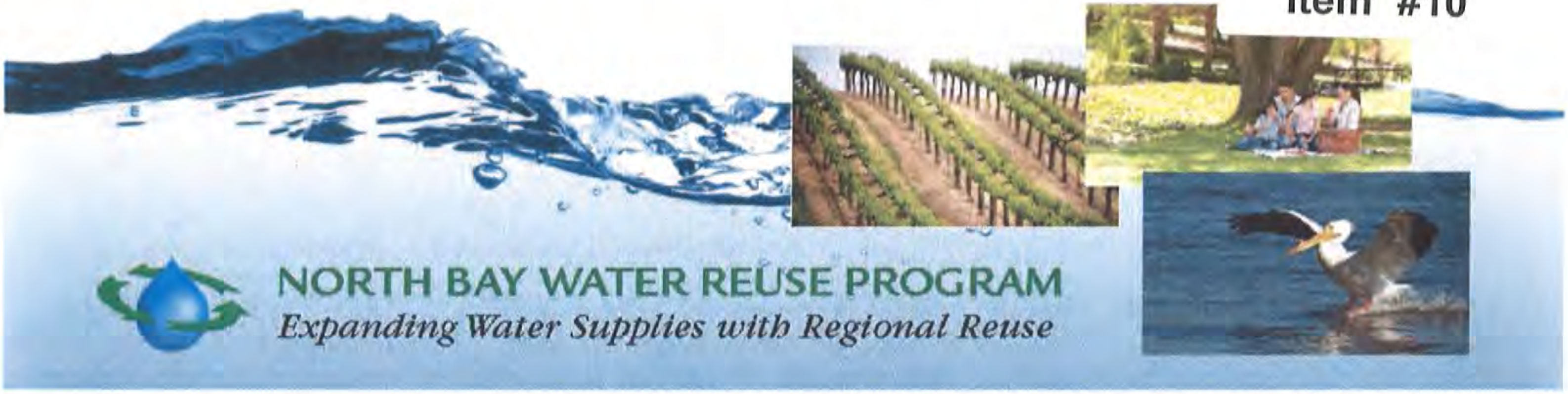
8. Items for Next Agenda
   No agenda items were suggested by the TAC members. **Public Comment:** Duane DeWitt, requested discussion about Roseland Creek. Jennifer Burke, TAC Chair, replied the TAC is an advisory committee to Sonoma Water related to the agency's operation of the Russian River system. **No other public comments.**

9. Check Out
   Jennifer Burke, TAC Chair, recognized Barry Dugan and Jay Jasperse who are both retiring from Sonoma Water in July. She also congratulated Roberta Atha, Administrative Secretary, who is retiring from the City of Santa Rosa in July.

   Meeting adjourned at 10:05 a.m.

10

Item #10



BOARD OF DIRECTORS MEETING

AGENDA

Monday, June 27, 2022
9:30 AM

Due to Shelter in Place Orders, and Board Policy this meeting will be a Zoom Meeting only. Meeting participants and the public may participate via the following:

Join Zoom Meeting
https://us02web.zoom.us/j/85825934397
Meeting ID: 858 2593 4397
One tap mobile +16699009128, 85825934397# US (San Jose)
Dial in +1 669-900-9128 US (San Jose)
Meeting ID: 858 2593 4397

1. **Call to Order (1 minute)**

2. **Roll Call (1 minute)**

3. **Public Comment (3 minutes)**
(Any member of the public may address the Board at the commencement of the meeting on any matter within the jurisdiction of the Board. This should not relate to any item on the agenda. It is the policy of the Authority that each person addressing the Board limit their presentation to three minutes. Non-English speakers using a translator will have a time limit of six minutes. Any member of the public desiring to provide comments to the Board on an agenda item should do so at the time the item is considered. It is the policy of the Authority that oral comments be limited to three minutes per individual or ten minutes for an organization. Speaker's cards will be available in the Boardroom and are to be completed prior to speaking.)

4. **Introductions (2 minutes)**

Action

5. **Board Meeting Minutes of March 28, 2022 (2 minutes)**
(The Board will consider approving the minutes from the March 28, 2022 Board meeting.)

6. **Report from the Chair (5 minutes)**
(The Chair will report on items of interest to the Board.)

6.a Report from the Technical Advisory Committee (5 minutes)
(The Board will review the Report on the TAC meetings of April 7, April 14, and June 2, 2022 and consider recommendations from the TAC included in this agenda.)

6.b Consultant Progress Reports (5 minutes)
(The Board will review the consultant progress reports for the periods February – May 2022.)

Discussion **7.** **Review of Board Policy Adopted on March 28, 2022 to Conduct Future Board Meetings Via Zoom to Reduce its Carbon Footprint and to Reduce Staff and Consultant Travel Costs (5 minutes)**
(The Board will review a recently adopted policy to conduct future meetings via Zoom to reduce its carbon footprint and to reduce staff and consultant travel costs.)

Information **8.** **Financial Reports for the Fiscal Year Ending June 30, 2022 (5 minutes)**
(The Board will review the Financial Reports for Fiscal Years Ending June 30, 2022.)

Action **9.** **FY2022/23 Budget and Resilience Arena Projects (10 minutes)**
(The Board will consider approving the FY2022/23 Budget and resilience arena projects.)

Information **10.** **Status of Phase 1 Reconciliation and Closeout Activities (5 minutes)**
(The Board will be updated on Phase 1 status of reconciliation and closeout activities.)

Discussion **11.** **Status of Phase 2 (5 minutes)**
(The Board will be updated on the status of the Phase 2 EIR/EIS and the funding application to USBR.)

Discussion **12.** **Items for the Next Agenda (5 minutes)**
(The Board will consider items for the next Agenda.)

Discussion **13.** **Comments from the Chair, Board, and Member Agencies (5 minutes)**
(The Board will discuss items for future discussion and the Chair, Board, or Member Agencies may make brief announcements or reports on their own activities, pose questions for clarification, and/or request that items be placed on a future agenda. Except as authorized by law, no other discussion or action may be taken.)

14. **Adjournment (1 minute)**

Next Board Meeting
Tentatively Scheduled September 26, 2022

(In compliance with the Americans with Disabilities Act of 1990, if you need special assistance to participate in a Board meeting, or you need a copy of the agenda, or the agenda packet, in an appropriate alternative format, please contact the Program Manager at (510) 410-5923. Notification of at least 48 hours prior to the meeting or time when services are needed will assist in assuring that reasonable arrangements can be made to provide accessibility to the meeting or service. A copy of all the documents constituting the agenda packet is available for public inspection prior to the meeting at 404 Aviation Boulevard, Santa Rosa, CA 95403. Any person may request that a copy of the agenda or the agenda packet be mailed to them for a fee of $.10 per page plus actual mailing costs. If you wish to request such a mailing, please contact Chuck Weir, Weir Technical Services, 3026 Ferndale Court, Pleasanton, CA 94588, 510-410-5923, chuckweir@sbcglobal.net. The agenda for each meeting is also available on-line at www.nbwra.org and will be available at the meeting.)

11

Item #11

North Bay Watershed Association
Board Meeting - Agenda

July 1, 2022| 9:30 – 11:30 a.m.

THIS MEETING WILL BEHELD VIRTUALLY VIA REMOTE CONFERENCING SERVICE— NO PHYSICAL MEETING LOCATION

Join Zoom Meeting:
https://us02web.zoom.us/j/81630673971?pwd=dm94TXJCRWMyWFBLc3U5V2pTSmNRZz09
Webinar ID: 816 3067 3971 **Password**: 216460

Agenda and materials will be available the day of the meeting at:
www.nbwatershed.org

AGENDA

Time	Agenda Item	Proposed Action
9:30	**Welcome and Call to Order – Roll Call and Introductions** *Jack Gibson, Chair*	*N/A*
9:33	**General Public Comments** This time is reserved for the public to address the Committee about matters NOT on the agenda and within the jurisdiction of the Committee.	*N/A*
9:38	**Agenda and Past Meeting Minutes Review** *Jack Gibson, Chair* **Draft June Treasure's Report** Jack Gibson, Chair	*Approve/ Review*
9:40	**Guest Presentation— Legislative Updates for Stormwater Management** *Karen Cowen, Executive Director, California Stormwater Quality Association (CASQA), and* *Hawkeye Sheene, Chair, CASQA Legislation Subcommittee* Karen and Hawkeye will provide an overview of current state water quality legislation consequential to our north bay watershed communities and our member agencies responsible for implementation.	*Handouts*

10:10	**Executive Director Report** *Andy Rodgers, Executive Director* Andy will provide updates on activities since the June 3 Board meeting, including active projects, recent meetings, regional programs and initiatives, communications, and committees. Andy will outline ideas for next and future Board meeting topics and solicit feedback.	*ED updates, Board questions, and input*
10:30	**Board Information Exchange and Drought Updates** *Members* Members will highlight issues and share items of interest.	*N/A*
11:30	**Announcements/Adjourn** **Next Board Meeting: September 2, 2022**	*N/A*

12

DISBURSEMENTS - DATED JUNE 30, 2022

Date Prepared 6/27/22

The following demands made against the District are listed for approval and authorization for payment in accordance with Section 31302 of the California Water Code, being a part of the California Water District Law:

Seq	Payable To	For	Amount
90497*	US Bank Card	Costco-First Aid Supplies ($382), Microsoft Monthly Subscription ($296) & Bluebeam Engineering Software Subscription ($449)	$1,126.94
90498*	CALPERs	July Insurance Premium (Employer $47,688, Retirees $11,388 & Employees $8,045)	67,121.32
60919*	JCA Construction	Installation of 2 Windows (Wood Hollow)	7,368.06
1	100 Wood Hollow Drive	July Rent	28,294.75
2	All Star Rents	Propane (27 gals) (STP Forklift)	116.62
3	Alpha Analytical Labs	Lab Testing (Pt Reyes)	180.00
4	Amazon/Genuine-Hardware	Computer Supplies ($1,010), Office Supplies ($555), Supplies for 100 Wood Hollow ($552), Utility Cart ($273), Auto Service Parts ($653), Stool for E/M ($57) & Document Bags for Lab ($67)	3,166.87
5	American Family Life Ins	AFLAC-June 2022 Employee Paid Benefit	3,402.29
6	AT&T	Leased Lines	67.94
7	Automation Direct	Programmable Logic Controller Parts	158.05
8	Bay Area Crane Services, Inc.	Crane Service (STP)	540.00
9	Bold & Polisner	Legal Fees-General ($5,648) & Potter Valley FERC NMWD Portion ($608)	6,255.00
10	Consolidated CM	Prog Pymt#12: Construction Management Services for NMWD Admin Building Renovation Project (Balance Remaining on Contract $33,992)	9,638.00
11	Core Utilities, Inc	Consulting Services-May IT Support ($6,000), IT & SCADA Support for Novato Radio/Cell Project ($475), CORE Billing Maintenance ($925), Setup & Planning Temp Office Location ($1,725) & Board Assistance ($400)	9,525.00

*Prepaid

Seq	Payable To	For	Amount
12	Core & Main	Fiberlyte Box Lids (40)	1,831.59
13	Dell Computers	Laptop ($1,746) & Desktop ($1,921) Assistant GM/Chief Engineer (Miller)	3,666.93
14	Environmental Science Assoc	Prog Pymt#9: Gallagher Well No. 2 (Balance Remaining on Contract $7,271)	24,760.98
15	Forevergreen Landscape	Vegetation Management @ Trumbull Tank ($3,475) & Stafford TP ($2,375)	5,850.00
16	Grainger	Sample Pump (STP) ($319), STP Cl2 Detector ($446) & Miscellaneous Maintenance Tools & Supplies ($343)	1,108.93
17	Hach Co.	Potassium Iodide Pillows (50), Acid Reagent (100) ($99) & Sodium Thiosulfate ($32) (STP)	192.16
18	Kaiser Foundation Health Plan	Pre Employment Physical (Miller)	65.00
19	Lincoln Life Employer Serv	Deferred Compensation PPE 6/15/22	12,723.61
20	County of Marin	Encroachment Permit (20 3rd Street, Pt Reyes Station)	448.54
21	Mutual of Omaha	July 2022 Group Life Insurance Premium	1,013.78
22	Nationwide Retirement Solution	Deferred Compensation 6/15/22	1,195.00
23	PG&E CFM/PPC Department	Power Service Design for 999 Rush Creek Place	22,755.77
24	Pipette.com	Service on Pipette Equipment (Lab)	85.00
25	Point Reyes Light	Legal Notices: Proposed Rate Increase West Marin ($134) & Oceana Marin Sewer Rate ($75)	208.50
26	Sage Software Inc	Accounting Software Fixed Assets (Budget $1,180) (7/22-723)	1,179.00
27	Scott Technology Group	Monthly Maintenance for Engineering Copier ($201) & Contract Overage Charge	295.34
28	Thomas Scientific	Agar (Lab)	164.07
29	Unicorn Group	Printing Services-Novato Waterline Newsletter (25,347)	4,063.07
30	Univar	Sodium Hypochlorite (800 gal) (RWF)	615.28

Seq	Payable To	For	Amount
31	USA BlueBook	Tube Assembly for OM Hypo Pump	431.24
32	VWR International LLC	Pipettor Stand, Burner Lighter, Lauryltryptose Broth, Brilliant Green Broth ($480), Tryptic Soy Broth ($73) & Buffer (Lab)	631.11
33	Whitwell, David	Novato "Pool Cover" Rebate Program	75.00
34	Wong, Sandra	Novato "Washer Rebate" Program	100.00
35	ZORO	Shovels (4)	191.39
		TOTAL DISBURSEMENTS	**$213,244.07**

The foregoing payroll and accounts payable vouchers totaling $213,244.07 are hereby approved and authorized for payment.

Julie Blue 06/28/22

Auditor-Controller Date

6/28/22

General Manager Date

DISBURSEMENTS - DATED JULY 7, 2022

Date Prepared 7/5/22

The following demands made against the District are listed for approval and authorization for payment in accordance with Section 31302 of the California Water Code, being a part of the California Water District Law:

Seq	Payable To	For	Amount
1	Alpha Analytical Labs	Lab Testing	$165.00
2	American Pavement Systems	Refund Security Deposit on Hydrant Meter Less Final Bill	451.37
3	A.S.T.I.	5 Year Inspection of Fire Protection System @ STP	690.00
4	AT&T	June Internet Service	100.95
5	AT&T	Telephone ($66), Fax ($55), Leased Lines ($142) & Data ($254)	517.93
6	Automation Direct	Level Sensor for Reclaim Ponds @ STP	806.46
7	AWWA CA-NV SEC	Reissue Check-Original Check Lost in Mail (Testing Fee for Grade 2 Lab Analyst-Nommsen)	280.00
8	Bay Alarm Company	Quarterly Fire Alarm Monitoring Fee (7/1/22-10/1/22) (STP)	338.19
9	Boucher Law, PC	March ($1,961) & April ($2,120) Labor & Employment Law Matters	4,081.00
10	Brown, Mary	Refund Overpayment on Open Account	1,006.23
11	Caltest Analytical Laboratory	Lab Testing	105.80
12	Clark, Robert E.	Exp Reimb: Lunch for Employees During Office Move	64.36
13	Clyde, Karen	Exp Reimb: Snacks & Coffee for Employees During Office Move	65.01
14	Diesel Direct West	Diesel (458 gal) ($3,273) & Gasoline (883 gal) ($5,079)	8,351.45
15	Environmental Express	Lithium (Lab)	66.59
16	Ferguson Waterworks	Retrofit Radio	215.41

Seq	Payable To	For	Amount
17	Fishman	Ibuprofen (800) ($83), Safety Gloves (1,000) ($194), Lens Wipes (800) ($66) & Ear Plugs (400)	403.27
18	Fisher Scientific	Chloride (Lab)	87.52
19	Grainger	Miscellaneous Maintenance Tools & Supplies	916.26
20	Kennedy Jenks	Prog Pymt#6: Local Water Supply Enhancements (Balance Remaining on Contract $47,867)	6,317.46
21	Kunst, Anriette	Refund Overpayment on Closed Account	35.64
22	Marin Color Service	Paint for Pump Station	60.13
23	Marin County Tax Collector	FY23 Possessory Interest Tax Bill (25 Giacomini Rd)	620.59
24	Miller Pacific Engineering	Prog Pymt #23: Admin Building Renovation Project ($816) (Balance Remaining on Contract $3,178) & Prog Pymt #24: Old Ranch Road Tank ($2,610) (Balance Remaining on Contract $567)	3,426.40
25	National Safety Council	Membership Renewal (Clyde) (7/22-6/23) (Budget $500)	495.00
26	Nerviani's Backflow	Backflow Testing (70)	4,830.00
27	Novato Glass	Windows for Wood Hollow Office (2)	216.50
28	Pace Supply	Service Saddles (4) ($849), Corp Stops (10) ($735), Gasket & Ring ($68)	1,651.21
29	Peterson Trucks	Air Conditioning Repair ('12 Int'l 4400)	1,845.09
30	Pollard Water	Valve	158.86
31	RAE Products & Chemicals Corp.	Valve Marking (9 rolls)	3,239.54
32	Scott Technology Group	Moving Services: Admin & Engineering Copiers to Wood Hollow	686.00
33	Soiland Co., Inc.	Asphalt Recycling (9 tons)	136.80
34	Sonoma County Water Agency	May Contract Water (includes 3 days in June)	844,808.75
35	Syar Industries Inc	EZ Street Asphalt (3 yds)	813.51
36	Thomas Scientific	Endo Broth (Lab)	52.92

Seq	Payable To	For	Amount
37	VWR International LLC	Buffer Solution (Lab)	55.85
38	Wood Rodgers, Inc.	Prog Pymt#9: Gallagher Well #2 Environmental Support (Balance Remaining on Contract $13,729)	1,562.50
39	Zhang, Zhibin	Refund Overpayment on Closed Account	23.32
40	Zoro	Tape Measure (25')	84.08
		TOTAL DISBURSEMENTS	**889,832.95**

The foregoing payroll and accounts payable vouchers totaling $889,832.95 are hereby approved and authorized for payment.

Julie Blue 07/05/2022

Auditor-Controller Date

7/5/2022

General Manager Date

DISBURSEMENTS - DATED JULY 14, 2022

Date Prepared 7/11/22

The following demands made against the District are listed for approval and authorization for payment in accordance with Section 31302 of the California Water Code, being a part of the California Water District Law:

Seq	Payable To	For	Amount
P/R	Employees	Net Payroll PPE 6/30/22	$161,466.15
90499*	Internal Revenue Service	Federal & FICA Taxes PPE 6/30/22	73,347.90
90500*	State of California	State Taxes & SDI PPE 6/30/22	16,464.99
90501*	CalPERS	Pension Contribution PPE 6/30/22	40,575.62
1	Able Tire & Brake	Tires (3) ('19 Ditch Witch-$475 & '18 Gem Cart-$186)	661.10
2	Arrow Benefits Group	June 2022 Dental Claims Expense	3,008.67
3	A.S.T.I.	Backflow Testing (30)	3,370.00
4	Bastogne Inc.	Return Payment-Not Our Customer	250.00
5	Buck's Saw Service	Gas for Yard Tools	235.89
6	Charles Custom Welding	Welding Services (Sodium Chloride Tank @ STP)	800.00
7	Cheang, Sandy	Novato "Toilet" Rebate Program	625.00
8	Comcast	Internet ($710) & Installation Fee (100 Wood Hollow)	912.94
9	Core & Main	Copper Pipe (240') ($5,456), Connection Rings (120) ($819), Steel Pipe (21') ($1,846) & Check Stop for STP SafetyShower ($411)	8,532.47
10	Cummings Trucking	Delivery of Sand (46 yds) ($1,050) & Rock (47 yds) ($735)	1,785.00
11	DataTree	June Subscription to Parcel Data Info	100.00
12	Direct Line Inc	June Telephone Answering Service	769.68
13	Eddings, Denise	Novato "Washer Rebate" Program	375.00

*Prepaid

Seq	Payable To	For	Amount
14	EKI Environment & Water, Inc.	Prog Pymt#2: Consulting Services for Grant Support Assistance (Balance Remaining on Contract $195,033)	4,530.76
15	Enterprise FM Trust	Monthly Leases for Chevy Colorado, Ford Ranger, F250's (2), Nissan Rogues (2), Nissan Frontiers (2) & F150's (7)	7,669.56
16	Frontier Communications	Leased Lines	1,739.88
17	Arthur J. Gallagher & Co	FY23 Cyber Liability Insurance (7/1/22-6/30/23)	6,801.08
18		Vision Reimbursement	645.98
19	GHD Inc.	Prog Pymt#25: Engineering Services for Oceana Marin Pond Rehab Project (Balance Remaining on Contract $16,692)	1,089.80
20	Gierlich Mitchell	Horizontal Closed Coupled Pump for Tank Cleaning	10,451.38
21	Ginocchio, Sandra	Novato "Cash For Grass" Rebate Program	503.00
22	Grainger	Pressure Washer Parts ($360), Reciprocating Saw Blades (80) ($334), Commercial Water Heater & Mixing Valves for STP Safety Shower ($10,947) & Miscellaneous Maintenance Tools & Supplies ($1,688)	13,328.55
23	Gruwell, Carin	Novato "Toilet" Rebate Program	250.00
24	Hach Co.	Buffer (STP)	110.67
25	Harrington Industrial Plastics	Replacement Valve Actuators (O.M. Irrigation Fields) ($2,271), Tubing & Piping for STP Chemicals ($2,569) & Plumbing Supplies ($112)	4,952.32
26	Hayles, Elizabeth	Novato "Toilet" Rebate Program	250.00
27	Holton, Nancy	Exp Reimb: Snacks for Annual Inventory	100.63
28	Home Depot	Probe Tester & Low Voltage Bracket ($49)	92.62
29	Intellaprint Systems	Moving Fee for Canon Engineering Plotter (100 Wood Hollow)	500.00
30	Jensen, Tyna	Novato "Washer Rebate" Program	125.00
31	KB Home North Bay	Refund Overpayment on Closed Account	79.61

Seq	Payable To	For	Amount
32	LeBrun, Kent	Exp Reimb: Drinks for Employees During Office Move	47.54
33	Lincoln Life Employer Serv	Deferred Compensation 6/30/22	11,630.81
34	The Madera Owners Assoc	Return Payment-Not Our Customer	713.04
35	Marin Color Service	Paint Supplies	20.53
36	Marin Landscape Materials	Fast Set Concrete (34 sacks)	353.33
37	McLellan Co, WK	Misc Paving	29,835.02
38	MSI Litho	Business Cards (250 ea) (Williams, Miller, Bynum, Pearce, Kurfirst & Blank)	203.51
39	Nationwide Retirement Solution	Deferred Compensation 6/30/22	1,195.00
40	North Marin Auto Parts	Rags for Construction ($139), Misc Service Parts ('15 Ford Escape-$491, '18 Dodge Ram-$72), Grease & Brake Tool	836.61
41	NMWD Employee Association	Employee Dues (3/31/22-6/30/22)	1,655.00
42	O'Reilly Auto Parts	Degreaser & Cleaning Supplies for Fleet ($265)	272.07
43	Pacific Gas & Electric Co	Power: Bldgs/Yard ($5,668), Other ($241), Pumping ($47,691), Rect/Controls ($692) & Treatment ($129)	54,421.28
44	Ralph Andersen & Associates	Prog Pymt#3: Recruitment of Assistant Gen Manager/Chief Engineer	10,300.00
45	Recology Sonoma Marin	June Trash Removal	571.16
46	Rozoff, Fran	Novato "Cash for Grass" Rebate Program	800.00
47	Stevenson Supply & Tractor	Consumables for Well Mound Construction (Gallagher Well #2 Project)	3,851.54
48	Syar Industries Inc	Pea & Sand (16 yds)	968.95
49	USA BlueBook	Optical Cap (2) (STP)	309.97
50	Van Bebber Bros	HR Plate	255.56
51	Verizon Wireless	Cellular Charges: Data ($1,289), Airtime ($76), iPads for Asset Management ($200) & Equipment ($291)	1,856.05

Seq	Payable To	For	Amount
52	Verizon Wireless	June SCADA & AMI Collectors ($650)	810.84
53	Watkins, Jeff	Exp Reimb: Hotel ($275), Meals ($57) for Diesel Emissions Class in Freemont (6/27-6/29)	332.71
54	Winzer Corporation	Hardware for Shop	450.97
55	Yang, Alex	Novato "Washer" Rebate Program	100.00
56	West Yost Associates	Prog Pymt#1: Consulting for Grant Support Services (Balance Remaining on Contract $199,397)	603.50
		TOTAL DISBURSEMENTS	**$488,896.24**

The foregoing payroll and accounts payable vouchers totaling $488,896.24 are hereby approved and authorized for payment.

Julie Blue 7/11/22

Auditor-Controller Date

7/11/2022

General Manager Date

NORTH MARIN WATER DISTRICT
MONTHLY PROGRESS REPORT FOR June **2022**
July 19, 2022

1.

Novato Potable Water Prod* - RR & STP Combined - in Million Gallons - FYTD

Month	*FY21/22*	*FY20/21*	*FY19/20*	*FY18/19*	*FY17/18*	*22 vs 21 %*
July	282.9	341.7	317.7	341.1	331.0	-17%
August	212.4	290.1	287.1	300.9	303.0	-27%
September	214.5	225.6	280.5	255.0	292.4	-5%
October	198.5	307.8	286.0	265.6	273.7	-36%
November	94.1	201.6	226.3	170.1	163.9	-53%
December	137.1	183.0	141.2	157.8	152.1	-25%
January	118.3	156.6	111.9	114.7	130.6	-24%
February	118.6	110.5	120.3	110.9	134.8	7%
March	130.3	124.1	151.8	138.8	130.2	5%
April	137.7	225.4	195.0	143.8	151.7	-39%
May**	204.7	209.9	217.6	198.6	237.4	-2%
June**	207.7	215.3	269.1	232.7	291.8	-4%
FYTD Total	2,057.0	2,591.4	2,604.4	2,429.9	2,592.5	-21%

*Excludes water backfed into Stafford Lake: FY22=12.82 MG.
**May & June 2022 totals are based on Operations production data. SCWA May invoice was for 36 billing days and the June invoice was for 27.

West Marin Potable Water Production - in Million Gallons - FY to Date

Month	*FY21/22*	*FY20/21*	*FY19/20*	*FY18/19*	*FY17/18*	*22 vs 21 %*
July	6.0	8.2	8.9	10.2	9.5	-26%
August	5.7	9.2	8.4	9.9	8.8	-38%
September	5.9	7.9	7.8	9.5	8.4	-26%
October	5.1	6.7	7.5	8.3	7.9	-25%
November	3.5	5.8	6.7	7.3	5.4	-39%
December	4.0	5.1	4.8	5.7	5.1	-21%
January	3.8	4.2	4.1	5.0	4.5	-11%
February	4.0	3.8	4.4	3.5	4.5	4%
March	4.1	5.1	5.2	4.4	5.1	-21%
April	5.1	4.8	4.9	4.9	5.1	5%
May	4.9	7.3	6.0	5.5	7.5	-33%
June	5.5	6.2	7.4	6.9	9.0	-12%
FYTD Total	57.5	74.4	76.2	81.1	80.9	-23%

Stafford Treatment Plant Production - in Million Gallons - FY to Date

Month	*FY21/22*	*FY20/21*	*FY19/20*	*FY18/19*	*FY17/18*	*22 vs 21 %*
July	67.0	105.8	68.2	78.6	112.6	-37%
August	31.3	81.1	103.8	79.3	81.5	-61% ?
September	41.7	16.1	115.0	60.5	122.7	159%
October	28.2	7.7	103.4	74.5	102.3	266%
November	0.0	0.6	102.8	0.0	53.6	-100%
December	0.0	0.0	0.0	0.0	0.0	-
January	0.0	0.0	0.0	0.0	0.0	-
February	0.0	0.0	0.0	0.0	0.0	-
March	0.0	0.0	0.0	19.2	0.0	-
April	0.0	0.0	30.9	60.3	5.4	-
May	0.0	0.0	60.2	97.4	85.2	-
June	0.0	0.0	101.8	97.1	82.8	-
FYTD Total	168.1	211.3	685.9	567.0	646.0	-20%

Recycled Water Production* - in Million Gallons - FY to Date

Month	*FY21/22*	*FY20/21*	*FY19/20*	*FY18/19*	*FY17/18*	*22 vs 21 %*
July	42.9	39.0	36.5	30.2	27.7	10%
August	41.4	43.2	33.3	30.6	26.1	-4%
September	39.6	29.5	29.7	33.5	25.0	35%
October	18.3	22.8	26.6	20.1	19.1	-20%
November	0.8	10.9	10.8	12.7	2.5	-92%
December	0.3	0.2	0.5	1.5	0.8	50%
January	0.8	0.3	0.6	0.9	1.0	150%
February	1.3	0.5	0.6	0.3	3.3	147%
March	14.3	11.4	11.7	0.4	1.7	25%
April	16.7	18.1	12.5	10.1	5.1	-8%
May	32.7	39.2	27.6	19.6	17.0	-17%
June	43.2	41.6	38.3	31.2	25.8	4%
FYTD Total*	252.3	256.7	228.7	191.0	155.0	-2%

*Excludes potable water input to the RW system: FY22=10 MG; FY21=24.7 MG; FY20=16.7; FY19=20.0 MG; FY18=18.1MG

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2. Regional and Local Water Supply

Lake Sonoma

	Current	2021
Lake Storage*	42,564 MG	41,958 MG
Supply Capacity	53.3 %	52.6 %

*Normal capacity =-245,000 AF (79,833.5 MG)

Lake Mendocino

	Current	2021
Lake Storage *	16,502 MG	9,732 MG
Supply Capacity	59.7 %	35.3 %

*Normal capacity = 70,000-110,000 AF (22,800-35,840MG)

3. Stafford Lake Data

	June Average	June 2022	June 2021
Rainfall this month	0.20 Inches	0.12 Inches	0.00 Inches
Rainfall this FY to date	26.6 Inches	18.25 Inches	8.57 Inches
Lake elevation*	190.1 Feet	190.2 Feet	184.4 Feet
Lake storage**	987 MG	993 MG	660 MG
Supply Capacity	71 %	71 %	47 %

* Spillway elevation is 196.0 feet
** Lake storage less 390 MG = quantity available for normal delivery

Temperature (in degrees)

	Minimum	Maximum	Average
June 2022 (Novato)	47	103	68
June 2021 (Novato)	52	104	68

4. Number of Services

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June 30	Novato Water			Recycled Water			West Marin Water			Oceana Marin Swr		
	FY22	FY21	Incr %	FY22	FY21	Incr %	FY22	FY21	Incr %	FY22	FY21	Incr %
Total meters installed	20,853	20,808	0.2%	101	99	2.0%	799	794	0.6%	-	-	-
Total meters active	20,700	20,607	0.5%	97	96	1.0%	789	785	0.5%	-	-	-
Active dwelling units	24,099	24,094	0.0%	-	-	-	837	836	0.1%	235	235	0.0%

5. Oceana Marin Monthly Status Report (June)

Description	June 2022	June 2021
Effluent Flow Volume (MG)	0.458	0.517
Irrigation Field Discharge (MG)	0.104	0.309
Treatment Pond Freeboard (ft)	5.0	6.1
Storage Pond Freeboard (ft)	7.6	9.8

6. Developer Projects Status Report (June)

Job No.	Project	% Complete	% This month
1.2836.00	Residence Inn	10	0
1.2858.00	North Bay Children's Center	20	0
1.2859.00	Station House Café	20	5
1.2855.00	NSD Ignacio Plant	20	0
1.2860	Habitat Redwood Blvd	5	0

District Projects Status Report - Const. Dept. (June)

Job No.	Project	% Complete	% This month
1.1798.00	Replace Valves on Center Road	10	0
2.6609.20	Gallagher Well No. 2	70	35
1.7205	Replace Copper Laterals – Jamison Ct	95	10

Employee Hours to Date, FY 21/22

As of Pay Period Ending June 30, 2022
Percent of Fiscal Year Passed = 100%

Developer Projects	Actual	Budget	% YTD Budget		District Projects	Actual	Budget	% YTD Budget
Construction	1,313	1,400	94%		Construction	2,296	3,988	58%
Engineering	1,878	2,290	82%		Engineering	2,660	4,323	62%

7. Safety/Liability

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	Industrial Injury with Lost Time				Liability Claims Paid	
	Lost Days	OH Cost of Lost Days ($)	No. of Emp. Involved	No. of Incidents	Incurred (FYTD)	Paid (FYTD) ($)
FY 22 through June	130	$53,006	3	3	0	$0
FY 21 through June	23	$10,120	3	3	3	$15,909

Days since lost time accident through June 30, 2022 **223 Days**

8. Energy Cost

FYE		June *kWh*	June *¢/kWh*	June *Cost/Day*	Fiscal Year-to-Date thru June *kWh*	Fiscal Year-to-Date thru June *¢/kWh*	Fiscal Year-to-Date thru June *Cost/Day*
2022	Stafford TP	72,592	22.2¢	$537	603,478	22.1¢	$365
	Pumping	138,035	28.6¢	$1,315	1,303,657	27.8¢	$997
	Other[1]	45,123	32.2¢	$484	498,861	31.1¢	$428
		255,749	27.4¢	$2,336	2,405,997	27.0¢	$1,790
2021	Stafford TP	74,704	21.5¢	$536	592,171	21.6¢	$350
	Pumping	154,064	25.7¢	$1,319	1,853,335	25.5¢	$1,296
	Other[1]	38,844	30.0¢	$388	569,710	27.3¢	$427
		267,612	25.2¢	$2,243	3,015,216	25.0¢	$2,073
2020	Stafford TP	96,700	19.6¢	$632	769,012	20.9¢	$441
	Pumping	156,858	25.6¢	$1,384	1,461,425	23.7¢	$946
	Other[1]	44,783	31.0¢	$479	560,536	26.1¢	$400
		298,341	24.5¢	$2,495	2,790,973	23.4¢	$1,787

[1]Other includes West Marin Facilities

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9. Water Conservation Update

	Month of June 2022	Fiscal Year to Date	Program Total to Date
High Efficiency Toilet (HET) Rebates	18	133	4,408
Retrofit Certificates Filed	19	169	6,701
Cash for Grass Rebates	1	68	1,216
Washing Machine Rebates	5	37	6,867
Water Smart Home Survey	2	9	3,908

10. Utility Performance Metric

SERVICE DISRUPTIONS (No. of Customers Impacted)	**June 2022**	**June 2021**	**Fiscal Year to Date 2022**	**Fiscal Year to Date 2021**
PLANNED				
Duration Between 0.5 and 4 hours	17	7	136	118
Duration Between 4 and 12 hours	48	18	65	20
Duration Greater than 12 hours				
UNPLANNED				
Duration Between 0.5 and 4 hours	4	0	120	59
Duration Between 4 and 12 hours	80	10	99	39
Duration Greater than 12 hours				1
SERVICE LINES REPLACED				
Polybutylene	2	2	41	82
Copper Replaced or Repaired)	4	1	21	19

Planned:
On top of 17 miscellaneous planned outages for service replacements, we had a planned 48-meter shutdown in the area of Diablo and Hotchkin Drive for a broken valve replacement. The repair and service interruption for this job was about 6 hours.

Unplanned:
We had an 8in water main break on Arthur Street. The repair took approximately 6 hours and 51 homes experienced service disruptions. Also, 29 services were disrupted on Silver Hills in Point Reyes due to a 6in water main break.

11. Summary of COVID-19 Costs and Water Bill Delinquency Impacts - to Date

	June Total	May Total
Increase in on-call Labor Costs	$ 137,000	$ 137,000
Payroll Accounts Receivable Collection Costs	$ 15,200	$ 15,200
Time off to Employees for COVID related reasons* -	$ 105,600	$ 82,300
Vendor Expenses - Including Legal Fees	$ 47,000	$ 47,000
Total Covid-19 Costs to Date	$ 304,800	$ 281,500

* Families First Coronavirus Response Act (FFCRA) & CA Supplemental Paid Sick Leave (SPSL)
Allows employees to take time off for COVID medical reasons including vaccination.

Water Bill Delinquency Impacts

	2 Years Ago 06/2020	Last Year 06/2021	This Year 06/2022
Customer Accounts Past Due (count)	8.8%	3.5%	1.1%
Delinquent Balances % Due on Account	3.5%	7.1%	3.3%
Delinquent Balances $ Due on Account*	$ 90,000	$ 115,000	$ 27,400

*High balance on record of $159K in 12/2021.

T:\AC\Board Reports\Board Memos\2022\[COVID Costs.xlsx]Progress Report

NORTH MARIN WATER DISTRICT

Summary of Complaints & Service Orders May 2022

Tag Breakdown:

Total: 246 **Consumer:** 92 Office: 154

Type	Jun-22	Jun-21	Added Notes
Meter Replacement	10	9	
Total	**10**	**9**	
Need Read	3	3	
Total	**3**	**3**	
No-Water	7	0	
Total	**7**	**0**	
Leak			
Consumer	175	74	
District	14	16	
Total	**189**	**90**	
Water Quality			
Color	1	0	
Total	**1**	**0**	
Noisy Pipes	0	2	
Total	**0**	**2**	
Check Pressure	1	3	
Total	**1**	**3**	
Turn Off / On	19	25	
Total	**19**	**25**	
Other	16	20	
Total	**16**	**20**	
TOTAL FOR MONTH:	**246**	**152**	**62%**

Fiscal YTD Summary				**Change Primarily Due To**
Billing	12	42	-71%	Decrease in Billing
Meter Replacement	110	90	22%	Increase in Meter Replacements
Need Read	26	11	100%	Increase in Reads
No-Water	26	-	100%	Increase in No-Water
Leak	1,714	1,068	60%	Increase in Leaks
Water Quality	5	1	400%	Increase in Water Quality
Noisy Pipes	1	2	-50%	Decrease in Noisey Pipes
Pressure	11	12	-8%	Decrease in Water Pressure
Turn Off / On	220	195	13%	Increase in Water On/Off
Other	88	90	-2%	Decrease in Misc. Tags
Total	**2,213**	**1,511**	**46%**	Increase overall

Bill Adjustments Under Board Policy:

June 22 vs. June 21

Jun-22	2	$1,543
Jun-21	7	$4,106

Fiscal Year vs Prior FY

FY 21/22	167	$66,465
FY 20/21	203	$86,785

Customer Service Questionnaire Quarterly Report

Quarter Ending : 06/30/22

NMWD

Water Quality	Agree	Neutral	Disagree
Courteous & Helpful	0	1	0
Accurate Information	1	0	0
Prompt Service	1	0	0
Satisfactorily Resolved	1	0	0
Overall Experience	0	1	0
	3	2	0

Pressure	Agree	Neutral	Disagree
Courteous & Helpful	0	0	0
Accurate Information	0	0	0
Prompt Service	0	0	0
Satisfactorily Resolved	0	0	0
Overall Experience	0	0	0
	0	0	0

Leak	Agree	Neutral	Disagree
Courteous & Helpful	53	0	0
Accurate Information	49	4	0
Prompt Service	51	2	0
Satisfactorily Resolved	46	7	0
Overall Experience	52	1	0
	251	14	0

Noisy Pipes	Agree	Neutral	Disagree
Courteous & Helpful	0	0	0
Accurate Information	0	0	0
Prompt Service	0	0	0
Satisfactorily Resolved	0	0	0
Overall Experience	0	0	0
	0	0	0

Billing	Agree	Neutral	Disagree
Courteous & Helpful	0	0	0
Accurate Information	0	0	0
Prompt Service	0	0	0
Satisfactorily Resolved	0	0	0
Overall Experience	0	0	0
	0	0	0

Other	Agree	Neutral	Disagree
Courteous & Helpful	10	1	0
Accurate Information	9	1	1
Prompt Service	10	1	0
Satisfactorily Resolved	10	1	0
Overall Experience	10	1	0
	49	5	1

	Agree	Neutral	Disagree
Grand Total	303	21	1
	93%	6%	0%

Questionnaires Sent Out	129	100%
Questionnaires Returned	66	51%

Customer Service Questionnaire Quarterly Report
Quarter Ending : 06/30/22

Customer Comments	Staff Response to Negative Comments	Issues NMWD Should Address In The Future
PRESSURE		
BILLING		
WATER QUALITY		
LEAK		
Friendly guy, good service and quick response. Thanks!		
Darrell was very professional & very knowledgeable. A very nice person to work with!		
Thank you!		
Most of our interactions have involved my terrible leaks. Not sure if water quality is better after rusty pipe in water main replaced.	Copy of questionnaire given to WQ	Not convinced that water at the base of tanks (on NMWD land in back of my house) is condensation.
The gentleman that came out was knowledgeable and courteous. Thank you.		
We appreciate that NMWD notified us by email of excessive water use. We were out of town and this enabled us to take action by calling your office plus having someone turn the water off.		
We appreciated the service person being vigilant and alerting us to the smell of gas. PG&E line was leaking.		Periodic checking of water meter. Had we not been replacing a faucet we would not have discovered a leak in the meter, the leak was on NMWD's side but the leak would have been undiscovered.
Great work, efficient and timely.		
Appreciated the info that we have a leak and you offer a bill adjustment.		
Travis was personable and efficient. Unfortunately we still couldn't find the leak.		
Thanks. Big Help.		
The Driver left his truck running the whole time while at my house.	Copy of questionnaire given to Jenny	Turn vehicle off when working at a house.
My issue was resolved promptly! Very good job!		
Technician came quickly after hours to restore		want fluoride!
The people who came out went above and beyond! Helpful, very communicative, and informative. They deserve raises and bonuses!		
Tech arrived less than 30 min after my call!		
Travis explained our problem + possible solutions to us very well.		
First staff member said someone else would be back to check, but we didn't see that person.	Identified possible irrigation runoff - no leak detected.	There isn't anymore standing water in the meter area, but it is still very wet.
Excellent Service!		
I wish all agencies were run as well as NMWD. Thank you!		
Great, quick Response!		
Travis detected the source of our leak and checked again to confirm leak had been repaired.		
We contacted NMWD through WaterSmart and Rich responded quickly. Rich and Darrell were both excellent.	Called and spoke with Susan about our RW Program.	Long term - It would be great if NMWD could work towards non-potable water to residential customers for irrigation.
Fast reaction, thanks.		
Thank you for taking care of the problem.		
Friendly, professional and answered all my questions		
The Service tech was great! He was on time and described what the problem was. I believe his name was Darrell.		No more rate hikes!
The best water district in the state!		
Thank you for the good service		
Very helpful and explained the nature of the problem and fixed it. Very happy with the experience.		
When I called NMWD the woman I spoke to was extremely helpful. The tech who promptly came to my house was very courteous & helpful.		
The guy was pleasant, knowledgeable, & prompt but basically concluded leak was not on NMWDs side and left with no suggestion for possible fix.		
NMWD Rep was great. Answered my questions and gave me additional valuable info.		
Water was shut of due to leak while we were on vacation. We called the emergency number to have it turned on once we arrived home, the rep was there 30 minutes later.		
Thanks for caring to send questionnaire.	Copy of questionnaire and tag given to Consumer Services Supervisor	It feels like NMWD wants to do ONLY what they must and the attitude feels unhelpful at times. Unfriendly. this is recent. Past service was much better, friendly, helpful. Please let me know if you want more feedback.
Thank you for your care & competence. Increasingly a rarity in todays day & age.	Emailed Water Conserve to contact owner about rainwater rebate.	Provide water catchment systems or knowledge to home owners.
Your staff has always gone out of their way to help.		
		Dye tab for toilet did NOT show leak in 15 minutes, it showed one hour later! New toilet style "infinity pipe" vs plunger need to set water BELOW recommended line.
The technician was great. He helped me resolve my problem and temporarily stopped the leak until I could get a plumber out to fix the pipe.		We need more reservoirs in CA. WTH happened that they didn't get built years ago?

Customer Comments	Staff Response to Negative Comments	Issues NMWD Should Address In The Future
Very courteous employee.		
Not sure if anyone came out or not. Judging by the grass that is growing around the meter tells me there is a leak somewhere. Not over watering.	Forwarded to Construction for follow up.	
The staff person was extremely kind and courteous. He explained what my problem could be and gave me tablets to put in toilets, he answered my questions and leak appeared in toilet he again gave me information. I was very appreciative of the service. Thank you.		
Rich was great! Called to let me know his arrival time, spent extra time making sure I was satisfied.		
OTHER		
Robert was very pleasant, helpful, and professional. As a bonus, he gave me a tip about a bike carrier installed on my car.		
Shut-off notice was found on ground afterwards - blew off? Everyone was prompt to reply when we called.	Copy of questionnaire given to Construction	Better to have put it on the outside of the mailbox if you cant put it in! Maybe call if you know water is to be shut off - better.
Everyone was so nice and helpful! Quick response time.		
Thank you for your help!		
Thank you for noticing water in the pool was left on.		
Feel free to call me with any further questions		
Thank you for being so customer and conservation focused.		
I appreciate the helpful information I was given.		Is NMWD water considered to be "Hard"?

MEMORANDUM

To: Board of Directors July 19, 2022

From: Julie Blue, Auditor-Controller JB
Nancy Holton, Accounting Supervisor NH

Subj: Auditor-Controller's Monthly Report of Investments for June 2022
t:\ac\word\invest\22\investment report 0622.doc

RECOMMENDED ACTION: Information

FINANCIAL IMPACT: None

At month end the District's Investment Portfolio had an amortized cost value (i.e., cash balance) of $45,264,153 and a market value of $44,808,263. During June the cash balance increased by $373,807. The market value of securities held decreased $455,890 during the month. The total unrestricted cash balance at month end was $4,517,609 and 98.9% of the Designated Cash Reserves are funded.

At June 30, 2022, 90% of the District's Portfolio was invested in California's Local Agency Investment Fund (LAIF), 7% in Time Certificates of Deposit, 2% in the Marin County Treasury, and 1% retained locally for operating purposes. The weighted average maturity of the portfolio was 31 days, compared to 33 days at the end of May. The LAIF interest rate for the month was 0.86%, compared to 0.68% the previous month. The weighted average Portfolio rate was 0.87%, compared to 0.47% for the prior month.

Investment Transactions for the month of June are listed below:

6/1/2022	US Bank	LAIF	$19,876,000.00	Trsf to LAIF account
6/9/2022	LAIF	US Bank	$350,000.00	Trsf from LAIF account
6/10/2022	US Bank	BMO Harris Bank	$246,000.00	Purchase 2.80% TCD due 6/10/24
6/29/2022	US Bank	Ge Credit Union	$249,000.00	Purchase 3.25% TCD due 6/28/24

NORTH MARIN WATER DISTRICT
AUDITOR-CONTROLLER'S MONTHLY REPORT OF INVESTMENTS
June 30, 2022

Type	Description	S&P Rating	Purchase Date	Maturity Date	Cost Basis[1]	6/30/2022 Market Value	Yield[2]	% of Portfolio
LAIF	State of CA Treasury	AA-	Various	Open	$40,536,334	$40,080,443	0.86% [3]	**90%**
Time Certificate of Deposit								
TCD	Enerbank	n/a	9/25/20	9/25/24	249,000	249,000	0.45%	1%
TCD	Sallie Mae Bank	n/a	8/18/21	8/18/23	249,000	249,000	0.35%	1%
TCD	UBS Bank	n/a	9/9/21	9/11/23	249,000	249,000	0.35%	1%
TCD	BMW Bank	n/a	8/20/21	2/20/24	249,000	249,000	0.45%	1%
TCD	Goldman Sachs Bank	n/a	1/19/22	1/19/24	249,000	249,000	0.75%	1%
TCD	Ally Bank	n/a	2/24/22	2/23/24	248,000	248,000	1.30%	1%
TCD	Greenstate Credit Union	n/a	3/15/22	3/15/24	249,000	249,000	1.60%	1%
TCD	Capital One Bank	n/a	4/7/22	4/8/24	247,000	247,000	2.20%	1%
TCD	Capital One Bank, N.A.	n/a	4/20/22	4/22/24	247,000	247,000	2.35%	1%
TCD	American Express Natl Bank	n/a	5/4/22	5/6/24	246,000	246,000	2.60%	1%
TCD	BMO Harris Bank	n/a	6/10/22	6/10/24	246,000	246,000	2.80%	1%
TCD	Ge Credit Union	n/a	6/29/22	6/28/24	249,000	249,000	3.25%	1%
					$2,977,000	**$2,977,000**	**1.48%**	**7%**
Other								
Agency	Marin Co Treasury	AAA	Various	Open	$1,045,108	$1,045,108	0.02%	2%
Other	Various	n/a	Various	Open	705,711	705,711	0.15%	1%
		TOTAL IN PORTFOLIO			**$45,264,153**	**$44,808,263**	**0.87%**	**100%**

Weighted Average Maturity = **31 Days**

LAIF: State of California Local Agency Investment Fund.
TCD: Time Certificate of Deposit.
Agency: STP State Revolving Fund Loan Reserve.
Other: Comprised of 5 accounts used for operating purposes. US Bank Operating Account, US Bank STP SRF Loan Account, US Bank FSA Payments Account, Bank of Marin AEEP Checking Account & NMWD Petty Cash Fund.

1 Original cost less repayment of principal and amortization of premium or discount
2 Yield defined to be annualized interest earnings to maturity as a percentage of invested funds
3 Earnings are calculated daily - this represents the average yield for the month ending June 30, 2022

Interest Bearing Loans	Loan Date	Maturity Date	Original Loan Amount	Principal Outstanding	Interest Rate
Marin Country Club Loan	1/1/18	11/1/47	$1,265,295	$1,098,813	1.00%
Marin Municipal Water - AEEP	7/1/14	7/1/32	$3,600,000	$1,930,238	2.71%
Employee Housing Loan (1)	3/30/15	3/30/30	250,000	250,000	Contingent
TOTAL INTEREST BEARING LOANS			**$5,115,295**	**$3,279,051**	

The District has the ability to meet the next six months of cash flow requirements.

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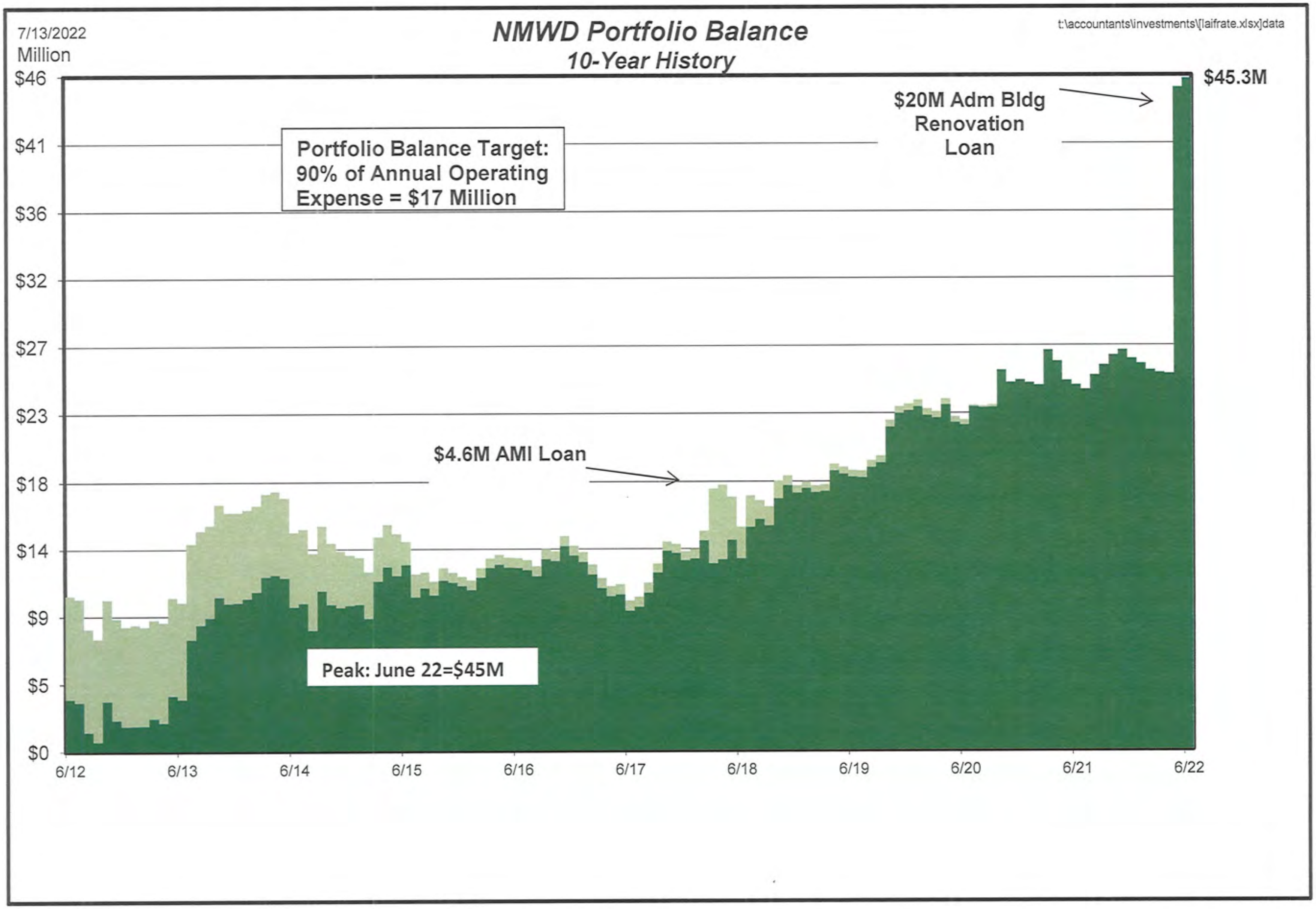
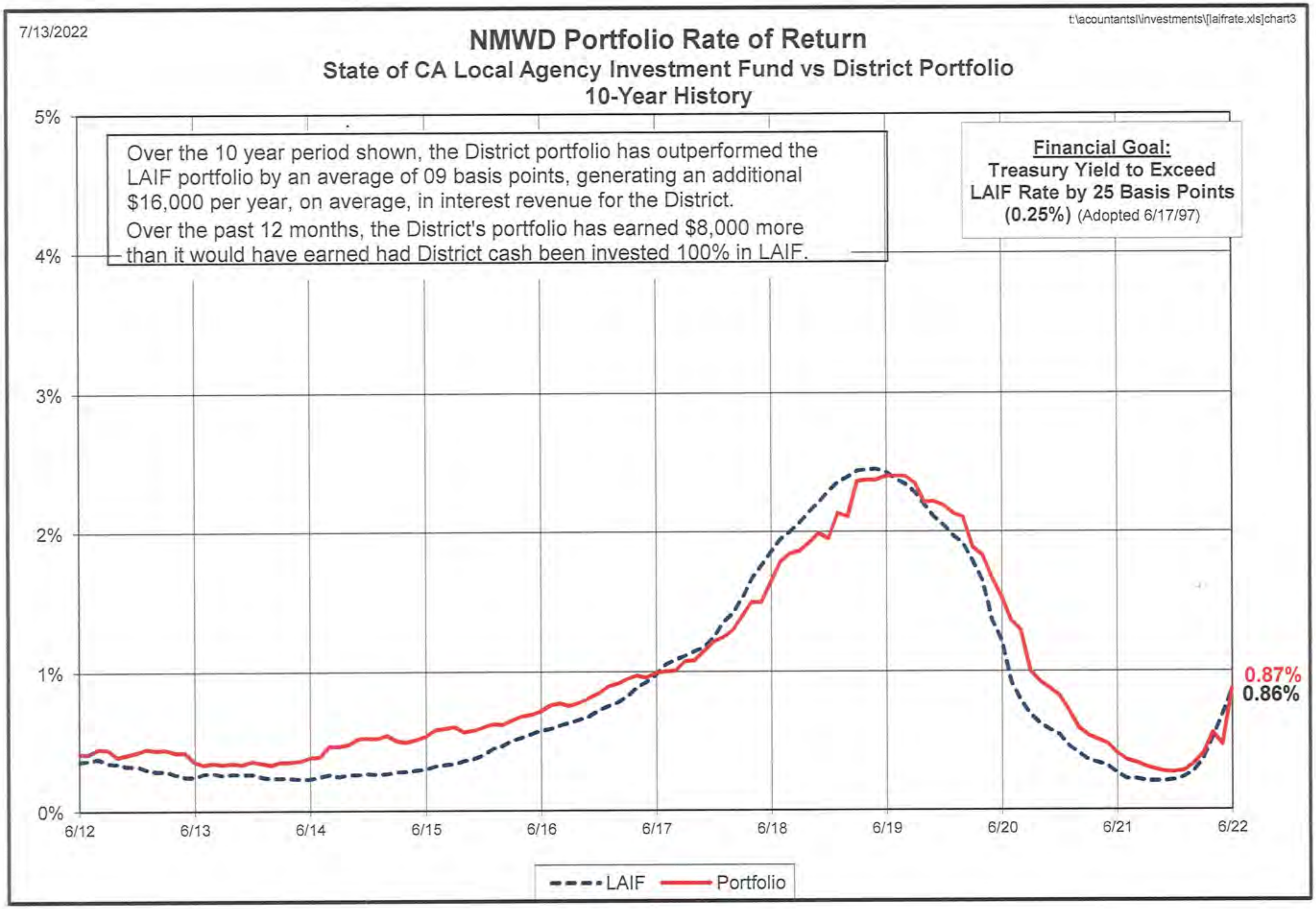

7/13/2022
NMWD Portfolio Balance
10-Year History
t:\accountants\investments\[laifrate.xlsx]data
Million
$46
$41
$36
$32
$27
$23
$18
$14
$9
$5
$0
$45.3M
$20M Adm Bldg
Renovation
Loan
Portfolio Balance Target:
90% of Annual Operating
Expense = $17 Million
$4.6M AMI Loan
Peak: June 22=$45M
6/12
6/13
6/14
6/15
6/16
6/17
6/18
6/19
6/20
6/21
6/22



7/13/2022
t:\acountants\investments\[laifrate.xls]chart3
NMWD Portfolio Rate of Return
State of CA Local Agency Investment Fund vs District Portfolio
10-Year History
Over the 10 year period shown, the District portfolio has outperformed the LAIF portfolio by an average of 09 basis points, generating an additional $16,000 per year, on average, in interest revenue for the District.
Over the past 12 months, the District's portfolio has earned $8,000 more than it would have earned had District cash been invested 100% in LAIF.
Financial Goal:
Treasury Yield to Exceed LAIF Rate by 25 Basis Points (0.25%) (Adopted 6/17/97)
5%
4%
3%
2%
1%
0%
6/12
6/13
6/14
6/15
6/16
6/17
6/18
6/19
6/20
6/21
6/22
0.87%
0.86%
LAIF
Portfolio

National Lakes Assessment 2022: A Fact Sheet for Communities

During the summer of 2022, the U.S. Environmental Protection Agency (EPA), states, tribes and other partners will conduct the fourth nationwide survey of the condition of the nation's lakes. The National Lakes Assessment (NLA) will help citizens and governments measure the health of our waters, take actions to prevent pollution, and evaluate the effectiveness of protection and restoration efforts. The NLA 2022 is one in a series of national surveys of the condition of the nation's waters (see https://www.epa.gov/national-aquatic-resource-surveys).

Tranquil lake sampled during the National Lakes Assessment.

Designed to estimate the percentage of lakes that are in good, fair, or poor condition, the survey will serve as a scientific report card on America's lakes. It will examine ecological, water quality, and recreational indicators, and assess how widespread key stressors (such as nitrogen, phosphorus, and acidification) are across the country.

The survey is a collaborative effort that involves dozens of state environmental and natural resource agencies, federal agencies, universities and other organizations. In most states, state water quality staff will conduct the water quality sampling and habitat assessments.

How were the lakes selected?

Distribution of base sites in the 2022 National Lakes Assessment.

A total of 904 natural lakes, ponds, and reservoirs across the lower 48 states are included in the survey. To be included in the survey, these lakes must be at least one meter deep and over 2.5 acres (1 hectare) in size. The survey does not include the Great Lakes or the Great Salt Lake. Lakes were selected randomly using a statistical survey design to represent the population of lakes in their ecological region – the geographic area in which climate, ecological features, and plant and animal communities are similar. In addition to these 904 sites, some sites will be re-sampled for quality assurance purposes; reference sites representing least-disturbed conditions will also be sampled.

What about my lake?

If your lake is sampled for this survey, it was most likely part of the randomly selected sites based on the population of lakes in your part of the country. There are a number of hand-selected sites (around 100), called reference sites, included in the survey as representative of the least-disturbed condition. Sites were not selected because the lake exhibits any particular problem or water quality condition. When the final report on the NLA 2022 is written, data from your lake will contribute to the regional and national picture of lake condition.

If your lake is not sampled for this survey, it was not omitted for any particular reason, but rather because it was not randomly selected or did not fit into the target population of lakes (e.g., those greater than 2.5 acres in area and at least one meter deep).

Many volunteer monitoring groups and lake associations have years of sampling data for their lakes, data vital to local lake management activities. This survey will provide a regional and national – and in some cases, statewide – assessment of lake condition. It will also allow those with sampling data on their lake to compare the condition of their lake to the range of lakes in their region or state.

What will researchers measure?

Field crews take many measurements at each selected lake. They use consistent procedures at all sites so that results can be compared across the country. They measure such things as:

- Temperature, dissolved oxygen, nutrients, chlorophyll a, water clarity, turbidity, and color
- Condition of the habitat along the shoreline
- Zooplankton and phytoplankton—microscopic animals and plants in the water that are an important part of the food chain
- Aquatic macroinvertebrates—small animals such as insects and snails that are a source of food for fish and birds
- Microcystin and Cylindrospermopsin—two common types of algal toxin, often associated with algal blooms
- Enterococci—indicator of fecal contamination from animals or humans
- Pesticide Screen—occurrence of Atrazine pesticide in water samples
- Environmental DNA– genetic indicator collected via water sample to look at potential variety of aquatic species including fish, invertebrates, algae.
- Fish – collected in 70% of waterbodies and tested for mercury, metals and other contaminants which may impact human health

For more information on the National Lakes Assessment, including the findings of the previous surveys:

For more information on the National Aquatic Resource Surveys, visit

U.S. Environmental Protection Agency
Office of Water
Monitoring Branch (4503T)
Washington, DC 20460

Sampling is scheduled for the summer of 2022. EPA intends to issue a report on the findings in 2024. Between the time that lakes are sampled and the national report is published, samples will be analyzed in the lab, the data entered into a database and analyzed, and the results will be made public via the NLA website.

Lake sampled during the National Lakes Assessment.

North Bay Watershed Association
One Water Initiative
Land Use and Water Infrastructure Virtual Workshop
Summary

Thursday, June 2, 2022
9:00 AM to 11:00 AM

Meeting Recording:
https://us02web.zoom.us/rec/share/pjgzYpKEnL23oqTKti-DbEsqzi4sJf2L2VGTI66VHiPrAcN0A2iVKojwp8HZszVr.JP_rh9-RHqYrQ7-u

Access Passcode: 6T%PWtc@

9:00 Introductions – Andy Rodgers

Twenty-two attendees:

Evan Gorman — City of Benicia
Erik Upson — City of Benicia
David Garcia — City of Petaluma
Erica Baptiste — City of Petaluma
Leelee Thomas — County of Marin
Chris Choo — County of Marin
Pat Marino — County of Napa
Jamison Crosby — County of Napa
Maureen Brown — County of Napa
Ben Horenstein — Marin Municipal
Andy Rodgers — NBWA
Sabrina Marson — NBWA
Tim Fuette — North Marin Water District
Rosalia Solar — North Marin Water District
Robert Pennington — Permit Sonoma
Dale Crossley — Reclamation District 2068
Pete Parkinson — Retired Director Permit Sonoma
Jason Montague — Rincon Consultants
Steve Moore — Ross Valley Sanitary District
Elizabeth Patterson – Solano County Water Agency
Jay Jasperse — Sonoma Water
Sandi Potter — West Yost Associates

Andy provided an overview of the North Bay Watershed Association's mission of facilitating partnerships across political boundaries that promote stewardship of the North San Pablo Bay Watershed resources; the association's members; the North Bay Watersheds; and the Association's goals of connecting, sharing resources, addressing watershed-based regulations, educating communities, increasing eligibility for watershed-based funding, influencing local, state, and federal policies and programs; and working within a One Water framework.

9:10 Land Use Planning and Water Resources – Pete Parkinson ***(Recording minute 12:00)***

Pete Parkinson has worked as a professional planner and manager for over 40 years, including Planning Director for Sonoma County from 2002 to 2013. He is the Past-President of the California Chapter of the American Planning Association and a member of the American Institute of Certified Planners. At Sonoma County, Pete oversaw development of one of the first General Plan Water Resources Elements in California and served on the Basin Advisory Panels for two AB 3030 Groundwater Management Plans. He has consulted with Sonoma Water on groundwater management and land use issues, including implementation of the state's new Sustainable Groundwater Management Act (SGMA).

Pete's presentation covered the following:

- The View from a Planner's Perspective
    - Land use development and planning and implementation has traditionally been

the domain of cities and counties in California; however, the state has been making progress in involvement, particularly in housing.

- The Planning Landscape: Mandates & Plans
  - Comprehensive planning (General Plans)
    - Nominally about "physical development," but so much more
    - Required elements: Land use; Circulation, Housing, Noise, Open Space, Conservation, Safety
    - Local Coastal Plans
  - For water, SGMA is an example of cities and counties taking charge, with the state stepping in if needed.
  - Beyond the General Plan required elements
    - Environmental Justice & Equity
    - Economic Development
    - Water Resources
    - Agriculture
    - Housing
    - The Consistency Mandate: foundational principal related to planning. Plans must be internally consistent (in implementation) as well as comprehensive. Applies to all land use and development decisions, including permit issues, such as capital improvements.
  - "Plan Bay Area 2050"
      - Regional Transportation Plans have evolved into something more comprehensive, and strengthening the connection between transportation, land use, housing, and greenhouse gas reduction. Plans must now include a Sustainable Community Strategy that brings these elements together.
      - Contains very strong financial incentives to align local transportation, land use, and housing decisions with regional housing land use policy.
      - There's also funds in the Plan Bay Area 2050 to support high priority conservation actions—Supporting ag and natural land protection.
  - Groundwater Sustainability Plans
  - Other Plans: Hazard Mitigation Plans, Community Wildfire Protection Plans, Climate Action, Local Transportation Plans
    - Many are water-focused: stormwater, watersheds, Urban Water Management Plan
  - Zoning Code (the "police power")-primary planning implementation tool using local government to regulate land use and development
  - Planning permits (more process)- Discretionary permit processes. Includes conditional use permits, subdivisions design reviews. Can be process heavy, public participation and hearings. Triggers compliance with the California Environmental Quality Act (CEQA).
  - CEQA
  - Local Agency Formation Commission
  - Well permitting- process have traditionally been at the local level, but is evolving.
  - Housing approvals
- Beyond the Mandates: Community Values
  - Planning must reflect the community and its values
  - Engagement and process are essential but challenging

    - Community values are embedded in the plan whether they are explicitly stated or not
    - Social values are complex and highly subjective, and variable over time
    - Planning is "values-laden" and so is water management
- Relationship between planning and water management
    - Supporting and Enhancing Water Management Through Good Planning
    - Planning & Water: Spatial relationships
        - Watersheds
        - Water systems & service areas
        - Jurisdictional boundaries often do not align
    - Planning & Water: Temporal Relationships
        - In the beginning, there was The Plan
        - Water suppliers/managers often playing catch-up
        - Different time scales
            - General Plan: 10+ years
            - Housing: 8-year statutory cycle
            - UWMP: 5-year statutory cycle
            - Capital Improvement Plans: 5-year horizon, annual updates
    - Planning & Water: Functional Relationships
        - "Will-serve" letters
        - Impact assessment and mitigation (CEQA)
        - Demand management thru planning implementation
        - Water resource protection
        - Conservation/protection of natural areas
    - Include a water focus in long-range and current planning
        - Coordinate general plans with UWMPs and IRWMPs, not just vice versa
        - Use a watershed-scale planning frame
        - Protect and enhance local water supplies
            - Protect recharge areas
            - Support Managed Aquifer Recharge (MAR) and conjunctive use
            - Protect riparian areas
        - Land use planning as a water demand management tool
            - Water-efficient land use pattern
            - Higher density = lower per-capita water use
            - Great fit with housing goals
            - On-site water reuse
    - SGMA: Supporting and Enhancing Water Management Through Good Planning
        - Water needed planners' skills/toolbox; planners needed waters' focus and science-orientation
        - Coordination and consistency mandated under SGMA
        - Governance was big issue; reflected spatial & political dimensions
        - Community engagement essential to balance interests; planners' forte
        - Relationships and leadership were key
        - Planners and water managers both use data, analysis and reporting; coordination and consistency are essential
    - How planners support water resource management.
        - Look at how the frame has changed since SGMA landed:
            - 2015: How do we ensure a sustainable water supply for future land uses and development?
            - 2022: How do we have enough water for existing land uses?

- Consider the impact of taking 500,000 acres of agricultural land out of production in the San Joaquin Valley!

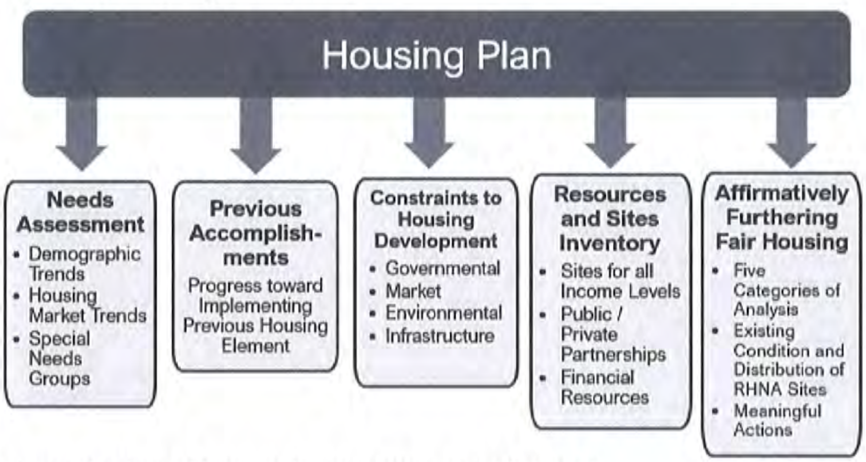
9:25 2022 Housing Challenge – Leelee Thomas *(Recording minute 34:00)*

Leelee Thomas is the Deputy Director of Housing & Federal Grants Division with the Marin County Community Development Agency. She develops affordable housing policy within the unincorporated area of the County and oversees the program which provides federal funds for affordable housing and local community services. She oversees implementation and monitoring of the Housing Element of the Countywide Plan, the Housing Trust Fund, and facilitation and funding of affordable housing projects. She also works with Marin cities and towns on housing policy and tenant protections. Leelee's work also focuses on equity within the County and cities and towns and in addressing residential patterns of segregation in our communities.

What is a Housing Element?

- Updated every eight years
- Required to be reviewed by California Housing and Community Development Department (HCD)
- Adoption deadline: January 2023
- Housing Elements are required for every jurisdiction

Components of Housing Element



What is the Regional Housing Needs Allocation (RHNA)?

- Draft Regional Housing Needs Allocation for Marin County: 14,210 units

- Meeting the RHNA
    - Approved housing and mixed-used projects as of June 2022
    - Projects in the application pipeline
    - Potential sites
        - Vacant sites
        - Underutilized sites that could be developed
        - Accessory dwelling units
        - Infill sites

Affirmatively Furthering Fair Housing (AFFH)

- Seeks to combat housing discrimination, eliminate racial bias, undo historic patterns of segregation, and lift barriers that restrict access in order to foster inclusive communities and achieve racial equity, fair housing choice, and opportunity for all Californians.

What happens if we don't have a certified Housing Element?

- The jurisdictions could face significant and costly consequences if we do not have a certified Housing Element, such as:
    - losing access to funding opportunities such as roads and transportation funds
    - opening up the possibility of a lawsuit from the State, which the State has recently done in Southern California
    - a requirement for the jurisdiction to update its Housing Element every 4 years rather than 8 years, at the County's expense
    - having the responsibility to plan for more housing, the current RHNA numbers would be added to the next housing element cycle.

Housing Elements – how to plan together

- Housing Elements – how to plan together
    - A group of planners from cities, towns and the County collaborating on affordable housing issues.
    - Started by the County and now funded through ABAG
    - A goal of receiving certified housing elements
    - Share ideas and resources
    - The Housing Working Group (HWG) is currently working on joint efforts on: ADUs, Inclusionary Policies, Objective Design Standards, and Housing Elements
- Housing Working Group
    - Housing Element Coordination includes
        - AFFH requirements – shared data analysis
        - Programs and Policies – best practices
        - Coordination of consultants doing CEQA review – looking for ways to learn from each other
- Housing Elements and Water
    - Local governments must evaluate whether sufficient water, sewer, and dry utilities are available and accessible to support housing development
    - If not available, must include a program in the housing element that ensures access and availability to infrastructure to accommodate development within the planning period
    - Local governments are strongly encouraged to consult with water and sewer providers during the development and update of the housing element
    - Water and sewer providers must adopt written policies and procedures that grant a priority for service allocations to developments that help meet the RHNA for lower-income housing

- State law prohibits water and sewer providers from denying, conditioning the approval, or reducing the amount of service for an application for development that includes housing affordable to lower-income households, unless specific written findings are made
- Urban water management plans must include projected water use for single-family and multifamily housing needed for lower-income households
- CA urban water demand is declining*
    - San Francisco uses less water today than mid 1960's
    - Los Angeles uses less water today than it did in 1970
    - More efficient devices
    - Recycled water
    - More climate appropriate plants
    - Changes in land use patterns
- Multifamily housing uses less water
- How can we work together to accommodate housing and plan for more efficient use of water?

Questions and comments

- Steve Moore: [for Pete] You mentioned water and sewer capital improvement plans (CIPs) have to be reviewed consistent with the general plan. Is that something that only happens when you have water and sewer under the same house?
    - Pete: He can't answer that specifically
      [Comment for Leelee] Water and sewer agencies must adopt written policies and procedures that create a priority for service allocations for RHNA. He didn't know this for the sewer agencies. This speaks to the coordination and dialogue that needs to happen. Any thoughts on that?
    - Leelee: It's their requirement that when they adopt the housing element they need to send the housing element to you along with the language that says under state law here are the requirements that you have to adopt. This is supposed to happen with all water and sewer providers. You should be receiving notices. You should also be hearing from environmental consultants regarding capacity—It's a requirement.
- Elizabeth Patterson: There is a consistency issue because UWMPs are not subject to CEQA on the one hand and are deemed consistent with the General Plan when general plans do not assess watershed sources. How do you get urban water management plans to look at capital improvement projects and the housing element? This is where the CEQA-like analysis breaks down.

9:55 Water Resource Management – Jay Jasperse ***(Recording minute 55:45)***

Jay Jasperse is the Chief Engineer and Director of Groundwater Management for Sonoma Water. He is a Registered Professional Engineer in the State of California. Prior to joining Sonoma Water, he worked as an environmental engineering consultant specializing in groundwater resource characterization and remediation. He is responsible for Sonoma Water's capital projects program and resource planning and management activities. He is an author of published journal articles and book chapters on topics such as surface water-groundwater interactions, natural filtration processes, riverbank filtration, and integrated water resource management.

Overview Regional Water Resource Management

- Sonoma Water Supply & Transmission System
    - Russian River Management
        - Reservoir Storage
        - In-Stream Flows

- Wholesale Water Supply
  - Transmission System
  - Deliveries to Retail Agencies in Sonoma & Marin Counties
- Surface Water Supplies – Napa & Solano Counties
  - Napa & Solano Counties receive water from the State Water Project via North Bay Aqueduct
  - State Water Project serves several communities including Cities of Napa, Calistoga, American Canyon, Fairfield, Vallejo, Vacaville, Benecia & others
  - Solano County also receives water supply from Lake Berryessa – Putah Creek system

- Sustainable Groundwater Management Act Compliance
  - Sustainable GW Management Act: *Required Ste*

- Models are mixed regarding ***average*** precipitation, however they agree that ***precipitation variability*** will increase due to increase in strength & prominence of Atmospheric Rivers
- Increased seasonality (wetter winter, drier fall/spring)

<u>Key Impacts:</u>

- Droughts & floods will be more severe
- Increased risk of wildfires
- Sea-level rise will occur

- Roll of Atmospheric Rivers

"Whiplash Weather"

- Atmospheric Rivers drive floods & droughts
- ARs responsible ~50% annual rainfall
- ARs responsible for 84% insured flood losses in 11 Western States
- Sonoma Co. highest recurrent flood damage of any western US county

- Drought Impacts & Vulnerabilities

Vulnerability Depends on Location & Circumstances

- Surface Water – Lake Sonoma vs. Lake Mendocino
- Groundwater – Areas of groundwater depletion (Sonoma Valley), generally groundwater levels similar to prior multi-year droughts - at least for now!

No Agency Manages Entire Water Supply

- Different approaches by County, Cities/Water Districts
- Rural residential & agriculture not part of developed water systems

Consider Drought Impacts to all Beneficial Uses of Water

- Drinking water, recreation, irrigation, ecosystems

- Drought Conditions & Response
  - What is Sonoma Water doing to build drought resiliency

<u>Current & Near-Term Actions</u>

Ongoing/expanded water use efficiency & conservation

- Sonoma Marin Saving Water Partnership

Russian River Management

- In-Stream Flows & Reservoir Storage
- Reduced Russian River Diversions

Winter Water Diversion Program

- Source Shift from Groundwater to Fall/Winter/Spring Russian River Natural Flows for supply
- Back-feed Marin County Reservoirs

<u>Current & Near-Term Actions</u>

Groundwater/Surface Water Conjunctive Management

- Activate SRP Wells & Convert to Aquifer Storage & Recovery
- Flood Managed Aquifer Recharge (Flood-MAR) – Alexander Valley

- **Regional Water Supply Resiliency Study**
  - Coordinated Drought Planning by 10 Sonoma & Marin Water Agencies
- **<u>Longer-Term Programs & Planning</u>**
  - Forecast Informed Reservoir Operations
  - Climate Adaptation Plan

- Regional Water Supply Resiliency Study

<u>Resiliency Study seeks to:</u>

- ID key factors impacting regional water supply resiliency,
- evaluate the current levels of resiliency without jurisdictional constraints,

- develop decision support framework model & process
- ID opportunities to improve regional resilience in the future

First of a kind look at the Integrated Regional System

- Russian River & Potter Valley Project (Eel River)
- Sonoma Water "backbone" system
- 9 retail customer systems/ & 6 groundwater basins
- local supplies & recycled water
- multiple risk drivers

- Land Use & Water Resource Management Coordination

Water Resource Management Planning

- Urban Water Management Plan (Every 5 yrs)
- 20 yr. supply/demand assessment
- Water shortage contingency plans
- Annual drought assessments
- Water Supply Assessments (Project Based)
- Groundwater Sustainability Plans (50 yr. horizon)

Land Use Planning

- General Plans (~20 yr +/-?)
- Specific Plans (Project Based)
- Well Permitting – Governor's Executive Order

10:15 Regional Solutions – Chris Choo *(Recording minute 1:26:33)*

Chris Choo is the Planning Manager for Marin County Department of Public Works. She supports Marin communities and local and regional government on sea level rise adaptation and resilience. She leads efforts to coordinate our approach to adaptation, identifies project and funding options to implement projects, works with frontline communities of color, and supports regional planning for water resources through the North Bay Watershed Association and Bay Adapt, BayCAN, and others.

- For the four North Bay counties there are 44,000 new housing units being planned through RHNA
- Drought conditions and impacts to the land and communities, such as fire risks, sea level rise, transportation should all be considered for finding safe places for people to live.
- This is the time to innovate with One Water and partner.
- NBWA is nimble and can assist with looking at opportunities to partner across the planning lenses and jurisdictions. The state budget will be ready soon and it's time to be creative and bold. There will be opportunities to fund new ideas.
- NBWA has a history, through the Joint Technical Committee, of helping to fund projects and to write grant applications, and fund feasibility studies that benefit the four north bay counties.
- There are new funding sources coming in the next few months that NBWA can assist with applying for
  - Dept of Water Resources Integrated Regional Water Management Planning Funding
  - State agency grants through the budget allocations

Questions and comments (Recording minute 1:34:45)

- Jay Jasperse: Legacy land use issues is a topic that didn't come up today but should be discussed in terms of land use and water management intersection; wastewater, septic systems, water quality, and groundwater.
- David Garcia: In thanking the speakers, he mentioned today had great talking points on how to speak to the community about the complexities of land use and water management.

- Andy Rodgers: [in response to comments about Planning Directors not making today's meeting] Outreach to them is important, and developing some shared messaging/talking points can be developed to address shared action plans to some of problem statements that have come up in today's discussion. The chat questions will be sent out in follow up to this workshop for further discussion. NBWA can assist with making projects more competitive with the state by making them collaborative and regional scale; please send ideas to NBWA staff.

  Please send NBWA any contacts of who should be invited to future discussions.

- Pete Parkinson: It is a struggle to get Planning Directors involved and engaged in this topic. It will take a sustained effort on the water management community to outreach and offer program ideas for meetings.

Zoom Chat:

Pat Marino: Given recent SEC proposed rule that requires companies to disclose to investors if whether the business in question would be at risk due to water scarcity....shouldn't local counties have similar rules that would require business to report water usage or prior to operation declare how much water they are going to use subject to county approval? https://www.sec.gov/rules/proposed/2022/33-11042.pdf

Chris Choo: [Questions to respond to]

1. What surprised you today?
   - Leelee: Planning directors should be part of the conversation.
   - Steve Moore: Are there some projects that are at the top of the list for NBWA for funding?
     i. Chris Choo: She is hoping projects will come from this workshop's conversations today and from future follow up discussions. Projects related to disadvantage communities will continue to move forward. Historic projects include reservoir improvements, rebates for water efficiency, recycled water projects, storm water, and restoration.
   - Erik: the real challenge is the state's requirements and all the laws and legislation being passed regarding housing and how it then impacts water. There are competing interests with housing needs and water issues. Smaller areas also lack staff to go after funding.
   - Evan: Today's discussion has highlighted missed water resources education opportunities in urban planning programs. Also, when you don't have progressive urban planners in regard to water resource planning, State mandates can be helpful.
2. Who do you need to talk to or meet? Take a moment to introduce yourself to others on the chat!
3. What is unfunded but needed?
4. Would it be helpful to convene more small focus groups around these topics? Jurisdictions, developers, community advocates, agencies?
   1. Continuing these conversations between planning and agencies. Bring in others?
5. Does the group need assistance accessing policies and practices for water planning in new development?
6. Do you need assistance with grants: IRWM in early 2023, other state and federal opportunities coming. NBWA has submitted multi-jurisdictional grants on behalf of agencies, brought information to the region, and has directly funded projects, studies, etc. Are you interested in assistance with grants?
7. Can NBWA help develop feasibility studies for regional concepts, lead a regional programmatic CEQA document or ?? Do Sonoma and Marin Counties need help with the next steps for the regional water supply resiliency study?
8. Can we coordinate advocacy to improve access to funds, streamlining processes, etc. else?

Andy Rodgers, NBWA: a couple ideas from both Leelee and Evan's comments: We consider developing shared messages/problem statements - perhaps Venn diagrams for the limitations and requirements of water resources and housing/land use. We need to educate decision makers as well as staff.

Pat Marino: Would it be wise to consider a moratorium or conditional water use on private plastic water bottling companies continuing to operate (i.e. Coca Cola, Nestle, etc.)?

<u>10:50</u> Next Steps & Closing – Andy Rodgers

Follow-up strategies to continue the dialog
Options for a next meeting possibly in September 2022

North Marin Water District

Budgets

Novato & West Marin Service Areas

Adopted June 28, 2022

Fiscal Year 2022/23

NORTH MARIN WATER DISTRICT
NMWD.COM
999 RUSH CREEK PLACE
NOVATO, CALIFORNIA 94945

INTRODUCTION

This document contains the fiscal year 2022/23 budgets for North Marin Water District's various enterprise service districts located in Marin County. These are:

Potable Water Service:
- Novato
- West Marin (Point Reyes Station, Inverness Park, Olema, Bear Valley, Silver Hills & Paradise Ranch Estates)

Recycled Water Treatment, Transmission and Distribution:
- Novato

Sewage Collection, Treatment & Reuse/Disposal:
- Oceana Marin

Accompanying the operating budgets are capital improvement project expenditures for the fiscal year. Questions regarding these budgets may be directed to Julie Blue, Auditor-Controller, at jblue@nmwd.com or 415-761-8950.

MISSION STATEMENT

Our mission is to meet the expectations of our customers in providing potable and recycled water and sewer services that are reliable, high-quality, environmentally responsible, and reasonably priced.

VISION STATEMENT

We strive to optimize the value of services we provide to our customers and continually seek new ways to enhance efficiency and promote worker and customer engagement and satisfaction.

NMWD VALUES

- Accountability – We work transparently and in full view of customers and take responsibility for our work.
- Integrity – Customers can count on quality and fair service from our staff and the District.
- Teamwork – We work cooperatively to accomplish our goals.
- Honesty – We always seek the truth in what we do.
- Respect – We value our customers and co-workers.

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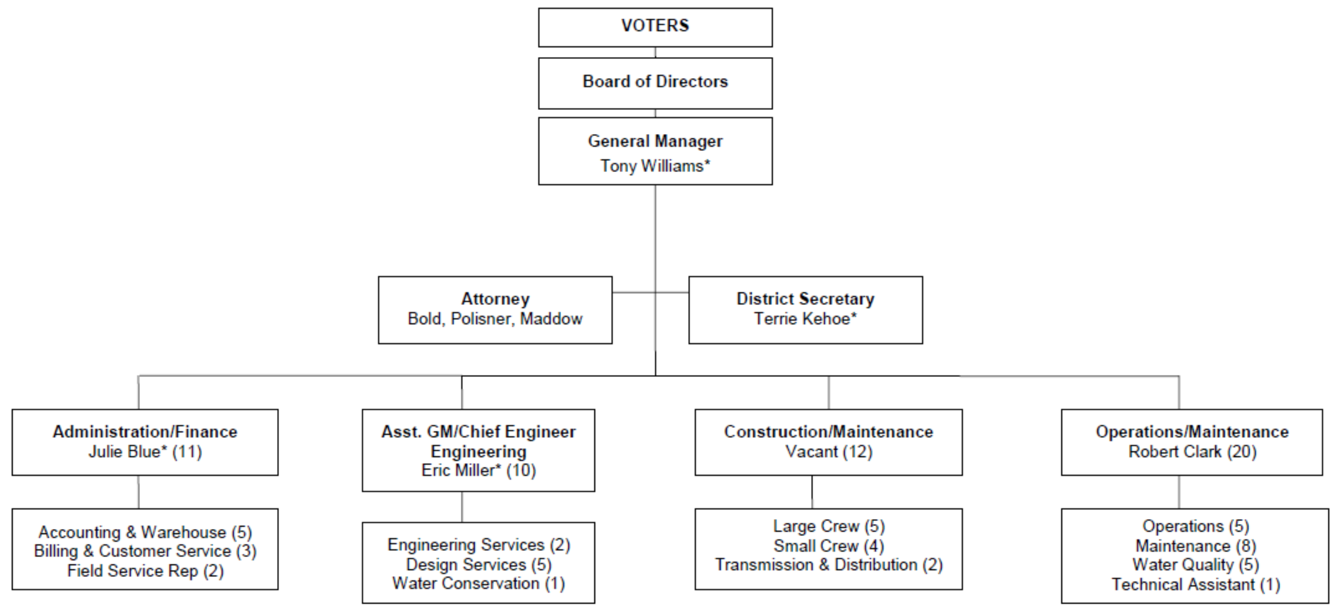
ORGANIZATION FACT SHEET
July 2022

Organization:

5 Directors elected By-District (Division) for 4-year terms
- Stephen Petterle (Division 4), President
- Rick Fraites (Division 5), Vice-President
- James Grossi (Division 1)
- Jack Baker (Division 2)
- Michael Joly (Division 3)

1 General Manager, Tony Williams (serves at the pleasure of the Board of Directors)
4 Departments
55 Employees (regular full-time-equivalent authorized)



*Also serves as District officer

Authority:

Formed by voter approval in April 1948 pursuant to provisions of the County Water District Law (refer Water Code - Division 12). A "voter-run" district.

Territory:

100 square miles (see attached map)

Distribution System Expansion Policy:

"Pay-as-you-go." Connection fees for typical single family units vary for each improvement district and are based on the policy that new growth pays the incremental cost to expand the utility plant allocable to said service.

North Marin Water District Boundary Map

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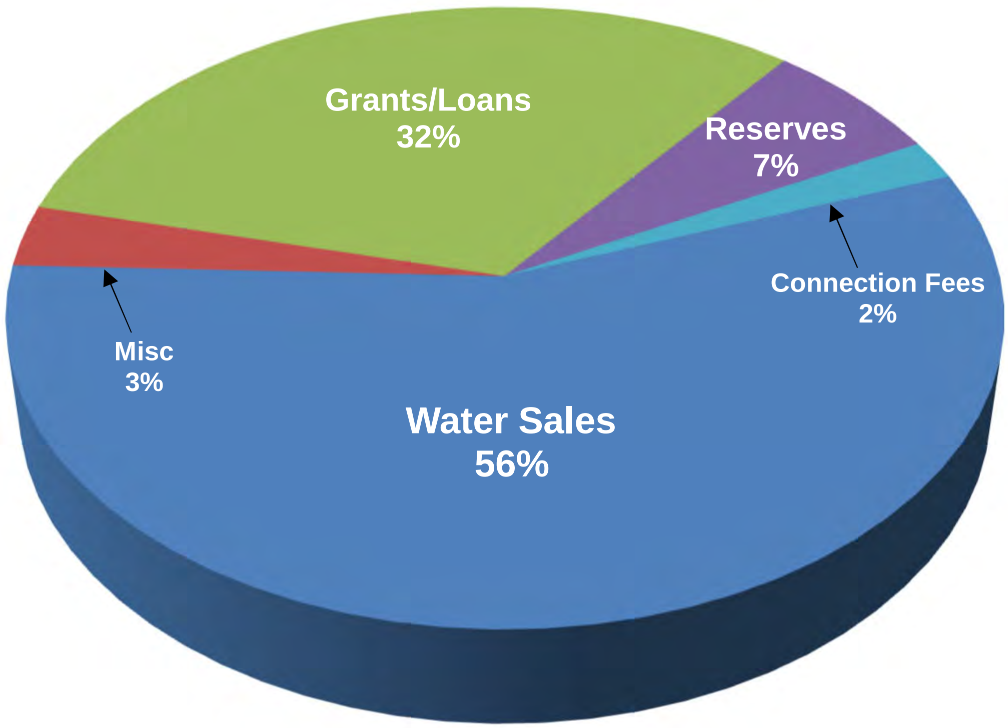
NORTH MARIN WATER DISTRICT
FISCAL YEAR 2022/23 WATER AND SEWER BUDGETS

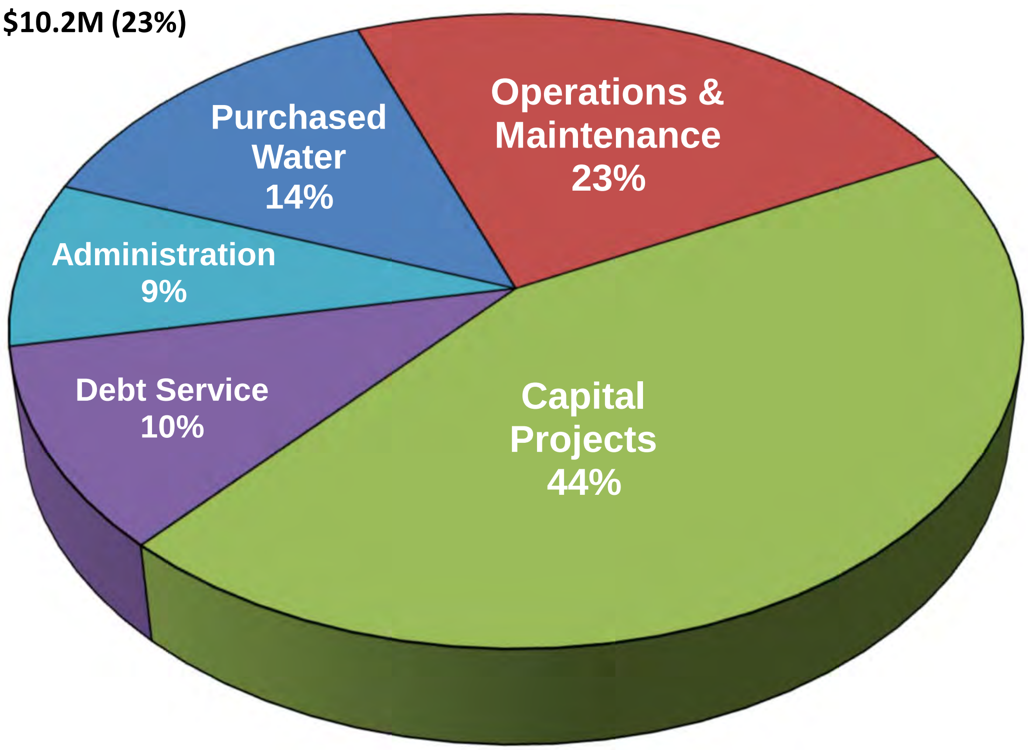
NORTH MARIN WATER DISTRICT

FY22/23 DRAFT BUDGET - ALL SERVICE AREAS COMBINED

SOURCES = $44,089,000



Labor = $10.2M (23%)



USES = $44,089,000

Excludes Depreciation Expense & Developer Funded Costs

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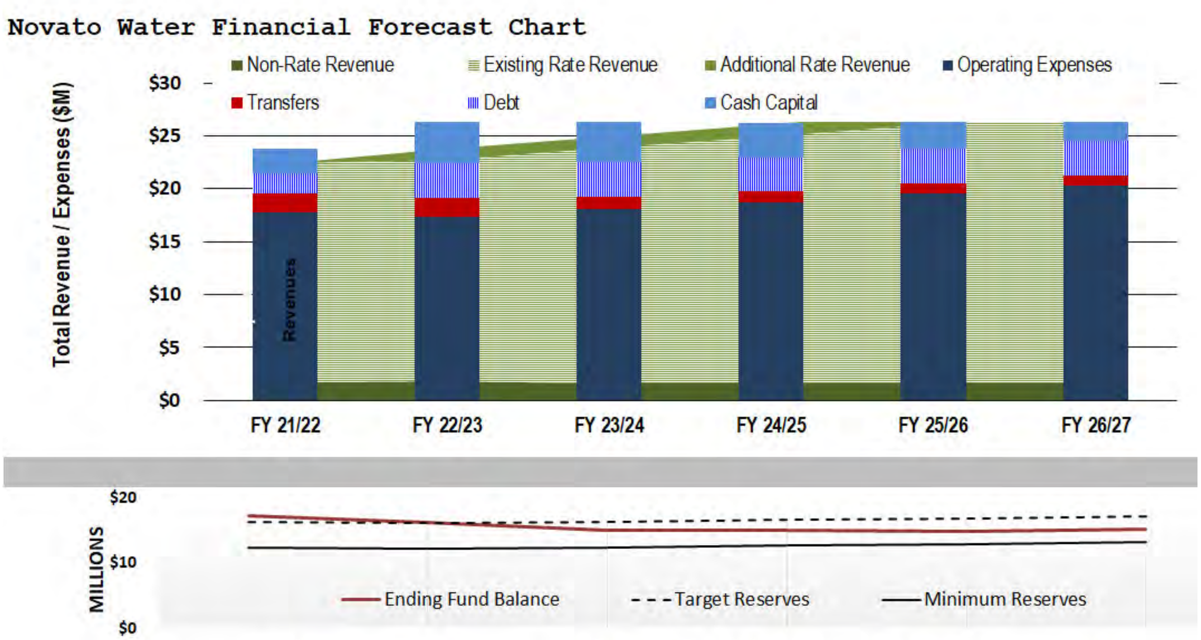
Summary

The $44.1 million consolidated budget projects operating revenue of $25.6 million and a net operating income of $2.5 million. The FY 22/23 budget incorporates $4.5 million in internally funded capital improvement projects and $5.7 million in water purchases. After payment of $4.6 million in debt service, the consolidated budget projects a decrease in cash for the fiscal year of $2.9 million.

Novato Water

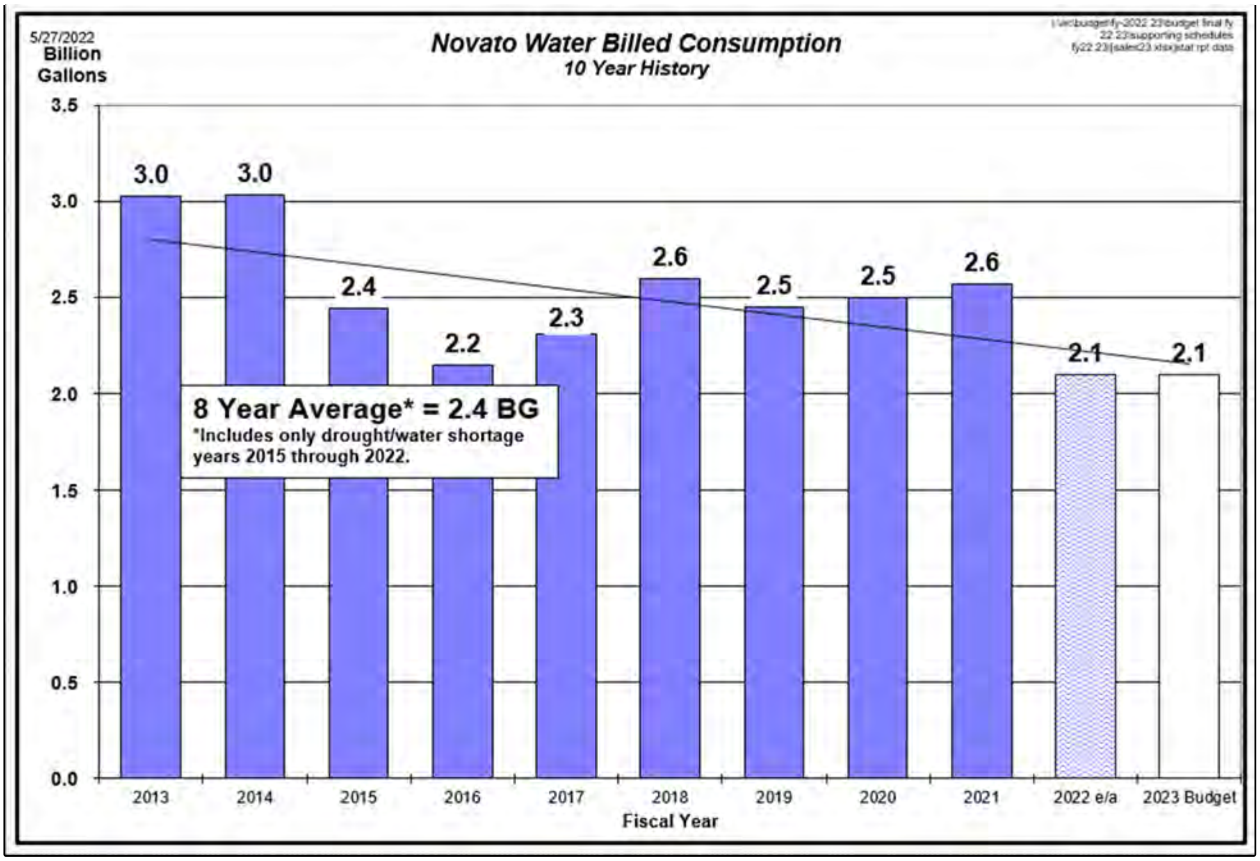
The Novato Potable Water System budget projects a $3 million cash decrease over the fiscal year. A 6% rate increase in both the commodity and service charge, effective July 1, 2022, was approved by the Board of Directors at a public hearing on June 28, 2022. Total budget outlay, which includes $3.9 million in internally funded capital improvement projects, is projected at $26.9 million which is $2M higher than the FY 21/22 budget. The below chart shows that the Novato Water financial plan will maintain sufficient cash reserves aiming towards the designated targets and remaining above the minimum level, as established during the 2020 Novato and Recycled Water Rate Study.



	FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27
	6.0%	6.0%	6.0%	5.0%	5.0%	5.0%
Debt Coverage Ratio:	2.04	1.72	1.86	1.99	2.14	2.29
Net Debt Proceeds:	$1.4M	$12.7M	$2.4M	$0.0M	$0.0M	$0.0M

Operating Revenue

Water Sales - Water sales volume is budgeted at 2.1 billion gallons (BG) which is a 12.5% decrease from the FY 21/22 budget. The decrease is primarily driven by the continuation of mandatory water conservation orders due to ongoing drought conditions and is equivalent to the estimated sales for FY 21/22. The 6% rate increase, effective July 1, 2022 is projected to increase revenues by $1 million but is highly dependent on water sales volume. The following chart shows a 10-year history of billed consumption for the Novato Potable Water System. The FY 22/23 Budget also includes a drought surcharge of 5%, assuming drought conditions (Stage 2 water shortage) to continue throughout the fiscal year.



Other Revenue – Connection Fee revenue is budgeted at $872,000. Connection Fee revenue of $890,000 for 31 Equivalent Dwelling Units (EDUs) is estimated to be collected in FY 21/22. The annual average connections have been 61 EDUs (FY 17/18 through FY 21/22). Included in the projections is annual Connection Fee revenue equivalent to 30.5 EDUs or about half of the actual five-year average.

The wheeling charge to Marin Municipal Water District is budgeted at $142,000. This is based on the average revenue collected in the past three years. In addition, MMWD will pay the annual fixed AEEP capital contribution of $205,000 in accord with the terms of the 2014 Interconnection Agreement. Miscellaneous Revenue of $216,000, from various sources, includes rental income, backflow charges, and account turn on charges.

Operating Expenditures

Operating expenses (excluding depreciation) are budgeted to increase 1% or $171,000 from the FY 21/22 budget. The increase is primarily due to inflation adjustments, increases in the cost to purchase water, insurance costs, and personnel costs. This increase is offset by a projected decrease in water purchases due to decreased demand. Water purchases, and some operational costs are variable and dependent on the volume of water produced and purchased while other expenses such as salaries, benefits, general liability insurance, and other administrative costs are fixed. More details are outlined in this budget report.

Source of Supply – The purchase price of water from Sonoma Water (SW) (AKA Sonoma County Water Agency) is projected to increase 5.2% in FY 22/23. This change will result in a cost per acre-foot of $1,102 for FY 22/23 versus $1,047 for the current fiscal year and is estimated to increase the cost to purchase water by $280,000.

Stafford Treatment Plant (STP) Water Production – STP water production is projected at 500 MG in FY 22/23 which is lower than the 10-year average annual production of 544 MG. This estimate could differ from actual operations and is dependent on drought conditions, statewide water restrictions, and water allocations from Sonoma Water. The cost of production at the end of FY 20/21 was $7,819/MG and varies depending on the volume and length of production.

Although the cost of STP water production is higher than purchases from SW, the benefits of having a local water supply for resiliency and emergency preparedness outweighs the additional costs in operating the plant.

Personnel Costs - The budget includes a staffing level of 55 full-time equivalent (FTE), see table below. There is an increase of a Junior Engineer, one FTE in the Engineering Department, to address an increase in workload demands due to an increase in Capital and Developer Projects. The temporary staffing budget hours are budgeted at 4,975 which is a reduction from the prior year's budget of 7,480 hours. Less temporary hours are needed due to increased efficiencies in the Consumer Services Department and the addition of the full time Junior Engineer position, decreasing the need for Engineering temporary hours.

FTE Staffing	FY23	FY22
Administration	8.0	8.0
Consumer Services	5.0	5.0
Construction/Maintenance	12.0	12.0
Engineering	10.0	9.0
Maintenance	9.0	9.0
Operations	6.0	6.0
Water Quality	5.0	5.0
	55.00	54.00

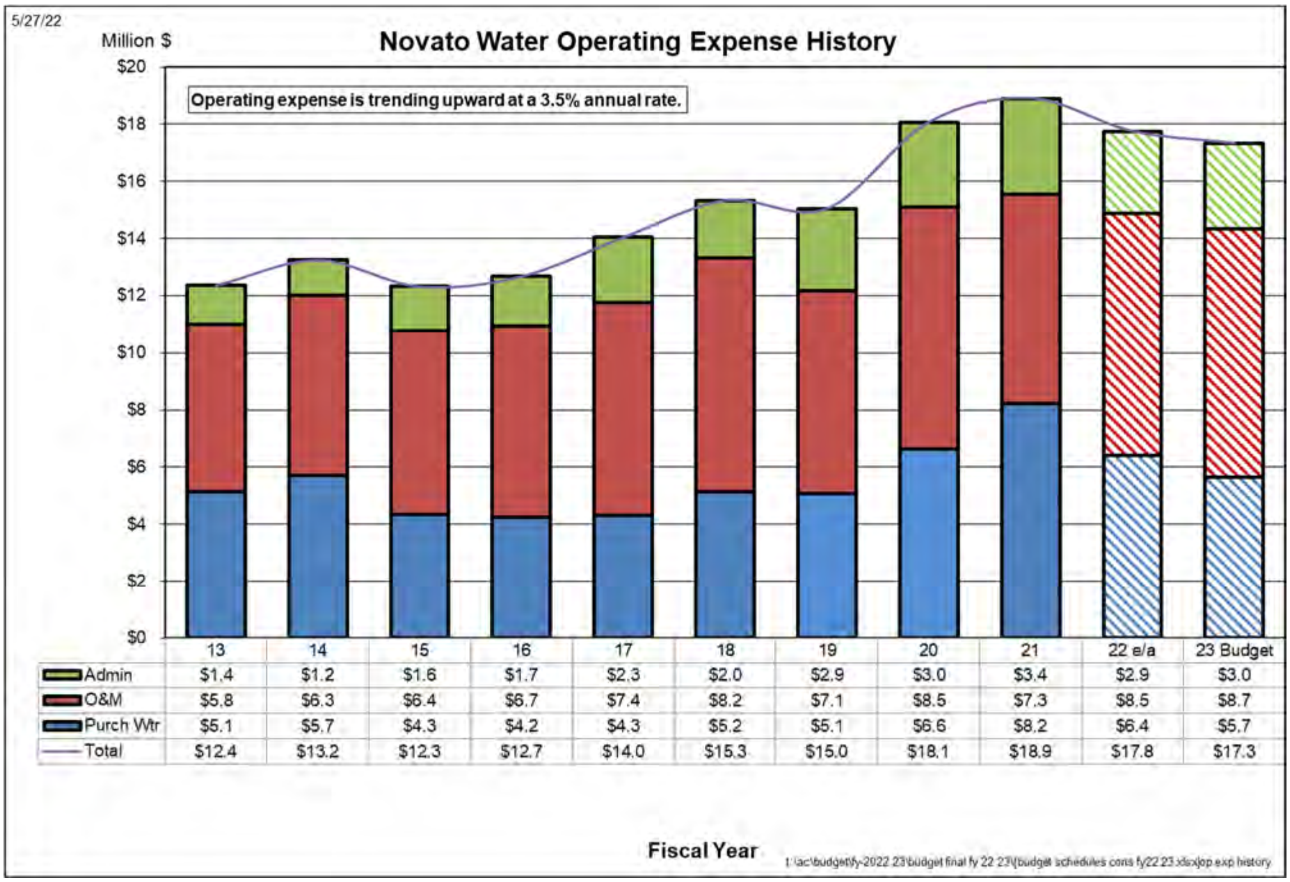
In accordance with the Employee Association and NMWD's Memorandum of Understanding (MOU), a 4.0% cost-of-living salary increase, has been factored into the budget effective October 1, 2022. The MOU links an annual cost-of-living adjustment (COLA) to the change in the Consumer Price Index (CPI). The District entered into a five-year MOU with the NMWD Employee Association beginning on October 1, 2018. The current MOU established a COLA minimum of 2.0% and a maximum of 4%. The 4.0% cost-of-living increase is staff's best projection at this time.

The District's average CalPERS retirement contribution rate will increase 1.81%, to 31.45% of earnings, compared to 29.65% from the rate budgeted last year. When applied to the FY 22/23 budgeted earnings this equates to an increase in pension expense of $173,000. For context the rate in FY 16/17 was 20.2% of earnings and any increases in pension expense has a compounding impact when tied to annual COLA increases. All employees now pay 100% of the CalPERS employee contribution. For budgeting purposes, group health insurance rates remained constant. This cost increased minimally in 2022 and in prior years.

Other Operations & Maintenance Expenses –

- Studies and Special Projects are budgeted at $359K which include an update to the Novato Water Master Plan and a Pipeline Condition Assessment.
- Water Conservation costs are budgeted to increase 19% over budgeted FY 21/22 costs. This is due to ongoing drought conditions and to align with the actual expenditures expected in FY 21/22.
- An addition of $20,000 in non-recurring election costs due to the term expiration of two members of the Board of Directors.
- An increase in insurance premiums and claims of $32,000 from the prior year's budget to align with expected premium costs.

The following chart shows the past 10-years of operating expense (excluding depreciation) for Novato Water. The five-year average increase to actual expenses is 8.6% which is influenced by a one-time payment of $1.1M in FY 19/20 for bond issued debt service made to SW. Additionally, the average increase in operating expenses is impacted by the purchase of 363.5 million gallons of water from SW to backfeed Stafford Lake in FY 21/22 at the cost of $1.1 million. The ten-year actual average increase to operating expenses is 5.6%.



	13	14	15	16	17	18	19	20	21	22 e/a	23 Budget
Admin	$1.4	$1.2	$1.6	$1.7	$2.3	$2.0	$2.9	$3.0	$3.4	$2.9	$3.0
O&M	$5.8	$6.3	$6.4	$6.7	$7.4	$8.2	$7.1	$8.5	$7.3	$8.5	$8.7
Purch Wtr	$5.1	$5.7	$4.3	$4.2	$4.3	$5.2	$5.1	$6.6	$8.2	$6.4	$5.7
Total	$12.4	$13.2	$12.3	$12.7	$14.0	$15.3	$15.0	$18.1	$18.9	$17.8	$17.3

Non-Operating Expenses –

- An increase of $406,000 for costs related to the lease of temporary office and lab space during the Administrative and Laboratory Upgrade Project.

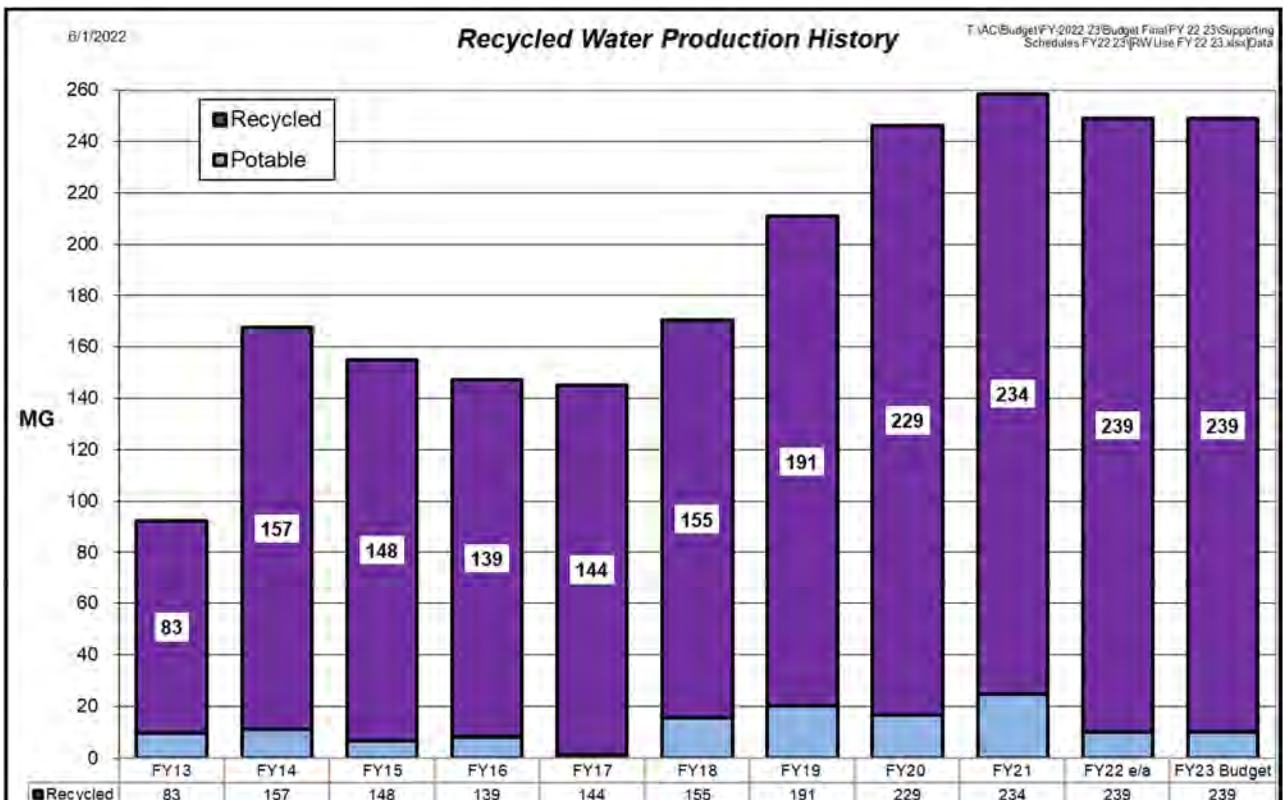
Recycled Water

The FY 22/23 Recycled Water (RW) System Budget projects demand of 249MG which is consistent with the estimated sales volume in FY 21/22. Over the past few years, sales have increased primarily due to the Central expansion project completion in FY 17/18. The budget projects purchase of 180MG of tertiary treated water from Novato Sanitary District for approximately $1,500/MG and 50MG from Las Gallinas Valley Sanitary District, at an average rate of $2,200/MG. The Deer Island Plant is budgeted to produce 5MG during the summer, to keep it operating, and to serve as a back-up facility.

Consistent with the potable water increase, a 6% commodity rate and bimonthly service charge increase was approved by the Board of Directors at a public hearing occurring on June 28, 2022, effective July 1, 2022. The increase is projected to generate $99,000 in additional revenue next fiscal year.

Operating expenses (excluding depreciation) are budgeted to increase 5% or $36,000 from the FY 21/22 budget. This increase is primarily due to refined budget estimates to align more closely with expected actual expenses. The RW system is projected to show a net operating income of $392,000 and an increase of cash for the year of $396,000.

The following chart shows the historical production for the Recycled Water System.

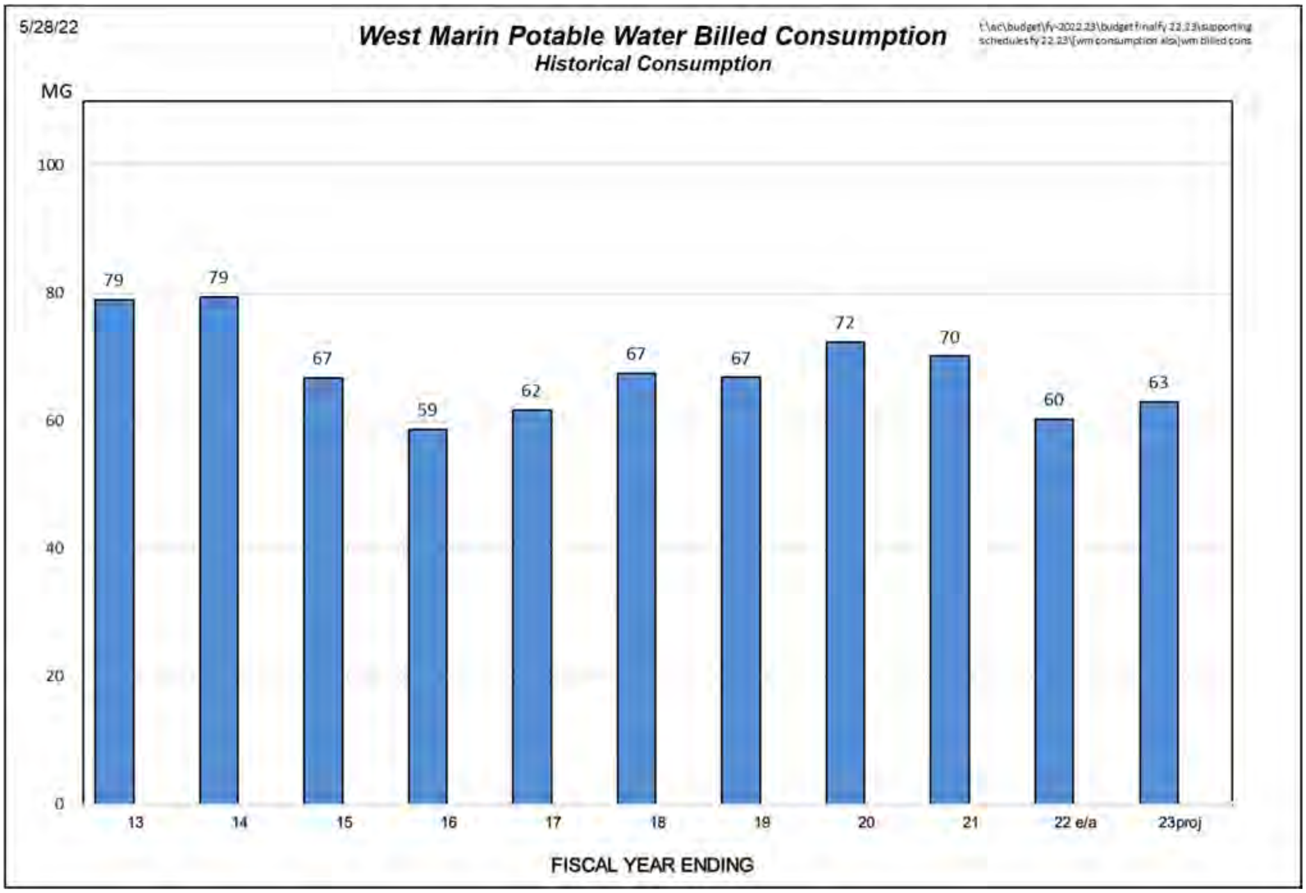


	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22 e/a	FY23 Budget
Recycled	83	157	148	139	144	155	191	229	234	239	239
Potable	9	11	7	8	1	16	20	17	25	10	10

West Marin Water

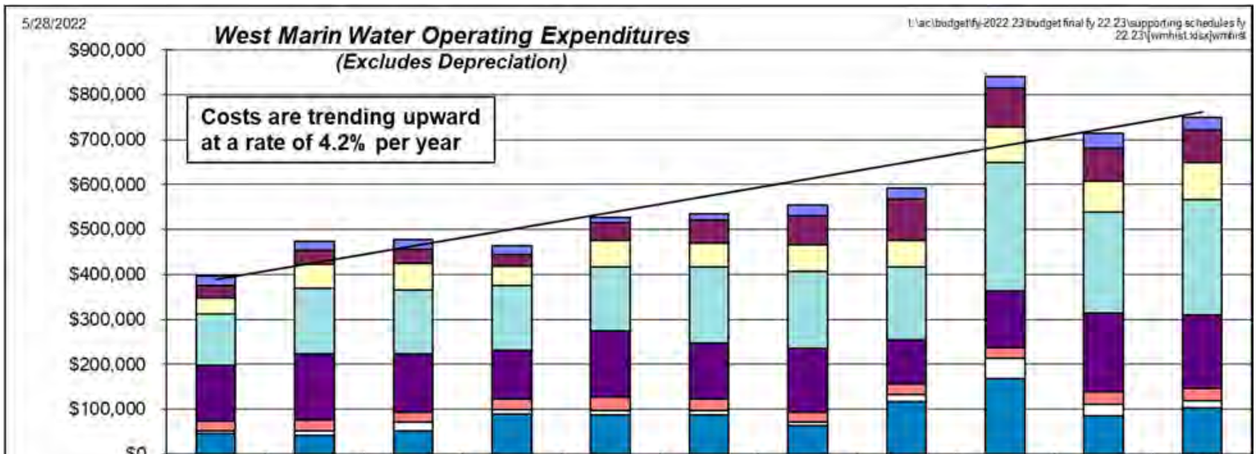
Incorporated in the West Marin Water budget is a 6% rate increase in both the commodity and service charge, effective July 1, 2022. This increase was approved by the Board of Directors at a public hearing on June 28, 2022. There are no new connection fees budgeted for FY 22/23. Included in the five-year financial forecast is revenue for one new connection every other year.

FY 22/23 water sales volume is budgeted at 63MG and is based on the estimated 60 MG in sales for FY 21/22, adjusted up by 5% for the anticipated slight rebound due to normal year water conditions in Lagunitas Creek. See the below chart for the historical consumption for the WM service area.



WM operating expenditures, before depreciation, are budgeted at $750,000 which is $140,000 higher or 22.3% more than the FY 21/22 adopted budget. The increase is primarily due to costs for Water Treatment which include Water Quality and Lab costs for ongoing efforts to monitor salinity intrusion in the West Marin System Source Wells. The budget projects a net operating income of $97,000 and, after capital outlay and debt service, the system is projected to show a cash decrease for the year of $71,000.

The below chart shows the past 10-years of operating expense for West Marin Water.



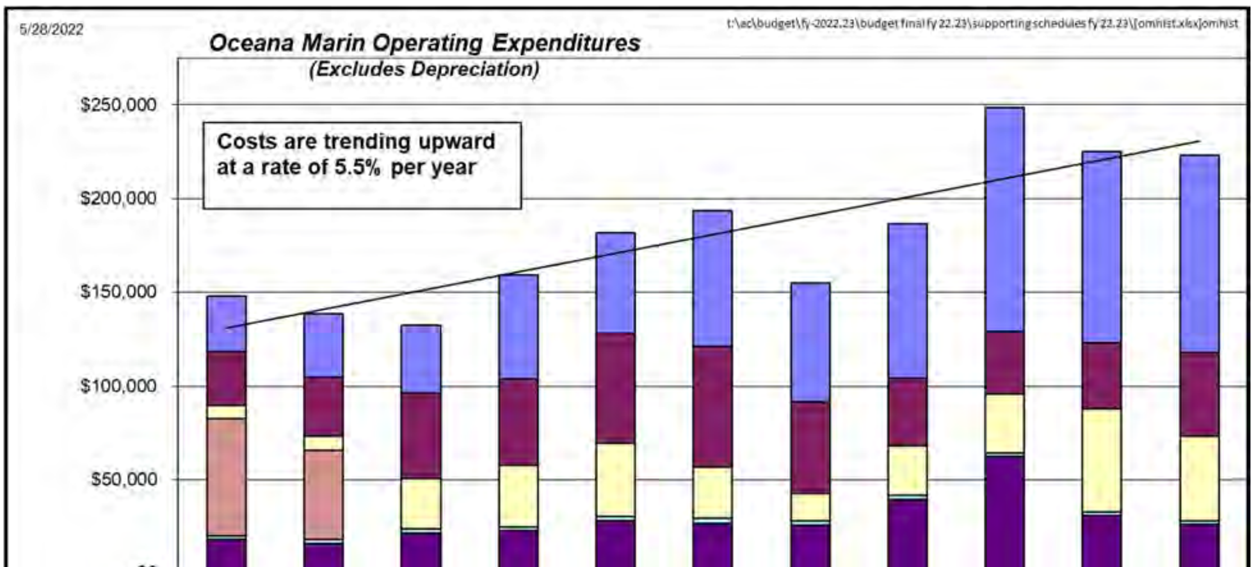
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022 e/a	2023 Budget
Source	$22,161	$21,183	$21,862	$18,290	$12,904	$13,678	$24,458	$22,935	$25,014	$34,000	$27,000
Pumping	$28,195	$30,514	$30,657	$26,199	$38,660	$50,974	$65,515	$91,995	$88,038	$72,000	$73,000
Operations	$34,466	$53,916	$59,531	$43,184	$60,032	$52,794	$59,285	$60,044	$79,176	$70,000	$83,000
Treatment	$113,619	$146,415	$141,132	$144,473	$141,079	$169,778	$169,705	$161,169	$284,865	$224,000	$258,000
T & D	$124,721	$146,566	$129,737	$109,484	$147,913	$123,710	$142,478	$97,879	$125,933	$176,000	$163,000
Cons Acctg	$21,947	$24,334	$23,457	$22,646	$30,414	$27,224	$21,459	$24,374	$24,950	$28,000	$28,000
Wtr Consrv	$5,857	$9,791	$18,960	$9,986	$10,413	$9,615	$7,631	$15,246	$44,357	$24,000	$15,000
G & A	$45,861	$41,561	$51,463	$88,982	$86,366	$86,494	$64,365	$117,324	$168,001	$86,000	$103,000
Total	$396,827	$474,280	$476,799	$463,244	$527,781	$534,267	$554,896	$590,967	$840,334	$714,000	$750,000

Oceana Marin Sewer

A proposed 5% rate increase ($5/month - to $1,296/year) in the Oceana Marin Sewer service charge effective July 1, 2022, is projected to add $14,000 in additional annual revenue. The increase was approved by the Board of Directors at a public hearing on June 28, 2022. Growth in the past three years has remained relatively stable so conservatively there is one new connection fee budgeted for FY 22/23. Included in the five-year financial forecast is revenue for one new connection every other year.

FY 22/23 OM operating expenditures, before depreciation, are budgeted at $223,000 which is an increase of $14,000 or 6.7% from the FY 21/22 adopted budget. The increase is primarily due to an increase in the annual State Water Resources Control Board permit fees for waste discharge. These fees have increased 58% over the last five years. The budget projects a net operating income of $36,000 and, after capital outlay, the system is projected to show a cash decrease for the year of $236,000.

The below chart shows the past 10-years of operating expense for Oceana Marin Sewer.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022 e/a	2023 Budget
Collection	$29,703	$33,587	$36,189	$55,475	$53,664	$72,261	$63,318	$82,426	$119,465	$102,000	$105,000
Treatment	$29,021	$31,901	$45,727	$45,868	$58,688	$64,613	$49,046	$36,060	$33,631	$35,000	$45,000
Disposal	$6,895	$7,257	$27,022	$32,850	$38,854	$27,083	$14,803	$26,545	$31,233	$55,000	$45,000
Contract Ops	$62,281	$47,803	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cons Acctg	$2,162	$2,235	$2,091	$2,131	$2,244	$2,590	$1,977	$2,162	$1,868	$2,000	$2,000
G & A	$18,099	$15,735	$21,604	$22,807	$28,284	$26,870	$25,925	$39,509	$62,440	$31,000	$26,000
Total	$148,161	$138,518	$132,633	$159,131	$181,734	$193,417	$155,069	$186,702	$248,637	$225,000	$223,000

Capital Improvement Project Budget (CIP)

The Fiscal Year 22/23 and FY 23/24 Capital Improvement Project (CIP) budget includes projects recommended for Novato Water, Recycled Water, West Marin Water, and Oceana Marin Sewer. Also included is a debt service schedule detailing the principal and interest payment required to fund prior CIPs.

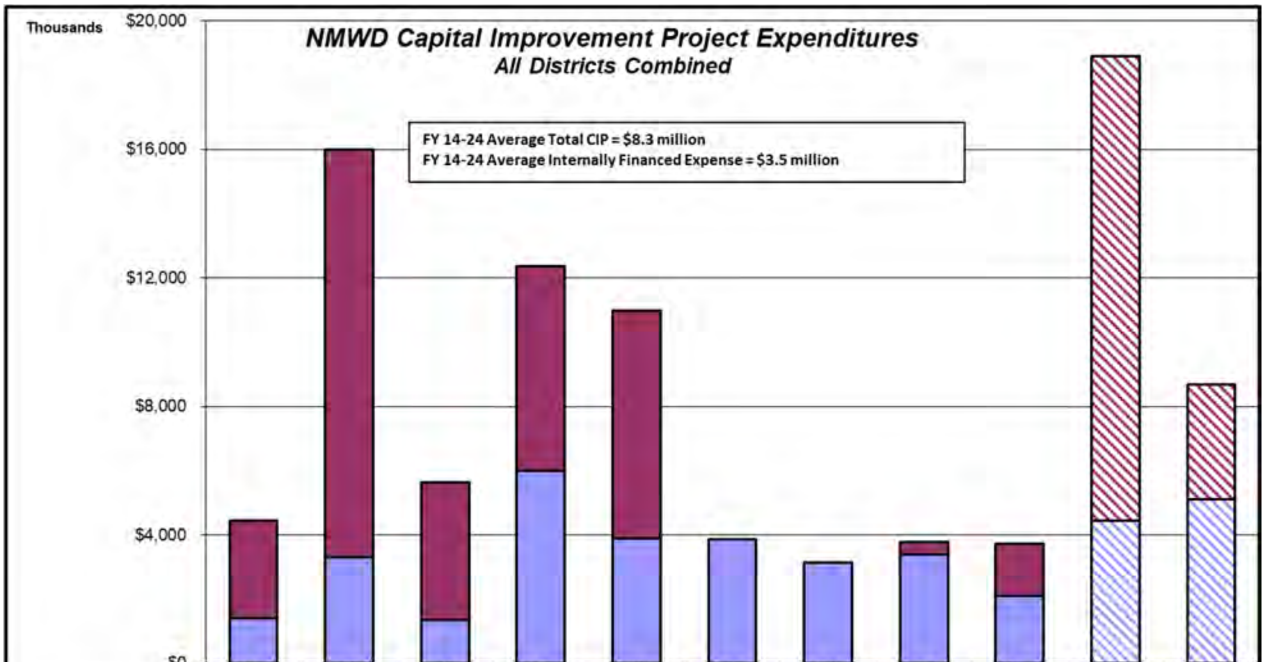
Below is a summary identifying the significant projects (totaling $400,000 or more) to be undertaken over the next two fiscal years. The below table also includes the total cost of the projects which adds all costs occurring within and outside of the two-year budget period.

Project	FY22/23	FY23/24	Total Project Costs
Administration and Laboratory Upgrade Project	$ 12,650,000	$ 2,350,000	$16,350,000
Novato Blvd Widening – Diablo to Grant (4,100')	1,000,000	1,500,000	2,500,000
Lynwood Recoat/Seismic Upgrade	1,000,000	1,000,000	2,000,000
San Mateo Tank 24" Transmission Main	-	332,000	1,328,000
Oceana Marin Treatment Pond Rehab (OM)	1,200,000	205,000	1,405,000
PRE Tank #1 & #2 Replacement (WM)	-	620,000	620,000
Other Projects	3,049,000	2,664,000	-
Gross Project Outlay	18,899,000	8,671,000	24,203,000
Less Loan/Grant Funding	(14,450,000)	(3,554,000)	(18,004,000)
Net Project Outlay (internally funded)	**$4,449,000**	**$5,117,000**	**$6,199,000**

The two-year combined total project outlay, net of grant/loan funding, totals $9.6 million, which is $1 million less than the $10.6 million combined two-year budget adopted last year. The CIP budget includes 38 projects in FY 22/23 and 31 projects in FY 23/24. This comprehensive plan is developed to confirm that adequate funding and staffing exists to accomplish the budgeted projects planned for FY 22/23.

	Net Cash Outlay (Pay-go)		
District	Proposed FY23 & FY23	Adopted FY21 & FY22	Increase (Decrease)
Novato Water	$8,457,000	$8,850,000	$ (393,000)
Recycled Water	-	450,000	(450,000)
WM Water	434,000	791,000	(357,000)
OM Sewer	675,000	510,000	165,000
Total	**$9,566,000**	**$10,601,000**	**$ (1,035,000)**

The below chart shows the District wide 10-year history of capital improvement projects which averages $8.3M per year including $3.5M of internally (or “Pay-Go”) financed projects.



	14	15	16	17	18	19	20	21	22 e/a	23 Budget	24 Budget
Debt/Grant Financed	$3,062	$12,676	$4,285	$6,351	$7,090	$0	$0	$411	$1,632	$14,450	$3,554
Internally Financed	$1,393	$3,321	$1,341	$5,999	$3,901	$3,871	$3,135	$3,381	$2,096	$4,449	$5,117
Total	$4,455	$15,997	$5,626	$12,350	$10,991	$3,871	$3,135	$3,792	$3,728	$18,899	$8,671

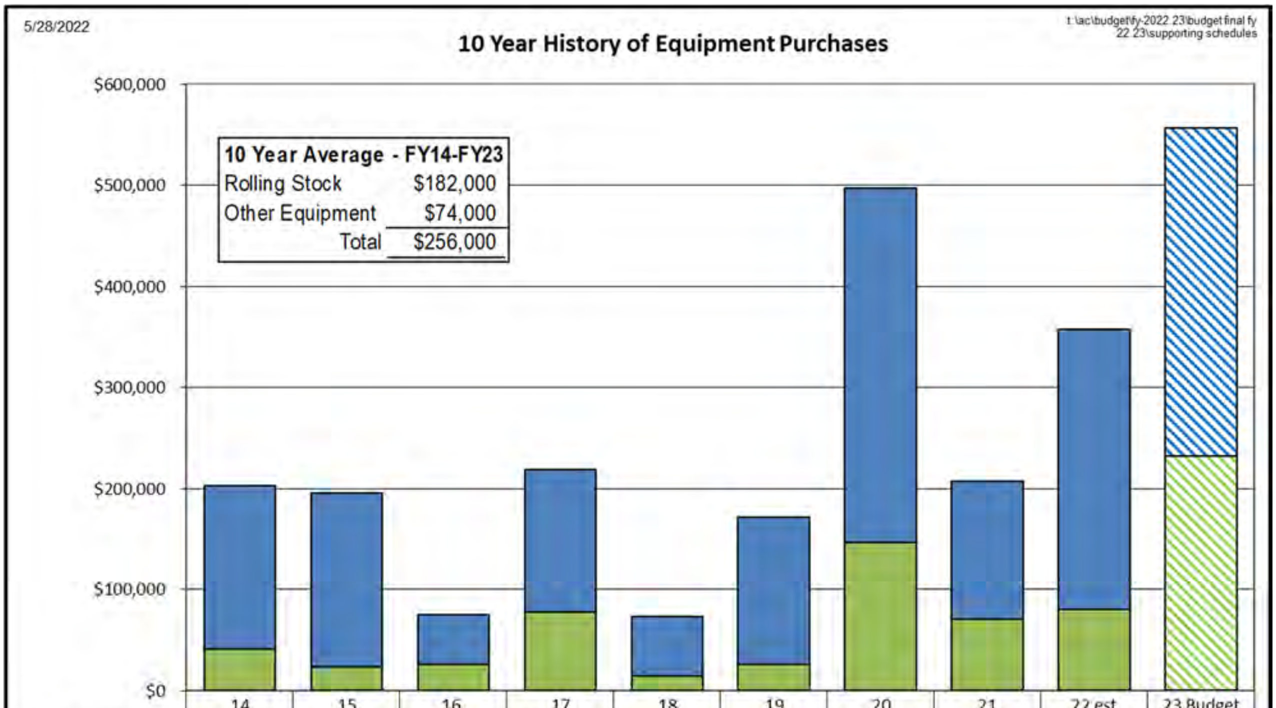
Novato Potable Water's CIP expenditure plan, when viewed over the current fiscal year and the next five years, averages $4.1 million annually in internally funded projects, which is within the budget constraints of the five-year plan as established with the Board approved 2020 Novato and Recycled Water Rate Study. West Marin Water's CIP expenditure plan, when viewed over the next five years, averages $280,000 annually in internally funded projects, which is within the budget constraints of the five-year plan as established with the Board approved 2021 West Marin Water Rate Study.

Equipment Budget

The FY 22/23 Equipment Budget totals $557,000. This is $262,000 higher than the FY 21/22 Equipment Budget of $295,000. FY 21/22 estimated actual expenditures are forecast to come in at $358,000 which is $63,000 above budget.

In FY 18/19 the District entered into a leasing agreement with Enterprise Fleet Management (EFM) with a plan to lease 27 vehicles, phased in over five years. The prior year budget did not include the leased vehicles due to a change in accounting treatment, effective June 30, 2021. There are currently 15 leased vehicles in the District's fleet. Included in the FY 22/23 budget is $205,000 for leased vehicles for the replacement of six additional vehicles, ranging from 6 to 10 years old.

Another significant purchase included in the equipment budget is $150,000 for a meter testing bench and equipment. The following chart shows the ten-year history of equipment purchases.



	14	15	16	17	18	19	20	21	22 est	23 Budget
Rolling Stock	$161,834	$172,989	$48,812	$141,044	$58,143	$145,730	$350,170	$136,581	$278,000	$325,000
Other Equipment	$40,934	$23,231	$26,374	$77,802	$14,731	$25,849	$146,935	$70,748	$80,000	$232,000
Total	$202,768	$196,220	$75,187	$218,846	$72,874	$171,579	$497,105	$207,329	$358,000	$557,000

Debt Service

Principal and interest payments totaling $4.6 million are budgeted as the annual obligation on $48.1 million in outstanding debt (as of June 30, 2022), comprised of:

1.) $3.6 million with a 2.69% interest rate for a bank loan used to finance the Advanced Meter Information (AMI) project;
2.) $6.7 million with a 2.39% interest rate for a State Revolving Fund (SRF) loan used to finance the Stafford Water Treatment Plant Rehabilitation;
3.) $12.1 million in SRF loans (with interest varying from 1%-2.6%) used to finance the recycled water distribution system;
4.) $4.4 million with a 3.54% interest rate for a bank loan used to finance the Aqueduct Energy Efficiency Project and West Marin Treatment Plant Solids-Handling Facility;
5.) $1.3 million with a 2.4% interest rate for a SRF loan used to finance the Deer Island Recycled Water Facility;
6.) $20 million with a 3.11% for a bank loan used to finance the Administration and Laboratory Upgrade Project other capital improvement projects in Novato & West Marin.

The Capital Improvement schedule includes additional debt service of $1,348,000 for the Administration and Laboratory Upgrade Project. The loan was obtained on May 31, 2022 and semi-annual repayments commence in September 2022. Additional debt capacity remains available and the debt financing planned in the CIP budget will allow the District to maintain an average debt service coverage ratio of 1.5 as required by the Board approved Debt Policy. The estimated FY 22/23 consolidated debt service coverage ratio is 1.67.

NORTH MARIN WATER DISTRICT
BUDGET SUMMARY - ALL SERVICE AREAS COMBINED
Fiscal Year 22/23

		Adopted Budget 2022/23	*Estimated Actual 2021/22*	*Adopted Budget 2021/22*
	OPERATING INCOME			
1	Water Sales	**$24,865,000**	$23,382,000	$22,957,000
2	Sewer Service Charges	**306,000**	290,000	290,000
3	Wheeling & Misc Service Charges	**381,000**	494,000	470,000
4	**Total Operating Income**	**$25,552,000**	$24,166,000	$23,717,000
	OPERATING EXPENDITURES			
5	Source of Supply	**$6,182,000**	$6,860,000	$6,559,000
6	Pumping	**627,000**	487,000	646,000
7	Operations	**1,120,000**	1,235,000	1,026,000
8	Water Treatment	**2,802,000**	2,418,000	2,794,000
9	Sewer Service	**195,000**	192,000	195,000
10	Transmission & Distribution	**3,898,000**	4,079,000	4,086,000
11	Consumer Accounting	**508,000**	480,000	528,000
12	Water Conservation	**462,000**	489,000	381,000
13	General & Administrative	**3,222,000**	3,102,000	2,440,000
14	Depreciation Expense	**4,077,000**	3,934,000	3,904,000
15	**Total Operating Expenditures**	**$23,093,000**	$23,276,000	$22,559,000
16	***NET OPERATING INCOME (LOSS)***	**$2,459,000**	$890,000	$1,158,000
	NON-OPERATING INCOME/(EXPENSE)			
17	Tax Proceeds	**$123,000**	$120,000	$116,000
18	Interest Revenue	**332,000**	217,000	241,000
19	Miscellaneous Revenue	**142,000**	69,000	136,000
20	Interest Expense	**(1,119,000)**	(687,000)	(1,372,000)
21	Transfers Out from Capital Expansion Fund	**(590,000)**	-	(501,000)
22	Miscellaneous Expense	**(407,000)**	(284,000)	(3,000)
23	**Total Non-Operating Income/(Expense)**	**($1,519,000)**	($565,000)	($1,383,000)
	NET INCOME/(LOSS)	**$940,000**	$325,000	($225,000)
	OTHER SOURCES/(USES) OF FUNDS			
24	Add Depreciation Expense	**$4,077,000**	$3,934,000	$3,904,000
25	Connection Fees	**902,000**	929,000	558,000
26	MMWD AEEP Capital Contribution	**205,000**	205,000	205,000
27	Loans/Grants	**13,450,000**	1,581,000	5,125,000
28	Marin Country Club Principal Repayment	**39,000**	38,000	38,000
29	West Marin Loan Principal Repayment	**69,000**	-	-
30	Capital Improvement Projects	**(18,899,000)**	(3,730,000)	(11,250,000)
31	CIP Efficiency Adjustment	**-**	-	1,558,000
32	Transfers In from Capital Expansion Fund	**350,000**	-	-
33	Capital Equipment Expenditures	**(557,000)**	(358,000)	(295,000)
34	Low Income Rate Assistance	**(42,000)**	(21,000)	(86,000)
35	Debt Principal Payments	**(3,459,000)**	(2,450,000)	(2,541,000)
36	**Total Other Sources/(Uses)**	**($3,865,000)**	$128,000	($2,784,000)
37	***CASH INCREASE/(DECREASE)***	**($2,925,000)**	$453,000	($3,009,000)

NOVATO POTABLE WATER
BUDGET SUMMARY
Fiscal Year 22/23

		Adopted Budget 2022/23	*Estimated Actual 2021/22*	*Adopted Budget 2021/22*
	OPERATING INCOME			
1	Water Sales	**$21,927,000**	$20,713,000	$20,398,000
2	Wheeling & Misc Service Charges	**358,000**	356,000	347,000
3	**Total Operating Income**	**$22,285,000**	$21,069,000	$20,745,000
	OPERATING EXPENDITURES			
4	Source of Supply	**$5,775,000**	$6,452,000	$6,141,000
5	Pumping	**547,000**	412,000	561,000
6	Operations	**933,000**	1,061,000	850,000
7	Water Treatment	**2,511,000**	2,166,000	2,594,000
8	Transmission & Distribution	**3,661,000**	3,866,000	3,853,000
9	Consumer Accounting	**476,000**	448,000	498,000
10	Water Conservation	**447,000**	465,000	377,000
11	General Administration	**2,989,000**	2,881,000	2,294,000
12	Depreciation Expense	**3,012,000**	2,918,000	2,807,000
13	**Total Operating Expenditures**	**$20,351,000**	$20,669,000	$19,975,000
14	***NET OPERATING INCOME (LOSS)***	**$1,934,000**	$400,000	$770,000
	NON-OPERATING INCOME/(EXPENSE)			
15	Interest Revenue	**$280,000**	$172,000	$150,000
16	Miscellaneous Revenue	**136,000**	$64,000	136,000
17	Interest Expense	**(846,000)**	(416,000)	(1,088,000)
18	Miscellaneous Expense	**(406,000)**	(283,000)	(2,000)
19	**Total Non-Operating Income/(Expense)**	**($836,000)**	($463,000)	($804,000)
20	***NET INCOME/(LOSS)***	**$1,098,000**	($63,000)	($34,000)
	OTHER SOURCES/(USES) OF FUNDS			
21	Add Depreciation Expense	**$3,012,000**	$2,918,000	$2,807,000
22	Connection Fees	**872,000**	890,000	558,000
24	MMWD AEEP Capital Contribution	**205,000**	205,000	205,000
25	West Marin Loan Principal Repayment	**69,000**	-	100,000
26	Loans/Grants	**12,650,000**	1,350,000	3,575,000
27	Low Income Rate Assistance Program	**(42,000)**	(21,000)	(86,000)
28	Capital Equipment Expenditures	**(557,000)**	(358,000)	(295,000)
29	Capital Improvement Projects	**(16,527,000)**	(3,220,000)	(8,475,000)
30	CIP Efficiency Adjustment	**-**	-	1,558,000
31	Debt Principal Payments	**(2,404,000)**	(1,487,000)	(1,488,000)
32	Connection Fee Transfer from (to) RW	**(890,000)**	(743,000)	(890,000)
33	Loan Transfer WM/OM - Less WM Repay	**(500,000)**	(800,000)	(550,000)
34	**Total Other Sources/(Uses)**	**($4,112,000)**	($1,266,000)	($2,981,000)
33	***CASH INCREASE/(DECREASE)***	**($3,014,000)**	($1,329,000)	($3,015,000)

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NOVATO POTABLE WATER
Fiscal Year 22/23 Five-Year Financial Forecast

		Adopted Budget FY 22/23	Forecast FY 23/24	Forecast FY 24/25	Forecast FY 25/26	Forecast FY 26/27
1		6.00%	5.00%	5.00%	5.00%	5.00%
	Rate Revenue					
2	**Water Rate Revenue**	$20,143,000	$22,178,000	$23,287,000	$24,451,000	$25,674,000
3	Drought Surcharge	750,000	-	-	-	-
4	Change due to growth	15,000	16,000	17,000	18,000	19,000
5	Increase due to rate adjustme	1,019,000	1,109,000	1,164,000	1,223,000	1,284,000
	Non-Rate Revenues					
6	Wholesale Rate Revenue	$142,000	$142,000	$142,000	$142,000	$142,000
7	Other Charges	216,000	182,000	182,000	182,000	182,000
8	Interest Earnings	255,000	173,000	173,000	173,000	173,000
9	Connection Fees	872,000	872,000	872,000	872,000	872,000
10	Miscellaneous Revenue	136,000	75,000	75,000	75,000	75,000
11	Loan Repayment WM	94,000	94,000	94,000	94,000	94,000
12	MMWD AEEP Contributions	205,000	205,000	205,000	205,000	205,000
13	**Total Revenue**	**$23,847,000**	**$25,046,000**	**$26,211,000**	**$27,435,000**	**$28,720,000**
	O&M Costs					
14	Source of Supply	$5,775,000	$6,122,000	$6,489,000	$6,878,000	$7,291,000
15	Pumping	547,000	563,000	580,000	597,000	615,000
16	Other Operations	933,000	961,000	990,000	1,020,000	1,051,000
17	Water Treatment	2,511,000	2,586,000	2,664,000	2,744,000	2,826,000
18	Transmission & Distribution	3,661,000	3,771,000	3,884,000	4,001,000	4,121,000
19	Consumer Accounting	476,000	490,000	505,000	520,000	536,000
20	Water Conservation	447,000	460,000	474,000	488,000	503,000
21	General Administration	2,989,000	3,079,000	3,171,000	3,266,000	3,364,000
22	***Total Operating Expenses***	**$17,339,000**	**$18,032,000**	**$18,757,000**	**$19,514,000**	**$20,307,000**
	Capital Costs					
23	**Total Capital Spending**	**$17,084,000**	**$6,461,000**	**$4,707,000**	**$3,739,500**	**$3,852,000**
24	**Debt/Grant Funded Capital**	**12,650,000**	**2,350,000**	**-**	**-**	**-**
25	**Grant Funded Capital**	**-**	**249,000**	**1,505,000**	**-**	**-**
26	Existing Debt Service	$1,902,000	$3,250,000	$3,250,000	$3,250,000	$3,250,000
27	Cash Funded Capital Projects	4,434,000	3,862,000	3,202,000	3,739,500	3,852,000
28	New Debt Service	1,348,000	-	-	-	-
29	***Total Capital Expenses***	**$7,684,000**	**$7,112,000**	**$6,452,000**	**$6,989,500**	**$7,102,000**
	Transfers/Other					
30	Transfer Out to Recycled Water	$890,000	$890,000	$890,000	$890,000	$890,000
31	Transfer Out to WM/OM	500,000	-	-	-	-
32	Funding for Affordability Program	42,000	84,000	84,000	84,000	84,000
33	Other Expenses	406,000	283,000	-	-	-
34	**Total Revenue Requirement**	**$26,861,000**	**$26,401,000**	**$26,183,000**	**$27,477,500**	**$28,383,000**
35	**Beginning Year Balance**	**$19,333,000**	**$16,319,000**	**$14,964,000**	**$14,992,000**	**$14,950,000**
36	**Surplus/(Shortfall)**	**($3,014,000)**	**($1,355,000)**	**$28,000**	**($42,500)**	**$337,000**
37	Restricted Reserves	$1,045,000	$1,045,000	$1,045,000	$1,045,000	$1,045,000
38	**End of Year Balance**	**$16,319,000**	**$14,964,000**	**$14,992,000**	**$14,949,500**	**$15,287,000**
39	*Minimum Reserves (by policy)*	$12,180,000	$12,411,000	$12,652,000	$12,905,000	$13,169,000
40	*Available Cash (Unrestricted)*	$3,094,000	$1,508,000	$1,295,000	$999,500	$1,073,000
41	**Debt Coverage Ratio**	**1.72**	**1.86**	**1.99**	**2.14**	**2.29**

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NOVATO POTABLE WATER OPERATING BUDGET DETAIL

Fiscal Year 22/23

		Adopted Budget 22/23	Estimated Actual 21/22	Adopted Budget 21/22	Actual 20/21	Actual 19/20	Actual 18/19	Actual 17/18	Actual 16/17
STATISTICS									
1	Active Meters	20,704	20,694	20,616	20,607	20,554	20,546	20,543	20,544
2	Avg Commodity Rate/1,000 Gal (Net)	$7.37	$6.89	$6.72	$6.68	$6.37	$6.00	$6.00	$5.40
3	Potable Consumption (BG)	2.10	2.10	2.40	2.57	2.40	2.42	2.58	2.31
OPERATING INCOME									
4	Water Sales	$21,987,000	$20,779,000	$20,470,000	$22,141,460	$20,709,608	$19,145,251	$19,645,814	$16,772,060
5	Bill Adjustments	(60,000)	(66,000)	(72,000)	(61,290)	(59,788)	(72,061)	(143,395)	(130,587)
6	Sales to MMWD	-	-	-	-	-	-	155,846	-
7	Wheeling Charges-MMWD	142,000	165,000	101,000	155,436	104,765	97,866	92,977	91,374
8	Miscellaneous Service Revenue	216,000	191,000	246,000	198,474	257,864	266,268	268,563	252,038
9	**TOTAL OPERATING INCOME**	**$22,285,000**	**$21,069,000**	**$20,745,000**	**$22,434,080**	**$21,012,449**	**$19,437,324**	**$20,019,805**	**$16,984,885**
OPERATING EXPENSE									
	SOURCE OF SUPPLY								
10	Supervision & Engineering	$9,000	$8,000	$12,000	$9,002	$13,274	$7,564	$9,303	$11,264
11	Operating Expense - Source	15,000	7,000	15,000	7,517	8,289	9,195	6,236	8,513
12	Maintenance/Monitoring of Dam	38,000	21,000	69,000	23,927	30,588	33,686	22,203	24,059
13	Maintenance of Lake & Intakes	14,000	-	21,000	5,790	14,240	24,172	10,690	7,575
14	Maintenance of Watershed	39,000	4,000	46,000	10,378	19,689	4,446	29,646	36,218
15	Water Purchased for Resale to MMWD	-	-	-	-	-	-	111,891	-
16	Water Quality Surveillance	2,000	1,000	18,000	722	1,642	1,669	6,728	3,513
17	Contract Water - SCWA	5,650,000	6,360,000	5,950,000	7,131,008	6,623,534	5,082,987	5,151,516	4,320,623
18	Contract Water - SCWA Backfeed	0	41,000		1,098,109				
19	GASB 68 & 75 Adjustment	8,000	10,000	10,000	3,403	7,592	3,690	8,535	5,682
20	**TOTAL SOURCE OF SUPPLY**	**$5,775,000**	**$6,452,000**	**$6,141,000**	**$8,289,856**	**$6,718,848**	**$5,167,409**	**$5,356,748**	**$4,417,447**
	PUMPING								
21	Operating Expense	$0	$3,000	$3,000	-	-	-	-	-
22	Maintenance of Structures/Grounds	32,000	30,000	33,000	41,581	34,416	56,801	32,611	28,514
23	Maintenance of Pumping Equipment	49,000	47,000	55,000	28,068	158,903	41,304	39,435	30,354
24	Electric Power - Pumping	450,000	312,000	450,000	473,378	341,401	285,772	293,588	246,869
25	GASB 68 & 75 Adjustment	16,000	20,000	20,000	6,887	14,298	5,272	6,967	3,496
26	**TOTAL PUMPING**	**$547,000**	**$412,000**	**$561,000**	**$549,914**	**$549,018**	**$389,149**	**$372,601**	**$309,233**
	OPERATIONS								
26	Supervision & Engineering	$211,000	$264,000	$171,000	$263,382	$232,895	$215,732	$253,594	$234,870
27	Operating Expense	380,000	472,000	319,000	414,387	507,830	306,774	400,138	343,890
28	Maintenance Expense	64,000	65,000	56,000	58,439	52,959	38,570	50,339	47,202
29	Telemetry Equipment/Controls Maint	61,000	53,000	96,000	55,401	61,798	84,979	94,523	101,568
30	Leased Line Expense	20,000	19,000	20,000	18,506	16,656	16,678	17,414	17,592
31	GASB 68 & 75 Adjustment	197,000	188,000	188,000	82,878	136,794	48,442	107,728	63,553
32	**TOTAL OPERATIONS**	**$933,000**	**$1,061,000**	**$850,000**	**$892,993**	**$1,008,932**	**$711,175**	**$923,736**	**$808,675**

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NOVATO POTABLE WATER OPERATING BUDGET DETAIL

Fiscal Year 22/23

		Adopted Budget 22/23	Estimated Actual 21/22	Adopted Budget 21/22	Actual 20/21	Actual 19/20	Actual 18/19	Actual 17/18	Actual 16/17
	WATER TREATMENT								
33	Supervision & Engineering	$187,000	$173,000	$157,000	$130,881	$170,261	$156,176	$169,851	$168,945
34	Operating Expense	250,000	184,000	353,000	144,628	284,929	228,878	276,795	349,671
35	Purification Chemicals	435,000	145,000	435,000	91,248	503,664	376,960	438,348	247,260
36	Sludge Disposal	111,000	81,000	130,000	72,767	93,987	88,352	100,305	107,942
37	Maintenance of Structures/Grounds	83,000	126,000	108,000	99,063	93,901	53,090	50,913	78,910
38	Purification Equipment Maintenance	221,000	326,000	193,000	199,629	200,107	162,714	212,385	186,246
39	Electric Power - Treatment	157,000	142,000	156,000	134,502	160,692	122,831	157,374	129,652
40	Laboratory Expense (net)	768,000	653,000	726,000	619,178	729,142	649,647	758,936	768,965
41	GASB 68 & 75 Adjustment	299,000	336,000	336,000	125,575	244,230	107,310	212,624	150,494
42	**TOTAL WATER TREATMENT**	**$2,511,000**	**$2,166,000**	**$2,594,000**	**$1,617,471**	**$2,480,913**	**$1,945,958**	**$2,377,531**	**$2,188,085**
	TRANSMISSION & DISTRIBUTION								
43	Supervision & Engineering	$677,000	$840,000	$636,000	$633,781	$600,516	$534,500	$659,085	$569,303
44	Maps & Records	146,000	162,000	163,000	132,140	121,602	132,053	159,512	168,267
45	Operation of T&D System	586,000	640,000	674,000	739,662	890,714	720,417	594,175	582,483
46	Storage Facilities Expense	117,000	87,000	147,000	141,484	113,029	107,033	110,077	155,641
47	Maintenance of Valves & Regulators	153,000	183,000	193,000	113,317	135,586	87,285	173,762	196,162
48	Maintenance of Mains	191,000	218,000	204,000	223,073	168,454	167,959	190,307	149,584
49	Backflow Prevention Program	237,000	238,000	243,000	231,595	187,669	231,822	186,692	155,536
50	Maintenance of Copper Services	214,000	194,000	215,000	189,641	131,389	182,789	157,337	159,769
51	Maintenance of PB Service Lines	425,000	424,000	498,000	482,542	443,334	558,788	471,527	473,695
52	Maintenance of Meters	107,000	134,000	145,000	135,771	96,608	113,810	126,985	66,356
53	Detector Check Assembly Maint	83,000	94,000	74,000	40,072	81,718	80,416	46,056	72,208
54	Maintenance of Hydrants	79,000	70,000	79,000	68,567	48,301	25,607	18,087	51,020
55	GASB 68 & 75 Adjustment	646,000	582,000	582,000	271,727	423,300	199,802	349,390	228,385
56	**TOTAL TRANSMISSION & DISTRIB**	**$3,661,000**	**$3,866,000**	**$3,853,000**	**$3,403,372**	**$3,442,219**	**$3,142,281**	**$3,242,992**	**$3,028,409**
	CONSUMER ACCOUNTING								
57	Meter Reading & Collection	$53,000	$25,000	$142,000	$23,359	$38,348	$99,549	$190,554	$182,663
58	Billing & Accounting	153,000	141,000	135,000	197,175	248,703	210,805	280,268	289,503
59	Contract Billing	15,000	16,000	18,000	18,752	13,742	15,484	16,395	16,692
60	Postage & Supplies	60,000	64,000	55,000	69,038	48,071	51,267	52,735	56,373
61	Credit Card Fees	60,000	57,000	65,000	59,613	64,242	55,709	46,678	29,685
62	Lock Box Service	11,000	11,000	11,000	10,998	10,998	10,944	10,944	10,944
63	Uncollectible Accounts	10,000	17,000	5,000	23,681	8,362	14,994	12,352	12,709
64	Office Equipment Expense	64,000	86,000	35,000	28,205	35,601	12,675	45,256	11,350
65	Distributed to Other Operations	(16,000)	(16,000)	(15,000)	(16,454)	(17,814)	(15,104)	(19,008)	(17,161)
66	GASB 68 & 75 Adjustment	66,000	47,000	47,000	27,626	56,438	29,463	75,257	49,950
67	**TOTAL CONSUMER ACCOUNTING**	**$476,000**	**$448,000**	**$498,000**	**$441,993**	**$506,690**	**$485,786**	**$711,431**	**$642,708**

NOVATO POTABLE WATER OPERATING BUDGET DETAIL

Fiscal Year 22/23

		Adopted Budget 22/23	Estimated Actual 21/22	Adopted Budget 21/22	Actual 20/21	Actual 19/20	Actual 18/19	Actual 17/18	Actual 16/17
	WATER CONSERVATION								
68	Residential	$266,000	$279,000	$252,000	$203,188	$198,881	$246,347	$235,438	$270,150
69	Commercial	5,000	4,000	7,000	3,579	6,481	7,983	5,818	1,702
70	Public Outreach/Information	111,000	146,000	98,000	111,992	125,537	51,040	33,789	30,618
71	Large Landscape	10,000	13,000	19,000	10,128	17,317	19,839	33,662	36,818
72	GASB 68 & 75 Adjustment	55,000	23,000	1,000	23,170	34,547	16,575	36,183	21,754
73	**TOTAL WATER CONSERVATION**	**$447,000**	**$465,000**	**$377,000**	**$352,057**	**$382,764**	**$341,784**	**$344,890**	**$361,042**
	GENERAL & ADMINISTRATION								
74	Director's Expense	$46,000	$45,000	$42,000	$41,450	$40,873	$36,815	$37,111	$34,384
75	Legal Fees	31,000	37,000	21,000	28,892	16,569	20,853	20,173	28,043
76	Human Resources	197,000	184,000	51,000	93,557	52,870	96,677	62,348	31,451
77	Auditing Services	25,000	20,000	20,000	16,008	19,651	22,731	19,706	16,220
78	Consulting Services/Studies	324,000	357,000	351,000	115,503	142,010	304,645	223,041	51,567
79	General Office Salaries	1,254,000	1,313,000	1,158,000	1,271,279	1,157,428	1,083,904	1,441,496	1,492,719
80	Office Supplies	36,000	16,000	42,000	31,434	33,783	31,761	33,753	35,048
81	Employee Events	12,000	4,000	12,000	1,186	9,369	10,664	10,123	9,726
82	Other Administrative Expense	56,000	9,000	15,000	8,508	6,281	7,289	12,528	13,960
83	Election Cost	20,000	0	-	250	0	18,915	0	2,077
84	Dues & Subscriptions	98,000	125,000	97,000	106,192	83,386	79,986	59,362	59,046
85	Vehicle Expense	8,000	8,000	8,000	8,112	8,112	8,112	8,634	9,325
86	Meetings, Conf & Training	156,000	125,000	194,000	79,640	111,593	107,583	149,670	186,436
87	Telephone, Water, Gas & Electricity	58,000	47,000	52,000	48,474	46,251	38,758	40,595	45,355
88	Building & Grounds Maintenance	32,000	73,000	60,000	97,509	77,130	58,884	75,130	62,856
89	Office Equipment Expense	128,000	123,000	120,000	112,374	143,224	109,014	97,003	95,465
90	Insurance Premiums & Claims	195,000	192,000	163,000	145,870	109,939	99,040	92,292	87,319
91	Retiree Medical Benefits	221,000	210,000	224,000	209,174	186,221	197,855	174,528	164,969
92	(Gain)/Loss on Overhead Charges	159,000	153,000	(90,000)	(107,012)	(322,446)	905,403	(357,925)	(19,931)
93	G&A Distributed to Other Operations	(169,000)	(202,000)	(135,000)	(147,885)	(130,592)	(140,526)	(157,976)	(161,036)
94	G&A Applied to Construction Projects	(363,000)	(348,000)	(501,000)	(351,489)	(389,809)	(374,552)	(346,105)	(290,813)
95	GASB 68 & 75 Adjustment	465,000	390,000	390,000	1,547,510	1,578,730	140,290	306,927	328,170
96	**TOTAL GENERAL & ADMINISTRATION**	**$2,989,000**	**$2,881,000**	**$2,294,000**	**$3,356,536**	**$2,980,572**	**$2,864,101**	**$2,002,414**	**$2,282,356**
97	Depreciation Expense	$3,012,000	$2,918,000	$2,807,000	$2,857,337	$2,660,688	2,752,212	$2,730,867	$2,710,627
98	**TOTAL OPERATING EXPENSE**	**$20,351,000**	**$20,669,000**	**$19,975,000**	**$21,761,528**	**$20,730,643**	**$17,799,855**	**$18,063,210**	**$16,748,582**
100	***NET OPERATING INCOME/(LOSS)***	**$1,934,000**	**$400,000**	**$770,000**	**$672,551**	**$281,805**	**$1,637,470**	**$1,956,595**	**$236,303**

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NOVATO RECYCLED WATER
BUDGET SUMMARY
Fiscal Year 22/23

		Adopted Budget 2022/23	Estimated Actual 2021/22	Adopted Budget 2021/22
	OPERATING INCOME			
1	Recycled Water Sales	**$1,746,000**	$1,647,000	$1,554,000
2	Bimonthly Service Charge	**123,000**	116,000	116,000
3	Miscellaneous Service Charges	**15,000**	15,000	-
3	**Total Operating Income**	**$1,884,000**	$1,778,000	$1,670,000
	OPERATING EXPENDITURES			
4	Purchased Water - NSD	**$270,000**	$264,000	$270,000
5	Purchased Water - LGVSD	**110,000**	110,000	120,000
6	Pumping	**7,000**	3,000	9,000
7	Operations	**104,000**	104,000	97,000
8	Water Treatment	**33,000**	28,000	35,000
9	Transmission & Distribution	**74,000**	37,000	65,000
10	Consumer Accounting	**2,000**	2,000	2,000
11	General Administration	**104,000**	104,000	70,000
12	Depreciation	**788,000**	768,000	779,000
13	**Total Operating Expenditures**	**$1,492,000**	$1,420,000	$1,447,000
14	***NET OPERATING INCOME (LOSS)***	**$392,000**	$358,000	$223,000
	NON-OPERATING INCOME/(EXPENSE)			
15	Interest Revenue	**$30,000**	26,000	$70,000
16	MCC Interest Payments	**10,000**	11,000	11,000
17	Transfers Out from Capital Expansion Fund	**(590,000)**	-	(501,000)
18	Deer Island SRF Loan Interest Expense	**(30,000)**	(36,000)	(36,000)
19	Distrib System SRF Loans Interest Exp	**(201,000)**	(215,000)	(215,000)
20	**Total Non-Operating Income/(Expense)**	**($781,000)**	($214,000)	($671,000)
21	***NET INCOME/(LOSS)***	**($389,000)**	$144,000	($448,000)
	OTHER SOURCES/(USES) OF FUNDS			
22	Add Depreciation Expense	**$788,000**	$768,000	$779,000
23	Connection Fees Transferred from (to) Novato	**890,000**	743,000	890,000
24	RW Central Area Expansion Grant	**-**	147,000	0
25	Marin Country Club Principal Repayment	**39,000**	38,000	38,000
26	Capital Improvement Projects	**(350,000)**	(30,000)	(100,000)
27	Transfers In from Capital Expansion Fund	**350,000**	0	0
28	Deer Island SRF Loan Principal Payments	**(243,000)**	(237,000)	(237,000)
29	Distrib System SRF Loan Principal Pmts	**(689,000)**	(675,000)	(675,000)
30	**Total Other Sources/(Uses)**	**$785,000**	$754,000	$695,000
31	***CASH INCREASE/(DECREASE)***	**$396,000**	$898,000	$247,000

NOVATO RECYCLED WATER
Fiscal Year 22/23 Five-Year Financial Forecast

		Adopted Budget	Forecast	Forecast	Forecast	Forecast
	Fiscal Year Ending June 30 >	**FY 22/23**	**FY 23/24**	**FY 24/25**	**FY 25/26**	**FY 26/27**
1	Active Services @ Fiscal Year End	96	96	96	96	96
2	Commodity Rate/1,000 Gal	$7.01	$7.36	$7.73	$8.12	$8.52
3	Consumption (MG)	249	224	224	224	224
	OPERATING REVENUE					
4	Recycled Water Sales	$1,746,000	$1,650,000	$1,732,000	$1,819,000	$1,910,000
5	Bimonthly Service Charge	123,000	129,000	135,000	142,000	149,000
6	Water Loads & Turn on Charges	15,000	15,000	15,000	15,000	15,000
7	**Total Operating Revenue**	**$1,884,000**	**$1,794,000**	**$1,882,000**	**$1,976,000**	**$2,074,000**
	OPERATING EXPENSE					
8	Purchased Water - NSD	$270,000	$278,000	$286,000	$295,000	$304,000
9	Purchased Water - LGVSD	110,000	110,000	110,000	110,000	110,000
10	Other Operating Expenses	324,000	334,000	344,000	354,000	365,000
11	Depreciation	788,000	788,000	788,000	788,000	788,000
12	**Total Operating Expense**	**$1,492,000**	**$1,510,000**	**$1,528,000**	**$1,547,000**	**$1,567,000**
	NON-OPERATING REVENUE/(EXPENSE)					
13	Interest Revenue	$40,000	$40,000	$40,000	$40,000	$40,000
14	Interest Expense	(231,000)	(213,000)	(193,000)	(190,000)	(185,000)
15	Transfers Out from Capital Expansion Fun	(590,000)	(536,000)	(571,000)	(609,000)	(648,000)
16	Other Revenue/(Expense)	-	-	-	-	-
17	**Total Non-Op Revenue/(Expense)**	**($781,000)**	**($709,000)**	**($724,000)**	**($759,000)**	**($793,000)**
18	**NET INCOME/(LOSS)**	**($389,000)**	**($425,000)**	**($370,000)**	**($330,000)**	**($286,000)**
	OTHER SOURCES/(USES) OF FUNDS					
19	Add Depreciation Expense	$788,000	$788,000	$788,000	$788,000	$788,000
20	Loan Principal Repayment Received	39,000	39,000	39,000	39,000	39,000
21	Grants	-	-	-	-	-
22	Novato Potable FRC Fund Trsf	890,000	890,000	890,000	890,000	890,000
23	Capital Improvement Projects	(350,000)	(200,000)	(100,000)	(100,000)	(100,000)
24	Transfers In from Capital Expansion Fund	350,000	200,000	100,000	100,000	100,000
25	Deer Island TP Loan Principal	(243,000)	(246,000)	(249,000)	(251,000)	(253,000)
26	SRF Loan Principal - System Expansion	(689,000)	(704,000)	(721,000)	(722,000)	(725,000)
27	Other Sources/(Uses)	-	-	-	-	-
28	**Total Other Sources/Uses**	**$785,000**	**$767,000**	**$747,000**	**$744,000**	**$739,000**
29	**Cash Increase/(Decrease)**	**$396,000**	**$342,000**	**$377,000**	**$414,000**	**$453,000**
30	**Ending Reserve Balance**	**$6,574,000**	**$6,916,000**	**$7,293,000**	**$7,707,000**	**$8,160,000**
31	**% Rate Increase[1]**	**6.0%**	**5.0%**	**5.0%**	**5.0%**	**5.0%**

[1]Fiscal year 2023 Rate increase approved by the Board of Directors on June 28, 2022. FY 2024 through 2027 are projections for financial forecasting purposes only - not yet approved by the Board of Directors.

WEST MARIN WATER

BUDGET SUMMARY

Fiscal Year 22/23

		Adopted Budget 2022/23	*Estimated Actual 2021/22*	*Adopted Budget 2021/22*
	OPERATING INCOME			
1	Water Sales	**$1,069,000**	$1,022,000	$1,005,000
2	Misc Service Charges	**8,000**	7,000	7,000
3	**Total Operating Income**	**$1,077,000**	$1,029,000	$1,012,000
	OPERATING EXPENDITURES			
4	Source of Supply	**$27,000**	$34,000	$28,000
5	Pumping	**73,000**	72,000	76,000
6	Operations	**83,000**	70,000	79,000
7	Water Treatment	**258,000**	224,000	165,000
8	Transmission & Distribution	**163,000**	176,000	168,000
9	Consumer Accounting	**28,000**	28,000	26,000
10	Water Conservation	**15,000**	24,000	4,000
11	General Administration	**103,000**	86,000	64,000
12	Depreciation Expense	**230,000**	201,000	269,000
13	**Total Operating Expenditures**	**$980,000**	$915,000	$879,000
14	***NET OPERATING INCOME (LOSS)***	**$97,000**	$114,000	$133,000
	NON-OPERATING REVENUE/(EXPENSE)			
15	Tax Proceeds - PR-2 Tax Allocation	**$60,000**	$58,000	$56,000
16	Miscellaneous Revenue	**6,000**	5,000	-
17	Interest Revenue	**8,000**	2,000	6,000
18	Loan Interest Expense	**(42,000)**	(20,000)	(30,000)
19	**Total Non-Operating Income/(Expense)**	**$32,000**	$45,000	$32,000
20	***NET INCOME/(LOSS)***	**$129,000**	$159,000	$165,000
	OTHER SOURCES/(USES) OF FUNDS			
21	Add Depreciation Expense	**$230,000**	$201,000	$269,000
22	Connection Fees	**-**	39,000	-
23	Grant/Loan Proceeds	**340,000**	884,000	550,000
24	Capital Improvement Projects	**(647,000)**	(438,000)	(1,085,000)
25	Debt Principal Payments	**(123,000)**	(51,000)	(141,000)
26	**Total Other Souces/(Uses)**	**($200,000)**	$635,000	($407,000)
27	***CASH INCREASE/(DECREASE)***	**($71,000)**	$794,000	($242,000)

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WEST MARIN WATER

Fiscal Year 22/23 Five-Year Financial Forecast

		Adopted Budget FY 22/23	Forecast FY 23/24	Forecast FY 24/25	Forecast FY 25/26	Forecast FY 26/27
	BASIC DATA					
1	Active Meters	789	790	790	791	791
2	Avg Commodity Rate/1,000 Gal	$12.94	$13.72	$14.54	$15.41	$15.88
3	Potable Consumption (MG)	63.0	65.0	65.0	65.0	65.0
	OPERATING REVENUE					
4	Commodity Charge	$815,000	$892,000	$945,000	$1,002,000	$1,032,000
5	Bimonthly Service Charge	254,000	269,000	285,000	285,000	285,000
6	Miscellaneous Service Charges	8,000	8,000	8,000	8,000	8,000
7	**Total Operating Revenue**	**$1,077,000**	**$1,169,000**	**$1,238,000**	**$1,295,000**	**$1,325,000**
8	Operating Expenditures	$750,000	$773,000	$796,000	$820,000	$845,000
9	Depreciation Expense	230,000	241,000	253,000	279,000	287,000
10	**Total Operating Expense**	**$980,000**	**$1,014,000**	**$1,049,000**	**$1,099,000**	**$1,132,000**
11	**NET OPERATING INCOME**	**$97,000**	**$155,000**	**$189,000**	**$196,000**	**$193,000**
	NON-OPERATING REVENUE/(EXPENSE)					
12	Interest Revenue	$8,000	$7,000	$6,000	$5,000	$4,000
13	Interest Expense	(42,000)	(38,000)	(34,000)	(30,000)	(26,000)
14	PR-2 County Tax Allocation	60,000	61,000	62,000	63,000	64,000
15	Miscellaneous	6,000	6,000	6,000	6,000	6,000
16	**Total Non-Op Revenue/(Expense)**	32,000	36,000	40,000	44,000	48,000
17	**Net Income**	**$129,000**	**$191,000**	**$229,000**	**$240,000**	**$241,000**
	OTHER SOURCES/(USES)					
18	Add Depreciation Expense	$230,000	$241,000	$253,000	$279,000	$287,000
19	Connection Fees	-	23,000	-	23,000	-
20	Capital Improvement Projects	(647,000)	(727,000)	(1,560,000)	(501,000)	(647,000)
21	Grant/Loan Proceeds	340,000	100,000	1,100,000	-	-
22	Loan from Novato Water Principal	(69,000)	(72,000)	(74,000)	(76,000)	(78,000)
23	Debt Principal Payments	(54,000)	(55,000)	(57,000)	(59,000)	(61,000)
24	**Total Other Sources/(Uses)**	**($200,000)**	**($490,000)**	**($338,000)**	**($334,000)**	**($499,000)**
25	**Cash Increase/(Decrease)**	**($71,000)**	**($299,000)**	**($109,000)**	**($94,000)**	**($258,000)**
26	Operating Reserve	$250,000	$258,000	$265,000	$273,000	$174,000
27	System Expansion Reserve	585,000	278,000	162,000	60,000	-
28	Liability Contingency Reserve	99,000	99,000	99,000	99,000	-
29	**ENDING CASH BALANCE**	**$934,000**	**$635,000**	**$526,000**	**$432,000**	**$174,000**
30	**% Rate Increase[1]**	**6.0%**	**6.0%**	**6.0%**	**6.0%**	**3.0%**

[1]Fiscal year 2023 Rate increase approved by the Board of Directors on June 28, 2022. FY 2024 through FY 2027 are projections for financial forecasting purposes only - not yet approved by the Board of Directors.

OCEANA MARIN SEWER
BUDGET SUMMARY
Fiscal Year 22/23

		Adopted Budget 2022/23	*Estimated Actual 2021/22*	*Adopted Budget 2021/22*
	OPERATING INCOME			
1	Monthly Sewer Service Charge	**$306,000**	$290,000	$290,000
2	Misc Service Charges	**-**	-	-
3	**Total Operating Income**	**$306,000**	$290,000	$290,000
	OPERATING EXPENDITURES			
4	Sewage Collection	**$105,000**	$102,000	$94,000
5	Sewage Treatment	**45,000**	35,000	54,000
6	Sewage Disposal	**45,000**	55,000	47,000
7	Consumer Accounting	**2,000**	2,000	2,000
8	General Administration	**26,000**	31,000	12,000
9	Depreciation Expense	**47,000**	47,000	49,000
10	**Total Operating Expenditures**	**$270,000**	$272,000	$258,000
11	***NET OPERATING INCOME (LOSS)***	**$36,000**	$18,000	$32,000
	NON-OPERATING REVENUE/(EXPENSE)			
12	OM-1/OM-3 Tax Allocation	**$63,000**	$62,000	$60,000
13	Interest Revenue	**4,000**	6,000	4,000
14	Interest Expense	**-**	-	(3,000)
15	Miscellaneous Expense	**(1,000)**	(1,000)	(1,000)
16	**Total Non-Op Income/(Expense)**	**$66,000**	$67,000	$60,000
	NET INCOME/(LOSS)	**$102,000**	$85,000	$92,000
	OTHER SOURCES/(USES) OF FUNDS			
17	Add Depreciation Expense	**$47,000**	$47,000	$49,000
18	Connection Fees	**30,000**	-	-
19	Grant/Loan Proceeds	**960,000**	-	1,450,000
20	Capital Improvement Projects	**(1,375,000)**	(42,000)	($1,590,000)
21	**Total Other Souces/(Uses)**	**($338,000)**	$5,000	($91,000)
22	***CASH INCREASE/(DECREASE)***	**($236,000)**	$90,000	$1,000

OCEANA MARIN SEWER

Fiscal Year 22/23 Five-Year Financial Forecast

		Adopted Budget FY 22/23	Forecast FY 23/24	Forecast FY 24/25	Forecast FY 25/26	Forecast FY 26/27
1	Number of Connections	236	236	237	237	237
2	Monthly Service Charge	$108.00	$113.00	$119.00	$125.00	$131.00
	OPERATING REVENUE					
3	Monthly Service Charge	$306,000	$320,000	$338,000	$356,000	$373,000
4	**Total Operating Revenue**	**$306,000**	**$320,000**	**$338,000**	**$356,000**	**$373,000**
	OPERATING EXPENSE					
5	Operating Expenditures	$223,000	$229,000	$235,000	$242,000	$249,000
6	Depreciation Expense	47,000	70,000	79,000	87,000	92,000
7	**Total Operating Expense**	$270,000	$299,000	$314,000	$329,000	$341,000
8	**NET OPERATING INCOME**	**$36,000**	**$21,000**	**$24,000**	**$27,000**	**$32,000**
	NON-OPERATING REVENUE/(EXPENSE)					
9	Interest Revenue	$4,000	$3,000	$1,000	$6,000	$4,000
10	Interest Expense	-	(16,000)	(14,000)	(25,000)	(23,000)
11	OM-1/OM-3 Tax Allocation	63,000	64,000	65,000	66,000	67,000
12	Miscellaneous Expense	(1,000)	(1,000)	(1,000)	(1,000)	(1,000)
13	**Total Non-Op Revenue/(Expense)**	**$66,000**	**$50,000**	**$51,000**	**$46,000**	**$47,000**
14	**Net Income**	**$102,000**	**$71,000**	**$75,000**	**$73,000**	**$79,000**
	OTHER SOURCES/(USES)					
15	Add Depreciation Expense	$47,000	$70,000	$79,000	$87,000	$92,000
16	Connection Fees	30,000	-	30,000	-	-
17	Capital Improvement Projects	(1,375,000)	(565,000)	(452,000)	(282,000)	(312,000)
18	Grant/Loan Proceeds	960,000	305,000	800,000	-	-
19	Debt Principal Payments	-	(43,000)	(45,000)	(81,000)	(86,000)
20	**Total Other Sources/(Uses)**	**($338,000)**	**($233,000)**	**$412,000**	**($276,000)**	**($306,000)**
21	**Cash Increase/(Decrease)**	**($236,000)**	**($162,000)**	**$487,000**	**($203,000)**	**($227,000)**
22	**ENDING CASH BALANCE**	**$297,000**	**$135,000**	**$622,000**	**$419,000**	**$192,000**
23	**% Rate Increase[1]**	**5.0%**	**5.0%**	**5.0%**	**5.0%**	**5.0%**

[1]Fiscal year 2023 Rate increase approved by the Board of Directors on June 28, 2022. FY 2024 through FY 2027 are projections for financial forecasting purposes only - not yet approved by the Board of Directors.

CAPITAL IMPROVEMENT PROJECTS

			FY23	FY24	FY23 & FY24 Project Description
	1.	PIPELINE REPLACEMENTS/ADDITIONS			
	a.	Main/Pipeline Replacements			
1.7189.00	1	Replace 12" Pipe S. Novato Blvd (785LF)	$50,000	$200,000	Replace 60 year old pipe near or at its end of useful life/in conjunction with City paving
1.7183.xx	2	Replace Plastic Thin Walled Pipe < 4-inch	$150,000	$150,000	Ongoing systematic replacement of all plastic thin walled pipe < 4-inch.
1.7195.00	3	Novato Blvd Widening - Diablo to Grant (4100LF)	$1,000,000	1,500,000	Replaces 60 year old cast iron pipe and replaces 50+ old ACP with 12" PVC; Joint project with City and Novato Sanitary District
		Subtotal	$1,200,000	$1,850,000	
	b.	Main/Pipeline Additions			
1.7150.00	1	San Mateo Tank 24" Transmission Main	$20,000	$332,000	Grant Project combined with Crest Pump Station
	2	Loop Los Robles Rd and Posada Del Sol (230LF)	-	$125,000	Master Plan Project 1b-11, Correlated with item No. 1b. 6 below (2025)
1.7206.00	3	Loop Zone Mall Area Near Nave Ct/ S. Novato	$275,000	-	Master Plan Project 1b-09, Correlated with item No. 1b. 6 below (2030)
		Subtotal	$295,000	$457,000	
	c.	Polybutylene (PB) Service Line Replacements			
1.7139.xx	1	Replace PB in Sync w/City Paving (30 Services)	$60,000	-	Ongoing sys replacement of PB services in advance of City paving projects
1.7123.xx	2	Other PB Replacements (40 Services)	$80,000	-	
		Subtotal	$140,000	-	
	d.	Relocations to Sync w/City & County CIP			
1.8737.xx	1	Other Relocations	$25,000	$70,000	Relocate facilities for yet to be identified City/County Projects
		Subtotal	$25,000	$70,000	
	e.	Aqueduct Replacements & Enhancements			
1.7118.02	1	MSN B2-Utility Agreement Costs	$12,000	-	Finalize pipeline easements and agreements
		Subtotal	$12,000	-	
		TOTAL PIPELINE REPLACEMENTS/ADDITIONS	$1,672,000	$2,377,000	

CAPITAL IMPROVEMENT PROJECTS

			FY23	FY24	FY23 & FY24 Project Description
	2.	SYSTEM IMPROVEMENTS			
1.7007.16	a.	DCDA Repair/Replace-FY23 (~8/yr)	$100,000	$100,000	Master Plan Project 2-01
1.7090.04	b.	Anode Installations-FY23 (150/yr)	$10,000	$10,000	Master Plan Project 2-03
1.6313.20	c.	Pressure Reducing Station - Harbor Drive	-	$25,000	Upgrades and improvements to valves and vaults
1.6302.21	d.	Rehab Black Point Pressure Regulating Station	-	$175,000	Upgrades and improvements to valves and vaults
1.7136.00	e.	Facilities Security Enhancements	$25,000	-	
	f.	Other System Improvements	$200,000	-	
		TOTAL SYSTEM IMPROVEMENTS	$335,000	$310,000	
	3.	BUILDING, YARD, STP IMPROVEMENTS			
	a.	Administration Building			
1.6501.44	1	NMWD Headquarters Upgrade (Note 1)	$12,650,000	$2,350,000	50-year-old building requires significant upgrading; Phases 1 - 2 shown
		Subtotal	$12,650,000	$2,350,000	
	b.	Yard Upgrade			
	1	Program Assessment for Site Improvements	-	$75,000	Re-confirm previous site program study and phase projects as required
		Subtotal	-	$75,000	
	c.	Stafford Treatment Plant			
1.6610.22	1	Replace Sludge Line to Center Road (4"@ 4,400')	$25,000	-	
1.6610.xx	2	Other Treatment Plant Improvements	$50,000	$100,000	Miscellaneous plant improvements, include roll up door
1.6600.97	3	Efficiency Improvements	$50,000	-	Improvement of sludge treatment process as suggested in the Efficiency Study and HSPS
1.6610.23	4	Water Supply Enhancement - STP Modifications	$50,000	-	Based on outcome of Local Water Supply Enhancement Study
		Subtotal	$175,000	$100,000	
	d.	Stafford Dam / Watershed			
1.6600.69	1	Dam Concrete Repair (Apron)	-	$150,000	Ongoing patch repairs as needed until full replacement FY27
1.6600.96	2	Leveroni Creek Embankment Repair (Note 2)	-	$175,000	Repair/stabilize culvert embankment under access road to STP/IVGC
1.6610.24	3	Water Supply Enhancements - Dam	$50,000	-	Based on outcome of Local Water Supply Enhancement Study
		Subtotal	$50,000	$325,000	
		TOTAL BUILDING, YARD, STP IMPROVEMENTS	$12,875,000	$2,850,000	

CAPITAL IMPROVEMENT PROJECTS

			FY23	FY24	FY23 & FY24 Project Description
	4.	STORAGE TANKS/PUMP STATIONS			
	a.	Clear Tank Sites			
		1 Woodland Heights (120,000 gal, 1974)	-	$100,000	Consider for future Recycled Water Opportunities
1.6207.20		2 Old Ranch Rd Tank (removal post install Tank No. 2)	$100,000	-	
		Subtotal	$100,000	$100,000	
	b.	Tank Rehabilitation			
1.6216.20		1 Fire Flow Backfeed Valve Nunes Tank	$200,000	-	Master Plan Project 4-03
		2 Recoating of Other Tanks (Garner in FY23)	$170,000	$17,000	
1.6213.24&1.6214.20		3 Lynwood Seismic Upgrade/Coating	$1,000,000	$1,000,000	Master Plan Project 4-04
		Subtotal	$1,370,000	$1,017,000	
	c.	Pump Station Rehabilitation and Replacement			
1.6141.00		1 Crest PS	$10,000	-	See 1.b.1 San Mateo Tank 24" Main
1.6112.26		2 Lynwood PS Upgrade	$40,000	$200,000	Upgrades tied to Study
		Subtotal	50,000	$200,000	
	d.	Hydropneumatic Systems			
1.7170.00		1 Hydropneumatic Upgrades, Phase 1	$50,000	$250,000	Specific project to be confirmed by Hydraulic Pneumatic Study
		Subtotal	$50,000	$250,000	
	e.	1 Other Tank & PS Improvements	$75,000	$75,000	Master Plan Project 4-07. Includes SS discharge, tank cleaning system, etc
		Subtotal	$75,000	$75,000	
		TOTAL STORAGE TANKS/PUMP STATIONS	$1,645,000	$1,642,000	
		TOTAL NOVATO SERVICE AREA	$16,527,000	$7,179,000	
	5.	RECYCLED WATER			
5.7162.04	a.	Replace CI in Atherton Avenue (1320LF)	$350,000	-	Evaluate 1950's era cast iron pipe re-purposed for RW, potential slip lining
5.7162,xx	b.	Other Recycled Water Expenditures	-	$100,000	Retrofit existing potable irrigation customers to RW
	c.	Reservoir Hill Tank Leak Repair	-	$100,000	Small leak detected in FY22; needs repair
		TOTAL RECYCLED WATER PROJECTS	$350,000	$200,000	

CAPITAL IMPROVEMENT PROJECTS

			FY23	FY24	FY23 & FY24 Project Description
6.		WEST MARIN WATER SYSTEM			
2.6609.20	a.	New Gallagher Well #2	$380,000	-	West Marin Master Plan Project 3-02
2.8829.xx	b.	PB Replace in Sync w/ County Paving	-	$52,000	West Marin Master Plan Project 1c-01 For 25 replacements
2-7185-00	c.	Gallagher Ranch Streambank Stabilization	$5,000	$5,000	Monitoring costs over 5 years.
	d.	PRE Tank #1 & #2 Replacement	-	$620,000	West Marin Master Plan Project 4-04 & 4-05
2.8912.00	e.	Lagunitas Creek Bridge Pipe Replacement (Caltrans)	$52,000	$50,000	Relocate/replace 8-inch water main across Lagunitas Creek Bridge
	f.	Miscellaneous Water System Improvements	$150,000	-	West Marin Master Plan Project 4-12
2.7192.xx	g.	PRE Replace 2-inch Galvanized Pipe	$45,000	-	Replacement of aging galvanized pipe
2.7203.00	h.	Raise Valves for HWY 1 Paving	$15,000	-	Relocation of water facilities in conjunction with Caltrans Paving
		TOTAL WEST MARIN WATER SYSTEM PROJECTS	$647,000	$727,000	
7.		OCEANA MARIN SEWER SYSTEM			
8.8672.28	a.	Infiltration Repair (Manhole Relining)	$40,000	$40,000	Ongoing work to identify and repair collection pipelines to prevent rainwater from leaking into the system
8.7173.00	b.	OM Treatment Pond Rehab-404 Grant-FEMA	$1,200,000	$205,000	Hazard mitigation project to armor the existing earthen treatment pond berms to minimize storm erosion and damage due to earthquakes
8.7173.01	c.	OM Treatment Pond Rehab-Grant Management	$10,000	$10,000	
	d.	North St. Lift Station Bypass	-	$310,000	
8.7208.00	e.	Sewer Force Main Improvements	$125,000	-	Adding isolation valves or other appurtenances in the 3,000+ LF FM to allow for repairs in the system. Commence Design and wait for funding
		TOTAL OCEANA MARIN SEWER SYSTEM PROJECTS	$1,375,000	$565,000	

CAPITAL IMPROVEMENT PROJECTS

	FY23	FY24	FY23 & FY24 Project Description
SUMMARY - GROSS PROJECT OUTLAY			
Novato Water	$16,527,000	$7,179,000	
Recycled Water	$350,000	$200,000	
West Marin Water	$647,000	$727,000	
Oceana Marin Sewer	$1,375,000	$565,000	
GROSS PROJECT OUTLAY	$18,899,000	$8,671,000	
LESS FUNDED BY LOANS/GRANTS/OTHER			
a. Office/Yard Building Refurbish (Note 1)	($12,650,000)	($2,350,000)	
b. Crest PS/San Mateo Tank Pipeline Grant	-	($249,000)	
c. RW Capital Replacement Expansion Fund	($350,000)	($200,000)	
d. WM Novato Water Loan to WM (Note 3)	($150,000)	($350,000)	
e. OM Novato Water Loan to WM (Note 4)	($500,000)	-	
f. WM CA DWR Drought Relief Grant	($340,000)	-	
g. WM Lagunitas Ck Bridge Pipeline Grant	-	($100,000)	
h. OM Treatment Pond Rehab Grant (Note 5)	($460,000)	($305,000)	
TOTAL LOAN/GRANT FUNDS	($14,450,000)	($3,554,000)	
SUMMARY - NET PROJECT OUTLAY			
Novato Capital Improvement Net Project Outlay	$3,877,000	$4,580,000	
Recycled Water	$0	$0	
West Marin Water	$157,000	$277,000	
Oceana Marin Sewer	$415,000	$260,000	
NET PROJECT OUTLAY	$4,449,000	$5,117,000	
Total Number of District Projects	38	31	

Novato 5-Year Average of Internally Funded Projects FY23-FY27	**$4,120,000**
RW 5-Year Average of Internally Funded Projects FY23-FY27	**$60,000**
West Marin 5-Year Average of Internally Funded Projects FY23-FY27	**$280,000**
Oceana Marin 5-Year Average of Internally Funded Projects FY23-FY27	**$260,000**

CAPITAL IMPROVEMENT PROJECTS

	FY23	FY24	FY23 & FY24 Project Description
NOVATO POTABLE WATER DEBT SERVICE			
a. STP SRF Loan	$1,044,000	$1,044,000	
b. AEEP Bank Loan	$482,000	$482,000	
c. Advanced Meter Info Retrofit Loan	$376,000	$376,000	
d. Admin Building Renovation Loan (Note 1)	$1,348,000	$1,348,000	
	$3,250,000	$3,250,000	
NOVATO RECYCLED WATER DEBT SERVICE			
e. Deer Island Facility SRF Loan	$273,000	$273,000	
f. RW North Expansion SRF Loan	$282,000	$282,000	
g. RW South Expansion SRF Loan	$332,000	$332,000	
h. RW Central Exp SRF Loan (Net of MCC)	$276,000	$276,000	
	$1,163,000	$1,163,000	
WEST MARIN WATER DEBT SERVICE			
i. WM Novato Loan Payback	$94,000	$94,000	
j. TP Solids Handling Bank Loan	$71,000	$71,000	
	$165,000	$165,000	
OCEANA MARIN SEWER DEBT SERVICE			
k. OM Novato Loan Payback	-	$59,000	
	$0	$59,000	
TOTAL DEBT SERVICE	$4,578,000	$4,637,000	
NET PROJECT OUTLAY & DEBT SERVICE	**$9,027,000**	**$9,754,000**	

CAPITAL IMPROVEMENT PROJECTS

		FY23	FY24	FY23 & FY24 Project Description
STUDIES & SPECIAL PROJECTS				
a.	Novato Water Rate Study	-	$60,000	
b.	Novato Water Master Plan Update (Note 6)	$175,000	-	
c.	Novato Connection Fee Study	$20,000	-	
d.	Compensation Survey & Review	$15,000		
e.	Lynwood /San Marin Zone 2 Modification Evaluation	$30,000	-	
f.	Stafford Lake Sediment Survey (every 10 yrs.)	-	$60,000	
g.	Cathodic Protection Master Plan (Note 7)	-	$40,000	
h.	Drought Contingency Plan - NBWRA	$9,000		
i.	West Marin Connection Fee Study	$10,000	-	
j.	West Marin Water Master Plan (every 10 years)	-	$65,000	
k.	Coast Guard Housing-PRTP Study	$25,000	-	
l.	Stafford Dam Master Plan	$25,000	-	
m.	Tank & Pipeline Easement	-	$25,000	
n.	Pipeline Condition Assessment (Note 8)	$50,000	-	
Total studies undertaken by the District		$359,000	$250,000	

Note 1 - $16.3M NMWD Headquarters Upgrade is funded by a 20 year 3.11% interest Bank Loan.

Note 2 - Project developed as part of October 2017 Feasibility Assessment prepared by Prunuske Chatham, Inc.

Note 3 - Loan from Novato Water - As included in the 2021 WM Water rate study - to be paid back with interest. Loan to occur in FY22 & FY23.

Note 4 - Loan from Novato Water - As included in the five-year financial forecast.

Note 5 - Project to be funded 60% by grants. Eligible project costs are budgeted at $1.5M (60%=$914K). Also includes loans for capital projects of $250K in FY23.

Note 6 - Novato Master Plan Update will be enhanced to include hydraulics, vulnerabilities (seismic, flooding, etc.), Frosty Lane pit, San Marin pit and NMA

Note 7 - Cathodic Protection Master Plan to Include an inventory and assessment of critical pipelines, casings, and highway crossings.

Note 8 - Perform pipeline condition assessment including large diameter pipelines to prioritize master plan designated improvements. Incl pipelines in narrow R/W and creek crossings.

EQUIPMENT EXPENDITURES

Fiscal Year 22/23 Budget

			Approved	Description
	1	**OPERATIONS/MAINTENANCE**		
12107.01.00	a.	Meter Maintenance Program	$150,000	Testing Bench for Meters up to 2"
12105.01.00	b.	Total Organic Carbon (TOC) Analyzer	$42,000	
			$192,000	
	2	**Engineering & Construction**		
12106.01.00	a.	GPS Unit (Surveying)	$40,000	Field GPS unit for locating new and exist. pipes, valves, etc.
			$40,000	
	3	**VEHICLE & ROLLING EQUIPMENT EXPENDITURES**		
12108.01.00	a.	STP Forklift 5,000 lbs	$60,000	
12104.01.00	b.	100 KW Portable Generator	$60,000	
12104.01.00	c.	Leased Vehicles	$205,000	Replace 6 Vehicles #515, 516, 518, 520, 521 & 522
			$325,000	
		Total	**$557,000**	

RECAP	Adopted Budget 2021/22	Estimated Actual 2021/22	**Proposed Budget 2022/23**
Equipment	$160,000	$80,000	$232,000
Rolling Stock	$135,000	$278,000	$325,000
	$295,000	**$358,000**	**$557,000**

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Smart' meters proliferate

DROUGHT

Bay Area water utilities, customers warm to wireless tracking

Marin Independent Journal

By Paul Rogers

Bay Area News Group

In the coming months and years as California struggles with worsening droughts, millions of Bay Area residents — including those in Marin — could be getting a so-called "smart" water meter.

Water meters — the clunky brass devices that sit in underground boxes near the sidewalks outside most homes and businesses, measuring water use — have been around since the 1820s. But in many areas, utilities only send out water bills every two months, or maybe once a month.

That means unless residents go out, lift the heavy concrete lid and dutifully write down the numbers on their analog water meters, most people don't know until weeks have gone by that they have a major leak from irrigation systems, old pipes or toilets, wasting thousands of gallons of water and running up their bill.

Smart meters instead send wireless signals in real time so residents and utilities can better track water use hourly, daily or weekly, making it easier to hit conservation targets and detect leaks.

"We are trying to get our customers over the ignoranceis- bliss mentality to the knowledge- is-power mentality," said Nelsy Rodriguez, a spokeswoman for the East Bay Municipal Utility District, which provides water to 1.4 million people in Alameda and Contra Costa counties.

The Marin Municipal Water District is considering plans to replace its 58,000 analog meters over three years at a cost ranging from $20 million to $25 million.

The North Marin Water District, which serves more than 60,000 residents in the greater Novato area and parts of West Marin, has already replaced its 20,500 analog meters with wireless alternatives as part of a $5.5 million project. District staff and board members say the meters have been integral in helping customers meet their water conservation targets over the last two years.

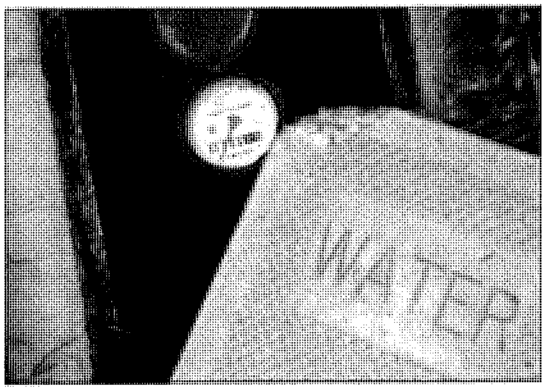
Smart meters are expensive to install. The technology changes every year. Some utilities have been reluctant to take the plunge.

As California's latest drought stretches into its third year, water supplies continue to tighten and state conservation rules increase, so a growing number of water agencies are deciding to upgrade.

METERS

San Jose Water Co. meter reader Jonny Som works along Los Suenos Avenue in San Jose on Wednesday. The company has received approval by state regulators to install wireless water meters throughout its service area.

PHOTOS BY ARIC CRABB — BAY AREA NEWS GROUP



A residential water meter on Som's route. The $100million wireless conversion project will add about $5a month to the average water bill.

In the Bay Area, San Francisco installed smart water meters in 2014 during the last drought.

This month, the San Jose Water Co., a private company that provides water to 1 million people in San Jose, Cupertino, Campbell, Los Gatos, Monte Sereno and Saratoga, received final approval from the California Public Utilities Commission to install smart meter technology on the 230,000 water meters at homes and businesses in its service area.

Work on the $100 million project will begin in two years and will finish in 2026, with the average water bill going up about $5 a month to pay for it, company officials say.

The company ran a pilot project in San Jose's Willow Glen neighborhood and found homes with the technology cut water use 7% on average, and the duration of leaks fell 38%.

"It went well," said Liann Walborsky, a San Jose Water Co. spokeswoman. "The customers who were in the pilot really enjoyed that they were able to see their water usage, and we saw results in conservation."

To the east, the Alameda County Water District, which serves Fremont, Union City and Newark, is spending $41 million to upgrade its 86,500 meters by 2025. It already has finished 17,500, said spokeswoman Sharene Gonzales.

And the East Bay Municipal Utility District has installed smart meter technology at about 19,000 homes and businesses. The district's board is scheduled to decide in September whether to expand the program.

“Just about every utility I know has a full smart meter system, or is investigating it, or is in the process of deploying it,” said Dave Wallenstein, an associate engineer with East Bay MUD.

The technology is not without controversy. When Pacific Gas & Electric Co. installed smart gas and electricity meters across Northern California a decade ago, a small but vocal group of protesters fought the idea. They raised concerns about privacy and potential health risks.

In 2011, the California Council on Science and Technology, which advises state government on technology issues, concluded the radio frequency emissions from smart meters were well within federal safety standards for cellphones and microwave ovens.

Still, most agencies, including PG& E, allow customers to opt out. Walborsky said the San Jose Water Co. will do that when specific plans are finished in the next two years and installation begins.

For people who already track their electricity use closely or watch their gas mileage in real time while driving, a smart water meter is another tool, say some experts. Most systems, like San Francisco’s, allow people to log on to a website and track their water use. Some have smartphone apps. Some send text messages when there are big spikes in water use.

“I remember a project I was working on in Coachella Valley where somebody had a really high-water bill,” said Lon House, a veteran energy and water consultant who works in Arizona and California. “They got irate. The water company said, ‘You used a lot of water in this particular week.’ They said, ‘Oh yeah, we went on a trip and left the hose running.’” On privacy, as part of its approval from the state PUC, the San Jose Water Co. and its contractors are required to comply with the California Consumer Privacy Act and not transmit specific information, such as customer names or bill payment status, over the wireless network.

Some East Coast utilities have installed smart meters to cut down on labor costs. With wireless signals sent from meters directly, they no longer need employees to read the meters.

Some water experts say that as climate change continues to heat up the already arid West, nearly every city will have smart water meters, which also can detect large leaks in distribution pipes and, in some cases, more easily locate people who are watering lawns over the limited number of days in droughts.

“In a drought, a utility can either say, ‘You can never water y our grass again,’ or you can say, ‘Here’s how much water you can use, you decide when you use it and how you use it,’” House said. “It’s a two-edged sword. It can be a bludgeon from the government, or it can be enabling for customers. But given what California is facing, they have to do this.”

San Jose Water Co. employee Jonny Som checks a meter Wednesday on Los Suenos Avenue in San Jose. The company plans to install smart water meters at 230,000homes and businesses.

ARIC CRABB — BAY AREA NEWS GROUP

Progress iffy on state's water use despite arid era

DROUGHT

Marin Independent Journal

By Hayley Smith

Los Angeles Times

The governor of California stood in a patch of dry brown grass as he made his proclamation: "We're in a new era. The idea of your nice little green grass getting lots of water every day — that's going to be a thing of the past," he said. "We're in a historic drought, and that demands unprecedented action."

But it wasn't Gavin Newsom speaking — it was the state's previous governor, Jerry Brown, and the year was 2015.

Seven years later, California is once again facing urgent calls for cutbacks as heat waves, record dryness and climate change converge to create critically short supplies. But what has California learned since then? Is the Golden State really ready to do this again?

Yes and no, experts say. While some of the promises made during the previous drought — including greater investments in water capture and recycling — have been advanced or upheld, progress has been slow-going and conservation is slipping. What's more, a rash of well-drilling is still threatening the state's groundwater supply, and fish and forests are continuing to suffer as the region grows drier.

"In some ways, the way we use water is pretty much like gambling," said Felicia Marcus, a fellow at Stanford University's Water in the West program. "We're going to have to learn how to hold back in normal times to see us through the longer dry times — and more frequent dry times — under climate change."

A look at where we stand today:

Conservation

In 2016, when then-Gov. Brown lifted the last statewide drought emergency, he also issued an executive order vowing to make water conservation a "way of life" in California.

The state largely responded to the call, maintaining daily per capita water use of around 90 gallons for the next several years, according to state data. But Californians have been slipping, and used about 18% more water in April compared to the same month in 2020, the year the current drought began.

Still, some experts said the big picture remains promising.

"We always backslide after a drought, but we backslide to a level which isn't as high as it was before the drought, and that's how we make progress in conservation," said Jeffrey Mount, a senior fellow at the Public Policy Institute of California.

Indeed, many Californians have made lasting changes that have helped keep overall usage down, including upgrading appliances for higher efficiency and generally being more conscious of their consumption. A growing number of residents have also taken advantage of programs to help convert grass lawns into drought-tolerant landscaping.

What's more, the last drought prompted a flurry of legislation that led to more stringent requirements for regional water suppliers, Mount said. Assembly Bill 1668 and Senate Bill 606, passed in 2018, required state agencies to establish long-term efficiency standards and to standardize their water shortage contingency plans.

"Droughts are really important because they push policy," Mount said. "Having two major droughts within 10 years is pretty grim, but it's pushing things along."

That doesn't mean there's no room for improvement, however. In fact, a recent study from the Pacific Institute found that California could still reduce urban water use by as much as 48% through a host of existing technologies and improved efficiency measures.

The Pacific Institute's co-founder, Peter Gleick, decried the state's recent backsliding and criticized authorities for not acting sooner.

"State officials have not rung the alarm bells the way they need to to help the public understand, first of all, that it really is a crisis, and second of all, that there are things they can do and should do," he said.

Groundwater

Perhaps the greatest advancement borne of the last drought was the Sustainable Groundwater Management Act of 2014, a historic law intended to address over-pumping and help regulate the state's supplies.

During dry periods, many Californians — agricultural users in particular — rely heavily on groundwater, especially when faced with cutbacks in deliveries from the state. But experts say the over drafting of wells not only saps groundwater, it also contributes to land subsidence.

Jay Lund, co-director of the Center for Watershed Sciences at UC Davis, said California has made some progress when it comes to implementing regulations and better managing groundwater, but the state is still a long way from achieving sustainability.

"You have to find ways during the non-drought years to repay that extra water that you pumped out of the ground, and that's a big change, and I don't know that everybody understands that yet," Lund said.

Part of the problem is that the SGMA laid out a timeline for implementation that spanned more than two decades, leading to a frenzy of well drilling even against the setting of two back-to-back droughts. Now, thousands of household wells in the Central Valley and other areas are at risk of going dry, and policymakers have acknowledged the legislation contained flaws.

In an effort to slow some of that drilling, Newsom this year signed an executive order requiring local groundwater agencies to verify that new wells are in accordance with sustainability plans. Also, proposed legislation, AB 2201, seeks to make that change permanent.

But in the meantime, some California communities are already losing water, while others are dealing with contaminated supplies.

Marcus, who also served as chair of the state water board during the last drought, remained o ptimistic about SGMA, particularly since the state is using its authority to "call balls and strikes" on inadequate local management plans, she said.

"It's more of an iterative process, so the jury's out on whether it will work in the long run," Marcus said, but "if it does work, it's going to be more sustainable and more durable than another way of doing it. What we were going for in SGMA was long-term sustainability — not immediate drought fix."

Capture and reuse

There have been other promises, too. In 2018, L.A. County voters approved Measure W, a massive tax aimed partially at capturing more stormwater before it reaches the ocean.

Earlier this year, a Times review found that the county had disbursed only a fraction of the funds for the project, and that construction is lagging despite the urgent need to boost supplies of water. Though the project could eventually capture as much as 98 billion gallons of water annually, it might take as long as 50 years to build out the system, officials said.

Bruce Reznik, w hose group Los Angeles Waterkeeper pushed to get the measure passed, credited the county for getting the massive project off the ground, but said he'd like to see more investments in smaller-scale residential level projects in addition to the big-ticket items.

"The reality is we've made really big strides, but we are still largely dependent on imported water, which is drying up," Reznik said. "That isn't a lot of water security."' There are several other projects in the works to help boost the area's supply, he said, including a major initiative from the Los Angeles Department of Water and Power called Operation Next, which aims to recycle as much as 100% of purified wastewater from the Hyperion Water Reclamation Plant by 2035.

DWP spokeswoman Ellen Cheng said it's one of many such projects in development, including a groundwater replenishment project in the San Fernando Valley that, when completed, will recycle 100% of available wastewater supply from the Donald C. Tillman Water Reclamation Plant and ultimately produce drinking water for more than 200,000 Angelenos.

"The key point is that LADWP continues to make significant investments in several programs to further diversify the city's water supply portfolio — which includes local groundwa-ter, recycled water, stormwater capture, water conservation and water-use efficiency," Cheng said.

The agency is also developing projects to collect rainwater and runoff from East San Fernando Valley parks, as well as a direct potable reuse project near Griffith Park that will treat wastewater to drinking water standards, Cheng said.

Statewide, officials with the Department of Water Resources are continuing to fund advanced water infrastructure and resilience projects at local agencies to help " droughtproof " the state, officials said. At the same time, the California Coastal Commission recently rejected plans for a desalination plant in Orange County.

When asked to grade the region's readiness for the current drought, Reznik offered a C-minus, but when asked to grade its efforts to get more water, he said it was "more in the B+ range." "We're in the right direction, it's just we could use more — and sooner," he said.

Environment

While the last drought shined a light on issues facing millions of residents, some of its most devastating impacts were felt in the state's forests and rivers. Experts say vulnerable fish species, particularly salmon, have been pushed to the brink of extinction due to warmer waters and shrinking stream flows.

The problem was "absolutely exacerbated during the last drought," said John McManus, president of the Golden State Salmon Association.

"A big heavy flush of water in the spring basically doesn't happen during the drought, and the ability to maintain cold water on the eggs of the fish that are incubating in the fall is compromised and often gets too warm," he explained.

Though California is continuing to lose huge volumes of naturally spawned salmon as the state gets hotter and drier, officials have taken some actions to help mitigate the problem, Mc-Manus said, including managing strategic releases of cold water from reservoirs and trucking salmon to areas where they have a better chance of survival, though the concept is not without controversy.

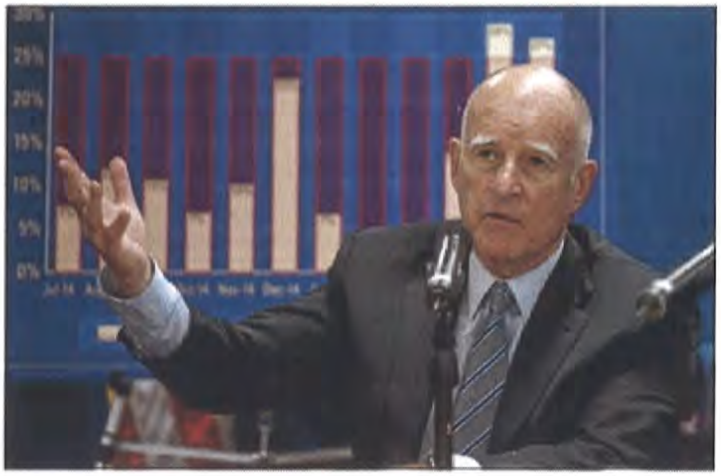
"They're reaching into their bag of tricks and saying, 'Where else can we park some of these adult fish where they can spawn naturally and there'll be cold enough water to keep eggs alive?'" McManus said. Though winter-run salmon, in particular, remain endangered, there are many stakeholders within the state that are "quite worried about seeing an extinction on their watch," he added.

But while salmon may benefit from some of these solutions, California's forests are facing a harder road. During the last drought, an estimated 102 million trees that depend on soil moisture died, according to a 2018 report that Lund co-authored. The tree mortality has dangerous implications for wildfires, erosion and public safety.

"For the forests, we're kind of stuck," he said, adding that it would take "many millions of acre-feet" of water to turn things around. "There are some of these environmental impacts that we just have to adapt to — that we're not going to be able to push back the clock on — and that's true for forests," he said. That may not be all bad, however, since many of the state's forests have become overgrown during the last century due to wildfire suppression, he said.

But as with groundwater and green lawns, it does mean residents of the Golden State should get used to the idea of a California that looks considerably different.

"We have to find a way to prepare ourselves for the aridification, essentially, of much of California's natural landscape," Lund said. *Distributed by Tribune News Service*



Gov. Jerry Brown talks about the drought and water restrictions in 2015following a meeting with San Diego County officials to discuss continued conservation efforts.

LENNY IGNELZI — THE ASSOCIATED PRESS

A sign promotes state efforts to save water in 2014at the Capitol in Sacramento. Brown lifted the last statewide drought emergency in 2016.

RICH PEDRONCELLI — ASSOCIATED PRESS

Inflation biting into new projects

INFRASTRUCTURE

Marin Independent Journal

By David A. Lieb and Michael Casey

The Associated Press

The price of a foot of water pipe in Tucson, Arizona: up 19%. The cost of a ton of asphalt in a small Massachusetts town: up 37%. The estimate to build a new airport terminal in Des Moines, Iowa: 69% higher, with a several year delay.

Inflation is taking a toll on infrastructure projects across the U.S., driving up costs so much that state and local officials are postponing projects, scaling back others and reprioritizing their needs.

The price hikes already are diminishing the value of a $1 trillion infrastructure plan President Joe Biden signed into law just seven months ago. That law had included, among other things, a roughly 25% increase in regular highway program funding for states.

"Those dollars are essentially evaporating," said Jim Tymon, executive director of the American Association of State Highway and Transportation Officials. "The cost of those projects is going up by 20%, by 30%, and just wiping out that increase from the federal government that they were so excited about earlier in the year."

In Casper, Wyoming, the low bid to rebuild a major intersection and construct a new bridge over the North Platte River came in at $35 million this spring — 55% over a state engineer's estimate. The bid was rejected and the project delayed as state officials re-evaluate their options.

"If this inflation keeps the way it is, we will have to roll projects from one year into the next, into the next, into the next," said Mark Gillett, chief engineer of the Wyoming Department of Transportation.

Gillett had hoped the federal Infrastructure Investment and Jobs Act would finance a boom in highway and bridge construction.

"But it's just not going to go as far as we had hoped," he said.

In addition to roads, the federal infrastructure bill includes billions of dollars for water projects, railways, airports, broadband internet, electric grids and green-energy projects over the coming years.

Inflation has affected the entire U.S. economy, posing one of Biden's biggest challenges during a midterm election year. Fuel, food and housing costs all have shot up. Consumer prices surged 8.6% in May over last year, the highest rate since 1981, according to the U.S. Department of Labor.

Prices for some key materials in infrastructure construction have risen even more. Prices paid to U.S. manufacturers of asphalt paving and tar mixtures were up 14% in May compared to last year, according to data from the Federal Reserve Bank of St. Louis. Prices for fabricated steel plate, used in bridges, were up 23%, and ductile iron pipes and fittings — used by water systems — were nearly 25% higher.

The hikes are being driven by a variety of factors, including worldwide supply-chain backlogs, strong consumer and business spending in the U.S., Russia's invasion of Ukraine — and, some argue, federal energy and fiscal policies.

U.S. Rep. Sam Graves, the ranking minority member on the House Transportation and Infrastructure Committee, contends the infrastructure law itself is contributing to inflation by pouring more federal money into an economy already flush with trillions of dollars in federal pandemic aid.

"They are borrowing more money so they can spend more money, (which) is driving inflation, which is cutting down on the projects that they're actually wanting to do," said Graves, a Missouri Republican who voted against the infrastructure bill.

White House senior adviser Mitch Landrieu said the infrastructure law "actually positions us for lowering costs for families in the short- and long-term." He pointed, among other things, to made-in America requirements for steel, iron and other construction materials that could strengthen supply chains and thus lower costs.

Officials at Des Moines International Airport were counting on the federal infrastructure money to replace an aging terminal with a modern structure. Four years ago, a new 14-gate terminal was projected to cost about $434 million and be open by 2026. By this spring, the cost had soared to $733 million.

That's more than the airport can afford, even with the federal aid. So officials are planning to break the project into phases, building just five new gates by 2026 at a cost of $411 million.

“If inflation continues, it may be a decade before the project gets completely done,” airport Executive Director Kevin Foley said.

Other projects also have been rocked by inflationary price hikes.

Since voters approved a property tax increase in 2020, the estimated cost of building two light rail lines and a tunnel through Austin, Texas, has gone from $5.8 billion to $10.3 billion. Doubling the tunnel length was a big factor. But inflation and surging real estate prices also fueled the increase, forcing officials to consider cutting costs or lengthening the time frame for completing the project.

“It’s been a challenge,” said David Couch, chief program officer at the Austin Transit Partnership.

A crew works on a project to replace water main pipes Wednesday in downtown Tacoma, Washington.

TED S. WARREN — THE ASSOCIATED PRESS

Monday, 06/20/2022 Page .A07

MARIN COUNTY

Grand jury report rips water supply planning

Marin Municipal blamed for 2021 drought emergency

Marin Independent Journal

WEDNESDAY, JUNE 22, 2022

The Nicasio Reservoir had cracked earth and low water level in July. The Marin civil grand jury criticized the Marin Municipal Water District for not having adequate supplies to handle droughts. PHOTOS BY SHERRY LAVARS — MARIN INDEPENDENT JOURNAL

BY WILL HOUSTON

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The Marin Municipal Water District has failed to adequately prepare for severe drought and should create a four-year water supply, the Marin civil grand jury said in a new report.

Last year, the district faced depleting local reservoir supplies as soon as summer. While rains in late 2021 nearly refilled reservoirs, the drought "exposed serious shortcomings" in the district's ability to offer a reliable water supply and has shaken public confidence in the district's leadership, the report states.

"Last year's drought emergency could have been avoided, if MMWD had taken sufficient measures to provide for a resilient water supply," the report stated. "With the mounting challenges posed by climate change, the mistakes of the past cannot be repeated. MMWD must establish a roadmap for achieving water supply resilience without delay."

The grand jury report calls on the district to increase its water supply by 10,000 to 15,000 acre-feet and consider a variety of sources, including new supply, conservation and recycled water expansion. The amount is about a 20% increase in the district's maximum water supply and a volume equitable to a new Nicasio Reservoir.

Hoses and faucets are set up at the recycled water filling station at the Civic Center in San Rafael in 2021.

The district's seven reservoirs in the Mount Tamalpais watershed hold about 80,000 acre feet, just more than two years' worth of supply. Additionally, the grand jury is calling on the district to prioritize new water supply options and how it would pay for them before the end of this year.

Before the rains in late 2021, the district had been preparing to build an emergency $100 million, 8-mile pipeline across the Richmond-San Rafael Bridge by summer to pump in Yuba County water.

In March, the district began a study that will assess the cost and benefits of potential new water supply options to serve the county's 191,000 central and southern residents, including a pipeline, a regional desalination plant, recycled water expansion, groundwater banking and additional conservation measures.

District General Manager Ben Horenstein said the grand jury's recommendations align with the current actions the board is taking to find new sources of supply.

"I think it's a thoughtful report, a good report and again I think it is a direction we're going consistent with the recommendations," Horenstein said.

He pushed back on the grand jury's findings that the district failed to adequately prepare, describing them as "opinions." He said the district has done a good job in its water supply planning and that it is not alone among western water suppliers in preparing for emergency supply projects during the drought.

"I think the context of the historic nature of the drought wasn't clear in the report," Horenstein said. "To me, I don't think it's necessarily fair to blame the district or to blame anyone versus supporting the direction that is laid out in the report that is consistent with what we're currently doing."
District board President Larry Russell said the report was helpful and that the district board should be able to identify some priority projects by the end of the year.

At the same time, Russell said the report showed some naiveté about the severity of the drought. He pointed to a peer-reviewed study published earlier this year that found the last 22 years in the western U.S. were the driest in 1,200 years.

"If a water district were, in their terms, to drought-proof itself — I don't even know what those words mean, drought-proof," Russell said, referring to the grand jury report. "What does it mean technically? How much reserve do you need? How long is the drought going to be?"

Kimery Wiltshire, president of the Sausalito-based Confluence West nonprofit organization that works on water issues in the western U.S., said she agreed with the grand jury findings that the district's two-year supply of water is "completely inadequate."

The proposed $100 million emergency pipeline was a "knee-jerk reaction" that frustrated East Bay residents and could have been avoided had the district increased water supplies in preceding decades.

"Marin, I think is behind the times," Wiltshire said. "Most water agencies have a minimum operating standard that they have identified and have in place at least four years of supply."

Wiltshire also agreed with the grand jury's criticism of the district using historical precipitation levels to predict future reservoir levels. The grand jury states a 2017 plan adopted by the district that predicted no shortages for projected water demand through 2040 under climate change conditions is erroneous.

"The practice of relying on historical precipitation to predict the future has proven to be flawed in light of climate change," the report states. "In fact, the possibility of reservoirs running dry is much higher than anticipated."

The district's new supply assessment is using models to stress-test the district's water supply under different scenarios, including more severe six- to seven-year droughts.

Larry Minikes, a member of the district's citizen advisory commission and a Marin Conservation League board member, said the grand jury's recommendations on new supply are valid. However, he said the report failed to capture the historical context behind the district's supplies, namely the county's reticence to more housing development.

"Marin for decades has been concerned with population growth," Minikes said. "Increases in water supplies were seen as the enemy, as bringing in new development. Here we are today and we're saying, 'Well, why didn't the district do more?' The grand jury should have brought into this the role the community played in getting where we are today. The district was not operating in a vacuum."

The district's seven reservoirs make up about 75% of its supply, with the remaining 25% coming from Russian River water imports from the Sonoma Water agency. The district has not expanded reservoir supplies since constructing the Soulajule Reservoir and nearly doubling the size of Kent Lake, its largest reservoir, in the 1980s.

Another issue is how the district would pay for these projects. The grand jury report states the district has $139 million in outstanding bond debt and has the capacity to raise another $150 million for water resilience projects so long as it increases rates and fees to keep up with inflation and recent water revenue losses.

Roger Roberts, a former district water rate advisory committee member and former longtime Marin Conservation League board member, said the district is already facing a "serious financial bind" after the pandemic and the drought. In addition to the water supply projects, he said the district has hundreds of millions of dollars in deferred maintenance to repair and replace aging pipes, pumps, storage tanks and other facilities.

Additionally, the district has also had to spend down reserve funds to make up for losses in water sales revenue incurred during the pandemic and drought as well as planning for the emergency pipeline, he said.

"It means the water rates will need to go up substantially," Roberts said. "They have prided themselves over the years for providing water at 1 cent a gallon. As a result of that, this financial problem that has been building up on them is now front and center."

One avenue the grand jury recommended is a new fee similar to the capital maintenance fee approved in 2019. The fixed fee is charged based on the size of the customer's meter, with larger meters corresponding with larger fees.

The fee is being challenged in court by the Coalition for Sensible Taxpayers (COST), which states that the fee is a tax and therefore requires voter approval. COST alleges the fee violates the voter-approved Proposition 218 from 1996, which prohibits government agencies from charging more for a service than it costs to provide it.

“Whatever portion of that which comes from ratepayers must be tied to the amount of their water usage,” COST executive director Mimi Willard wrote in an email. “Charging people based on the size of their meter is unfair, removes any incentive to conserve and we believe is illegal."

POINT REYES LIGHT

NEWS

Marin details raft of housing programs

by Ike Allen
June 22, 2022

Marin County has settled on a set of programs intended to make housing more abundant, affordable and fair in coming years. Since the start of the year, the county has held public meetings on the Housing Element as it worked through the thorny details of meeting state housing mandates and rectifying a severe shortage of affordable homes.

Now, the public and elected officials can review a full draft of the element, along with the corresponding Safety Element.

At a hearing last week, supervisors, planning commissioners and community members responded to the 675-page document, the most ambitious effort in decades to dismantle the significant barriers to housing in unincorporated Marin.

"The array of programs that you have brought to us to address the housing needs we have is really impressive," Supervisor Stephanie Moulton-Peters told county staff last

Tuesday.

The most incendiary aspect of the process has been the housing sites list, an inventory of 109 parcels that the county will rezone to accommodate more than 2,600 new units. (Marin must plan for 3,569 new units within the next eight years.)

The county's last effort at a sites inventory in 2014 yielded just one development, and it's unlikely that the new zoning exercise will turn out to be a to-do list for housing developers. Several of the selected landowners in West Marin have no plans to use their parcels for housing, and coastal development regulations still stand in the way.

But the heart of the draft Housing Element is the slate of 33 programs intended to give teeth to the county's housing commitments. The first two are perhaps the most concrete and imminent. In Program 1, the county will rezone 109 parcels totaling 1,455 acres across Marin by January 2023, including 18 parcels currently zoned for agriculture.

This large-scale rezoning is the result of state mandates that already survived an appeal by the county last year. But it continues to alarm some West Marin locals, who feel the community plans and environmental values of coastal villages are being thrown by the wayside.

"This is scary stuff," said Ken Levin, president of the Point Reyes Station Village Association. "We have serious concerns that the historic environmental protections for which Marin County is so well known are threatened by this document."

He said community plans shouldn't be viewed as impediments to housing, and he argued county planners could look to more creative solutions that won't strain West Marin's limited rural infrastructure.

Program 2 is the adoption of a state law that weakens county control over certain housing developments. If a landowner wants to develop affordable housing at any parcel that was already suggested during the county's two previous housing cycles, it must be approved "by right" and is exempt from environmental review.

The by-right program is meant to streamline affordable housing at the "recycled" sites Marin has been eyeing for more than a decade; it allows only an objective design review before approval, except in the coastal zone, where developers still need to meet the county's Local Coastal Program guidelines. One example of a recycled site is the Grandi building in Point Reyes Station, where the county's suggestion of 25 affordable housing units continues to be unlikely: owner Ken Wilson plans to turn the place into a hotel. Marin is considering expanding streamlined approvals for any project with more than 20 percent affordable units.

The 31 other programs span a wide array of methods for promoting housing development and keeping existing housing affordable. Among dozens of specific policy actions, the county plans to permit an average of 35 accessory dwelling units each year, establish minimum densities for projects in multi-unit zoning areas by the end of next year, rework the development code to allow slightly taller buildings, remove parking requirements for many residential developments and expand tenant protections and rent stabilization.

Several programs were of specific interest to West Marin, though some were just imprecise plans. For example, the county aims to develop formal standards for multi-unit development in areas that use septic systems. And next year, the Community Development Agency will study alternatives to the individual septic systems that have long fettered new housing projects on the coast and in the San Geronimo Valley. Pre-manufactured "packaged" sewage plants, community septic systems and incinerator toilets will be on the list of considerations.

Program 15 of the element looks at housing for farmworkers and hospitality workers, the contingents who staff West Marin's commercial engines but seldom make enough money to afford stable housing in the area. The county's stated goal is to increase housing stock for these workforces by 20 percent in the next eight years. Developers can set aside affordable units for agricultural workers, as the Community Land Trust Association of West Marin is doing in its 50-unit Coast Guard development. But they are prevented by federal housing law from giving preference to locals because doing so could further segregate a county with a history of exclusion.

The program suggests potentially requiring hospitality employers to provide housing for seasonal workers or contribute to a fund that could help them pay rent.

Planning Commissioner Don Dickenson said public agencies also have a responsibility to provide workforce housing, particularly in West Marin.

"The National Park Service is the largest landowner in the county, a significant employer in the county and creates housing needs for their employees," he said. The county's workforce housing program should include working with the park to make sure it can house park employees and ranch workers within its borders, Commissioner Dickenson suggested.

On Tuesday, supervisors extended West Marin's short-term rental ordinance for two years, barring all new registrations of vacation rentals until May 2024.

Tourist-serving coastal towns struggle to house permanent residents because, though long-term rents are expensive enough, vacation rentals can fetch up to $1,000 a night. In communities like Marshall and Stinson Beach, 20 percent or more of the housing stock is occupied by vacation rentals, and 57 percent of homes in West Marin are not primary residences, county staff found.

The ordinance saw widespread support from community housing groups like the Bolinas Community Land Trust, and some pushed for a more permanent change. It could eventually be taken further, according to the Housing Element's Program 18, with steps like a permanent cap on short-term rentals by percentage, a prohibition on such rentals in multi-unit buildings or even a full-on ban. Supervisor Dennis Rodoni said it should be a given that any properties the county rezones by the end of 2022 should not be eligible for short-term rentals. Another program will entail the county studying the efficacy of a tax on vacant homes in 2024.

Spurred by the Housing Element process, the county is also updating its Safety Element, the planning document for hazards like wildfires and flooding, for the first time.

The document establishes new goals of climate resiliency and equity, and accommodates wildfire programs that have expanded since the creation of the Marin Wildfire Prevention Authority in 2020, including a comprehensive evacuation route mapping project.

Another new Safety Element program is a property rating system that will disclose environmental hazards to potential buyers and renters. Homes in high wildfire severity zones, or in areas at increasing risk of flooding and inundation, would get lower ratings that could be improved by mitigation strategies like home hardening.

The county will release a draft environmental impact report for the Housing and Safety Elements in mid-July, and members of the public will have another opportunity to comment at a Board of Supervisors hearing on Aug. 23.

EDITORIAL

State pulls plug on ability to fight housing

Marin municipalities are trying to come up with plans to meet ambitious housing quotas handed down by the state.

Local officials are hearing complaints that they are rolling back land-use protections that have been in place for generations.

They are. But don't blame them; the criticism should be aimed at Sacramento.

There's no debate that the state faces a housing crisis, but Sacramento's solution is to rewrite the rules, undermining local control over land use.

Those rules have helped protect Marin's landscape from overbuilding.

At the same, as those restrictions have been tightened over the years, they have fueled escalating home prices and severely reduced the availability of affordable housing — creating an exclusionary market that raises valid questions regarding racial and economic equity.

Because of that, Marin has become one of the state's political poster children in local exclusionary land-use restrictions that need to be scaled back in order to allow for the construction of new housing.

For too long, Marin has ignored Sacramento's demands that it build its regional fair share of housing. Few, if any, politicians are getting elected by promising to build more affordable housing.

Those who promised to be tough on developers and builders fill elected decisionmakers' seats.

Marin holds itself up as an example of a community located a short distance from metropolitan cities that didn't allow its landscape to be covered by suburban sprawl or urban development.

Strong political resistance to change and development remains strong, but officials' legal tools have been severely weakened, almost to the point where developers' plans that comply with weakened local zoning can expect almost automatic approval.

The days of people flooding council and planning commission chambers and drowning developers' goals and plans are numbered thanks to state lawmakers. In addition, if it wasn't protests from neighbors, growth was tempered by costly and time-consuming red tape and requirements.

Now, the county Board of Supervisors and Planning Commission are trying to come up with a local plan to guide its requirement to meet the state-mandated goal of building 3,569 new residences in Marin's unincorporated areas between 2023 and 2031.

Other local municipalities are facing similarly difficult-to-attain numbers.

County planning staff have come up with a list of 79 potential sites.

Many are going to generate protests by neighbors, but local officials don't have a lot of available options with much of the unincorporated area comprising local, state and federal open space and parkland or protected by agricultural zoning. There aren't many available sites, especially when officials are also trying to stay away from locations deemed risky in terms of sea level rise or wildland fire.

The state also requires the county to work with water agencies to come up with strategies needed to provide enough water for the growth.

Besides identifying potential sites, local control is limited to "objective design standards" such as height, setbacks, lot coverage and parking requirements. Those may prove critical in preventing over-building.

The goals for affordable housing remain the same — the right locations in terms of proximity to jobs and transit and the right size and design. But instead of the political inclination to say "no" — either outright or by burdening plans with requirements and restrictions — to those who might meet those criteria, officials' discretion has been severely limited by Sacramento.

It's a new day for developers and builders — and for those who have fought growth to protect their neighborhoods and local environment.

While county supervisors and other local officials try to make local sense of these top-down quotas, there is no sign that Sacramento has any intent of changing its mindset.

MARIN SUPPLY

Diving deep: New water sources are on the table

BY WILL HOUSTON

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Marin Municipal Water District will hold a series of meetings focused on adding new water sources.

The district, which serves 191,000 central and southern Marin residents, launched a water supply study in March as it faced depleting its local reservoir supplies after two years of severe drought.

On Tuesday, staff will provide the district Board of Directors a first-time overview of the various water supply options the agency could consider as it looks to bolster its supply. The meeting begins at 5 p.m.

Among the options being studied are desalination, increasing local reservoir storage, groundwater banking in Sonoma County, increasing water imports from the Russian River, expansion of recycled water systems, conservation measures and a pipeline across the Richmond-San Rafael Bridge.

The Tuesday overview will be followed by more in-depth discussions of desalination and recycled water options on July 12, followed by a discussion on an East Bay water pipeline, increasing local storage and increasing water imports from Sonoma County.

“Obviously it’s a serious challenge and we need to take our time and be as thoughtful as possible,” said board Director Larry Bragman during a discussion on the study this month.

About 75% of the district's water supply comes from seven reservoirs in the Mount Tamalpais watershed while the other 25% is from Russian River water imported from the Sonoma Water agency. This month, district consultants presented findings of a stress test of the district's existing water supplies, which modeled how the supply would weather a variety of drought scenarios.The scenarios included historic supply data, climate change models and changes in water demand in the coming decade.

The tests found that the existing supplies would not be enough to weather a severe four-year drought — a drought that combines the district's two droughts of record in 2020-2021 and 1976-77 —and would be significantly strained during longer-term droughts lasting up to seven years.

"The point of all the scenarios is really to get a range on the potential water supply deficits and to set the stage for the problem: what do we do about it?" district consultant Armin Munevar told the board during a June 14 discussion.

While the district's reservoirs hold about 80,000 acre-feet of water — with an acre-foot being nearly 326,000 gallons — district staff said not all of that water is usable. Only as much as 55,000 acre-feet, or about 70% of it is considered a reliable water supply. When reservoir levels reach 10,000 acre-feet or below, this water will likely be unusable because of siltation and pumping limitations, staff said. Additionally, the district also considers water stored between the 10,000 to 25,000 acre-feet levels to be emergency backup supplies that would need to be used sparingly during severe droughts.

With district ratepayers currently using about 25,000 acre-feet of water per year, the reservoirs hold just more than two years of reliable supply.

By 2045, water demand is expected to increase to about 27,500 acre-feet per year by 2045 when incorporating population growth, state housing production mandates and ongoing conservation, according to district water resources director Paul Sellier.

The assessment used various drought scenarios to predict how much extra water the district would need on an annual basis to stay above the 25,000 acre-foot emergency storage level. Depending on the severity of the drought and conservation measures, the models showed the district could need to add a range of 3,000 to 11,700 acre-feet of water per year.

Where this new water would come from will be the discussion in the next three workshops.

"I think the first thing we need to do is squeeze as much efficiency as we can out of what we have, including our system here in Marin and our partnership with North Marin and Sonoma," Bragman said this month. "That is clearly the most cost-effective and pragmatic approach. And quickest."

More information about the upcoming workshops can be found at marinwater.org.

POINT REYES LIGHT

NEWS

Crop values battered by drought

by **Ike Allen**
June 22, 2022

The drought took a predictably harsh toll on farming and ranching in Marin last year.

The gross value of agriculture dropped by 5 percent in 2021, the county's annual crop and livestock report showed. Grass stayed short, wells ran dry and ponds receded, undoing the modest gains reported the previous year. Nearly every crop and product in Marin, from fruit to cattle, saw precipitous profit declines, and the overall value of the county's agriculture sank from nearly $102 million to about $96.6 million, lower than it has been since 2018.

"Between the pandemic and the third year of drought, our agricultural producers have become very weary and a bit disheartened," agricultural commissioner Stefan Parnay said at a presentation to the Board of Supervisors last week.

The previous crop report was deceptively promising. The beginning of the pandemic saw surges in value for many ranchers and dry conditions hadn't yet caught up to the overall trend toward growth. But the agriculture community knew the numbers would soon see a downturn. The 2021 report, released last week, bore out those predictions.

The drought's hardships were widespread but uneven. Cattle and organic milk, which together account for almost half of Marin's agricultural production, both saw serious declines in value. As ranchers and dairy farmers sold off cows from their herds last summer to avoid overgrazing meager pastures, cattle prices plunged by 13 percent to just $1,000 per head. Organic milk, the county's most important agricultural product, saw an 8 percent value decline for similar reasons. But plants are the first to suffer from drought, and the most dizzying drop came for growers: Fruit and vegetable production lost more than a third of its value, from more than $4 million in 2020 to just $2.6 million last year.

Anticipating a dry summer, beef ranchers sold calves before they were "finished," not having reached the weight at which they'd normally be sold. Unloading small calves in a crowded market, they made little profit. But for most, it was the wisest financial decision. "You can't buy your way out of a drought," said rancher Mike Gale, who runs Chileno Valley Ranch with his wife, Sally. "You can't just keep buying water and feed."

The Gales sold 79 animals last year, more than half their herd, for about 25 cents per pound—less than a quarter of what they could have fetched in 2019. "The prices were not good, but the idea of keeping them was a worse option," Mr. Gale said.

Kevin Lunny, who grazes beef cattle at G Ranch in the Point Reyes National Seashore, made the same calculation last June. At the tail end of the rainy season, grass on his ranch should be up to a person's waist, and it was barely knee-level. Mr. Lunny recognized something was wrong and sold 30 percent of his mother cows. Soon after, the park service sent a letter to its tenant ranchers instructing them to sell cows or risk failing to meet the agency's thresholds for residual dry matter, the plant matter left on the ground just before the first rains, when the herd has grazed the land to its breaking point.

"Overgrazing serves no purpose to anybody," Mr. Lunny said. The park service wants to protect against denuded, barren soil that heightens erosion and kills native plants, and ranchers want productive rangeland that is easily rejuvenated by winter rains. Well-timed late-season rains this year gave pastures a helpful boost, and now that most herds are smaller, ranchers will likely have an easier summer this summer.

Yet destocking, as livestock producers call it, is a painful choice, and its consequences take years to reverse. Ranchers spend years cultivating favorable genes in their herds and come to depend on productive cows and lineages.

"I had to sell cows off that I had been with for eight years," said Guido Frosini, who runs True Grass Farms in Tomales. "You sell off the ones that are older or don't perform as much. It's still sad."

Beef ranchers are relatively lucky in that their water needs are limited. Dairy farmers need much more water for processing and washing, and most had to resort to trucking in water. The Lafranchi Ranch in Nicasio is home to an active spring that normally provides much of the dairy's water, but last year, the dependable spring ran dry.

"At one point in early fall, we were hauling all our water," said Rick Lafranchi, who manages sales and marketing for the Nicasio Valley Cheese Company, the family's creamery. "Whatever we needed, we had to haul." Dairy farmers with no value-added products like cheese had an even harder time staying afloat. And the closure of the McClure Dairy in the seashore last spring contributed to the overall drop in organic milk value.

Vegetable growers, the farmers with the least room for water troubles, are barely hanging on in Marin—or worse. When water is scarce, their row crops are the first to be afflicted, and many had to let much of their acreage lie fallow last year.

At its peak, Marin Roots Farm cultivated about 40 acres of leased land in Hicks Valley, using a goat farmer's pond to water lettuces, root vegetables and herbs. But last year, the landowner needed every drop of pond water for the goats, so farmers Moira and Jesse Kuhn had to fend for themselves. They couldn't afford to truck in water without raising costs to exorbitant levels—"Do you want to pay $20 per lettuce head?" Ms. Kuhn asked—so they fashioned a makeshift tanker truck by placing water totes on an equipment trailer. Through a county program, they had permission to draw water from a North Marin Water District hydrant on San Antonio Road. They used about 1,250 gallons per day.

In the end, they cultivated just an eighth of an acre and decided to permanently let go of about three quarters of the land they once farmed. With too little water, carrots taste more like bitter parsnips, so the Kuhns focused on a lettuce mix they could sell at the farmers' market.

Ms. Kuhn said the situation is especially precarious for renters like them, and they've grown accustomed to debt. "The rent bills keep coming in even if you can't produce anything," she said. Some fellow vegetable farmers have left Marin altogether.

Fallow fields around the American West have an indirect effect on livestock production, too. Alfalfa prices shot up last year as farmers from the Sacramento Valley to Idaho didn't have enough water to irrigate their fields and competition for existing feed became fierce. Rising fuel prices have only worsened Marin ranchers' bills for shipping feed.

Some agricultural products were fortunate outliers. Though the market for wool collapsed, the price per head of sheep actually went up by about 10 percent. Sheep need less water and feed than cattle, so ranchers could wait until their lambs were the right size before selling them for slaughter at full price. Reliable demand for local lamb from restaurants helped some producers along. "It's very much a niche market for a small producer like me," Marshall sheep rancher Marcia Barinaga said. "I'm trying not to grow my flock too much but I'm not cutting back either."

West Marin's oyster industry was another bright spot. Mariculture more than doubled in value during 2021, as businesses like Hog Island Oyster Company and Tomales Bay Oyster Company recovered quickly from the plummeting sales they suffered during the early lockdowns of the pandemic. In 2020, local shellfish farms lost more than $3 million in value, but as restaurants—their key clients—reopened, they surged back to life.

Marin agriculturalists are far from helpless. They can tap into a wide array of federal, state and county drought assistance funds that have expanded since the county declared a drought emergency last May. And last week, supervisors approved $100,000 in relief for farmers from a drought mitigation fund to help offset the millions ranchers already spent on trucking water last year. The county also paid for Marin Water and N.M.W.D. to supply more than two dozen ranchers with water from hydrants last summer.

"We are fortunate to live in a county where the board does keep agriculture in mind," assistant agricultural commissioner Scott Wise said. He said the county doesn't anticipate any need for water hauling this summer, though ranchers will still likely have to fight to afford feed costs.

Most producers are doing better this June than they were a year ago. Marin Roots Farm has enough water to grow a wider variety of greens, Mr. Lunny's grass has reached a much more respectable height, and the heavy, isolated rains recharged wells and ponds throughout the county. But some cautioned their fellow agriculturalists against placing all their hopes on one season of replenishing rain.

"I feel that people in our community seem to have a short-term memory about droughts, treating water as a week-to-week and summer-to-summer challenge," Ms. Kuhn said. "We really need to take a decade-long approach to things."

Mr. Frosini said ranchers need to be more nimble and ecologically aware. Some might require technical assistance to adopt carbon farming techniques or to diversify their pastures with hedgerows and trees, but doing so will be necessary to keep producing food, he said.

"This is not just 'poor ag.' Ranchers need to shape up to adapt for the ecosystem and their own business," he said. "It's really hard as a reality, but I think it's an incentive for the farming community."

EDITORIAL

Grand jury put tight focus on water district

The 2021-22 Marin County Grand Jury's review and assessment of local water quandary should bolster diligent movement toward increasing both our supply and our capacity to store water.

Marin Municipal Water District staff and directors say they've been working toward that goal.

Not fast enough, according to the grand jury's report, "A Roadmap to Water Resilience for Marin Municipal Water District."

"Last year's drought emergency could have been avoided, if MMWD had taken sufficient measures to provide for a resilient water supply. With the mounting challenges posed by climate change, the mistakes of the past cannot be repeated," the civil grand jury stated.

MMWD, whose primary focus has been on conserving local water use, should be focused on building a four-year supply — a reserve amounting to a 25% increase in its current supply — rather than a repeat of its 2021 crisis where there was real concern that the district's supply would run dry.

An unusual November downpour saved the day — for this year.

But it was a crisis that could have been avoided.

The grand jury report calls for "decisive action" — now.

Last year's dwindling shoreline of Lake Nicasio is a sound argument that the district should have been focusing on this issue long before last year's crisis and this year's worries after seeing hardly any rain since December.

Increasing the amount of water MMWD gets from Sonoma County, an estimated $100 million pipeline bringing in water from the Central Valley, another look at desalination (possibly as part of a Bay Area regional project) and increased recycling need to all be on the table for the district's consideration.

The grand jury summed up its review:

"The time has come for MMWD to take action and ensure that the district has a sound plan to secure adequate water supplies in the face of an uncertain future."

The district appears to be locked in on that goal now, as staff, consultants and directors are actively diving into its possible options — their potential, costs and ramifications.

The late-year rainstorm bought MMWD some time. It, in effect, sidelined the district's plan to build an emergency pipeline across the Richmond-San Rafael Bridge to bring in water from the Central Valley sources.

That plan has its local critics. So do the others.

But the grand jury — as have many MMWD customers — argues the district cannot conserve its way out of this quandary.

MMWD customers have proven themselves able to conserve water. Many customers are veterans of the 1976 drought. The latest call for bolstering local conservation is on top of measures many businesses and households are already taking. Still, last year, MMWD customers were able to cut back their water use to an average of 124 gallons per capita per day, down from the 149 gallons per day MMWD customers used in 2015.

Certainly, we should all be looking for ways we can save. But the grand jury found: "Conservation is essential but it is not enough to ensure a reliable water supply, particularly with state mandates for thousands of new homes."

While customers have a responsibility to not waste water, the MMWD's responsibility is to provide the community with the water they need for their households and businesses.

The grand jury's write-up should serve as strong impetus and pressure that the public expects action, not more planning reports and studies, from MMWD's leadership. This is no time for so-called paralysis by analysis. MMWD is on a decisionmaking path and its leadership needs to show it is time for forthright action — now.

POINT REYES LIGHT

NEWS

Seats open on local boards

by **Ike Allen**
July 6, 2022

With no incorporated towns and a single supervisorial district shared with suburban cities, West Marin's 12,000 residents have few elected officials to call their own. But on Election Day in November, they will have several opportunities to elect or re-elect officials at the most local level: school board trustees and utility agency directors. Incumbents can file papers to run for these offices from July 18 to Aug. 12. The filing period for new candidates is from Aug. 13 to Aug. 17. In Bolinas, where the **Bolinas Community Public Utility District** functions almost like a town council, two directors are up for re-election, and director Lyndon Comstock is not seeking re-election after nine years in the role. Mr. Comstock, a retired community development banker who championed increased investment in the district's infrastructure, will focus on his work as an amateur historian. "It's essentially a volunteer position, and I put in my stint," he said of his time on the board. BCPUD directors are paid $250 per month. Board president Jack Siedman and director Grace Godino will seek re-election. In the **Bolinas-Stinson Union School District**, three seats are up. Director Jenny Pfeiffer has said she will not seek re-election, while Nate Siedman will, and Arianne Dar will run if needed. "I'm going to see how many people sign up," Ms. Dar said. “I don’t want to take a seat from somebody who maybe has a current child at the school.” In the **Lagunitas School District**, three trustees’ terms are expiring. Board president Amos Klausner told the Light he will not run again after four years on the board, leaving an open seat. His fellow board member James Sanders will seek re-election, and Steve Rebscher, a trustee for 15 years, told the Light he is undecided. At **Shoreline Unified School District**, West Marin’s largest school district, three seats are up. Jane Healy, a 16-year trustee who represents Marshall, Tomales and Dillon Beach, plans to run again. Tim Kehoe, who has represented the combined Point Reyes Station and Inverness area on the board for more than 20 years, said he is undecided, but will run again if there are no new contenders. Heidi Koenig said she will seek a second term representing that same area. In the tiny **Nicasio School District**, two of the three seats are expiring, and Elaine Doss and Mark Burton plan to run again. “We were out trying to recruit, but we can’t find anybody else,” Mr. Burton told the Light. On the **Inverness Public Utility District** board, both directors up for re-election, Ken Emanuels and Dave Press, plan to run again. **Stinson Beach County Water District** directors Larry Baskin and Jim Zell are up for re-election and haven’t announced their plans. Two directors of **North Marin Water District**, Rick Fraites and Jim Grossi, are up for re-election, but neither have announced they plan to leave. Mr. Grossi represents Division 1, which includes the district’s entire West Marin service area of Point Reyes Station, Inverness Park, Olema and Marshall. Even residents of Inverness, with its own water district, could run for the position, since the community is within North Marin’s district boundaries. Marin’s largest utility district has an open seat, as **Marin Water** director Cynthia Koehler, who has represented Mill Valley, Marin City and Sausalito since 2005, has announced she won’t seek re-election. Director Larry Bragman, whose division includes the San Geronimo Valley and Fairfax, is up for re-election and will seek another term.

POINT REYES LIGHT

NEWS

New restroom, parking lot planned for Point Reyes

by Ayla Burnett
July 6, 2022

To accommodate increased visitation in Point Reyes Station, the county plans to develop a state-of-the-art bathroom facility and an overflow parking lot funded by $1 million in American Rescue Plan Act monies earmarked for tourism infrastructure in West Marin. Under an agreement with Marin County Parks, Sherwood Design Engineers will design new bathrooms on a Mesa Road lot and a new parking area on the Donovan lot on B Street.

Long lines at the Toby's playground bathrooms, the only permanent public restrooms in town, and a lack of parking are commonplace in Point Reyes Station, where tourism continues to rise.

"We manage 34 open space preserves and over 40 sites across the county, and those restrooms are the third most-visited site," said Max Korten, director of Marin County

Parks. "They get more visitation than any of our regional parks or playgrounds or any of our trails."

The Mesa Road restrooms were built in 2008 and renovated last year with a $165,000 ramp, but wastewater demands far outweigh their capacity. Around 6,000 gallons of wastewater are received there a day, though the septic system can only process 900 gallons. As a result, the county pumps the site one to three times a week, and in recent years it placed portable toilets behind the facility and around town.

A community working group convened under Supervisor Dennis Rodoni has been examining the wastewater problem in Point Reyes Station since 2019, and a subgroup has focused on the idea of new bathrooms on the Mesa Road lot, which the county acquired from EAH Housing in 2005. The group determined that composting toilets or another green alternative could both serve the community's needs and educate visitors.

"Not only will visitors use it, but they'll learn something about rural areas and how difficult it is for us to deal with our infrastructure," Supervisor Rodoni said.

At a presentation last Tuesday, Sherwood engineers presented four design options for toilets that are "ecological-based, green and cutting-edge." The technologies they are considering include composting toilets, anaerobic baffled reactor systems, which are advanced septic systems, and a membrane aerated biofilm reactor, which uses less energy and chemicals and produces reusable effluent.

Sherwood is also working with the county to build parking on the Donovan lot, which the county purchased last year. Supervisor Rodoni said the lot was originally proposed as an entrance to the Giacomini Wetlands, but the county didn't have the funds to buy it until 2021, when the owners offered it for its original appraisal price.

Because the parcel's soils have a potential for liquifaction, development must be limited. The county is exploring the idea of the parking area having a pervious surface, which would allow rainwater to be absorbed. Sherwood is also looking at the feasibility of a small bathroom, which would depend on the property's soil types.

The Point Reyes Station Village Association supports the plan, said Ken Levin, president of the association. He said the group would be interested in seeing welcoming and educational materials in addition to an energy-neutral, non-polluting restroom facility.

Yet at least one resident disagrees. Bob Johnston, a retired land use planning professor who lives in Inverness, said the lot's placement in a flood-prone area should disqualify it from any development. Mr. Johnston served on the Alliance of Coastal Marin Villages for two years and said the group recommended against expanding parking capacity in West Marin.

"If you expand parking, it fills up and then you're back to where you started," he said. "In other words, there's no such thing as meeting the demand; it's just going to keep increasing."

Other residents expressed concern about potential traffic congestion near the Mesa Road lot caused by a new restroom facility. Craig Richardson, a senior planner with Marin County Parks, said the county will work with Sherwood to analyze traffic flows and maximize efficiency as the project moves forward.

Sherwood will create a conceptual plan in September, and another community meeting will be scheduled for late October.

CALIFORNIA

Drought-driven deep cuts in water affect thousands of farms

People fish in the Sacramento-San Joaquin River Delta's Elk Slough near Courtland in 2020. Regulators have begun curtailing the water rights of many farms and irrigation districts, putting a hold on about 5,800 water rights across the Sacramento and San Joaquin rivers' watersheds. RICH PEDRONCELLI — THE ASSOCIATED PRESS, FILE

BY IAN JAMES AND SEAN GREENE

LOS ANGELES TIMES

California regulators have begun curtailing the water rights of many farms and irrigation districts along the Sacramento River, forcing growers to stop diverting water from the river and its tributaries.

The order, which took effect Thursday, puts a hold on about 5,800 water rights across the Sacramento and San Joaquin rivers' watersheds, reflecting the severity of California's extreme drought.

Together with a similar order in June, the State Water Resources Control Board has curtailed 9,842 water rights this year in the Sacramento and San Joaquin watersheds, more than half of the nearly 16,700 existing rights.

"The need to take these curtailment actions is in many ways unprecedented. And it reflects just how dry things have been in California over the last three years," said Erik Ekdahl, deputy director of the state water board's water rights division.

"After three years of really unprecedented drought, reservoir storage is at record lows for much of the state. And there's just simply not enough water to go around."

The number of water rights that fall under this year's orders is slightly less than the 10,200 curtailed in 2021. But the latest cuts have come earlier in the summer, affecting many farmers at the peak of their growing season, when they typically irrigate more.

A long list of agricultural water suppliers were emailed notices this week ordering them to stop water diversions from rivers and streams. They included Glenn-Colusa Irrigation District, Browns Valley Irrigation District and Nevada Irrigation District.

Cities from San Francisco to Sacramento to Redding have also been told to stop diverting water.

In all, more than 4,300 water rights holders are affected by the curtailments, many of them farmers.

California's water rights system allows for regulators to curtail rights and halt diversions based on the year a rights holder started using water.

In the Sacramento River watershed, Ekdahl said, “we’re curtailing down to a priority date of about 1910,” while those with older rights will be able to continue taking water.

While the initial cuts in June primarily affected those in the San Joaquin watershed, the latest order affects more than 5,000 water rights along the Sacramento River and its tributaries.

“Curtailments are never our first option, and yet we kind of need to go this route,” Ekdahl said.

He pointed out that much of Northern California has received only about two-thirds of the average rainfall over the last three years.

“We’re now in a really tough scenario where we have to look and evaluate how much supply and demand is there, and implement the water rights priority system like it was designed back in 1914,” Ekdahl said. “That’s important for just ensuring that there is water available and for providing a stable and orderly way to administer a very limited supply during drought.”

Those who have been told to stop diverting water have largely been complying, he said.

“It shows that people do recognize that we are in this scenario, we have to work through it all together. But it’s going to get harder,” Ekdahl said.

The cuts are intended to help preserve water supplies as much as possible, he said, not only to get through this year but also in case the state ends up enduring a fourth year of severe drought.

According to the state water board, the curtailments will reduce water diversions by about 789,000 acre-feet during July — more than the nearly 500,000 acre-feet that the city of Los Angeles supplies to customers annually.

Farms and cities across California have already been grappling with cuts in supplies from two large water-delivery systems, the State Water Project and the Central Valley Project.

The drought has taken a toll on California's agriculture industry, which produces a range of crops including nuts, fruits, rice and hay for cattle.

Researchers at the University of California, Merced estimated that reduced water deliveries last year resulted in 395,000 acres of cropland left dry and unplanted. And growers have been leaving more land fallow this year in the Central Valley.

DROUGHT

Californians miss targets for saving water again

Newsom won't say if crackdown planned

Gov. Gavin Newsom asked residents last July to voluntarily cut urban water use by 15% compared to 2020 levels. RICHARD VOGEL — AP PHOTO, FILE

BY PAUL ROGERS

BAY AREA NEWS GROUP

Californians continue to miss conservation targets by a large margin, new numbers released Friday show, despite Gov. Gavin Newsom's warning six weeks ago that mandatory statewide restrictions are on the way if local conservation efforts don't improve.

Last July, Newsom declared a drought emergency and asked California residents to voluntarily cut urban water use by 15% compared to 2020 levels. Although Northern Californians reduced consumption by 8.5% in May, Southern California regions fell far short at just 2.2% and dragged the statewide reduction in use to 3.1% compared to May 2020.

The new numbers represent only a slight improvement from last July through May, when residents, businesses and government agencies cumulatively reduced water use statewide by 2% compared to the same period in 2020, according to the State Water Resources Control Board.

Is a crackdown coming, with mandatory conservation targets for each city? That's what former Gov. Jerry Brown imposed during California's last drought, but Newsom's office wasn't saying on Friday.

Newsom spokeswoman Erin Mellon called the May numbers a positive trend but said more needs to be done.

"Individuals and California businesses need to step up," Mellon said. "We will continue to monitor the state's conservation numbers, especially the early June numbers as we evaluate if additional changes are necessary."

On May 23, Newsom told the leaders of the state's largest water agencies that the lagging conservation was a "black eye." He said his office would monitor the situation over the next 60 days, and he told the agencies to step up outreach and education efforts to communicate the urgency of the crisis to the public.

A few weeks later, the state water board required most cities and water districts to limit outdoor watering to two days a week and ban the irrigation of 'non-functional turf,' or grass at office parks and industrial sites, but not at schools, parks or golf courses.

After three dry years in a row, on Thursday 97% of the state was in a severe drought and 59% in an extreme drought, the third and fourth most severe of five drought categories, according to the U.S. Drought Monitor, a weekly federal report.

Some people may finally be getting the message. The May numbers represent improved conservation from March and April, when statewide urban water use actually increased 18.9% and 17.6% compared with the same months in 2020.

The gradual trend toward more conservation comes after modest rain across the state in April — following the driest January, February and March in recorded state history — and increased campaigns by cities and water agencies around the state urging people to conserve while reservoir levels continue to drop and hot summer months loom.

Preliminary numbers for June, submitted by water agencies representing about 30% of California's population, are showing further conservation with water savings of 7.7%, water board officials said.

Still, some water experts on Friday said that the governor's approach is falling short.

"It's pretty clear the voluntary actions aren't enough," said Peter Gleick, co-founder and a senior fellow at the Pacific Institute, a non-profit water research organization in Oakland. "The numbers are better than last month, but they are still really disappointing."

One reason for the lackluster conservation is a continued difference between water use in Northern and the "South Coast" area that includes Los Angeles, Orange County and San Diego.

"My impression is that Northern California water agencies are playing up the drought more than Southern California water agencies," said Jay Lund, co-director of the UC Davis Center for Watershed Sciences.

Some of the difference is due to varying weather conditions. Some is due to differing local drought rules, Lund said. Some is due to agencies' reluctance to sell less water, which reduces revenue. And part is due to the fact that some have done a better job increasing local water supplies in recent decades than others.

The San Diego County Water Authority, for example, built a $1 billion desalination plant in Carlsbad in 2015 that now provides about 10% of the area's water. It signed a contract nearly 20 years ago to help farmers in Imperial Valley line canals and take other conservation measures, then purchased the saved water for San Diego residents. The agency also increased the height of San Vicente Dam northeast of San Diego by 117 feet in 2014, doubling the reservoir's size to store more water in rainy years for dry years.

Gleick said there are cheaper ways to boost supply, and far more cities and water agencies should be doing them.

"There are two pieces," he said. "Right now we have to improve efficiency and conserve. In the longer term we need to be accelerating wastewater recycling and capturing stormwater. There are billions of gallons of wastewater and stormwater that we throw away. If that was being used now, our reservoirs would be fuller."

Alarm bells: COVID returns at higher levels

NEW SUB VARIANTS DEFEAT VACCINE

Novato Advance

Marinscope

New COVID-19 sub variants that can infect people who are fully vaccinated and boosted are cropping up in California at an alarming rate. The news comes after big July Fourth celebrations brought people together for parades and festivities for the first time in two years.

"California's seven-day COVID-19 test positivity rate hit 15% on July 4, according to the state Department of Public Health — a rate approaching the record- high 22.5% logged in January during the height of the omicron surge," CalMatters.org reported. "Although hospitalizations have remained fairly stable and low — as have death rates — experts are raising concerns about the ultra-contagious

omicron sub variants BA.4 and BA.5, which have become the dominant COVID strains nationwide and are infecting people who are fully vaccinated and boosted and those who previously tested positive."

The entire Bay Area, Marin officials said, is now at the high community risk level for COVID-19 at which federal regulators recommend everyone wear face masks indoors as newer and more immunity-evasive versions of the omicron variant continue to spread across the country.

Dr. Bob Wachter, chair of UC San Francisco's Department of Medicine, tweeted: "Although vaccinations and boosters are still 'hugely valuable' in protecting against hospitalization and death, one of the biggest implications of BA.5: a prior infection — including an Omicron infection as recent as

last month — no longer provides robust protection from reinfection.

And, Dr. Sara Cody, Santa Clara County's public health officer, said "People are just wanting the pandemic to be over and acting accordingly. What I want to say as a motivator: You're not protected from long COVID. And I don't know about you, but if I can do my best to prevent something that will give me brain fog, that's why I wear my KN95 face mask.

In Main, the latest update from the county health department showed that many children – ages 6 months to 4-years-old – are getting vaccinated. Since the vaccinations were approved, 1,221 Marin County children have received

Since the vaccinations were approved, 1,221 Marin County children have received their first dose. In most pediatric vaccination locations, both the Pfizer (3 dose regimen) and the Moderna (2 dose regimen) products are being offered.

"So far, parents are choosing the Moderna products slightly more frequently (63 percent)," county health officials reported. Many parents choosing this product prefer the convenience of the two-dose regimen that can be completed in one month. Pediatric practices across Marin are continuing to make vaccine appointments available to families.

Also, local health gurus reported that COVID-19 transmission rates continue to be high in Marin County and across the region.

"Local data shows that the second booster significantly reduces risk of COVID-19 infection, hospitalization and mortality. Still, 34 percent of Marin residents age 65 or older have not received a second booster dose. The most important risk factor for hospitalization or death from COVID-19 and Marin is older age. Residents are encouraged to take advantage of the many locations across the county offering second boosters, to limit the risk of preventable illness as the virus continues to circulate widely."

"The pattern we're seeing in our data does make me think a sustained surge is possible," Dr. Cody said. "Previous patterns were we went up and then down, but we went up and now we're staying at a high plateau."

PG&E plans to decommission Potter Valley Project

Company won't re-examine license terms for endangered species in the interim

The Scott Dam is part of Pacific Gas and Electric Co.'s Potter Valley Project, which the utility is not planning on relicensing. PG&E submitted a letter to the Federal Energy Regulatory Commission on Tuesday stating it will not reexamine license terms in the interim related to endangered species after the National Marine Fisheries Service submitted evidence endangered species were being harmed by current conditions. (Justine Frederiksen/Ukiah Daily Journal file photo)

By **SONIA WARAICH** | swaraich@times-standard.com | Eureka Times-

Pacific Gas & Electric does not believe it's necessary to reexamine its license terms for endangered species at the Potter Valley Project as it prepares to decommission the dams, according to a letter the utility submitted to federal regulators.

PG&E submitted letters to the Federal Energy Regulatory Commission on Friday stating that it would take about 30 months to submit an application to surrender its license once its plan and schedule for doing so receives approval from the federal agency. On Tuesday, PG&E sent another letter stating that the letter sent by the National Marine Fisheries Service stating the terms for endangered fish species should be reevaluated in the interim contained "legal and factual inaccuracies" though it was willing to revisit some terms "so long as any revisions reflect the same level of effort and funding as is currently required."

"To the extent NMFS intended there to be some reevaluation or assessment after twenty years, it could have said so in the (Biological Opinion)," the letter states. "In fact, the BiOp does require periodic adaptive management reviews. For example, NMFS required a review of the summer flow component of the (reasonable and prudent alternative) after 10 years of monitoring. Similarly, the interactions of the pikeminnow population and salmonids were required to be reassessed after 5 years. Those reviews occurred, and no changes were determined to be necessary."

Fish conservation groups like California Trout and Trout Unlimited, however, disagreed and issued a statement criticizing the company's "refusal to protect listed salmon and steelhead in the Eel River."

"PG&E has made it clear they will rid themselves of the 100-year-old Eel River dams, but they seem content to slow-walk the process and continue to kill (Endangered Species Act)-listed fish while they take their sweet time," Matt Clifford, California water attorney with Trout Unlimited, said in a statement. "Yesterday's filing officially puts PG&E on the path toward decommissioning the Project, but that can't come soon enough for Eel River salmon and steelhead. These fish need help from PG&E while it still owns the Project so that by the time the dams actually come out there will still be viable populations of native salmonids to rebuild."

The Potter Valley Project is a 9.4 megawatt hydroelectric project that includes Scott Dam, forming Lake Pillsbury, and Cape Horn Dam, forming the Van Arsdale Reservoir. The project diverts water from the Eel River to the Russian River.

In 2019, the utility told FERC it would not relicense the project and the license officially expired the past April. A regional partnership known as the Two Basin Partnership was working on taking over the project and finding a way to continue diverting some water to the Russian River, which those in counties south of Humboldt County say is crucial to their water security as drought worsens.

However, opinions on how to move forward have become more polarized, with some arguing for total dam removal while others still believe the current project can be modified to continue providing water.

Last month, Lake County Board of Supervisors Chairman Eddie Crandell issued a statement that dam removal would be "an expensive gamble with (their) water supply."

"The current narrative that dam removal in Lake County is the only viable solution is being pushed forward without proper scrutiny," Crandell wrote. "No real weight is being given to the true potential financial costs and the very real threat to our regional water security. This narrative effectively ignores that the Eel River water diverted from Lake Pillsbury ultimately flows into the Russian River, where it is then routed into pipelines supplying it throughout Sonoma County and Marin County, into the taps of cities like Sonoma, Petaluma, and Novato."

Fish conservationists, however, pointed to the partnership's studies showing that removal of both dams was "feasible and could be completed relatively quickly, restoring access for salmon and steelhead to habitat critical for their recovery."

"The Potter Valley Project will be our nation's next big dam removal project and is justified both economically and ecologically," Redgie Collins, legal and policy director for CalTrout, said in a statement. "Russian River water users must now determine if they want to maintain a diversion, how much they are willing to pay to secure one, and determine how they will pay for it. CalTrout remains committed to helping move forward a surrender plan that represents a compromise between Russian and Eel River interests. If PG&E truly wants to make a positive impact for Californians then we urge them to be fully committed partners on the Eel River rather than simply guilty bystanders."

CAPITOL WEEKLY (https://capitolweekly.net)
COVERING CALIFORNIA GOVERNMENT AND POLITICS

NEWS

Desalination: Should California use the ocean to quench its thirst?

BY *AARON GILBREATH* POSTED 07.12.2022

As the state's water supplies continue to dwindle during this drought, it's always worth weighing the pros and cons of desalinization to meet the state's water needs

Groundwater keeps shrinking, reservoirs keep drying. Is it time for California to use desalinization to increase its depleted water supplies?

Here we are again: California is enduring another punishing drought, this one only a few years after the last one ended, which was the most severe drought in the state's nearly 500 years of recorded history. Low winter snowpack combined with scorching summer temperatures and the driest winter months in 100 years have severely impacted the state's water supply. Lake Oroville, an important reservoir in Butte County, had sunk to 49% of capacity by July 1. Lake Shasta was at 39% capacity. Those are only two of many depleted reservoirs (https://cdec.water.ca.gov/cgi-progs/products/rescond.pdf) in the state's water storage system. Every one of California's 58 counties is under a drought emergency proclamation. As analysts know, drought drives California policy. So what has changed since the last drought?

A lot but not enough.

In 2014, the state passed the sweeping Sustainable Groundwater Management Act. Previously, California had no statewide policy either regulating or monitoring groundwater usage. Groundwater provides an estimated 30% of California's water supply, yet no permits were required to drop a new well on private land, and there were no requirements for reporting how much water was withdrawn. Farmers rely on groundwater to grow crops during drought years when surface water is scarce, and without recharge, water tables keep sinking, causing subsidence, reducing supplies to utilize during the next drought, and drying shallower aquifers that support residences. By limiting how new wells get drilled on private land, the law aims to protect California's groundwater from rampant over-pumping and lack of recharge and make sure it's available during drought and non-drought years.

In 2018, Assembly Bill 1668 and Senate Bill 606 required local water suppliers and state agencies to establish long-term efficiency standards and water shortage contingency plans. In 2017, Californian used 90 gallons of water, on average, per day. Aimed at increasing water conservation by reducing and governing local use, this legislation set a standard limit of 55 daily gallons per person, with the amount set to reduce incrementally after January 1, 2025.

By 2027, fines will be imposed on local water suppliers who fail to meet standards during both drought and non-drought years.

Parts of greater Los Angeles are developing projects to collect rainwater and runoff from neighborhoods and parks and turn it into drinking water. Treating "wastewater" as usable water too precious to waste is wise long-term strategy, especially across the grand scale of large metro areas, and in conjunction with water conservation measures, water recycling, and lawn removal. That's another excellent development: Los Angeles homeowners can receive financial incentives (https://www.latimes.com/lifestyle/story/2022-05-09/rebates-for-lawn-removal-in-los-angeles-and-tips-for-turf-maintenance-during-drought-water-restrictions) to convert their thirsty lawns into water-efficient, drought-tolerate landscapes.

Multiplied across thousands of lawns, such measures can save a lot of water for people, rather than grass, to drink.

The thing is, drought may drive policy, but droughts end, and people return to old habits in the gray areas and neglected spaces that policy has yet to change.

Even as some urbanites remove their lawns, many others keep watering theirs. Farmers still raise dairy cows in parched parts of the San Joaquin Valley where there's scarce water or natural grass. And some of the benchmarks for achieving the Sustainable Groundwater Management Act's groundwater sustainability goals are set two decades ahead of the law's 2014 enactment, so its actual implementation leaves room for further over-extraction. During the current drought, private landowners keep drilling new wells and pushing others deeper while it's still legal, chasing the disappearing water in what some describe as a frenzy (https://www.latimes.com/projects/california-farms-water-wells-drought/). What's changed since the last drought is the idea that California can go on like this forever.

The old way of doing things must be seen as over. As Gov. Jerry Brown said in 2015: "We're in a new era. The idea of your nice little green grass getting lots of water every day — that's going to be a thing of the past."

In 2022, what's already changed is the landscape: shifts in rain and snow patterns, and the timing of sensitive temperature changes, threaten the very system the state relies on. The way California's water supply has worked in the past is no longer working, and it may soon stop working at all.

How California gets water

California gets part of its water from the massive Colorado River system, which also supplies Colorado, Utah, Wyoming, Nevada, Arizona, New Mexico, and Mexico. That system is failing. This June, the U.S. Department of Interior proposed cutting 2 to 4 million acre-feet from those customers, which is a historic, arguably unbearable, reduction. High level goals have shifted from delivering water to keeping the entire Colorado System from crashing.

The other part of California's water collection and storage system works by capturing river and other surface water in reservoirs and transporting it to communities and farms. The wetter north has always watered the drier south, but it's the Sierra Nevada snowpack, running through the state's middle, that is the system's keystone. In the simplest terms, a lot of California experiences a wet winter and dry summer. Most of the states' snow and rain arrives between November and April. As spring starts to warm, the rains cease and the mountain snow melts, swelling creeks and rivers with freshwater, and recharging wetlands and aquifers. Dams now capture that runoff in reservoirs, which supplies the state through a network of canals. Climate change has changed this system dramatically.

Less rain fell in 2021 than in previous years. In fact, that was the second driest California winter on record. Snowpack was also lighter. Less snow means less water to fill reservoirs. The temperature also impacted supply.

Warmer temperatures in April and May melted snow at a faster rate in vital Sierra Nevada watersheds, including the Sacramento, American, and Feather rivers, and runoff evaporated more quickly.

Now here we are.

If the climate has changed enough that the terrestrial system California relies on no longer provides enough water, then logic dictates that the state must look beyond its borders, be it at other imported water, or to desalinizing the ocean that it abuts.

Fixing the state's long-term water shortages has to involve reducing water use, creating efficiencies, and recycling. But it cannot depend entirely on those measures. Here's why: The drought started in 2020, an emergency was declared in July 2021, and Californians have only reduced their water usage by 2%. The goal is 15%. In fact, this April, water use has actually increased by upwards of 26% in certain parts of southern California (https://www.latimes.com/california/story/2022-06-07/californians-increased-water-use-18-in-april)! A recent Pacific Institute study (https://www.latimes.com/california/story/2022-04-12/california-could-shrink-water-use-in-cities-by-30-or-more) concluded that a combination of improved efficiencies and current technologies could reduce California's urban water use by 48%, so why hasn't that happened? Change happens so slowly, and it seems we've run out of time. Solutions that address the supply must explore ways to expand it, and desalinization *seems* like one obvious drought-proof solution. A severe drought is certainly a constructive time to weigh the pros and cons of desalinization once again.

The state of desalinization in California

The idea is an old one: California is perched beside a huge body of water, so why not take the salt out of the ocean and drink it? Framed that way, desalinization seems like a no-brainer: If the land won't produce enough freshwater, then the ocean can make up the difference. Of course, it's not that simple.

To be clear, California already has 11 operating desalinization plants (https://www.latimes.com/opinion/story/2021-08-22/drought-proof-california-desalination-plants) of varying sizes and around 10 more pending approval.

The Claude Bud Lewis Carlsbad Desalination Plant in Carlsbad is the largest desal plant in the country. It went online in 2015 and cost approximately $1 billion dollars. In Santa Barbara, the smaller Charles E. Meyer Desalination Plant renders three million gallons of drinking water each day, sating 30 % of the city's demand. There is a contentious proposal for a large plant on the Monterey Peninsula, but the Sand City Coastal Desalination Plant (https://www.montereyherald.com/2019/03/20/sand-city-seeks-increase-of-its-desal-plants-intake-wells/) has been processing brackish water in Monterey County since 2010. The Southern California Edison facility produces about 200,000 gallons a day on Catalina Island. But the physical process of desalinating sea water is not only complicated, it's complicated ecologically and politically, and that makes it contentious.

This May, the California Coastal Commission unanimously rejected the proposed $1.4 billion dollar Huntington Beach Desalination Plant for environmental reasons. Set on a low-lying coastal site, the Commission was concerned that the facility's location exposed it to rising sea levels, and that its process for converting 50 million gallons of drinking water per day would harm marine life in 100 billion gallons of seawater each year. The plant's aim was to reduce Orange Country's dependence on imported water. Gov. Newsom supported the plant, calling desal (https://www.mercurynews.com/2022/04/29/newsom-desalination-project-should-be-approved-we-need-more-damn-tools-in-the-toolkit/) "more tools in the tool kit," but critics argued that the water the plant would produce would be too expensive for low-income consumers and never produce enough water to significantly move the county toward greater water independence.

So who do you believe?

A severe drought is a constructive time to weigh the pros and cons of desalinization once again.

The pros and cons

1) Costs

To many critics, desalination is prohibitively expensive. There's the cost of building the facility, then there are the ongoing operational costs. The Pacific Institute's research shows that seawater desalination costs nearly four times more than water importation, and five times as much as capturing and processing rainwater. Certain costs have come down, but measured against other available options, water conservation and capture still seem much more practical that expensive desal.

2) Water volume

For all of desal's promise, it doesn't produce that much clean water. The nation's largest plant only provides 7% (https://www.kqed.org/science/28668/why-isnt-desalination-the-answer-to-all-californias-water-problems) of San Diego County's water. Due to the nature of the process, only around half of the saltwater that a facility draws in can be made potable—half. And because the potable water that facilities do produce is more expensive than other available water, getting cheaper water elsewhere still resembles the preferable option. That's the free market.

"If you look at existing and planned ocean desal in the state," Stanford law professor Leon Szeptycki said (https://deeply.thenewhumanitarian.org/water/community/2016/06/02/why-desalination-isnt-the-solution-to-water-woes) in 2016, "it's a small fraction of the state's overall water demand. It adds up to just over 600,000 acre-feet (740 million cubic meters) a year, compared to overall freshwater withdrawals of something like 34 million acre-feet (41,938 million cubic meters) a year." That isn't enough to truly offset California's ongoing drought troubles.

3) Ecological damage

When desal plants draw in seawater, they kill millions of marine organisms in the course of a year. Then, once the process physically separates the salt from the water, the dense byproduct must be disposed of, and historically, that concentrated brine has been discharged into the ocean. Because the byproduct is heavier than seawater, it doesn't simply mix back in. It sinks, damaging the marine ecosystem it comes in contact with. One solution is to blend the byproduct back into the seawater using sprayers or special pipes to disperse the water over greater areas more effectively. That is also expensive.

4) Carbon footprint

Pumping enormous volumes of water from the ocean through pipes requires large amounts of energy. And pushing that water through the membranes to remove the salt also requires large amounts of energy. Some estimates state that seawater desalination uses up to three times more electricity than various water recycling technologies. Critics argue that importing water from the Colorado River Aqueduct, recycling local wastewater, and instituting local efficiencies are far more energy-efficient options for a thirsty state in the throws of climate change. As states like California work hard to reduce greenhouse gas emissions and their reliance on fossil fuels, using this much power to produce clean water seems to take the state backwards, not forward.

Newsom is already preparing to counter potential summer blackouts by purchasing power from gas-fired plants (https://www.msn.com/en-us/news/us/newsom-plans-for-fossil-fuels-to-avoid-summer-blackouts-in-california/ar-AAZ4N4g), complicating the state's clean energy goals. Desal plants emit large amounts of greenhouse gases. Then there's the fluctuating cost of energy in California. Energy prices often increase during droughts, due to reduced hydrological power. The turbines can't spin if there isn't enough water, and lack of water is what we're trying to solve in the first place.

Where do you go from there?

"We always backslide after a drought," Jeffrey Mount, a senior fellow at the Public Policy Institute of California, told *The Los Angeles Times (https://www.latimes.com/california/story/2022-06-15/didnt-california-learn-anything-from-the-last-severe-drought-a-mixed-record?_amp=true)* in June, "but we backslide to a level which isn't as high as it was before the drought, and that's how we make progress in conservation."

But how much more time does California have to make such slow, incremental progress?

The current drought is the state's second extreme drought in a single decade, and the State of California calls (https://drought.ca.gov/current-drought-conditions/) that historic situation "a symptom of a warming climate." Drought drives California policy, but with climate change driving drought, it's time to speed up and diversify the way the state both conserves water and sources it.

Ultimately, when you view the desal process' large carbon footprint through the wide-angle lens of climate change, the cost benefit analysis makes it look like an unattractive means to supplying the state. Maybe scientists can devise ways to offset some of the current drawbacks, such as drawing water from deeper waters rather than along the shore, and maybe certain operational costs will come down, but the idea of finding renewable sources of energy to power smaller plants seems difficult, considering that bigger plants have greater economies of scale.

Desal won't save California from its thirst, because too many factors conspire to keep it from contributing more than a relatively small volume to the state's total water needs, but as part of a diverse portfolio of conservation approaches, recycling, waste and stormwater capture, and other efficiencies, desal may still help—especially in coastal communities that don't receive water from the State Water Project. Because frankly, it remains unclear how long northern California and the Colorado River can supply the rest of the state. It certainly seems unwise to bank on them for much longer. Maybe it's finally time to dip more of the proverbial straw into the ocean that has helped define the Golden State's image, economy, and recreation. Or maybe it's time to stop looking for more resources to exploit at great cost and find ways to maximize the resources we have and minimize our footprint.

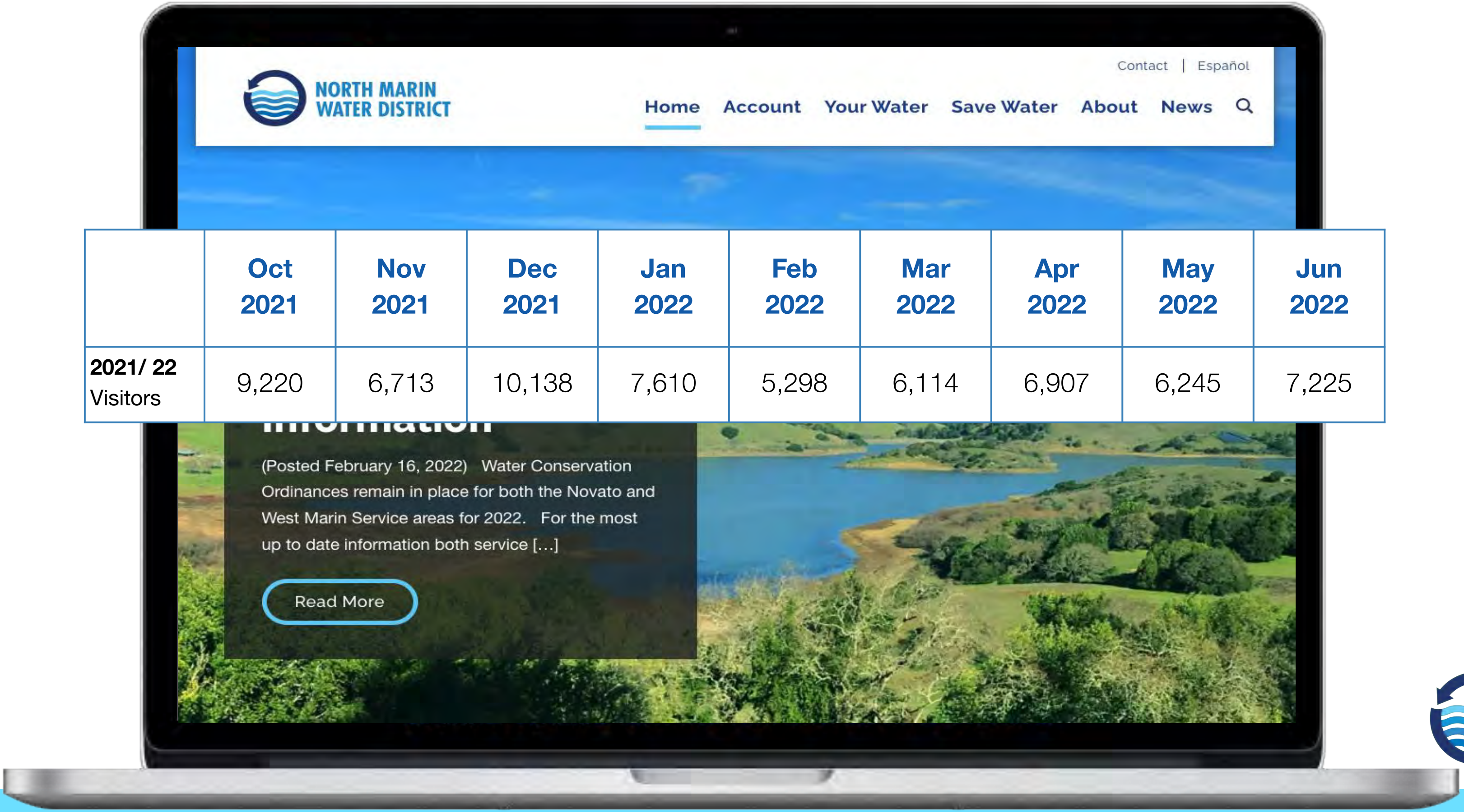
Avoiding that is what got us into this mess in the first place.

NORTH MARIN
WATER DISTRICT

Web & Social Media Report

June 2022

Website Statistics



	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022	Mar 2022	Apr 2022	May 2022	Jun 2022
2021/ 22 Visitors	9,220	6,713	10,138	7,610	5,298	6,114	6,907	6,245	7,225

Social Media Followers

	Oct-2021	Nov-2021	Dec-2021	Jan-2022	Feb-2022	Mar-2022	Apr-2022	May-2022	Jun-2022
Facebook Followers	1,313	1,338	1,376	1,454	1,510	1,571	1,627	1,695	1,760
Twitter Followers	61	63	65	66	66	69	70	72	76
Instagram Followers	593	599	611	618	630	638	645	656	670

NMWD Most Visited Pages

Pages	Unique Pageviews	% of Total
Home	3,953	27.75%
Online Billing	2,074	15.54%
Watersmart	1,947	14.85%
Drought is Here, Save Water.	349	2.52%
Save Water Outdoors	340	2.37%
Contact	303	2.04%
Novato Service Area Drought Guide	254	1.66%
Novato Water	189	1.25%
Indoors	186	1.24%

June Social Media Highlights | Facebook

271 people reached | 30 engagements

731 people reached | 127 engagements

Engagements include likes, reactions, clicks and comments

June Social Media Highlights | Facebook

140 people reached | 2 engagements

176 people reached | 24 engagements

Engagements include likes, reactions, clicks and comments

June Social Media Highlights | Facebook

North Marin Water District
Published by Hootsuite · 8 June at 00:00 ·

Did you know that installing a drip system can reduce water use by 30-70% versus a standard sprinkler system? We are still in a drought and outdoor water use is a great place to decrease usage and increase water savings. Check out more tips and tricks for saving water at WaterSavingPartnership.org

178 people reached | 5 engagements

North Marin Water District
Published by Hootsuite · 9 June at 19:01 ·

The District proposes rate increases for the Novato service area for fiscal year 2022-2023. If approved at the public hearing on June 28, 2022, the new rates will go into effect on July 1, 2022. Customers are welcome and encouraged to attend. Visit nmwd.com/ratehearing for more information.

148 people reached | 22 engagements

Engagements include likes, reactions, clicks and comments

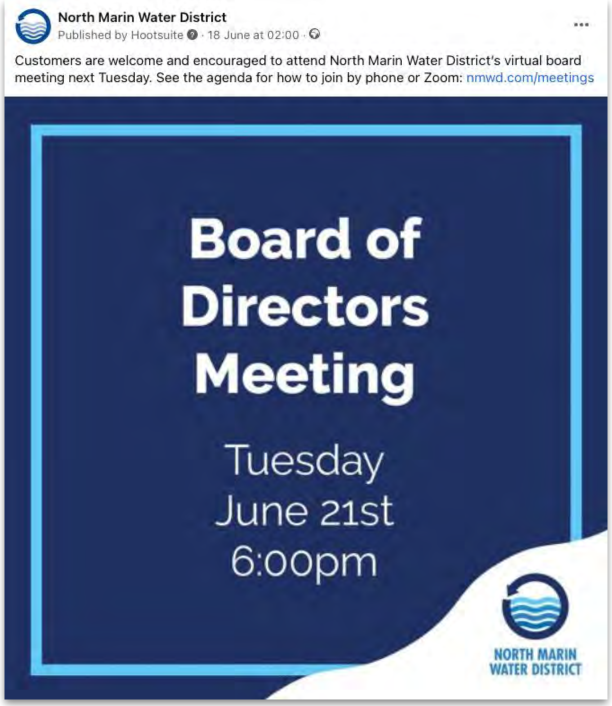
June Social Media Highlights | Facebook

207 people reached | 17 engagements

120 people reached | 4 engagements

Engagements include likes, reactions, clicks and comments

June Social Media Highlights | Facebook



99 people reached | 1 engagements

242 people reached | 9 engagements

Engagements include likes, reactions, clicks and comments

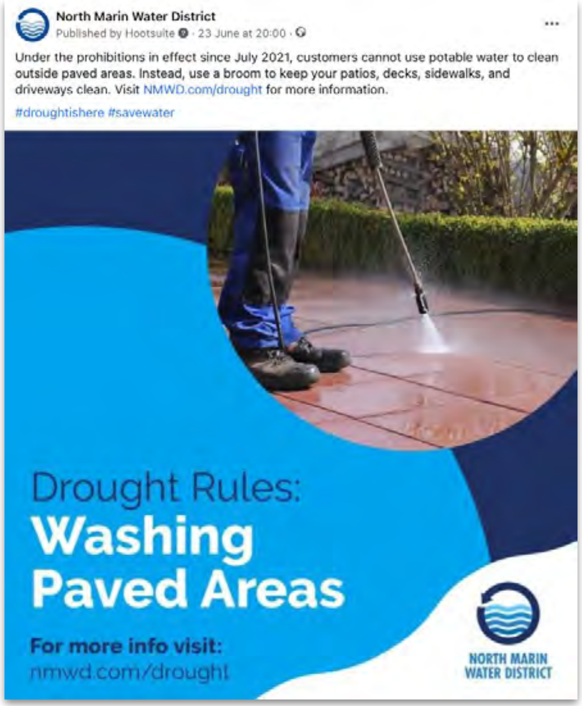
June Social Media Highlights | Facebook

93 people reached | 2 engagements

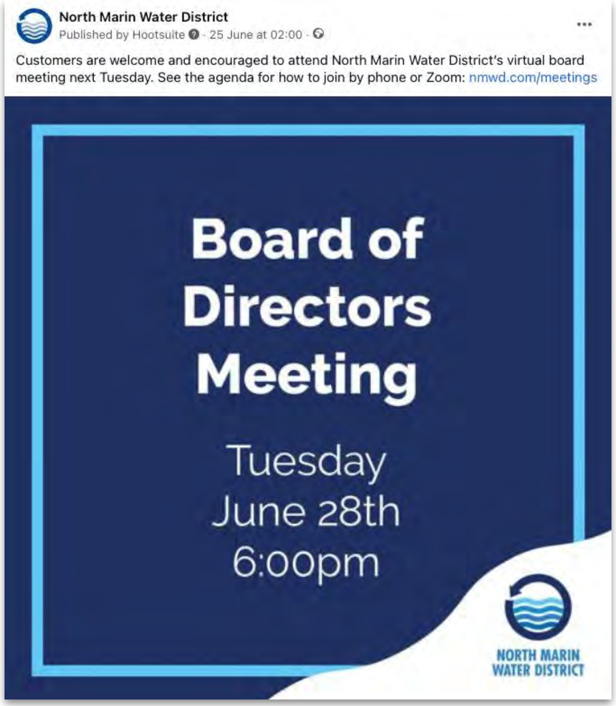
334 people reached | 9 engagements

Engagements include likes, reactions, clicks and comments

June Social Media Highlights | Facebook



75 people reached | 1 engagements



103 people reached | 1 engagements

Engagements include likes, reactions, clicks and comments

June Social Media Highlights | Facebook

North Marin Water District
Published by Hootsuite · 5 d ·

Reminder! The District is proposing rate increases for the Novato service area for fiscal year 2022-2023. If approved at the public hearing today, the new rates will go into effect on July 1, 2022. Customers are welcome and encouraged to attend. Visit nmwd.com/ratehearing for more information.

180 people reached | 2 engagements

North Marin Water District
Published by Hootsuite · 4 d ·

Got 10 minutes? Run your sprinklers when it's light outside and hunt for leaks. Fixing a leaky sprinkler head will save 12-15 gallons each time you water. Set a reminder to repeat this every month! Find more info about finding a fixing leaks here: https://www.savingwaterpartnership.org/leaks/

109 people reached | 2 engagements

Engagements include likes, reactions, clicks and comments

June Social Media Highlights | Facebook

North Marin Water District
Published by Hootsuite · 3 d ·

Under the prohibitions in effect since July 2021, customers must use a hose with an automatic shut-off nozzle when washing vehicles, trailers, and boats. Visit NMWD.com/drought for more information.

#droughtishere #savewater

411 people reached | 50 engagements

Engagements include likes, reactions, clicks and comments

June Social Media Highlights | Twitter

North Marin Water District @NorthMarinWater · Jun 1

June kicks off #NationalRiversMonth! The Russian River is a prominent source of year round water for Novato. This past winter we purchased surplus water from the Russian River to help refill Stafford Lake.

#rivers #water #savewater #russianriver

North Marin Water District @NorthMarinWater · Jun 2

Construction has begun on a second well at the Gallagher Ranch that will increase the supply of high-quality groundwater to West Marin customers. Thanks to @CA_DWR for fiscal support & @MALT_AG for conservation efforts.

June Social Media Highlights | Twitter

North Marin Water District @NorthMarinWater · Jun 4

Customers are welcome and encouraged to attend North Marin Water District's virtual board meeting next Tuesday. See the agenda for how to join by phone or Zoom: nmwd.com/meetings

North Marin Water District @NorthMarinWater · Jun 6

Did you know the average family of four uses 5,000-8,000 gallons of water annually for washing clothes? Install a simple laundry-to-landscape graywater system and you can reuse the valuable water in your landscape! Watch this video to learn more - youtu.be/SkA9YyxzK8o

June Social Media Highlights | Twitter

North Marin Water District @NorthMarinWater · Jun 8

Did you know that installing a drip system can reduce water use by 30-70% versus a standard sprinkler system? We are still in a drought and outdoor water use is a great place to decrease usage and increase savings. For more tips on saving water visit WaterSavingPartnership.org

North Marin Water District @NorthMarinWater · Jun 9

The District proposes rate increases for the Novato service area for fiscal year 2022-2023. If approved at the public hearing on June 28, 2022, the new rates will go into effect on July 1, 2022. Visit nmwd.com/ratehearing for more information.

June Social Media Highlights | Twitter

North Marin Water District @NorthMarinWater · Jun 13

To save water, make the change to low water use and native plants. Check out the Water Smart Plant Picker to find plants available at local nurseries savingwaterpartnership.org/programs-rebat..

North Marin Water District @NorthMarinWater · Jun 16

As you begin to think about turning on your irrigation system, remember that drought prohibitions remain in effect and Novato customers are only allowed to use overhead or above ground irrigation up to three days per week. Visit NMWD.com/drought for more information.

June Social Media Highlights | Twitter

North Marin Water District @NorthMarinWater · Jun 18

Customers are welcome and encouraged to attend North Marin Water District's virtual board meeting next Tuesday. See the agenda for how to join by phone or Zoom: nmwd.com/meetings

North Marin Water District @NorthMarinWater · Jun 22

It's easy to save water by turning the faucet off when you are washing your hands or brushing your teeth - but what about waiting for the water to run hot? Grab a bucket to collect the water, then use it to water indoor or outdoor plants. The water savings can really add up!

June Social Media Highlights | Twitter

North Marin Water District @NorthMarinWater · Jun 22

NMWD is temporarily relocating while an Administration and Laboratory building is being renovated. Our temporary office will be located at 100 Wood Hollow, Suite 300 in Novato. Our current office will be closed 6/23 and 6/24. For more information visit nmwd.com/officemove.

North Marin Water District @NorthMarinWater · Jun 23

Installing efficient irrigation for your garden can be a water saver, time saver, and plant saver. Choose drip instead of overhead sprinklers. Don't forget to check the system regularly to prevent runoff. Learn more -> SavingWaterPartnership.org

June Social Media Highlights | Twitter

North Marin Water District @NorthMarinWater · Jun 23

Under the prohibitions in effect since July 2021, customers cannot use potable water to clean outside paved areas. Instead, use a broom to keep your patios, decks, sidewalks, and driveways clean. Visit NMWD.com/drought for more information. #droughtishere #savewater

North Marin Water District @NorthMarinWater · Jun 25

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June Social Media Highlights | Twitter

North Marin Water District @NorthMarinWater · Jun 28

The District is proposing rate increases for the Novato service area for fiscal year 2022-2023. If approved at the public hearing, the new rates will go into effect on July 1st. Customers are welcome and encouraged to attend. Visit nmwd.com/ratehearing for more information.

North Marin Water District @NorthMarinWater · Jun 29

Got 10 minutes? Run your sprinklers when it's light outside and hunt for leaks. Fixing a leaky sprinkler head will save 12-15 gallons each time you water. Set a reminder to repeat this every month! Find more info about finding a fixing leaks here: savingwaterpartnership.org/leaks/

June Social Media Highlights | Twitter

North Marin Water District @NorthMarinWater · Jun 30

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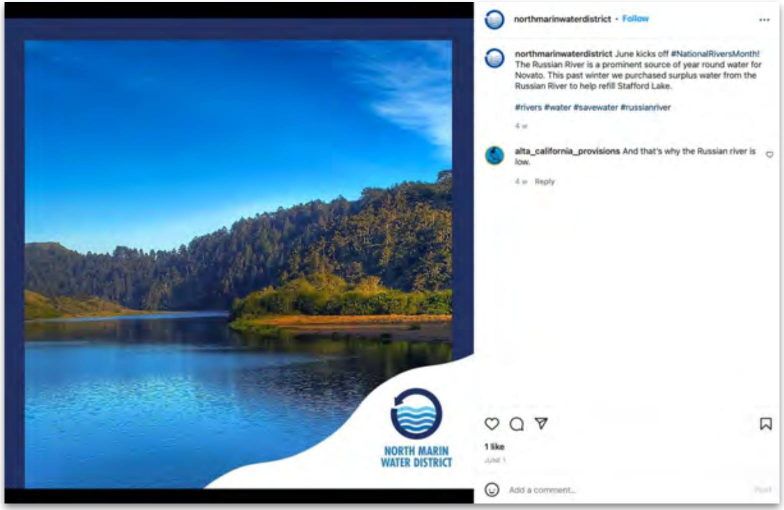
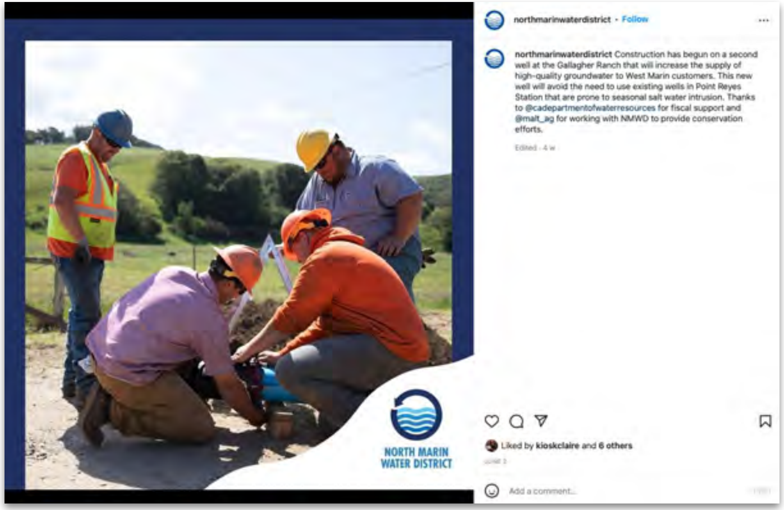
June Social Media Highlights | Instagram



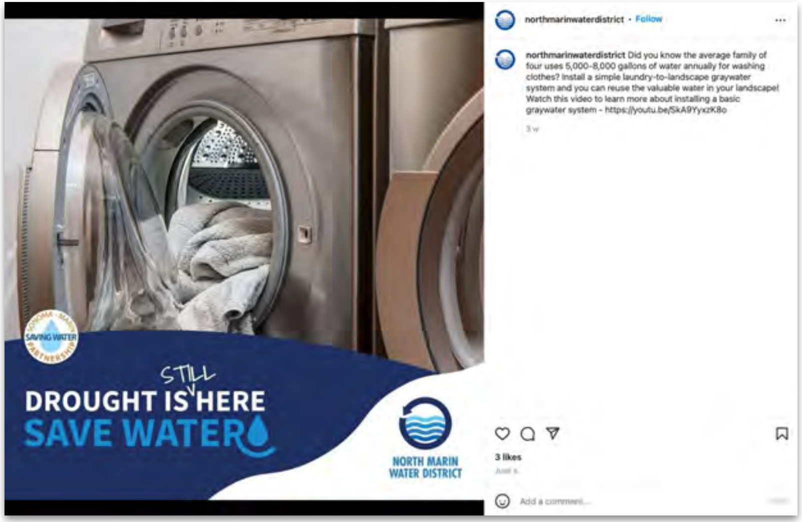
1 likes



7 likes

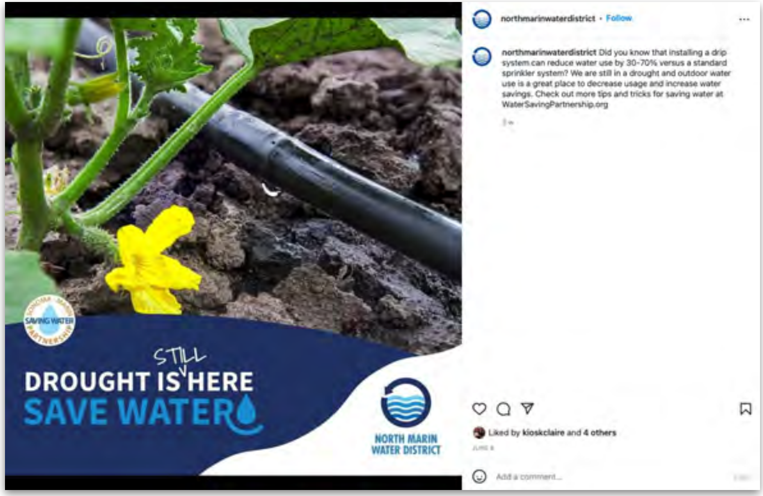
June Social Media Highlights | Instagram

2 likes



3 likes

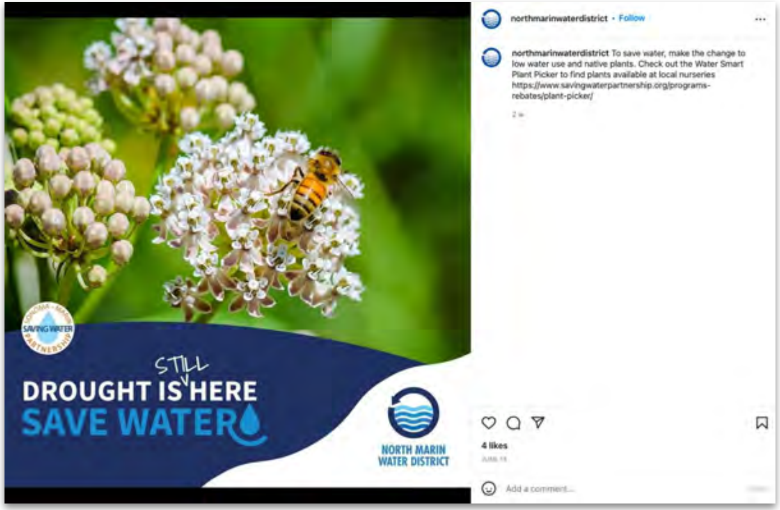
June Social Media Highlights | Instagram



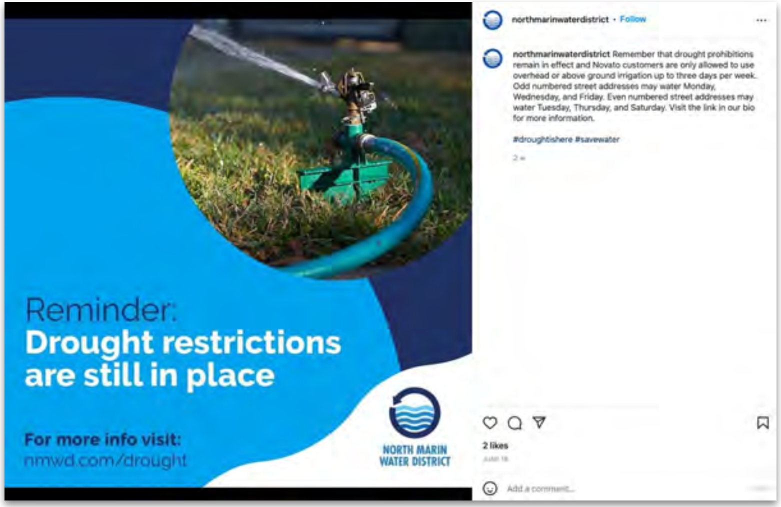
5 likes

1 likes

June Social Media Highlights | Instagram



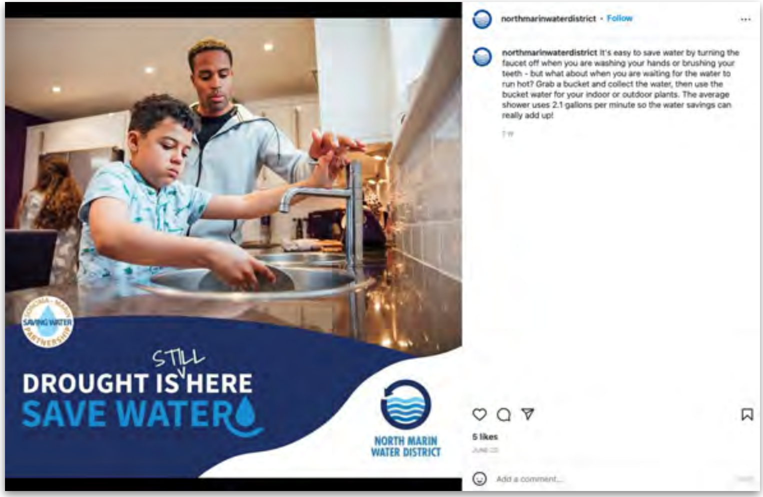
4 likes



2 likes

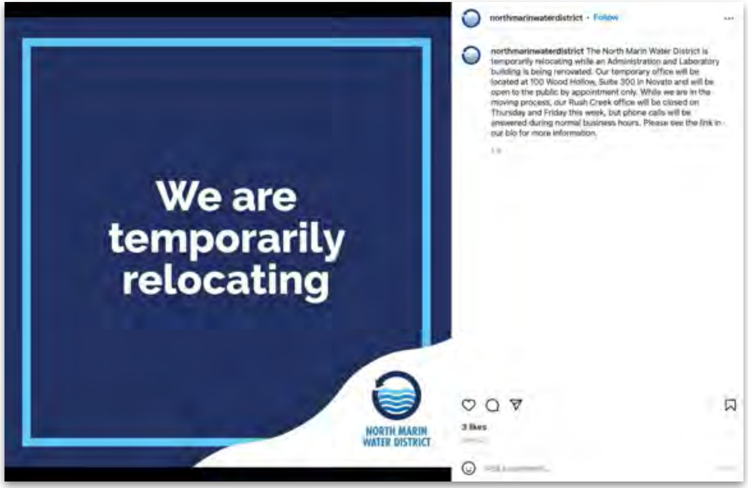
June Social Media Highlights | Instagram

2 likes



5 likes

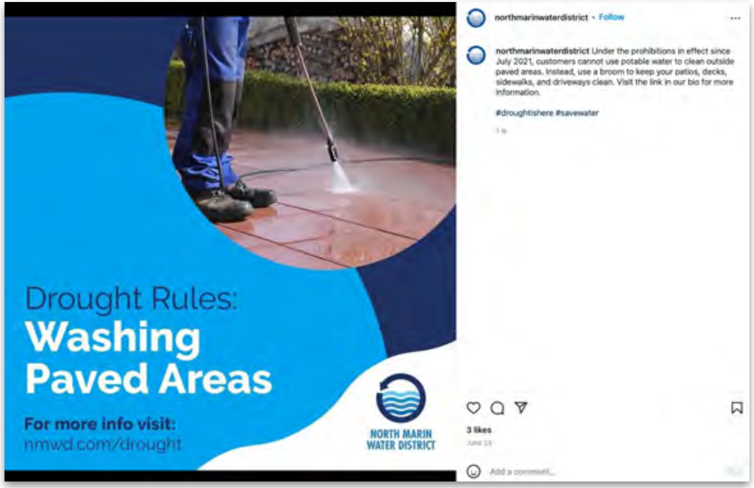
June Social Media Highlights | Instagram



3 likes

2 likes

June Social Media Highlights | Instagram

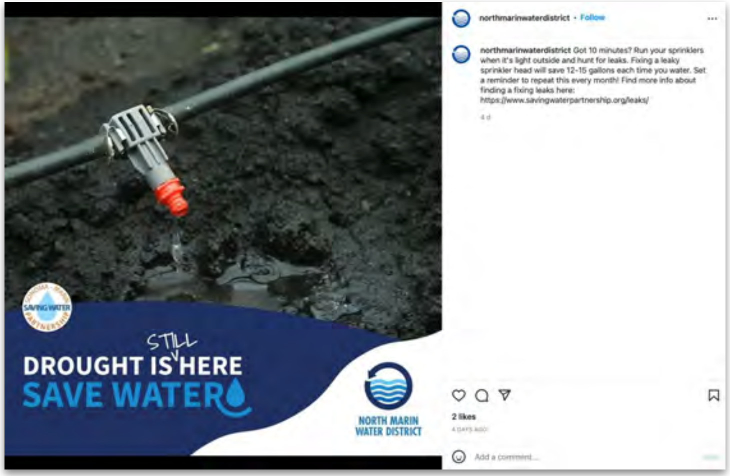


2 likes

1 like

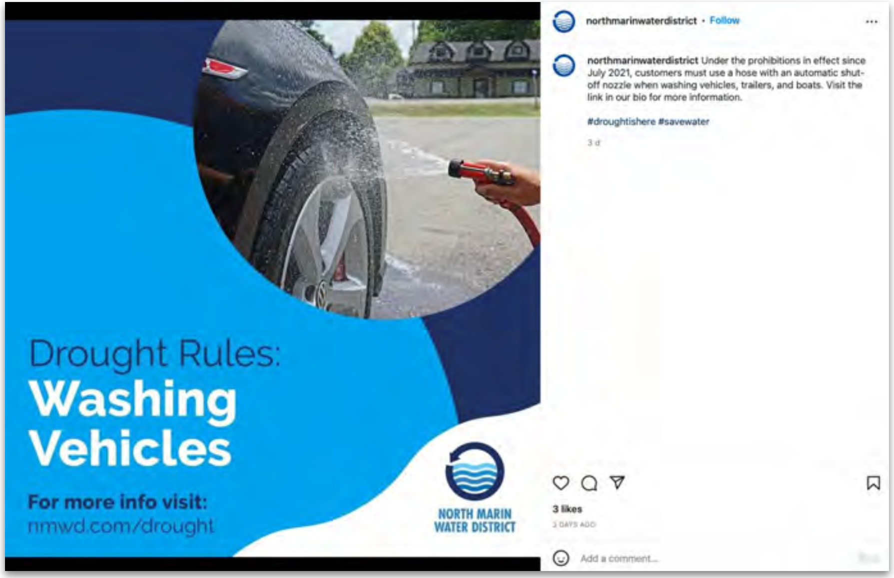
June Social Media Highlights | Instagram

1 like



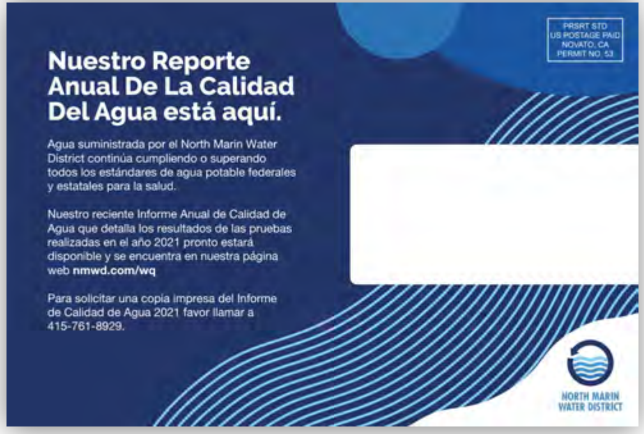
2 likes

June Social Media Highlights | Instagram



3 likes

Novato and West Marin Water Quality Mailer / Postcard



Public Sign For Rush Creek

Administration and Laboratory Upgrade Project

We have temporarily relocated during construction

Moved to:
100 Wood Hollow Dr, Ste 300

Starts: July 5, 2022
Ends: October 31, 2023

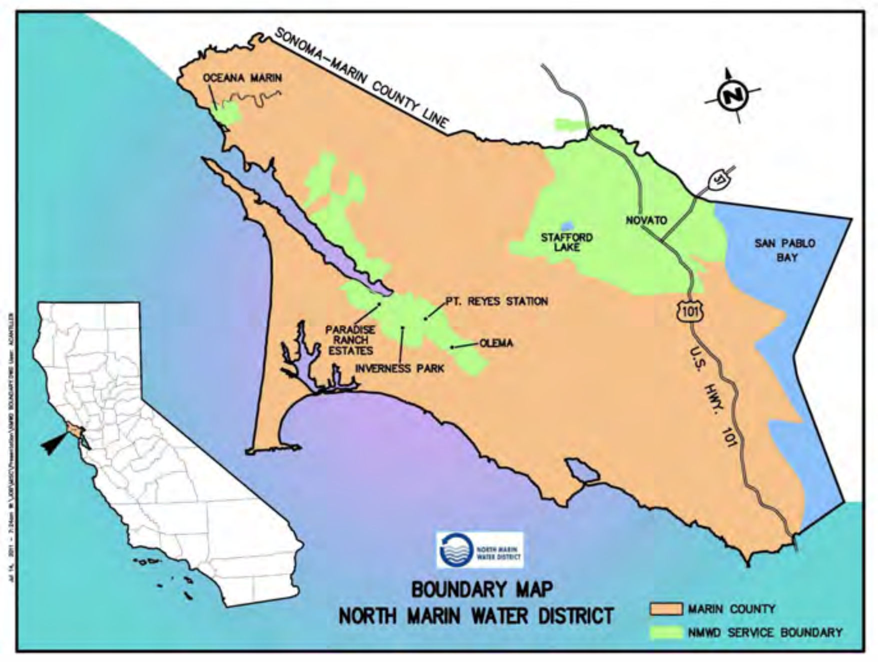
For more information:
Call 415-897-4133 or visit nmwd.com

NORTH MARIN
WATER DISTRICT

New Thank You Card

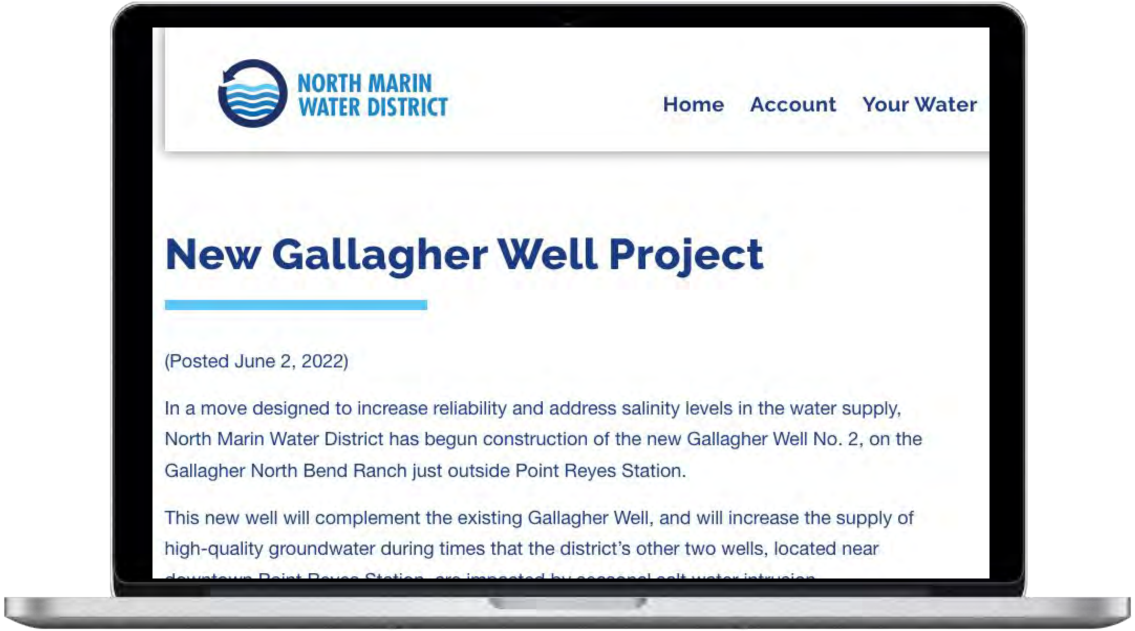
New Boundary Map

Before



After

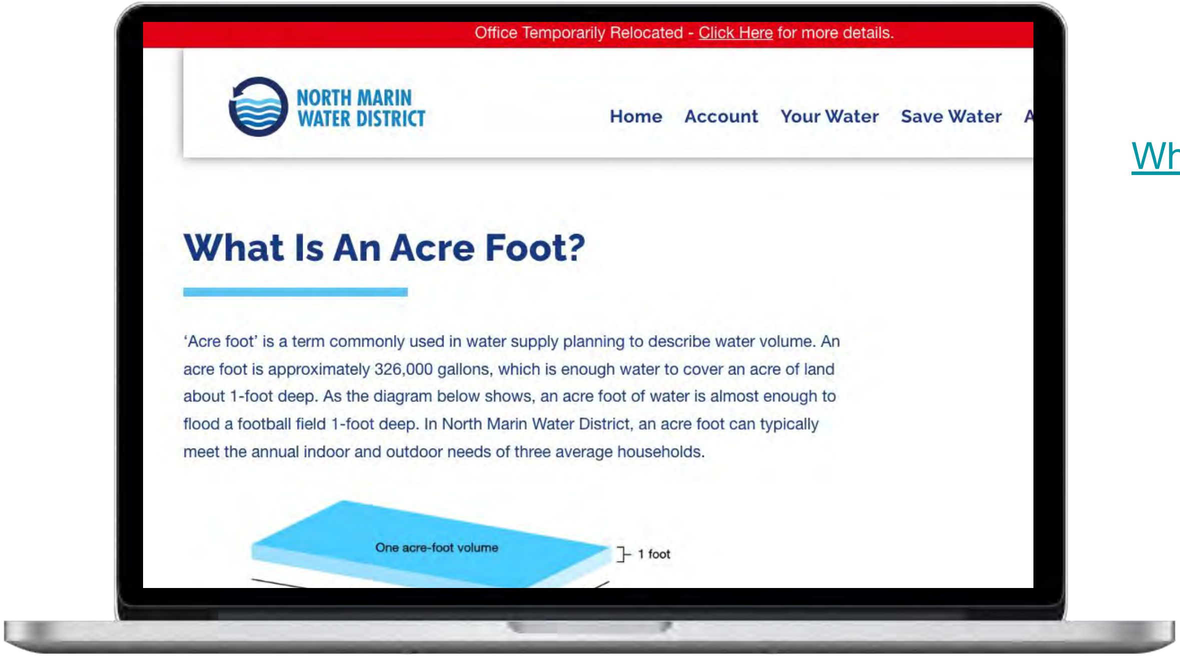
News Stories - June



(1) New Gallagher Well Project

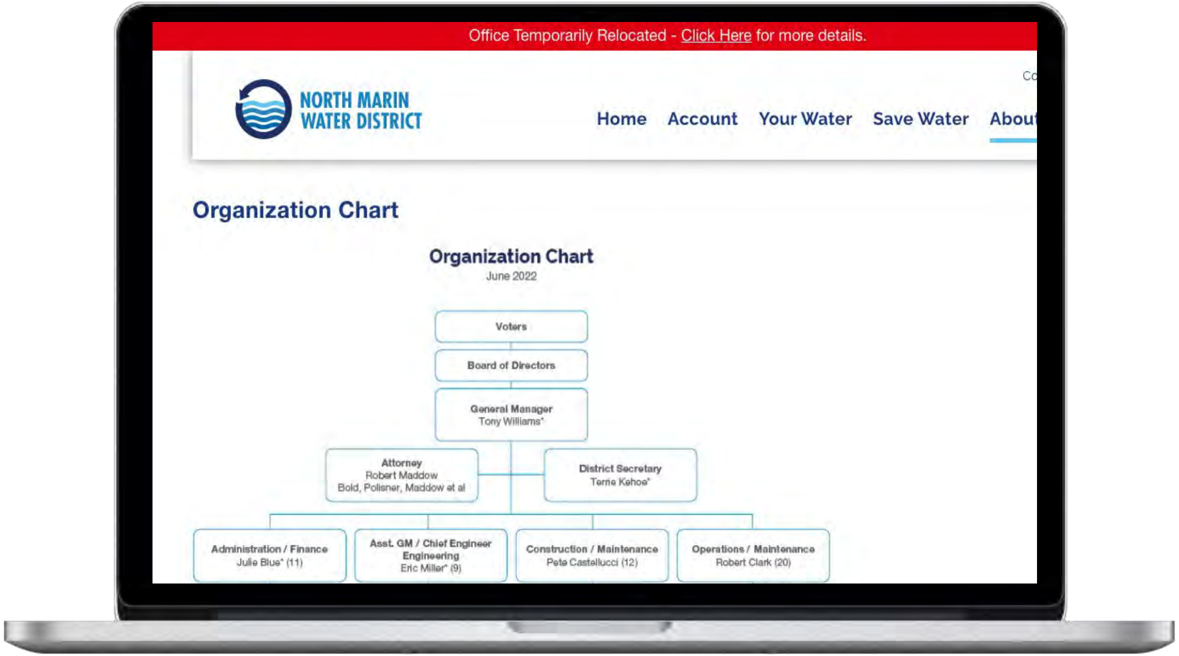
(2) Office Temporarily Closed page and banner

New Web Page - June



[What Is An Acre Foot?]

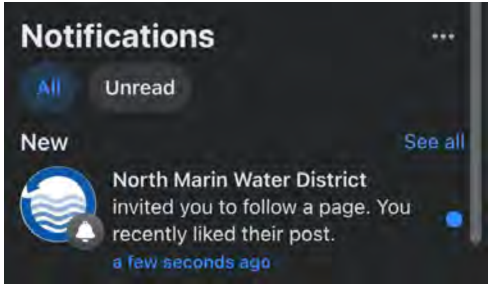
Updated Org Chart - June



Updated org chart on the [‘About’ page of NMWD.com]

Facebook Likes Campaign - June Report

We are running an evergreen ad which encourages customers in the NMWD service areas to ‘like’ (follow) the NMWD Facebook page.



Spend in June 2022	**Reach** (Number of people who saw the ad)	**Impressions**	**Results** (New Page Likes)	**Cost Per New Page Like**
$31.04	2,751	5,117	65	$0.54

This month, we were able to reach over ***2,751*** *people with the Likes Campaign*

What's Next?

- Water Quality Report for Novato and West Marin
    - Spanish translations of Novato and West Marin Water Quality Reports
- Template for construction project signs
- Continued drought social campaign during summer months
    - This will include sharing SMWSP social ads
- Continuation of social posts to highlight employees on their work anniversaries

Thank You