



STAFF REPORT

Meeting Type: Board of Directors
Title: Water Supply Roadmap - Selection of a Preferred Project to Move Into Design and Environmental Review
From: Paul Sellier, Water Resources Director
Through: Ben Horenstein, General Manager
Meeting Date: February 25, 2025

TYPE OF ACTION: X Action Information

RECOMMENDATION: Direct staff to: (i) proceed with design and environmental review of the PETA-3 conveyance project; (ii) continue to drive ongoing water efficiency efforts , (iii) continue to investigate the feasibility of increased local storage for additional water supply; (iv) continue to monitor desalination technological advances and cost, (v) pursue opportunities for grant funding or public-private partnership funding for recycled water projects, (vi) identify and evaluate other potential water supply opportunities, such as groundwater banking, as they arise, and (vii) develop deeper understanding of current state of science on climate change including the rate of change and potential effects on water resources

SUMMARY: By mid-2021, as a result of historic drought conditions, the District was left with just months of water supply. By December of 2021 with the help of historic rainfall, the District’s reservoirs were at capacity. Over the next year the District developed the Strategic Water Supply Assessment (SWSA) that investigated the District’s ongoing vulnerability to drought and established the need for additional water supply. The SWSA evaluated a range of water supply alternatives that culminated in February 2023, when the Board selected the Integrated Roadmap for improved water supply resiliency (Roadmap). Since that time, staff has been striving to investigate and implement the Roadmap projects. In particular the work focused on developing a detailed understanding of Local Storage as well as Conveyance of winter water to a Marin reservoir. In addition, costs and considerations for Desalination and Recycled water options, which had been studied in the past, were brought up to date so that all the alternatives could be evaluated. Staff also continued with our aggressive award-winning water efficiency program, successfully reducing overall demand.

DISCUSSION: The Strategic Water Supply Assessment (SWSA) found that under severe drought conditions the District would require an additional 8,500 AFY of water supply, which has been reduced to 6,500 AFY due to water efficiency efforts that has reduced demand to levels significantly lower than anticipated in the SWSA. Planning processes are inherently conservative and as is typical in planning studies, like the SWSA, a number of conservative assumptions were made to arrive at the volume of

water needed. These assumptions provide a buffer such that small deviations in demand (or supply) can be accommodated without compromising water supply resilience.

The overarching goal of the Roadmap is to close the supply gap identified in SWSA thereby enhancing the reliability, flexibility, and resiliency of the District's water system and improving service to Marin Water customers. The Roadmap also represents a change in the way the District thinks about and manages water supply from a short term drought influenced perspective to an ongoing adaptively managed process of continuous assessment. The Roadmap identified five broad strategies for achieving this goal and developing a resilient water supply, including Water Efficiency, In-District Improvements, Sonoma-Marin Partnership, Local Storage Enlargement, and New Supply Development, which includes desalination and recycled water. Over the past year, staff has been reviewing available information and developing new information to thoroughly understand the longer-term projects included in the Roadmap.

Water Efficiency is both a short-term and long term initiative in the Roadmap and continues to be the District's first strategy in stretching the District's existing water supply and as such is included in all water supply plans. The District's award winning water efficiency program includes a wide range of incentive and educational programs to help District customers achieve their water savings goals. The Water Efficiency Master Plan is a user friendly document that lays out a thoughtful, adaptive approach to drive water savings. Since 2021 the District has aggressively pursued water efficiency establishing a number of new programs and a consistent outreach to our customers with considerable results. Demand is today 4,000 AFY less than it was in forecast to be and we have not experienced the typical post-drought bounce back in demand. The incredible response from our customers has allowed us to reduce the water supply goal identified in the SWSA by 2,000 AFY from 8,500 AFY to 6,500 AFY.

As part of driving water efficiency, the District is pursuing the implementation of Advanced Metering Infrastructure (AMI) with a goal of beginning the implementation in 2026 and completion in late 2029 early 2030. AMI will facilitate customers' understanding of how they use water and where additional savings may be possible, as well as provide immediate notification of customer leaks.

Review and Evaluation of Roadmap Projects

At the January 21, 2025 board meeting, staff presented the initial evaluation of the alternatives that resulted in a narrowing of the water supply options. As a result of that evaluation recycled water purple pipe projects, Direct Potable Re-use and Indirect Potable Re-use, 5-MGD and 15-MGD desalination plants, as well as the Upper Nicasio Local Storage and Peta-4 and Cotati-3 alternatives were not prioritized for further consideration. While these projects are not being prioritized at this time, staff anticipates keeping current on developments in desalination, water reuse (IPR/DPR) and in the case of purple pipe projects staff will continue to actively pursue grant funding and private-public partnership funding opportunities to increase recycled water use in the service area. The remaining alternatives are summarized below:

Desalination: The District developed information on desalination across a range of capacities (5-MGD, 10-MGD and 15-MGD). For the final evaluation, staff is focusing on the 10-MGD desalination plant because it has a more favorable unit cost than the 5-MGD plant and is not burdened with the capital cost of the 15-MGD plant. Desalination would take San Pablo Bay water and treat the water to drinking water standards using reverse osmosis membranes. The project would also require significant storage

and pumping facilities to integrate the 10-MGD of treated water into the District's system. Desalination processes produce a brine as a byproduct of treatment, which would be added to the existing Central Marin Sanitation Agency's (CMSA) outfall eliminating the need to construct a dedicated outfall. Disposal of brine is challenging and can lead to environmental concerns even when mixed with treated water from CMSA.

The primary advantage for desalination is that it has the highest reliability in terms of a "drought-proof" water supply since the source of the water is inexhaustible. Desalination would need to be run continuously even in non-drought conditions which drives up the cost of this supply and increases operational complexity for the District. From an implementation standpoint, the desalination plant poses a challenge since it would require overturning an existing ballot measure, several major regulatory permits, substantial environmental analysis and possible litigation over environmental concerns. These factors would push the in-service date out to approximately ten or more years.

The treated water, while complying with all regulations, would have a different source water than the water currently provided by the District. This could create concerns for inequity, as the desalinated water would be provided to only a portion of the service area. Finally, the desalination plant is relatively costly both to construct and to operate – and much of the operational costs need to be borne even in non-drought years. Initial capital costs have been estimated at \$330-\$440M, and operating costs of about \$20M/year on average.

Local Storage Improvements - The project team reviewed extensive existing information and gathered and developed new data to thoroughly review the portfolio of local storage alternatives presented in the Strategic Water Supply Assessment. Each site was reviewed for constructability, potential environmental impact, geotechnical issues, and ultimate overall viability. In April 2024, the project team reviewed 11 alternatives with the Board, narrowing down the shortlist to three options for further evaluation and also recommending Nicasio Spillway Modifications move forward as an independent project. The remaining local storage projects are:

Kent Dam raise - The existing dam at Kent Lake would be raised to increase the capacity of Kent Lake by 20,000 acre-feet, to a new total capacity of about 53,000 acre-feet. Rainfall would fill the new storage which would serve as an emergency drought reserve. Kent Lake is in a very productive watershed and fills in most years. Reliability of the additional drought supply would therefore be very good since the lake would tend to refill quickly in between droughts. For comparative purposes, the project yield is taken as 5,000 acre-feet per year. The additional water supply would blend seamlessly with Marin Water's existing supplies and require no additional costs to integrate the water supply with Marin Water's existing infrastructure. The project would not require the conversion of any private property and any trails that may be inundated could be replaced. The additional inundation area to accommodate the increase in storage capacity is approximately 194 acres. The dam and new area of inundation are on Marin Water property. Once built, the project would have essentially no operating costs or energy usage relative to today's practices.

Implementation would likely exceed 10 years due to complex technical and environmental requirements and a multi-year construction period. The need to drain the reservoir for initial construction, however, would pose an unacceptable risk that renders the project infeasible, given that the lake is Marin Water's most important water supply. Prior implementation of a conveyance project could reduce that construction risk. The initial capital cost is estimated at \$520M, the highest of the

projects screened so far. That high initial cost is somewhat offset by extremely low operating costs, and the very long lifetime of the project, easily 100 years or more.

Soulajule Dam raise - The existing dam at Soulajule would be raised to increase the capacity of the reservoir by 20,000 acre-feet, to a new total capacity of about 30,500 acre-feet. Rainfall would fill the new storage which would serve as an emergency drought reserve. Reliability of the additional drought supply would be good because the watershed is fairly productive, though not as productive as that of Kent Lake. The project yield is taken as 5,000 acre-feet per year. The additional water supply would blend seamlessly with Marin Water's existing supplies. The initial capital cost is estimated at \$485M, which is the lowest cost of the major storage projects evaluated. The capital cost is somewhat offset by low operating costs, and the very long lifetime of the project, easily 100 years or more.

The project would require taking private lands impacted by inundation of the enlarged reservoir. An additional 523 acres of land would be inundated by increasing the storage capacity of Soulajule, some of which supports valued pasture lands and includes land on which homes and other structures currently sit. Some property owners have indicated that the inundation of this land would make their existing ranching operations unviable. While construction of the project is fairly straightforward, overall Implementation would likely exceed 10 years due to complex technical and environmental requirements, as well as the potential for litigation. Like any storage project, this project provides value only if there is enough rainfall to fill it in between dry years. A conveyance project could provide synergistic benefits.

Sonoma-Marin Conveyance Alternatives: The project team narrowed 13 conveyance alternatives to a shortlist of three possible projects that were presented to the Board in April 2024. Since April, the project team has continued to refine the three shortlisted alternatives in greater detail such that a preferred project alternative may be identified and proceed to design and environmental review. At the January 21, 2025 Board meeting Peta-3 was identified as the preferred conveyance project. A new 36" diameter pipeline and pumping plant would be constructed running from North Marin Water District's aqueduct, at or near San Marin Drive, to the District's Lake Nicasio with a future turn out to Soulajule. Those "conveyance" facilities would be operated in the wintertime as needed to replenish 3,800 acre-feet in storage in District reservoirs. Historical data and models find that, even in dry years, there is likely to be substantial "winter water" on the Russian River during storm events; the project would be developed to divert some of the storm water to storage.

The new conveyance facilities would be relatively straightforward to operate and integrate into the District's water system. The initial phase of the project would require about \$168M for initial capital costs. While not insignificant, that cost is less than that of other options examined. The project's operating costs would be comprised primarily of water purchase costs, and the cost of electricity for pumping. Those costs would only be incurred when the District operated the pipeline, i.e., in conjunction with storm events in dry years, so the average annual operating cost would be about \$3M. While the project will require detailed environmental analysis and regulatory permits, the potential impacts would appear less significant relative to other options considered, and less likely to incur major delays for permitting. Therefore, an implementation time of as few as four years could be achievable.

Meeting the Water Supply Need

Based on the analysis presented in the Strategic Water Supply Assessment and factoring in the reduced level of demand discussed previously, the District is seeking an increase in water supply of approximately 6,500 AFY. In the period since the end of the 2021 drought District demand levels remain approximately 4,000 AFY less than forecasted in SWSA and the typical post drought rebound in demand has not occurred to the extent that it has in the past. Continued lower demand suggests an adjustment to the water supply need determined by SWSA is appropriate. A measured reduction in overall demand of 2,000 AFY would reduce the water supply need established in SWSA, from 8,500 AFY to 6,500 AFY and is supported by the historic demand data while accounting for a very moderate post drought rebound. In addition to water efficiency, projects underway that can provide additional water supply include the Nicasio Spillway modifications (750 AFY), electrification of Soulajule Pump Station (420 AFY), Phoenix to Bon Tempe Connection (260 AFY) and work currently in planning such as the In System improvements (1,000 AFY to 1,500 AFY), are projected to increase the District's supply ranging from an additional 2,400 AFY up to 2900 AFY. Combining these projects with Peta-3, which has a projected supply capacity ranging from between 3800 AFY to 4,750 AFY, will close the 6,500 AFY supply gap identified in SWSA.

SUMMARY



Given the District's ongoing vulnerability to drought, the time to implementation of a project is a critical factor in selecting the preferred project to move into design and environmental review. Projects with longer implementation timeframes tend to be more complex, more costly and bring considerable risks. In the portfolio of remaining options, both desalination and local storage represent complex projects with significant timelines for implementation. The Peta-3 conveyance project is estimated at four years to implement and based on the evaluation of the alternatives presented in Attachment 1, is the District's best immediate option to improve the District's water supply reliability. The evaluation of Peta-3 across nearly every criteria (See Attachment 1) identifies it as superior to all other options available to the District. The Peta-3 project, once complete, may also help to alleviate the risks of enlarging Kent Reservoir, thus providing a basis for further consideration of this attractive option in the future. The Russian River is a robust water source and even in the driest years on record excess streamflow exists during storm events. The ability to phase the Peta-3 project would reduce the initial capital cost, as shown in Attachment 2, and allow the District the adaptively manage the ongoing process of ensuring water supply for Marin Water's customers.

ENVIRONMENTAL REVIEW: Not applicable, as the recommendation is to direct District staff to focus work on the Peta-3 Conveyance Project, which would include design and project level environmental review and permitting to allow staff to bring this project to the Board for consideration of project approval.

FISCAL IMPACT: The next phase of work on the recommended alternative, Peta-3, is to begin designing the facilities to support preparation of documentation for the California Environmental Quality Act (CEQA). Given the large capital cost of the project, the engineering fees will likely be in \$15 million to \$20 million range for full design and environmental review taking place over an approximately two year period. As discussed at prior board meetings, funding for this work is already in place. Upon selection of the design team, staff will return to the Board with a recommendation for award of one or more professional services agreements for this work.

ATTACHMENT(S):

1. Attachment 1 – Table Summarizing Evaluation of Alternatives
2. Attachment 2 – Economic and Financial Summary of Alternatives

DEPARTMENT OR DIVISION	DIVISION MANAGER	APPROVED
Water Resources	 Paul Sellier Water Resources Director	 Ben Horenstein General Manager