

## 1. Project Understanding

The Marin Municipal Water District (MMWD or District) serves the populous eastern corridor of Marin County from the Golden Gate Bridge northward up to, but not including, Novato. The district covers approximately 147 square miles and serves a population of approximately 190,000 customers with surface water supplies from seven local reservoirs, augmented with Russian River supplies imported from the Sonoma County Water Agency (Sonoma Water). Historically, MMWD has successfully met demands during periods of extreme drought with a combination of rationing, conservation, and increased Sonoma Water supplies. However, recent drought conditions that severely threatened water supply reliability have prompted MMWD to explore various water supply options to enhance resiliency for its customers.

This Strategic Water Supply Assessment will be additive to past planning efforts and is designed to fill in the gaps on new water supply alternatives. A comparative analysis will be performed on the water supply options available to MMWD and provide recommendations on a strategic water supply roadmap. In addition, the accelerated pace of climate change had signaled the need to model greater hydrologic extremes (both floods and droughts) than those that have occurred in the past. Specifically, the Assessment will seek to address the following questions:

- What is the current risk to MMWD's water delivery reliability under recent and projected future droughts?
- How much additional water supply is needed under different future hydrologic drought and demand scenarios?
- What are the range of water supply alternatives that could increase resiliency of MMWD's system? And what are their strengths and weaknesses?
- What recommendations can be developed to support MMWD's near-term investment in drought resiliency?

The Jacobs team is currently supporting Sonoma Water and its retail customers (including MMWD) on the Regional Water Supply Resiliency Study and has unique regional, state, and national experience and skills to support MMWD in this strategic assessment. The Jacobs team has conducted integrated water management resilience efforts throughout the state and thrives on these strategic planning efforts.

## 2. Scope of Work

Based on our understanding of the project, Jacobs is developed the following tasks to achieve the project goals. These tasks begin with strategic planning workshop effort to lead with the “end in mind”, then lead to technical and modeling assessments, and finally with an evaluation process and recommendation. One optional task has been included to provide contingency should work be needed outside of the specific tasks indicated.

### Task 1 – Confirm Water Supply Strategy and Goals

Jacobs will conduct an early workshop with the project and management team to confirm MMWD’s water supply strategy for both long-term reliability and drought (or other acute risks) resiliency. This workshop will result in an articulation of MMWD’s strategy and specific goals to be achieved in this strategic assessment. Jacobs will lead this workshop, share example strategies from related water agencies, and elicit input from the MMWD team to ensure that the assessment achieves the district’s goals.

In addition to ensuring alignment with the MMWD’s strategy and goals, the workshop will seek to establish performance metrics that can indicate the extent to which water supply alternatives meet the goals. Quantitative performance metrics will be sought, although some qualitative metrics may also be included where quantification may not be easily be conducted.

**Assumptions:** 2-hour virtual workshop via MS Teams

**Deliverables:** A brief (less than 3 pages) write-up documenting the discussion of this strategy workshop, goals, and performance metrics.

### Task 2 – Review Existing Studies and Reports

Jacobs will review existing studies and reports related to this MMWD’s water supply planning and drought resiliency project development. At a minimum, the Jacobs team will review the following reports and studies:

- SASM-MMWD Recycled Water Feasibility Study (2014)
- CMSA-MMWD Recycled Water Feasibility Study (2016)
- Water Resources Plan 2040 (2017)
- Marin Municipal Water District Desalination Plan EIR (2008) and Unpublished Updates (2021)
- EBMUD-MMWD Intertie EIR (2022, in progress)
- North Bay Water Reuse Plan Phase 2 (2018)
- MMWD’s In-System “Bottleneck” Study (2022, as available)
- Water Shortage Contingency Plan (2021)
- Urban Water Management Plan (2021)
- CMSA-MMWD Briefing Document Evaluating Direct Potable Reuse in Marin
- Water Supply Master Plan (1989)

This task will also include the collection of additional information related to the MMWD surface reservoirs and general system operation, supplies, and demands. MMWD's WaterSim GoldSim Model will be further reviewed to ensure that that integration with the Sonoma Water Decision Support Model (DSM) is achieved at the appropriate level. This information will be used to better understand the system operations and constraints for subsequent tasks.

**Assumptions:** MMWD will provide all the document for review including current models and reservoir historical data available. Documents for review might include draft documentation of reports that are not published yet.

**Deliverables:** A brief technical memorandum (maximum 5 pages) describing the key elements of each report and information that will be used to support this Assessment. The TM will be provided as a first draft electronic file (pdf) for comments. A final version addressing comments will be integrated into the final Report.

### Task 3 – Update Decision Support Model

Jacobs developed the Sonoma Water DSM as part of the Sonoma Water Resiliency Study contract with Sonoma Water. The MMWD system representation in the Sonoma Water DSM was simplified for the goals of the Sonoma Water project. It is expected that more details related to the MMWD system will be added to the current version of the Sonoma Water DSM resulting in a more accurate model tool that could be used by both agencies.

Jacobs will update the existing Sonoma Water DSM based on the information collected during Task 2. A simplified representation of MMWD reservoirs and main constraints (Kastania booster and treatment plants) is included in the existing DSM developed for Sonoma Water and its retail customers. DSM improvements will be related to achieve an improved representation of the MMWD system, reservoir operations, operational adjustments and constraints, and potential new infrastructure to support the evaluation of new water supplies.

**Assumptions:** Sonoma Water DSM developed by Jacobs under Sonoma Water contract will be used.

**Deliverables:** An updated version of the DSM could be provided to MMWD after Sonoma Water's approval.

### Task 4 – Develop Water Supply and Demand Drought Scenarios

The system represented in the Sonoma Water DSM will be tested under different water supply and demand conditions. Jacobs will develop up to four (4) drought scenarios that will be used to test the reliability of the MMWD system. The current DSM incorporates a stochastic resampling of historical hydrology (108 years) and 20 individual future climate model projections. Climate change amplification of the drought extremes will be evaluated and incorporated into scenarios. Jacobs will recommend scenarios that ensure that a robust range of plausible drought stress test hydrologic and initial storage conditions are incorporated.

Demand projections will be consistent with MMWD's Urban Water Management Plan (UWMP) and Water Shortage Contingency Plan.

**Assumptions:** Jacobs will use only the current hydrological sequences available in the Sonoma Water DSM, which includes historical hydrology from 1910 to 2017 and 20 climate projections. Any hydrology updates provided by Sonoma Water will be included in the DSM.

**Deliverables:** A brief technical memorandum (less than 5 pages) describing the drought scenarios that will be used to support this Assessment and the basis for the assumptions. The TM will be provided as a first draft electronic file (pdf) for comments. A final version addressing comments will be integrated into the final Report.

## **Task 5 – Conduct Assessment of Water Supply Alternatives**

This task will compile the information associated with various water supply alternatives and conduct an assessment of each. Initially, Jacobs will review a broad range of water supply options including those compiled in the Water Resources Plan 2040. Additional concepts through discussion with the Project Team and will be added to ensure that the assessment begins with a board consideration of water supply approaches.

After reviewing the water supply options, Jacobs will work with MMWD to select the most promising supplemental supply alternatives for more detailed assessment. The following water supply alternatives are anticipated to be confirmed as the most promising alternatives and will be included in the assessment:

- Baseline – Existing water supply system with planned improvements
- Water Shortage Contingency Plan Drought Conservation Scenario – Maximum of 20% conservation savings achieved
- Water Purchases with Conveyance through East Bay Intertie
- Desalination in North Bay
- Sonoma Water Options
- Increase Local Surface Storage
- Expand Recycled Water

The assessment will include a description of each drought water supply alternative and an evaluation of the performance of the alternative under the various drought scenarios.

### **Task 5.1 – Compile Descriptions of Drought Water Supply Alternatives**

Jacobs will compile descriptions of each drought water supply alternative. The descriptions will include a definition of the alternative, infrastructure needed to implement the alternative, and operational considerations for integrating the alternative into the MMWD system. It is assumed that information recently developed by MMWD for the Central Valley Purchases with East Bay Intertie, Desalination, and Expand Recycled Water will be directly incorporated in this assessment. Jacobs will primarily rely on this existing information to describe and assess these alternatives. Additional information and assessments will be conducted to support a more detailed assessment of Winter Water Delivery from Sonoma Water and Increase Local Storage.

### **Task 5.2 – Perform Modeling Assessment of Water Supply Alternatives**

The updated Sonoma Water DSM will be simulated with each of the water supply alternatives, and under each of the drought scenarios, to evaluate performance. Jacobs will develop specific assumptions for each alternative, review these with the MMWD project team, and implement in the Sonoma Water DSM. Jacobs will assess the availability of supply, feasibility of conveyance, and impact on system performance through these technical and modeling assessments.

In this subtask, Jacobs will determine how much water supply would be needed by MMWD given existing and future demand projections and current system infrastructure. The demands will be compared against the current existing supplies to determine the magnitude and frequency of potential future shortages. Under this task a supply demand gap will be identified together with its frequency under different hydrological scenarios. Major constraints limiting future potential of incorporating new water supplies will be identified.

### Task 5.3 – Review Results and Summarize Performance

Jacobs will review the results from each drought water supply alternative assessment and summarize the performance of all to begin to allow for a comparison of system performance. This

**Assumptions:** Water supply assessment will be based on existing information available except for supplies that will be evaluated with the Sonoma Water DSM.

**Deliverables:** A draft technical memorandum (maximum 20 pages) describing how the system was evaluated under different scenarios will be delivered as an electronic file for the District's review. Comments will be incorporated and delivered in a final version at the end of the project.

## Task 6 – Perform Evaluation of Water Supply Alternatives

The water supply alternatives identified and assessed in Task 5 will be further evaluated in this task based on a full range of criteria.

### Task 6.1 – Develop Evaluation Criteria

The criteria to evaluate and inform the recommended alternative and decision process will be defined under this task. Jacobs will work with the MMWD to identify a list of criteria and the relative importance of each one. In general, the range of criteria will include categories such as feasibility, financial, implementation time, legal/regulatory, implementation risks, environmental, and social impact. Jacobs will propose a set of criteria and work with the project team to refine the criteria and evaluation method. The performance criteria identified and assessed in the previous tasks will also form the basis for additional benefit criteria.

### Task 6.2 – Develop Cost Estimates

Once the water supply alternatives are identified, described, and performance assessed, the Jacobs team will provide high-level relative cost estimate for the supply alternatives evaluated under Task 5. The purpose of these cost estimates is to provide a comparative cost value across projects that will be used in the selection of a preferred project. Although this might be the first step towards a final project cost, the estimates will be have a relatively high level of uncertainty.

**Assumptions:** Class 5 Cost estimates will be prepared as part of this effort. Class 5 estimates (as characterized by the Association for the Advancement of Cost Engineering (AACE) International) are prepared based on limited information, where little more than proposed infrastructure type, its location, and the capacity are known. Strategic planning purposes include, but are not limited to, market studies, assessment of viability, evaluation of alternate schemes, project screening, location and evaluation of resource needs and budgeting, and long-range capital planning. Examples of estimating methods used include cost/capacity curves and factors, scale-up factors, and parametric and modeling techniques. Little time is expended in the development of this estimate. The typical expected accuracy range for this class estimate is –20 to –50 percent on the low side and +30 to +100 percent on the high side.

### Task 6.3 - Decision Analysis

A decision analysis approach will be developed and applied to assist in informing the selection of preferred project. The decision analysis may include Multi-Objective Decision Analysis (MODA) using the evaluation criteria, preference weights, and performance. MODA analysis would include both quantitative evaluation criteria (e.g. performance metrics) and qualitative evaluation criteria (e.g. environmental and legal) as identified in task 6.1. Jacobs will also offer additional decision analysis methods that could be used to inform recommended

future decision pathways and triggers. The result of this evaluation will be a recommended MMWD water supply resiliency strategy that may involve one or more water supply alternatives depending on the severity and type of drought risks.

**Assumptions:** High-level cost estimates will be used solely for the evaluation of water supply alternatives

**Deliverables:** TM (maximum 10 pages) describing the cost estimate assumptions and the decision analysis process that resulted in a recommended pathway.

## Task 7 – Prepare Water Supply Assessment Report

Task 7 will consolidate all the individual draft technical memoranda delivered as draft throughout the duration of the project as sections of the final documentation report. The consolidated documentation will include an executive summary, introduction, system description, water supply alternatives, evaluation approach and results, and recommended strategy.

**Assumptions:** Maximum 60-page electronic document. MMWD will provide comments within one week from the draft deliverable.

**Deliverables:** Final project report incorporating all final TM's, an executive summary, and a final conclusions section. The project report will be delivered as draft for final comments. The final project report will be delivered as an electronic file (pdf) addressing all comments.

## Task 8 – Meetings and Coordination

### Task 8.1 – Project Team Coordination Meetings

Jacobs plans to establish weekly coordination meetings with MMWD to provide project updates and resolve project details for the duration of the project up to 6 months. It is assumed that all meetings will be held virtually through MS Teams, and an agenda and review material will be made available prior to the meeting.

### Task 8.2 - Workshops and Board Meetings

Jacobs expects to deliver two project workshops and up to four Board meeting updates. Jacobs will prepare material to support MMWD staff at the four Board meetings at dates to be determined by MMWD.

The workshops will cover the following subjects:

- Workshop#1- Confirmation of water supply strategy and goals, system representation, scenarios and supplies to be evaluated. At the end of this workshop the project team will propose performance metrics and evaluation criteria to be used to evaluate projects.
- Workshop#2- Presentation of the results of the assessment, performance criteria, decision analysis approach, and recommended roadmap.

### Task 8.3 - Support for Public Meetings

Jacobs expects to support MMWD at up to three (3) public meetings during the course of this planning effort. Jacobs will prepare material to support MMWD staff at these meetings and will assist in presenting technical content related to this assessment. It is assumed MMWD will lead in the organization and communication of the public meetings.

**Assumptions:** All workshops and meeting to be delivered virtually by MS Teams. One-hour maximum weekly project meetings for up to 22 weeks. Both workshops will last up to 2 hours. The 3 public meetings are assumed to be delivered virtually via MS Teams and last up to two hours each.

**Deliverables:**

- One kick-off meeting with Jacobs and MMWD teams.
- Weekly progress meetings with power point draft presentation to be provided prior to the meeting. Meetings are assumed to be delivered virtually on MS Teams.
- Two 2-hour workshops to be presented virtually on MS Teams.
- Support on up to 4 Board meetings.
- Support on up to 3 Public Workshops, up to 2 hours each

## **Task 9 – Project Management**

### **Task 9.1 - Project Management**

Jacobs shall be responsible for project administration and management throughout the course of this task. Jacobs shall manage the project execution and production efforts, budget, schedule, internal resource, monitor progress and direct Quality Assurance (QA) activities and coordinate with MMWD. The costs for project management are based on:

- Update project documents
- Conduct team management, internal coordination, and resource allocation and staffing
- Complete project controls, budget and schedule monitoring and updates for project tracking
- Conduct quality control and quality assurance activities for project deliverables
- Complete monthly invoicing and monthly progress reports

**Assumptions:** Project will last a total of 22 weeks without optional tasks

**Deliverables:** Weekly update meetings delivered by MS Teams and monthly invoices.

## **Task 10 – Optional Task**

This task will be set up to cover optional work that might be identified along the project execution. Due the short schedule (6 months) of the project, this optional task will provide great flexibility to accommodate out of scope tasks that could be crucial to the conclusion of the project. This project task will be approved only after a mutual agreement between Jacobs and the District on the scope and deliverables of the task.

