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Timber Cove County Water District

Phased Strategic Plan

Accepted by Board on 8/27/2022

Infrastructure Committee

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Table of Contents

Table of Contents.....	1
Executive Summary.....	1
Introduction.....	2
Background.....	2
Committee Goals and Accomplishments.....	2
Committee Process.....	3
Challenges.....	4
Project Funding Opportunities.....	4
Findings and Recommendations.....	6
Recommended Projects and Activities.....	6
Installation of Automatic Meter Reading Meters.....	9
Evaluation and Prioritization of Distribution System Improvements.....	10
Evaluation and Installation of Koftinow Pumping Station.....	11
Filter Vessel Train Improvements.....	11
Tank Piping Replacements.....	12
Evaluation of UV System.....	13
Evaluation and Installation of Weir Improvements.....	13
Hire External Consultant to Monitor and recommend Grants and other 3rd Party Funding Opportunities.....	14
Projects Considered but Not Recommended within the Next Three Years.....	14
Appendix.....	17
DS1 – Amanita, Pine, and Cypress Pipe Replacement Project Summary.....	17
DS2 – Upper Koftinow Pipeline Loop Project Summary.....	23
TP1 – Replacement of the Treatment Plant with an Ultrafiltration System.....	26
Public Comments and Committee Response.....	34

Executive Summary

The Timber Cove County Water District (TCCWD) Capital Improvement and Infrastructure Planning Committee (the Committee) was authorized to evaluate TCCWD’s infrastructure and project ideas through a TCCWD Board vote in August 2021. The Committee reviewed all available documents and received input from TCCWD operators and Brelje & Race engineering consultants. Although the Committee was challenged by incomplete documentation, they were able to assess existing project designs and ideas to suggest an actionable Phased Strategic Plan (the Plan) for further project evaluation and implementation. The Committee views the Plan as a reasonable, prudent list of executable activities for TCCWD’s size and financial status. The Plan does not authorize funding for any of the projects recommended. All decisions to proceed with any specific recommendation and related funding approvals need to follow the established authorization process that requires a TCCWD Board vote in a public meeting.

The Committee viewed the near-term activities presented in this Plan as the most important to execute within the next three years. Developing 5 and 10 year action plans at this point for longer term projects presented in the Plan was not viewed by the Committee as being in the best interest of TCCWD and the Timber Cove Community as operating conditions, the results of implementation of near-term improvements, available technologies, and cost information will change over time. Instead, the Committee recommends that the longer term projects discussed in this Plan be further evaluated and prioritized in preparation for the next Plan update, which the Committee recommends should be released every three (3) years.

As an important near-term objective, the Plan recommends an Evaluation and Prioritization of Distribution System Improvements. This activity does provide a pathway to develop a more prioritized infrastructure improvement plan in the next Plan update. As part of this evaluation, it may be deemed reasonable to implement some of the prioritized projects prior to the next update. The Committee recommends conducting progress checks annually at TCCWD Board meetings to review changing system needs.

Table 1: Summary of All Projects Recommended for Round 1 Implementation

Near-term projects (1-3 year window)	<ul style="list-style-type: none">● Installation of Automatic Meter Reading (AMR) Water Meters● Evaluation and Prioritization of Distribution System Improvements● Evaluation and Installation of Koftinow Pump Station (DS2 Alternate Option)● Filter Vessel Train Improvements● Tank Piping Replacements● Evaluation of Ultraviolet (UV) System● Evaluation and Installation of Weir Improvements● Hiring of External Consultant to Monitor Grants and other 3rd Party Funding Opportunities
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Some previously identified projects that were reviewed by the Committee have not been recommended as part of the Plan. Primary reasons for this include a lack of information to assess validity, a non-cost effective determination, a need for a life-cycle cost analysis, and/or an absence of current business need for TCCWD.

Introduction

The Infrastructure Committee was appointed by the TCCWD Board in 2021 and tasked with developing a Phased Strategic Plan that identifies long term capital improvement recommendations for Board consideration. The Committee is comprised of two directors and two resident/customers, including a professional engineer, a specialist in public utility operations and optimization, the former senior vice president and general counsel of a major national consulting engineering firm specializing in design, construction and trouble-shooting of municipal water and waste water treatment facilities, and the Board director who has worked closely with plant operating staff over the past decade. Especially for a group of local volunteers, this team is appropriately qualified for its task.

The Infrastructure Plan was presented to the Board at the July 2022 Board meeting. In response to suggestions from Directors and community attendees, the Board offered an opportunity for the public to further review the Plan and submit comments to the Infrastructure Committee with a deadline of August 6. The Committee reviewed and considered the comments received, updated the Plan as appropriate and added a “Public Comments and Committee Response” section to the Appendix.

Background

Committee Goals and Accomplishments

The Committee established goals early in the process. These goals included:

- Organizing and evaluating the existing documents and information available,
- Providing an actionable plan for near term project evaluation and implementation,
- Identification of potential longer term projects that need further evaluation, and
- Creating a standard process for evaluating project vendors and suppliers.

Organizing and Evaluating Existing Information – Historical document organization and management complicated our evaluation. Many files are missing from a significant period. Other files were not in the TCCWD office and computers but may be on personal computers from past Board members or otherwise involved parties. The Committee organized all currently available files by utilizing Google Drive cloud storage and renaming files with descriptive file names. Once organized, the files could be systematically reviewed for content and evaluated by project or recommendation. We believe the resulting information system can serve as a continuing asset for the District. TCCWD staff will take over ongoing maintenance of these files upon completion of this Plan. The Committee encourages cloud storage, file and folder structures organized by project, and standard file naming conventions.

Providing an Actionable Plan – This report serves as an actionable infrastructure improvement plan. It lays the groundwork for continued, proactive management of the TCCWD infrastructure. Near term projects and activities are outlined which the Committee recommends TCCWD begin implementing without delay. The Committee would have preferred to provide more specific sets of projects to begin implementation and upgrade of the infrastructure. Incomplete records, the absence of an overall system assessment, and a lack of other detailed information made the development of a comprehensive set of near, mid, and long term projects not feasible. To advance that objective, the plan should be regularly updated and supplemented to assess the ongoing needs of TCCWD infrastructure.

Identification of Projects Needing Further Evaluation – For the past few years, the inputs of new Board Directors and Operators and the interest of community stakeholders has generated significant cost savings and reliability ideas. As stated above, the Committee was unable to realistically compare benefits and costs of many previously proposed projects, dating back several years, due to a lack of essential information and detail. Where the Committee has deemed appropriate, recommendations are made to further evaluate potential projects to determine the feasibility, benefits, and costs under today’s conditions.

Creating a Standard Process for Evaluating Vendor Bids – The Committee identified that past projects may not have followed a standard process for sourcing and evaluating vendor bids. Due diligence in vendor selection even for design assignments is critical to maintaining responsible fiduciary actions. The Committee has identified best practices for non-emergency infrastructure work based on their collective industry experience in evaluating vendor proposals. These include:

- Where possible, receive at least three (3) vendor proposals for intended work.
- Review each proposal to ensure that the scope is clearly defined, and exclusions are identified.
- Evaluate the scope to determine what, if any, can be accomplished in-house.
- Interview other districts or customers for which similar scopes has been provided by the vendor.
- Weigh the proposals on a life cycle cost analysis basis.
- Detail pros and cons of each proposal, including potential non-monetary impacts.

Note that this is not intended to apply for emergency infrastructure repair work such as a leak or pipe failure.

Committee Process

The Committee was authorized by a TCCWD Board vote in August of 2021. All four member of the Committee were appointed by a unanimous vote.

The Committee is made up of two TCCWD Board members and two community members. Members of the Committee include:

- Spencer Lipp: TCCWD Director and Professional Engineer with 25 years’ experience evaluating improvements to mechanical systems,
- John Rea: TCCWD Director and Vice President; 45 years of hands on mechanical experience
- Renée Fernandez-Lipp: Utility professional with over 30 years of experience evaluating energy efficiency, demand side management, renewable energy and energy infrastructure improvements, and utility operations optimizations projects
- Bob Leichtner: Retired Senior Vice President and General Counsel of Brown and Caldwell, Environmental Consulting Engineers, and current board member of the Timber Cove Homes Association.

The Committee has met regularly on a biweekly basis since September 10, 2021. Two distinct types of project documentation were available for the Committee’s evaluation. These included fully designed projects and summaries or ideas of potential projects from past Boards and past and current Operators.

The fully designed projects included engineering documents created by Brelje & Race in approximately 2014-2016 for three projects (DS1 – Amanita Circle, Cypress, and Pine Pipe Replacement, DS2 – Koftinow Loop Project, and TP1 – Plant Replacement with Ultrafiltration System). Thanks to the availability of engineering information, the Committee was able to provide fairly thorough assessments of these projects. Extensive evaluations of each of these projects are provided in the Appendix of this report.

The other project ideas stem from several sources including the “2016 Capital Plan” developed by the 2016 Board, a system description from prior operator Ben Harty, a summary of potential project ideas from prior operator Tanner Hiers, and a list of potential improvement ideas from current Chief Operator, Ryan Gomez.

The Committee organized the documents by project and systematically reviewed all the documents. The Committee discussed the designed projects in detail with Brelje & Race to understand the impetus and premises of each project and identify any additional tasks needed to reevaluate and update, if necessary, the designs under today’s operating conditions. Once all the project ideas were categorized, the Committee sought input from the current Operators on prioritization and specific need. The current Operators, Ryan Gomez and Jeff Hughes, possess a system familiarity under today’s operating conditions and expertise that the Committee viewed as highly valuable in the project evaluations and decisions to recommend or not recommend a project. The Committee’s final recommendations are presented in the Findings and Recommendations section of this document.

Challenges

The biggest challenge for the Committee was the lack of detailed information and missing documentation. The Committee requested community members to provide all past project documentation that exists on potential projects. Aside from this request, a subset of the likely TCCWD funded design documents were available. The Committee reached out to Brelje & Race for any missing documents. Due to the passage of time and their file storage structure, Brelje & Race requested \$1,700 to provide missing documents. While those documents would have been helpful, the Committee did not feel there would be enough additional information to warrant use of TCCWD funds for this purpose. Thus, the Committee evaluated those project with the files that were available from TCCWD. Brelje & Race has since agreed to provide additional documentation without charge.

The document that was included and described as the 2016 Capital Plan was not a complete and detailed Plan Report, it was a print of an Excel workbook. There were hidden rows and references to other worksheets that were not available. For some of these projects it was difficult to determine what the intent was with the brief description available. Costs were included that referenced other worksheets which were not available. Thus, the Committee could not validate the reasonableness of any of these costs, making their inclusion in this plan difficult.

The organization and review of documents was very time consuming. The Committee would have liked to perform more evaluation of identified and new projects under today’s actual operating conditions, not those six to eight years in the past. However, that would have significantly postponed the release of this Plan. The Committee viewed the present recommendation of a pathway toward a prioritization of projects as more important than a delayed actual prioritization or a prioritization based on incomplete information. Thus, some of the immediate recommendations are to conduct evaluations and/or studies that can be used by this Committee, its successor, or an alternative method determined by the Board to implement or update the plan under future operating and economic conditions.

Project Funding Opportunities

There is a variety of funding opportunities potentially available to TCCWD to implement capital projects. The Committee recommends engaging with a grant writing and financing professional to get TCCWD capital project “funding ready” and to monitor the status of potential opportunities.

2022 TCCWD Infrastructure Committee Phased Strategic Plan

During the Committee's work, a number of potential funding opportunities were discovered. The following is not intended to represent an exhaustive list. However, this list does represent a starting point for TCCWD's research into potential funding opportunities.

- The California Water Board's [Division of Financial Assistance](#) implements a number of financial assistance programs including grants and loans.
- [California Special District Association \(CSDA\) Finance Corporation](#) is a non-profit public benefit corporation established to help special districts and other public agencies through the use of innovative and efficient financing programs.
- [California Governor's Office of Planning and Research](#) provides technical assistance to local governments on how to find and apply for Federal grants.
- California Infrastructure and Economic Development Bank manages the [Infrastructure State Revolving Fund Program](#) which is authorized to directly provide low-cost public financing to local government entities.

Findings and Recommendations

The following section describes the Committee’s findings and recommendations resulting from its investigations. Details on the projects and activities recommended for action in the initial 1-3 year period are included. Additionally, this section contains a summary of all the projects that were evaluated as part of the development of the Plan.

Recommended Projects and Activities

The following section illustrates the findings and recommendations of the Committee. Table-2 below identifies the projects that are recommended to commence prior to the next scheduled update of the plan in three (3) years. Progress should be monitored by the Board annually. A key to funding all of these projects is to engage with an external professional proficient in water infrastructure grant availability and writing.

Table 2: Recommended Near-Term Projects

Project	Description	Key Drivers / Benefits	Avoided Risks	Next Steps	Approximate Cost ^a
Installation of AMR Water Meters	<ul style="list-style-type: none"> - Install of new water usage meters with Automated Meter Reading (AMR) technology. 	<ul style="list-style-type: none"> - Reduced Operator labor for meter reading. - Real-time information on water usage and possible system leaks. 	<ul style="list-style-type: none"> - Long-term undetected leaks. - Inaccurate readings. - Personnel safety. 	<ul style="list-style-type: none"> - Take delivery of new meters. - TCCWD staff to proceed with meter installation. 	\$60,537 ^b
Evaluation and Prioritization of Distribution System Improvements	<ul style="list-style-type: none"> - Conduct a new distribution system evaluation and develop system improvements prioritization plan^e 	<ul style="list-style-type: none"> - Creates a systematic approach to distribution system upgrades with a strategic evaluation of the system. - Prioritizes the system areas of greatest need. 	<ul style="list-style-type: none"> - Overspending on projects that are unnecessary or could be deferred 	<ul style="list-style-type: none"> - Draft RFI/RFP with clear scope of work. - Issue RFI/RFP to qualified engineering firms. 	\$10,000 - \$40,000
Installation of Koftinow Pump Station (DS2 Option)	<ul style="list-style-type: none"> - Installation of a new booster pump station near Tank 3.^c 	<ul style="list-style-type: none"> - Alleviate low pressure issues on upper Koftinow Drive. - Provide compliant flow rates and minimum service pressures to all service connections and fire hydrants. 	<ul style="list-style-type: none"> - Regulatory non-compliance - Insufficient water flows for daily and emergency use. - Potential customer satisfaction issues. 	<ul style="list-style-type: none"> - Resolve project siting issues. - Draft RFI/RFP with clear scope of work. - Secure alternative funding sources. 	\$262,000- \$393,000 ^d

Project	Description	Key Drivers / Benefits	Avoided Risks	Next Steps	Approximate Cost ^a
Filter Vessel Train Improvements	<ul style="list-style-type: none"> - Replace corroded ductile iron pipe from the vessels to the clear well. - Reinstating granular activated carbon (GAC) for chemical removal. 	<ul style="list-style-type: none"> - Piping integrity restoration. - Addressing organic matter removal. - 	<ul style="list-style-type: none"> - Potential leaks - Potential pipe failure. - Potential water quality issues. 	<ul style="list-style-type: none"> - Secure alternative funding sources. 	\$187,550
Tank Piping Replacements	<ul style="list-style-type: none"> - Replace corroded ductile iron pipe. - Inspect Altitude valves for cavitation or wear. 	<ul style="list-style-type: none"> - Piping integrity restoration. 	<ul style="list-style-type: none"> - Potential leaks - Potential pipe failure 	<ul style="list-style-type: none"> - Obtain quotes for Tank 1, Tank 2, and Tank 3 pipe replacement. 	\$50,000
Evaluation of UV System	<ul style="list-style-type: none"> - Evaluate installation of a chemical free Ultraviolet (UV) system in the plant for water purification 	<ul style="list-style-type: none"> - Eliminates waterborne microorganisms. - Reduces the amount of chlorine used to purify the water. 	<ul style="list-style-type: none"> - Poor water quality - Regulatory non-compliance 	<ul style="list-style-type: none"> - Finalize project engineering, design and cost analyses. - Conduct benefit-cost analysis. 	TBD
Evaluation of Weir Improvements	<ul style="list-style-type: none"> - Proposed weir dredging project. 	<ul style="list-style-type: none"> - Optimized source water collection capabilities. - Increased pumping season timeframe. - Increase the useful life of the pumps. 	<ul style="list-style-type: none"> - Declining source water collection capabilities. - Overspending on pump maintenance and replacement. 	<ul style="list-style-type: none"> - Conduct Biological Assessment. - Finalize project engineering, design and cost analyses. - Conduct benefit-cost analysis. - Secure project permits. 	TBD (min: \$5,600)

2022 TCCWD Infrastructure Committee Phased Strategic Plan

Project	Description	Key Drivers / Benefits	Avoided Risks	Next Steps	Approximate Cost ^a
Grant Funding Evaluation and Monitoring	<ul style="list-style-type: none"> - Utilize an outside professional to research available grants for implementation of projects^f. When applicable, assist with authoring grant applications. 	<ul style="list-style-type: none"> - Allows for knowledge of available funding on a real-time basis to accelerate system upgrades and other projects. - Provides external funding sources for system upgrades and projects. 	<ul style="list-style-type: none"> - Insufficient funding for critical improvement projects. 	<ul style="list-style-type: none"> - Source a professional with water district grant experience. 	<p>Estimate \$4,000/year</p>

^aTBD represents costs that could not be determined within the Committee’s timeframe of this Plan. All costs with TBD should be evaluated for return on investment and other beneficial components before being approved for funding.

^bCost is for the purchase of the meters. This expenditure was approved by the Board in March 2022. TCCWD intends to install the meters with in-house labor.

^cDS2 design is for a loop. Brelje & Race indicated the pumping station design was “pretty far along”.

^dBased on Brelje & Race estimated increase from 2011 cost estimate of \$131,200.

^eOperator recommended Pacific View Drive for replacement. The Committee feels an overall assessment should be performed prior to committing that any particular area within the distribution system is replaced.

^fCurrent TCCWD staff or Board do not have the expertise to monitor appropriate opportunities and author applications. CSDA offers members 15% off grant writing services.

Installation of Automatic Meter Reading Meters

The current customer meters in place are the original distribution system meters. The Operators manually read the meters on a monthly basis for billing purposes. These meters do not have the granularity to read water usage below 75 gallons. Some customer experiences have led to speculation that these meters may not read small amounts of continuous water use (e.g. running toilet). If this is correct, this water would be in the Primary: Unaccounted, Non-Billable Losses from the Operator's State Water Resources Control Board Monthly Report.

Since these meters were installed, meter technology has improved significantly to allow for more accurate and convenient meter readings. Automated Meter Reading (AMR) meters now allow water utilities to automatically collect water consumption and status data using tablets during walking or drive by rounds without the need to physically see the meter. This results in quicker, safer and more accurate data collection. Since the Operators drive the district daily to evaluate the conditions, data can also easily be collected on a daily vs monthly basis.

The real-time water usage collected from AMR meters will also potentially help TCCWD identify leaks quicker. Daily water usage information can be analyzed to identify both distribution system leaks and customer leaks. When this meter data is combined with the recently installed SCADA system, system leaks can be pinpointed in specific system areas. Small, trickle customer leaks will be identified when the meter data shows consistent small water use throughout atypical times such as overnight. Upon detecting these leaks, TCCWD staff can contact the customer to encourage correction of the leak, which improves customer satisfaction.

The purchase and installation of the AMR meters is already in progress following the March 2022 approval by TCCWD Board action. Due to supply chain issues, however, installation of the meters has been delayed. This Committee was part of the project evaluation process and utilized the recommended vendor selection process outlined in the Committee Goals and Accomplishments section of this report to select an implementation contractor. The vendor selection process for this project included the following steps:

- Obtaining and evaluating three different vendor bids with presentations to the Board,
- Evaluation of the overall scope of work to confirm that the installation of the meters could be done by TCCWD Operators,
- Interviewing other districts, such as Sea Ranch, that has Badger meters to get feedback on AMR meter functionality and vendor customer service, and
- Conducting detailed comparative analyses/discussions of the different vendors through Committee meetings and in Board meetings.

Advance metering infrastructure (AMI) technology was also discussed due to the additional benefit of personnel-free data collection. However, it was eliminated from consideration due to the need for consistent cell phone signal which is not locally or reliably available.

Project Next Step(s) – Install and commission the meters with location prioritization given to improved lots over unimproved lots.

Financial Impact of Implementation – The installation of the AMR meters would be done by TCCWD Operators. Thus, there would be no additional direct financial impact. Some work currently done might need to be deferred to install the meters. However, the Committee recommendation would be to install meters in batches as time allows to eliminate the impact on deferment of critical work.

Evaluation and Prioritization of Distribution System Improvements

The distribution system is aging and in need of a prioritized repair and replacement plan to efficiently address the areas of greatest need. There are currently several project ideas in various stages of development and design and opinions on areas of the system that appear to be more problematic than others.

The Committee reviewed all of the information currently available on the system and the existing project ideas but did not have complete documentation sufficient to develop a prioritization plan. For that reason, the Committee recommends utilizing an outside engineering firm to conduct a new system evaluation to determine the appropriate integrity and prioritization plan that balances current system needs with the funding and internal resources available to implement projects. The Committee believes that the evaluation could be completed within one year and that the identified top priority projects could be designed, at a minimum, and perhaps implemented prior to the next recommended update to this Plan. The results of this study should be utilized in the next Planning Committee Evaluation as a basis for prioritizing the next round of projects.

The engineering evaluation should, at a minimum, consider

- Any previous engineering system evaluations that have been performed,
- All available engineering drawings of the system,
- Current operating conditions and components of the system,
- All feasible identified projects, and
- Overall leak history information.

The expected report outcome is to prepare an infrastructure integrity procedure appropriate for the size and resources of TCCWD which likely includes timelines for inspections of different sections of the distribution system with a prioritization of distribution system projects. These projects could include potential pipe connections and/or mains replacements based on the information considered above and any structural integrity through non-destructive acoustic testing or utilizing segments to perform destructive laboratory testing. The prioritization could also include installations such as Pressure Reducing Valves (PRV) that improve the operations of the distribution system.

Two pipe areas of interest to note are Amanita Circle, Pine Court, and Cypress Court and Pacific View. The Amanita Circle, Pine Court, and Cypress Court has had some recent leaks and was addressed in a fully designed DS1 project from 2015 that was never implemented. This project was evaluated by the Committee with the findings referenced in the Appendix. Pacific View has had more substantial recent leaks and was recommended as an area of interest by Ryan Gomez.

Another potential project identified by previous Operators is the installation of a Pressure Reducing Valve (PRV) at the top of Umland. This project would correct a pressure issue in the distribution system where some pressures are 100 psi.

While the Committee respects the previous localized work efforts and expertise, it is believed that the most prudent activity is to evaluate the entire system holistically to prioritize the most needed areas for attention based on the most recent available information.

Project Next Step(s) – Obtain cost estimates from engineering firms following the best practices for vendor selection to execute the distribution system evaluation.

Financial Impact of Implementation – It is estimated that the evaluation would cost \$10,000 to \$40,000 depending on the overall scope. Much of the variability includes the extent that the structural integrity activities are performed. The engineering firms should advise on the most cost effective option to achieve the goals.

Evaluation and Installation of Koftinow Pumping Station

There is a known low pressure issue in the Upper Koftinow Drive region of the distribution system. High flow events occasionally result from opening one or more fire hydrants for firefighting or maintenance purposes. During these events, the system is unable to provide flow rates and minimum service pressures to all service connections and fire hydrants in compliance with California Water Works Standards and local fire department requirements. Low pressure areas can cause community safety concerns in the event that fire fighters need access to multiple hydrants. There are also possible customer satisfaction concerns during these events if residences do not have enough water pressure in their homes.

A system evaluation of pressure zones was conducted by Brelje & Race in 2011. Five options were identified to correct the pressure issues on Upper Koftinow Drive¹. Of the five options identified, the installation of a new pumping system on Koftinow to create a new pressure zone was determined to be the lowest cost option with an implementation cost of \$131,000. According to Brelje & Race, this project’s design was “fairly well along” before a nearby property owner opposed the location of the pumping station. At that point, the DS2 Pipeline Loop project was designed as an alternate solution.

Project Next Step(s) – The Committee recommends several actions on this project. Continual evaluation during the execution of these steps should be conducted to ensure the project economically meets the objectives.

- 1) Since the pumping station project option incurs a substantially lower estimated installation cost than the DS2 Pipeline Loop option while yielding the same benefits, TCWWD should work with the current property owners to resolve any potential concerns over the proposed pumping station site.
- 2) Finalize the project design and determine budgetary cost estimates.
- 3) Draft a Request for Proposal (RFP) package for the pumping station project, including a clear scope of work.
- 4) Secure non-TCCWD grant funding and 3rd party financing sources, as applicable.
- 5) Release RFP and evaluate proposals from prospective contractors.

Financial Impact of Implementation – The DS2 Pipeline Loop option’s implementation cost was estimated back in 2011 to be \$204,800 more expensive than the implementation cost for the new pumping station. Brelje & Race estimated today’s installation costs to escalation two to three times for both projects. Thus, the pumping station’s overall cost would be approximately \$400,000 to \$600,000 less than DS2. Implementing this project with TCCWD funds would consume approximately 25-40% of the current financial reserves. The Committee recommends utilizing available grants and financing to implement this project. The availability of grants and/or financing alters the financial impact of this project. Thus, direct financial impact cannot be determined until specifics of the available funding is known.

Filter Vessel Train Improvements

The ductile iron pipe to the filter vessel trains shows signs of tuberculation, small mounds of corrosion products within iron pipes, which lead to capacity change and pitting. This condition is often a precursor to leaks and micro biological growth from affected areas. Operator Ryan Gomez observed concentrated cell corrosion, where

¹ See Appendix - DS2 Upper Koftinow Pipeline Loop Project Summary

two dissimilar metals exchange electrons while using the water as a solvent, in the filter vessel trains and tank plumbing. Concentrated cell corrosion creates built up deposits and pitting in pipe walls. These points of deposits and pits form a weak point in the pipe which will eventually leak.

The options considered for the plant filter vessel trains include replacing the plumbing with new cement lined fittings, modifying the alum dosing, and the addition of chemical additives. Pipe replacement has been deemed the best option to prevent pipe failure and manage water quality. Adjusting the alum dosing will free up alkalinity but can possibly have an adverse effect on the filtration, and jar testing will have to be performed. Utilizing chemical additives will require its own injection and sedimentation prior to filters. This can cause cementing over at the filters. The current plant process does not include the granular activated carbon (GAC) within the procedures. GAC provides additional organic matter removal which are total trihalomethanes (TTHMs) and haloacetic acid (HAA5) precursors. TTHMs and HAA5s are reported to be the biggest water quality issue for the plant. The current Operator is unaware of any rationale for abandoning the GAC other than some more complicated procedures. Reinstating the GAC would require state approval, create procedures for testing and maintaining the media, and perform additional monitoring of the amount of organic carbon as an indicator of media exhaustion. The filter vessel train general scope includes inspecting and/or installing new PVC terminals and the replacement of the media for the GAC, two clarifiers, and two filters.

Project Next Step(s) – The Committee recommends utilizing the research on available grants or financing to fund the project. Alternatively, if grants or 3rd party financing are not available, funds must be budgeted for the filter vessel train and tank piping. The filter vessel train may be able to be implemented in phases to spread out the costs.

Financial Impact of Implementation – The filter vessel train improvements have an overall estimated implementation cost of \$187,500. Quotes for the filter vessel train improvement were obtained by the TCCWD Operator. These costs are itemized in Table 3 below.

Table 3: Filter Vessel Train Improvement Costs

Component	Description	Cost
GAC Filter	Install GAC and Internals	\$23,035
	Prep and Coat Internals	\$18,265
Filters	Remove and Install New Filter Media	\$36,430
	Prep and Coat Internals	\$36,530
Clarifiers	Remove and Install New Filter Media	\$36,430
	Prep and Coat Internals	\$36,860
Total		\$187,550

Tank Piping Replacements

Similarly, to the vessel piping, the ductile iron pipe in the three tanks within the system shows signs of tuberculation. This has been observed through videos of divers performing tank maintenance.

The 90° elbows of the pipes prior to the valves are likely eroding due to the entering flow at higher pressures. This can have a scrubbing action on the inside of pipes. The replacement of this pipe will prevent failure of a pipe system without a bypass. While these improvements are being scoped, the Altitude valves at Tank 1 and Tank 2 should be checked for cavitation or wear on parts.

Project Next Step(s) – Firm quotes should be obtained for the tank pipe replacement.

Financial Impact of Implementation – An initial budgetary project estimate is approximately \$50,000 for the tank piping. While this could be included within the Distribution System Evaluation, this is a known issue and our concern is that eventually the pipes will fail. The failure would cause an emergency repair situation at increased cost with a disturbance in water production or water service. These are alleviated by a preventative replacement.

Evaluation of UV System

TCCWD currently uses chlorine to disinfect source water during the treatment process. The use of UV light to disinfect water is of interest to TCCWD due to its ability to inactivate pathogen microorganisms without forming regulated disinfection byproducts, such as TTHMs) that result from chlorine addition, and the effectiveness against some pathogens that are resistant to chlorine². The EPA reported in 2020 that there has been considerable advancement since the UV Disinfection Guide Manual in 2006 that may make the system a more cost effective method to disinfect potable water³.

Cryptosporidium and Giardia Cysts are two pathogens that UV light is more effective treating than chlorine. The cysts lay dormant and can activate later in the distribution system. UV light deactivates those cells which will reduce chlorine use and TTHMs.

Testing will have to be done to determine the effectiveness of UV on the TCCWD system and the amount of chlorine that can be eliminated. There are additional costs that will need to be evaluated including incorporating the UV system into the existing SCADA. These two changes will trigger T3 operator certifications requiring knowledge of UV absorbance.

Project Next Step(s) – A full life cycle analysis should be conducted weighing all the costs as described above. Since this solution has similar benefits as the GAC, this evaluation should be performed after the reinstatement of the GAC.

Financial Impact of Implementation – Evaluating the potential of installing a UV system is done with existing TCCWD labor and does not have a material impact on the budget. The impacts of implementation of the UV system are not known until the evaluation is concluded.

Evaluation and Installation of Weir Improvements

Natural, untreated water is sourced from the creek and channeled through a weir near Hwy 1 to pumps that convey the water up to the reservoir for treatment. Over time, sediment has collected in the weir making the controlled flow and diversion of this water to the pumps less effective. With improvements to the weir and surrounding area, more water could be efficiently channeled to the pumps and the collection season could possibly be extended.

Over the past few years, several improvement options to this system have been discussed. These include dredging the weir, moving the collection upstream, modifying the weir barrier, and drilling a new well in the weir area. Currently, TCCWD operators believe the best option is to dredge the weir. Dredging the weir will remove the existing sediment buildup and allow for a redistribution of the river rock. This will improve control of the flow and clarity of the source water to the pumps, reduce wear and tear on the pumps, and potentially

² UV Disinfection Guidance Manual. EPA. 2006 p. 1-1

³ Innovative Approaches for Validation of Ultraviolet Disinfectant Reactors for Drinking Water Systems. EPA. 2020.

lengthen the amount of time that water can be channeled from the weir area to the pumps. The other options may become desirable in the future.

The climate and recent drought years make this an important project for community water sourcing assurances. In October 2021, TCCWD came close to meeting the criteria for entering Stage 1 of the TCCWD Conservation Plan, which would have prompted the need to ask the community for a 10% voluntary reduction in water consumption.

This project will require a Biological Wildlife Assessment Report submitted to the Department of Fish and Wildlife in order to secure a permit for the work. The action to source the Biological Wildlife Assessment Report from an environmental consultant was approved by the TCCWD Board in the June 18, 2022 meeting.

In the past few years, TCCWD has invested in a number of related activities aimed at augmenting available water resources. Surveys and studies have been conducted to assess the viability of aquifers that could be drilled for additional water. Locations include at the weir and adjacent to the reservoir. Additionally, TCCWD has rights to a well at the Timber Cove Inn. Historically, this well was regarded as one of the best producing wells by Timber Cove Inn. The Committee recognizes the need for additional water sources and recommends continuing to assess and review viable water sources with the TCCWD water capacity needs after the weir improvements have been completed.

Project Next Step(s) – Proceed with the Biological Assessment Report that was approved by the Board. Continue assessment and evaluation of the weir improvements as more information is available.

Financial Impact of Implementation – The Biological Assessment Report cost is \$5,520. The weir modification costs are yet to be determined. Once total project implementation costs are determined, a benefit-cost analysis should be conducted.

[Hire External Consultant to Monitor and recommend Grants and other 3rd Party Funding Opportunities](#)

The proposed projects within this Plan cannot be executed solely using existing TCCWD capital reserves. There are several potential funding opportunities described in the Project Funding Opportunities section. However, these are not exhaustive and new funding sources will become available. The Committee recommends that TCCWD hire an external consultant with targeted experience and expertise in securing grant funds to monitor and identify potential funding opportunities, prepare TCCWD to apply for relevant grants, and potentially assist with preparing applications and grant writing if needed.

Project Next Step(s) – Identify a pool of professionals with targeted experience and expertise in securing grant funding for the water and waste water treatment sector.

Financial Impact of Implementation – The annual cost estimate of \$4,000 for monitoring and advising on funding opportunities is based on an average of four hours/month at a rate of \$80/hour. Any additional grant writing costs would be rolled into each applicable project budget, as needed.

[Projects Considered but Not Recommended within the Next Three Years](#)

The Committee evaluated all projects that were identified in documentation we found. As stated in the challenges section, some projects had more information than others. For those with substantial designs and documentation, Amanita, Pine Cypress Pipe Replacement - DS1, Koftinow Pipe Loop – DS2, and Replacement of the Treatment Plant with Ultrafiltration System - TP1, detailed reports and finding of these projects are provided in the Appendix.

Table 4 below identifies the projects that were evaluated and not recommended in this Plan.

Table 4: Considered and Not Recommended Projects

Project	Source of Project Idea	Rationale for Exclusion
Automated Water lockouts	2016 Capital Plan	Not recommended by Operator.
DS1 - Amanita, Pine Cypress Pipe Replacement	Engineered and Designed Project	Recommended to be assessed as part of the Overall Distribution System Evaluation. See Appendix for more details.
Emergency water supply at far end of the subdivision	2016 Capital Plan	Not enough information. Not recommended by the Operator.
Evaluate potential new water sources such as wells	Previous Operator	Not recommended by Operator. Competing solution recommended but may be evaluated after the weir improvements.
Fire hydrants to NFPA standards	2016 Capital Plan	Not enough information. Not recommended by the Operator.
DS2 – Upper Koftinow Pipe Loop	Engineered and Designed Project	See Appendix. Koftinow Pump Station recommended as an alternative solution.
Looping of all dead end 6" lines	2016 Capital Plan	Not recommended by Operator
Raw water distribution to hydrants	2016 Capital Plan	Not enough information. Not recommended by the Operator.
Relocation of existing TCCWD improvements to legal easements or property owned by TCCWD	2016 Capital Plan	Not enough information. Not recommended by the Operator.
Replace all 1720e turbidity meters with tu5300	Previous Operator	Not recommended by the Operator.
Replace failing pipes - 2,400 linear feet every 3 years	2016 Capital Plan	Recommended to be assessed as part of the Distribution System Evaluation.
Replace pipe with 6" C900 (one street per year)	Previous Operator	Recommended to be assessed as part of the Distribution System Evaluation.
TP1 - Replacement of the Treatment Plant with Ultrafiltration System	Engineered and Designed Project	See Appendix.
Replace decant with larger sediment tank and create a more permanent sludge bed	Previous Operator	Not recommended by the Operator.
Reservoir cover	2016 Capital Plan	Not enough information. Not recommended by the Operator.
Security for water theft	Previous Operator	Not recommended by the Operator.
Stabilizing water pressure throughout the system	2016 Capital Plan	Not enough information. Not recommended by the Operator.
Storage tanks for fire protection.	2016 Capital Plan	Not enough information. Not recommended by the Operator.

2022 TCCWD Infrastructure Committee Phased Strategic Plan

Project	Source of Project Idea	Rationale for Exclusion
Vessel nozzle upgrade to eliminate mudballs after backwashing.	Previous Operator	Not recommended by the Operator.
Website upgrade for online billing and payments and user water usage feedback	2016 Capital Plan	Competing project recommended for water usage feedback.

Appendix

The Appendix includes three project evaluations. These three projects had engineering designs completed around 2014-2015. The inclusion of these evaluation as an Appendix is to inform TCCWD staff, consultants, Directors, or community stakeholders. The evaluations can be used in future TCCWD activities as a summary of information on these projects.

DS1 – Amanita, Pine, and Cypress Pipe Replacement Project Summary

Project Summary

The project involves the replacement of pipe in the Amanita Circle, Pine Court, and Cypress Court areas of the TCCWD distribution system. Table A.1 below identifies the impacted infrastructure.

Table A.1. DS1 Summary of Impacted Infrastructure⁴

Distribution System Area	Construction Date	Pipe Material	Pipe Diameter
Amanita Cir, Cypress Ct	Prior to 1984 [1]	Asbestos-Concrete (transite)	4 inch
Pine Ct	1995	PVC in parallel to abandoned, in place, transite pipe	2 inch

[1] TCCWD inherited a distribution system in 1984 with no plans, specifications, or record drawings on file.

The project proposes to replace 2,070 feet of pipe with 6 inch diameter PVC C900 pipe. All existing water services and fire hydrants within existing public utility easements will be reconnected. Existing infrastructure will be abandoned in place or disposed of in accordance with applicable hazardous materials handling regulations.

Project Objectives

The objective of the project is to

- Reduce potential leaks,
- Improve water pressures to meet the California Waterworks Standards,
- Update infrastructure (>36 years)⁵.

Project Evaluation

Leak Analysis

A large scale leak was discovered at a joint in the piping on Amanita Circle in late 2015. The water loss calculated by Brelje & Race as part of the engineering evaluation for this project is presented below⁶.

⁴ Brelje & Race T1 Engineering Report. A.1 Background and Introduction

⁵ Brelje & Race T1 Engineering Report. B. Problem Description

⁶ Brelje & Race T1 Engineering Report. Attachment 2.

Figure A.1: 2015 and 2016 Unidentified Water Losses

Unidentified Water Uses (Water Losses)
Timber Cove County Water District

Month	Total Water Plant Production (gal.)	Total Billable Water (gal.)	Total Non-Billable Water Usage (gal.)	Filter Backwash Water Usage (gal.)	Plant O&M Water Usage (gal.)	Distribution Flushing Water (gal.)	Fire Fighting Water Usage (gal.)	Total Unidentified Water Usage (gal.)
Jun-2015	425,776	312,814	112,962	55,231	8,000	10,000	0	39,731
Sep-2015	397,838	275,937	121,901	49,490	10,000	10,000	0	52,411
Oct-2015	602,158	405,864	196,294	60,661	10,000	10,000	0	115,633
Nov-2015	587,389	244,745	342,644	48,162	10,000	25,000	25,000	234,482
Dec-2015	357,867	205,326	152,542	31,368	10,000	65,000	0	46,174
Jan-2016	385,296	181,090	204,206	41,686	50,000	69,000	0	43,520
Feb-2016	224,914	140,399	84,515	42,305	17,000	10,000	0	15,210
Mar-2016	241,936	118,259	123,677	29,286	8,000	63,000	0	23,391
Apr-2016	266,615	166,355	100,261	34,480	8,000	48,000	0	9,781
May-2016	275,900	163,075	112,825	40,370	8,000	54,000	0	10,455

Assuming the leak started in June of 2015, increasingly got worse with time and then was fixed in December and January as the Brelje & Race Engineering Report suggests, the average of February 2016 through May 2016 can be used to calculate normal unaccounted for losses in the system. Therefore, the average unaccounted for loss (not attributable to the Amanita leak) is calculated to be 14,709 gallons/month. Any loss above this in the Amanita leak period is considered to be a result of the leak. Therefore, the total loss attributable to the Amanita leak during the period of June 2015 to Jan 2016 is calculated to be 443,776 gallons.

Following the 2015-2016 leak, no further significant leaks have been attributed to Amanita Circle distribution piping. A review of all the meeting minutes available revealed the following incidents related to leaks.

- April 2019 – The Operator’s Report indicated that most of the historic leaks in the system were in PVC pipes.
- January 2020 – Tanner Hiers located and fixed a leak on the ocean side of Amanita Circle. The leak occurred at a meter connection.
- June 2020 – The California Rural Water Association (CRWA) executed a leak detection study and indicated no leaks were detected in the entire system.
- July 2020 – Tanner Hiers attributed unaccounted for usage as being a result of slow meters and the fact that TCCWD doesn’t read the last number on the meter (which accounts for up to 75 gallons/meter per month).
- April 2022 – A leak occurred at a customer service connection while a plumber was working on the customer’s PRV. The cause of the leak is unclear but was exacerbated when the plumber depressurized the system against the recommendation of TCCWD staff.

The conclusion is that systemic and ongoing leaks in the Amanita Circle Distribution piping have not been a problem since the Brelje & Race study of the system was conducted.

System Pressure

The distribution system is a gravity fed system. Thus, system pressure is a function of elevation with the lower the elevation the higher potential pressure. There are pressure relief valves (PRVs) located through the distribution system to control the overall pressure. A PRV is located on the ocean side of the Amanita/Ruoff

intersection. TCCWD staff take periodic pressure readings at the hydrants. For the area of the distribution system involved in DS1, these readings range from 44-91 psig and 22-67 psig in static and residual pressure, respectively. The California Waterworks standard Section 64602 states:

Section 64602. Minimum Pressure. (a) Each distribution system shall be operated in a manner to assure that the minimum operating pressure in the water main at the user service line connection throughout the distribution system is not less than 20 pounds per square inch at all times.⁷

Additionally, the National Fire Protection Association (NFPA) recommends that fire hydrants maintain a residual pressure of at least 20 psig (NFPA 291). The system appears to be meeting both standards in its current configuration.

Infrastructure Age

The exact age of the distribution system piping is unknown, but it has been in operation at least 38 years. The piping was reported to have “multiple failures (stress cracks and service saddle corrosion) resulting in leaks that require expensive repairs”⁸. The source and timing of these issues is not known other than the 2015 Brelje & Race Engineering Report. The 2015 leak was found at a joint connection in the piping and not in the piping infrastructure itself. In 2021, the TCCWD operators utilized a portable leak detection unit throughout the entire TCCWD distribution system. Only one leak was found on Amanita at a service connection and not in the distribution piping. TCCWD engaged American Leak Detection in March 2022 to evaluate a high unaccounted for loss in the system. They tested the entire system including the Amanita Circle distribution system. The leak was found on Ninive Road. Thus, the absence of leaks in recent years within the distribution piping is evidence that the DS1 distribution system is not experiencing systemic failures.

The State Water Resources Control Board Division of Drinking Water conducted inspections of the TCCWD system on July 22, 2019 and December 8, 2020. The Sanitary Survey Report from these inspections indicated that water was sampled for asbestos at 22095 Amanita Court. The result was that asbestos is non-detectable with a recommendation of continued monitoring to take place every 9 years. The next test period is 2028⁹.

To further understand the degradation characteristics of this type of piping, reference was made to a University of Arkansas assessment conducted on an asbestos concrete water distribution piping system with an evaluation of the remaining useful life. The system evaluated was installed in the 1970’s and 1980’s. This is the same type of pipe and a similar installation time of the Amanita Circle and Cypress Court pipe. Based on 23 samples taken, the report concluded that the pipe had degraded between 1-31% with over 60% of the samples with degradation under 10%. The estimated remaining useful life varied between 1 and >100 years with 54% estimated service life greater than 100 years¹⁰. The chart below shows the distribution of the estimated remaining useful life¹¹.

⁷ https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/waterworksstandards/R-14-03-FINALRegTextInternetVersion.pdf

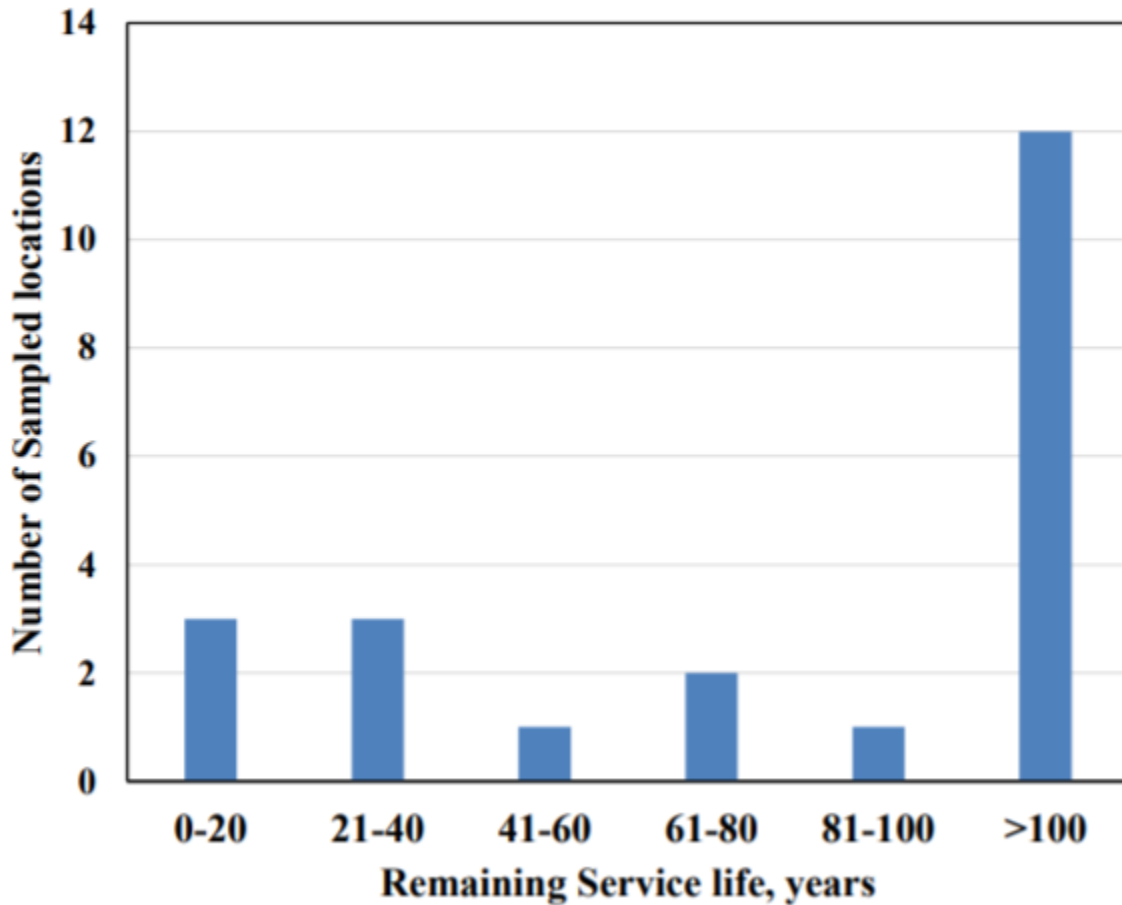
⁸ Brelje & Race T1 Engineering Report. B. Problem Description.

⁹ SWRCB inspection of TCCWD.pdf page 6.

¹⁰ <https://scholarworks.uark.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=3283&context=etd>. Page 3

¹¹ <https://scholarworks.uark.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=3283&context=etd> page 97

Figure A.2: University of Arkansas Concrete Asbestos Pipe Useful Life

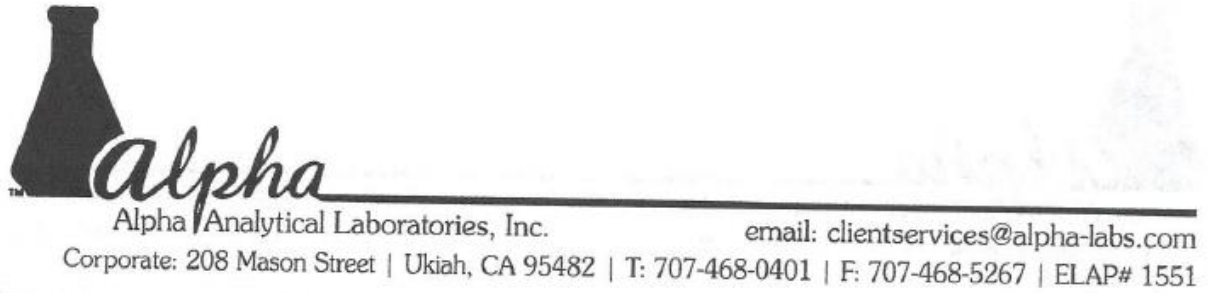


According to the study, low alkalinity water (below 60mg/L as CaCO₃) results in faster degradation of asbestos concrete piping. The aggressiveness of the degradation can be estimated using either the Langalier Index (LI) or AWWA Aggressiveness Index (AI), both of which are based on a measure of the calcium carbonate (CaCO₃) content of water relative to its pH. TCCWD operations staff provided an 8/25/21 test from Alpha labs that reported the Aggressive Index = 11.34. AI < 10.0 is considered highly aggressive, 10.0 < AI < 11.9 is considered moderately aggressive, and AI > 12 is considered non- aggressive.^{12 13}. Thus, the system conditions can be characterized as moderately aggressive.

¹² <https://scholarworks.uark.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=3283&context=etd> page 7

¹³ <https://stpnr.com/wp-content/uploads/2014/08/Langelier-index.pdf>

Figure A.3: TCCWD Lab Results



Timber Cove County Water District 22108 Timber Cove Rd. Jenner, CA 95450	Project Manager: Alfonzo Portugal Project: Water Quality Project Number: -	Reported: 08/25/21 09:06
--------------------------------------------------------------------------------	----------------------------------------------------------------------------------	-----------------------------

Result	Reporting Limit	Dilution	Batch	Prepared	Analyzed	ELAP#	Method	Note
T1 (21H0628-01)								
			Sample Type: Water			Sampled: 08/03/21 12:10		
Metals (Drinking Water) by EPA 200 Series Methods								
Silver	ND ug/L	10	1	AH13765	08/11/21 11:06	08/11/21 14:20	2303 EPA 200.7	
Metals by EPA 200 Series Methods								
Calcium	16 mg/L	0.050	1	AH13765	08/11/21 11:06	08/11/21 14:20	2303 EPA 200.7	
Copper	ND ug/L	50	1	AH13765	08/11/21 11:06	08/11/21 14:20	2303 EPA 200.7	
Iron	ND ug/L	100	1	AH13765	08/11/21 11:06	08/11/21 14:20	2303 EPA 200.7	
Magnesium	9.7 mg/L	0.050	1	AH13765	08/11/21 11:06	08/11/21 14:20	2303 EPA 200.7	
Manganese	ND ug/L	20	1	AH13765	08/11/21 11:06	08/11/21 14:20	2303 EPA 200.7	
Potassium	1200 ug/L	200	1	AH13765	08/11/21 11:06	08/11/21 14:20	2303 EPA 200.7	
Sodium	22 mg/L	0.050	1	AH13765	08/11/21 11:06	08/11/21 14:20	2303 EPA 200.7	
Zinc	ND ug/L	50	1	AH13765	08/11/21 11:06	08/11/21 14:20	2303 EPA 200.7	
Conventional Chemistry Parameters by APHA/EPA Methods								
Aggressive Index	11.34 NU	2.00	1	AH13765	08/11/21 11:06	08/11/21 14:20	2303 AWWA	
Color	ND CU	5.0	1	AH13204	08/04/21 16:00	08/04/21 16:20	2303 SM2120B	
Odor	1.0 T.O.N.	1.0	1	AH13204	08/04/21 16:00	08/04/21 16:20	2303 SM2120B	OD-1
pH	7.69 pH Units	1.00	1	AG14717	08/05/21 09:30	08/05/21 11:00	2303 SM4500-H+ B	T-14
Specific Conductance (EC)	300 umhos/cm	10	1	AG14717	08/05/21 09:30	08/05/21 11:00	2303 SM2510B	
Total Alkalinity as CaCO3	56 mg/L	5.0	1	AH13906	08/13/21 08:00	08/13/21 12:41	2303 SM2320B	
Turbidity	ND NTU	1.0	1	AH13204	08/04/21 16:00	08/04/21 16:20	2303 SM2130B	
Bicarbonate Alkalinity as CaCO3	55 mg/L	5.0	1	AH13906	08/13/21 08:00	08/13/21 12:41	2303 SM2320B	
Carbonate Alkalinity as CaCO3	ND mg/L	5.0	1	AH13906	08/13/21 08:00	08/13/21 12:41	2303 SM2320B	
Hydroxide Alkalinity as CaCO3	ND mg/L	5.0	1	AH13906	08/13/21 08:00	08/13/21 12:41	2303 SM2320B	
Hardness, Total	80 mg/L	1	1	AH13765	08/11/21 11:06	08/11/21 14:20	2303 SM2340B	

Finally, internet research indicates that the useful service life range of asbestos concrete piping ranges from 50-70 years but is dependent on the actual conditions. Therefore, this piping is well within its useful life but should be monitored due to the moderately aggressive degradation rating of the water flowing through it.

Operator’s Assessment

The Infrastructure Committee provide an opportunity for the TCCWD Operator to weigh in on the prioritization of proposed projects. Ryan Gomez indicated that this pipe replacement project was not a priority for implementation at this time, but that an overall distribution system evaluation was a good idea..

Project Risks and Opportunity Costs

The following represent the risks for delaying the project.

- An actual survey of the DS1 pipe to determine the state of degradation has not been performed.
- Many types of pipe start with smaller leaks prior to complete failure. Asbestos concrete pipe tends to fail catastrophically with no prior warnings¹⁴.

Project Status

The project documents include a full bid package developed in August 2015 by Brelje & Race. Complete engineering design documents were developed as part of that package. For implementation, the design and implementation cost would need to be re-evaluated as to feasibility under today's conditions.

Committee Implementation Recommendations

Based on the findings mentioned above, this project does not appear to meet the criteria for immediate implementation, but merits regular monitoring. However, the age of the asbestos concrete pipe is not known and may be at an age where failure could appear. Whenever authorized per the recommended prioritization of the distribution system, the committee suggests implementing this project using an abandon-in-place of the existing pipe.

Recommended Project Funding Alternatives

The 2015 costs for this project were estimated to be \$335,000 for construction alone. With project management and contingencies, the total project cost was estimated to be \$405,000. This cost was based on open trenched construction. Directional drilling may lower the cost.

Grants should be evaluated to fund this project including the Federal Infrastructure Bill passed in November 2021 which allocated \$55B to drinking water, wastewater, and storm water infrastructure. An evaluation of the Infrastructure Bill funding availability and schedules may alter the recommendation of the implementation schedule.

Assessed Documentation

The following represent the assessed TCCWD documentation for the project.

- Brelje & Race T1 Engineering Report – August 2015
- Brelje & Race T9 Engineering Design Drawings – August 2015
- Brelje & Race DS1 Bid Package – August 2015
- Kilgore DS1 Transmittal to TCCWD – November 2020
 - Attachment 2 – System specifications
 - Attachment 3 – Cost Breakdown

¹⁴ <https://www.waterworld.com/technologies/pipes/article/16190948/the-asbestos-beneath-our-streets>

- TCCWD Operator system pressure logs
- State Water Resources Control Board Inspection Report – July 2021

DS2 – Upper Koftinow Pipeline Loop Project Summary

Project Summary

The project involves modifications of the distribution infrastructure to correct a low distribution system pressure issue on upper Koftinow Drive. A system evaluation was conducted in November 2011 which identified five low pressure areas resulting from high flow events. High flow events generally are a result from opening one or more fire hydrants for firefighting or maintenance purposes. The areas include:

- Upper Koftinow Drive
- Davis Way
- Lee Drive (Western end)
- Buffano Court, and
- Signaigo Way.¹⁵

The Distribution System Evaluation identified five possible solutions to rectify the low pressure on Upper Koftinow.

Table A.2- Brelje & Race Options for Upper Koftinow¹⁶

Option	Summary	Description	Cost (2011 \$)
1	New Tank at Higher Elevation along Timber Cove Road	Installation of a 100,000 gallon tank along Timber Cove Road on a lot not currently owned by TCCWD. Installation of three (3) pressure reducing valves (PRV). Connect the new tank to the existing distribution system with ~1,200 feet of 8” pipe parallel to the existing pipe along Timber Cove Road with a connection to the existing 6” main below Ruoff Drive.	\$574,000
2	New Tank Above Koftinow	Installation of a 100,000 gallon tank north of and above Koftinow Drive at the same elevation as Tank 3 and on a non-TCCWD owned lot. Install ~1,000 feet of 8” pipe connecting the new tank to the distribution system in Koftinow Drive. Installation of a control valve station to control the flow.	\$441,000
3	Pipe Loop from Tank 3 to Koftinow Drive near Hydrant 3-20	Installation of ~2,250 feet of 8” pipe along the northern boundary of the subdivision to create a loop from the existing tank to the end of the 6” pipe in Koftinow Drive. Pipe may run through non-TCCWD owned property.	\$336,000
4	Expand Zone 3P to Include the End of Koftinow Drive	Install ~1,500 feet of 4” pipe from the existing booster pump station to the eastern end of the existing 2” pipe in Koftinow to bring the low flow areas (Zone 3) into Zone 3P [1]. This pipe would run through non-TCCWD owned land. Extend the current 2” main ~250 feet to the west.	\$238,000

¹⁵ Brelje & Race. Distribution System Evaluation. Low Pressure Areas. Page 2

¹⁶ Brelje & Race. Distribution System Evaluation. Upper Koftinow Drive. Page 3

Option	Summary	Description	Cost (2011 \$)
5	Booster Pump Station on Koftinow Drive	Add a booster pump station on Koftinow Drive to create a new pressure zone. Add ~250 feet of 4" pipe to create a new pressure zone for the system.	\$131,200

[1] The system is divided into 5 pressure zones (1, 2, 3, 3P, 4). See Additional Documentation.

TCCWD began designing the low cost Option 5. According to Brelje and Race, the design is pretty far along. In 2015, TCCWD switched to Option 3 due to objections by a local resident to the proximity of the pump station to their property and created an engineering contract for Brelje & Race to further design and evaluate alternatives to this option.

Project Objectives

The objective of the project is to

- Correct the low pressure problems on Upper Koftinow Drive and
- Provide flow rates and minimum service pressures to all service connections and fire hydrants in compliance with California Water Works Standards and local fire department requirements¹⁷.

Project Evaluation

A complete review of the five individual options could not be performed with the information available.

Options 1-4 all included potential for TCCWD tanks and/or pipe to be on non-TCCWD right of way or owned property. Thus, a purchase of property or an easement acquisition would need to be executed for each of these Options.

While the TCCWD board ultimately selected Option 3 to design, the documentation provided does not justify how this occurred. Details on the low cost option (Option 5) were not included in the documents that have been provided for evaluation.

TCCWD Operator, Ryan Gomez, indicated this is a project that should be further evaluated and executed if possible.

Project Risks and Opportunity Costs

The following represent the risks for delaying the project.

- Low pressure areas can cause customer satisfaction issues and safety concerns if multiple hydrants are needed for fire safety.

Project Status

The project documents include an unexecuted contract for Brelje & Race to provide a full bid package in September 2015. Complete engineering design documents for Option 3 were developed as part of that package. For implementation, the design would need to be evaluated as to feasibility under today’s conditions.

Partial engineering design documents exist for Option 5. These would need to be evaluated under today’s conditions and completed.

¹⁷ DS2 Upper Koftinow Contract. Project Understanding

Committee Implementation Recommendations

Based on the findings mentioned above, this low cost option should be reevaluated as outlined in the Committee’s Findings and Recommendations. While project costs are certain to be higher than the 2011 cost estimates, Brelje & Race has advised that Option 5 will likely still be the low cost option and the cost ranking between the different options should be the same. Thus, preliminary cost estimates from 2011 do not need to be reevaluated to determine the preferred option to implement from a cost standpoint.

As the low cost option, Option 5 should be evaluated under today’s conditions. The following provide a high level summary of the activities that could be performed simultaneously:

- Review and evaluate the status of the current design to determine the level of effort and cost required to have a bid ready design package
- Update the project implementation cost estimates and research available funding sources
- Work collaboratively with the community to ensure awareness and necessity of the project

Recommended Project Funding Alternatives

The 2011 project costs are estimated to be in the range of \$131,200 to \$574,000 depending on the option. These costs are over a decade out of date. An itemized engineering cost estimate should be developed for the option selected.

Grants should be evaluated to fund this project including the Federal Infrastructure Bill passed in November 2021 which allocated \$55B to drinking water, wastewater, and storm water infrastructure.

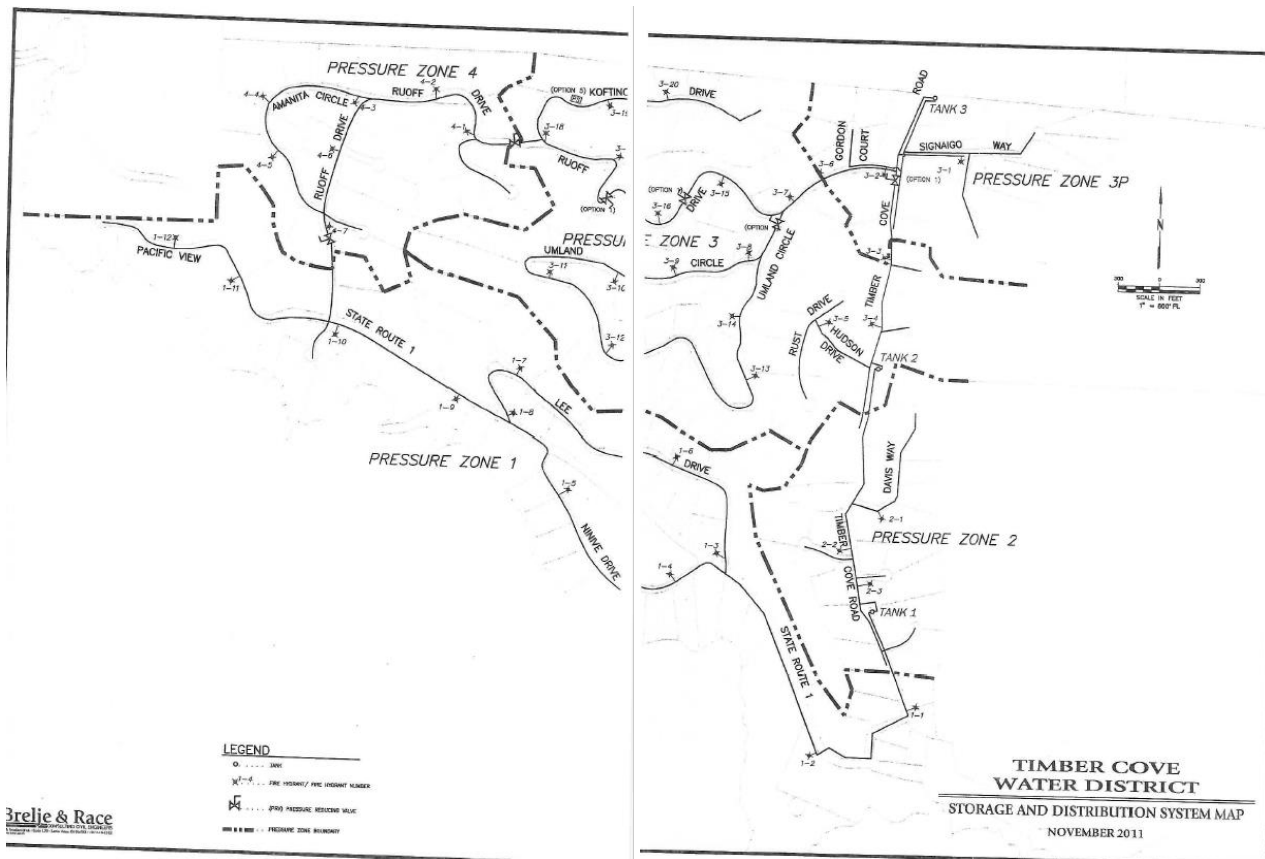
Assessed Documentation

The following represents the assessed TCCWD documentation for this project.

- Brelje & Race Distribution System Evaluation – November 2011
- DS2 Upper Koftinow Pipeline Loop Contract (unexecuted) – September 2015
- DS2 Upper Koftinow Pipeline Loop State of CA Water Resources Board funding application (not signed) – Unknown Date
- 2016 Concept Master Plan – June 2016

Additional Information

Figure A.5 Pressure Zone Map¹⁸



TP1 – Replacement of the Treatment Plant with an Ultrafiltration System

Project Summary

The project involves the proposed replacement of the current treatment plant with an ultrafiltration system. In the engineering reports for the project, the current system built in 1994 was deemed to be at the end of its useful life due to deterioration of the interior coating of the pressure vessels and the need to replace the granular media several times from a period of 2010 to 2015. Additionally, water chemistry was reported to be a challenge for the past plant operators since prior to 2015¹⁹. The current plant operators have additional tools to assess real time water chemistry and report that this is not an issue with the current operation.

Project Objectives

The objective of the project is to

- Improve the degree of automation of the operation of the treatment plant,
- Increase the plant’s reliability, and

¹⁸ Brelje & Race. Distribution System Evaluation. Figure 1.

¹⁹ Brelje & Race TP1 T1 Engineering Report. B. Problem Description

- Increase the plant’s production efficiency²⁰ through
 - Decrease in water losses in the backwashing process with more efficient filtration media and an automation in the cleaning and backwashing process,
 - Decrease in water losses with distribution system flushes by reducing the opportunity for disinfection by products to be formed due to the reduction of total organic carbon in the finished water²¹.

Project Evaluation

Existing System Description

The following provides a summary of the system as described in the State Water Resources Control Board July 23, 2021 inspection report. The treatment process consists of aluminum sulfate injection, static mixing, clarification, filtration, disinfection, tank mixing, and ventilation. There are two trains of Culligan inline static mixer and clarifier/filter. Only one train is operated at a time. Train #2 provides the highest capacity at 37.5 gpm. Raw water is pumped from the reservoir to the treatment plant. The water is mixed with General Chemical alum in the in-line static mixer before entering the clarifier and filter vessels. A 30 minute manual backwash cycle is triggered based on 3-5 psi differential pressure across the filter, an increased/spiked turbidity, or every 30,000-40,000 gallons of water produced. Note that TCCWD Operator Ryan Gomez reported in the March 2022 Board meeting that the ability to test water essentially instantaneously has allowed the Operators to increase the water produced to 50,000-60,000 gallons in between backwashes and has reduced the water used in the backwash process to from 4,800 gallons to 2,200 gallons per backwash. Backwash is discharged to the decant tanks where it settles and then reintroduced into the reservoir. After the filter vessels, in process water is disinfected by HASA multichlor 12.5% NaOCl before filling the 101,000 gallon Tank #3. Tank #3 includes a PAX tank mixer and PowerVent system²². The PAX tank mixer intends to eliminate thermal stratification, reduce residual loss, and lower disinfection byproducts²³. Tank #3 is the onset of the distribution system. Figure A.1.3 below provides a schematic of this process.

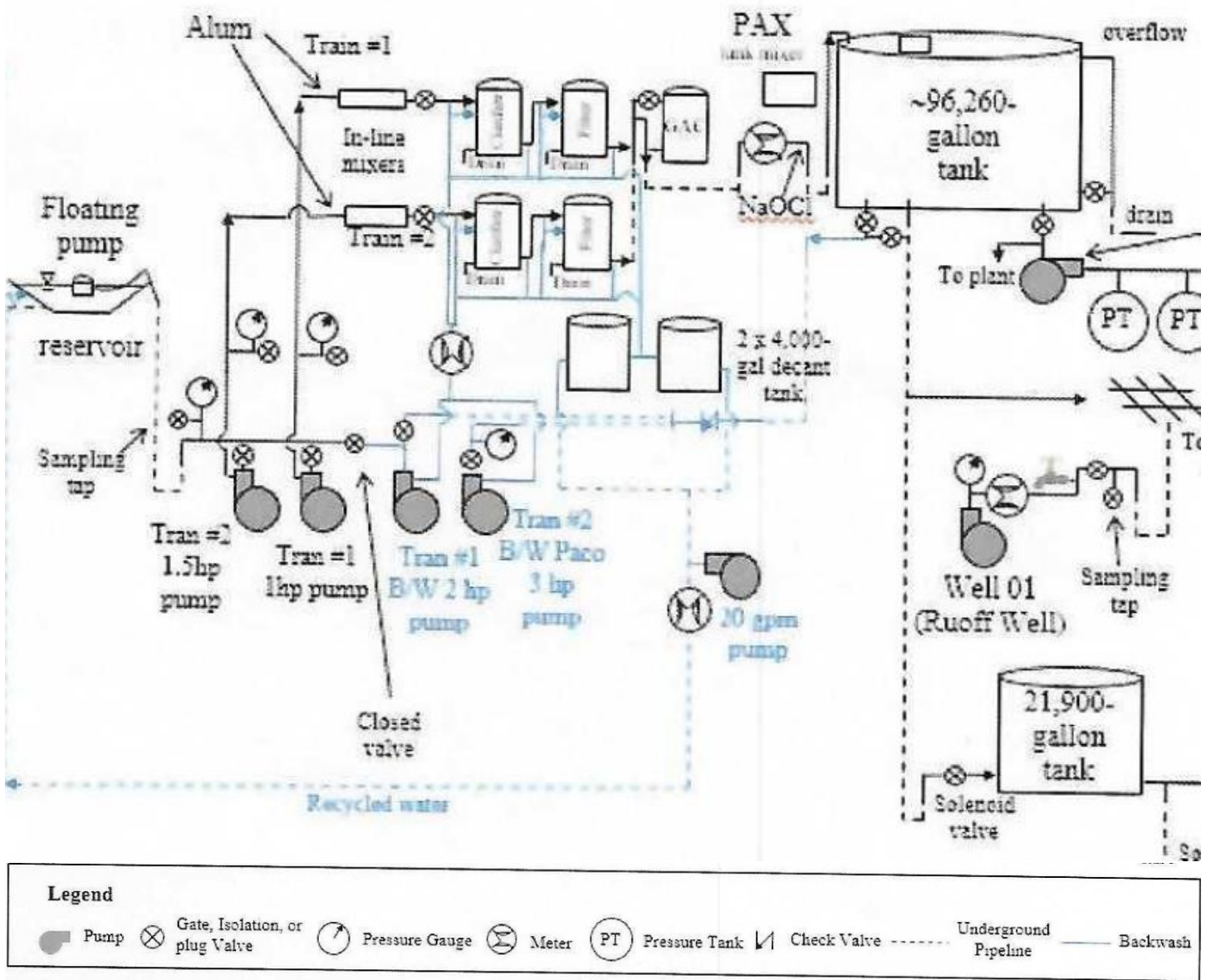
²⁰ Brelje & Race TP1 T1 Engineering Report. A.2 Project Objective

²¹ Brelje & Race TP1 T1 Engineering Report. D. Selected Construction Project

²² State Water Resources Control Board. Treatment. July 23, 2021

²³ <https://www.paxwater.com/news-events/bid/92845/pax-water-technologies-launches-pax-water-mixer-pwm100-for-small-storage-tanks>

Figure A.6 : Existing Treatment Plant Schematic²⁴



Proposed Solutions

The following table presents the solutions that have been considered by Brelje & Race. Note that these are not the Committee’s conclusions after researching all available information.

²⁴ State Water Resources Control Board. Water System Schematic. July 23, 2021

Table A.3: Plant Upgrade Solutions Considered by Brelje & Race in 2015 and their Conclusions²⁵

Solution Considered	Conclusion
Consolidation with a neighboring water system	Deemed not viable due to the remoteness of TCCWD
Rehabilitating the current plant	Deemed as not cost effective
Installation of a new ultrafiltration plant [1]	System originally selected for design.
Installation of new ultrafiltration and nanofiltration plant [2]	Deemed as a higher first and maintenance cost.
Installation of a microfiltration system	Higher cost than ultrafiltration

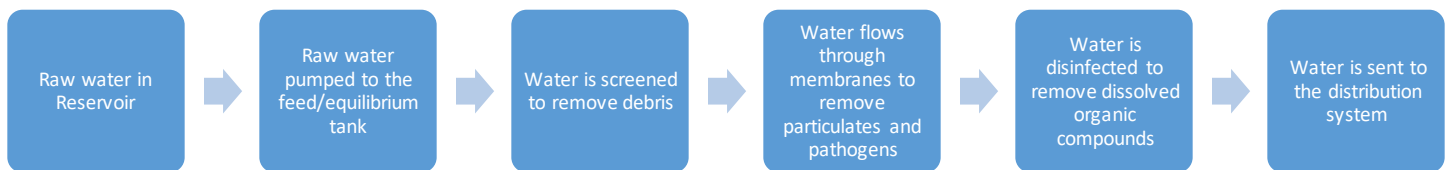
[1] Ultrafiltration pore size removes all water contaminants except dissolved organic compounds. The use of a membrane compatible coagulant is used in conjunction with the ultrafiltration for complete removal of water contaminants.

[2] Ultrafiltration pore size removes all water contaminants except dissolved organic compounds. Nanofiltration is a secondary filtration step to remove the dissolved organic compounds.

Overview of the proposed new Ultrafiltration Plant

The project would replace the existing water treatment plant with a packaged ultrafiltration system. The existing treatment pump and control building would be expanded to house the new system. The process is illustrated in Figure A.7.

Figure A.7: General Ultrafiltration Process

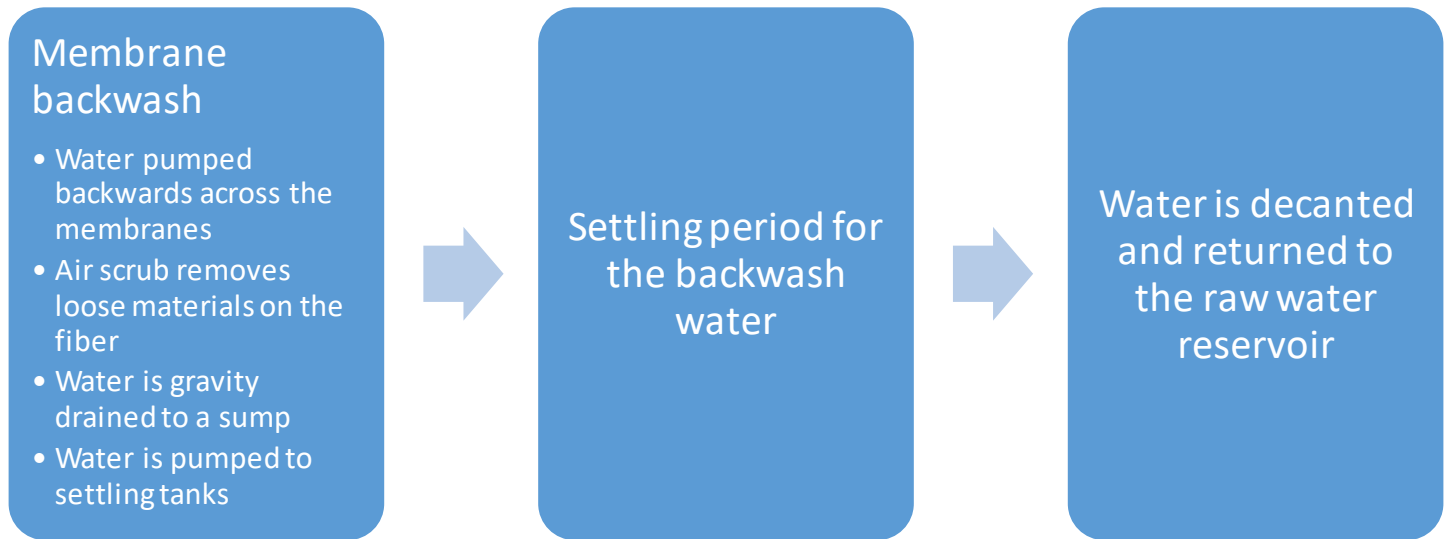


Monitoring of the system operations is crucial to ensure the system remains meeting the service needs. Fluid turbidity must be continuously monitored to ensure the membranes are properly operating. Additionally, a pressure decay test using compressed air should be performed every 24 hours. The pressure decay test will indicate if the membranes have experienced any broken fibers.

The membranes need to be periodically cleaned to maintain optimum transmembrane pressure and throughput capability due to the buildup on the membrane surface caused by rejected particles and pathogens. The process shown in Figure 3 is estimated to be performed hourly with automation included in the Ultrafiltration system.

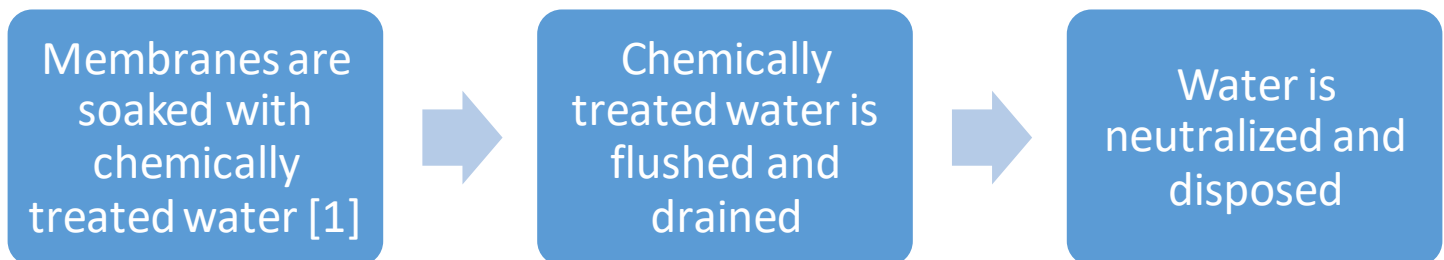
²⁵ Brelje & Race TP1 T1 Engineering Report. C. Alternative Solutions

Figure A.8: General Ultrafiltration Membrane Backwash Process



A maintenance clean uses chemicals to dissolve the particle layer that accumulates on the membrane surface. The frequency of maintenance cleans will vary from once daily to once weekly depending on the accumulation rate.

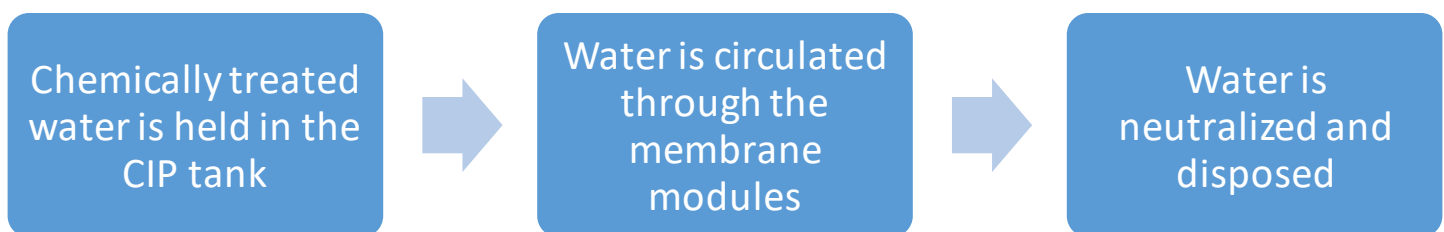
Figure A.9: General Membrane Maintenance Cleaning Process



[1] Multiple soakings with different chemicals may be required.

A once a month clean in place (CIP) process uses a small quantity of chemically treated water that is circulated through the membrane modules to removed fouling constituents.

Figure A.10: General Membrane Clean in Place Process



Project Risks and Opportunity Costs

The following represent the risks for implementation and delaying the project.

- Although the TP1 above provides a qualitative description of an evaluation of the options, there is no evidence of a life cycle cost analysis was performed ranking the feasible alternatives. A life cycle cost analysis would include the operating costs including, but not limited to,
 - Feasible alternatives implementation costs
 - Chemical costs
 - Cleaning water disposal costs
 - Utility costs
 - Typical equipment maintenance costs, and
 - Labor costs.
- Recent maintenance activities at the current plant have forced manual testing during operation of the plant.

Project Status

The project documents include a full bid package from Brelje & Race with system design drawings dated October 2016. Complete engineering design documents were developed as part of that package. For implementation, the design would need to be evaluated to determine appropriateness under today's conditions.

The Infrastructure Committee provided an opportunity for the TCCWD Operator to weigh in on the prioritization of projects. Ryan Gomez indicated that this project was not a priority for implementation at this time.

Committee Implementation Recommendations

Based on the assessment of the project objectives compared to today's operating characteristics of the plant, this project does not appear to meet the criteria for immediate implementation. Incremental improvements to the existing plant since Brelje and Race's previous evaluation have automated much of the operation and improved the water efficiency of the plant. If this project is considered in the future, an evaluation of each option should be performed which includes a life cycle cost analysis to identify the most advantageous option for implementation.

Recommended Project Funding Alternatives

Since the Infrastructure Committee is not recommending this project for implementation and a complete reevaluation should be performed on alternatives if major plant upgrades are considered in the future, no funding alternatives have been recommended. However, for completeness of this evaluation, the 2016 project costs are estimated to be \$1.3M as shown in Figure 6²⁶.

²⁶ Brelje & Race TP1 T1 Engineering Report. Attachment 5

Figure 6: Ultrafiltration System Estimated Implementation Cost

Total Project Cost Estimate

Cost Classification	Total Project Costs	Other Funding	Requested Financing
Facilities Planning			
Environmental Planning/Funding Package	\$25,000		\$25,000
Cultural Resources Study	\$2,000		\$2,000
Biological Resources	\$1,000		\$1,000
Nesting Bird Survey	\$5,000		\$5,000
Technical Funding Package	\$10,000		\$10,000
Facilities Design			
Engineering	\$160,000		\$160,000
Architecture	\$25,000		\$25,000
Construction Management (incl. Inspection)	\$80,000		\$80,000
Administration	\$5,000		\$5,000
Facilities Construction (detailed estimate below)	\$843,200		\$843,200
Contingency	\$168,640		\$168,640
Pre-Purchased Materials/Equipment	\$0		\$0
Land and Right-of-Way	\$0		\$0
Other Costs			
County Permit Fees (Coastal & Use Permit)	\$6,232		\$6,232
TOTAL			\$1,331,072

20%

Detailed Construction Cost Estimate

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization	1	LS	\$20,000.00	\$20,000.00
2	Temporary Facilities	1	LS	\$35,000.00	\$35,000.00
3	General Site Preparation & Building Demolition	1	LS	\$32,000.00	\$32,000.00
4	Treatment Building	1	LS	\$115,000.00	\$115,000.00
5	Site (Exterior) Piping & Underground Cistern	1	LS	\$40,000.00	\$40,000.00
6	Interior Piping1	1	LS	\$60,000.00	\$60,000.00
7	Microfiltration System2	1	LS	\$353,000.00	\$353,000.00
8	Electrical & Instrumentation3	1	LS	\$130,000.00	\$130,000.00
9	Sheeting & Shoring	1	LS	\$1,000.00	\$1,000.00
10	Pressure Filter Demolition	1	LS	\$15,000.00	\$15,000.00
11	Earthwork (Excavation, subex. & fill)	1	LS	\$10,000.00	\$10,000.00
12	Fence	117	LF	\$100.00	\$11,700.00
13	Overexcavation	10	CY	\$50.00	\$500.00
14	Commissioning (Testing, Start-up & Training)	1	LS	\$15,000.00	\$15,000.00
15	Demobilization	1	LS	\$5,000.00	\$5,000.00
	TOTAL				\$843,200.00

Assessed Documentation

The following represent the assessed TCCWD documentation for the project.

2022 TCCWD Infrastructure Committee Phased Strategic Plan

- Brelje & Race T1 Engineering Report. TP1 Water Treatment Plant Upgrade Project – Unknown date
- Brelje & Race Treatment Plant Upgrade Project Memorandum – December 21, 2015
- TP1 Water Treatment Plant Upgrade Project Bid Package
- TP1 Water Treatment Plant Upgrade Project Design Drawings – October 2016
- TP1 Ultrafiltration System Survey by Kris Kilgore of Existing Plants
- State Resources Control Board July 22, 2019 and December 8, 2020 Inspection Report

Public Comments and Committee Response

The Timber Cove County Water District Phased Strategic Plan was distributed to the Board on 7/16/2022, one week before the 7/23/2022 TCCWD Board meeting, to allow Directors to review the Plan and accept its completion status. The Board deferred the decision to accept completion of the Plan until the 8/29/2022 Board meeting to give the public an opportunity to review the Plan and submit comments by 8/6/2022, allowing time for the Infrastructure Committee to review comments and provide responses. The Plan was posted to the TCCWD website on 7/26/2022 and notifications were sent to the public advising of the posting with a reminder of the 8/6/2022 deadline to submit comments. TCCWD received comments from three members of the public within the posted timeframe, one of whom is a member of the Board. Two members submitted written comments and the other submitted verbal comments. Four more members of the public submitted written comments after the deadline.

After reviewing the comments received, the Committee would like to clarify or highlight a few points. First, the Committee was tasked to review and recommend, not to make any commitments or spending decisions. That is solely within the Board's discretion and authority. In accepting the Plan, the Board is making no project commitments, nor is it approving, or rejecting, any expenditures. Rather, voting on acceptance of the Plan concludes the task assigned to this Committee. How the Board uses these recommendations will be determined in the future and subject to Board votes in a public meeting. For that reason, unlike a proposed rate increase, District legal counsel has confirmed that no special public hearing or forum is required for the Board to accept the Plan.

Second, a major challenge the Committee confronted from the onset of this endeavor was that District records of prior proposals and engineering designs were neither complete nor coordinated and in many cases were years out of date. For example:

- The "Capital Improvement Plan" of 2016 was not a detailed, fully supported report, but rather an Excel Workbook with constituent data and premises missing. It was also six years out of date.
- The three Brelje & Race project designs from the 2014-2016 period showed no indication of how they related to each other in relative urgency, sequencing, cost effectiveness, or available funding sources. Additionally, it is not clear as to why none of those projects were ever carried forward.

These designs are now six to eight years out of date. Since then, TCCWD staff have implemented many projects and procedures to address concerns related to these projects including, but not limited to, the significant improvements in recent years made to plant equipment, data monitoring, instrumentation and operating methods which have had major impacts on water efficiency and recovery, addressed systematic water losses, and improved automation and labor efficiency.

The aged and incomplete nature of previously proposed projects does not necessarily invalidate them, but it does mean that important features or need determinations may have been importantly impacted by changes in equipment, operations, or available technology. The Committee also believes that an updated and holistic review of the system allows projects to be identified and prioritized in relation to current operating conditions with current available solutions, benefits and implementation costs in mind.

The following table summarizes the comments received by the public with responses by the Committee.

Comment Number	Comment	Committee Response
1	Consider adding drilling wells to the recommended projects. TCCWD has spent money over the past few years to determine potential feasibility of drilling wells or utilizing existing wells (i.e. well owned by TCCWD at Timber Cove Inn)	The weir improvements discussed in the “Evaluation and Installation of Weir Improvements” recommendation are intended to address any immediate supply concerns. However, the Committee acknowledges that geological studies supporting the possible need for additional wells have been performed and we have added continuing investigation of viable alternate sources of water to the weir improvements discussion.
2	Brelje & Race were not asked to comment on the plan; their observations might assist recommendations.	Page 4 of this Plan states that the Committee consulted with Brelje & Race during the process of reviewing and assessing the information available. The Committee submitted a set of questions to Brelje & Race on the three projects they designed as well as general system and procedural questions. Brelje & Race requested \$13,200 to research and respond to those questions. As the Committee was not authorized to incur costs for developing this Plan, they instead initiated a conference call with Brelje & Race to discuss the most pertinent questions. As part of the submission, the Committee requested that Brelje & Race provide electronic copies of all files they had previously been paid to develop for the District. This request was initially met with a request for \$1,700 from Brelje & Race to compile the files. Brelje & Race recently agreed to provide them at no additional cost. The Committee has not yet received those files.
3	Our water mains are undersized to the point that our Fire Hydrant spacing does Not meet the Code, and many property owners will not be able to obtain building final inspection as a result.	The 2016 Capital Plan included a potential project to bring the existing fire hydrants up to NFPA standards. However, the documentation available in the 2016 Capital Plan was limited and provided neither explanatory details nor cost estimates for the Committee to review. The Committee believes that fire hydrant spacing and evaluation of the ability to respond to fires in the community should be led by TC Fire Department, with cooperation by TCCWD as required. Thus, this is outside of the Committee’s purview.

2022 TCCWD Infrastructure Committee Phased Strategic Plan

4	The Committee emphasizes addressing water pressure problems on Upper Koftinow, when in reality, increasing the pressure will not solve the problem without increasing the Pipe Size, and tying it via an easement directly to our Tank 3, as former TCCWD Boards were advised to do.	The Brelje & Race Distribution System Evaluation indicates an increase in the delivery pressure and/or reducing friction losses would improve the pressure and lists five options. The Committee conferred with Brelje & Race and they confirmed that the low cost option of adding of a pump station would alleviate the pressure issue.
5	Concern raised that the Plan would not be revised for at least five years.	This statement is inaccurate. Page 1 of this Plan states that formal updates to the Plan “should be released every three (3) years”. Page 5 also refers to the next scheduled update to the plan “in three (3) years” and states that “Progress should be monitored by the Board annually”. There are no references to a five (5) year revision schedule.
6	Any work TCCWD proceeded with in this time period (3-5 years) would only be directed by the Plan.	This is a misunderstanding or inaccurate statement. The Plan does not restrict or preclude any not-recommended projects from being implemented. That is a matter for analysis and decision by the Board. The Plan also does not specifically "direct" any work to be done. Page 1 of the Plan explicitly states that "The Plan does not authorize approval or funding for any of the projects recommended. All funding approvals need to follow the established authorization process that requires a TCCWD Board vote in a public meeting."

2022 TCCWD Infrastructure Committee Phased Strategic Plan

<p>7</p>	<p>Note that no discussion of any of the projects or potential recommendations of the Infrastructure Committee took place at any Board Directors' meeting from the time the committee was formed in August 2021 as promised.</p>	<p>The August 2021 Board action tasked the Committee with developing the Plan. The instructions did not require the Committee to bring projects or potential recommendations to TCCWD Board meetings for discussions until the Plan was complete.</p> <p>Analysis and recommendations were changing throughout the process as evaluations were conducted and information became available. Thus, until a final determination of the Committee's recommendations was made, any discussions in public Board meetings would have been premature.</p> <p>Jesse Barton, TCCWD's legal counsel, has confirmed that no public hearing is required to merely adopt a strategic plan. A strategic plan is only a planning document and does not commit the District to any particular course of action in the future. It is merely a planning tool intended to identify actions that can help the District achieve its operational goals. If the District decides to pursue any of the actions identified in the Plan, the public will be informed of opportunities for discussion/comments through the typical noticed agenda that the District provides before every meeting.</p>
<p>8</p>	<p>The Plan does not recommend actions to resolve the three issues listed below. In fact, this plan recommends against and or recommends a significant deferring for many years.</p> <ol style="list-style-type: none"> 1. Pacific View Drive, Amanita Circle, and Cypress Court need new pipes. 2. Koftinow Dr. has approximately 1,000 feet with no fire hydrants and the main is 2" which would not provide adequate flow to the hydrants in case of a fire. Flushing the dead end water mains needs to be studied. 3. Several dead-end streets have 2" mains serving a wharf hydrant. 	<p>The Plan does not recommend against or dismiss any idea. Rather, the Plan recommends that the entire distribution system be evaluated to identify and prioritize all system modifications that are most prudent to the District based on to today's operating conditions. To the extent that these three issues still exist, the recommended system evaluation would develop an overall strategy to assess and prioritize mitigation actions. The "Recommended Projects and Activities" and "Projects Considered But Not Recommended" tables have been updated to better reflect the projects that would be part of the distribution system evaluation.</p>

2022 TCCWD Infrastructure Committee Phased Strategic Plan

<p>9</p>	<p>Comment stating that a public forum is required before the Board can accept this Plan based on a memo from 2014 TCCWD President Brian Todd explaining the use of public hearings to discuss the District’s need to raise the base rate and projects being funded at that time.</p>	<p>The 2014 public hearing was required because a rate increase was being proposed by the Board. That is not the case here.</p> <p>Jesse Barton, TCCWD’s legal counsel, has confirmed that no public hearing is required to adopt a strategic plan since a strategic plan is only a planning document and does not commit the District to any particular course of action in the future. It is merely a planning tool intended to identify actions that can help the District achieve its operational goals. If the District decides to pursue any of the actions identified in the Plan, the public will be informed of opportunities for discussion/comments through the typical noticed agenda that the District provides before every meeting.</p>
<p>10</p>	<p>Construction of the office building that has been part of many recent Board meetings is not addressed.</p>	<p>The Committee was tasked with addressing the water treatment and distribution infrastructure of the water system. The office building is not part of our scope.</p>
<p>11</p>	<p>It was a mistake to not pay the mere \$1,700 for Brelje & Race to search for and supply missing technical documents.</p>	<p>The \$1,700 cost was for Brelje & Race to provide final documents from the three projects that were designed. TCCWD had already paid Brelje & Race for this work and decided that it was not a prudent use of TCCWD funds to pay again to simply obtain a digital copy of these files. With the help of our legal counsel, however, it should be noted that Brelje & Race has since agreed to provide the electronic files free of charge to TCCWD.</p>
<p>12</p>	<p>Discussion of missing records unfairly implies that past Board members and the community were holding back information.</p>	<p>The Plan states the need for further evaluation of some projects due to a lack of or incomplete information. There is no reference or implication of records being withheld by past board members or members of the community.</p>

<p>14</p>	<p>There is a frequent short statement, “Not recommended by the Operator.” Never is this lack of recommendation explained against the technical details provided in favor of work being rejected (sometimes temporarily) by the operators. Never is this lack of recommendation supported by operational history regarding the TCCWD system work under consideration. Because Operator input is required to implement projects that truly address TCCWD water system problems, a full discussion of all issues is necessary.</p>	<p>The Committee conferred with the system operators multiple times throughout this process via email, phone conversations and in person meetings. The operators’ input was considered essential to determining projects that should be recommended for implementation in the near term as they are the ones most familiar with the system and its current operating needs. It was not practical to provide a detailed log of these discussions in this report. Ultimately, the Plan does not recommend against or dismiss any idea. Rather, the Plan recommends that the entire distribution system be evaluated to identify and prioritize actions that are most prudent to the District based on to today’s operating conditions.</p>
<p>15</p>	<p>The Plan states, “Developing 5 and 10 year action plans at this point for longer term projects presented in the Plan was not viewed by the Committee as being in the best interest of TCCWD and the Timber Cove Community as operating conditions, available technologies, and cost information will change over time.” This sentence underestimates the vital need public utilities have to understand the whole picture of the needs and potential failures of TCCWD. A 10 or 20 year plan is always necessary.</p>	<p>The quote from the comment is taken out of context. Page 1 of this report states “The Committee viewed the near term activities presented in this Plan as the most important to execute within the next three years. Developing 5 and 10 year action plans at this point for longer term projects presented in the Plan was not viewed by the Committee as being in the best interest of TCCWD and the Timber Cove Community as operating conditions, available technologies, and cost information will change over time. Instead, the Committee recommends that the longer term projects discussed in this Plan be further evaluated and prioritized in preparation for the next Plan update, which the Committee recommends should be released every three (3) years.” These omissions from the Comment are critical to the meaning of that statement because key to the Plan is the use of the evaluation of the distribution system to prioritize the most important areas to address for the long term plan. Any attempt to do so at this point would be impracticable. We are a very small district with limited funds. This Plan has identified the most cost effective actions that can address the District’s most pressing needs in the near term while outlining actions for longer term considerations. Given the information we currently have available, that is the most that can realistically be accomplished.</p>

2022 TCCWD Infrastructure Committee Phased Strategic Plan

<p>16</p>	<p>The ‘Creating a Standard Process for Evaluating Vendor Bids’ is a useful procedure. The Board should discuss implementing this procedure, with possible exceptions when it is not possible to meet some of the steps.</p>	<p>The Committee agrees.</p>
<p>17</p>	<p>‘Evaluation and Prioritization of Distribution System Improvements’, puts off decisions on any distribution system work until after the 3 – 5 years action period discussed in the July 23, 2022 TCCWD Board Director’s meeting.</p>	<p>This is an inaccurate statement. The Plan identifies distribution system evaluation as a priority and recommends this be completed within 1 year. Page 10 states “The Committee believes that the evaluation could be completed within one year and that the identified top priority projects could be designed, at a minimum, and perhaps implemented prior to the next recommended update to this Plan.” After review of all the available information, the Committee concluded that any other prioritization would not be in the best interest of the community.</p>
<p>18</p>	<p>A volunteer has already invested “1000s of hours” pursuing project grants as a volunteer in 2015-2017. Her prior efforts and offer to assist in the future as a volunteer should be considered as an alternative to spending \$4000 per year for an external consultant, who cannot accomplish much with such limited funding.. But a consultant in an advisory capacity would be helpful.</p>	<p>The Committee appreciates the contributions of volunteers over the years. The District has a lot of infrastructure project needs and the Committee believes that a consultant with specialized experience and expertise in securing grant funds is needed at this point to monitor and identify all potential funding opportunities. This consultant should also have the ability to guide the District, on a project by project basis when needed, through the grant application process in order to obtain the funds. The Committee has updated the title and description of this recommendation within the body of the Plan to provide further clarity on the intent and benefit.</p> <p>This recommendation, like all others mentioned in this Plan, will be subject to a Board vote for approval.</p>
<p>19</p>	<p>‘Relocation of existing TCCWD improvements to legal easements or property owned by TCCWD.’ Is not supported. This non-recommendation likely refers to the location of Tank No. 2 adjacent to 22050 Timber Cove Rd.</p>	<p>The Committee determined there was not enough information to assess this recommendation. The inclusion of “likely refers to the location of Tank No. 2” corroborates the Committees conclusion of not enough information to assess the project.</p>

2022 TCCWD Infrastructure Committee Phased Strategic Plan

<p>20</p>	<p>Comment suggests that the DS1 evaluation in the Appendix of the Plan does not illustrate project objectives related to equity, potential pipe failure identified in a 2020 memorandum from a Board member, or conservation of water and energy resources from a 2017 Brelje & Race Technical Memorandum.</p>	<p>The Plan states that the project objectives were taken from the Brelje & Race T1 Engineering Report developed during the design of the project. The Committee viewed this document, since it was developed by the engineering firm hired by the District to design the project, as a credible source for outlining the project objectives. The 2017 Brelje & Race Technical Memorandum was not available for the Committee’s review (it is not listed in the Assessed Documentation section in the Plan) nor was it included with the comment.</p> <p>The Plan recommends that the entire distribution system be evaluated to identify and prioritize actions that are most prudent to the District based on to today's operating conditions. All District objectives will be addressed in that evaluation.</p>
<p>21</p>	<p>Comment suggests that the leak analysis in the Plan under reports the amount of water lost in 2015. Additionally, it describes more leaks in the Amanita Circle piping than the Plan identifies. Finally, these leaks are suggested to be caused by stresses on the service connections and mains.</p>	<p>The Plan describes the basis for the calculation loss in the 2015 leak. The comment does not specify how this analysis is flawed nor was documentation provided with the comment to support an alternative calculation. Therefore, the Committee has no reasonable way to consider the potential accuracy of the comment.</p> <p>The Plan recommends that the entire distribution system be evaluated to identify and prioritize actions that are most prudent to the District based on to today's operating conditions. System leaks will be analyzed further as part of that evaluation.</p>

2022 TCCWD Infrastructure Committee Phased Strategic Plan

<p style="text-align: center;">22</p>	<p>DS1 system pressure section lacks detail on the requirement to have 6” main feeding the fire hydrants.</p>	<p>This section was not intended to identify all the codes related to piping and fire hydrants. As one of the objectives of the project was to improve water pressure, the Committee analyzed the water pressure of the area. The goal of this section was to describe the state of the system pressure relating to the objective outlined by Brelje & Race.</p> <p>However, the Committee reviewed the California Regulations Related to Drinking Water (Title 22). §64573 requires “Newly installed water mains in a community water system shall have a nominal diameter of at least four inches.” This section has no other stipulation for mains serving fire hydrants.</p> <p>The Plan recommends that the entire distribution system be evaluated to identify and prioritize actions that are most prudent to the District based on to today's operating conditions. Piping replacement needs, including Amanita’s required main diameter, will be analyzed further as part of that evaluation.</p>
<p style="text-align: center;">23</p>	<p>Additional studies may be available other than the University of Arkansas on the potential risks of Asbestos Concrete pipe.</p>	<p>The Committee acknowledges that there is likely more research than was presented. The Arkansas study was used to show probable pipe useful life.</p> <p>The Plan recommends that the entire distribution system be evaluated to identify and prioritize actions that are most prudent to the District based on to today's operating conditions. Piping replacement needs will be analyzed further as part of that evaluation.</p>

<p>24</p>	<p>DS1 project cost escalation based on 2-3 times is not substantiated. Piazza Construction provided directional drilling detailed costs for work they did on Timber Cove Rd. which should have been factored into cost evaluation of DS1 options, might lead to different conclusions.</p>	<p>The escalation rate was conveyed by Brelje & Race both verbally and in an email. It is informal and not a built up cost estimate.</p> <p>A cost estimate from Piazza was not forwarded to the Committee for review. The Plan, however, acknowledges on page 22 that “Directional drilling may lower the cost.”</p> <p>The DS1 construction cost estimate was taken directly from Attachment 3 of a memo from Kris Kilgore to the Board dated 2/13/2020 requesting discussion of the DS1 Project. Attachment 3 included two tables showing projects construction costs to be ~\$335,000 with hand written notes indicating that the costs were for “open trench” and that the “estimate would be lower with directional drilling vs open trench”. No directional drilling cost estimates were ever made available.</p> <p>The Committee recommends performing a detailed benefit-cost analysis of this project as part of the Distribution System Evaluation recommended by this Plan.</p>
<p>25</p>	<p>The Plan does not list the following DS2 project objectives:</p> <ul style="list-style-type: none"> • Inadequate fire hydrant spacing, • Inadequate 2” main on Koftinow dead end, and • Water quality and flushing issues. 	<p>The DS2 project objectives were obtained from the Exhibit A Project Understanding of the Brelje & Race contract to provide design services.</p> <p>The Plan recommends that the entire distribution system be evaluated to identify and prioritize actions that are most prudent to the District based on to today's operating conditions. The DS2 project will be analyzed further as part of that evaluation.</p>
<p>26</p>	<p>Cost estimates of the DS2 loop project were provided totaling \$402,808 with a 1.5x escalation from a 2017 Piazza quote.</p>	<p>A 2017 Piazza quote was not made available to the Committee and thus, was not listed in the Assessed Documentation section for this project. The comment has not provided a basis for the 1.5x escalation. Note that this cost is still higher than the estimates of \$262,000-\$393,000 in the Plan. The Committee met with Brelje & Race and discussed extensively the five options from 2011 and relative costs. Brelje & Race indicated that Option 3 and Option 5 would likely escalate at the same rate. Thus, Option 5 would remain as the low cost option.</p>

<p>27</p>	<p>Commenter provided a comparison of the recommended Option 5 pump station versus the DS2 Option 3 loop to support the opinion that Option 3 is a better alternative. The following key benefits were cited:</p> <ul style="list-style-type: none"> • Addition of 2 new hydrants on the system, • Increased main diameter, and • Meeting current standards of eliminating dead-end main pipes. 	<p>The Committee met with Brelje & Race to discuss the five options. Brelje & Race indicated that the reason the partial design on Option 5 was halted was not because of additional benefits. It was because of an issue with a property owner adjacent to the proposed pump station.</p> <p>The comment did not provide any reference to a standard that require the elimination of dead-end main pipes. The Committee has reviewed the California Regulations Related to Drinking Water (Title 22). §64575 allows newly installed mains to be dead-end as long as there is a flushing valve.</p> <p>The Committee notes that the DS2 loop as described in the comments may add additional benefits of fire hydrants and a larger 6” main. These potential benefits could not be assessed in the comment period for the Plan. However, since all projects recommended by the Plan will have a discussion in a Board meeting prior to funding and implementation, an evaluation of benefits and costs of each project may be warranted.</p>
<p>28</p>	<p>The Plan does not adequately explain why TP1 is not recommended.</p>	<p>TP1 is out of date and important conditions or assumptions have changed significantly. The project objectives of improving automation and production efficiency have already been addressed by the current and previous operators since TP1 was originally proposed.</p> <p>The Plan has been updated to include clarity on the recommendation.</p>
<p>29</p>	<p>Whether “Incremental improvements to the existing plant since Brelje & Race’s previous evaluation have improved the water efficiency of the plant,” is true or not depends on operations records regarding work on the treatment plant system. The commenter includes an abridged summary of work described in operator reports for support.</p>	<p>This comment is mixing two things. The quote from the plan is discussing water efficiency and not maintenance and work required. The water efficiency has improved. TP1 proposed to decrease water usage in the backwashing process. As described on page 27, the frequency of the backwash and the amount of water used in the backwash process have been reduced through process improvements.</p>

<p>30</p>	<p>An excerpt of a US Forestry Life Cycle Cost Guideline concludes that “over the 30 year life of a building or process project, operation and maintenance costs (excluding operations labor costs) exceed initial construction costs by at least 150%”</p>	<p>The US Forestry Service Life Cycle Cost Analysis methodology referenced in this comment only applies to buildings, not buildings and processes. Refer to the USFS website for clarification:</p> <p>https://www.fs.usda.gov/t-d/pubs/htmlpubs/htm08732839/page01.htm</p> <p>The USFS methodology also refers to a 2006 study titled 'Re-examining the Costs and Value Ratios of Owning and Occupying Buildings' by Graham Ive. This study also states that it “found the cost of operation and maintenance of office buildings to be about one and a half times the cost of initial construction.” (emphasis added)</p> <p>The operations and maintenance costs of an office building are different than the operations and maintenance costs of a water treatment plant. Therefore, the numbers and values listed in the US Forestry Service document cannot be transferred to the plant project.</p>
<p>31</p>	<p>While a formal life cycle cost analysis was not performed for the TP1 Project, one of the most important factors in selecting the ultrafiltration water treatment package plan was that operation hours would be reduced, thus reducing the life cycle cost. In Kris Kilgore’s 2017 installation survey of one ultrafiltration water treatment system in Arch Cape, Oregon and a series of small ultrafiltration systems in Maple Ridge, Utah, it was reported that the operational hours were much less than those required for their former, standard rock/sand filtration systems. For the Arch Cape ultrafiltration system, the operators spent 6 – 8 hours per week operating the system and 35 to 40 hours per month monitoring the annual ‘clean-in-place’ backwash cycle. They only spend 60 – 65 hours per month maintaining the distribution system, which hours include reading meters by laptop near the meters.</p>	<p>The Committee appreciates this anecdotal information. However, an informal survey conducted by interviewing other districts should not be the basis for an expenditure over \$1M as it lacks the level of factual context and verification required for inclusion in benefit-cost analysis decision making that fits TCCWD circumstances.</p> <p>This Plan recommends that a formal and comprehensive life cycle cost analysis be conducted for TP1 to determine whether the existing plant or a new ultra-filtration plant would be more economical on a lifecycle basis. The Plan lists several components that would likely be included in the treatment plant lifecycle analysis, only one of which is labor hours. A comprehensive lifecycle cost analysis ensures that the overall most cost-effective solution is chosen for our community and our specific conditions.</p>

<p>32</p>	<p>Comment states that the TP1 project summary does not discuss key reasons for replacing the existing water treatment system.</p> <p>Reason #1 listed is Time Spent Addressing Issues to the Existing System, including:</p> <ol style="list-style-type: none"> 1. Corroded pipes 2. Vessel tank interior coating deterioration 3. Water chemistry issues 4. System controls issues 5. Pumps and other mechanical equipment issues 6. Raw water filter intake replacement 7. Difficulty maintaining chemical tanks, feed lines and controls 8. Backwash sludge handling issues 9. Granulated Activated Carbon filter issues 10. Increasing Algae and other organic growth in the reservoir. 	<p>Several of these items have either already been corrected or are addressed in this Plan. See responses to each key reason listed below:</p> <ol style="list-style-type: none"> 1. The Filter Vessel Train Improvement recommendation outlined in this Plan includes replacement of corroded pipes. 2. The Filter Vessel Train Improvement recommendation outlined in this Plan includes replacing the vessel tanks interior coating. 3. TCCWD Operators have confirmed that the water chemistry issues have been resolved. 4. TCCWD Operators have confirmed that the new SCADA system resolved most of the controls issues. 5. Examples provided were from 2020 and 2021. TCCWD Operators have confirmed that these issues have been resolved. 6. Filter replacements are considered ongoing maintenance items. Ongoing maintenance will still need to occur even with a new plant. The lifecycle analysis would review the current maintenance activities to reasonably assess future maintenance costs. 7. TCCWD Operators have confirmed that the issues listed in the examples provided have been resolved. 8. TCCWD Operators have confirmed that the issues listed in the examples provided have been resolved. 9. The Filter Vessel Train Improvement recommendation outlined in this Plan includes GAC filter improvements. 10. The reservoir holds raw, untreated water. Algal blooms impact ultrafiltration system membranes permeability and increase energy consumption. Ongoing considerations to reduce algal blooms is required regardless of which filtration system is used to treat the water downstream.
<p>33</p>	<p>Reason #2 states: the ultrafiltration system is installed on a completely self-contained skid. Controls, pre-screening, membrane cleaning, process testing, equipment monitoring, and remote monitoring minimize the time operators spend on the system with estimates from the manufacturer of the system.</p>	<p>An independent analysis of operator time should be used. Relying on the vendor designing and selling the system may misstate actual operations. This analysis should be part of a full lifecycle cost analysis.</p>

<p>34</p>	<p>Reason #3 states: It was determined that this alternative had the least footprint of any other alternative. For instance, installing an ultraviolet disinfection system would require installation of both screening and 5 to 20 micron filtration of raw water. If the raw water has total suspended solids greater than 10 ppm, the ultraviolet equipment is likely to be 'fouled' beyond the point of adequate disinfection. The ultrafiltration equipment has an integral screen on the skid.</p>	<p>The Brelje & Race T1 Engineering Report lists four alternatives. These include:</p> <ul style="list-style-type: none"> ● Connecting with a neighboring system, ● Maintaining the current plant, ● Ultrafiltration, and ● Ultrafiltration with nanofiltration. <p>This report identifies the construction scope to expand the existing pump and control building. It has no other comparison to the footprint of the alternatives.</p> <p>The Plan recommends evaluation of an ultraviolet disinfection, complete with a comprehensive full lifecycle analysis. This would include any potential space limitations integrating the system into the plant process, which does not appear to be an issue at this time.</p>
<p>35</p>	<p>Is TCCWD Board ready to spend \$187,550 for all the recommended 'Filter Vessel Train Improvements' and continue with the above described ongoing operation and maintenance expenses that would be eliminated by TP1? Information is needed on how quickly the piping, valving, filter tank wall deterioration is proceeding. What parts of this equipment can be replaced while waiting to construct the new ultrafiltration system?</p>	<p>The Plan does not approve any project for funding and implementation. Page 1 says "The Plan does not authorize funding for any of the projects recommended. All funding approvals need to follow the established authorization process that requires a TCCWD Board vote in a public meeting." Thus, the question will be brought up in a Board meeting for discussion and only pursued if the Board approves the project by majority vote.</p> <p>Brelje & Race estimated the ultrafiltration system installation costs at over \$1.3 million, based on 2016 costs, which is greater than the District's total current reserves. The existing system is successfully treating water and can be maintained and even upgraded while still allowing funds to be utilized for additional projects that address other the District's operational needs.</p>

<p>36</p>	<p>Figure 6, the detailed project cost estimates, confuse funds already spent on TP1 versus those needed to construct the project. In the first table, last column ‘Requested Financing’, funds already allocated and approved in a series of TCCWD Public Hearings April to August 2014 have been spent. In order to re-start the project and bring TP1 drawings and specification up to 100% completion, engineering estimated costs would be less than the listed \$160,000 – say \$10,000. To bring the architecture plans up to 100% complete would be another \$10,000. And since all work is within the treatment plant and does not disturb new land, the Cultural Resources Study, Biological Resources and Nesting Bird Survey may not apply. So the total for Requested Financing would be \$1,031,200.</p>	<p>The Plan states that the inclusion of Figure 6 is for completeness of the evaluation to show the estimated project cost. Invoices for work performed already were not provided to the Committee and cannot, therefore, be verified to reduce the estimated project cost. Additionally, the estimated project costs listed in the Plan are in 2016 dollars. Therefore, applying the US inflation rate increase from Dec 2016 to August 2022 of 56.269% (296.276%-240.007%) to even the reduced estimated project cost of \$1,031,200 quoted in the comment would yield an updated 2022 estimated project cost of \$1.6M.</p> <p>Link to US Consume Price Index and Annual Percent Changes from 1913 to 2008: https://www.usinflationcalculator.com/inflation/consumer-price-index-and-annual-percent-changes-from-1913-to-2008/</p>
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