WORK PLAN

Project Name: Lake Francis Estates Project Sanitization
Client: Lake Francis Estates
State: California

Chapter Involved: Engineers Without Borders, Columbia University Chapter
Project Leads: Sophia Olmeda and Aaliyah Faith Benjamin-Roach
Registered Engineer in Charge (REIC): Kajori Purkayastha

Engineering Service Agreement Signing Date:

Community Engineering Corps

Table of Contents

1 Project Description **3**

1.1 Client Description 3

1.2 Community Background and Beneficiary Description 5

1.3 Location 6

1.4 Environmental Resources Present 10

1.5 Population & Growth Capacity 11

2 Need for Project **12**

2.1 Health, Sanitation, and Security 14

2.2 Infrastructure 15

3 Stakeholder Analysis **17**

4 Scope of Services **19**

4.1 Deliverable 19

4.2 Client's Plan for Deliverable 20

5 Project Schedule **21**

6 Quality Control **22**

7 Site-Specific Safety Hazards **23**

Appendices **24**

1 Project Description

1.1 Client Description

Lake Francis Mutual Water Company (LFMWC) is a private water utility corporation located in Dobbins, CA, and is responsible for supplying drinking water and advising the sewer collection system process for households within Lake Francis Estates (LFE) service area of approximately 75 people. Currently, LFMWC oversees the established water treatment infrastructure but does not have much jurisdiction over the community's sanitation practices, largely due to the individualized and decentralized approach to how wastewater/sanitation practices are adhered to.

Property owners in the LFMWC are major stakeholders in the community and part of the framework that introduces Capital Improvement Plans to community infrastructure. Property owners own a share of LFMWC by purchasing lots and paying annual fees to the utility. Property owners volunteer their time on LFMWC and board members include a President, Vice President, Treasurer, Secretary, and Water Manager. The board is elected every two years by shareholders.

In February 2023, CE Corps conducted a Preliminary Assessment Report (PAR) of the wastewater system at LFE, which includes a socioeconomic profile of the community, a profile and evaluation of how the wastewater infrastructure is managed, the financial history of LFMWC, and directions for engineering solutions. LFMWC has highlighted that the community has sought out services from the firm Coleman Engineering to design and construct improvements for their drinking water system. The PAR has provided baseline community and infrastructure data for CU-EWB along with maps and tables, which will be used in this report. The full report can be found in Appendix A.

Furthermore, Columbia University's chapter of Engineers Without Borders (CU-EWB) will be working alongside the community and the Architectural Control Committee (ACC), a non-profit organization run by the residents of the Lake Francis community. The ACC and LFMWC are already working together to understand the Covenants, Conditions, and Restrictions (CC&R) recorded in California and provide guideline suggestions for water development. The community has indicated that email is the best form of communication, and CU-EWB has had satisfactory communication with LFMWC thus far.

In May 2023, CU-EWB conducted a site investigation in LFE with LFMWC Treasurer, Ethel See-Winchell. During the investigation, CU-EWB members observed the topography of the estates and the existing drinking water system and examined the existing septic tank systems of two households. In-person discussions with Ms. See-Winchell provided further insight into the infrastructure and economic needs of the community and supplemented the information provided in the PAR. A summary of findings from CU-EWB's site investigation can be found in Appendix B. From these preliminary investigations, it was determined that the wastewater system needed significant improvement and provided the basis for the Work Plan below.

1.2 Community Background and Beneficiary Description

The beneficiaries of this project are the residents of Lake Francis Estates, a low-income community with an estimated population of 75 people as of 2023 based upon an average-persons-per-household survey conducted. Residents live in homes, which are subdivided into 52 of 58 available lots according to the current water/wastewater system (provided in Appendix A). Households include homeowners, renters, and seasonal residents. According to the 2021 US Census for Dobbins, CA, the population is predominantly white with a median age of 44. According to California's Department of Housing and Community Development, a household of 3 with a yearly income of $59,400 in 2023 is considered low income in Yuba County. The average household income of residents in Yuba County is $59,424 with approximately 2.88 persons per household.

Many of the residents have septic systems that were installed over 40 years ago and, according to LFMWC, these systems are starting to reach the end of their useful lifespan. There also appear to be other issues that some residents have reported specifically with respect to heavy rainfall causing overflow alarms. The 2022 Annual Meeting Report of the LFMWC highlighted that the community has secured a grant from the California State Waterboard for $618,000 to fund engineering design and construction for new water infrastructure (see Appendix A). This demonstrates the community's capacity to win grants that are geared towards improving critical infrastructure similar to the goals of improved wastewater infrastructure.

1.3 Location

CU-EWB will be working in the Lake Francis Estates neighborhood located in Dobbins, California, in Yuba County. The neighborhood is located next to Lake Francis along the western slope of Sierra Nevada. Lake Francis flows into Dobbins Creek, which is a tributary of the Yuba River, and then into Feather River. The approximate coordinates of the neighborhood are 39.365°N, 121.211°W. According to the Lake Francis Estates & Mutual Co. website, the Regional Waste Management Authority oversees policies of waste management, while covenants, conditions, and restrictions (CC&Rs) are enforced by Homeowners Associations (HOAs) or individual property owners. For centralized wastewater treatment systems, LFMWC must seek approval from the Central Valley Regional Water Quality Control Board while Yuba County is the authority for on site treatment systems. There are no centralized wastewater treatment plants in Dobbins, and the closest municipal treatment facilities are located about 35 miles away in Yuba City, Marysville, and Olivehurst. Given the cost and complexity of constructing this pipework, the range of feasible solutions for wastewater treatment in Lake Francis Estates lies in decentralized treatment.

Figure 1: A map depicting Yuba County in central California, with Dobbins in the northeast of the county (Source: d-maps.com)

There are two plots of land at the north and south ends of the estates that are currently owned by the original developer of the subdivision, Tim Wilkinson. Mr. Wilkinson has been in contact with the community as they have expressed their interest in acquiring the land and aim to use grant funding to do so when money becomes available and a solution has been chosen. Figure 2 (right side) displays about 85 acres of open land that could possibly be used as a site for

a treatment facility. Figure 2 (left side) also shows 18 acres of land owned by the original developer that could be used, however, due to proximity to drinking water wells, they are less desirable. If the 18-acre property is to be used, the treatment facility's proximity to the wells used for drinking water must be accounted for.

Figure 2: Aerial Map of Lake Francis Estates with the left image showing an 18-acre lot adjacent to the community and the right image showing an 85-acre lot adjacent to the community (NOTE: These satellite images are two different scales with the left image being more zoomed in).

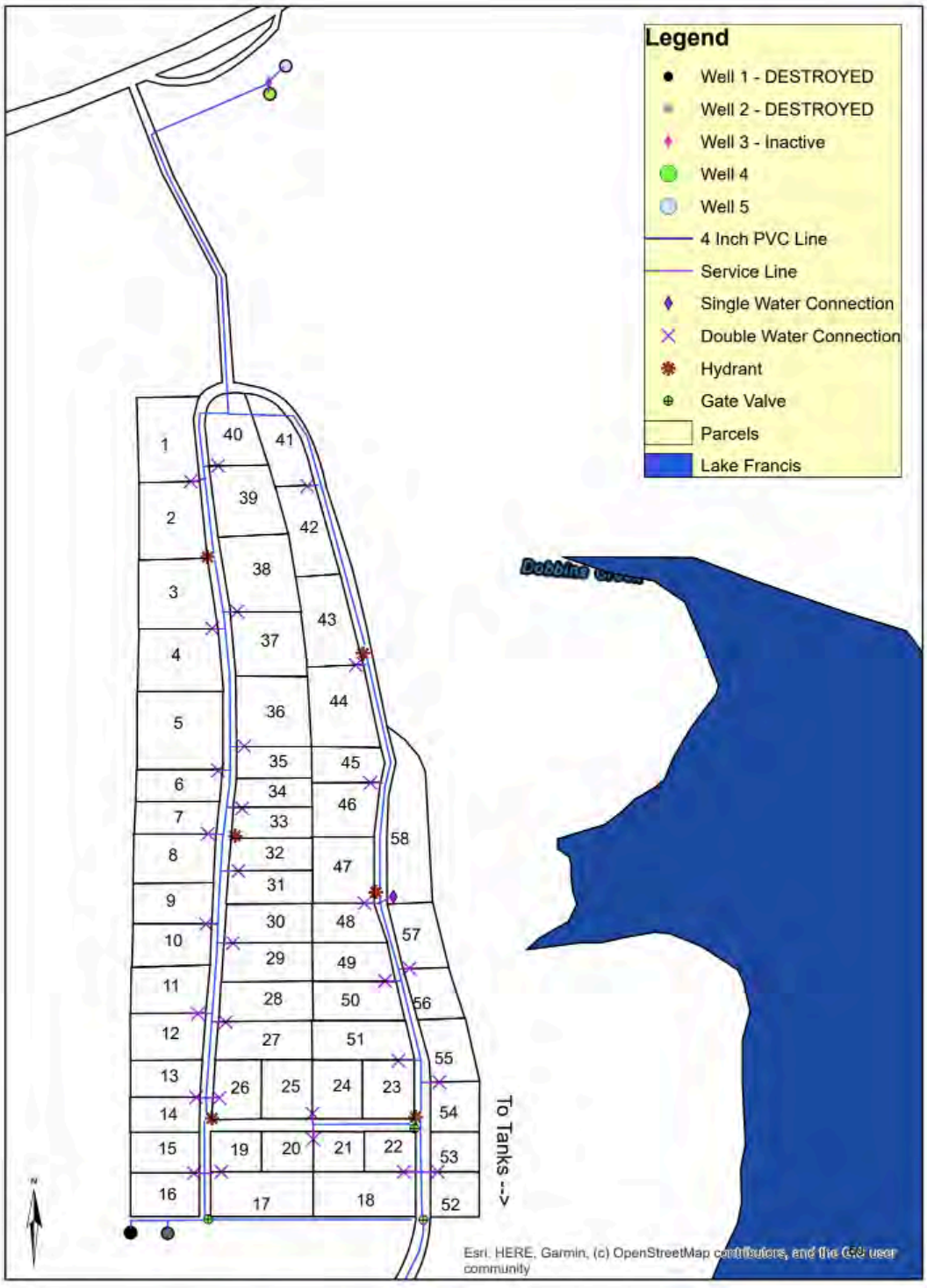


Figure 3: Parcel Delineation and Drinking Water Systems Map (Source: PAR, Coleman Engineering)

1.4 Environmental Resources Present

Yuba County is one of the most biodiverse counties in the contiguous US with 1,968 native vascular plant species per 10,000 square kilometers (3,860 sq mi). Nationally-protected areas in Yuba County include parts of the Plumas National Forest and the Tahoe National Forest. Lake Francis is a major reservoir in Dobbins, Yuba County, and mainly serves for hydroelectric power generation, flood control, water supply, and recreation. Yuba County has extensive natural areas consisting of forestation, grassland (habitats for several endangered species), riparian areas, and other habitats. More potential endangered species habitats include the Yankee Slough, Yuba River, Dry Creek, and Feather River. The environmental resources present within Lake Francis Estates and the intended site must be identified so as to comply with the requirements of the California Environmental Quality Act (CEQA) for permitting purposes which will be determined based on the type of solution proposed in the PER. In consideration of the proximity of the estates to the Yuba River, the PER will focus on proposing solutions that will not pose an additional threat to water quality or increase runoff into the river.

1.5 Population & Growth Capacity

According to the US Census, Dobbins, CA, had a population of 551 in 2020—down from 624 people in 2010. Lake Francis Estates, specifically, is home to 75 residents living in 26 occupied and developed lots. Table 1 indicates the population demographics in Yuba County, Dobbins, and the total Lake Francis Estates population according to the 2020 US Census. In total, there are 58 lots within the 20 acres of LFE, indicating the full capacity of the estates is about 167 residents (by using the census estimate of 2.88 persons per household). The capacity of the wastewater treatment system outlined in our Preliminary Engineering Report will take into account the projected population increase of Dobbins County as indicated by forecasts adhering to the Classification Of Instructional Programs (CIP) standard.

Description	Population (2020 US Census)						
	Total	White	African American	American Indian	Asian	Other	2 or more races
Yuba County, CA	81,575	46,590	3,052	1,754	5,774	12,227	12,178
Dobbins, CA	551	414	2	18	9	12	96
Lake Fransis Estates *	75						
* 26 lots currently developed in Lake Francis Estates. Census for Yuba County, CA estimates 2.88 persons per household							

Table 1: Population and capacity for Yuba County, Dobbins, and Lake Francis Estates

2 Need for Project

This project is geared towards addressing the needs of the Lake Francis Estates community as it relates to their wastewater treatment system. Currently, many residents use decentralized, privately-owned septic tanks to treat their household wastewater while some residents have cesspools. Due to this structure of decentralized wastewater treatment systems, the extent of operation and maintenance, condition of the systems, and monitoring issues with the existing infrastructure has not been maintained. Wastewater from septic systems is discharged into leach fields located in backyards, and households vary in engineering solutions used to treat their wastewater. This leachate has minimal regulatory oversight as the client has not informed us of any formal correspondence between them and the Central Valley Regional Water Quality Control Board (RWQCB) or the county. The Board of the Lake Francis Mutual Water Company has expressed an interest in developing a centralized wastewater treatment system to replace the aging septic tanks owned and managed by individual households. The PAR (Appendix A) indicates the septic tanks are outdated and likely operating beyond their lifespan. In May 2022, CU-EWB conducted a site visit of Lake Francis Estates. Discussions with community members and community representative Ethel See-Winchell showed that precipitation runoff disrupts septic systems in households located on lower terrains as the precipitation saturates the soil which leaks into the tank and causes false alarms of full tanks (Appendix B). There are also power outages that occur regularly and affect septic system usage. Due to the remote nature of Lake Francis Estates, and therefore risk to fire hazard, planned and unplanned power outages are prevalent. The Lake Francis Estates electricity provider, Pacific Gas and Electric Company (PG&E), has stated its intention to use its "Public Safety Power Shut Off" program during

extreme weather events such as high winds, hot temperatures and low humidity to reduce any fire risk caused by power transmission lines affected by such extreme weather.

Community members are concerned about groundwater contamination and do not know how well the leach fields are removing contaminants from the discharged wastewater (Appendix B). Furthermore, the entire service area is located near Lake Francis; contamination of this water quality source is a subject of concern for LFMWC and further highlights the need for strategies to improve the community's wastewater management.

The final deliverable of the project will be a Preliminary Engineering Report (PER), which will include recommendations for a centralized wastewater treatment system through an alternative analysis of these various solutions. The PER will bolster LFMWC's ability to access grant funding to hire a consultant to complete the final design as well as the construction and implementation of a wastewater treatment system. A large consideration of the PER will be to recommend a wastewater treatment solution that is economically feasible for the community to maintain. This cost consideration is critical given the overwhelming interest in reducing annual costs for their drinking water utility expressed in the PAR, alongside the need for operation and maintenance plans and the desire for a fee structure based on a flat annual fee (Appendix A). Centralizing the wastewater system will incur a new fee structure for residents since the lots are accustomed to maintaining their personal systems on a need basis; through communication with LFMWC and the homeowners, we will analyze fee structures that are typical for similarly structured systems and not exceedingly expensive compared to the current cost of operation and maintenance for their existing wastewater treatment systems.

2.1 Health, Sanitation, and Security

The lack of regulatory oversight on wastewater leachate poses a serious contamination concern for individual homes and the nearby Lake Francis water quality. The community currently does not possess an NPDES permit for neither Lake Francis nor Dobbins Creek. This would require requesting approval from the Public Works Department of the Yuba County agency for onsite wastewater treatment systems and determining the need for a NPDES permit. CU-EWB's analysis of the wastewater systems will consider the approval for the given system in accordance with the Central Valley RWQCB for a new centralized wastewater treatment plant and a new collection and conveyance system. The sizes of the vacant lots as well as the varying topography across each individual lot raise challenges in determining an appropriate site for a centralized wastewater treatment system.

2.2 Infrastructure

Lake Francis Estates has a full buildout capacity of 58 individual lots and the report CU-EWB generates will consider wastewater capacity for current and estimated future residents of the 58 lots. Since the existing sanitation systems occupied by each house/residential lot were built at the discretion of the homeowner, there is some variation in the type, age, and condition of the existing wastewater treatment systems. This variation in both existing infrastructure and land features of the individual lots will need to be considered in the PER. LFMWC has indicated that they have existing power and communication systems in place, along with some backup power in case of emergency shut offs. These are coordinated by the Pacific Gas and Electric Company (PG&E) as part of their "Public Safety Shutoff" program and generally occurs during extreme weather events. The shutoffs typically last 24 to 48 hours and LFMWC has been advised to invest in a portable generator as indicated in the PAR (Appendix A). LFMWC has not indicated whether the capacity of their power and communication services would be sufficient for a centralized wastewater treatment plant. Currently, improvements to the drink water system are being done by Coleman Engineering and the state of their progress is unknown. While it is unclear who currently operates the water system, LFMWC board member Terry Patton is the representative water engineer and possesses all the relevant documentation for the current system. It is also unclear who would be operating a centralized wastewater treatment plant.

The expectation is that some of the individual septic tank systems will fail at some point in the near future due to the infrastructure reaching the end of its life expectancy (20-30 years). As community members have varying wastewater treatment systems on their lots, CU-EWB plans to conduct a survey to assess the community's interest in a centralized wastewater treatment system and the desired nature of this system. This survey will also help CU-EWB gain

a better understanding of the distribution of wastewater treatment systems across the developed lots as well as their condition and age.

The wastewater systems differ from lot to lot. Some have a sand filter on their leach fields for their septic systems, while others have a cesspool rather than septic tanks. There are power outages that occur regularly and affect system usage as indicated by Ms. See-Winchell during our site visit. The lots with septic systems that use pumps within their property have generators that enable the sanitation systems to still function during these outages. Each property owner individually manages the discharge from the wastewater systems. The discharge into the leach fields is not tested for water quality. The LFMWC has not indicated which permits they have or if they are meeting NPDES discharge requirements.

The capacity of the current wastewater system's discharge is unknown because the existing sanitation systems are individually managed and their daily output is not recorded. Therefore, the capacity will need to be estimated using water usage data provided in the PAR (Appendix A) and consulting with the Responsible Engineer in Charge (REIC) to follow capacity sizing based on local guidelines.

3 Stakeholder Analysis

Name	Position/Title, and Affiliated Organization or Employer	Describe relation to project or role	Email and Phone Contact Information
Ethel See-Winchell	Vice President and Treasurer, LFMWC	Board member of LFMWC and main point of contact to CU-EWB	ethel@lakefrancisestates.org
Molly Sullivan	Program Engineer, Community Engineering Corps	Liaison between LFMWC and CU-EWB, responsible for preliminary data assessment and involved in the project approval process	msullivan@awwa.org
Evelyn Choudhary	Mentor, EWB-USA	Provides professional insight for the completion of the project	evelyn.choudhary@wsp.com
Jeff Benway	Quality Assurance Manager (QAM)	Responsible for providing comments and quality checks for our deliverables	jbenway@sfceng.com
Kajori Purkayastha	Responsible Engineer In Charge (REIC)	Leads all technical design, mentors CU-EWB Chapter on all technical components of the project and manages all deliverables completed by Chapter before submission to CECorps and LFMWC.	kajoripurkayastha@kennedyjenks.com
	Architectural Control Committee	Issues guidelines and interprets the Covenants, Conditions & Restrictions (CC&R) for how LFMWC can operate	
Jon Kaminsky	Project Manager, Coleman Engineering	Leads redesign for Lake Francis Estate's drinking water supply	(916) 791-1188 jon@coleman-eng.com
Alex Mushegan	California Central Valley Regional Water Quality Control Board -	This agency will be involved in issuing permits for a new wastewater treatment	(559) 488-4397

	Program Manager for Waste Discharge Requirements	system on the property of Lake Francis Estates	
Chris Benedict	Yuba County; Sewage Disposal Program	The sewage disposal program ensures that on-site wastewater treatment systems (OWTS) are properly sited and designed to prevent impacts to groundwater and public	(530) 749-5450

4 Scope of Services

4.1 Deliverable

Our final deliverable will be a Preliminary Engineering Report (PER) outlining and evaluating the solutions proposed by CECorps in the PAR, such as the Advanced Ecologically Engineered System ("The Living Machine"), Constructed Wetland Treatment, Lagoon Treatment, Conventional Activated Sludge Package Plant, and Community Septic System. We conducted a preliminary analysis of the five solutions based on community interests, environmental impact, land requirements, construction permitting and feasibility, costs, and sustainability considerations to select the three best solutions for further analysis. This initial analysis will allow the project team to focus on three solutions to provide an in-depth feasibility of these solutions. The PER will analyze the most feasible solution selected by our Project Team (The Living Machine), along with the two alternative methods (Community Septic System and Constructed Wetland). This report will include the following sections as advised by CECorps:

1) PROJECT PLANNING
2) EXISTING FACILITIES
3) NEED FOR PROJECT
4) ALTERNATIVES CONSIDERED
5) SELECTION OF AN ALTERNATIVE
6) PROPOSED PROJECT (RECOMMENDED ALTERNATIVE)
7) CONCLUSIONS AND RECOMMENDATIONS

4.2 Client's Plan for Deliverable

The community is looking for a new wastewater collection/treatment system that will replace the aging septic systems as well as other variable wastewater treatment systems on individual properties on the estates and will keep the community's wastewater system in compliance with local, state, and federal regulations. We are considering solutions that will be environmentally sustainable so as not to contaminate the nearby environments—including Lake Francis and the Yuba River—or contribute to land and air pollution, monitor leach fields, perform well in heavy precipitation, and are not susceptible to power outages. Per the needs outlined by LFMWC via communication and the site visit, our final deliverable will consist of a report outlining the most suitable solution, as well as an alternatives analysis, which the community will use to consider which wastewater treatment plan they would like to move forward with and apply for grants to fund the centralized system of their choice. The PER will focus on solutions that are economically viable considering available grant funding from sources such as the USDA Rural Development Loan and Grant Program, Rural Community Assistance Program, and solution-specific grants from EPA along with working in tandem with community wastewater fees. Potential grant funding could be used toward an otherwise costly wastewater treatment system permitting process for the new system, implementation of the design for the chosen solution, and other associated costs. Additionally, EWB will meet with LFMWC monthly to establish an understanding of the solutions desired and expressed in the PER, gain feedback on the needs of the community via surveys, and answer any additional questions the board may have.

5 Project Schedule

Event	Date	Description
Project Kickoff	December 28, 2022	CECorps staff officially start the project team.
Initial Site Visit	May 20, 2023	Work-planning with community representatives on the scope of work and deliverables requested.
Submit Work Plan & ESA to CECorps for Review	September 16, 2023	Submitted to CECorps for review by Technical Review Committee and Legal Review Committee and approval.
Work Plan Finalized	December 2023	ESA signed by REIC and client representative
Site Visit 2	TBD	Data collection, executing research necessary for workplan
Meeting with LFMWC	January 2024	Progress Report - Work Plan, PER, Introduction to new PMs after EWB transition, Updates from community - Yuba County Water Board
Quality Control Team Meeting 1	February 2024 (continuous email communication + virtual meeting)	Meet with QAM, REIC, and Engineering Mentor to review project progress and receive feedback on technical questions (specific to the analysis of Living Machine solution)
Meeting with LFMWC	February 2024	Review on progress of PER and receiving results from the community survey; answer any additional questions
Quality Control Team Meeting 2	March 2024 (continuous email communication + virtual meeting)	Meet with QAM, REIC, and Engineering Mentor to review project progress and receive feedback on technical questions (specific to the analysis of Community Septic solution)
Meeting with LFMWC	March 2024	Review on progress of PER; answer any additional questions
Quality Control Team Meeting 3	April 2024 (continuous email communication + virtual meeting)	Meet with QAM, REIC, and Engineering Mentor to review project progress and receive feedback on technical questions (specific to the analysis of Constructed Wetland solution)
Meeting with LFMWC	April 2024	Review on progress of PER; answer any additional questions
Submit Draft Deliverable to CECorps for Review	May 2024	Present draft deliverable to CECorps for review by Technical Review Committee.
Final Submittal of All Deliverables to Client	TBD	Present all listed deliverables.

6 Quality Control

Throughout this project, CU-EWB is determined to meet the needs of the community by conducting surveys regularly throughout the report and alternatives analysis process. We will conduct several comparison methods to select the most suitable solution and alternatives for the community's needs based on their responses and the data we collect from our research. Our Responsible Engineer in Charge (REIC), Kajori Purkayastha PE, will monitor our progress throughout the project and assist technically in reaching the deliverables of the Work Plan and Preliminary Engineering Report to ensure that they meet the necessary engineering standards so that our final deliverable is feasible and sustainable for the community. With the guidance of our CECorps liaison, our team will submit our drafts in a timely manner so that our panel of independent reviewers will provide us with the necessary feedback as we move forward in the process. Additionally, our Quality Assurance Manager, Jeffrey M. Benway, PE, and Engineering Mentor, Evelyn Choudary, will be providing quality assurance support through continuous commentary and feedback during the writing of the PER. EWB aims to receive comments as we finish our analysis of each solution from the QAM and Engineering Mentor as well as receive ongoing support from the REIC in our research of the various solutions. Consultation with other professional agents from the California Central Valley Regional Water Quality Control Board and Yuba County's wastewater programs will also be necessary for our research of the feasibility of each of the solutions outlined by CECorps.

7 Site-Specific Safety Hazards

There are various safety hazards outlined in the CECorps Health & Safety Guidelines as well as in Columbia University's Travel Policy that the team will adhere to throughout the project, especially as it pertains to traveling to and working at the project site. Before travel, the team will request permission to visit the community, so that the community is prepared for the presence of volunteers from an outside area. In addition, proper health precautions will take place. This includes identifying local hospitals and hotels nearby in case of any injuries that may occur while visiting the community. Personal equipment, such as an emergency kit, is also useful in case of accidents. Since Lake Francis Estates is situated within a densely-forested area and neighboring creek, we will be mindful of the species present and any threats they pose (i.e. poison ivy, deer, bugs, etc.)

Appendices

Appendix A: Final – Lake Francis Estates (Yuba County) – Preliminary Assessment Report

Appendix B: May 2023 Site Investigation Findings

Lake Francis Estates
Yuba County, California

Preliminary Assessment Report

February 2023

Prepared by: John Donahue
jdonahue@awwa.org
(815) 988-1200

CECORPS: PRELIMINARY ASSESSMENT

Project Name: Lake Francis Mutual Water Company
Dobbins, CA
Septic System Evaluation

Client*:

State: California

Assessment Type (check one):

Water ____ Wastewater __X__ Both Water/Wastewater ____

Contractor Signature: _____

Client Signature: _____

2

Contents

1 General Profile 4

1.1 Location & System Information. 4

1.2 Governance, Stakeholders, Staff. 8

1.3 Shareholders 9

1.4 Population & Capacity. 10

2 General Management and Administration 11

3 Finance 13

4 Asset Management 19

5 Water Systems Evaluation 20

6 Wastewater Systems Evlauation 23

Top Engineering Needs 25

Appendix A: Location Maps & Key Features 26

Appendix B: Coleman Engineering Statement of Qualificatons 27

Appendix C: California Rural Water Association, Source Water Capacity Study 41

Appendix D: Rose Water System Assessment 83

Appendix E: USEPA Constructed Wetlands Information 93

Appendix F: Regulatory Non-Compliance Notifications 96

Appendix G: Site Photos 97

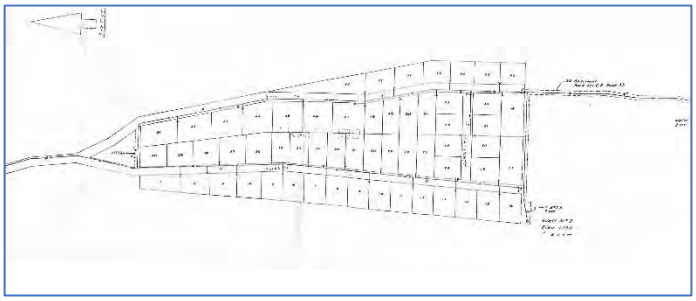
Appendix H: Advanced Ecologically Engineered System "the Living Machine" 100

1 General Profile

1.1 Location & System Information

About Lake Francis Estates

Lake Francis Estates is located approximately 70 miles north of Sacramento, California in Dobbins, CA *(Appendix A)*. Lake Francis Estates is a subdivision subject to Covenants, Conditions, & Restrictions (CC&R's) along the west shoreline of Lake Francis. It has an Architectural Control Committee (ACC) that interprets the CC&R's and issues subsequent guidelines. The subdivision development encompasses approximately 20 acres of property divided into 58 lots. All homes in the subdivision are single-family, with 1 or 2 being manufactured homes. There are no mobile homes permitted in the subdivision.



The development's water is served by the Lake Francis Mutual Water Company (LFMWC), of which all property owners are shareholders. When persons purchase property in Lake Francis Estates they are issued a membership share in the Lake Francis Mutual Water Company appurtenant to each original lot, which entitles the shareholder to receive water for domestic and irrigation use. It is important to note, the LFMWC is not a utility per se, but a non-profit company. This distinction apparently limits the LFMWC from setting water and wastewater rates based on consumption, but rather on annual costs distributed evenly to all shareholders.

The Board of the LFMWC is very interested in creating a wastewater utility to construct both a conveyance and treatment system to replace the aging septic systems privately owned by the shareholders of the company. There are currently 23 active users of the water system who own septic systems on their approximate 1/3 acre lots. These systems were originally built in the 1960's and are reaching the end of their useful life. There is also concern regarding the proximity of the subdivision to Lake Francis and the potential negative impact the septic systems could have on the water quality in the lake.

The size of the vacant (non-developed) lots are also an issue. In many cases they are too small to support a traditional septic system which would require property owners to purchase multiple lots, adjoin them and then construct. Another limitation to constructing new septic systems may be the topography of the subdivision. There is approximately 200 vertical feet of grade change from the lowest point in the subdivision (Lake Francis shoreline) to the highest. This situation alone will create challenges to determining which (if any) centralized wastewater treatment option should be utilized.

The Board of the LFMWC is also interested in pursuing environmentally friendly and sustainable options for the proposed wastewater treatment system. A constructed wetland has been discussed, but not vetted. A few of the options discussed are:

1. Constructed wetland treatment
2. Lagoon treatment
3. Community septic system
4. Advanced Ecologically Engineered System ("The Living Machine) *see appendix H*
5. A conventional activated sludge package plant should also be considered

There are approximately 85 acres of open space adjacent to the subdivision that is currently owned by the original developer (Tim Wilkinson) of the subdivision. This property could be considered for a constructed wetland or treatment facility site.

This developer (Tim Wilkinson) also owns 18 acres of open space near the entrance of the subdivision, however it is near Wells 3, 4 & 5, so careful consideration must be given to the proximity of drinking water wells to the ultimate wastewater treatment system.

Based upon conversations with the Board of the LFMWC, this developer may be very eager to dispose of this property since it been sitting vacant for many decades.

The roads in the Lake Francis Estates subdivision are owned by the individual property owners of the subdivision. A utility easement has been established perpendicular to each lot to host the water system infrastructure. It is unknown at this time if there would be adequate space in this easement to accommodate sanitary sewer pipelines.

The 2022 Annual Meeting Report of the LFMWC highlighted the community has applied for a Grant from the California State Waterboard in the amount of $618,000 to fund engineering design and construction for new water infrastructure. Modest changes to the original project scope may occur as the project moves forward. Coleman Engineering (Jon Kaminsky) is the engineer for the project *(See Appendix B)*.

1.2 Governance, Stakeholders, Staff

Lake Francis Mutual Water Company Board of Directors

Name	Position	Email	Telephone
Anna Romano	President	president@lakefrancisestates.org	(530) 324-5511
Ethel See-Winchell	Vice President/Treasurer	treasurer@lakefrancisestates.org	(818) 824-2841
Lisa Thompson	Secretary	secretary@lakefrancisestates.org	(530) 988-8154
Terry Patton	Water Manager	tands@yahoo.com	(530) 692-1082

The Board of the LFMWC are elected by the shareholders every two years, with the most recent election being held on July 9, 2022.

1.3 Shareholders

Lake Francis Estates			
Address		Owner	Value (est.)
13970	Ingersoll	BRENDAN & FRANCES ANKERS	$ 40,000
13903	Ingersoll	PATRICK SCOTT EDMONDSON	$ 25,000
13880	Ingersoll	KENNETH RAY BAKER JR	$ 20,000
13838	Ingersoll	GIOVANNI BUSCO & ANNA ROMANO	$ 275,100
13889	Ingersoll	JAMES FLEISHER & SANDRA SAETTONE	$ 325,900
13863	Ingersoll	ROBERT R CLAYCAMP	$ 8,500
13917	Ingersoll	ROBERT ARROYO	$ 19,999
13958	Ingersoll	PAMELA & JOSEPH KELLERMAN	$ 213,800
13911	Ingersoll	TEAM BUILDER LLC	$ 20,000
13904	Ingersoll	MATTHEW J & TERI VAN AIRSDALE	
13886	Ingersoll	ROOJA MOHASSESSY & TANGKAO TAN	$ 310,000
13870	Ingersoll	FISCHER SAWYER TRSTES ETAL	$ 254,700
13971	Ingersoll	MICHAEL & LISA THOMPSON	$ 19,000
13883	Ingersoll	PIETERNEL MARIA VAN GIERSBERGEN	$ 19,000
13928	Ingersoll	EMERALD COVE MARINA INC	$ 150,000
13897	Ingersoll	THEODORE C HRONES	
13941	Ingersoll	RUDY & PATRICIA GONZALES	$ 4,000
13931	Ingersoll	RUDY & PATRICIA GONZALES	$ 313,700
13869	Ingersoll	SETH STEMEN	$ 33,900
13948	Ingersoll	TIMOTHY P & JUANITA S TIMMS	$ 301,500
13936	Ingersoll	EMERALD COVE MARINA INC	$ 150,000
13846	Ingersoll	GIOVANNI BUSCO & ANNA ROMANO	$ 15,850
13894	Ingersoll	ALAIN & ERIKA LUNA CABRERA	$ 39,000
13910	Ingersoll	MATTHEW J & TERI VAN AIRSDALE	$ 12,500
13925	Ingersoll	SUSAN RAINIER	$ 13,500
13875	Ingersoll	STACY P & ETHEL WINCHELL	$ 290,700
13856	Ingersoll	DAVID & RITA BARTLETT	$ 15,850
13839	Ingersoll	CAROL N BENTLEY	$ 279,200
13920	Ingersoll	ANDREA GREENWELL & PAUL GIBNEY	$ 105,000
13961	Ingersoll	LISA & MICHAEL THOMPSON	$ 266,800
13951	Ingersoll	WILLIAM & JENNIFER DAY	$ 227,100
13857	Shirley	JAMIE SCOTT MORRISON	$ 25,000
13868	Shirley	MARCUS D WEBER	$ 21,000
13885	Shirley	SUSAN SMITH	$ 132,000
13882	Shirley	TERRY A & SUSAN M PATTON	
13849	Shirley	LARRY J & CINDY F NARDI	$ 10,500
13920	Shirley	DAVID & ARLEEN WASKO	$ 33,000
13930	Shirley	HUGO A SIBRIAN	$ 251,800
13876	Shirley	DANIEL & TAMARA BEWS	$ 9,500
13908	Shirley	ANDREA GREENWELL & PAUL GIBNEY	$ 214,700
13898	Shirley	STEPHEN & JEANNE FAIRMAN	$ 292,800
13875	Shirley	ENRIQUE GUTIERREZ	
13942	Shirley	EDWARD & KRYSTA PETERS	$ 90,909
13907	Shirley	ALBERT VERNON JR & MARY J DIXON	$ 419,800
13839	Shirley	LARRY J & CINDY F NARDI	$ 412,100
13867	Shirley	RONEL & SHIRLENE SULATAN	$ 25,000
13838	Shirley	BRIDGETTE & BRUCE EVANS	$ 299,800
10788	Kenneth	DAVID & CAROLE FONTANA	$ 120,000
10780	Kenneth	TIMOTHY & KRYSTAL MOONEY	$ 272,100
10789	Kenneth	JONATHAN & JULIANA BETH	$ 367,800
10781	Kenneth	LORETTA BANKS	$ 18,000
10799	Kenneth	JONATHAN & JULIANA BETH	
10772	Kenneth	RIGO GARCIA	$ 10,000
10798	Kenneth	DAVID & CAROLE FONTANA	$ 229,000

1.4 Population & Capacity

Description	Population (2020 US Census)						
	Total	White	African American	American Indian	Asain	Other	2 or more races
Yuba County, CA	81,575	46,590	3,052	1,754	5,774	12,227	12,178
Dobbins, CA	551	414	2	18	9	12	96
Lake Fransis Estates *	75						
* 26 lots currently developed in Lake Francis Estates. Census for Yuba County, CA estimates 2.88 persons per household							

Based upon published property values from realtor.com, there are 26 lots currently developed in Lake Francis Estates. Based upon estimated persons per household, the estimated population of Lake Francis Estates is 75.

The Median household income for Yuba County (in 2020 dollars) is $59,424 based on the most recent census. Approximately 16.3% of the people in Yuba County, CA are considered to be living in poverty. The median value of owner-occupied housing units in Yuba County (based on the 2020 census) is $273,600.

The median household income in Dobbins, CA in 2019 (city-data.com) was $37,429. The federal poverty level for a family of 4 in 2023 is $27,750. Using the Health and Human Services (HHS) conversion for MHI/Poverty Level of 125%, the poverty level in Dobbins is $34,687. This data would indicate the need to be extremely sensitive to water and wastewater rate impacts from additional capital investment and ongoing operation and maintenance costs.

The average value of homes in Lake Francis Estates according to Realator.com is $265,938.

2 General Management and Administration

Question	Y	Some	N	NA or No Information
Do your administrators and governance have a firsthand knowledge of your entire system?	X			
Is there ongoing public information and outreach to customers and the community at large?	X		Newsletter & CCR	
Does your utility have a strategic plan or capital improvement plan?	X			
Does the utility have current standard operating policies and procedures?			X	
Do managers contribute to/confirm that the annual Consumer Confidence Reports are accurate and delivered on time?	X			
Do you have a system-wide emergency response plan, including communication practices designed for emergency situations? Has a Vulnerability Assessment been conducted?	X		Members of CalWARN	
Do all staff feel their individual roles are well defined?	X			
Is your staff of sufficient size to accomplish the core functions under the organization?		X	Would like PT Accountant	
Does everyone get the training they need to maintain their certifications/licenses?			X	Contract
Does everyone receive the proper health and safety training to fit their role(s)?	X			
Do you have a high amount of turnover and struggle to retain and/or recruit employees?				X
Does your system have access to legal and regulatory expertise when necessary?	X		By contract through Cal Rural Water Association	
Has your management ensured the safety and security of your system through proper fencing, surveillance, and regular inspection?		X	Needs Improvement	
Is there adequate physical security of all assets within the system?		X		
Are there cybersecurity policies or processes in place for securing digital information?	X		Website security, Antivirus Software	
Has the utility received notifications of non-compliance that are regularly occurring and/or are currently delinquent?		X		
Does all routine monitoring and compliance sampling take place within the parameters of current permitting?	X			

Notes/Follow-up Actions:

For a mostly volunteer utility, the Board of the LFMWC does a remarkable job overseeing the needs of their shareholders. They are very proactive when it comes to leveraging member benefits from the organizations they belong to such as the California Rural Water Association, CalWARN, and now, Community Engineering Corps to maximize their knowledge of their current operational conditions and help them assess their future options at little, to no cost to the utility.

As they move forward towards investigating their options for the replacement of their aging septic systems, it will be useful to keep the new system (whatever that will entail) as simple as possible. It is important to understand this is a very small subdivision with limited growth potential and designing a wastewater system with minimal operational control would be most beneficial to the shareholders of the LFMWC long term.

Based upon my onsite visit (February 2023) with the Board of the LFMWC, from a management and administrative perspective, any future investment in wastewater treatment that results increased costs to the shareholders is likely to be a tough sell for the following reasons:

1. It is estimated there is a low tolerance for increased monthly/annual costs to the shareholders due to individual household budget limitations. It was described they may only be able to manage an additional $20 per month of costs for wastewater treatment.
2. It will be difficult to sell the idea of centralized wastewater treatment to the shareholders since all of the “developed lots” have septic systems that are currently working so they may not wish to pay for something they don’t perceive they need.
3. They will also have to overcome the real issue of stranded investments on existing septic systems should they need to be replaced before they fail.

On the plus side, the idea of centralized wastewater treatment for those property owners with “undeveloped lots” may be better received since:

1. The lots are too small for septic systems but they may be large enough to build on with a central wastewater system.
2. In order for those with small undeveloped lots to build a home, they would currently have to purchase and combine additional lots to have enough space for a septic system, a central wastewater system would likely eliminate that situation.
3. These undeveloped lots would have no stranded investment, and the cost to connect to a central wastewater system could be less than what they would be required to spend with a septic system.

3 Finance

Question	Y	Some	N	NA or No Information
Do you have adequate mechanisms in place to send out customer bills and properly collect funds?	X		Flat rate, Annual Bill	
Does your utility conduct a financial audit and are recent audit records available?	Too Expesive, Reviewed by RCAC		X	
Have you established adequate methods to address unpaid bills, up to and including disconnecting service, imposing liens, etc.?	X		Can impose lien	
Do you have established charges and fees to cover expenses for services such as new connections, unpaid bills, and service turn on/off?	X			
Does your system have water meters?			X	
Do you have automated meter reading?			X	
Do you provide on-line bill pay services for your customers?	X			
Does your system manager develop, review, and approve annual budgets and monitor annual spending? Does the capital budget look forward at least 5 years and preferably 10 years?		X	As needed	
Does your system maintain and use a core set of financial policies and procedures?	X			
Does your system set aside reserve funds regularly?		X		
Are your rates sufficient to recover operations and maintenance expenses, as well as cover debt service and make reinvestments?	X		Adequate next 5 years	
Are rates evaluated and/or adjusted on an annual or regular basis to ensure costs are covered?		X	Will consider for future	
Do you track and report regularly on how well you are following your established annual budget?			X	
Does paying debts (bonds or loans) keep you from paying for other things?		No current debt		X
Do you have enough financial reserves to pay for 6 months of O&M expenses?	X			
Do you have an established method of communication that helps your customers understand the true costs and value of the water services you provide?	X	Newsletter, website, social media		
Are there procurement policies in place defining bid thresholds, bidding policies, etc?	X			

Notes/Follow-up Actions:

The LFMWC operates on a Fiscal Year (April 1 – March 31). The Board would prefer to move to a calendar year basis; however, a variety of issues prevent them from doing so.

The Board does an excellent job managing the water utility, and they are truly committed to ensuring the utility is sustainable. However, I believe they, and their customers, would benefit from implementing some basic utility management initiatives. They should consider developing a multi-year budget, and capital improvement plan. Given their strategy to implement a wastewater utility in conjunction with their existing water utility, these simple actions would provide them with a plan for the future and help them manage expectations as they move forward.

Based upon a conference call with the Board members, they are under the impression they are unable make "a profit" from their utility since it is a "non-profit" 501(c)(3) organization. While the members are considered shareholders, I believe they are still allowed to generate adequate revenue through rates to develop a cash reserve. Maintaining a reasonable reserve (suggest at least 6 months of O&M) is a policy most every utility uses to ensure they are able to manage emergencies and future capital programs. I would suggest they establish a written policy related to their financial reserve goal and couple that with their capital improvement plan as a justification for the amount.

Currently, the water utility charges a flat rate ($1,200 / year) to all customers for water use. This fee is charged on an annual basis. However, the Board has implemented an online payment system which allows users to pay their water bill on any frequency they wish (monthly, quarterly, etc.) in order to make the payment more manageable for their shareholders. I also believe they are considering metering their water services. I would encourage this initiative, especially with the consideration of establishing a wastewater utility. With individual metering, the utility would be able to monitor their "water loss" which is a significant issue with aging water distributions systems. In addition, the utility could consider setting water and wastewater rates based on actual consumption (if their corporate status permits), in addition to an annual "fixed fee" for all users as described in AWWA's M54 manual. This rate program would create a little more fairness, so customers who use the most water, pay the most, while everyone would pay the same "fixed charge" for those costs that are fixed each year such as meter reading, administration, contract labor, debt service etc.

I would also recommend the utility consider initiating a modest rate increase each year to help keep pace with the rate of inflation (Consumer Price Index). This allows the users to keep up with inflation through regular increases versus large increases every 5-10 years, which are typically less desirable.

The following 4 pages include the two most recent Profit and Loss Statements for the Lake Francis Mutual Water Company.

Lake Francis Mutual Water Company

Profit and Loss

April 2021 - March 2022

	TOTAL
Income	
Board Members water benefit	-4,800.00
Developed Water Fees	20,626.31
Unapplied Cash Payment Income	0.00
Undeveloped Water Fees	8,679.08
Total Income	**$24,505.39**
GROSS PROFIT	**$24,505.39**
Expenses	
Advertising/Promotional	1,045.29
Bank Service Charges	70.00
Depreciation Expense	371.00
Education	745.00
Fire Protection Maintenance	1,050.00
Insurance	2,691.00
Licenses and Permits	682.08
Miscellaneous	100.00
Office Expenses	
Computer software	39.95
Dues & subscriptions	1,007.90
Office Supplies	557.53
Website hosting	42.32
Total Office Expenses	**1,647.70**
Postage and Delivery	24.43
Professional Fees	
Board of Directors	1,600.00
Filing	296.00
Legal & Professional Fees	14,933.17
Tax prep	386.72
Water Manager	400.00
Total Professional Fees	**17,615.89**
QuickBooks Payments Fees	88.35
Repairs	
Water Line	7,920.00
Well	200.00
Total Repairs	**8,120.00**
Taxes	
State-Corporation	737.93
Total Taxes	**737.93**

Lake Francis Mutual Water Company

Profit and Loss

April 2021 - March 2022

	TOTAL
Travel	
Mileage	22.40
Total Travel	**22.40**
Utilities	2,984.10
Venues and Meetings	50.00
Water Testing Monthly	3,240.00
Total Expenses	**$41,285.17**
NET OPERATING INCOME	**$ -16,779.78**
Other Income	
Financials Fees	383.25
Grants for Administrative Fees	296.00
Total Other Income	**$679.25**
NET OTHER INCOME	**$679.25**
NET INCOME	**$ -16,100.53**

Lake Francis Mutual Water Company

Profit and Loss

April 2020 - March 2021

	TOTAL
Income	
Board Members water benefit	-4,200.00
Developed Water Fees	25,820.00
Interest Income	
Interest Inc	11.89
Late Fee Inc	35.00
Total Interest Income	**46.89**
Undeveloped Water Fees	9,660.00
Total Income	**$31,326.89**
GROSS PROFIT	**$31,326.89**
Expenses	
Bank Service Charges	70.00
Education	470.00
Fire Protection Maintenance	1,365.00
Other Business Expenses	608.62
Total Fire Protection Maintenance	**1,973.62**
Improvement	
Road Improvement	147.82
Total Improvement	**147.82**
Insurance	1,304.00
Licenses and Permits	545.37
Office Expenses	
Computer software	420.00
Dues & subscriptions	547.88
Office Supplies	140.36
Website hosting	105.08
Total Office Expenses	**1,213.32**
Postage and Delivery	29.20
Professional Fees	
Board of Directors	600.00
Filing	5.00
Legal Fees	13.50
Tax prep	365.40
Water Manager	400.00
Total Professional Fees	**1,383.90**
QuickBooks Payments Fees	35.90
Repairs	
Water Line	3,639.50
Total Repairs	**3,639.50**

Lake Francis Mutual Water Company

Profit and Loss

April 2020 - March 2021

	TOTAL
Taxes	
State-Corporation	1,707.00
Total Taxes	**1,707.00**
Travel	
Mileage	46.00
Total Travel	**46.00**
Utilities	2,931.38
Water Testing Monthly	3,507.40
Total Expenses	**$19,004.41**
NET OPERATING INCOME	**$12,322.48**
Other Income	
Financials Fees	175.00
Total Other Income	**$175.00**
NET OTHER INCOME	**$175.00**
NET INCOME	**$12,497.48**

You can see the LFMWC was in the black with a net income of $12,497.48 for Fiscal Year 2020-21 but had a deficit of $16,100.53 for Fiscal Year 2021-22. The reason for this fluctuation is cash flow. As of February 2023, they are operating with a positive reserve position. This situation is what can happen when using an annual fee. Often, income is received after the fiscal years books are closed out.

4 Asset Management

Question	Y	Some	N	NA or No Information
Does the system have an up-to-date schematic map that includes all major physical assets? (examples of major assets include wells, distribution mains, storage facilities, hydrants)	X			
Are there SOPs for O&M for any or all of the system assets?			X	
Are maintenance records kept that include procedures performed, dates completed, and notes on observation of asset condition during maintenance?			X	
Has the age and condition of production wells been documented?	X			
Does the system have a complete pipeline inventory that documents size, length, age, location, and materials of construction?	X			
Has the size, age, and materials of constructions been identified for all distribution system storage tanks?	X			
Does the utility have a lead service line inventory/map?				X
Does the utility have an inventory of its pumping facilities, including information on number, capacity, size, age, inspection records, and strategy for redundancy?		X		
Does the system have adequate backup pump capacity?			X	
Do your facilities have backup power for emergencies?		X		
Does the utility have a current inventory of all valves and hydrants, including installation and repair history?	X			
Do valve and hydrant records include what occurred during the last hydrant flush? Are there issues? Do valves close properly and has there been a change to flushing practices?			X	
Does an asset management program exist that includes information such as condition assessment, residual life, replacement cost estimate, level of service targets, criticality,			X	
Are there any asset replacement projects currently in progress or planned for the near future?	X			
Are there spare and replacement parts for critical devices regularly stocked?			X	

Notes/Follow-up Actions:

The LFMWC is working with a consultant to evaluate their water system assets and develop a maintenance program.

5 Water System Evaluation

Question	Y	Some	N	NA or No Information
Does the system have a source water protection program/plan? Is there source water sample data that can be examined?	X			
Is a cross-connection control program in place?			X	
Have potential sources of microbial and chemical contamination of water sources been identified?			X	
Are all the wells constructed according to AWWA Standard A100-15?				X
Are your wells maintained to prevent vulnerability to contamination?				X
Does the utility have sufficient well capacity to meet its current and projected long-range water demand?			X	
Is there master meter or pumping data available to assist in conducting a water loss audit?	X			
Does the utility routinely monitor source water level/supply and quality?				X
Is the utility meeting its current sampling requirements for select constituents and frequency? (examples include sampling for constituents such as chlorine residual or bacteria)	X	The system is not routinely chlorinated		
Are sampling locations representative of the water quality throughout the system?	X			
Are there exceedances of local regulatory limits (health, secondary, MCL, etc) for certain constituents? (Provide records where available)			X	
Do sample locations show that disinfectant residual levels meet local regulatory requirements?				X
Does your system monitor and track main-break events, repairs, and the frequency/location?	X			
Are there SOPs for main break events?	X			
Is pressure monitored at a minimum of 2 critical sites (high and low)?		X		
Measured or anecdotally, are there customers that do not have sufficient pressure or too much?			X	
Are distribution system storage tanks regularly inspected?			X	

Notes/Follow-up Actions:

The California Rural Water Association conducted a **Source Water Capacity and Storage Assessment** of the LFMWC in 2022 *(see Appendix C)*. The information in the following paragraphs are excerpts from that report.

The LCMWC is serviced by two active wells (Well 4 & Well 5). Wells 1 & 2 were abandoned and Well 3 is inactive. Well 4 produces approximately 23 gallons per minute (gpm), and Well 5 produces approximately 30 gpm to the distribution system. Both wells are equipped with a production meter and production readings are logged monthly. Chlorination is only used for emergency disinfection purposes; no continuous disinfection practices are used. Both wells draw from a fractured rock aquifer.

Arsenic levels in Well 5 exceed the Maximum Contaminant Level (MCL) of 10 ug/L, therefore, water from Well 5 can only be pumped when it is blended with water from Well 4. Blended samples are taken from the sample tap located near Well 3. Analytical results taken from the blended sample tap suggest the blending ratio meets state and federal standards for arsenic.

The main transmission line is 4-inch class 160 polyvinyl chloride (PVC) pipe configured in a loop system to avoid stagnant dead ends. All service connections, except lot 58, are serviced by a double service connection. The system is currently unmetered and does not have a method to determine water loss from unknown leaks. The system has five 4-inch standpipe hydrants and three gate valves.

Three gravity storage facilities maintain pressure in the distribution system and satisfy demand when the wells are not running. The system has one pressure zone. Tank 1 is approximately 7,000 gallons, Tank 2 is approximately 10,000 gallons, and Tank 3 is approximately 14,000 gallons for a total storage capacity of 31,000 gallons. However, a float gauge prevents the tanks from filling above 2/3 full, therefore, the usable storage is approximately 20,400 gallons. The storage facilities are not National Sanitation Federation (NSF) 61 certified and are therefore not suitable for use in drinking water systems. Efforts are currently underway to replace the existing storage facilities. See Appendix B for system maps.

Based on the results of this analysis and the field data collected on March 2, 2022, Well 4 and Well 5 are able to produce the volume of water needed to sustain a full buildout of 58 lots. However, additional field investigations taken during the summer months may be necessary to further substantiate these findings. The additional storage required for a full buildout is 12,000 gallons with the 10% increase in storage or 14,200 gallons without the 10% increase in storage. This is the minimum additional volume needed to meet the estimated maximum day demand at full buildout. This value does not include the additional volume needed for fire protection.

Rose Water System Management, LLC (March 8, 2021) Water System Assessment

In March of 2021, Rose Water Management, LLC conducted a Water System Assessment *(Appendix D)* of the LFMWC. This assessment served to identify the highest priority needs for the water system and provide supporting rationale.

Among the recommendations produced from their report are:

1. Conduct a Preliminary Engineering Report (water system)
2. Perform a hydraulic model of their water system
3. Consider additional water storage for fire protection
4. Consider portable generator for standby power
5. Consider water meter installation
6. Consider installing supervisory control and data acquisition (SCADA) system.
7. Consider performing well evaluation and maintenance

6 Wastewater Systems Evaluation

Question	Y	Some	N	NA or No Information
Is the centralized system meeting NPDES discharge requirements in their permit? Obtain NPDES permit or discharge monitoring reports.				X
For a centralized system, have there been recent inspection of the collection system and all lift/pump stations?				X
For a centralized system, is the stormwater system combined or separated?				X
For a centralized system, is the capacity sufficient to handle current and/or future projected flows?				X
For a centralized system, are key process control parameters monitored on a regular basis, either through grab samples or automated analyzers?				X
For a centralized system, is there metering of energy use for mixing, pumping, and aeration?				X
For a centralized system, are there recent events of unintended discharges or overflows of the primary containment, and are there known reasons why these				X
What is the final disposition of the treated effluent, method, and rights/ownership of that disposition in place?				X
For septic systems, can residents generally afford the maintenance of their system?			X	
Are septic systems owned by individual property owners, and are there records to understand the relative age and construction of the septic system?	X			
Is there any anecdotal evidence unintended leaks, discharges, or standing sewage that is not treated? Is there anecdotal or data-driven evidence showing resident contact with untreated wastewater?			X	
Do the septic systems have leach fields associated with them, and do those leach fields appear to be functioning/flowing?	X	Unknown Condition		
Are there key environmental features or sensitive habitats or areas that may be impacted by wastewater discharge?	X	Lake Francis is immediately adjacent to the subdivision		

Notes/Follow-up Actions:

Based upon some limited research, the average cost of installing a septic system in the Sacramento, California area is between $8,500 – $10,500. This includes a leach field, concrete tank (1,000-gallon capacity), and PCV piping for a conventional system. It does not include removing any existing equipment/tanks/material from the original septic system. It also excludes percolation tests, permit/inspection fees or landscaping.

An important aspect of determining the options for considering centralized wastewater treatment is the topography of the area.

The topographic map above indicates the subdivision is very three dimensional. There are areas of high ground at 1,880’ above mean sea level to 1,680’ above mean sea level at the lake. This results in 200’ of elevation change across the subdivision. This topographic challenge must be taken into consideration no matter which wastewater treatment alternative is chosen.

Top 3 Engineering Needs

Based on the evaluation above, identify the top 3 engineering needs the community might have that could be reasonably completed within a period of 1 year, for the approximate cost of $30,000. An engineering need may be related to a response to a compliance violation, an engineering study supporting a critical decision, an administrative need for planning (emergency response, capital improvement, alternatives analysis, business plan).

1. Depending upon the wastewater treatment system selected, an NPDES permit may be required. I would suggest the CE Corps team reach out to the appropriate regulatory agency to determine if an NPDES could be permitted for discharge into either Lake Francis or Dobbins Creek. If an NPDES permit is not possible, wastewater treatment alternatives will be greatly reduced.

2. The subsurface geological condition of the subdivision is also an important consideration for determining wastewater treatment alternatives. I am aware the LFMWC has access to the "drillers" logs for their wells so I would suggest the team obtain those logs and any other subsurface information they can to have a thorough understanding of the geological conditions in the subdivision.

3. The CE Corps team should evaluate at least 3 wastewater treatment options for this very small system. These could include the ones described in Section 1.1 or others that the team wishes to consider.

I am concerned the financial impact of any wastewater project may not be palatable to the shareholders unless 100% of the costs can be grant funded, including some O&M. These shareholders already pay $100 / month for water, while the water bill for the average American is only $45.44 per month. This coupled with the low-income nature of the shareholders in the Dobbins, CA area make additional utility costs a serious issue.

*Based on the evaluation above, identify the top **non-engineering** needs for the community, which may include training, public communication, staffing, management, financial analysis, etc. This would be for a subject where an engineering firm would not typically be hired.*

1. As stated in this report, support from the shareholders will be essential to moving a wastewater project forward. I might suggest the LFMWC, or the CE Corps team send out a community survey to ascertain the shareholders appetite for supporting any wastewater project, especially when it comes to additional costs. While the Board is sensitive to the shareholders financial risk, it would be helpful to understand just how much the community as a whole is willing to pay for the improvements, especially the potential operation and maintenance costs.

Appendix A: Location Maps and Key Features