WATER SECTION FROM DRAFT ENVIRONMENTAL ASSESSMENT (PREPARED BY HO‘OKULEANA LLC OCTOBER 2020)

APPENDIX

I-1

4.7 Water Resources & Wastewater

This section discusses the water resources and wastewater management practices in the region and in the subject property area and the potential impacts of the project on those resources, and mitigation measures the project will employ to mitigate those potential impacts.

4.7.1 Environmental Setting

R. M. Towill Corporation prepared a preliminary engineering report for the project. The following water and wastewater matters are from that report, as well as other sources, as noted. It should be noted that at the time the preliminary engineering report was written (Exhibit G), the Hōkūao project was intended to be a 200-unit 201H housing development. Since then the unit count has decreased to a 150-unit 201H housing development, nonetheless the footprint of the development has remained the same. The estimated water and wastewater amounts should be lower, and the recommendations proposed remain valid.

Water Sources

The following is from the Lānaʻi Water Use and Development Plan (2011.) Lānaʻi lies in the rain-shadow of Maui and Molokai. The island has no major surface water sources. The sustainable yield (SY) of Lānaʻi is estimated at 6 million gallons per day ("MGD"). Virtually all of this is located in the Central aquifer sector which is divided into two aquifer systems with 3 MGD each. Withdrawals come primarily from eight wells, with the exception of about 2,000 GPD. The Commission on Water Resource Management (CWRM) in 2019 reviewed all the Hawaiʻi Counties' SY and increased/decreased/no change as a result of further water analysis entitled Robust Analytical Modeling (RAM). On Lānaʻi they allowed for the possibility that there are seven additional aquifers that could provide water to Lānaʻi with up to a SY of 36M GPD. Further research is needed and then accepted by CWRM to change the SY from 6 MGD. The following notes the Predicted Sustainable Yields Ranges Considered by CWRM (Sustainable Yield (SY) in Million Gallons Per Day (MGD)) (Water Resources Protection Plan 2019 Update (page 75)):

Aquifer Sector	Aquifer System	RAM (1990)	RAM (2008) corrected *(1)*	RAM + Updated Information *(2)*	RAM 2 + Updated Information *(2)*	*SY Range (2019)* *(3)*	Previously Adopted SY (2008)	SY (2019)
Lānaʻi								
Central	Windward	3(4)	3	5	~	*3-12*	3	3
Central	Leeward	3(4)	3	5	~	*3-6*	3	3
Mahana Sector	Hauola	~	~	3	~	~-3	0	~0
Mahana Sector	Maunalei	~	~	2	~	~-2	0	~0
Mahana Sector	Paoma	~	~	4	~	~-4	0	~0
Kaʻa	Honopū	~	~	4	~	~-4	0	~0
Kaʻa	Kaumālapaʻu	~	~	2	~	~-2	0	~0
Kanao	Lealia	~	~	1	~	~-1	0	~0
Kanao	Mānele	~	~	1	~	~-1	0	~0

General Comments & Historical Background on Changes to Aquifer System Boundaries and Sustainable Yield:

(1) Corrected minimum for 2008 WRPP SY based on 2017 review of RAM D/I, recharge that should have been used in 2008, or mathematical errors)

(2) RAM or RAM 2 methodology using updated best information available for recharge estimates. In cases where multiple valid studies were published ranges of SY are shown.

(3) 2019 SY Range - The bounds of the sustainable yield range were set based on the minimum and maximum estimates resulting from the comparison between the green columns: corrected RAM 2008, RAM + Updated best available Information, and RAM 2 + Updated best available Information.

(4) The Sustainable Yield values

The following illustrates the existing water service on the Island.

Schematic Layout of Lānaʻi Water Systems

The Lānaʻi Water Company privately owns the domestic water system on Lānaʻi.

The water for this system is provided by existing groundwater sources and the water quality has met all State of Hawaiʻi regulations for drinking water. All water quality monitoring required by the State of Hawaiʻi Department of Health, Safe Drinking Water Branch, Annual Consumer Confidence Reports are available to all customers on the Lānaʻi Water Company Website.

The water system for Lāna‘i is divided into nine (9) aquifer systems for the island. The Project falls within the Leeward Aquifer; however, water to support the project is intended to come from the Leeward and Windward aquifers.

Some Key Points on the Lāna‘i Water System as Noted Primarily from the Lāna‘i Water Use and Development Plan (2011)

Lāna‘i has five water supply systems, including two public drinking water systems, two reclaimed water systems, and a brackish water system. All are owned and operated by wholly owned subsidiaries of Pūlama Lāna‘i.

The following information is from the Lāna‘i Water Use and Development Plan (2011); there have been changes in certain operations and uses (i.e. Mānele was renovated and has changes in operations, Kō‘ele Lodge has been renovated and the Kō‘ele golf course is not in operation), but the summary gives a good contextual background of the systems, as indicated in the CWRM-approved Plan:

- Lāna‘i Water Systems
    - Two drinking water systems
        - Lāna‘i City to Kaumālapa‘u (PWS 237)

          The system has five available wells for service, three tanks and roughly thirty-five miles of potable line. Source for this system is/can be drawn from three wells:

            - Well 2/Shaft 3 is a potable source, and was once a major source of the pineapple plantation’s irrigation water.
            - Well 3 is located such that it has the most flexibility of any source in the system, but it was most recently used primarily as backup for the Mānele system, serving as a secondary backup for the City, Kō‘ele and related areas.
            - Well 4 services the mauka region.
            - Well 6 is a major source for this system.
            - Well 7 has never been in regular use but is considered a future source.
            - Well 8 is located above the City and the former Kō‘ele Golf Course.

                - Total Installed Capacity 2.416-MGD
                - Installed Capacity of Potable Sources 2.016-MGD
                - Average Fresh Water Use 0.523 metered/0.605 pumped
                - Average Reclaimed Use 0.209-MGD Kō‘ele Golf Course
                - Capacity of Brackish Sources in Use 0.000-MGD
                - Capacity of Reclaimed Water Facilities 0.400-MGD
                - Average Effluent Production 0.235-MGD
                - Potable Storage 2.786-MGD
                - Non Potable Storage 16.8 active/22.8-MGD total

        - Mānele, Hulopo‘e and the Pālāwai Irrigation Grid (PWS 238)

          The Mānele Water System may be served by several wells, five tanks and roughly thirty-five miles of potable waterlines.

            - Wells 2 and 4 are the primary wells for this system
            - Well 5 has not seen much use and is considered a potential backup or future source for the Mānele area.
            - Well 6 is currently a major source serving this system.

                - Total Installed Capacity 4.518-MGD
                - Installed Capacity of Potable in Use 3.024-MGD
                - Average Potable Use 0.375 metered/0.683 pumped
                - Average Brackish Use 0.760 metered/0.944 pumped
                - Average Reclaimed Use 0.073-MGD
                - Capacity of Brackish Sources in Use 1.354-MGD
                - Capacity of Reclaimed Water Facilities 0.140-MGD
                - Average Effluent Production 0.073-MGD
                - Potable Storage 2.000-MGD
                - Non Potable Storage 17.85 active/19.35-MGD total

        - Two reclaimed water systems used for irrigation

        - One brackish water system used for irrigation

- Collectively, these systems include about 79-miles of active pipe, 35-MG of storage, of which about 4.8-MG is potable, and about 6.394-MGD installed well capacity of which 5.04 is potable.

- No surface water sources remain on Lāna‘i, although historical evidence points to the fact that the island once had springs, streams and even taro lo‘i. Lāna‘i has 13-ahupua‘a. Of one hundred and ten kuleana claims made within these ahupua‘a, fifty-six were awarded.

- Fresh water is found only in high level dike confined compartments in the Central Sector. The hydrogeology of Lāna‘i is unusual in various respects, among them the predominance of high level water.
    - High-level water is found within 3.8-miles of the coast all around the island.
    - Numerous dike and fault boundaries divide the main aquifer into many smaller, relatively independent compartments bounded by vertical walls of lower permeability.

- Only the Central Aquifer sector is believed to contain fresh water.

- Estimates of sustainable yield on the island have varied from about 5- to 10-MGD, with the current regulatory sustainable yield estimate at 6-MGD.

- The island's entire sustainable yield of 6-MGD is found in the Central Sector.
    - The Central Sector is divided into two aquifer systems, the Leeward and the Windward, with 3-MGD sustainable yield in each.

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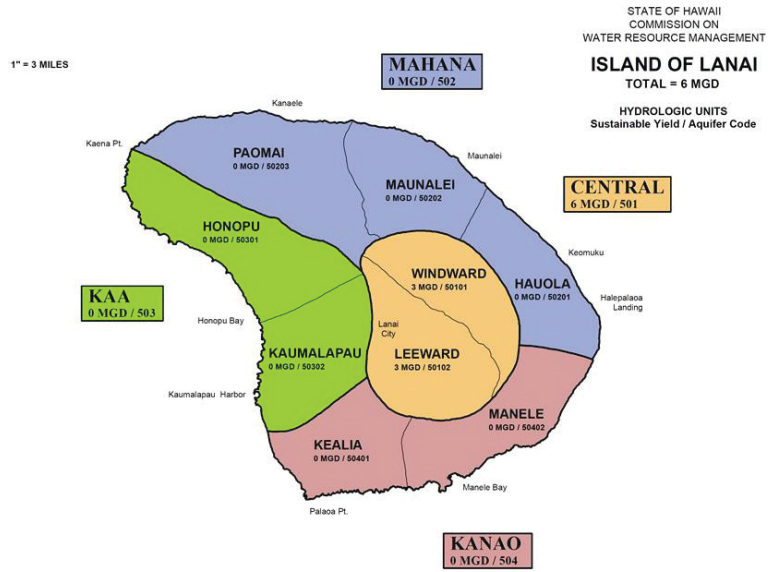
- There are currently 7 pumped sources, with one pumped at only 2,000-GPD.
    - Average day capacity of potable systems in use, by System Standards, equates to about 2.24-MGD.

- According to the Lāna‘i Water Company Periodic Water Report, the current moving average pumping is 1.643-MGD (2020 PWR).
    - All pumping sources, but one, are currently located in the Leeward aquifer system, with about 85% of total pumpage coming from the Leeward aquifer system.



Commission on Water Resource Management (CWRM)

The Commission on Water Resource Management provides a variety of resources to the public to ensure the proper management of Hawai‘i’s water resources. As defined in the State Water Code, the Commission protects and manages the State’s ground and surface water resources.

First and foremost, the Commission utilizes a permit system to regulate water use and ensure the integrity of our streams and aquifers. Permit forms and applications, along with request forms for other Commission actions, are available to the public for download.

Ground-water hydrologic units have been established by the Commission on Water Resource Management to provide a consistent basis for managing ground water resources. The units are primarily determined by subsurface conditions.

In general, each island is divided into regions that reflect broad hydrogeological similarities while maintaining hydrographic, topographic, and historical boundaries where possible. Smaller sub-regions are then delineated based on hydraulic continuity and related characteristics. In general, these units allow for optimized spreading of island-wide pumpage on an aquifer-system-area scale.

An aquifer coding system is used to reference and describe the ground water hydrologic units delineated by CWRM. It is established to provide a consistent method by which to reference and describe ground water resources, and to assist in various water planning efforts. The coding system was first initiated by the State Department of Health in response to directives from the U.S. Environmental Protection Agency.

Since then, boundary delineations of ground-water hydrologic units were manually drawn or retraced by the DLNR Division of Water and Land Development (DOWALD) General Flood Control Plan of Hawai‘i (1983), the State Department of Health (1987), and the Commission on Water Resource Management (1990). (CWRM)

On January 22, 2014, the Commission required all wells in the State of Hawai‘i to report monthly ground water use including quantity pumped, chloride (and/or conductivity) concentrations, temperature, and (pump off) water-level data (CWRM)

Lāna‘i Water Use and Development Plan (WUDP) (2011)

In 1990 each county in the State of Hawai‘i prepared and adopted its initial Water Use and Development Plans (WUDP). These WUDPs were incorporated by the Commission on Water Resources Management (CWRM) into the Hawai‘i State Water Plan.

The State Water Code and the Maui County Charter, Chapter 11, Section 8-11.2(3) mandate that County WUDPs be consistent with County land use plans and policies. The 2030 Maui County General Plan is comprised of the Countywide Policy Plan (2011), Maui Island Plan (MIP, 2012) and the Community Plans adopted in various years.

The plans provide direction for future growth, the economy, and social and environmental decisions and establishes a Directed Growth Strategy. The WUDP does not propose alterations to proposed land use and development patterns established by the General Plan.

The original WUDP for Maui County was adopted by County ordinance and by CWRM in 1990. An update adopted by Maui County Council in 2010 was not approved by CWRM, primarily because it was limited in scope to the MDWS District rather than all water uses and needs.

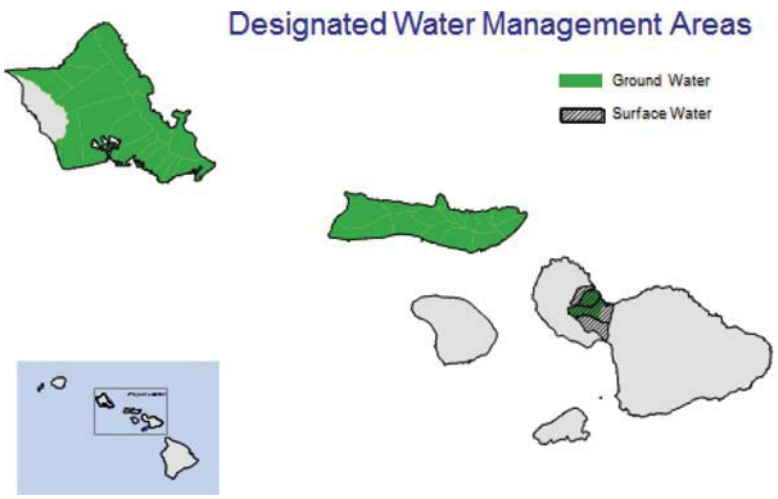
The Lāna‘i WUDP was updated in 2011 and the Molokai WUDP will be updated following adoption of this Maui Island WUDP. (Maui County WUDP Update, 2018)

Water Management Areas

Water Management Areas are special areas where additional Commission regulation is required. This additional regulation is for owners of water sources (such as wells owners) who must obtain water use permits to withdraw water for various uses. Fundamentally, individual water management areas coincide with individual hydrologic unit areas.

Science is the foundation of the Water Commission's water management area designation decision-making. State Law (HRS §174C-41) notes that designation of water management areas shall occur "when it can be reasonably determined, after conducting scientific investigations and research, that the water resources in an area may be threatened by existing or proposed withdrawals".

State Water Management Area designation is not a simple or routine process. It is complicated, expensive and has an uncertain outcome. Compounding the problem, Water Use Permits are subject to Contested Case Hearings. Lāna'i is not a Designated Water Management Area.



Map taken from the approved Water Resource Protection Plan (2019) noting Existing CWRM Designated Water Management Areas (WRPP 2019)

If a State Water Management Area designation is granted:

- Existing permittees (well owners) must apply for a Water Use Permit from the State - even the County's Department of Water Supply. No one is grandfathered in.
- There is no guarantee that any existing water user will be issued a State Water Use Permit, including the existing water company providing water to others.
- Well owners do not know what level of water use will be permitted to them.
- Well owners may receive an allocation that is lower than their present use. (In that case, water companies are obligated to provide water to existing customers, before it can consider providing water to future users.)
- The Water Commission will resolve all "existing" water uses before it will process any "new" water uses.
- Every Water Use Permit in the designation process is subject to a Contested Case Hearing.

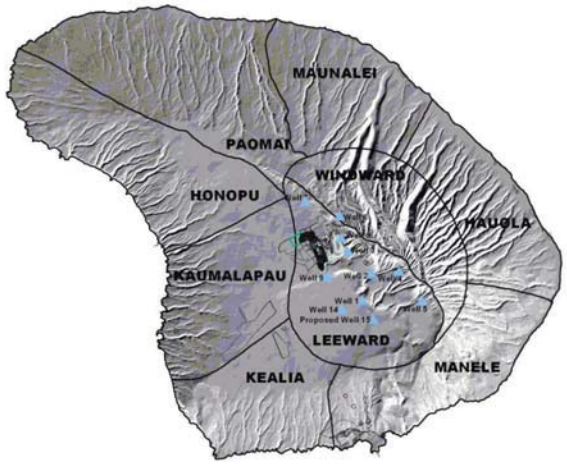
Lāna'i Water Management Area Matters

The Lāna'i Island WUDP notes Lāna'i "faces several regulatory challenges."

Resolving a petition filed in 1989, the CWRM in 1990 decided not to designate any of Lāna'i's aquifers as groundwater management areas. In lieu of designation the CWRM required ongoing monitoring, preparation of a water shortage plan and annual information status hearings. The CWRM also set conditions that would trigger reconsideration of groundwater management area designation.

"The Commission of Water Resource Management (CWRM) decided in January 1990 to authorize the Chairperson to reinstitute water management area proceedings if the static water level of any production well should fall below one half its original level above sea level. It granted the same authorization should any source of supply in the Company's plans fail to materialize but full land development continues."

"In March of 1991, another trigger was set, to reinstitute designation proceedings should total pumpage exceed 4.3-MGD. Even without these triggers, the State may initiate designation proceedings when the withdrawal from any aquifer reaches 90% of its sustainable yield, which in the case of Lāna'i's aquifer systems would be 2.7-MGD each in the Windward and Leeward systems of the island's Central Aquifer sector."



Lāna'i Aquifers and Wells (Lāna'i Island WUDP 2011)

"In response to such challenges, a resource development strategy, including sufficient conservation and new supply resources to meet expected water demand for the 2030 planning horizon, was developed. … If conservation and leak reduction targets are achieved, this strategy would result in pumpage between 3.3-MGD and 3.66-MGD in the year 2030 assuming expected levels of water demand and build-out of projects with existing entitlements." (CWRM 1990).

"Without implementation of the identified conservation measures, pumpage could exceed the 4.3-MGD trigger for proceedings by the State Commission on Water Resource Management (CWRM) to designate Lāna'i as a groundwater management area. Measures for watershed protection and source protection are identified, as well as recommendations for changes to monitoring and data management.

Status of CWRM decisions on March 29, 1990 and April 16, 1997 (as of February 14, 2019 Public Meeting)

The following summary was part of a CWRM public information meeting presentation on Lāna'i on February 14, 2019. It notes the conditions and status of each related to prior CWRM decisions on March 29, 1990 and April 16, 1997. Summary:

- Monitoring of Ground Water conditions is acceptable
- All conditions of non-designation decisions have been met
- Acceptance of Lāna'i WUDP meets intent of LWAC

Note that Lāna'i Water Company is in full compliance with all conditions noted in the CWRM actions.

The following lists (numerically/alphabetically) various conditions associated with the prior CWRM analysis on whether a Water Management Area should be implemented on Lāna'i. Below each is the CWRM statements of response to each condition (bullet points) for each condition. This information was part of the public update presentation CWRM staff conducted on Lāna'i on February 14, 2019.

Assessment of March 29, 1990 CWRM Non-Designation of Lāna'i Groundwater Management Area Decision Conditions:

1. Require Lāna'i Company to immediately commence monthly reporting of water use to the Commission, under the authority of Chapter §174C-83, HRS, which would include pumpage, water level, temperature, and chloride measurements from all wells and shafts.
    - Lāna'i Co. reports every 4 weeks which results in a 13-period reporting frequency. This is in compliance with the frequency portion of condition 1. Overall, condition 1 is followed.

2. In addition to monthly water use reporting and pursuant to Secs. 174C-43 & 44, HRS, require Lāna'i Company to monitor the hydrologic situation so that if and when ground-water withdrawals reach the 80-percent-of-sustainable-yield rate, the Company can expeditiously institute public informational meetings in collaboration with the Commission to discuss mitigative measures.
    - Monthly water use reports provide the means for monitoring hydrologic conditions. Condition was mainly to notify the public of 174C-43 & 44 concerning the requirement of public involvement for mitigative actions when 80 percent sustainable yield actual use is occurring. Based on current public involvement with the Lāna'i Water Subcommittee monthly monitoring this condition is followed.

3. Require Lāna'i Co. to formulate a water shortage plan that would outline actions to be taken by the Company in the event a water shortage situation occurs. This plan shall be approved by the Commission and shall be used in regulating water use on Lāna'i if the Commission should exercise its declaratory powers of a water emergency pursuant to Section 174C-62(g) of the State Water Code. A draft of this plan should be available for public and Commission review no later than the beginning of October 1990 and shall be approved by the Commission no later than January 1991.
    - Should be incorporated in the Water Use and Development Plan update.

4. That the Commission hold annual public informational meetings on Lāna'i during the month of October to furnish and receive information regarding the island's water conditions. The public shall be duly notified of such meetings.
    - Public informational meetings have been held annually since 1990, usually in October. The last informational meeting was held on January 18, 2001. Since then, the Lāna'i Water Advisory Committee has been formed, which relieved the Commission of public information meetings per the Commission's 1997 reconsideration of designation.

5. Authorize the Chairperson to re-institute water-management-area designation proceedings and, hence, re-evaluations of ground-water conditions on the island if and when:
    a. The static water-level of any production well falls below one-half its original elevation above mean sea level, or
    b. Any non-potable alternative source of supply contained in the Company's water development plan fails to materialize and full land development continues as scheduled.
    c. Items 1, 2, and 3 are not fulfilled by Lāna'i Company.
    d. When actual water use exceeds 4.3 MGD.
        - No part of condition 5 has materialized to warrant chairperson action. For clarification, item 5.b. referred to non-potable alternatives of wastewater reuse and wells 12 & 13 at the time of designation and full (both existing and future) land development continued. Since 1990, pineapple has been phased-out resulting in less than the full development scenario and a much reduced water consumption. Nevertheless, alternative water projects are continuing. Kō'ele & Mānele G.C.s now use treated effluent.
        - Should be incorporated in the Water Use and Development Plan update.

Assessment of April 16, 1997 Non-Designation of Lāna'i Groundwater Management Area Decision

1. Deny without prejudice the petition to designate the island of Lāna'i as a ground water management area.

2. Continue to conduct annual public informational hearing in October to monitor conditions until the formation of a permanent advisory group to monitor implementation of the Lāna'i Working Group Report.
    - Formation of the Lāna'i Water Advisory Committee (LWAC) satisfies this condition.

3. Accept the LWGR as a guide for decision making until the Lāna'i WUDP is adopted by the Maui County Council by ordinance.
    - WUDP adopted August 15, 2012

4. Request the County to provide quarterly progress reports on the formation of the ongoing community-based advisory committee, and the adoption process of the Lāna'i Community Plan and Lāna'i WUDP.
    - Formation of the Lāna'i Water Advisory Committee satisfies this condition.

5. Request Lāna'i Company quarterly progress reports on its watershed management activities.
    - Submitted to LWAC on fencing and hunting issues which satisfies this condition. October 2018 Pūlama Watershed Report submitted to DLNR DOFAW. 2019 an island-wide Natural Resources Management Plan expected.

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... to take responsibility ...

6. Request the LUC to provide regular updates as to the status of Lāna'i-related issues before the LUC, including a copy of court decisions that may affect these issues.
    - Should be incorporated in the Water Use and Development Plan update.

Ground Water Pumping and Reporting

Under the Hawai'i Administrative Rules Title 13 Chapter 168 Subtitle 7, the collection & submittal of monthly water use reporting, including pumpage, chloride concentrations, temperature, and (pump off) water level data, is required.

The 12-Month Moving Average (12-MAV) is used to smooth out short-term fluctuations and highlight longer-term trends or cycles in pumpage. To determine the 12-MAV for a selected month: the pumpage in million gallons per day (MGD) for the selected month is added to the pumpage in MGD for the previous 11 months then this total is divided by 12 (or averaged) which gives the 12-MAV for the selected month.

The reported 12-month moving average of pumping from Lāna'i wells in 2018 were 1.527-MGD (as of December 2018) and 1.555-MGD (in August 2019). In a May 21, 2018 letter to Kurt Matsumoto, Chief Operating Officer of Pūlama Lāna'i, Water Commission Deputy Director, Jeff Pearson, noted

> "The Commission also continues its active monitoring involvement through monthly water use reports, where Lāna'i Water Company Inc. has always shown exemplary reporting. As such, Lāna'i is the only island we can confidently post total historical island-wide pumpage against Lāna'i's sustainable yield to show that the resource is not threatened. …
>
> If more data is desired to be posted we can do that; however, it should be understood that pumpage within the adopted estimates of sustainable yield indicates that the public trust resource is not threatened."

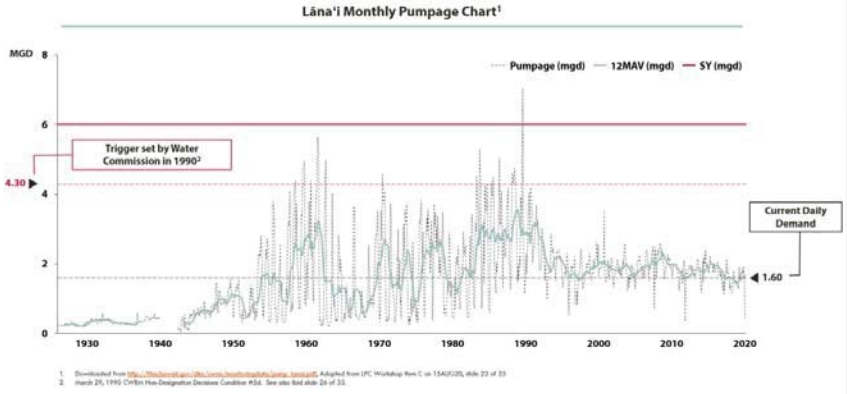
As noted in the following, Lāna'i is the only Island with regular reporting (WRPP 2019; page 14).

Water Use Reporting by Island 2016

Island	Total # of Production Wells[1]	# Wells Reporting Water Use	Compliance Rate
Kaua'i	288	139	48.3%
O'ahu	818	491	60.0%
Moloka'i	89	40	44.9%
Lāna'i	10	10	100.0%
Maui	567	240	42.3%
Hawai'i	927	331	35.7%
TOTAL	2,699	1,251	46.4%

1. Production Wells are defined as all wells that are not abandoned, observation, or unused wells.

The following notes the monthly pumpage and 12-month moving average for Lāna'i wells from 1926 through early 2018:



Monthly Pumpage (blue) – 12-month moving average (green) and Sustainable Yield (red) for Lāna'i wells (CWRM)

(Note peak withdrawal years in the 1950s to early 1990s were during the pineapple cultivation on the island.)

The following summarize existing demands as of December 2016 in relation to aquifer system area sustainable yields for the Island of Lāna'i. Water use is based on reported pumpage as of December 31, 2016, unless otherwise noted. Aquifer sustainable yields are those noted in the 2019 update of the WRPP (2016 data). (WRPP 2019 Appendix H)

Existing Demands by Aquifer System Area, Island of Lāna'i, December 2016

(Aquifer Code Number) Aquifer System	Sustainable Yield (SY) (MGD)	Existing Water Use (MGD) 12 MAV	SY minus pumpage (MGD)	Existing Water Use as a Percent of SY
(50101) Windward	3	0.27	2.73	8.9%
(50102) Leeward	3	1.51	1.49	50.4%
(50201) Hauola	0	NRU	NRU	NRU
(50202) Maunalei	0	NRU	NRU	NRU
(50203) Paoma'i	0	NRU	NRU	NRU
(50301) Honopū	0	NRU	NRU	NRU
(50302) Kaumalapau	0	NRU	NRU	NRU
(50401) Lealia	0	NRU	NRU	NRU
(50402) Mānele	0	NRU	NRU	NRU
LĀNA'I TOTAL	**6**	**1.78**	**4.22**	**30%**

NRU: No reported water use. There are no reports of ground water use to CWRM for this aquifer system.

NOTE: Lāna'i aquifers are not designated ground water management areas; therefore, withdrawals do not require water use permits.

Hōkūao Water Demand Estimated below 121,700 GPD

The R. M. Towill Corporation Preliminary Engineering Report for the Hōkūao 201H Housing Project included information related to the water demands and supply for the project.

The "Water System Standards" for the four respective counties in Hawai'i estimates that the Average Daily Demand for water per residential unit (whether single-family or multi-family) in Hawai'i County is 400-gallons per unit; Kauai – 500-gals/unit; Maui – 600-gals/unit and Oahu – 500-gals/unit).

Conformance with the County standards provides accepted criteria for water system planning and design, although the water system, inclusive of water source, storage, and piping, will remain privately-owned and will not be subject to all County requirements.

Using the County of Maui Department of Water Supply Standards of 600 gallons per day per single family unit and 1,700 gallons per acre for a park as guides, the proposed average daily domestic water demand for the 200 single family units and the 1-acre park with future 1,500 square foot pavilion with comfort stations and parking is estimated to be 121,700 GPD. As previously mentioned, the project has been adjusted to 150 homes versus the 200 homes that the calculations were based on, that being said, the estimated water demand is expected to be lower than the calculated 121,700 GPD.

The estimated total water demand of the project is lower than 121,700 GPD. The Lāna'i Water Company has indicated
that:

> "the project will have a long-term, reliable supply of water in accordance with Chapter 14.12, Water Availability, Maui Code, upon completion of new source development."
>
> "The Lāna'i Company is in the process of permitting the development of Well #7 which is anticipated to be the source of water for the project."

This estimated demand plus recent 12-month moving average for the entire island of 1.468 MGD (Mar 2019) results in total estimated overall usage of approximately 1.590 MGD.

There is Adequate Water Supply for Hōkūao 201H Housing Project

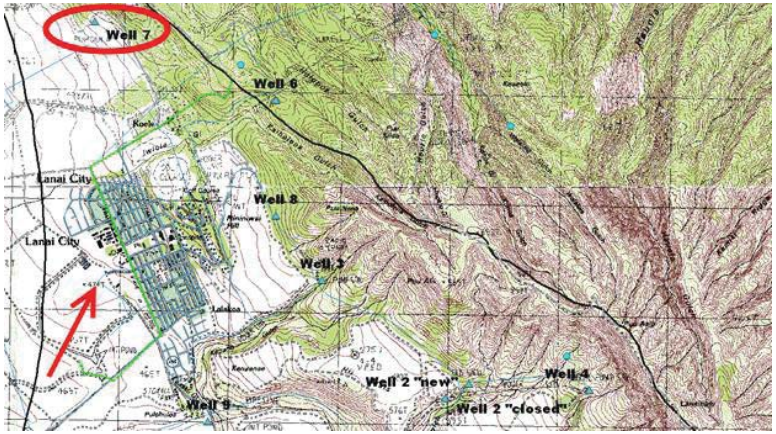
Well 7 was drilled in 1987, it will be the water source for the Hōkūao project. Well 7 is at ground level of 2,100 feet; the well depth is 1650 feet.

The well is expected to average sustainable pumping of 300,000 GPD; as noted in the following, the estimated water demand is lower than 121,700 GPD. The project fits within the Lāna'i WUDP.

Well 7 has never been in regular use. Activating and using Well 7 has been identified as the planned source for domestic water needs at Hōkūao 201H Housing Project.

This is consistent with the Lāna'i WUDP that included in its examination of new supply resource options the recommissioning of Well 7 in the Leeward Aquifer.

As noted in the Lāna'i WUDP, "Well 7 could provide both reliability and improved distribution of withdrawals on the north end of the Leeward aquifer. Well 7 has the advantage of being situated such that, with transmission improvements, it could serve either Lāna'i City or the Irrigation Grid."



Mapping noting Well 7 (red ellipse) and general location of the Hōkūao 201H Housing Project (red arrow)

Proposed Water Supply and Distribution System

The Lāna'i Water Company privately owns the domestic water system servicing the proposed. The existing regional schematic water system consists of a 12-inch waterline on Fraser Avenue.

The existing domestic water system will provide water service to the project through a new connection to the 12-inch water main on Fraser Avenue.

Proposed water distribution mains along the new roads will be 8-inch to 12-inch in diameter to ensure adequate fire protection flows can be provided. Water pressure exceeds 80 psi in some areas of this system and individual pressure reducing valves are required.

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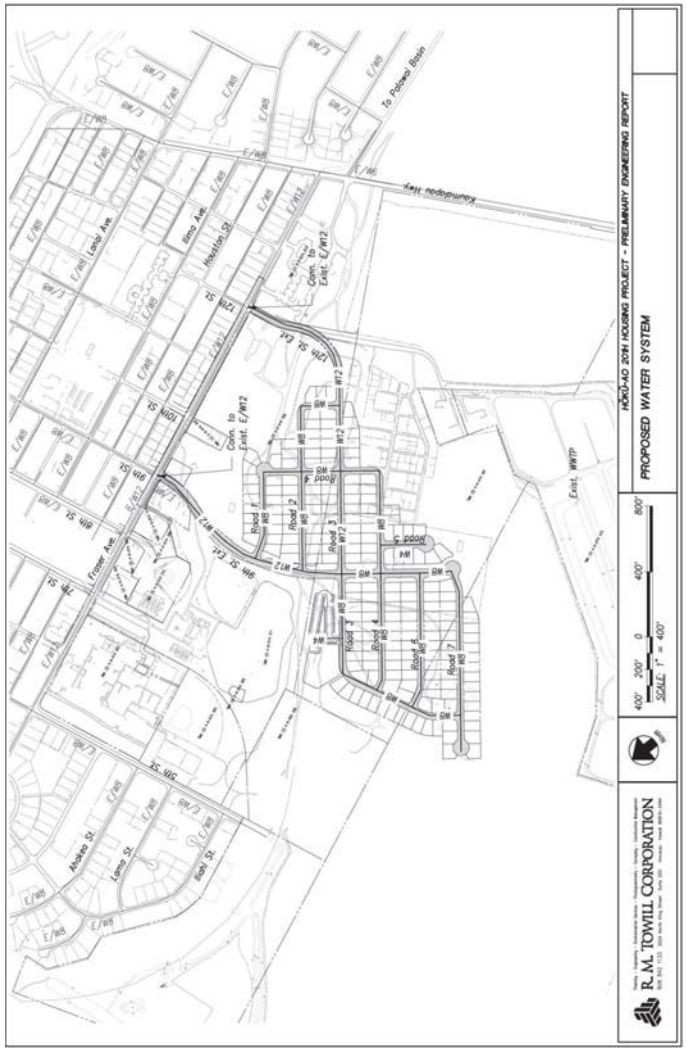
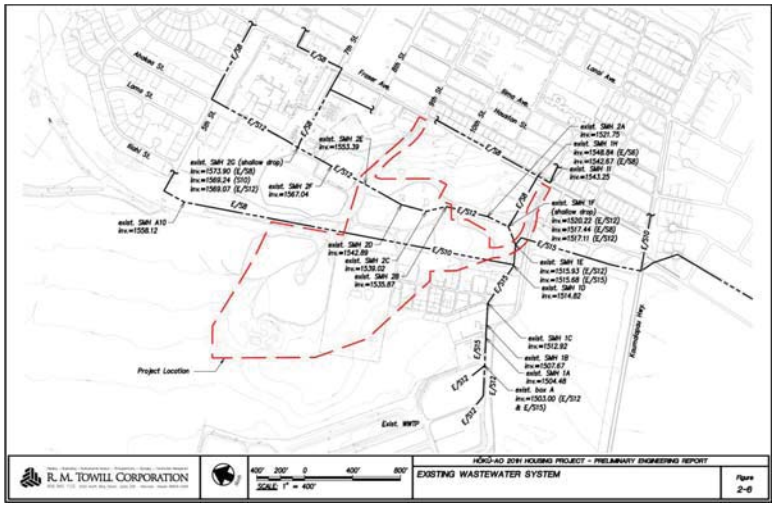


Wastewater

Lāna'i's municipal wastewater collection system is situated in and around Lāna'i City, as illustrated in the following map (R. M. Towill Corporation.)



Based on as-built plans of the Lāna'i Sewerage System and Waialua Annex Subdivision, sewer mains are located in Fraser Ave., as well as the County's major sewer collector lines which are located through the proposed project. Existing 10-inch and 12-inch sewer lines route sewage from the existing residential subdivision along Fifth Street to the 15-inch interceptor sewer which discharges to the wastewater reclamation facility west of the project site.

The existing main along Fraser Avenue consists of an 8" pipe of unidentified material, and the collector lines are a 10" vitrified clay pipe, and a 12" pipe of unidentified material. The 8" main serves the portion of Lāna'i City below Ilima Ave., between Eighth and Twelfth streets. The 10" collector line serves the entire half of Lāna'i City to the north of Seventh street. The 12" collector line serves the western portion of Lāna'i City, below Fraser Ave. The collector lines merge and flow to the Lāna'i Wastewater Reclamation Facility (WWRF).

The existing 10-inch and 12-inch collector lines will need to be relocated within proposed street right of ways and connected back to the 15-inch interceptor sewer going to the WWRF. Easements within privately owned residential lots will not be accepted by the County.

Per the County's Department of Environmental Management, Wastewater Reclamation Division, the capacity of the Lāna'i WWRF is 0.50 million gallons per day (MGD). The actual average daily flow is

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approximately 0.315 MGD, and additional allocations totaling .080 MGD have been granted to existing development, for a total allocation of 0.395 MGD. The project is located just north of the boundary of the WWRF.

Pūlama Lāna'i will conform with the requirements of Department of Health and County of Maui as it relates to installation, inspection and maintenance of individual wastewater systems in handling wastewater on the site.

4.7.2 Potential Environmental Impact & Mitigation Measures Water

Based on the County of Maui Department of Water Supply Standards of 600 gallons per day per single family unit and 1,700 gallons per acre for a park, the proposed average daily domestic water demand for the 200 single family units and the 1-acre park with future 1,500 square foot pavilion with comfort stations and parking is estimated to be 121,700 GPD. As previously mentioned, the project has been adjusted to 150 homes versus the 200 homes that the calculations were based on, that being said, the estimated water demand is expected to be lower than the calculated 121,700 GPD.

The existing domestic water system will provide water service to the project through a new connection to the 12-inch water main on Fraser Avenue. Proposed water distribution mains along the new roads will be 8-inch to 12-inch in diameter to ensure adequate fire protection flows can be provided. Water pressure exceeds 80 psi in some areas of this system and individual pressure reducing valves are required.

The estimated total water demand of the project is lower than 121,700 GPD. The LWC has noted that "the project will have a long-term, reliable supply of water in accordance with Chapter 14.12, Water Availability, Maui Code, upon completion of new source development. The Lāna'i Company is in the process of permitting the development of Well #7 which is anticipated to be the source of water for the project."

Regulatory Provisions Call for Timely Action in the Event Issues are Noted

The Commission on Water Resource Management uses regulatory controls to implement its policies and Hawai'i Water Plan requirements for well development and water use. Regulations are also used to protect ground water quantity and quality, optimize ground water availability, and obtain maximum reasonable-beneficial uses.
State law address designation of water management areas as noted in the following (§174C-41):

> §174C-41 Designation of water management area.
> (a) When it can be reasonably determined, after conducting scientific investigations and research, that the water resources in an area may be threatened by existing or proposed withdrawals or diversions of water, the commission shall designate the area for the purpose of establishing administrative control over the withdrawals and diversions of ground and surface waters in the area to ensure reasonable-beneficial use of the water resources in the public interest.
> (b) The designation of a water management area by the commission may be initiated upon recommendation by the chairperson or by written petition. It shall be the duty of the chairperson to make recommendations when it is desirable or necessary to designate an area and there is factual data for a decision by the commission. The chairperson, after consultation with the appropriate county council, county mayor, and county water board, shall act upon the petition by making a recommendation for or against the proposed designation to the commission within sixty days after receipt of the petition or such additional time as may be reasonably necessary to determine that there is factual data to warrant the proposed designation.
> (c) Designated ground water areas established under chapter 177, the Ground-Water Use Act, and remaining in effect on July 1, 1987, shall continue as water management areas.

Likewise, Hawai'i Administrative Rules set provisions for designation and regulation of Water Management Areas (HAR §13-171). As noted in the rules (§13-171-1):

> The purpose of this chapter is to provide for the designation and regulation of hydrologic areas where water resources are being threatened by existing or proposed withdrawals or diversions of water, water quality problems, or serious disputes. It shall be the duty of the commission to designate areas for the purpose of establishing administrative control over the withdrawals and diversions of ground and surface water in threatened areas to ensure the most beneficial use, development, or management of the water resources in the interest of the people of the state.

Ground water criteria for designation, as stated in the rules, are:

> §13-171-7 Ground water criteria for designation. In designating an area for ground water use regulation, the commission shall consider the following:
> (1) Whether an increase in water use or authorized planned use may cause the maximum rate of withdrawal from the ground water source to reach ninety percent of the sustainable yield of the proposed water management area;
> (2) That the rates, times, spatial patterns, or depths of existing withdrawals of ground water are endangering the stability or optimum development of the ground water body due to upconing or encroachment of salt water;
> (3) That the chloride contents of existing wells are increasing to levels which materially reduce the value of their existing uses;
> (4) Whether excessive preventable waste of water is occurring;
> (5) There is an actual or threatened water quality degradation as determined by the department of health;
> (6) Serious disputes respecting the use of ground water resources are occurring;
> (7) Whether regulation is necessary to preserve the diminishing ground water supply for future needs, as evidenced by excessively declining ground water levels; or
> (8) Whether water development projects that have received any federal, state, or county approval may result, in the opinion of the commission, in one of the above conditions.
>
> Notwithstanding an imminent designation of a water management area conditioned on a rise in the rate of ground water withdrawal to a level of ninety percent of the area's sustainable yield, the commission, when such level reaches the eighty percent level of the sustainable yield, may invite the participation of water users in the affected area to an informational hearing for the purposes of assessing the ground water situation and devising mitigative measures. (HAR §13-171-7)

Preliminary Precautionary Steps Prior to Designation

As noted in the law and rules, certain preliminary precautionary steps may be taken as monitoring of production of wells indicate any issues/concerns related to pumpage approaching the Sustainable Yield.

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Full buildout of the proposed 200-acre Miki Basin Industrial Park will be developed incrementally over a period of 30-years (not all at once.) So, there is time to monitor as the incremental development moves forward.

The 90% threshold does not automatically trigger designation; it triggers the commission to consider impacts.

The rules also note that the commission may invite the participation of water users in the affected area to an informational hearing for the purposes of assessing the ground water situation and devising mitigative measures when the level of pumping reaches the eighty percent level of the sustainable yield. So, in the event pumpage approaches these levels, there is ample time to address the matter.

Other Near-term Anticipated Water Demands on Lāna'i

A couple proposed projects pending approval and final decisions for implementation relate to the Miki Basin Industrial Park and Amendment to the Kō'ele Project District.

Water Demand for the Miki Basin Industrial Park

Water for the existing industrial uses adjoining the proposed 200-acre Miki Basin Industrial Park is currently provided by the Mānele Water System which is owned, operated and maintained by the Lāna'i Water Company. The system, sourced by Wells No. 2 (State Well No. 5-4953-001) and 4 (State Well No. 5-4952-002), currently services Mānele, Hulopo'e and the Pālāwai Irrigation Grid.

Well No. 2 has a pump capacity of 500 gallons per minute (gpm) or an average day capacity of 320,000 GPD based on an operating time of 16 hours. According to the 2011 Lāna'i Water Use and Development Plan, the well can be outfitted with a pump with a capacity of up to 1,200 gpm or an average day capacity of 768,000 GPD.

Well No. 4 has a pump capacity of 900 gpm or an average day capacity of 576,000 GPD.

The existing average daily water usage from the Mānele Water System is currently estimated at 418,000 GPD. The operation of Sensei Farms is anticipated to increase water usage to approximately 469,000 GPD at full operation.

The Water System Standards requires sources be able to meet maximum day demand with an operating time of 16 hours, assuming that the largest pumping unit is down. Since Well No. 2 has the larger pump capacity of the two wells, available source capacity for the system is governed by Well No. 4. Based on the existing water use, an average day capacity of 107,000 GPD is available to initially support the development of the 200-acre Industrial Park.

According to the Lāna'i Water Company Periodic Water Report, the current moving average pumping is 1.643-MGD (2020 PWR).

Water from the wells is either stored in the existing 0.5 million gallon ("MG") Hi'i Tank or 1.0 MG concrete Hi'i Reservoir or fed directly into the distribution system depending on need. The 0.5-MG Hi'i Tank (elevation 1823 feet) serves as the water distribution storage tank for Mānele, Hulopo'e and the Pālāwai Irrigation Grid. The 1,000,000 gallon Hi'i Reservoir (elevation 1823 feet) primarily serves as storage for the two well water sources to supply water into the distribution system.

The existing Mānele Water System consists of 10-inch, 12-inch and 16-inch transmission mains. The Mānele Water System is interconnected with the Lāna'i City Water System. During emergencies, the Lāna'i City System can supply water to the Mānele Water System by opening a valve.

A 12 - 16-inch high density polyethylene transmission mains transport water from the 0.5-MG Hi'i Tank into the Mānele Water System. The 12-inch main splits at a junction to serve both Mānele and Pālāwai Irrigation Grid.

> To Mānele and Hulopo'e – From the junction, the 12-inch line feeds into three pressure breaker storage tanks that service Mānele.
>
> To Pālāwai Irrigation Grid – From the junction, the waterline upsizes to a 16-inch main that delivers water to the Pālāwai Irrigation Grid area. The existing 12-inch Pressure Reducing Valve (PRV) downstream of the junction reduces the pressure in the waterline to 95 psi.

Since development plans for the Industrial Park are not yet available, proposed water use for buildout of the Industrial Park is based on the proposed land use and an estimated developable area for each parcel. The developable area of each parcel estimates that up to 70 percent of the total parcel area will require water; the remaining 30 percent will consist of areas with no water use such as roads and parking areas.

In accordance with the Water System Standards, available source capacity is governed by the well with the smallest pumping unit. Well No. 2 can be outfitted with a pump with a capacity of up to 1,200 gallons per minute (gpm) while Well No. 4 has a pump capacity of 900 gpm. Since Well No. 4 has the smaller pump capacity, available source capacity for the water system is governed by Well No. 4, which has an average day pumping capacity of 576,000 GPD, which is equivalent to a maximum day pumping capacity of 864,000 GPD. Once this capacity is used/committed, construction of a new well will be required.

Water to support the project is intended to come from the Leeward and Windward aquifers. As noted, full buildout of the proposed 200-acre Miki Basin Industrial Park will be developed incrementally over a period of 30-years (not all at once.)

The proposed average day demand for full buildout of the Industrial Park, including existing use is 1,309,000 GPD. The existing water system does not have adequate source capacity and reservoir storage to support full buildout of the Industrial Park. In addition, the transmission mains do not meet Water System Standards for fire flow protection.

The following improvements will be required to support full buildout of the Industrial Park:

- Drilling of a new source or multiple sources to obtain a total minimum pump capacity of 1,546 gpm.
- Construction of a new storage tank with a minimum capacity of 500,000 gallons.
- Upsizing of an existing 12-inch water main between Hi'i Tank and the Pālāwai Pressure Reducing Valve to a 16-inch main or installation of a parallel 6-inch water main to meet fire flow requirements. Alternatively, the construction of a new storage tank could provide fire flow protection in additional to storage capacity.
- Construction of new 16-inch distribution mains to provide service to currently undeveloped areas.

The intent is to use available water capacity to handle the initial needs. As needs increase over time and the development of industrial park expands, then new wells will be drilled in the Leeward and Windward aquifers.

Well Pump Sizing

i. Existing average day capacity = 576,000 GPD
   Existing maximum day capacity = 864,000 GPD

ii. Full buildout average day demand = 1,309,000 GPD
    Full buildout maximum day demand = 1,963,500 GPD

iii. Additional average day capacity required = 733,000 GDP
     Additional maximum day capacity required = 1,099,500 GPD
     1,099,500 gallons / 16 hours / 60 min = 1,146 gpm
     Total required pump capacity = 1,146 gpm

     Full buildout of the Industrial Park will require the development of a new well or multiple wells with a total minimum total capacity of 1,146 gpm.

The Lāna'i Water Use and Development Plan (WUDP) discusses the following options for development of a new well to meet future water demand requirements:

i. Drill a Leeward high level well between Hi'i Tank and Well 3 (Windward wells are also considered)
ii. Well 7 is currently out of service. Recommissioning the well would provide reliability for both the Lāna'i City system and the Irrigation Grid.
iii. Install a permanent interconnection with the Lāna'i City System.

Reservoir Capacity

i. Case A: Meet maximum day demand in 24-hours
   Capacity required = 1,963,500 gallons

   Case B: Meet maximum day + fire flow, reservoir ¾ full
   Max day rate = 1,963,500 GPD = 1364 gpm
   Fire flow = 2,500 gpm

   Max day rate + fire flow for 120 minutes
   = 3,864 gpm x 120 min
   = 463,680 gallons

   Size required = 463,680 * ¾ = 347,760 gallons

   Case A governs:
   Minimum Reservoir Capacity = 2,000,000 gallons
   Existing Reservoir Capacity = 1,500,000 gallons

   Additional Storage Required = 500,000 gallons

   Construction of a new storage tank for the Industrial Park could also satisfy fire protection requirements for the Industrial Park. In order to provide service to the Industrial Park, the tank would need to be located at a minimum elevation of 1,414 feet.

Presently, Pūlama Lāna'i is under contract with Brown and Caldwell to do the preliminary engineering on the transmission line. In addition, a proposal is being submitted for a 1.5-MG storage tank on Hi'i. (0.5-MG for this project and 1MG for abandoning the old underground storage).

Water Demand for the Kō'ele Project District Amendment

Pūlama Lāna'i is also proposing to make amendments to the existing Kō'ele Project District. The purpose and intent of the Project District remain unchanged; its existing and continued purpose and intent are to provide for a flexible and creative approach to development at Kō'ele that is complementary and supportive of services offered in the adjoining Lāna'i City.

The Project District calls for a low-density residential and recreational development with hotel facilities in an upland rural setting that considers physical, environmental, social and economic factors in a comprehensive manner.

The proposed amended Project District will provide housing and recreational opportunities to island residents. Uses include, but are not limited to, single-family residential, multifamily residential, hotel, open space, park, golf course and resort commercial.

The existing Kō'ele Project District is a 618-acre area, located just north and east of Lāna'i City, between the elevations of 1,700' and 1,800'. At full build-out, under existing provisions, the Project District would have 535-single family units, 156-multifamily units, 253-hotel units, 11.5-acres of park, 1-acre of public facility space, 12-acres of open space and 332.4-acres in golf course use.

The proposed Kō'ele Project District Amendment will result in a 564-acre land area. At full build-out, under proposed provisions, the Project District would have a maximum of 18-single family units, 53-multifamily units, 137-hotel units, 271.7-acres of park, 89.5-acres of open space, 78-acre golf course and 5.7-acres of resort commercial uses.

The following shows a comparison of land use allocations between the existing approved land uses and the land use allocations in the Proposed Action.

Type of Use	Existing Land Area	Proposed Land Area
Single Family	214.0-acres	9.8-acres
Multifamily	26.0-acres	18.7-acres
Hotel	21.1-acres	39.1-acres
Open space	12.0-acres	89.5-acres
Public	1.0-acres	0.0-acres
Park	11.5-acres	271.7-acres
Golf course	332.4-acres	78.0-acres
Resort Commercial	0.0-acres	57.2-acres
Total	618.0-acres	564.0-acres

Outcomes of some of the proposed changes include:

* Overall land area is reduced from 618-acres to 564-acres
* Maximum Density (Units per Acre) reduced for Single Family, Multifamily and Hotel
* Maximum Units Allowed reduced for Single Family, Multifamily and Hotel

Single Family Residential

- Land area for Single Family Residential is reduced from 214-acres to 9.8-acres
- Maximum Density for Single Family Residential reduced from 2.5-units/ac to 2-units/ac
- Maximum Units Allowed for Single Family from 535-units to 20-units

Multifamily Residential

- Land area for Multifamily Residential is reduced from 26.0-acres to 18.7-acres
- Maximum Density for Multifamily Residential is reduced from 6-units/ac to 3-units/ac
- Maximum Units Allowed for Multifamily is reduced from 156-units to 56-units

Hotel

- Land area for Hotel increases from 21.1-acres to 39.1-acres
- Maximum Density for Hotel is reduced from 12-units/ac to 3.5-units/ac
- Maximum Units Allowed for Hotel is reduced from 253-units to 137-units

The R. M. Towill Corporation Preliminary Engineering Report for the Kō'ele Project District Amendment included information related to the water demands and supply for the project. Overall, the proposed Kō'ele Project District will cause a reduction in water demand, compared to the existing Kō'ele Project District, as a result of a reduction in developable land and reduction in densities. The calculated water demands for the existing and proposed, in full buildout condition, are summarized below (RM Towill Preliminary Engineering Report).

Water Demand Summary		
Land Use	**Existing Koele PD Average Daily Demand (gpd)**	**Proposed Koele PD Average Daily Demand (gpd) [a]**
1. Hotel	185,000	162,782
2. Multi-Family Residential	54,000	31,800
3. Single-Family Residential	153,000	10,800
4. Park	19,550	750
5. Open Space	0	0
6. Golf Course [b]	20,750	20,000
7. Public	1,700	N/A
8. Resort/Commercial	N/A	20,260
TOTAL	**434,000**	**246,392**

a. *Proposed demands are based on Pulama Lanai program, which limits unit counts and developed area.*
b. *Clubhouse and Cavendish only. The Experience at Koele irrigation provided by effluent.*

With the amendment to the Kō'ele Project District, the additional water demand (beyond existing withdrawals) is estimated to be 106,260-GPD (74,000 GPD for Hotel, 12,000 GPD for Multi-Family Residential and 20,260 GPD for Resort Commercial.)

Mānele Project District Decreasing Water Demand for Residential Uses

The Mānele Project District Phase I was conceived as an 869-acre area located at sea level on the southeastern shore of Lāna'i. At full build-out, this Project District would have 282-single family units, 184 multi-family units, 500-hotel units, 5.25-acres of commercial space, 66.33-acres of park, 2-acres of public facility space, 152.02-acres of open space, and a 172-acre golf course. (Lāna'i WUDP; 4-68)

According to the Mānele Project District ordinance (19.70.0900), the initial land use categories and maximum acreages for various land use categories within Mānele Project District are:

Residential (SF)	328.80 acres
Multi-family	55.00 acres
Commercial	5.25 acres
Hotel	56.60 acres
Park	66.33 acres
Open space	152.02 acres
Golf course	172.00 acres
Roads	32.00 acres

The Ordinance also notes the maximum permitted density for various land use categories; the computed total number of units for residential uses (single-family and multi-family) and hotel are noted below:

	Acres	**Density (Units per Acre)**	**Maximum Units**
Single-family	328.8	0.8576	282
Multi-family	55	3.34	184
Hotel	56.6	10	566

Although these maximum single-family and multi-family unit counts had been conceived in the initial Project District approval in 1986, in 1995, the Lāna'i Planning Commission approved a total of 166-single-family and 54-multi-family units at Mānele. Since then, the residential unit maximum has been renewed every five years to retain the 166-single-family/54-multi-family count.

By December 2017, only a total of 40-single-family lots had been developed and 53-multi-family units had been constructed.

At that time, the Lāna'i Planning Commission approved a request by Pūlama Lāna'i to reduce a total maximum allowable units in the Project District to 80-single-family residential lots (the 40-existing and allowing only another 40-single-family lots).

	Total Units Initially Conceived (1986)	**Total # of Units Allowable (1995)**	**Maximum Units Permitted (2017)**
Single-family	282	166	80
Multi-family	184	54	54

This reduction in allowable units significantly reduces the water demand within the Mānele Project District.

Using the County of Maui Department of Water Supply Standards of 600-gallons per day per single family unit, rather than an overall water demand based on the previously allowed number of units (99,600-GPD as suggested in the Lānaʻi WUDP (166-units at 600-GPD)), the added demand for Water at Mānele Project District for the residential uses is only an additional 24,000-GPD.

This is a reduction in overall water demand of 75,600-GPD that had been estimated and reflected in the Lānaʻi WUDP.

This is significantly less than the anticipated water demands previously contemplated in the Lānaʻi WUDP and other planning documents. However, it is not clear when the additional residential units will move forward, as there remain unsold properties at Mānele.

Existing Moving Average Well Pumping (August 2019) and Existing/Proposed Uses of Water

The following listing notes the different water sources (both brackish and drinking) and moving average pumping (gallons per day - GPD) submitted to and reviewed by CWRM as of August 2019, as well as a summary of the total existing and proposed uses of water on Lānaʻi.

Leeward (SY 3-MGD)		
Existing Use		
Brackish (Lanai Water Co data - 08/22/19)		
Well 1	109,675	
Well 9	0	
Well 14	100,108	
Well 15	370,825	
Subtotal Brackish	**580,608**	
Drinking (Lanai Water Co data - 08/22/19)		
Well 2/Shaft 3	194,983	
Well 3	148,006	
Well 4	256,894	
Well 7	0	
Well 8	227,291	
Subtotal Drinking	**827,174**	% of SY
Existing Use (Leeward)	**1,407,782**	46.93%
Proposed Use (Leeward)		
Hokuao 201H Housing (Well 7)	121,700	
Kōʻele Project District New Uses *	106,260	
DHHL Water Reservation (Well 7) **	67,200	
Mānele New Residential	24,000	
Subtotal Proposed (Leeward)	**319,160**	% of SY
Total Leeward (Existing & Proposed)	**1,726,942**	57.56%

Windward (SY 3-MGD)		
Drinking		
Well 6	147,480	% of SY
Existing Use (Windward)	**147,480**	4.92%
Proposed Use (Leeward & Windward)		
Miki Industrial (Existing Capacity & New Wells over 30-years)	1,309,000	
Subtotal Proposed (Leeward & Windward)	**1,309,000**	
Comparison of Existing and Proposed to Overall SY of 6-MGD		% of SY
Subtotal Existing Use (Leeward & Windward)	**1,555,262**	25.92%
Subtotal Proposed Use (Leeward)	**319,160**	5.32%
Subtotal Proposed Use (Leeward & Windward)	**1,309,000**	21.82%
Anticipated Total (Leeward & Windward)	**3,183,422**	53.06%

Notes:

* Per the Kōʻele Project District Amendment Preliminary Engineering Report, the Existing Kōʻele Project District (existing and proposed uses) has an average daily demand of 434,000-GPD. Under the Kōʻele Project District Amendment, permitted densities and unit counts for a variety of uses (hotel, single family and multi-family) are significantly reduced. This results in an estimated reduction in the estimated water demand for uses in the project district to a total estimated demand (existing and proposed uses) of 246,392-GPD (an overall reduction of 187,608-GPD).

** Per the DHHL State Water Projects Plan Update (2017) (page 4-25), "The potable water requirement for the Lānaʻi City tract is 0.0672 MGD, all from Residential land use. The tract is within the service area of the existing water system managed by the Lānaʻi Water Company; however, with the new ownership of the island, it is unclear how the existing municipal operations will be affected. The DHHL development is not scheduled until the final year in the 20-year timeline; therefore, it is recommended that DHHL monitor the operational situation and establish contact if changes are made."

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Addressing Water Demands for Other Proposed Developments

The Lāna'i Community Plan, approved in 2016, identifies a number of additional proposed projects across the Island. Some of these are noted in the following chart and summaries from that plan follow the chart:

Table 9.2 Lāna`i Community Plan
Acreage by Growth Area and Land Use Designations

Growth Area	Land Use Designations								Total Acres
	Mixed-Use Residential	Hotel	Airport	Light Industrial	Heavy Industrial	Public/ Quasi-public	Park	Rural	
Lāna`i City									**1,488**
Lāna`i City Expansion*	546								
University Campus						524			
Tennis Academy							50		
Linear Park/Drainage							280		
Gateway Park							16		
Rural Residential								50	
Film Studios				22					
Airport									**246**
Enhancement of present airport facilities			46						
Miki Basin Industrial				100	100				
Mānele									**181**
Mānele Mauka	105								
Rural Residential								76	
Kaumālapa`u									**60**
Ocean Resources Heavy Industrial					10				
Kaumālapa`u Mixed-Use Residential	50								
TOTAL ACRES	**701**		**46**	**122**	**110**	**524**	**346**	**126**	**1,975**

*Note: Includes proposal to incorporate County Affordable Housing Project into new land use designation.

Chart noting Land Uses identified in the Lāna'i Community Plan (9-7)

Mixed-Use Residential – Lāna'i City Expansion

This area will consist of approximately 546-acres on the west end of the existing town. It will include part of the County's affordable housing lands and extend south, below Ninth Street, to include the land area of the current WWTF. The WWTF will possibly be moved north of Paliamano Gulch.

The Lāna'i City Expansion will be a mixed-use residential project, which includes primarily residential development, with neighborhood parks, commercial/business, and public/quasi-public development. Street pattern and housing form will be similar to the historic areas of Lāna'i City.

Land for some of the housing is proposed for exchange by Pūlama Lāna'i for land within the County's affordable housing project, which currently has a 73-acre site.

If approved, this will allow construction of mixed-use housing to occur at an earlier date and, over time, will blend the affordable housing with other housing throughout the area, resulting in a mixed-income housing community.

Extensions of Fifth Street and Ninth Street will intersect with a new bypass road that will cross the Kaumālapa'u Highway and loop north then east to end at the corner of Lāna'i Avenue and Keomuku Road. (Lāna'i Community Plan; 9-5)

Note, related to the status of the proposed County Affordable Housing Project:

Per the Unilateral Agreement for Conditional Zoning, dated February 1992, Castle & Cooke deeded 115-acres of land for affordable housing to the County.

Approximately 73-acres is now identified for an Affordable Housing project (42-acres are for DOE as a school expansion area). It is identified a Tax Map Key: (2) 4-9-002:058. It remains in the same vacant land condition as in 1992.

In January 2010, a Final Environmental Assessment was prepared that noted that the project was proposed to include approximately 412-residential units – 293-house lots and 173-multifamily units - and two parks.

It was estimated that the proposed project would need approximately 0.278-MGD from the Lāna'i Water Company.

A November 26, 2015 Hawaii News Now report noted that the "affordable housing project planned for the island of Lanai has stalled … The project stalled because the county would have to spend $7 million just to build sewer and water lines to the property, a huge expense, before any buildings were built."

An October 15, 2018 meeting was held on Lāna'i, with the County proposing to change the configuration to multiple phases in slightly different locations, with the first phase being 12-single family lots and 24-multi-family units. The single-family lots would be available for construction by the purchaser.

A 201H application is needed to be initiated with the new proposal. The County estimated that the funds for the project could be raised over the next few years. This did not receive favorable response from the Lāna'i community. It is not clear when the project will move forward.

University

Approximately 524 acres are proposed for a new university and research institute on the western edge of the Lāna'i City Expansion. The proposed acreage reflects the intent to reserve enough space to achieve an attractive campus design. (Lāna'i Community Plan; 9-6)

Note, related to the status of the suggested University on Lāna'i:

Other than references in the Lāna'i Community Plan and prior (2013) references to Larry Ellison and the Lanai Community Plan Advisory Committee, "The planned Lanai campus, which would be located just south of Lanai City is years down the line". It is not clear what the project scale will be and when the project will move forward.

Tennis Academy Park

The tennis academy is proposed on approximately 50-acres of park land in the central education and recreation core. The concept is modeled after similar programs that train professional tennis players.

The academy will have dormitory housing nearby and complete tennis facilities. Students will come from around the world to train for international level competition. (Lāna'i Community Plan; 9-5 & 6)

Note, related to the status of the suggested Tennis Academy:

Other than references in the Lānaʻi Community Plan and prior (2015) references to Larry Ellison, there have been no additional, timely information on the proposed project. The land area where the Tennis Academy was to be placed is now part of the area where the Hōkūao housing project is located.

There is no other land area indicated for the Tennis Academy. It is not clear what the project scale will be and when the project will move forward.

Gateway Park

This 16-acre site will expand the existing undeveloped park at the junction of Mānele Road and Kaumālapaʻu Highway. The park will provide an attractive gateway entrance to Lānaʻi City. (Lānaʻi Community Plan; 9-6)

Note, related to the status of the suggested Gateway Park

A 10-acre site at the corner of the Mānele and Kaumālapaʻu roads was transferred to DHHL from DLNR, and is planned by DHHL to be a commercial area. There has not been any progress on this project.

Rural Residential

A rural residential area is proposed adjacent to Kōʻele stables. The 50-acre area is located between Keomuku Road and Kopolihua Road. It will be served by a proposed extension of Fraser Avenue for additional road access.

This area is intended to provide larger lots than the lots within Lānaʻi City, and to allow farming. Lot sizes could range from 0.5 acre to 10 acres or more under the County's current zoning code for rural lands. (Lānaʻi Community Plan; 9-8)

Note, related to the status of the suggested Rural Residential:

A 9.5-acre portion of this area is included in the Kōʻele Project District amendment and will not be used as rural residential. It is not clear what the project scale will be and when the project will move forward.

Film Studio

Twenty-two acres of light industrial land will be used for film studio facilities. The warehouse-type structures will be sited to prevent the buildings from being visible from Mānele Road.

Note, related to the status of the suggested Film Studio:

It is not clear what the project scale will be and when the project will move forward.

Lānaʻi Airport

"The projected airport requirement increases gradually, reaching 2,900 in the year 2015 and 3,900 in the year 2020. In calendar year 2008, consumption at the Department of Transportation's airport meter averaged 1,502 GPD. There is also a meter at the airport tank. Total consumption between the two meters was 5,624 in 2008, and has exceeded 6,000 GPD in past." (Lānaʻi WUDP; 4-67)

Mixed-Use Residential – Mānele Mauka

The conceptual plan proposes approximately one hundred and five acres, with approximately eighty-three acres for primarily residential use, with some commercial uses and amenities, such as neighborhood parks and a community center.

Mānele Mauka will be a compact walkable neighborhood with single-family and multifamily units and a variety of housing types, including housing for seniors. Mānele Mauka is located south of the junction of Mānele Road and Kaupili Road, with open agricultural lands bordering both roads to retain views. Road access will initially be via Mānele Road and Kaupili Road; Hulopoʻe Drive will be opened at a later time to connect to the Mānele PD. (Lānaʻi Community Plan; 9-8)

Note, related to the status of the suggested Mānele Mauka:

Other than references in the Lānaʻi Community Plan and prior (2013) references to Larry Ellison, there are been no additional, timely information on the proposed project. It is not clear when the project will move forward.

Kaumālapaʻu Harbor Mixed-Use Residential

The concept proposes creating a mixed-use residential area on approximately 50-acres of land above the harbor and south of Kaumālapaʻu Highway. There will be ocean-view residential lots, limited neighborhood service commercial uses, a community garden/farm, and neighborhood parks. The development will be sited to reduce visibility of buildings from the highway and to retain view corridors from the highway to the coast.

Note, related to the status of the suggested Kaumālapaʻu Harbor Mixed-Use Residential:

It is not clear what the project scale will be and when the project will move forward.

A general note on "Mixed-use Residential" as noted in different uses noted above – this land use type is not presently noted in Maui County Zoning Ordinances. Prior to any planning, permitting or construction that could occur, a new Zoning Ordinance would need to be proposed and approved by Maui County.

Uses noted in Lānaʻi Community Plan and Lānaʻi WUDP

Lānaʻi Agricultural Park

On July 15, 1994, Pūlama Lanai entered into an agreement leasing 100-acres of land for 55 years at a nominal lease rate of $100 per year for use as the Lānaʻi Agricultural Park. The lease states that the State "shall have the right to purchase from the public utility and to use up to, but not more than 0.20 MGD on the average annual basis."

An Amendment of lease states that, notwithstanding this quoted sentence of the Lease, "the parties further agree that additional water will be allocated to the agricultural park in the future, but that the need for such additional water will be the [State's] responsibility to justify and that any costs incurred for this additional water will be borne by the [State]." There has not been any further change in status since the amendment." (2017 Annual Report from Pūlama Lānaʻi to the Land Use Commission Docket

No. A89-649 (Mānele Golf Course)) (Note that the Lanai WUDP suggests a water demand of 500,000-GPD.)

Note, related to the status of the Lāna‘i Agricultural Park:

> In its May 2017 review of the possible demand for agricultural lots, the Department of Agriculture apparently concluded that there had not been any substantial change from its position in November, 2006, that there was insufficient interest to go forward with the agricultural park.

Mānele Harbor

The combined potable and non-potable estimates for Mānele Harbor, in the amount of 5,000 GPD, are lower than the average use of 21,179 in 2008.

Lāna‘i Water Use and Development Plan Identifies Various Means to Meet Future Water Demands

The Lāna‘i Water Use and Development Plan anticipates a number of actions to meet the water needs on the Island.

> The Island of Lāna‘i has a total sustainable yield of 6 million gallons per day (MGD). Virtually all of the island’s available ground water resources are confined to dike compartments in the Central Aquifer Sector Area, which is divided into two aquifer system areas having sustainable yields of 3-MGD each Recharge is highly dependent on the forested mauka watershed, with a significant amount deriving from fog drip.
>
> Although historical evidence suggests the existence of perennial streams, no surface water sources currently exist on the island. Lāna‘i has two drinking water systems, one brackish water system used for irrigation, and two recycled water systems, also used for irrigation. …
> Future water demands were assessed based on the estimated rate of increase in demand predicted by economic and demographic considerations through 2030 and based on build-out of known projects and projects with Phase II approval.
>
> The resource development strategy includes new ground water source development, water reuse expansion, and desalination, in addition to both supply-side and demand-side conservation. (CWRM Staff Submittal August 15, 2012)

Water Supply Options

The Lāna‘i Water Use and Development Plan includes a list of potential supply options sufficient to meet the forecast land uses. These sources include recommissioning old wells, drilling new wells, desalination and other source options. (Information from Chapter 5 of the Lāna‘i WUDP follows.)

New supply resource options that were examined include:

- High level potable well near Well 5 in the Leeward Aquifer
- Well 2-B at the site of Shaft 3 in the Leeward Aquifer
- Recommissioning Well 7 in the Leeward Aquifer
- New wells in the Windward Aquifer at Mala‘au
- Recommissioning the Maunalei Shaft and Tunnels in the Windward Aquifer
- New wells in the Windward Aquifer at or near the Maunalei Shaft and Tunnel sites
  - Two (2) new wells using existing transmission
  - Three (3) new wells using existing transmission
  - Three (3) new wells using new transmission
- New wells in the Windward Aquifer at Kauiki
  - Assuming that these wells can tie into Maunalei Wells transmission
  - Assuming new transmission had to be constructed
- New wells in the Windward Aquifer at Kehewai Ridge
  - At 2,250’ elevation
  - At 2,750’ elevation
- New Brackish Well 15 in the Leeward Aquifer
  - Used without additional desalinization
  - Used with desalinization
- “General” Desalinization Options
  - Brackish to potable
  - Seawater to potable
  - Seawater to brackish for irrigation

Supply Side Efficiency Options include:

- Loss Reduction - Repair of Pālāwai Grid Pipes
- Loss Reduction - Cover for the 15 MG Brackish Reservoir
  - Floating cover
  - Aluminum cover
  - Hypalon balls
- Expanded use of Lāna‘i City Reclaimed Water
  - Lāna‘i City to Miki Basin
  - Lāna‘i City to Mānele
  - Lāna‘i City to Mānele via Miki Basin

In discussing new wells, the WUDP notes that new wells “could be developed to provide additional water supply for Lāna‘i. Aside from additional supply, benefits provided by additional wells would include improved geographical distribution of well pumping, increased production redundancy for system reliability, and potentially increased flexibility of operations.”

With respect to Leeward versus Windward well development strategies, the Lāna‘i WUDP (2011) notes the need to “Plan and ultimately develop operable groundwater sources in the Windward aquifer to distribute groundwater pumping and provide resources, as necessary, to provide for system growth beyond the capacity of the Leeward aquifer.” (Lāna‘i WUDP; 31)

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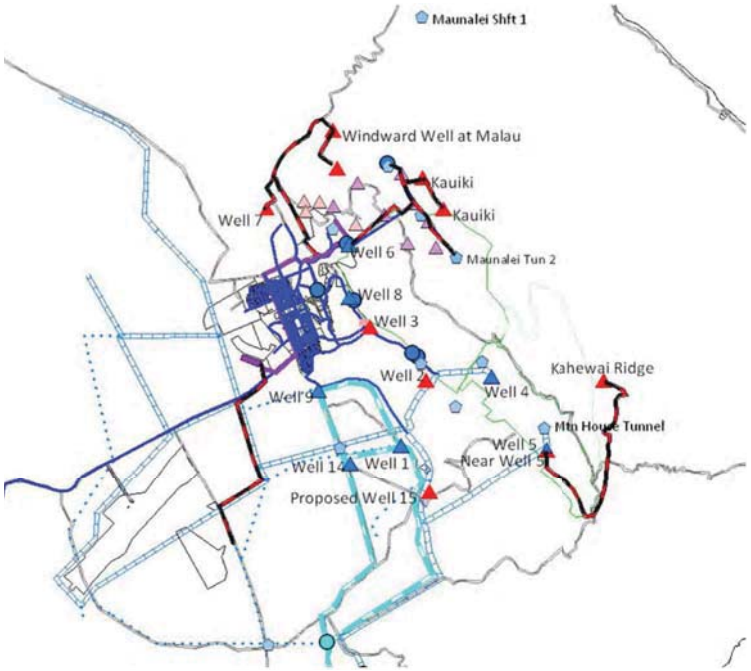

Lāna'i Source Options Considered in Lāna'i WUDP; 5-11

Desalination

The Lāna'i Water Use and Development Plan notes that "Desalination of seawater offers essentially unlimited ultimate source capacity but is more expensive than other available options." (Lāna'i WUDP; 5-38)

"Desalination facilities can reduce the chloride level of brackish water to potable drinking standards. The cost of desalination is very dependent on the amount of required reduction in chloride level. Desalinating a brackish water source that is close to potable standards is much less expensive than desalination of seawater." (Lāna'i WUDP; 5-36)

The Lāna'i Community Plan notes that "The new landowner is exploring the option of developing desalination plants that would create potable water out of saltwater. Producing potable water through desalination would greatly decrease the potential of over-pumping the aquifer."

"Increased production of potable water for human consumption means there could be adequate water supply for the re-introduction of agricultural operations. Potable water can be saved by using brackish and treated water for the irrigation of the golf courses and resort landscaping." (Lāna'i Community Plan; 2-7)

In 2013, Pūlama Lāna'i submitted an application for "a reverse osmosis desalination water treatment facility located on property described as Tax Map Key (TMK) (2) 4-9-002:001 (por.)" The request was for a "proposed Reverse Osmosis ("RO") Well No. 3 (source well), water transmission lines, and access roads."

The information here comes primarily from the Lāna'i Planning Commission FOF, COL and Decision and Order, signed January 21, 2015. The State Special Use Permit covers an area less than 15 acres; as such, the Lāna'i Planning Commission has the authority to act on the application.

In 2014, announcements were made that a

> … state-of-the-art, multi-million dollar Hawaii desalination plant, which will supplement the island of Lāna'i's existing water supply and enhance its groundwater reserves, is scheduled to begin in 2014-15 with plans to provide five million gallons of water per day.
>
> The first phase of the project will provide 2.5 million gallons of fresh water each day, according to Pūlama Lāna'i, the operations firm owned by the billionaire technology mogul, who bought 98 percent of the Pineapple Island in 2012.
>
> The facility, which will be located about one-half mile above The Challenge at Mānele Bay golf course, where test tells are currently being drilled, will be built by IDE.
>
> The Israel-based firm has installed 400 desalination facilities in 40 countries.
>
> Desalination turns salt water into fresh water that's suitable for drinking. (Pacific Business News, February 27, 2014)

In 2015, the Lāna'i Planning Commission found "that the uses proposed in the Project District Application are "accessory uses" as defined in MCC § 19.04.04, being incidental and subordinate to the principal uses of the land, which is single-family residential, multifamily residential, hotel, commercial, park, golf course, open space, and public. The Commission further finds that the proposed uses are located on the same zoning lots as the principal uses."

The Commission further found that "The proposed project could prove to be a dependable alternative water supply that reduces the island's reliance on the High Level Aquifer, and could positively contribute to the availability of potable and non-potable water on the island and meeting the anticipated long-term water demand."

"The project could have a beneficial impact on agricultural production and land in that a portion of the water produced by the project will be used for irrigation and agriculture in the Pālāwai Basin".

"Groundwater on Lāna'i occurs in two (2) different modes: high level and basal. The island of Lāna'i's primary current water source is a High Level Aquifer located in the central section of the island and extending across the Pālāwai Basin. The total sustainable yield from the High Level Aquifer is 6 million gallons per day. Basal groundwater exists in the areas between the High Level Aquifer and the shoreline."

"Basal groundwater is a lens of brackish water floating on denser saline groundwater beneath it. The proposed project's source wells draw water from below the basal groundwater lens at a depth of 50-145 feet below sea level."

"The proposed desalination water treatment facility's groundwater supply wells are located approximately six-tenths (.6) of a mile from the coastline. The project will not draw water from the High Level Aquifer and is not anticipated to have an adverse impact on hydrogeologic conditions and features."

"Disposal of the hypersaline concentrate ("brine") from the reverse osmosis process occurs in two deep disposal wells, at a depth of 160 to 300 feet below sea level."

"The brine, being 1.8 times saltier than sea water, is denser than the receiving saline groundwater and will sink deeper as it travels seaward and is anticipated to discharge approximately 2 miles offshore at an ocean floor depth of approximately 650 feet. At the point that the brine comingles with the open ocean water, it will be approximately the same salinity level as the receiving water."

"The Planning Department recommended approval of the Project District Application and recommended approval of the [Special Use Permit] SUP Application, subject to 22 conditions".

In review of the application, "The Planning Department recommended a 30 year Special Use Permit time limit based on the anticipated useful life of the desalination plant, and stated that this was consistent with other long-term projects granted extended permit time limits although no other 30-year permit was identified."

"The Applicant [Pūlama Lāna'i] testified that the 30 year limit was necessary due to the significant financial cost of the project, and that any shorter time period would render the project unfeasible."

"The project was designed to meet long-term needs for potable and non-potable water on the island of Lāna'i, as identified in the 2011 Lāna'i Water Use and Development Plan."

However, "The [Lāna'i Planning] Commission found that the SUP 30-year time limit recommended by the Department and proposed by the Applicant was too long and further that the Commission should review requests for time extensions beyond the initial permit term."

"The Commission found that the Special Use Permit should not be 30 years due to the Commission's desire to review the project's operational status and the island's economy, after the project had been in operation for a period of time and prior to any extension of the SUP."

The Lāna'i Planning Commission granted the Special Use Permit, however, rather than a 30-year term, the "Special Use Permit shall be valid until June 17, 2029" (for 15-years).

In addition, the Lāna'i Planning Commission imposed an additional condition (condition 23) that states,

> "Once the desalination plant is operational no High Level Aquifer water will be pumped to or used in the Mānele Project District except in the event of an emergency as determined by the Lāna'i Water Company and the Lāna'i Water Advisory Committee, and then only for human consumption." (Lanai Planning Commission Pūlama Lāna'i Desalination FOF, COL and D&O, January 21, 2015)

"(C)onstruction of the planned desalination plant was halted on September 12 (2014)." (Daily Mail, September 25, 2014).

In follow-up media reports,

> Lāna'i Planning Commission Chairman John Ornellas said Pūlama Lāna'i sought a special use permit for the desalination plant last year.
>
> "We spent four months reviewing it," he said.
>
> But the commission concluded that instead of a 30-year permit for the plant, it would grant 15 years, Ornellas said. The permit was approved, and he said commission members heard later that they were being "blamed" for "Pūlama shutting down the desal plant." …
>
> Kurt Matsumoto, chief operating officer of Pūlama Lāna'i, said … that the company had not given up on development of a desalination plant, but its plans were being reassessed in light of the planning commission's actions in June. He said the company had invested substantially toward developing the plant." (Maui News, January 20, 2015)

Water Conservation Measures

Efficient use of water and reductions in supply system leakage are essential to reduce waste of Lāna'i's limited water resources. The following are stated provisions from the WUDP and the Lāna'i Water Company (LWC) responses and status of these provisions (indented bullet) (2016):

- Lāna'i's water and wastewater utilities should implement water recycling and water conservation programs targeting landscape and indoor water uses to substantially reduce water consumption to the extent allowed by the Public Utilities Commission.
    - All wastewater on the island is currently reclaimed from the two wastewater plants.

  LWC currently promotes conservation messages on its website and in public meetings.

  A more extensive conservation program is being developed and LWC is working on implementation of the plan. HRWA (Hawaii Rural Water Association) staff assisted with a residential "Direct Install" program to replace all existing, non-conserving toilets, showerheads and faucet aerators and clothes washers on the island.

  Reduction in water use will also be promoted by the use of native species requiring less irrigation. These plant types will be promoted in the community,

  Lāna'i Water Company has completed a 100% replacement program for all water meters on Lāna'i with the installation of Smart Meters. These meters allow 15 minute increment readings for all meters, and have an App that consumers can use to see their usage. The system also provides notifications to LWC and the consumer if there appears to be a leak.

  This will induce conservation as customers see what their water use and change behaviors to more efficiently use their water. A pilot program was started at the end of 2015 and is now complete.

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- The County and public utilities should implement education and supporting measures to encourage planting of low-water-use plants for new and existing landscaping.
    - LWC currently promotes conservation messages on their website and in advertisements in the Lāna'i monthly newspaper. Several xeriscaping projects have been implemented in the Mānele area on roadside irrigation and LWC is working with homeowners and associations in the reduction of water use, install drip irrigation, and plant xeriscaping where appropriate LWC encourages best practices in irrigation conservation for all our customers, homes, hotels, commercial space, etc.

- Lāna'i's public water utility should reduce unaccounted for water to reasonable levels including implementation of the following measures:
    - Replace and/or repair deteriorating or leaking supply pipes including replacement of deteriorated Pālāwai grid pipeline
        - LWC has replaced the entire section from Hi'i to Miki pipeline with a new PVC pipe.

        LWC has also budgeted amounts for future years to replace sections of pipe each year. Some of these funds are part of the approved PUC agreement and the $10 million in funds for infrastructure improvements committed to by Pūlama Lāna'i. A report is filed regularly with the PUC.

    - Implement programmatic leak detection and repair programs
        - LWC has implemented an unaccounted for water program to find unmetered water and leaks. Utilizing data, leak detection equipment, meter information, meter installations, and monitoring water lines, we have reduced unaccounted for water.

        Also, by reducing the pressure in the Pālāwai Ag system utilizing a pressure reducing valve (PRV) station, we have significantly reduced the leaks in that area. We call on all departments and residents to report leaks or water loss.

        These actions have reduced the overall unaccounted for water on the island between pumping and billing from 28.36% in 2008 as reported in the WUDP to 17% in recent years and now down to approximately 15%. The WUDP calls for a reasonable goal of 15% and a better goal of 12%. We continue to look for leaks and unmetered water.

- Install floating ball or blanket type cover on existing 15MG brackish water reservoir
    - This is part of the PUC funding and the options of a solid cover versus the proposed floating balls are being explored.

    LWC conducted a test of a Monolayer technology to inhibit water evaporation but the results were in the 7-9% reduction range and not as much as hoped for (30-40%).

Notes on Other Water Savings Efforts

In March 2017 changes were made to the Mānele Hotel which reduced the overall number of rooms (by combining rooms to become suites).

Likewise, the proposed irrigation and pool water in the refreshed areas went from 26,717 to 22,715-GPD.

"With respect to the development and utilization of alternative non-potable water sources (brackish water and reclaimed sewage effluent), [Pūlama Lāna'i] has developed a high capacity system for Golf Course irrigation. [Pūlama Lāna'i] has developed a non-potable water system for irrigation purposes that utilizes brackish well-water and stores this non-potable water in a 15-million gallon open reservoir."

"[Pūlama Lāna'i] also utilizes reclaimed water from the Mānele Wastewater Treatment Plant for Golf Course irrigation, which provides "R-1" quality water and produces between 60,000 and 120,000 gallons per day (approximate) of reclaimed water (with an expanded capacity of 140,000 gallons per day). The County of Maui concluded that Petitioner has developed an adequate brackish and non-potable water system for the Golf Course." (2017 Annual Report to LUC)

In addition, in August, 2017, the Mānele Golf Course started the project to replace the irrigation lines in the golf course. This has resulted in an average of 10,668-GPD reduction from the average brackish pumpage of 42,975-in August, 2017. This does not include the R1 water from the Mānele Waste Water Treatment facility.

Ongoing Measures to Reduce/Monitor Water Use on Lāna'i

Pūlama Lāna'i has made significant progress in reduction of leaks, conservation efforts and changes to existing projects resulting in reduced water demands and usage.

In addition to the reduced scale, densities and number of units called for in the proposed amended Kō'ele Project District noted above, during the recent refresh at Mānele, there was also a reduced number of hotel units at Mānele Hotel.

Likewise, at Mānele, Pūlama Lāna'i reduced the irrigation and pool water usage for the pool area changes. They changed types of plantings and left large areas to be in a natural state, rather than grass; so there is no irrigation needed. The pool area uses artificial turf rather than grass. And Mānele went with two pools, rather than the proposed three.

Wastewater

On the western flank, the project sets back from the existing wastewater treatment plant with a 600 foot buffer between the closest lot and the WWTP edge.

The proposed wastewater demand estimates and wastewater system design were derived from the County of Maui's Water Reclamation Division Wastewater (WRD) Flow Standards (Reference 6), or WRD approved Sewer Studies for similar facilities where practicable.

Per capita usage set at 80 GPD for single family or duplex based on County of Maui Standards of the Water Reclamation Division (Standards use 4 capita per single family or duplex unit which equates to 320 gallons per day per unit). Per capita usage set at 5 for park and capita per car set at 4 based on the approved Central Maui Regional Park Sewer Study (the park study used 4 capita per vehicle which equated to 20 gallons per day per parking stall and 50% usage at any given time).

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Based on the proposed 200 single family unit and a 1-acre park with the future 1,500 square foot pavilion with comfort stations and 60-parking stalls, using the design standard of 4 persons per single family unit at 80 gallons per capita per day and 20 gallons per parking stall, the proposed average wastewater demand generated by the project is estimated at 0.064 MGD for the single-family units and 0.02 MGD for the park or 0.066 MGD. This estimate is used for the hydraulic calculations.

As previously mentioned, the project has been adjusted to 150 homes versus the 200 homes that the calculations were based on, that being said, the estimated waterwater MGD is expected to be lower than the calculated 0.064 MGD.

The 20 gallons per parking stall used to estimate the wastewater demand was approved by the County of Maui for the Central Maui Regional Park (CMRP) and is based on 4 persons per vehicle and 5 gallons per capita. The CMRP also estimated that no more than 50% of the parking would be in use at any time so a 50% reduction in wastewater demand was allowed. As most of the parking is for non-park use, a conservative average wastewater demand for the park is 0.001 MGD at the treatment plant is estimated at 0.065 MGD.

The new onsite wastewater system will collect wastewater generated by the new homes and convey the wastewater to the existing Lāna'i Wastewater Reclamation Facility. The new wastewater collection system will be designed for the residential units and the future park, pavilion and parking stalls and constructed within the new roads.

The wastewater demand of the project is estimated to be lower than 0.065 MGD of which 0.064 MGD is for the proposed housing demand and 0.001 MGD is for the 1-acre park demand. The Preliminary Engineering Report Lāna'i City Auxiliary Wastewater Treatment Facility report done in 1993 by Belt Collins & Associates states that the Lāna'i City Wastewater Treatment Plant was designed to treat wastewater generated by Lāna'i City and the Koele Project District.

The Lāna'i Wastewater Reclamation Facility is currently servicing an average daily flow of approximately 0.315 MGD. Additional development allocations totaling 0.080 MGD have been granted.

The proposed development will yield an average daily flow of less than .070 MGD, for a total average daily flow of 0.465 MGD, therefore there is currently sufficient capacity at the WWRF to serve the project.

4.7.3 Level of Impact after Mitigation

Pūlama Lāna'i will conform with the requirements of the Commission on Water Resource Management, Department of Health, County of Maui and other regulatory entities as it relates to installation, inspection and maintenance of water and wastewater systems associated with the project.

The impact of the proposed is on water and wastewater improvements will have a less than significant impact.