Draft Environmental Impact Statement

Infrastructure Improvements at the Yap International Airport and the Yap Seaport

Yap State, Federated States of Micronesia

ID# EISX-007-USN-1775813621

APRIL 2026

Appendix G
Yap Airport and Seaport Utility Support Requirements (2026)

Yap International Airport Improvement Projects - Utility Use Estimates
Yap, Federated States of Micronesia

Date: April 8, 2026

Project name: FY26 YAAD229010 Runway Extension and
FY26 YAAD229020 Aircraft Parking Apron and Taxiway

Project no: D3430604, WFXO6323, WFXO6324, D3430615

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1. Executive Summary

Tables 1-1 through 1-4 summarize the rough order of magnitude (ROM) estimate for utility usage anticipated during construction activities at the Yap International Airport.

Table 1-1. Water Use Utility Summary by Phase

Phase	Location	Water Source	Water (gallons/day)
1A	Workforce Camp/Staging Area	YSPSC or SYWA	13,750
1B – 3B	Workforce Camp/Staging Area	YSPSC or SYWA	22,000
	Concrete Batch Plant Mix	YSPSC or SYWA	800 - 57,600

The Phase 1A water use is estimated to be 13,750 gallons/day. The Phase 1B-3B water use is estimated to be 22,800 to 79,600 gallons/day.

Table 1-2. Water – Pond/Surface Water Use Summary by Phase

Phase	Location	Water Source	Water (gallons/day)
1A	Construction Dust Control Water	TBD - Pond/surface water	33,950
1B-3B	Construction Dust Control Water	TBD - Pond/surface water	67,900 – 224,070
	Concrete Batch Plant Wash Water	TBD - Pond/surface water	40 - 28,800
	Asphalt Batch Plant Wash Water	TBD - Pond/surface water	1,500 - 30,000

The Phase 1A water use is estimated to be 33,950 gallons/day. The Phase 1B-3B water use is estimated to be 126,700 gallons/day. Note, per assumptions above, dust control water is anticipated to be required no more than 109 days per year.

Table 1-3. Wastewater Use Utility Summary by Phase

Phase	Location	Wastewater Service	Water (gallons/day)
1A	Workforce Camp/Staging Area	YSPSC	13,750
1B – 3B	Workforce Camp/Staging Area	YSPSC	22,000

The Phase 1A wastewater discharge is estimated to be 13,750 gallons/day. The Phase 1B-3B water use is estimated to be 22,000 gallons/day.

Table 1-4. Electric Demand Summary by Phase

Phase	Location	Electric Source	Electric Demand (kVA)
1A	Workforce Camp/Staging Area	YSPSC	448
1B – 3B	Workforce Camp/Staging Area	YSPSC	513
	Concrete Batch Plant	YSPSC or generators	200
	Asphalt Batch Plant	YSPSC or generators	1,400

The Phase 1A electric demand is estimated to be 448 kVA. The Phase 1B-3B electric demand use is estimated to be 2,113 kVA. It is anticipated that the batch plants will be powered by generators, as the nearest electric connection is located at a distance from the construction support site where the batch plants will be constructed.

2. Project Overview

Proposed airport improvement projects at Yap International Airport, Federated States of Micronesia (FSM) which are funded by the United States (US) Department of War (DoW) require Yap State utility support for construction activities. The proposed airport improvement projects will extend the runway, construct an aircraft parking apron, and a new parallel taxiway.

The purpose of this technical memorandum (TM) is to present the ROM estimate for water, wastewater, and electrical use to support the airfield improvement projects during construction. This TM describes the utility estimations for the construction support areas including the workforce camp and staging areas and asphalt and concrete batch plants. This ROM estimate will be more clearly defined when the DoW construction contract is awarded, and the airport construction contractor determines their means and methods for implementation of the project. These estimates are intended for planning purposes only.

3. Existing Conditions

The airport project areas include the existing airport airfield and surrounding undeveloped land with dense vegetation, rolling terrain, and many drainage pathways. The runway extension project sites are located to the east and west of the existing Runway (RW) 07-25 pavement areas. Both areas off the ends of the runway currently consist of low-lying valleys/depressions just beyond the blast pads that then transition up to hills that exceed the elevations of the runway ends before cresting and ultimately falling back down towards sea level beyond the project limits. The construction of the aircraft parking apron and parallel taxiway requires substantial cut and fill of the existing terrain to construct the new infrastructure north of the existing runway and terminal. The area northeast of the runway includes construction of a new fire water pump house and fire water tank which will provide the water pressure and volume required at the fire hydrants serving the aircraft parking apron.

4. Proposed Project Scope of Work

The airport improvements at the airport include a Runway Extension project and an Aircraft Parking Apron and Taxiway project as well as support facilities, infrastructure, workforce camp area, staging area(s) and concrete and asphalt batch plants.

The Runway Extension project will construct runway extensions that provide a total paved runway length of 9,100 feet with approximately 8,000 feet useable in either direction at Yap International Airport. The Runway Extension project also includes the installation of aircraft arresting system foundations and all other requirements to support the future extended runway operations including airfield lighting, signage, pavement markings, shoulders, stormwater control, utility connections, airport fence extensions, and all necessary supporting facilities.

The Aircraft Parking Apron and Taxiway project will provide a new parking apron for five modified commercial aircraft and includes construction of a full length parallel taxiway to support the extended runway and associated improvements of existing airfield infrastructure. The Aircraft Parking Apron and Taxiway projects include the design of a transient aircraft parking apron, new 9,100-foot-long full-length parallel taxiway, four connector taxiways to the runway, taxiway shoulders, site grading, fire hydrants, fire water tank and fire water pump house, taxiway edge lighting, and signage.

This project also includes the permanent relocation of an existing public roadway, including new asphalt access road, repaving existing roads, new fencing in select areas with gates for flight line access, and other supporting facilities as needed around the Yap International Airport, FSM.

Construction support areas include a workforce camp to house project workers. It will include lodging, offices, kitchen, and laundry for the construction workers at one of two potential workforce camp locations. The staging area(s) will include office trailers, soils laboratory, and other maintenance and storage areas. For the purposes of this TM, the workforce camp and office trailer staging areas are assumed to be collocated. The construction support areas include one asphalt batch plant and one concrete batch plant. The exact location of workforce camp, staging areas, and batch plants, including the activities allowed at each potential site, are being negotiated via DoW and Yap State Task Force (YTF) discussions and have not been finalized. The proposed project scope of work is summarized in the exhibit provided in Attachment 1 of this document.

4.1 Project Phasing

The project is divided into separate and distinct work phases to support airport operations and meet FAA-required Construction Safety Phasing Plan (CSPP) requirements. The estimated utility use is less in the first phase (Phase 1A) of the project, as the workforce camp size is smaller than is anticipated for subsequent phases of work. As such, this TM provides daily ROM estimates of utility use for Phase 1A through 3B collectively (as daily use is the same for these phases). Table 4-1 provides a summary of each phase, duration of the phase, how many days the batch plants are estimated to be in operation by phase, and a brief scope description.

Table 4-1. Phase Name, Phase Duration and Scope Summary

Construction Phase	Estimated Phase Duration (days)	Concrete Batch Plant Duration (days)	Asphalt Batch Plant Duration (days)	Phase Scope Summary
1A	186	0	0	Complete initial clearing and grubbing, topsoil removal, and rough grading beyond the existing airport fence line on the east end of the runway.
1B	1344	14	387	Complete construction to extend the existing runway to the east and construct a temporary compacted aggregate community access road.

Construction Phase	Estimated Phase Duration (days)	Concrete Batch Plant Duration (days)	Asphalt Batch Plant Duration (days)	Phase Scope Summary
				Complete associated work within the existing Runway Safety Area (RSA).
2A	6	0	0	Reconfigure runway to open the eastern runway expansion completed in Phase 1 and to establish a temporarily displaced western runway threshold. Complete all activities associated with the construction of the western runway extension behind the temporarily displaced runway threshold.
2B	456	7	38	Complete all activities associated with the construction of the western runway extension behind the temporarily displaced runway threshold
3A	6	0	0	Reconfigure runway to open the western runway expansion completed in Phase 2.
3B	829	60	236	Complete all activities associated with the construction of the new aircraft parking apron, access taxiways, and parallel taxiway.

4.1.1 Phase 1A

Phase 1A includes initial clearing and grubbing, topsoil removal, and rough grading beyond the existing airport fence line on the east end of the runway. Phase 1A 's anticipated construction duration is approximately 186 days (~6 months). Figure 4-1 shows these work areas graphically.

Figure 4-1. Yap International Airport – Phase 1A Construction Area

4.1.2 Phase 1B

Phase 1B includes construction to extend the existing runway to the east and construct a temporary compacted aggregate community access road. It also includes completion of the associated work within the existing RSA. Structural Overlay of the Port-to-Airport Road will also occur in this phase. Phase 1B's anticipated construction duration is approximately 1344 days (~45 months). Figure 4-2 shows these work areas graphically.

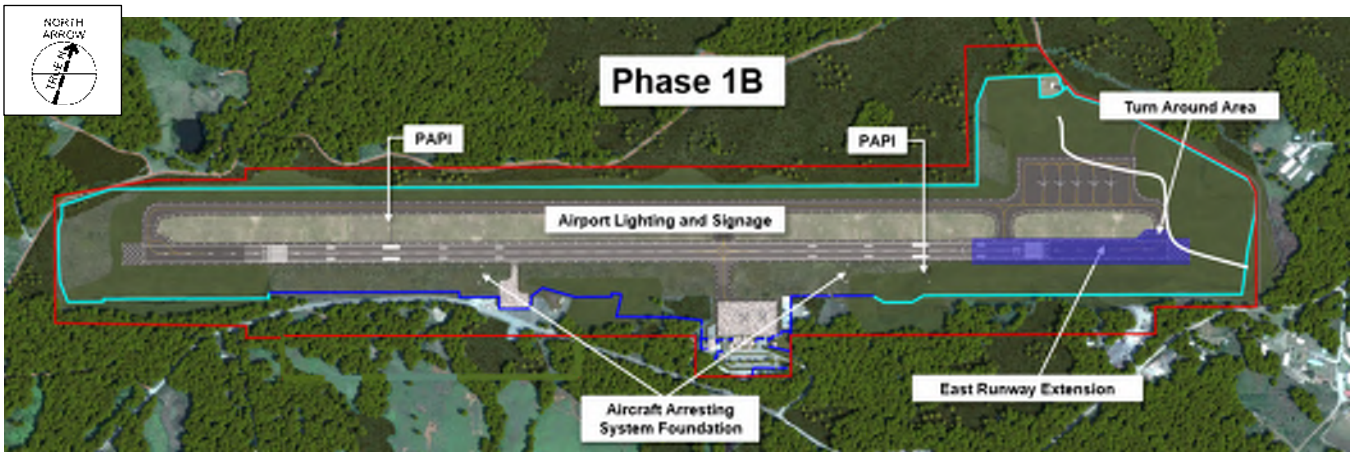


Figure 4-2. Yap International Airport – Phase 1B Construction Area

4.1.3 Phase 2A

Phase 2A includes reconfiguring the runway to open the eastern runway expansion completed in Phase 1 and to establish a temporarily displaced western runway threshold. Phase 2A's anticipated construction duration is approximately 6 days (~0.2 months). Figure 4-3 shows these work areas graphically.

Figure 4-3. Yap International Airport – Phase 2A Construction Area

4.1.4 Phase 2B

Phase 2B includes completing all activities associated with the construction of the western runway extension behind the temporarily displaced runway threshold. Phase 2B's anticipated construction duration is approximately 456 days (~15 months). Figure 4-4 shows these work areas graphically.

Figure 4-4. Yap International Airport – Phase 2B Construction Area

4.1.5 Phase 3A

Phase 3A includes reconfiguring the runway to open the western runway expansion completed in Phase 2. Phase 3A's anticipated construction duration is approximately 6 days (~0.2 months). Figure 4-5 shows these work areas graphically.

Figure 4-5. Yap International Airport – Phase 3A Construction Area

4.1.6 Phase 3B

Phase 3B includes all activities associated with the construction of the new aircraft parking apron, access taxiways, and parallel taxiway. Phase 3B's anticipated construction duration is approximately 829 days (~28 months). Figure 4-6 shows these work areas graphically.

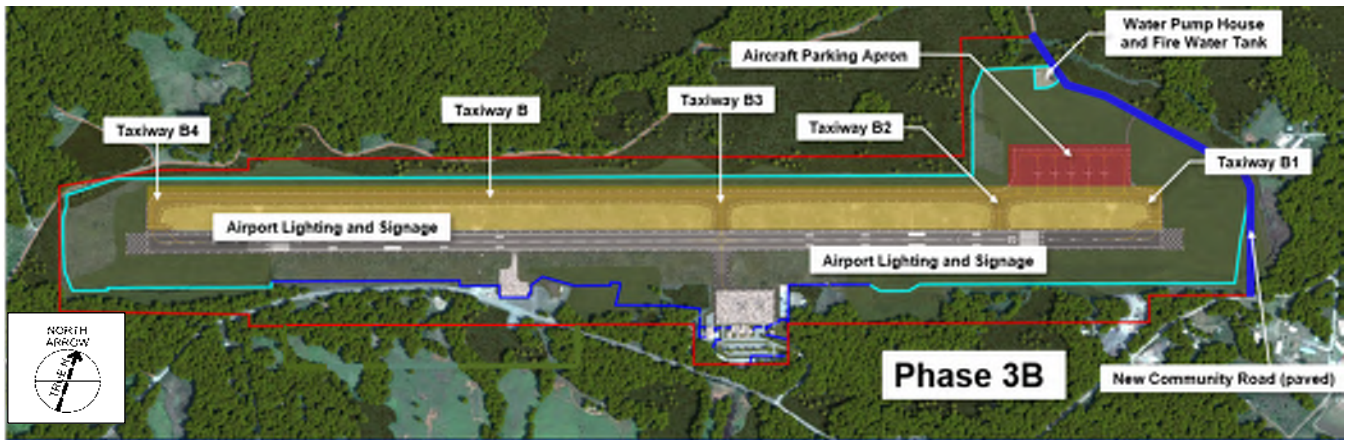


Figure 4-6. Yap International Airport – Phase 3B Construction Area

5. Yap State Utility Agencies and Coordination

5.1 Water Utility

There are three water service providers on Yap, two of them provide service to the airport area. The Southern Yap Water Authority (SYWA) supplies water to the west side of Yap International Airport. The Yap State Public Services Corporation (YSPSC) supplies water to the east side of the Yap International Airport (from the terminal to the east). The third water supply is located far from the airport on another island and has not been considered as a source to support airport construction activities.

5.1.1 Southern Yap Water Authority (SYWA)

SYWA supplies water to the west side of the Yap International Airport. This water is sourced from groundwater per previous discussions with the utility providers.

The airport design team met with SYWA on 04 May 2023 to share the airport project's concept design. Mr. John Guswel/SYWA attended this in-person meeting on Yap Island and meeting minutes documented the discussion and attendance. During this meeting, no concerns regarding the ability to provide water service to the airport construction project were raised. In June 2024, Mr. Jonathan Marmar/Host Nation Liaison, located on Yap Island and subcontracted to support the architect/engineer (A/E), coordinated with SYWA to obtain additional information about the water system to inform design documents. An in-person meeting was scheduled in November 2025 with all utility providers invited for which the A/E prepared a detailed presentation to advance discussion and confirm past guidance. However, the meeting was cancelled and not rescheduled. On 10 February 2026, a teleconference call with Mr. Guswel confirmed that SYWA still has no capacity issues or concerns with supplying water to the airport contractor via the existing distribution pipe to a workforce camp located along the Ports-to-Airport Road and will confirm with Yap State Department of Public Works for their concurrence. It was clarified during this meeting that the intentions of the airport project contractor are to tap into their existing pipe. There is not, and has never been, any intention of the airport construction contractor installing wells into the SYWA water supply aquifer.

5.1.2 Yap State Public Services Corporation (YSPSC)

YSPSC supplies water to the east side of the Yap International Airport (from the terminal to the east).This water is sourced from a combination of groundwater and surface water and is assumed to be non-potable per coordination

discussions indicating an inability of that source water to meet all Yap State Environmental Protection Agency (EPA) potable water standards with Yap's existing YSPSC water treatment plant.

The airport design team met with YSPSC on 04 May 2023 to share the airport project's concept design. Mr. Charles Falmeyog/YSPSC Water and Sewer Division attended this in-person meeting on Yap Island and meeting minutes documented the discussion and attendance. During this meeting, no concerns regarding ability to provide water service via the water distribution pipe under the Ports-to-Airport Road were raised by YSPSC to support the airport project construction. In June 2024, Mr. Marmar coordinated with YSPSC to obtain additional information about the water system to inform design documents. An in-person meeting was scheduled in November 2025 with all utility providers invited for which the A/E prepared a detailed presentation to advance discussion and confirm past guidance. However, the meeting was cancelled for reasons unknown and not rescheduled.

5.2 Wastewater (YSPSC)

YSPSC provides wastewater infrastructure collection via waste pipe installed under the Port-to-Airport road. Water that may be provided from either SYWA or YSPSC would be discharged to the YSPSC wastewater collection/sewer system.

The airport design team met with YSPSC on 04 May 2023 to share the airport project's concept design. Mr. Falmeyog attended this in-person meeting on Yap Island and meeting minutes documented the discussion and attendance. During this meeting, no concerns regarding their ability to provide wastewater service in support of the airfield project construction via the sewer pipe located in the Ports-to-Airport Road were raised by YSPSC. In addition, no concerns regarding the ability of the wastewater treatment plant to handle additional flow were raised. In June 2024, Mr. Marmar coordinated with YSPSC to obtain additional information about the wastewater system to inform design documents. An in-person meeting was scheduled in November 2025 with all utility providers invited for which the A/E prepared a detailed presentation to advance discussion and confirm past guidance. However, the meeting was cancelled and not rescheduled.

5.3 Electrical (YSPSC)

YSPSC provides electrical service to the airport area.

The airport design team met with YSPSC on 04 May 2023 to share the airport project's concept design. Mr. Florentino Ruwawyoch attended this in-person meeting on Yap Island and meeting minutes documented the discussion and attendance. During this meeting, no concerns were raised regarding the ability of YSPSC to provide electric service support the airport project construction.

Per the "Yap Micronesia Construction Capacity Study" (Jacobs, 21 November 2023), "…the electrical grid of Yap is a mixture of diesel-fired generators and solar photovoltaic arrays for a maximum capacity of 8.3 Megawatts with a nominal consumption of 2.4 to 3.2 Megawatts. The power plant and solar arrays were upgraded in 2018. There has been no indication of capacity issues or distribution issues with the electrical grid."

In June 2024, Mr. Marmar coordinated with YSPSC to obtain additional information about the electrical system to inform design documents. An in-person meeting was scheduled in November 2025 with all utility providers invited for which the A/E prepared a detailed presentation to advance discussion and confirm past guidance. However, the meeting was cancelled and not rescheduled.

During July 2025 in-person Yap meetings and November 2025 teleconference meeting, YSPSC indicated sufficient electrical generation to support the workforce camp, staging areas, and airport improvements.

6. General Construction Assumptions

The following are assumptions and clarifications that were used in the development and evaluation of the utility estimates as described in this section:

6.1 24-Hour Workdays

24-hour construction workdays are allowable and 7-day/week work weeks acceptable. The airport utility estimates in this TM assumes the contractor may choose to have two workforce crews (rather than three) working 6-days per week, 16-hours per day. The contractor may implement this construction with a different approach to means and methods which will change the utility estimates presented in this TM.

6.2 Workforce Size

Per assumptions in Section 5.1, it is anticipated that the workforce to support Phase 1A may be up to 125 individuals. For Phase 1B through Phase 3B, it is anticipated that the workforce will increase to approximately 200 individuals. The contractor may implement this work with a different approach to means and methods which will change the utility estimates presented in this TM.

6.3 Weather Challenges

Yap experiences frequent rain, as indicated by historical data from Yap International Airport (1992-2021). Consequently, weather will limit the contractor's work hours and workdays. In addition, with exception of occasional periods of drought, dust control water is not anticipated to be a large water need for the construction project due to frequent and heavy rains and humid environment during non-drought conditions.

6.4 Staging Area Locations

The location of the workforce camp and staging areas to support the airport construction are currently undetermined. The agreements to secure all construction support areas as shown on Figure 6-1 are still being finalized through DoW and YTF discussions. All facilities, buildings, batch plants, and other construction support staging area materials and equipment will be removed by the airport contractor after that construction support area is no longer needed.

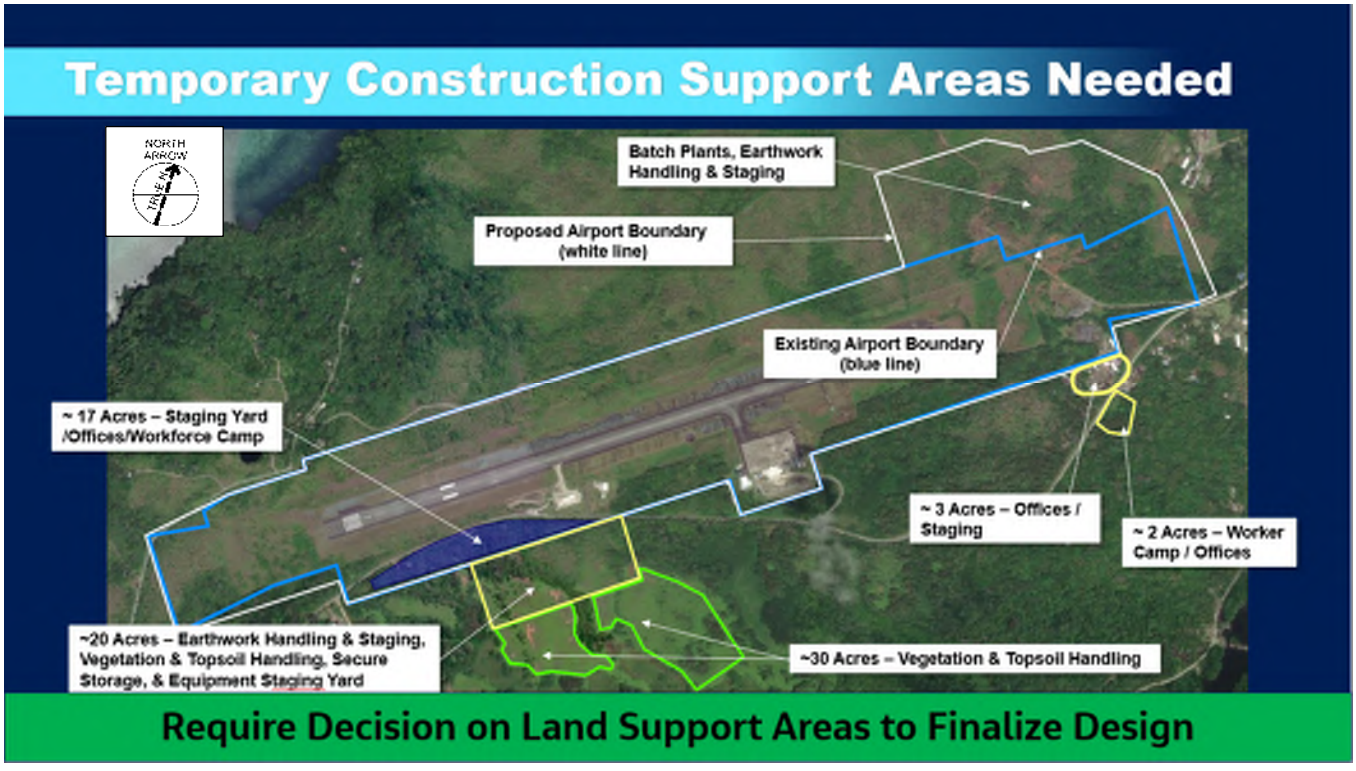


Figure 6-1. Yap International Airport – Potential Construction Support Area Locations

7. Utility Use Estimates

7.1 Water Utility – Piped Water Supply

This section describes the assumptions and estimate of piped water to support Phase 1A and separately for Phases 1B-3B. SYWA or YSPSC water supplied via pipe in the Port-to-Airport Road is required to support the workforce camp, staging areas, and the concrete batch plant.

7.1.1 Workforce Camp and Staging Area

The location of the workforce camp and staging areas are currently undetermined. Two potential locations for these activities are shown on Figure 6-1. One potential site is located on the east end of the airport, and the other site is on the west end. If located on the east end of the airport, water would be provided by the pipe installed along the Port-to-Airport Road supplied by SYWA. If located on the west end of the airport, water would be provided by the pipe installed along the Port-to-Airport Road supplied by YSPSC, however this water is not currently potable so potable uses would need to be met via temporary piping, potable tanks, or other means.

Assumptions

Water use expected at the workforce camp and staging area includes domestic water use for consumption, personal hygiene, laundry, and cooking.

Water usage estimates are per UFC 3-230-3, Table 4-1 at 110 gallons/person/day on average.

Phase 1A Estimate

Based on the expected population of the workforce camp of 125 workers for Phase 1A, the daily water demand for SYWA and YSPSC supplied water is as follows:

Daily Water Demand = Average demand per person per day * number of people

Daily Water Demand = 110 gallons/person/day *125 workers = 13,750 gallons/day

Phases 1B-3B Estimate

Based on the expected population of the workforce camp of 200 workers for Phase 1B-3B, the daily water demand for SYWA and YSPSC supplied water is as follows:

Daily Water Demand = Average demand per person per day * number of people

Daily Water Demand = 110 gallons/person/day *200 workers = 22,000 gallons/day

7.1.2 Concrete Batch Plant

The location of the asphalt and concrete batch plants is anticipated to be located north of the future aircraft parking ramp, which is north of the Port-to-Airport Road as shown on Figure 6-1. Per Table 4-1, the concrete batch plant will operate for a total duration of 14 days, 7 days, and 60 days in Phase 1B, 2B, and 3B, respectively.

Assumptions

Concrete Mix Water

The water for the concrete batch plant mix is assumed to be sourced from the water utility supplier on the east end of the airport, YSPSC. Treated water is required for concrete mix use to avoid concerns with contaminants affecting the mix properties or the processes. This is required to maintain quality control of the materials produced by the batch plants. The concrete mix water requirement varies depending on the mix design and use of water by

reducing admixtures. For the purpose of estimating water demand for this TM, a conservative approach was used to assume a higher water mix at 40 gallons per cubic yard.

Phase 1A Estimate

The area anticipated for placement of the new asphalt and concrete batch plants will be excavated and flattened during Phase 1A. In addition, the batch plant facilities will be constructed during Phase 1A. As such, no concrete mix water is anticipated for this phase.

Phases 1B-3B Estimate

Concrete Mix Water

For Phase 1B-3B, the daily water demand for SYWA or YSPSC supplied water is as follows:

Peak Water Demand (during Phase 3B concrete apron paving) = 40 gallons/cy * 90 cubic yards/hour * 16 hours/day = 57,600 gallons/day

Occasional Water Demand = 40 gallons/cy * 20 CY/day = 800 gallons (likely needed only once a week or once a month depending on the construction phase)

7.1.3 Water Utility Use Summary

Table 7-1 provides a summary of the water utility use by phase for airport construction support areas.

Table 7-1. Water Use Utility Summary by Phase

Phase	Location	Water Source	Water (gallons/day)
1A	Workforce Camp/Staging Area	YSPSC or SYWA	13,750
1B – 3B	Workforce Camp/Staging Area	YSPSC or SYWA	22,000
	Concrete Batch Plant Mix	YSPSC or SYWA	800-57,600

The Phase 1A water use is estimated to be 13,750 gallons/day. The Phase 1B-3B water use is estimated to be up to 22,800 gallons/day with peak usage up to 79,600 gallons/day to support 14 days of concrete apron paving.

7.2 Water – Pond/Surface Water

SWYA or YSPSC water will not provide water to be used for dust control or asphalt batch plant activities including wash down, aggregate cooling, and equipment cleaning. Instead, it is anticipated that the YTF will assist DoW with identifying local pond/surface water sources that can be accessed by the airport's contractor for dust control and wash water. Figure 7-1 shows the two locations that have been proposed as possible sites for the contractor to obtain untreated water for this use.

Figure 7-1. Yap International Airport – Potential Construction Support Area Locations

7.2.1 Construction Dust Control Water

The average annual rainfall on Yap Island is over 120 inches per year with average humidity over 80 percent, making Yap Island a favorable climate for construction site dust control through natural means. However, there will likely be periods when rainfall is not sufficient to maintain dust control. There are several methods to accomplish dust control on a construction site, but on Yap Island, it is expected to be completed by spraying disturbed soil with pond water. As such, it is anticipated that water for dust control will be limited and infrequent but is included in this TM to cover drier periods that may be experienced during the construction duration of the project.

Dust control for the Yap International Airport project will be associated with minimizing mobilization of disturbed soils due to construction activity. "Construction activity" includes demolition of structures and pavement, stripping of vegetation, and cut/fill operations associated with grading.

Assumptions

The quantity of water and how frequently it should be applied is described in this section. The measurable rainfall depth which is likely suitable for natural dust control was approximated from the National Oceanic and Atmospheric Administration (NOAA) which defines "measurable rainfall" as 0.01 inches. Based on the likelihood of antecedent soil moisture on-site and prolonged retention of moisture due to high humidity, it is assumed that 0.01 inches is the minimum amount of rainfall suitable for dust control. The number of days Yap Island has measurable rainfall (0.01 inches) is estimated from NOAA data which indicates the island receives 256 days of measurable rainfall per year, on average (see Figure 7-2). Therefore, it is assumed that water application is needed for dust control for the remaining 109 days per year.

Climate data for Yap Island (1991–2020 normals, extremes 1948–present) [hide]													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °F (°C)	94 (34)	96 (36)	95 (35)	97 (36)	96 (36)	97 (36)	96 (36)	95 (35)	96 (36)	96 (36)	94 (34)	94 (34)	97 (36)
Mean maximum °F (°C)	89.5 (31.9)	89.7 (32.1)	90.2 (32.3)	90.7 (32.6)	91.5 (33.1)	91.2 (32.9)	90.7 (32.6)	90.5 (32.5)	90.7 (32.6)	90.8 (32.7)	90.4 (32.4)	89.8 (32.1)	92.5 (33.6)
Mean daily maximum °F (°C)	87.1 (30.6)	87.1 (30.6)	87.9 (31.1)	88.6 (31.4)	88.9 (31.6)	88.5 (31.4)	87.8 (31.0)	87.5 (30.8)	87.7 (30.9)	88.1 (31.2)	88.0 (31.1)	87.4 (30.8)	87.9 (31.1)
Daily mean °F (°C)	81.0 (27.2)	80.9 (27.2)	81.3 (27.4)	82.1 (27.8)	82.5 (28.1)	82.0 (27.8)	81.4 (27.4)	81.1 (27.3)	81.3 (27.4)	81.5 (27.5)	81.7 (27.6)	81.4 (27.4)	81.5 (27.5)
Mean daily minimum °F (°C)	74.9 (23.8)	74.6 (23.7)	74.7 (23.7)	75.6 (24.2)	76.0 (24.4)	75.4 (24.1)	75.0 (23.9)	74.8 (23.8)	74.8 (23.8)	75.0 (23.9)	75.4 (24.1)	75.5 (24.2)	75.1 (23.9)
Mean minimum °F (°C)	71.5 (21.9)	71.4 (21.9)	71.0 (21.7)	71.9 (22.2)	72.3 (22.4)	72.1 (22.3)	71.6 (22.0)	71.4 (21.9)	71.6 (22.0)	71.6 (22.0)	71.6 (22.0)	71.9 (22.2)	69.2 (20.7)
Record low °F (°C)	67 (19)	66 (19)	64 (18)	66 (19)	67 (19)	65 (18)	66 (19)	65 (18)	66 (19)	66 (19)	63 (17)	65 (18)	63 (17)
Average precipitation inches (mm)	7.85 (199)	5.81 (148)	5.80 (147)	6.19 (157)	9.11 (231)	12.15 (309)	14.89 (378)	14.84 (377)	14.59 (371)	12.60 (320)	9.26 (235)	10.33 (262)	123.42 (3,135)
Average precipitation days (≥ 0.01 inch)	20.4	18.2	17.2	17.9	20.8	24.3	23.8	23.1	23.0	22.6	22.6	22.4	256.3
Source 1: NOAA[2]													
Source 2: XMACIS2 (mean maxima/minima 1991–2020)[3]													

Figure 7-2. Yap International Airport – Western Regional Climate Center Precipitation Data for Yap Island

The Yap International Airport site plan indicates that approximately 265 acres of land will be disturbed for the project for grading activities. Another 61 acres of staging areas including material handling areas are also anticipated to be disturbed to prepare the land for construction activities. One of the more commonly published water application rates for construction site dust control is 0.5 gallons per square yard, or 2,420 gallons per acre. This equates to a depth of approximately 0.09 inches. This is well above the minimum 0.01 inches of rainfall depth for dust control discussed above. Assuming the published rate pertains to an "average" site, and that Yap Island is likely "below average" relative to watering needs due to its moist climate, 0.05 inches will be used as the minimum amount of water to spray. This equates to an application rate of 1,358 gallons per acre.

In summary, it is assumed that 0.01 inches is the minimum rainfall depth for adequate natural dust control. Rainfall of this depth and greater occurs on average, during 256 days per year. For the remaining 109 days per year, it is assumed that a minimum of 0.05 inches will be a suitable depth for artificial dust control. This depth equates to 1,358 gallons per acre of dust control water.

To compute total gallons of water needed for dust control spraying, we can use the following assumptions based on Section 6.2.1:

- Disturbed soils are estimated to be sprayed with water once per day on 109 days per year.
- Spray rate is 1,358 gallons per acre per day.
- Approximately 25 to 50 acres of disturbed soils will be sprayed per day.

Due to the variability of site conditions and climate, adjustments to the above application rates and quantities may be needed for adequate dust control. The estimates of dust control use herein should be used for budgeting and estimating purposes only.

Phase 1A Estimate

The anticipated soil disturbance area at any one-time during Phase 1A may be around 25 acres. Per the assumptions above, total water sprayed for dust control is anticipated to be 33,950 gallons per day for 109 days per year. This is equivalent to about fifteen (15) 2,000-gallon water truck loads per day.

Daily Dust Control Water Demand = 25 acres * 1358 gallons/acre/day = 33,950 gallons/day

Phase 1B-3B Estimate

The anticipated soil disturbance area at any one-time during Phase 1B-3B is estimated at 50 acres for Phases 1B and 2B and 165 acres for Phase 3B. Per the assumptions above, total water sprayed for dust control is anticipated to be 67,900 gallons per day, for 109 days per year. This is equivalent to about thirty (30) 2,000-gallon water truck loads per day.

Phase 1B and Phase 2B Daily Dust Control Water Demand = 50 acres * 1,358 gallons/acre/day = 67,900 gallons/day

Phase 3B Daily Dust Control Water Demand = 165 acres * 1,358 gallons/acre/day = 224,070 gallons/day

7.2.2 Asphalt and Concrete Batch Plants

Assumptions

Concrete Batch Plant Wash Water

'Wash water' supporting concrete batch operations consists of water supporting the plant operations for wash down, cleaning equipment, dust control, and cooling aggregates. This water use typically ranges between 10 to 20 gallons per cubic yard. The 'wash water' quantities assumed for the concrete batch plant in this TM is 20 gallons per cubic yard.

The combined water use for the concrete batch plant operations is assumed to be 60 gallons per cubic yard.

The concrete batch plant is assumed to have a production rate of 90 cubic yards per hour.

Per Table 4-1, the concrete batch plant will operate for a total duration of 14 days, 7 days, and 60 days in Phase 1B, 2B, and 3B, respectively.

Asphalt Batch Plant Wash Water

'Wash water' supporting the asphalt batch plant is less than the concrete batch plant. Asphalt plant water is used for dust control of aggregates storage areas and equipment cleaning. It is assumed that the same amount of cleaning water as used with concrete batch operations will be needed for asphalt batch operations or 10 gallons per cubic yard of material.

The asphalt batch plant is assumed to be a 300 tons per hour batch plant. The unit weight of the asphalt is assumed to be 2 tons per cubic yard.

Assumed both concrete and asphalt batch plants operate 20 hours a day assuming 4 hours of down time each 24-hour period.

Per Table 4-1, the asphalt batch plant will operate for a total duration of 387 days, 38 days, and 236 days in Phase 1B, 2B, and 3B, respectively.

Phase 1A Estimate

As the area for the asphalt and concrete batch plants will be excavated and flattened and the facilities constructed during Phase 1A, no water use for this phase is required.

Phases 1B-3B Estimate

Concrete Batch Plant Wash Water

For Phase 1B-3B, the daily water demand for pond/surface water is as follows:

Peak Daily Water Demand = 20 gallons/cubic yard * 90 cubic yard/hour * 16 hours/day = 28,800 gallons/day

Occasional Daily Water Demand = 20 gallons/cubic yard * 20 cubic yard/day = 400 gallons/day

Asphalt Batch Plant Wash Water

For Phase 1B-3B, the daily water demand for pond/surface water is as follows:

Peak Daily Water Demand = 10 gallons/cy * (300 ton/hour / 2 tons/cy) * 20 hour/day = 30,000 gallons/day

Occasional Daily Water Demand = 10 gallons/cy * (300 ton/hour / 2 tons/cy) * 1 hour/day = 1,500 gallons/day

7.2.3 Water – Pond/Surface Water Summary

Table 7-2 provides a summary of the water utility use by phase for airport construction support areas.

Table 7-2. Water – Pond/Surface Water Use Summary by Phase

Phase	Location	Water Source	Water (gallons/day)
1A	Construction Dust Control Water	TBD - Pond/surface water	33,950
1B-3B	Construction Dust Control Water	TBD - Pond/surface water	67,900 – 224,070
	Concrete Batch Plant Wash Water	TBD - Pond/surface water	40 - 28,800
	Asphalt Batch Plant Wash Water	TBD - Pond/surface water	1,500 -30,000

The Phase 1A water use is estimated to be 33,950 gallons/day. The Phase 1B-3B water use is estimated to be between 69,440 and 282,870 gallons/day. Note, per assumptions above, dust control water is anticipated to be required no more than 109 days per year.

7.3 Wastewater Utility

7.3.1 Workforce Camp and Staging Area

Assumptions

It is assumed that the contractor will connect to the existing YSPSC wastewater system and that YSPSC will provide all wastewater conveyance from the workforce camp after that connection point, although the water may be supplied by SWYA or YSPSC. For either possible workforce camp location, it is assumed that wastewater will discharge to the existing YSPSC collection system's 8-inch poly-vinyl chloride (PVC) wastewater pipe located in the Port-to-Airport Road. SWYA does not have a wastewater pipe system in this area.

It is assumed that laundry, showers, toilets, and cooking wastewater will be pumped from the workforce camp to the existing YSPSC collection system. Infiltration and inflow into the workforce camp wastewater is anticipated to be minimal and the wastewater load generated directly at the workforce camp is sufficient for estimating quantities.

Per discussions with YSPSC, it is assumed that there is adequate conveyance capacity in the existing 8-inch PVC wastewater pipe for the addition of the wastewater from the workforce camp and corresponding treatment capacity at the wastewater treatment facility.

It is assumed that the daily sewage load is equal to the daily water demand, as demonstrated in the estimates provided below.

Daily Wastewater Demand = Average demand per person per day * number of people

Phase 1A Estimate

Based on the expected population of the workforce camp of 125 workers for Phase 1A, the daily wastewater demand is as follows:

Daily Wastewater Demand = 110 gallons/person/day *125 workers = 13,750 gallons/day

Phases 1B-3B Estimate

Based on the expected population of the workforce camp of 200 workers for Phase 1B-3B, the daily wastewater demand is as follows:

Daily Wastewater Demand = 110 gallons/person/day *200 workers = 22,000 gallons/day

7.3.2 Asphalt and Concrete Batch Plants

Personal hygiene facilities for the concrete batch plant, asphalt batch plant and other work locations within the construction site are anticipated to be supported by chemical toilets and handwashing stations.

7.3.3 Wastewater Utility Estimate

Table 7-3 provides a summary of the wastewater generated by phase for airport construction support areas.

Table 7-3. Wastewater Use Utility Summary by Phase

Phase	Location	Wastewater Service	Water (gallons/day)
1A	Workforce Camp/Staging Area	YSPSC	13,750
1B – 3B	Workforce Camp/Staging Area	YSPSC	22,000

7.4 Electrical

7.4.1 Workforce Camp and Staging Area

During on-site meetings in July 2025 and a teleconference meeting in November 2025, YSPSC Electrical management personnel noted that the electrical grid on-island has significant spare capacity built into the distribution, should be able to support the additional loads required by the workforce camp and asphalt and concrete batch plants.

Assumptions

The following preliminary load assumptions outlined in this tech memo are provided for planning reference only, as accurately estimating all contractor activities is not possible without knowing specific means and methods and given some unknowns. Assumptions for sizing are included in the estimate sections below.

Phase 1A Estimate

Based on the expected population of the workforce camp of 125 workers for Phase 1A, the daily electrical demand is 448 kVA per the following:

- Contractor Administration Trailers – 30 kilovolt-ampere (kVA) per trailer (100 ampere [A], panel in each trailer), assume 4 total = 120 kVA
- Contractor Berthing Trailers - 2-6 VA per square foot (from UFC 3-501-01, load for bachelor enlisted quarters [BEQ]), assume 6 VA per trailer at 12-feet x 60-feet each (125 personnel @ 5 people per trailer) = (6VA * 720sqft) * (125/5) =108 kVA
- Contractor Mess Hall - 6 -10 VA per sq-ft (from UFC 3-501-01, load for a Mess Hall), assume 8 VA for 20,000 square feet = 160 kVA
- Contractor Storage - 4 VA per square foot (from UFC 3-501-01, load for Warehouses), assume 15,000 square feet = 60 kVA

Phases 1B-3B Estimate

Based on the expected population of the workforce camp of 200 workers for Phase 1B-3B, the daily wastewater demand is 513 kVA per the following:

- Contractor Administration Trailers (same as 1A) = 120 kVA
- Contractor Berthing Trailers - 2-6 VA per square foot (from UFC 3-501-01, load for BEQ), assume 6 VA per trailer at 12-feet x 60-feet each (200 personnel @ 5 people per trailer) = (6VA * 720sqft) * (200/5) = 173 kVA
- Contractor Mess Hall - 6 -10 VA per sq-ft (from UFC 3-501-01, load for a Mess Hall), assume 8 VA for 20,000 square feet = 160 kVA
- Contractor Storage - 4 VA per square foot (from UFC 3-501-01, load for Warehouses), assume 15,000 square feet = 60 kVA

7.4.2 Asphalt and Concrete Batch Plants

As there is no electrical service along the dirt road from the Port-to-Airport road to the future asphalt and concrete batch plant construction support area, electricity to run these facilities is anticipated to be from generators. However, if the contractor choses to bring power from the road to the site, an estimated power need is provided in this section. Per Table 4-1, the concrete batch plant will operate for a total duration of 14 days, 7 days, and 60 days in Phase 1B, 2B, and 3B, respectively. Per Table 6-1, the asphalt batch plant will operate for a total duration of 387 days, 38 days, and 236 days in Phase 1B, 2B, and 3B, respectively.

Assumptions

The following preliminary load assumptions outlined in this tech memo are provided for planning reference only, as accurately estimating all contractor activities is not possible without knowing specific means and methods and equipment.

Phase 1A Estimate

As the area for the asphalt and concrete batch plants will be excavated and flattened and the facilities constructed during Phase 1A, no electrical use for this phase is required.

Phases 1B-3B Estimate

For Phase 1B-3B, the total electrical utility estimate at maximum capacity is when both batch plants are in operation. This demand is approximately 1,600 kVA per the following:

- Concrete batch plant - Assuming a 90 yd^3/hour plant [69 m^3/hour plant]) = 200 kVA
- Asphalt batch plant – Assuming a 300 ton/hour = 1400 kVA

7.4.3 Electric Utility Use Summary

Table 7-4 provides a summary of the electric utility use by phase for airport construction support areas.

Table 7-4. Electric Demand Summary by Phase

Phase	Location	Electric Source	Electric Demand (kVA)
1A	Workforce Camp/Staging Area	YSPSC	448
1B – 3B	Workforce Camp/Staging Area	YSPSC	513
	Concrete Batch Plant	YSPSC or generators	200
	Asphalt Batch Plant	YSPSC or generators	1,400

The Phase 1A electric demand is estimated to be 448 kVA. The Phase 1B-3B electric demand use is estimated to be 2,113 kVA.

8. Possible Utility Contingency Plans

This section describes possible utility contingency plans for times when utility service may be impacted.

8.1.1 Water Utility - Piped Water Supply

For piped water, due to the duration of the construction project, it is possible that Yap Island could experience a drought. During times of drought, it has been suggested that the airport contractor may have to provide water to the workforce camp or for concrete mix water during this time without support from Yap utility companies. Alternatively, the contractor may choose to halt construction efforts until the drought ends.

During times of drought, the airport contractor may need to generate freshwater with a water treatment system such as a reverse osmosis water purification unit (ROWPU). A ROWPU generates fresh water from salt water by forcing the water through a membrane that removes a percentage of the salts and discharges a brine solution that is very high in salt content. The concentrated brine can be disposed via evapotranspiration pit, deep well injection or through deep water ocean discharge. Either discharge option must be appropriately designed and meet all substantive regulatory requirements. To support an evapotranspiration pit, the surface area required for an effective pit is dependent on climate conditions at the time of use. Evapotranspiration pits are more effective during drier drought-type conditions, but they may be inefficient and ineffective in the typical warm, humid conditions on Yap. To support installation of a deep injection well, a detailed hydrogeologic, geotechnical, and groundwater quality investigation would be required to identify aquifer characteristics, soil and rock conditions, and sustainable injection rates. To support installation of a deep ocean discharge pipe, a detailed bathymetric and ocean mixing study may be required to meet the substantive regulatory requirements. The use of a ROWPU and corresponding discharge injection well or deep ocean discharge pipe are presented as conceptual contingencies only and would require siting and ensuring that the system meets all substantive regulatory requirements.

In the event that a ROWPU system is implemented for the project, it would be temporary and removed upon completion of construction activities.

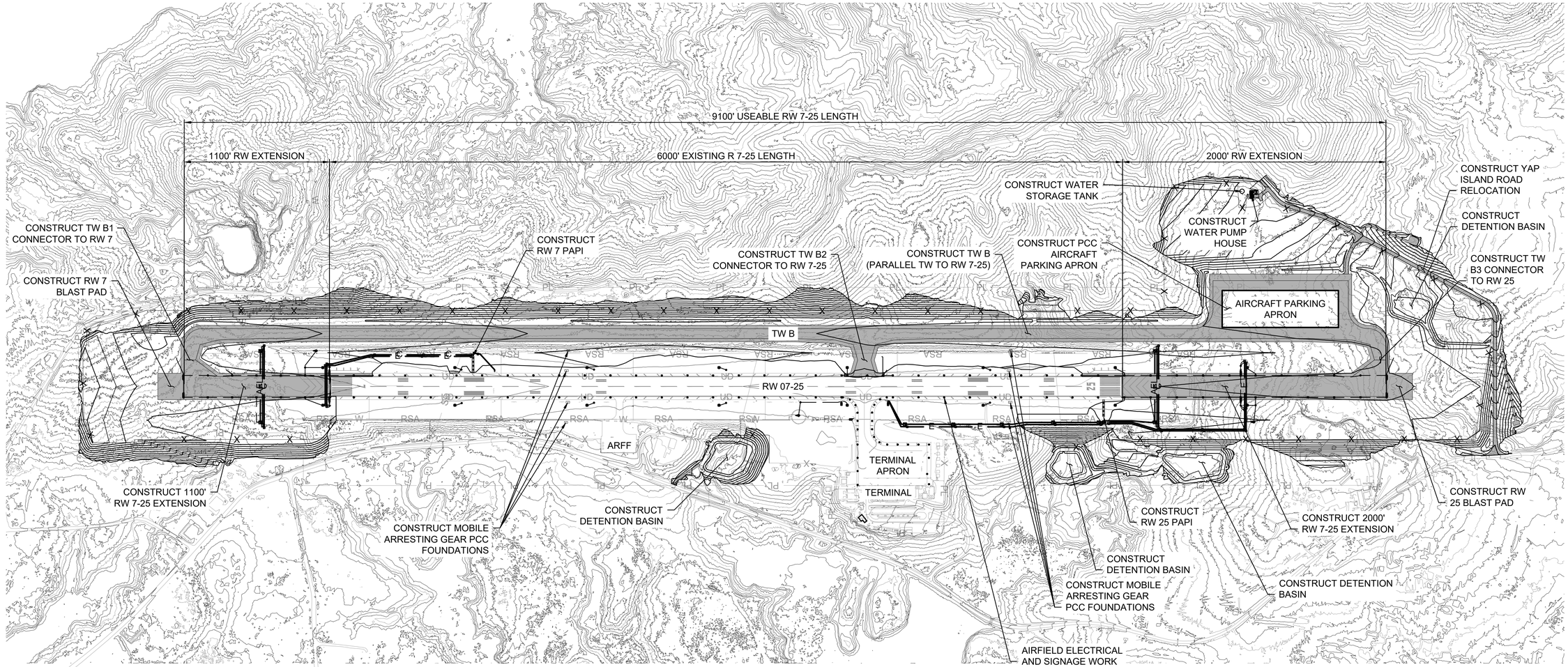
8.1.2 Wastewater Utility

No backup for wastewater discharge from the workforce camp is planned for the airport project. The Port-to-Airport Road sewer pipe and wastewater treatment plant are assumed to have capacity to effectively serve the project without service disruption.

8.1.3 Electrical

The YSPSC electric grid is anticipated to have sufficient capacity to serve the construction support areas. However, if needed, the contractor may choose to provide backup generators and corresponding fuel to provide service to the workforce camp in times of outage.

Attachment 1
Proposed Scope of Work



LEGEND:

- RSA — RUNWAY SAFETY AREA (RSA)
- ROFA — RUNWAY OBJECT FREE AREA (ROFA)
- PL — YAP AIRPORT PROPERTY BOUNDARY
- X — EXISTING FENCELINE
- X — PROPOSED FENCELINE

N

0 400' 800'

NAVFAC

FOR REVIEW ONLY

These documents are for Design Review and not intended for Construction Bidding or Permit Purposes.

Jacobs
JACOBS GOVERNMENT SERVICES COMPANY
777 MAIN STREET
FORT WORTH, TEXAS 76102

A/E Contract No. N62742-17-D-0003
A/E Task Order No. N62742-22F-0338
JGS: WYK0620
A/E INFO

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND
NAVFAC PACIFIC

NAVAL FACILITIES ENGINEERING SYSTEMS COMMAND ~ PACIFIC
MAKALAPA, HAWAII

YAP INTERNATIONAL AIRPORT, FSM

YAP, FEDERATED STATES OF MICRONESIA (FSM)

FY25/FY26 MCAF/MCON PROJECTS

SCOPE OF WORK

SCALE: AS SHOWN

EXHIBIT

FILE NAME: C:\pw_workdir\den003\ch2mhill_n1062689\d1652511\P-000_Exhibit_RSA-Work.dwg
LAYOUT NAME: Project Scope
PLOTTED: 07/22/2025 5:59pm
USER: R1062689

Attachment 2
March 2026 Yap State Task Force Utility Presentation

YAP INTERNATIONAL AIRPORT IMPROVEMENTS

United States of America and Federated States of Micronesia Partnership Project

ESTIMATED ELECTRICAL, WATER, AND WASTEWATER REQUIREMENTS FOR AIRFIELD PROJECT

March 2026

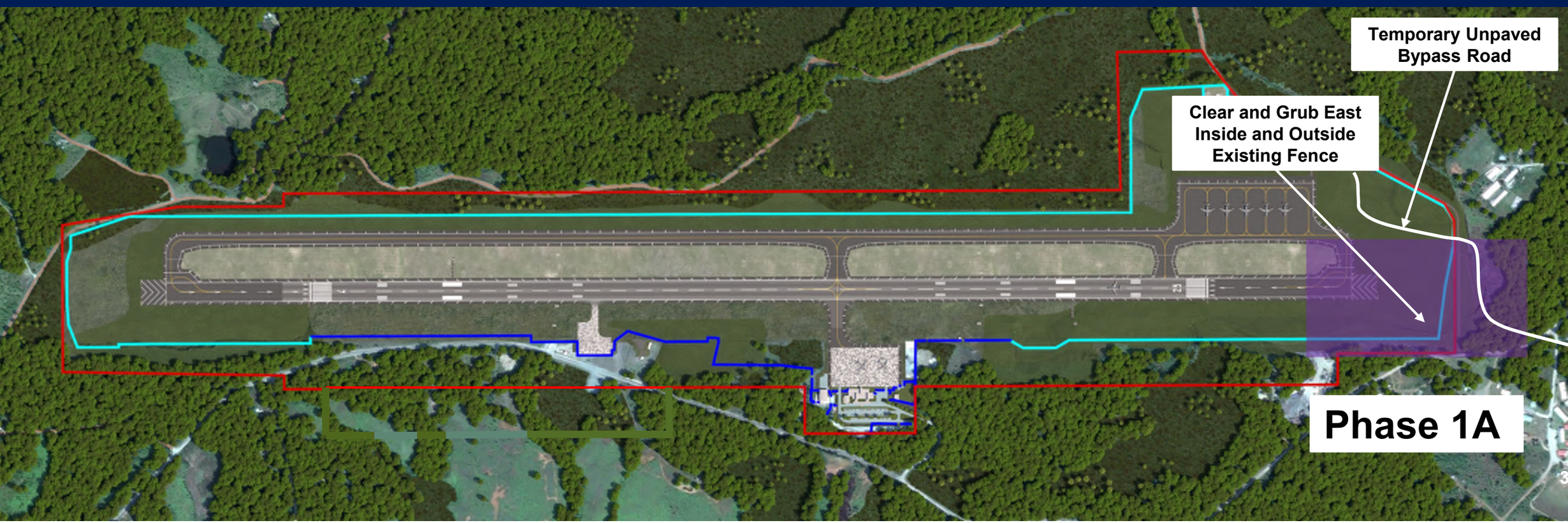
Agenda

- Estimated electric and water requirements by phase
- Wastewater requirements
- Summary of interactions with service providers
- Questions

Construction Phase Descriptions

Phase 1A

- Complete initial clearing and grubbing, topsoil removal, and rough grading beyond the existing airport fence line on the east end of the runway.



Estimated Utility Requirements for Phase 1A

- **Electric: ~448 kVA**

Location	Electrical Source	Estimated Days	Mancamp Population	kVA Required	Notes
Mancamp	YSPSC	186	125	448	includes contractor admin trailers, berthing trailers, mess hall, and storage

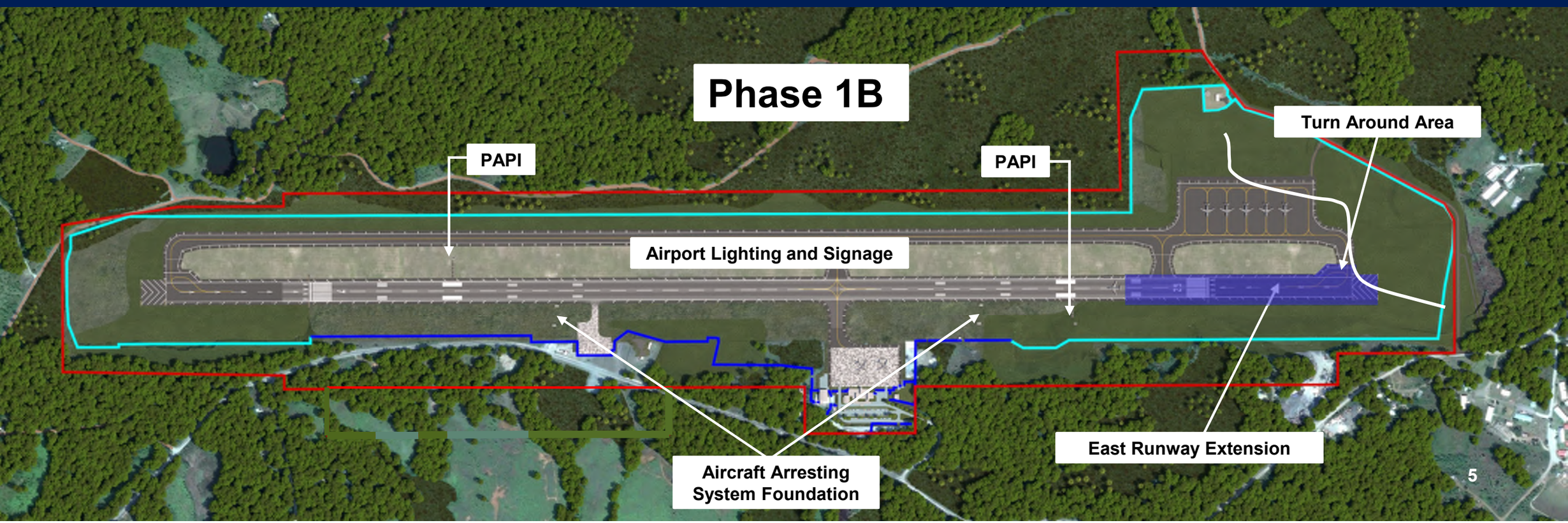
- **Water: ~13,750 gallons per day**

Location	Water Source	Estimated Days	Mancamp Population	Gallons per Day	Notes
Mancamp	YSPSC or SYWA	186	125	13,750	Per UFC 3-230-3, Table 3-1; 110 gallons/person/day - potable

Construction Phase Descriptions

Phase 1B

- Complete initial construction to extend the existing runway to the east and construct a temporary compacted aggregate community access road. Complete associated work within the existing RSA.



Estimated Utility Requirements for Phase 1B

- **Electric**

Location	Electrical Source	Estimated Days	Mancamp Population	kVA Required	Notes
Mancamp	YSPSC	1344	200	513	Includes contractor admin trailers, berthing trailers, mess hall, and storage
Concrete Batch Plant	Onsite Generator	14	N/A	200	
Asphalt Batch Plant	Onsite Generator	387	N/A	1,400	

- YSPSC electric requirement: ~513 kVA (for entire phase)
- Onsite generator electric requirement: ~1,600 kVA (for approximately 400 days)
- Concrete batch plant based on a 60 m^3/ hour plant
- Asphalt batch plant based on 300 tons per hour

Estimated Utility Requirements for Phase 1B

- **Water**

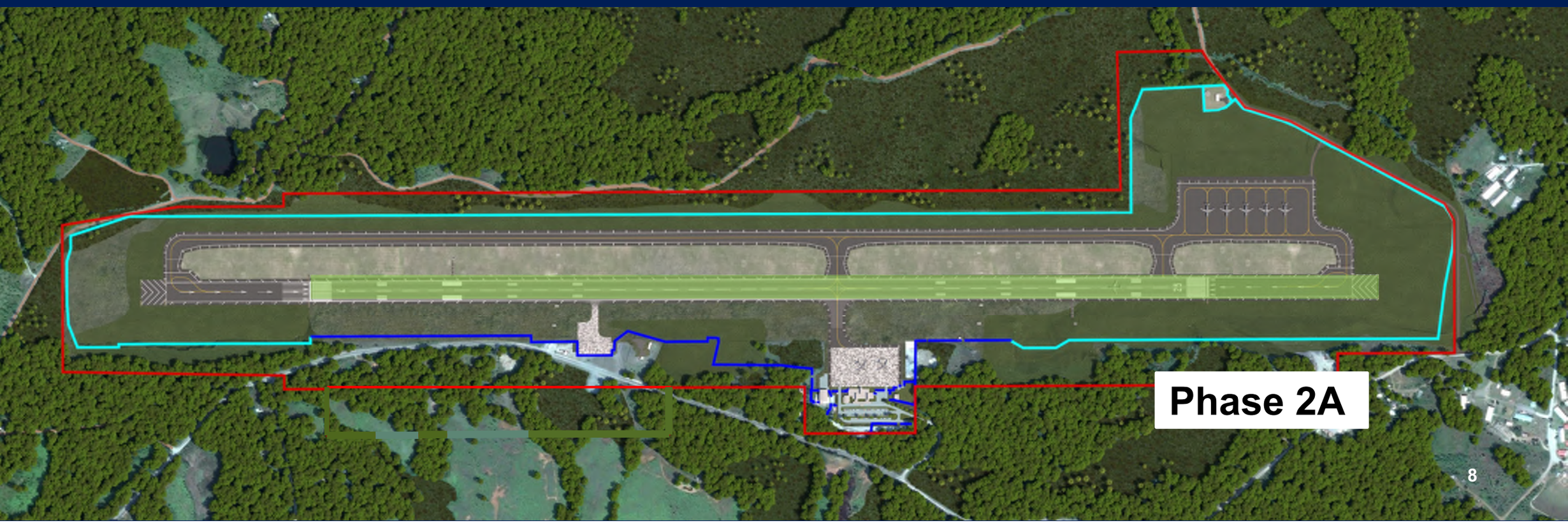
Location	Water Source	Estimated Days	Mancamp Population	Gallons per Day	Notes
Mancamp	YSPSC or SYWA	1344	200	22,000	Per UFC 3-230-3, Table 3-1; 110 gallons/person/day - potable
Asphalt Batch Plant	TBD	386	N/A	30,000	Wash, clean, dust, cooling
Concrete Batch Plant	YSPSC or SYWA	14	N/A	57,600	Concrete mix water - potable
Concrete Batch Plant	TBD	14	N/A	28,800	Wash, clean, dust, cooling

- Washing, cleaning, dust control, and cooling water could be sourced from other than YSPSC or SYWA.
- Total water for concrete batch plant: ~1.21M gallons (over approximately 14 days)
- Total water for asphalt batch plant: ~11.6M gallons (over approximately 386 days)
- Concrete batch plant based on a 60 m^3/ hour plant operating for 16 hours per day
- Asphalt batch plant based on 300 tons per hour operating for 16 hours per day

Construction Phase Descriptions

Phase 2A

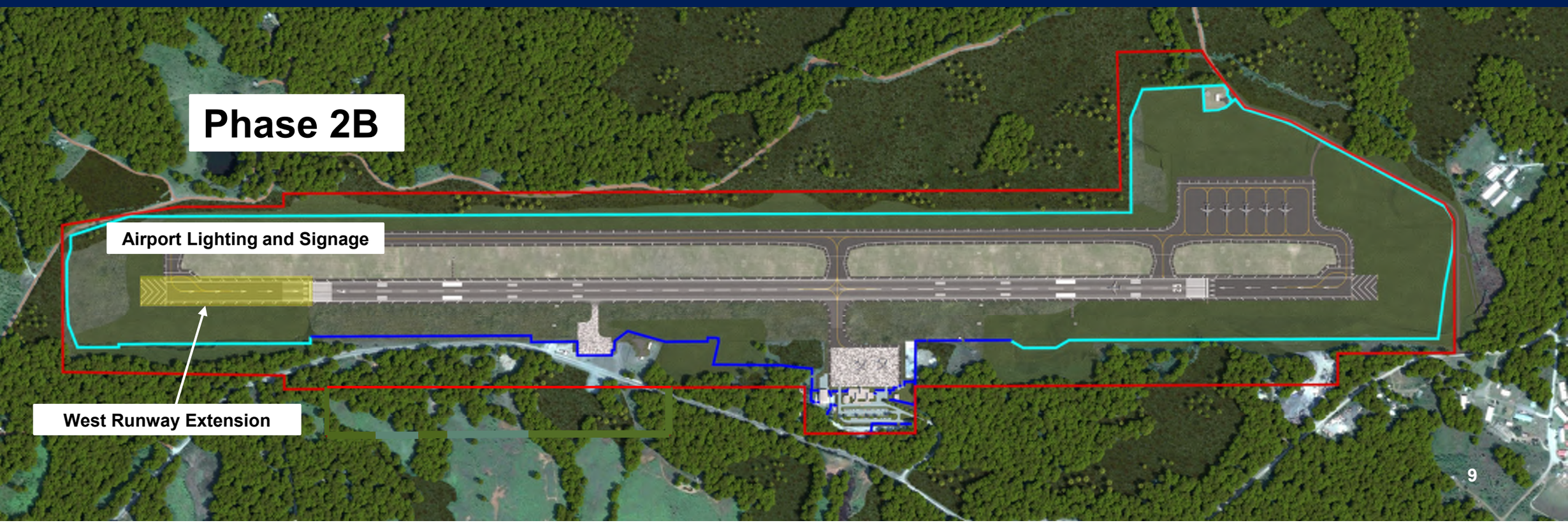
- Reconfigure runway to open up the eastern runway expansion completed in Phase 1 and to establish a temporarily displaced western runway threshold.



Construction Phase Descriptions

Phase 2B

- Complete all activities associated with the construction of the western runway extension behind the temporarily displaced runway threshold



Estimated Utility Requirements for Phase 2B

- **Electric**

Location	Electrical Source	Estimated Days	Mancamp Population	kVA Required	Notes
Mancamp	YSPSC	371	200	513	Includes contractor admin trailers, berthing trailers, mess hall, and storage
Concrete Batch Plant	Onsite Generator	7	N/A	200	
Asphalt Batch Plant	Onsite Generator	38	N/A	1,400	

- YSPSC electric requirement: ~513 kVA (for entire phase)
- Onsite generator electric requirement: ~1,600 kVA (for approximately 45 days)
- Concrete batch plant based on a 60 m^3/ hour plant
- Asphalt batch plant based on 300 tons per hour

Estimated Utility Requirements for Phase 2B

- **Water**

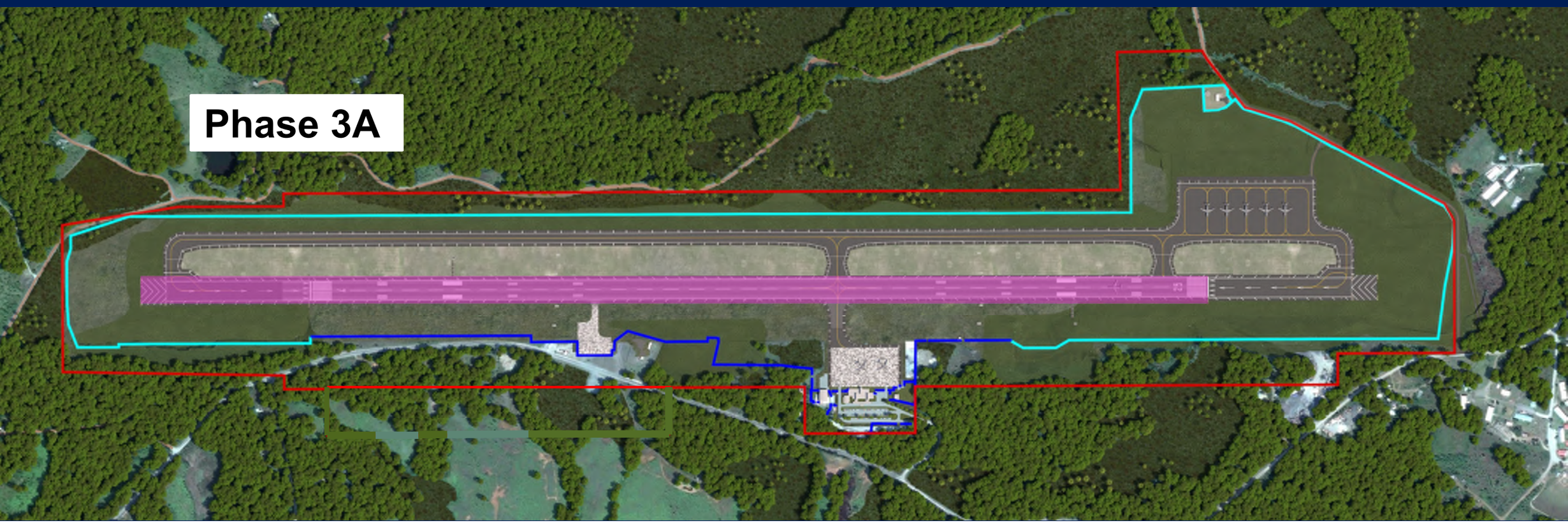
Location	Water Source	Estimated Days	Mancamp Population	Gallons per Day	Notes
Mancamp	YSPSC or SYWA	371	200	22,000	Per UFC 3-230-3, Table 3-1; 110 gallons/person/day - potable
Asphalt Batch Plant	TBD	38	N/A	30,000	Wash, clean, dust, cooling
Concrete Batch Plant	YSPSC or SYWA	7	N/A	57,600	Concrete mix water - potable
Concrete Batch Plant	TBD	7	N/A	28,800	Wash, clean, dust, cooling

- Washing, cleaning, dust control, and cooling water could be sourced from other than YSPSC or SYWA.
- Total water for concrete batch plant: ~604,800 gallons (over approximately 7 days)
- Total water for asphalt batch plant: ~1.14M gallons (over approximately 38 days)
- Concrete batch plant based on a 60 m^3/ hour plant operating for 16 hours per day
- Asphalt batch plant based on 300 tons per hour operating for 16 hours per day

Construction Phases Descriptions

Phase 3A

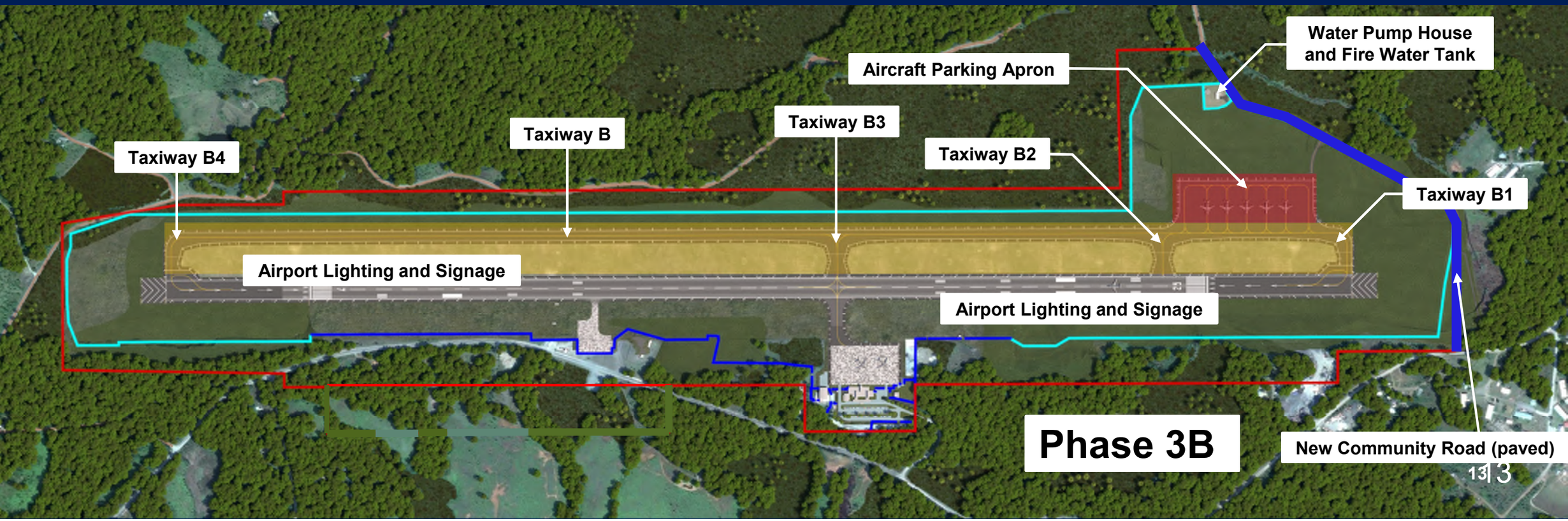
- Reconfigure runway to open the western runway expansion completed in Phase 2.



Construction Phases Descriptions

Phase 3B

- Complete all activities associated with the construction of the new aircraft parking apron, access taxiways, and parallel taxiway.



Estimated Utility Requirements for Phase 3B

- **Electric**

Location	Electrical Source	Estimated Days	Mancamp Population	kVA Required	Notes
Mancamp	YSPSC	465	200	513	Includes contractor admin trailers, berthing trailers, mess hall, and storage
Concrete Batch Plant	Onsite Generator	60	N/A	200	
Asphalt Batch Plant	Onsite Generator	236	N/A	1,400	

- YSPSC electric requirement: ~513 kVA (for entire phase)
- Onsite generator electric requirement: ~1,600 kVA (for approximately 296 days)
- Concrete batch plant based on a 60 m^3/ hour plant
- Asphalt batch plant based on 300 tons per hour

Estimated Utility Requirements for Phase 3B

- **Water**

Location	Water Source	Estimated Days	Mancamp Population	Gallons per Day	Notes
Mancamp	YSPSC or SYWA	465	200	22,000	Per UFC 3-230-3, Table 3-1; 110 gallons/person/day - potable
Asphalt Batch Plant	TBD	236	N/A	30,000	Wash, clean, dust, cooling
Concrete Batch Plant	YSPSC or SYWA	60	N/A	57,600	Concrete mix water - potable
Concrete Batch Plant	TBD	60	N/A	28,800	Wash, clean, dust, cooling

- Washing, cleaning, dust control, and cooling water could be sourced from other than YSPSC or SYWA.
- Total water for concrete batch plant: ~5.18M gallons (over approximately 60 days)
- Total water for asphalt batch plant: ~7.08M gallons (over approximately 236 days)
- Concrete batch plant based on a 60 m^3/ hour plant operating for 16 hours per day
- Asphalt batch plant based on 300 tons per hour operating for 16 hours per day

Estimated Wastewater Requirements

- **Wastewater requirements for Phase 1A:**

Location	Water Source	Estimated Days	Mancamp Population	Gallons per Day	Notes
Mancamp	YSPSC	186	125	13,750	Per UFC 3-230-3, Table 3-1; 110 gallons/person/day - potable

- **Wastewater requirements for Phases 1B through 3B:**

Location	Water Source	Estimated Days	Mancamp Population	Gallons per Day	Notes
Mancamp	YSPSC	2641	200	22,000	Per UFC 3-230-3, Table 3-1; 110 gallons/person/day - potable

- Water may be sourced from YSPSC or SYA, but the sewer provider is YSPSC regardless of source.
- Asphalt and concrete batch plants would have de minimus discharge.

Summary of Coordination With Providers

- YSPSC – no concerns regarding ability to provide utility service raised by the provider
  - May 2023 – Electric utility meeting on Yap Island
  - May 2023 – Water and Wastewater utility meeting on Yap Island
  - June 2024 – Onsite data collection from utility by Host Nation Liaison
- Southern Yap Water Authority– no concerns regarding ability to provide utility service raised by the provider
  - May 2023 – Water utility meeting on Yap Island
  - June 2024 – Onsite data collection from utility by Host Nation Liaison
  - January 2026 – Teleconference meeting discussion
- November 2025 - Utility meeting scheduled with all providers with detailed presentation prepared to advance discussion and confirm past guidance. Meeting cancelled for reasons unknown and not rescheduled.

Questions & Comments

Thank you for your time and attention.

Attachment 3
Utility Meeting Minutes

Meeting Minutes

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F +1 808.954.4400
www.jacobs.com

Subject **Site Engineering Investigation Meeting – Water and Sanitary Sewer Discussion**

Projects P-010 Extend Runway, P-020 Yap Aircraft Apron, and P-030 Perimeter Road, P-970 Aircraft Parking Apron Extension, P-990 Runway Extension, P-991 Aircraft Taxiway, and P-1037 APOD Fuel Storage at the Yap International Airport, FSM

Prepared by Jessica Burdick, PE, PMP
Bryan Keas, PE

Contract Nos. N62742-20-D-0002; N62742-17-D-0003

Location Manta Ray Bay Hotel – Conference Room

eProjects No. 1687159; 1719021; 1719022; 1708905

Date/Time 04 May 2023; 1300-1400 hrs YAPT

Attendees

1. Yap State Public Services Corporation (YSPSC) Water & Sewer – Mr. Charles Falmeyog
2. YSPSC Customer Service – Mr. Gideon Moofal
3. YSPSC Power Distribution – Mr. Florentino Ruwawyoch
4. Southern Yap Water Authority Manager – Mr. John Guswel
5. Host Nation Liaison - Mr. Jonathan Marmar
6. Jacobs Project Manager – Ms. Jessica Burdick
7. Jacobs Design Manager – Mr. Bryan Keas
8. Jacobs Lead Potable Water/Fire Flow - Mr. Antonio Esposito
9. Jacobs Civil Lead/Road Designer - Mr. Scott Bacina
10. Jacobs Civil Site Drainage - Mr. Daniel Selk
11. Jacobs Construction Capacity Study - Mr. Matthew Smith
12. AFIMSC PM - Mr. Brent Ciboch
13. AFIMSC Cost Estimator - Mr. William Thornton
14. NAVFAC DM - Mr. Devin Kitashiro
15. NAVFAC PM Alternate - Mr. Ian Beltran
17. AFIMSC ENV - Mr. Matthew Welsh Jacobs Construction Capacity Study - Mr. Joseph Stone
18. NAVFAC Engineer - Mr. Meldrick Zuniga

A stakeholder meeting to discuss the MCAF P-010 Extend Runway, MCAF P-020 Aircraft Parking Apron/P-030 Perimeter Road, MCON P-970 Aircraft Apron Extension, MCON P-990 Runway Extension, and MCON P-991 Aircraft Taxiway projects at the Yap International Airport, FSM was held at the Yap International Airport AARF Conference room to review project status and support the design of the airport improvement projects. The purpose of the meetings was to discuss the project design requirements, logistical constraints for Contractors, permit requirements, and stakeholder concerns. The following is a summary of the meeting notes and discussion items:

Notes:	**Action**
Opening Remarks/Introduction to Projects Ms. Jessica Burdick/Jacobs reviewed the following and provided a handout to the group:	

Notes:		Action
1	Project scope overview was discussed with meeting participants including the Airport Development program for DoD requirements. It was indicated that we are expecting FY25 funding for construction for late 2025 construction start The projects being designed include: • P-010 Extend Runway • P-020 Yap Aircraft Apron • P-030 Perimeter Road • P-970 Aircraft Parking Apron Extension • P-990 Runway Extension • P-991 Aircraft Taxiway P-1037 APOD Fuel Storage	No action required.
2	Site Map showing all project locations was shared.	No action required.
Design Criteria Questions		
1	Q. Does the Utility have any design reports for the original construction or for the expansion of the water main and sanitary trunk lines?	
	A. Yes, these are from the1970's, but they are not reliable, as they find changes when they investigate onsite. Jacobs can review existing as-built information at the city water plant location.	Jacobs to review existing as-built information at the city water plant location.
	The existing water treatment plant is a very old treatment plant and will be replaced soon. The YSPSC has design plans for a replacement water and wastewater treatment plants.	
	The water plant has approximately 20,000-gallon storage tank and (2) 1-million-gallon storage tanks on the island with one located on the hill near Colonia, and the other located on the hill near the power plant. There are plans to build a third tank and refurbish the existing 2 tanks.	
	Existing distribution system generally consists of 6-inch and 8-inch pipe segments between water plant and airport.	
	The utility typically does not use metal pipes, but there are some segments of cast iron/ductile iron pipes. There is no cathodic protection on the existing metal pipes that are currently in service.	

Notes:		Action
2	Q. Have there been any breaks on the Water mains or the sanitary trunk lines? If so, what materials does the Utility use for repairs? A. Yes, breaks are experienced throughout the system. They are primarily associated with the older asbestos cement (AC) pipes. Repair material not provided.	No action required.
3	Q. Is there only one potable water main/source for the airport? We have heard that there is a second water source but has not found drawings showing the location. A. There are currently four (4) separate water service agencies on the island of Yap. The airport terminal's domestic and three fire hydrants are served by the Yap State Public Service Corporation (YSPSC) and the Aircraft Rescue and Fire Fighting (ARFF) area is served by the Southern Yap Water Authority. The two water systems are connected near the ARFF station but are separated with an isolation valve primarily due to the Southern Yap Water Authority water being potable, and the YSPSC water being non-potable. The YSPSC water pressures are generally higher though (around 70-80 psi). The YSPSC uses both surface reservoirs and wells to supply water. All hydrants are currently operational. There are booster pumps located at the YSPSC and Southern Yap Water Authority locations that engage when pressures drop.	No action required.
4	Q. What design requirements/standards does the Utility have for pipe, joints, valves, hydrants? A. The utility company has standards for water, sewer, electric. Utility will provide their design standards and specifications in an email for review by Jacobs.	YSPSC to send utility standards information
5	Q. What is the process for requesting deviations from the Utility's design requirements? A. The utility does not have a defined process for requesting deviations from the design requirements. Each deviation should be discussed with the utility.	No action required at this time.
6	Q. Does the Health Department have any requirements that any extensions of the Water and Sewer systems have to meet?	Question to be asked during the EPA meeting tomorrow.

	Notes:	Action
	A. Need to ask the Health Department during the Health Department meeting.	
7	Q. Are "hot tap" connections to existing active water lines acceptable? A. "Hot taps" are acceptable for connections of new service lines to existing lines. Larger taps such as size on size will require shutdowns of the utilities.	No action required.
8	Q. What disinfection does the water Utility require for the water lines? A. Disinfection is completed by chlorination of the new segments of pipe for 24 hours.	No action required.
9	Q. Does the Utility have a preference on thrust blocks versus restrained joints to capture thrust? A. The utility primarily uses thrust blocks with local aggregate. They have not had any issues with the thrust blocks failing.	No action required.
10	Q. What is the EPA's definition of "potable" water? A. Try to follow ACPA and EPA guidelines but can't meet most standards for water quality.	To be discussed in more detail with the EPA at tomorrow's meeting.
11	Q. What water quality testing is completed by the EPA? A. EPA tests approximately once per month. They conduct e.coli and coliform testing.	No action required.
12	Q: Are there any existing as-builts for sanitary sewer utility system? We are seeking any existing information for those building materials within sanitary sewer utilities that could be hazardous (e.g. AC pipe or pipe insulated with asbestos, etc.) A. Sanitary sewer connects terminal to treatment plant with pipe sizes around 4-inch by terminal to around 6-inch by the injector pump. Pump can't keep up during heavy rains. Currently they are not close to reaching sanitary sewer treatment plant capacity. However, new treatment plant design further increases capacity.	No action required.
13	Q. What pipe materials does the utility have? A. The utility uses C900, DIP, CIP, and AC (asbestos cement) Pipe.	No action required.

Notes:		Action
14	Q. Where is the AC pipe located? A. There is AC pipe around the airport in different locations and it is believed that there is AC pipe in the area between the high school and the airport. Most C900 around the airport, but there is AC pipe near the ARFF station as well.	No action required.
Contractor Logistics and Procedures		
1	Q. Who needs to be notified to request a shutdown of the utility? A. Contact Customer Service at 350-4427 or Gidion Moofal's cell 950-2845	No action required.
2	Q. What is the notification time frame for requesting an outage of a utility? A. For outages anticipated to be of only short duration, a 24 hour notice is required. If the duration will last longer than 24 hours it is considered major and requires one week notification. Major outages require public notification.	No action required.
3	Q. Is there any specific procedures that need to be followed during a shutdown, i.e. hydrants need to be tagged as out of service? A. There are no procedures that have to be followed during a shutdown.	No action required.
4	Q. What is the current rate (cost) for water and/or sewer? A. For Water 0-5K gallons $4.00/1k gallons 5K-25,000K $5.00/1K gallons >25,000 $7.00/1K gallons Minimum charge of $5 For Sewer 80% of water consumption at $0.92/1K of water used.	No action required.
5	Q. Will the contractor be expected to provide water metering for construction and/or temporary housing needs? A. Yes, YSPSC prefers the use of master meters. There is currently a 2-inch meter that services the terminal building. There are currently no meters on the fire hydrants	No action required.

Notes:		Action
6	Q. How is the water sourced on Yap Island? If the local source is not adequate, can temporary ponds be constructed to provide non-potable water? A. Water provided by YSPSC is not considered potable. The water is sourced from water reservoirs near the treatment plant for most of Colonia and ground water wells on the north side of their service area. The water from the Southern Yap Water Authority is potable. In addition, GW feeds the well system on the north, managed by Gagil/Tomil Water Authority (GTWA), which is separate from the surface water fed system in town. Tanks are located on the hill by the resort and on the hill just pass the power system	No action required.
9	Q: Are there any existing as-builts for the sanitary sewer utility system? Seeking any existing information for building materials within sanitary sewer utilities that could be hazardous (ex. AC pipe or pipe insulated with asbestos A: Some water pipes are asbestos pipes. There was a replacement project in the 1990s with piping replaced with PVC.	No action required.
Outage and Design Requirements for Tie-Ins to Existing Utilities		
1	Q. If "hot taps" are not allowed, how long can the water line be taken out of service? A. The water lines can be taken out of service for extended periods of time. See above questions and answers associated with outages and notification requirements.	No action required.
2	Q. Who needs to be notified to request a shutdown of the utility? A. See answers to questions above concerning notifications.	No action required.
3	Q. What is the notification time frame for requesting an outage of a utility? A. See answers to questions above concerning notifications.	No action required.
4	Can we get design as-builts for the new plants to be installed. Program Management Office (PMO) is running this job. $13mil to $29mil for both projects. New YSPSC water plant will be designed for 20 year timeframe/ growth	Jacobs to request PMO provide design drawings for proposed projects.

Notes:	Action
and will be designed to meet current water quality standards.	

END OF ITEMS

Technical Memorandum

April 12, 2026

To	NAVAL FACILITIES ENGINEERING COMMAND SOUTHWEST NAVAL BASE SAN DIEGO	**Contact No.**	N6247323F4522
Copy to	NAVFAC Southwest, File	**Email**	Paul.baron@ghd.com
From	Paul Baron, PE, GHD	**Project No.**	12635440
Project Name	FY26 NAVY PROJECTS MALAKAL PORT, PALAU & YAP PORT, YAP		
Subject	Yap Utilities Capacity Assessment – Seaport, Roadway and Temporary Areas		

1. Purpose

This technical memorandum summarizes the availability, capacity, and reliability of utilities to support the Yap Port Improvement Project, including permanent seaport facilities, construction-phase utility demands for all construction, and associated temporary areas for support facilities, staging and stockpiling. The memorandum is intended to address questions raised by NAVFAC regarding utility demand versus system capacity and to document coordination with the Yap State Public Service Corporation (YSPSC) and the Gagil Tomil Water Authority (GTWA)based on direct correspondence.

Utility information herein is based on email correspondence with the YSPSC, including responses addressing electrical service capacity, outage history, water availability (including drought restrictions), and general coordination for water/wastewater considerations.

2. YSPSC and GTWA Points of Contact

This memorandum documents coordination and information provided by YSPSC and GTWA for planning and environmental review purposes and does not represent a commitment by either agency to provide future capacity beyond standard service agreements. YSPSC identified the personnel below as pertinent contacts for consultations across power, water, and wastewater. Victor Nabeyan has served as the primary coordinating point of contact for YSPSC and Ignatius Uron was the sole point of contact for GTWA for water at Chief Mar's lot, the sports complex and the Tamil offload and stockpile areas.

Table 1 – YSPSC and GTWA Contacts

Name	Role / Branch
Victor Nabeyan, YSPSC	General Manager
Charles Falmeyog, YSPSC	Assistant General Manager
Vincent Bouet, YSPSC	Electrical Engineer
Gidion Moofal, YSPSC	Power Division Manager
Steven Libmad, YSPSC	Power Division Assistant Manager
Philip Chugrad, YSPSC	Water/Wastewater Division Manager
Camron Miles, YSPSC	Water/Wastewater Division Manager
Chris Igem, YSPSC	Power Plant Division Manager
Roscoe Tamag, YSPSC	Power Plant Division Assistant Manager
Ignatius Uron, GTWA	Point of Contact

3. Electrical Utilities (Seaport and Staging Areas)

3.1 Provider and System Overview

Electrical service on Yap Island is provided by the Yap State Public Service Corporation (YSPSC) via a 13.8-kV wye primary distribution network supplied by island-based diesel generation. Based on coordination with YSPSC, existing island generation capacity and feeder loading were reviewed relative to the estimated project demands summarized in Table 2. YSPSC confirmed that these demands can generally be accommodated within the existing system without system-level upgrades or constraints under normal operating conditions.

Estimated construction-phase electrical demands—on the order of hundreds of kilowatts across seaport and roadway construction activities and distributed temporary staging, housing, and offloading areas—are within the scale of loads routinely served by the YSPSC system and do not represent a material increase relative to overall island capacity. However, due to the island's isolated diesel-based grid and historic outage conditions, the Contractor will be contractually required to plan for and provide independent power generation in the event utility power is unavailable.

3.2 Electrical Demand and Capacity

Demand:

Electrical demand was evaluated using conservative, site-specific planning-level assumptions intended to represent a reasonable worst-case construction scenario for environmental review purposes. As summarized in Table 2, the total combined electrical demand across all construction and staging locations could approach approximately one (1) megawatt (MW) if all sites were operating simultaneously at the high end of the estimated demand ranges.

Electrical loads are anticipated to be served by a combination of utility power from YSPSC, where available and practical, and portable or temporary (semi-fixed) diesel generators provided, operated, and maintained by the Contractor. Anticipated source preferences shown in Table 2 represent a planning-level assessment using a power factor of 0.8 and are based on site location, noise sensitivity, and YSPSC serviceability, and are not intended to limit the Contractor's means and methods or options.

Permanent post-construction electrical demand at the seaport is expected to be minimal and primarily associated with energy-efficient LED lighting, with preliminary design calculations indicating the need for only a 100-amp service requirement.

Staging areas and worker housing demand at Sports Complex and/or Chief Mar's lot was estimated at 140-190 kW connected load. YSPSC confirmed that there is adequate capacity to serve these staging areas if utility power is used rather than solely relying on generators. As noted above, Table 2 below summarizes the estimated power demands and the anticipated source preference that the contractor may have.

The pending permanent seaport demand after construction is considered low as it will primarily serve the proposed seaport lighting using modern LED fixtures. The design load calculations indicate a 100-amp service. Construction-phase seaport demand was conservatively estimated at 135-260 kW, up to 300 kW. YSPSC confirmed the grid and generation system can support these construction loads without impacting the seaport or adjacent communities.

Capacity:

Yap's power system consists of an isolated diesel-based grid operated by the Yap State Public Service Corporation with approximately 8.3 MW of installed generation capacity serving a peak demand of about 2.4 MW; while this provides a nominal reserve margin exceeding 200%, system resilience is constrained by reliance on centralized diesel generation and storm-vulnerable overhead distribution infrastructure.

Our assumption of how we believe the contractor may elect to provide power to the sites is shown as the "Anticipated Source Preference" after the location name in the left-hand column of the Table 2. For areas like the seaport project site that YSPSC indicated they could serve, we have indicated "Primary YSPSC, Generator Backup" in the table. We have also defaulted on this for areas that we anticipate may be sensitive to noise and where generator use may not be preferred by the public due to noise primarily. For

instance, the site near the library at the seaport. In these areas where we believe the contractor will prefer to use generators or where YSPSC cannot serve them, we have put “Primary Generator/ Backup YSPSC.”

In addition, the contractor will be required contractually to plan to provide 100% or their utilities in the event that Yap cannot support it or in the event that there are YSPSC power outages.

Table 2 – Estimated Electrical Demands

Location/Anticipated Source Preference	Demand (kW/Generator kVA)	Comments
Seaport/Primary YSPSC, Generator Backup	0.17–0.38 MVA	40 workforce; primary construction area; potential concrete batching and heavy equipment. Not sensitive to noise.
Iboom Seaport Staging Area/Primary YSPSC, Generator Backup	0.04–0.08 MVA	Administrative trailers, storage, light maintenance. Sensitive to noise.
Library Seaport Staging Area/Primary YSPSC, Generator Backup	0.04–0.08 MVA	Administrative trailers, storage, light maintenance. Sensitive to noise.
Nungoch Park/ Primary Generator/ Backup YSPSC	0.03–0.05 MVA	Temporary; active only during park construction. Not Sensitive to noise.
Rull Dredge Offload Area/ Primary YSPSC, Generator Backup	0.04–0.08 MVA	Temporary; dredge support, lighting, minor equipment. Sensitive to noise.
Rull Upland Staging Area/ Primary YSPSC, Generator Backup	0.03–0.05 MVA	Administrative, storage, light maintenance. Sensitive to noise.
Rull Waterfront Staging Area/ Primary YSPSC, Generator Backup	0.03–0.05 MVA	Administrative, storage, light maintenance. Sensitive to noise
Rull Men’s House Offload Area/ Primary YSPSC, Generator Backup	0.03–0.05 MVA	Temporary; dredge support, lighting, minor equipment. Sensitive to noise
Tamil Dredge Offload and Stockpile Areas / Primary YSPSC, Generator Backup	0.04–0.08 MVA	Temporary; offloading operations, lighting, limited support equipment. Sensitive to noise
Chief Mar’s Lot/ Primary Generator/ Backup YSPSC	0.05–0.09 MVA	Administrative, storage, light maintenance. Not sensitive to noise.
Sports Complex/ Primary YSPSC, Generator Backup	0.18–0.24 MVA	Administrative, storage, light maintenance, and worker housing. Sensitive to noise.

3.3 Reliability and Outage History

YSPSC provided feeder outage context: Hospital feeder (~25hrs/year cumulative; ~2hr average; 70% unplanned) and Colonia feeder (~15hrs/year cumulative; ~1.5hr average; 60% unplanned). The longest documented power outage on Yap within the past 30 years occurred following Typhoon Sudal in April 2004, when damage to the island-wide distribution system resulted in a complete outage lasting approximately 21 days for power and required emergency restoration efforts, including emergency generator deployment and infrastructure repairs.

3.4 Service Requirements and Lead Time

YSPSC requires electric service applications for staging/service locations and notes contractors must mitigate electrical interference (harmonic emissions). YSPSC also noted procurement of certain electrical equipment may require lead times exceeding six (6) months, supporting early application/PO actions.

3.5 Temporary and Portable Power Generation

We estimate that they will need to have up to 11 portable and/or temporary generators ready to meet the demand if YSPSC is not able to provide any power for the project. Based on coordination with YSPSC, we believe most of the time they would be able to, and want to, provide service at the seaport and the Rull and Colonia areas at a minimum. Thus, portable diesel generators may be used on a temporary and intermittent basis to support isolated construction activities or where grid power is unavailable or impractical.

Generator sizes are anticipated to range from approximately 0.06-0.38 MVA (50 kW to 300 kW), consistent with typical construction support equipment, previously identified peak construction demand and depending on rating and derating factors.

The largest electrical demand is associated with the concrete batch plant estimated at 300kW peak. Typical concrete daily placement rates are on the order of tens of cubic yards per day, with occasional short-duration peak days potentially approaching several hundred cubic yards per day. These values are consistent with operation of a small portable concrete batch plant and do not imply industrial-scale hourly production. The asphalt batch plant is estimated to require a larger electrical demand between 400 to 600 kW but the total number of paving days in the preliminary construction schedule is only 10 days. Thus, we anticipate the contractor will try and use the existing on island batch plant if available even if they need to assist with upgrades to the plant to meet permitting requirements.

Note, the generators themselves are temporary, non-industrial sources and are not anticipated to trigger air permitting requirements under the U.S. Clean Air Act or Yap State air regulations subject to size, runtime, and regulatory interpretation. Accordingly, no stand-alone air quality permit is anticipated solely for construction power generation, again, subject to size, runtime, and regulatory interpretation. Consistent with NEPA, emissions associated with temporary generators and mobile construction equipment are addressed at a programmatic level and managed through implementation of standard construction best management practices, including equipment maintenance and dust control measures.

Separately, the establishment of a concrete batching plant, aggregate processing operation, or similar materials production facility would represent a distinct project component with the potential for continuous and localized air emissions (e.g., particulate matter from mixing, handling, and loading operations). Such a facility would be evaluated independently under NEPA, and coordination with Yap State EPA would be required to determine whether air quality permitting, monitoring, or additional mitigation measures are applicable.

Table 2 also shows whether a location is “sensitive to noise”. Typical sound pressure levels for enclosed construction generators range from approximately 65 to 75 dBA at 25 feet, and generators would be located and operated in accordance with standard construction noise control practices to avoid disruption of adjacent businesses and residences. However, portable or temporary generators located near sensitive noise receptors (e.g., residences or the public library) will be contractually required to limit offsite noise levels to approximately 55 dBA at 25 feet, consistent with typical community noise compatibility thresholds. Acoustically enclosed generators and supplemental sound attenuation (e.g., barriers or mufflers) may be required to achieve this level under worst-case operating conditions, which will be the contractor’s responsibility.

4. Water Utilities

4.1 Demand and Capacity

Demand:

The primary construction water demands are anticipated to be dust control, concrete batching plant, and temporary workforce housing. The concrete batch plant and dust control demands are expected to be mostly in the Colonia/seaport vicinity but also needed at the temporary areas spread throughout the island. The main worker housing is anticipated to be located across the street from the National Sports Complex near Ruu Village.

The anticipated peak on site construction workforce for the Yap seaport projects (Parts A, B and C) is on the order of 75 workers. Workforce levels would fluctuate by construction phase, with peak staffing expecting to occur over a 6-to-12-month period sometime during marine construction activities and not sustained for the full duration of the project. Typical workforce levels outside of peak marine construction are expected to be lower by a magnitude of 15-25%.

We anticipate that the 75 personnel coming from off island would require temporary housing and believe up to 60 of them could be housed up at the sports complex and the other 15 (mostly supervisors or subcontractors) would be housed in apartments or hotels on island. In addition, we expect another 20 personnel will be locally hired primarily as non-construction support staff for the entire length of the project. Although these support staff may not increase the overall demand on island because they already consume water, their demand will need to be accounted for in the areas that we expect them to be working during their shift.

Based on the above, for the peak water demand we are assuming the number of personnel shown in the left-hand column of Table 3 as “shift” or “housed” workers and have separated the areas within the YSPSC Water System and the GTWA Water System. To account for the 15 housed personnel that would not be staying at the sports complex we applied the “housed” demand to the Seaport Project area under the YSPSC Water System.

The total estimated potable water demand for temporary workforce housing facilities is based on UFC 3-230-3, May 2020, Table 3-1 which uses 110 gallons per capita per day (GPCD) for Unaccompanied Personnel Housing for resident personnel averaged over a 24-hour period; and 30 GPCD for Nonresident Personnel and Civilian Employees per 8-hour shift. For workers housed at the sports complex or seaport area but working their shift at another location we have deducted 30 GPCD for the shift so it is not double counted on the housed portion. For example, a worker working at the seaport would have 30 GPCD applied to that and only 80 GPCD applied to the Sports Complex (a total of 110 GPCD) if that is where they are housed. Water demands shown in Table 3 represent planning level peak or intermittent estimates for construction and staging activities and are intended for environmental review purposes only.

Table 3 – Estimated Water Demands

Location/Assumed No. Personnel	Estimated Potable Water Demand (gpd)	Dust Control Assumptions	Comments
YSPSC Water System			
Seaport – Permanent Facilities/NA	Low / Minimal for normal use, assume seaport bunkering to continue	None	Commercial/Domestic use only, assume Seaport will continue to bunker water to ships as needed.
Seaport – Construction Activities/40 Shift 15 Housed	Batching: 300CY x 40 = 12000 GPD Shift: 40 x 30 = 1200 GPD Housed: 15 x 80 = 1200 gpd, Total = 14,400 GPD	Up to 6,000 gpd (intermittent)	Concrete batching (~40 gal/CY), equipment washdown, active haul routes and exposed surfaces
Road Project, Seaport Iboom Staging Area/5 shift	5 x 30 = 300 GPD	Up to 1,000 gpd (as needed)	Administrative trailers, laydown areas, light vehicle traffic
Road Project Seaport Library Staging Area/5 shift	5 x 30 = 150 GPD	Up to 1,000 gpd (as needed)	Administrative trailers, laydown areas, light vehicle traffic
Nungoch Park (during construction)/5 shift	5 x 30 = 150 GPD	Up to 3,000 gpd (intermittent)	Earthwork and surface disturbance during park construction
Rull Dredge Offload Area (during construction)/5 shift	5 x 30 = 150 GPD	Up to 5,000 gpd (intermittent)	Active offloading, haul routes, exposed materials
Rull Upland Staging Area/5 shift	5 x 30 = 150 GPD	Up to 1,000 gpd (as needed)	Administrative, storage, limited disturbance
Rull Waterfront Staging Area/5 shift	5 x 30 = 150 GPD	Up to 1,000 gpd (as needed)	Administrative, storage, limited disturbance
Rull Men’s House Offload Area/5 shift	5 x 30 = 150 GPD	Up to 1,000 gpd (as needed)	Stockpiles, material handling, vehicle traffic
TOTALS	**15,600 GPD**	**19,000 GPD**	
GTWA Water System			
Tamil Dredge Offload & Stockpile Areas/5 shift	5 x 30 = 150 GPD	Up to 4,000 gpd (intermittent)	Stockpiles, material handling, vehicle traffic
Chief Mar’s Lot/5 shift	5 x 30 = 150 GPD	Up to 1,000 gpd (as needed)	Administrative and light staging
Sports Complex (Staging & Support)/10 shift 60 housed	10 x 30 = 300 GPD 60 x 80 = 4,800 Total = 5,100 GPD	Up to 3,000 gpd (intermittent)	Open staging and storage areas in addition to mechanics
TOTALS	**5,400 GPD**	**8,000 GPD**	

The table also shows the temporary dust control measures that will be implemented at active construction, staging, and stockpile areas as needed to minimize airborne dust during dry conditions. Dust control is anticipated to consist primarily of intermittent water application using water trucks or temporary hoses sourced from available water supplies or supplemental sources as required. It does not have to be potable, but salt water is not allowed to be used for dust control on the roads.

Dust control water usage is expected to be intermittent and variable, dependent on weather conditions, soil disturbance, and active construction intensity, and is not anticipated to represent a continuous demand.

Capacity:

Victor Nabeyan (YSPSC) provided daily volumes that can be made available outside drought conditions:

- Colonia Service area (Seaport, Nungoch and Rull): up to 413,610 gallons/day
- Gagil-Tamil Service area (Chief Mar's Lot and Sports Complex): up to 6,700 gallons/day

YSPSC noted that meeting these volumes may require increased pumping and that incremental production costs may need to be address depending on required daily volumes; hydrants can be metered if practical.

During drought conditions, YSPSC stated that it typically prohibits use for dust control and more severe cases may implement water rationing, depending on drought severity. YSPSC noted that during the last drought, dust control water was prohibited, but rationing and limits on concrete batching water were not implemented.

We currently have a request into Ignatius Uron at GTWA requesting additional feedback on the GTWA system for the area across the street from the sports complex area and near Chief Mar's lot requesting confirmation of the of the daily production capabilities, storage capacity and daily consumption related to potential worker housing at the sports complex, use of water for dust control, options to provide supplemental water and drought conditions. However, based on the current estimates GTWA service alone may be insufficient during peak conditions.

In addition, the sports complex would also need a way to dispose of the wastewater, and we are looking at a septic tank and shallow leaching field option (see Section 5 of this memorandum). The site is about 2,300 feet away from the nearest well which we believe is the Mukong Well. This is also being coordinated with GTWA and will be confirmed in upcoming face to face meetings on Yap in early May 2026. Figure 1 below provides a cross section of the nearest well to the sports complex that shows the setback distance is well above the typical 1,000 foot radius required to allow this. See additional discussion in Section 5.

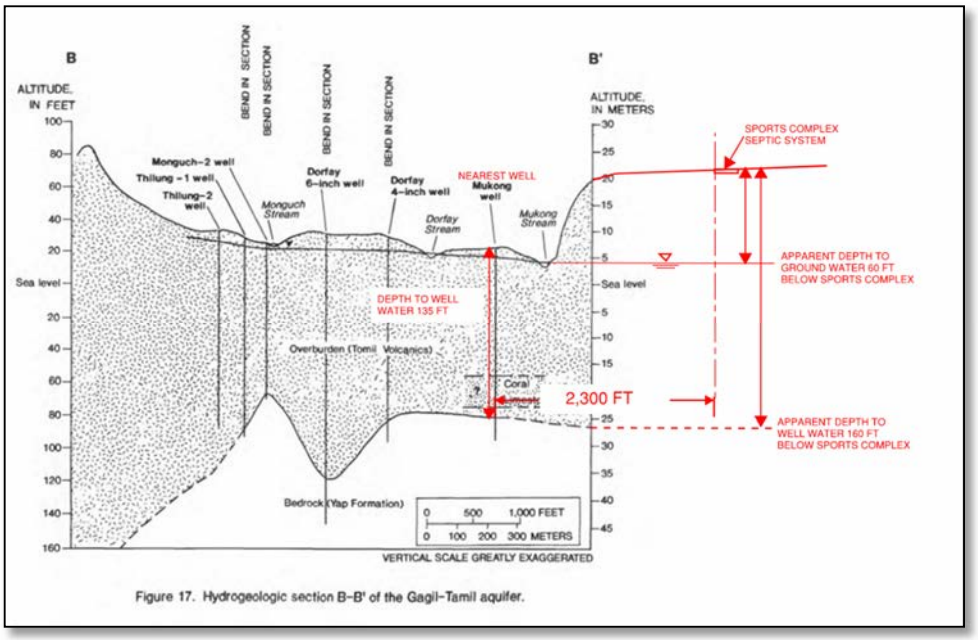

Figure 1. Hydrogeologic Cross Section from USGS with Sports Complex Superimposed

4.2 Reliability and Outage History

Water supply reliability on Yap is highly dependent on electrical power, as demonstrated during Typhoon Sudal in April 2004 when island-wide power was out for approximately 21 days which resulted in more than 80% of the population losing access to clean drinking water; damage to public utilities left the majority of villages without water shortly after the outage, indicating that gravity-fed storage alone could not sustain service and that restoration of potable water required active intervention, including system repairs and use of temporary generators. In addition, Yap is subject to drought periods with the drought periods in 2015–2016 and 2019–2020 as the most recent events affecting water availability on the island.

4.3 Water Measures Contingency

Contractors will be required to utilize rainwater harvesting systems for collection and storage of rainwater from rooftops and other surfaces into tanks all at locations if practical. However, these systems typically can only supplement the water supply and given drought-period restrictions on dust control water, and limitations on the availability of water from the Gagil-Tamil service area, contractors may need to implement alternative supply measures (e.g., hauling/storage and other temporary supply methods). Additionally, it is possible that contractors may need to generate freshwater with water treatment systems (e.g., reverse osmosis). This will require them to perform detailed hydrogeologic, geotechnical, and groundwater quality investigations to identify aquifer characteristics, soil and rock conditions, and sustainable injection rates in accordance with the EPA Underground Injection Control program and obtain approval and permits from Yap. Injection wells are presented as a conceptual contingency only and require separate siting, permitting, and regulatory approval. Given the challenges in permitting and designing a RO system we expect that the following are anticipated means by which contractors will try and meet their water demands in order of preference:

- On-site water storage tanks fill slowly in off peak periods from YSPSC system.
- Water delivery by truck or barge.
- Water treatment systems like Reverse Osmosis or Atmospheric Water Generators (AWG).

Atmospheric Water Generators (AWGs) were considered as a potential supplemental water source; however, while technically feasible in Yap's humid climate, AWGs are not a practical solution for construction-phase water demands due to their low production rates, high energy consumption, and high unit cost of water. Commercial-scale AWGs require substantial continuous electrical power and typically produce water at a cost significantly higher than hauled water or temporary desalination systems.

As noted above, if contractors have no other options, they may look at reverse osmosis which generates fresh water from salt water by forcing the water through a membrane that removes a percentage of the salts and discharges a brine solution that is very high in salt content. The concentrated brine is typically disposed through above ground lined evapotranspiration pits or via deep well injection through and appropriately designed injection wells subject to feasibility and permitting constraints.

The biggest challenge with RO systems is the disposal of the concentrated brine. As an example, to produce 10,000 GPD of potable water (less than 300 mg/l of salts) over a 12-hour period, assuming 40% efficiency in the RO system would generate up to 15,000 GPD in concentrated brine (60,000 mg/l of salts) and use about 25,000 gallons of seawater which has approximately 35,000 mg/l of salts. This is the approximate volume that would be needed for the batch plant daily demand or about double what would be needed for the potable water supply at the sports complex housing area.

In the event that an RO system becomes necessary, it would be temporary and removed upon completion of construction activities.

Figure 2. shows a conceptual illustration of a lined evapotranspiration pit for management of reverse osmosis brine concentrate. The figure shows the lined system is completely dependent on evaporation and thus these ponds can require very large areas. Based on dry-season climatic conditions in Yap and a conservative evaporation rate of 6 mm/day for a black HDPE-lined pond, approximately 9,500 m² of pond area is required to evaporate 15,000 gallons per day of RO concentrate within a 24-hour period.

The pond is not intended as a discharge structure and will operate as a closed system with no releases to surrounding land, surface water, or groundwater. Because the brine is contained within a lined pond with no discharge pathway and is managed only during the dry season, we believe the activity may not constitute a surface water discharge, subject to final regulatory concurrence.

RO operation and brine generation would need to be suspended during the wet season or when rainfall conditions no longer support evaporative management. In this case, typically an injection well would be used.

Figure 3 shows a conceptual illustration of Class V injection well for disposal of concentrated brine with and without a freshwater lens below it. Injection well feasibility, depth, and other requirements would be subject to site-specific location evaluation and regulatory approval as noted above and we believe would be a last resort option for contractors.

Note, Figures 2 and 3 are provided solely to illustrate theoretical concepts and do not represent proposed designs or locations.

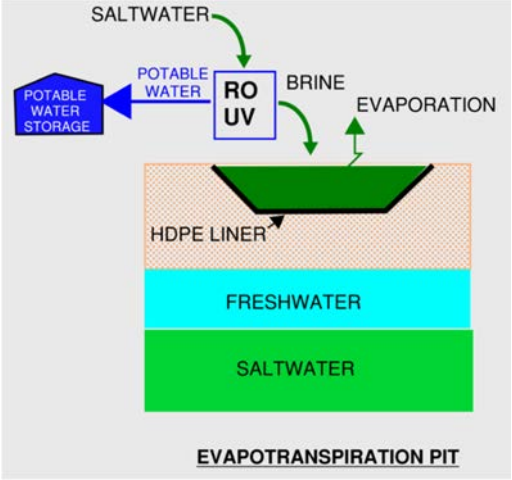

Figure 2. Conceptual Evapotranspiration Pit

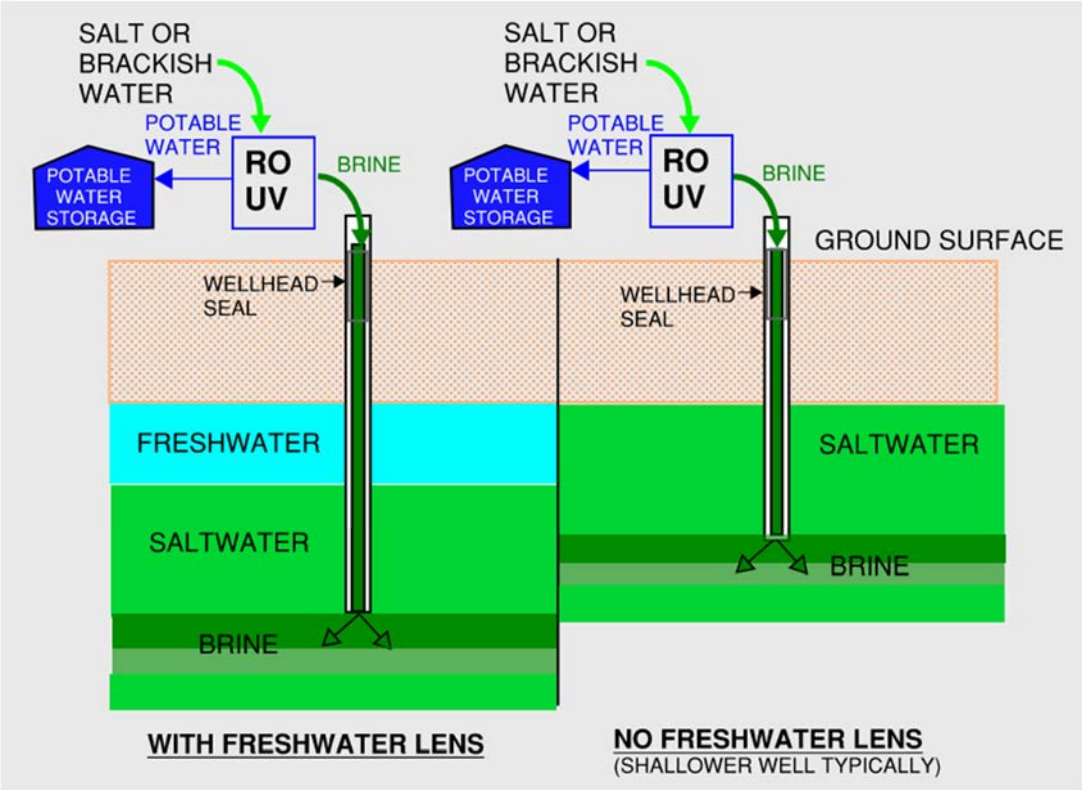

Figure 3. Typical RO Injection Well with and Without Freshwater Lens

Final selection of the water supply method would be determined by the contractor, but we will include requirements within Section 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS that prescribes the requirements that the contractor will need to follow which we will coordinate in advance with regulatory agencies.

5. Wastewater / Sewer Utilities

5.1 Wastewater Generation and Capacity

Wastewater generation estimates shown in Tables 4 and 5 are based on planning-level personnel assumptions using typical domestic wastewater generation rates based on 80% of the water demand shown in Table 3. As shown in Table 4 the total estimated daily sewage flow across all the project location is 8,360 gallons.

Table 4. Assumed Construction Personnel Wastewater Estimates

Location/Assumed No. Personnel	Water Demand (GPD) Applicable to Wastewater	Resulting Wastewater Estimate
Seaport – Permanent Facilities/NA	Low / Minimal for normal use, assume seaport bunkering to continue	No Change in current sewage fixtures due to project.
Seaport – Construction Activities/40 Shift 15 Housed	2,400 GPD	~1,920 gpd
Road Project, Seaport Iboom Staging Area/5 shift	300 GPD	~240 gpd
Road Project Seaport Library Staging Area/5 shift	150 GPD	~120 gpd
Nungoch Park (during construction)/5 shift	150 GPD	~120 gpd
Rull Dredge Offload Area (during construction)/5 shift	150 GPD	~120 gpd
Rull Upland Staging Area/5 shift	150 GPD	~120 gpd
Rull Waterfront Staging Area/5 shift	150 GPD	~120 gpd
Rull Men's House Offload Area/5 shift	150 GPD	~120 gpd
TOTAL Colonia Area	**3,600GPD**	**2,880 GPD**
Tamil Dredge Offload & Stockpile Areas/5 shift	150 GPD	~120 gpd
Chief Mar's Lot/5 shift	150 GPD	~120 gpd
Sports Complex (Staging & Support)/10 shift 60 housed	5100 GPD	~4,080 gpd
TOTAL Tamil/Gagil Area	**5,400 GPD**	**4,320 GPD**

5.2 Reliability and Outages

The reliability of Yap's wastewater system is also closely tied to the island's electrical infrastructure for Colonia areas on public sewer, as collection pump stations and treatment processes rely on continuous power. Based on coordination with the YSPSC, and as noted above, localized power outages and service interruptions do occur periodically due to weather events, equipment condition, and the island's isolated utility systems. YSPSC has noted that portions of the existing water and wastewater infrastructure are aging and subject to maintenance-related disruptions, and that prolonged island-wide outages associated with severe storms or typhoons can affect wastewater conveyance and treatment operations. As a result, construction-phase wastewater management planning for the project assumes that short-term service interruptions are possible and relies on standard contingency measures such as, backup generators, pump-out of holding tanks or portable sanitation systems to ensure continuity of service during outages or maintenance events.

5.3 Wastewater Infrastructure

Wastewater collection and treatment on Yap Proper is operated by the YSPSC, which manages the centralized sewer system and wastewater treatment plant serving Colonia and adjacent areas, including the seaport corridor (see Figure 4 for locations of Yap Sewer collection system from YSPSC). In email correspondence from YSPSC, it was noted that wastewater from the additional workers would be small and could be managed using porta-potties and/or existing domestic systems where available; no quantified wastewater flow rates were provided by YSPSC but they did indicate that the use of porta potties would be acceptable to them and they could service them for under $200 per load with the discharge point at the manhole prior to the WWTP in Colonia by the seaport. They also indicated they currently only have one working pumper truck. Based on this we will include a requirement in the contract for the contractor be capable of hauling their own sewage and providing their own porta potties in compliance with USEPA standards.

Figure 4. Location of YSPSC Public Sewer Collection System

As Figure 4 shows, the seaport area is directly connected to the municipal sewer system, with flows conveyed to the YSPSC wastewater treatment plant at the end of the Colonia peninsula. The existing system is designed to accommodate routine domestic wastewater loads associated with existing development but is not intended to support large construction-phase increases in flow. As noted above, wastewater generated during construction is expected to be minimal and limited to domestic sanitary flows from a relatively small workforce and will be managed through a combination of existing sewer connections where available, pump-out of holding tanks or portable sanitation facilities, and disposal at approved sewer manholes upstream of the treatment plant, subject to coordination with YSPSC.

Table 5. Estimated Wastewater Generation and Management (Planning Level)

Location	Primary Management Approach (Planning Level)	Notes
Seaport – Permanent Facilities	Connection to existing sewer system	No change to baseline operations
Seaport – Construction Activities	Portable sanitation or temporary connection	Workforce-driven only; no process wastewater
Seaport Iboom Staging Area	Portable sanitation or temporary septic	Temporary; workforce-related only
Seaport Library Staging Area	Portable sanitation or temporary septic	Temporary; workforce-related only
Nungoch Park (during construction)	Portable sanitation	Short-duration construction activities
Rull Dredge Offload Area	Portable sanitation	Temporary; no permanent facilities
Rull Upland Staging Area	Portable sanitation	Minor administrative use
Rull Waterfront Staging Area	Portable sanitation	Minor administrative use
Rull Men's House Offload Area	Portable sanitation	Temporary; workforce-related only
Tamil Dredge Offload & Stockpile Areas	Portable sanitation	Temporary; workforce-related only
Chief Mar's Lot	Portable sanitation or temporary septic	Minor administrative and staging use
Sports Complex (Staging & Housing)	Septic system with leach field, Porta potties and hauling or skid-mounted package WWTP	Final approach subject to site conditions, groundwater protection, and permitting

5.4 Wastewater Temporary Systems

The proposed temporary options for wastewater disposal aside from connecting the YSPSC system include porta-potties and/or septic systems where appropriate, subject to contractor planning and local siting/permitting considerations.

A temporary septic system with leach field is considered the most feasible primary option for the Sports Complex construction area, subject to site-specific percolation rates and setback requirements from groundwater wells. Based on our review, the proposed location at the Sports Complex is more than 1,000 feet from the nearest groundwater production well. Based on the planning-level wastewater flows on the order of up to 5,000 gallons per day, corresponding to the assumed construction workforce and housing, and assuming a moderate to slow soil percolation rate of 0.3–0.5 gpd/sf, the preliminary leach field sizing is estimated to be on the order of 8,000 to 16,000 square feet. This range reflects conservative application rates typically associated with slower-draining soils and is intended for environmental review purposes only. Note, leach field area estimates are preliminary and based on conservative percolation assumptions; actual field sizing may be reduced or increased based on site-specific soil testing.

As an alternative, contractors could store and haul with pumper trucks the sewage to the manhole at the WWTP, but this could require over 8 truckloads per day assuming 500 gallons per load. Another but less likely option would be a skid-mounted package wastewater treatment plant (WWTP) that could be deployed if site constraints or groundwater protection requirements preclude leach field installation and trucking and hauling is too difficult or costly. Such systems would require temporary electrical power and would generate minor air and noise emissions consistent with small mechanical treatment units and the process would still require disposal of the effluent and sludge. It is assumed that the effluent could be discharged into a leach field after treatment and the sludge would be trucked to the WWTP. If these are not viable options, then the use of an onsite WWTP would most likely be precluded from use.

Final selection of wastewater management approach would be determined during construction planning and permitting.

6. Conclusions

Electrical: Coordination with YSPSC confirms that existing island generation capacity and distribution feeders can accommodate the permanent seaport electrical demand as well as the conservatively estimated construction-phase and staging/worker housing loads evaluated in this memorandum. Feeder reliability context indicates that short-duration outages occur periodically due to weather and system maintenance, and longer outages are possible following severe storm events. As a result, contractors will be required to plan for temporary and portable power generation sufficient to support construction activities during outages. Anticipated generator sizes are typical for construction support and are expected to fall below thresholds requiring standalone air emissions permitting, subject to confirmation during final construction planning and compliance with applicable Clean Air Act requirements.

Water: YSPSC provided explicit daily water availability volumes outside drought conditions and identified established drought response measures, including prohibition of network water for dust control and potential rationing depending on severity. Construction-phase water demands are driven primarily by concrete batching and intermittent dust control, with worker-related potable water demands being comparatively minor. During drought conditions, contingency measures may include hauling from available municipal sources, use of non-potable water sources where permitted, excluding roadways and areas where saltwater application would cause corrosion or environmental damage, and temporary freshwater generation (e.g., reverse osmosis) where potable water is required. Any temporary water treatment systems would be subject to site-specific feasibility evaluations, permitting, and removal upon completion of construction.

Wastewater/Sewer: Wastewater generation associated with construction activities is expected to be limited to domestic sanitary flows from a relatively small workforce and does not represent a material increase relative to existing municipal wastewater loads. Coordination with YSPSC indicates that limited discharges to the Colonia collection system and receipt of pump-out loads at approved manholes upstream of the wastewater treatment plant are acceptable, subject to operational constraints. Primary wastewater

management during construction is anticipated to rely on portable sanitation facilities, temporary septic systems, and/or hauling and disposal, with contractors required to provide their own wastewater services as needed. Wastewater quantities evaluated herein are not sufficient to drive permanent wastewater infrastructure improvements.

Risk Management and Contingencies: Given the isolated nature of Yap's utility systems and exposure to droughts and storm-related outages, the project relies on standard construction-phase contingency measures, including contractor-provided power, water storage, hauling, and temporary systems. Potential use of reverse osmosis for freshwater generation and associated brine management is presented as a contingency only and would require separate regulatory coordination and approval. Overall, the evaluated utility demands are manageable within existing system capabilities using established construction-phase practices and do not present a constraint to project implementation.

The project is proposing to include the following requirements in the construction specifications to address Risk Management and Contingencies related to utilities subject to discussion and concurrence by all stakeholders. It is important that this be limited to requirements that will not make it impractical for a contractor to execute the project efficiently, while at the same time finding a balance to protect the local population from utility outages and shortages caused by the construction.:

1. The Contractor shall not rely on the availability, continuity, or reliability of utility services from the Yap State Public Service Corporation (YSPSC) or any other local utility provider, or supplies for food, fuel and day to day operations.
2. The Contractor bears full responsibility for furnishing, operating, maintaining, and paying for all temporary utility services required for construction and for Contractor temporary facilities, including but not limited to electrical power, telecommunications, potable water, non-potable water, and sanitary sewer services, regardless of whether Government or local utility connections are present.
3. The Contractor shall be fully self-sufficient in providing all food, fuel, potable water, consumables, and day-to-day supplies required for its personnel, equipment, and temporary facilities for the duration of construction activities.
4. The Contractor shall not rely on being able to procure from, or otherwise impact local commercial vendors, subsistence resources, community supply chains, or government-supported distribution systems for routine food, fuel, or daily operational needs, except for incidental retail purchases typical of short-term visitors.
5. Fuel required for construction equipment, vehicles, generators, vessels, and temporary facilities shall be imported or otherwise procured by the Contractor through dedicated supply channels, and all not displace or reduce fuel availability for local residents, essential services, or public infrastructure.
6. Food, fuel, and supply provisioning shall be planned, sourced, transported, stored, and managed as part of the Contractor's logistics and mobilization planning, including off-island sourcing where necessary to avoid adverse effects on local availability, pricing, or community access.
7. The Contractor shall submit a logistics and provisioning approach as part of its mobilization submittals demonstrating compliance with this requirement. Failure to maintain self-sufficiency shall be grounds for corrective action at no additional cost to the Government.
8. Electrical power service from YSPSC, if available, shall be considered intermittent and unreliable.
    a. Extended outages, including outages lasting up to 30 consecutive days, may occur.
    b. The Contractor shall provide independent, self-sustained power generation sufficient to support all construction activities and temporary facilities without reliance on YSPSC power.
    c. Temporary power systems shall include:
        i. 1. Primary power generation
        ii. 2. Redundant generation capacity
        iii. 3. Fuel storage sufficient to sustain operations during extended outages
        iv. All distribution, grounding, protection, and safety systems required by applicable codes and provide generators that are compliant with the current Clean Air Act without waivers.
    d. Limit offsite noise levels to approximately 55 dBA at 25 feet, consistent with typical community noise compatibility thresholds, except within the Seaport main project limits. Acoustically enclosed generators and supplemental sound attenuation (e.g., barriers or mufflers) may be required to achieve this level under worst case operating conditions, which will be the contractor's responsibility.

e. Any connection to YSPSC power, if permitted, shall be considered supplemental only and shall not relieve the Contractor of responsibility to maintain continuous operations during outages.

9. Potable and Non-Potable Water
    a. a. Potable water service from YSPSC, if available, shall be considered intermittent and unreliable. Extended outages, including outages lasting up to 60 consecutive days, may occur.
    b. b. The Contractor shall provide independent potable water supply, including but not limited to:
    c. On-site water storage tanks
    d. Water delivery by truck or barge
    e. Water treatment systems, if required
    f. The Contractor shall size storage and supply systems to support construction activities and temporary facilities during extended outages without reliance on YSPSC service.
    g. All potable water used for drinking, food preparation, hygiene, and sanitary purposes shall meet applicable health standards.
    h. Any connection to YSPSC water systems, if permitted, shall be considered supplemental only and shall not relieve the Contractor of responsibility for continuous supply.
10. Sanitary Sewer and Wastewater
    a. Sanitary sewer service from YSPSC, if available, shall be considered limited and unreliable.
    b. The Contractor shall provide independent sanitary facilities, which may include:
        i. Holding tanks
        ii. Septic systems
        iii. Package treatment units
        iv. Regular pump-out and off-island disposal, as required
    c. All sanitary systems shall be designed, installed, operated, and maintained by the Contractor in compliance with applicable environmental and health requirements.
    d. Discharge to any municipal or public sewer system shall not occur without written approval from the Contracting Officer and the system owner.
11. Telecommunications
    a. Telecommunications services on Yap are limited and may only be available through local providers, including FSM Telecommunications Corporation (FSMTC/FSTC) or iBoom, subject to availability and service limitations.
    b. The Contractor shall be solely responsible for arranging, furnishing, operating, maintaining, and paying for all telecommunications services required for construction operations and temporary facilities, including but not limited to:
        i. Telephone service
        ii. Mobile or cellular service
        iii. Data and internet connectivity
        iv. Satellite communications, if required
    c. Telecommunications services from FSMTC/FSTC or iBoom, if available, shall be considered intermittent, capacity-limited, and subject to extended outages. No guarantee is made regarding bandwidth, reliability, or continuity of service.

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