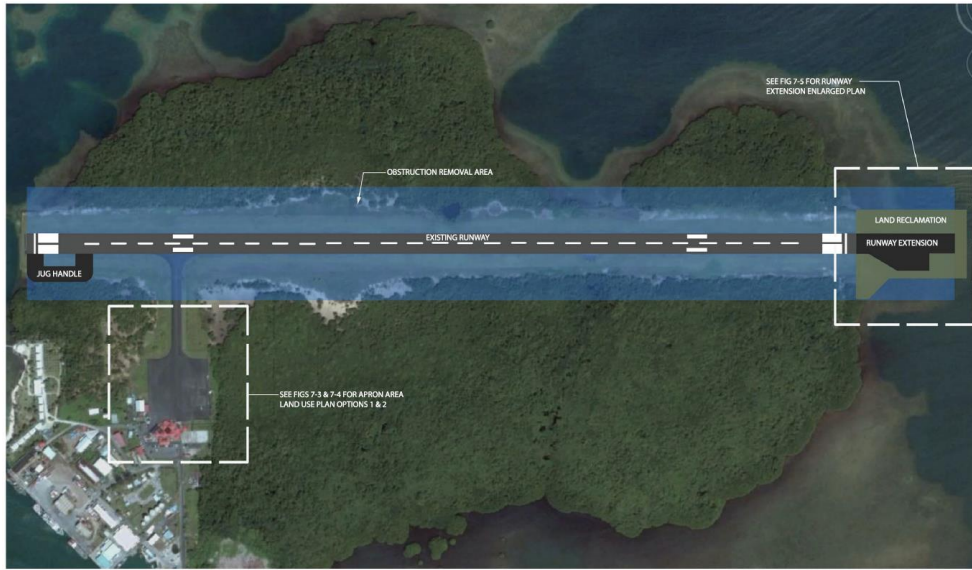


FEDERATED STATES OF MICRONESIA (FSM)
2024/2025 COMPACT INFRASTRUCTURE PROGRAM

Terms of Reference (ToRs)

*Professional Consulting Service for the Design of the Pohnpei International Airport Runway 9-27
 Extension by 4,000 ft, Dekehtik, Nett, Pohnpei, FSM*



POHNPEI INTERNATIONAL AIRPORT
 FEDERATED STATES OF MICRONESIA

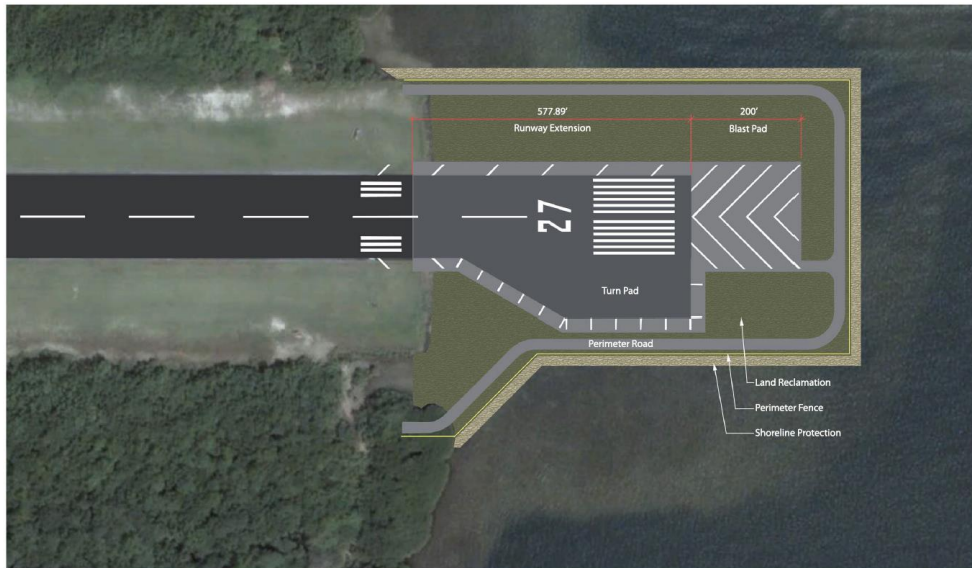
LEO A DALY

NOT TO SCALE

LAD PROJECT #081-10015-009

LAND USE PLAN OVERVIEW

FIG 7-2



POHNPEI INTERNATIONAL AIRPORT
 FEDERATED STATES OF MICRONESIA

LEO A DALY

NOT TO SCALE

LAD PROJECT #081-10015-009

RUNWAY EXTENSION PLAN

FIG 7-5

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1.0 Introduction

Pohnpei International Airport is the main airport in the State of Pohnpei. PNI is owned and operated by the Pohnpei Port Authority. The airport is at an elevation of 8 feet mean sea level (MSL) on the Island of Dekehtik, which is a small island strip that is just north of the main Island of Pohnpei. The Airport Reference Code is N06°59.11' E158°12.54'. The Airport is operated in compliance with the International Civil Aviation Organization (ICAO), but follows the procedures in Federal Aviation Regulations (FAR) Part 139, Certification of Airports, to meet ICAO requirements.

Critical Design Aircraft

The critical design aircraft for PNI is the Boeing 737-800 series operated by Continental Airlines. The Boeing 737-800 series aircraft is the only scheduled aircraft that flies into Pohnpei International Airport and, with more than 250 arrivals and departures, meets the FAA criteria for critical design aircraft.

Airport Reference Code

The airport reference code (ARC) is a system established by the FAA to relate airport design criteria to the operational and physical characteristics of the aircraft currently operating and/or forecast to operate at the airport. The ARC has two components relating to the airport design aircraft. The first component, depicted by a letter, is the aircraft approach category and correlates to the aircraft approach speed (an operational characteristic). The second component, depicted by a Roman numeral, is the aircraft design group and relates to aircraft wingspan and tail height (physical characteristics). Generally, aircraft approach speed applies to runways and runway facilities and aircraft wingspan or tail height applies to taxiway and taxi lane separation criteria. The ARC for Pohnpei International Airport is D-III.

Runway

PNI consists of a single runway: 9-27, which is 6001 feet long by 150 feet wide. The runway is paved with asphalt, grooved, and currently in fair condition. Roughly 95% of air carrier operations (landings and takeoffs) use runway end 9. On runway 9-27, the surface is bituminous with a weight bearing capacity of 75,000 pounds for single wheel aircraft; 170,000 pounds for dual-wheel aircraft; and 290,000 pounds for dual tandem wheeled aircraft. Pohnpei International Airport has a flexible PCN value of 76/F/C/X/T.

Passenger Terminal

Completed in late 1980's, the Pohnpei International Airport terminal is located to the south of the runway, closer to the approach end of Runway 9. The terminal is a single-story building and has three sections: departures on the right, arrivals on the left, and a center terminal area (viewed from landside). The terminal is approximately 12,000 square feet. In 2011, the Terminal Expansion Project was completed consisting of a new 14,692 sq. ft. facility to be used as the arrival terminal area and renovation of the existing terminal building to be the departure terminal area. This project also included a new parking area and the procurement and installation of x-ray security equipment, baggage handling equipment and a baggage trolley. More details are provided in the attached existing Master Plan at **Appendix A**.

NOTICE TO PROVIDERS OF PROFESSIONAL SERVICES

The Pohnpei State Government through its Pohnpei Port Authority (PPA) is hereby soliciting Statements of Professional Qualifications and Financial Proposals from interested entities for the purpose of implementing the “*Professional Consulting Service for the Design of the Pohnpei International Airport Runway 9-27 Extension by 4,000 ft, Dekehtik, Nett, Pohnpei, FSM*” in Pohnpei State, FSM. This work will be performed with funding under the FSM Infrastructure Compact grants. As such, all designs and work (drawings and calculations) shall be done in accordance with **FAA, U.S. Codes and Standards**, and the **International Building Code (2021)**.

2.0 Scope of Assignment

The PPA is seeking a qualified firm to assist the government in providing the detailed designs and bidding documents for the above-mentioned projects at the Pohnpei International Airport located at Dekehtik Island, Pohnpei State, FSM. See Scope of Services below:

2.1 Stages 1, 2 : Site Investigation, Testing, Surveys, Updated Master Planning and Concept Designs

The consultant will be required to establish the availability of construction materials within Pohnpei and specify performance output requirements of construction materials;

The Consultant will liaise with PPA and the respective service authorities to obtain all available information on the type, location and level of all overhead and underground services (including proposals) which may cause a potential conflict with the proposed construction activities. Test and Survey Technical Specifications are detailed at **Appendix B**.

Runway Extension Design Brief

1. Background

Pohnpei International Airport (PNI) serves as a critical hub for both international and domestic flights in the Federated States of Micronesia. To accommodate larger aircraft, improve safety, and enhance operational capacity, the airport runway must be extended by 4000 feet. This extension will allow the airport to handle higher volumes of traffic, including long-haul international flights and larger aircraft types, while adhering to the safety and operational standards set by the Federal Aviation Administration (FAA).

The design of this runway extension will follow the guidelines provided by the FAA Advisory Circular (AC) 150/5300-13B, which outlines airport design standards. The project will consider factors such as safety, environmental impact, airport capacity, operational efficiency, and future growth in air traffic.

2. Objective

The primary objective of this project is to develop the design for a 4000-foot extension to the existing runway at Pohnpei International Airport, in compliance with FAA AC 150/5300-13B. The extension must:

- Meet all FAA regulations for runway design, including safety, geometry, grading, and markings.
- Improve the airport's capacity to handle larger aircraft and higher traffic volumes and update the current Master Plan accordingly.
- Ensure the design considers local environmental and geographic conditions, including stormwater management and resilience to extreme weather.

- Provide detailed construction plans and specifications for implementing the runway extension.
- Integrate sustainable design practices where possible, including measures to reduce environmental impact during construction and operation.

3. Scope of Work

The selected design team will be responsible for delivering all necessary architectural, engineering, environmental, and operational services to achieve the runway extension objectives. The scope of work includes, but is not limited to:

3.1 Site Assessment and Data Collection (See Appendix B)

- **Topographical and Bathymetric Survey:** Conduct a detailed topographic and Bathymetric survey of the runway extension (The Project Site) to establish existing ground elevations and site conditions.
- **Geotechnical Investigation:** Perform soil testing and geotechnical analysis to assess subsurface conditions and recommend appropriate runway base materials and construction methods.
- **Environmental and Climate Considerations:** Evaluate the local climate, flood risks, and environmental factors that may affect the runway design and construction.

3.2 Runway Design in Compliance with FAA AC 150/5300-13B

- **Runway Extension Geometry:** Design the runway extension according to the dimensions and standards outlined in FAA AC 150/5300-13B, including proper clearances, safety zones, and runway/taxiway separation.
- **Pavement Design:** Design the runway pavement structure, considering aircraft load-bearing requirements, expected traffic volumes, and life-cycle costs.
- **Grading and Drainage:** Provide a grading plan that ensures proper surface drainage away from the runway to prevent ponding and ensure safe operations.
- **Lighting and Markings:** Design appropriate runway lighting systems and pavement markings as per FAA requirements, ensuring visibility and safety during both day and night operations.
- **Navigational Aids (NAVAIDs):** Assess and recommend adjustments to NAVAIDs, such as Instrument Landing Systems (ILS) and runway end identifier lights (REIL), to accommodate the runway extension.

3.3 Environmental Impact Assessment

- **Environmental Impact Assessment (EIA):** Conduct an environmental assessment to evaluate potential impacts of the runway extension on local ecosystems, air and water quality, and noise levels.
- **Mitigation Strategies:** Propose mitigation strategies to minimize environmental impacts during construction and post-construction operation.

3.4 FAA Compliance and Permitting

- **Compliance with FAA AC 150/5300-13B:** Ensure that the design complies with all relevant sections of FAA AC 150/5300-13B, particularly in terms of runway geometry, safety area dimensions, and other technical specifications.
- **Permitting:** Assist in obtaining necessary permits from the FAA and other relevant local and international authorities.

3.5 Sustainability and Climate Resilience

- **Sustainable Design:** Where applicable, integrate sustainable design elements such as the use of environmentally friendly materials, energy-efficient lighting systems, and stormwater management strategies.
- **Climate Resilience:** Incorporate climate-resilient features to protect the runway from extreme weather events, including heavy rainfall and tropical storms common in the region.

3.6 Cost Estimates and Phasing Plan

- **Cost Estimation:** Provide a detailed cost estimate for the design and construction of the runway extension, broken down by phase and material.
- **Phasing Plan:** Develop a phased construction plan that minimizes disruptions to airport operations during the runway extension project.

3.7 Stakeholder Consultation

- Engage with relevant stakeholders, including government agencies, airlines, airport authorities, and local communities, to gather input and ensure the design meets their needs.
- Incorporate feedback from stakeholder consultations into the final design.

4. Technical Deliverables

The selected design team will be expected to provide the following deliverables:

1. **Site Assessment Report:**
 - Detailed topographic and geotechnical survey results.
 - Climate and environmental impact analysis.
2. **Runway Design Documents:**
 - Final runway extension design, including layout plans, cross-sections, grading, pavement design, lighting, and marking plans.
 - Specifications for runway pavement materials and construction.
 - Drainage design and climate resilience measures.
 - Construction Safety and Phasing Plan in accordance with AC 150/5370-2G - Operational Safety on Airports During Construction
3. **Environmental Impact Assessment Report:**
 - Detailed EIA report with proposed mitigation measures.
4. **FAA Compliance and Permitting Documentation:**
 - FAA compliance checklist and associated permit applications.
5. **Cost Estimate and Phasing Plan:**
 - Detailed cost breakdown for construction, materials, and labor.
 - Phased construction plan with timelines and resource allocation.

6. Stakeholder Engagement Report:

- o Summary of stakeholder consultations and how their input has been incorporated into the design.

The Project Site



Table 5-9. Runway Protection Zone

RUNWAY PROTECTION ZONE			
	Runway End	9	27
	Approach Category	D	D
	Visibility Minimums	Greater Than 1 Mile	Greater Than 1 Mile
RPZ	Length – L	1,700 feet	1,700 feet
	Inner Width – W1	500 feet	500 feet
	Outer Width – W2	1,010 feet	1,010 feet
	Acres	29.5	29.5
Approach	Length	10,000 feet	10,000 feet
	Inner Width	500 feet	500 feet
	Outer Width	4,000 feet	4,000 feet
	Slope (H=Horiz. V+vert.)	34:1	34:1

Source: FAA AC 150/5300-13

2.2 Stages 3, 4: Preliminary Engineering Design

For each improvement, based on the detailed site investigations, survey data collection, prepare preliminary design plans and prepare a suitable estimate of quantities and a cost estimate for physical works

Review and determine appropriate engineering standards in consultation with PPA. Consideration shall include, but not be limited to, the following:

- Appropriate design standards (consider only FAA international design standards, criteria);

- Design life of each element;
- Drainage concepts, if required;
- Access to premises, if required;
- Lighting;
- Utility services relocation, if required, and future needs; and
- Safety considerations
- Climate Change
- Signage and night visibility;
- NAVAIDs
- Backup Power Generation

In consultation with all service utility providers, identify, locate, and survey any underground and/or above-ground services that may be affected by the proposed improvement and construction works. Include any required utility work in the design documents.

Design objectives shall include (but not be limited to) the following:

- Enhance and promote safety as a priority;
- Be cost effective and consider options based on their respective economic rates of return;
- Foundation, sub-structure and superstructure elements that are resilient, durable, accessible and can be sustainably maintained;
- Integrate resource efficiency and pollution prevention and control in detailed design;
- Confirm the lease arrangements and ensure all works are taking place within the boundary of a satisfactory lease;
- Close liaison with utility services providers in identifying and preparing plans for service relocation, if required.

Works Procurement Strategy

The consultant shall be required to present a proposed procurement strategy to implement the works that have been chosen for procurement. This strategy would consider packaging, lots/contract sizing, staging of contracts, financial and technical capacity of international and domestic contractors likely to bid, recommended post-qualification criteria (i.e. annual turnover, minimum plant and equipment owned or leased, qualifications/experience of key persons) to apply. For each of the work packages (or one package if single contract regarded as optimal strategy), a detailed breakdown of the procurement approach in the form of a

detailed implementation plan (Microsoft Project Gantt or equivalent) to be provided along with basis of schedule plan. A matrix of key risks to the procurement strategy should be outlined and mitigation measures proposed as well.

2.3 Stage 5, 6, 7 : Detailed Design and Bid Documentation

The consultant shall undertake the detailed engineering design of the proposed works. This will follow review of the preliminary design and report by relevant stakeholders, and accommodating any comments/revisions to the scope that may arise following this review. In carrying out the detailed design the consultant will utilize data obtained from site investigations, data collected from surveys, materials testing, consultations and from the design-related mitigation requirements from any environmental and safeguards risks that have arisen out of preliminary assessments.

Where significant gaps in data are identified from earlier site investigations, such as uncertainty in ground or structure conditions at particular locations, then additional work may be required (such as additional geotechnical investigations, for example). Any such additional work shall be discussed with and approved by PPA.

In addition to paper and transparency copies of survey data and design plans, the final design, bathymetric and topographic survey data collected should be submitted to PPA in a digital form which is suitable for direct input to Civilcad, and/or Autocad, using such format as mutually acceptable to both parties.

The design shall be carried out using applicable and current design standards used in the US and shall include, but is not limited to, the following:

- retaining structures;
- Concrete aprons;
- Design of drainage concepts (surface preferable);
- Hydrology/hydraulic modeling as and if required;
- Power supply and backup generation for facility;
- Area lighting provision;
- New and improved security fencing and access;
- Utility services relocation; and

The proposed codes and standards to be used in the designs include the following inter alia:

(Kindly note that the latest revisions of the undermentioned lists should be consulted)

Relevant FAA Advisory Circulars:

AC 150/5300-13B - Airport Design - Change 1

AC 150/5320-6G - Airport Pavement Design and Evaluation

AC 150/5340-1M - Standards for Airport Markings

AC 150/5340-30J - Design and Installation Details for Airport Visual Aids

AC 150/5050-4A - Community Involvement in Airport Planning

AC 150/5370-10H - Standard Specifications for Construction of Airports

AC 150/5370-2G - Operational Safety on Airports During Construction

International Building Code 2021 (<https://codes.iccsafe.org/content/IBC2021P2>)

As part of the detailed design, the consultant shall include an assessment of how vulnerable the completed improvements will be to natural disasters during their design life, particularly resulting from the effects of internationally accepted likely climate change scenarios (e.g. increased intensity and frequency of rainfall in general and typhoons in particular etc.) and include increasing the assets' resilience to natural hazards. The consultant will make use of the best available data and climate change projections. The firm will use two emission pathways: Representative Concentration Pathway (RCP) 4.5 (base case) and 8.5 (worse case) to inform the design work and assess options. All designs should assume an 80-year design life unless otherwise recommended / agreed beforehand.

The design should consider the availability of sustainable local construction materials, energy efficiency improvements, methods of construction, and the suitability of imported materials to the project. Whenever possible, without compromising applicable design standards, innovation, quality of work or maintenance requirements, consideration should be given to locally fabricated products or materials, particularly where high maintenance costs may result from the use of imported products.

In addition to the detailed design, the Consultant will prepare all necessary bidding documents including specifications and performance requirements, engineering design drawings, bills of quantities, engineer's

detailed estimate, environmental, social, health and safety clauses, works implementation program, and other documentation as required (see Reporting Requirements below).

Following acceptance / approval of the Design Completion Report and Bidding Documents, and the Client's decision to proceed with the works contract(s) bidding, the consultant shall assist PPA with procurement of the works contractor(s), during and after the bidding period. Assistance will include but not be limited to:

- Assisting with the preparation of invitation for bids;
- Attending and acting as technical assistant at the pre-bid meeting or any meetings with bidders as required;
- Assisting with responses to bidders' written queries and preparation of addenda to the bid document if required;
- Carrying out the detailed bid evaluation and preparing a draft Bid Evaluation Report (BER) for consideration by the Technical Evaluation Committee (TEC), all in full accordance with the Compact Fiscal Procedures Agreement and CFR 200;

3.0 Deliverables/Reporting

Stages 1 – 2

3.1 Inception Report

Within three (3) weeks after the effective date of the assignment the Consultant shall submit four (4) copies of the Inception Report confirming the detailed methodology for the provision of the services and including a detailed program, personnel schedule, Consultant's organization chart and channels of communication for the project team. The report should also clarify any ambiguities or agreed amendments to the ToR and identify any perceived risks or potential constraints to the timely delivery of the services. It should include an agreed schedule for project progress meetings between PPA, the Consultant and other relevant parties.

3.2 Basis of Design Report (Design Features Report)

The Consultant shall submit within three (3) months after the effective date of the assignment, four (4) hard copies and digital (.pdf) files of the Basis of Design Report including as appropriate plans, sections and elevations at suitable scales, of all proposed improvements. A Basis of Design (BoD) report for buildings is a critical document used in the construction and engineering industries to outline the conceptual framework and design criteria that will guide the development of a building project. It provides detailed information on the

design intent, building systems, and how the project will meet its functional requirements. Here's an outline of a typical table of contents (ToC) for a Basis of Design report:

Executive Summary

- 1.1 Overview of the Project
- 1.2 Project Objectives
- 1.3 Key Design Criteria and Compliance Standards
- 1.4 Summary of Recommendations

Introduction

- 2.1 Project Background
- 2.2 Purpose of the Report
- 2.3 Scope of Work
- 2.4 Project Location and Site Description

Design Criteria and Standards

- 3.1 FAA Advisory Circular AC 150/5300-13B Compliance
- 3.2 ICAO Standards and Recommended Practices (SARPs)
- 3.3 Local and National Regulatory Requirements
- 3.4 Environmental and Sustainability Considerations (LEED, Resilience Standards)
- 3.5 Design Safety Zones (Runway Safety Area, Object-Free Area, Clear Zones)

Site Assessment and Existing Conditions

- 4.1 Topography and Geotechnical Investigations
- 4.2 Existing Runway and Apron Conditions
- 4.3 Climatic and Environmental Conditions
- 4.4 Coastal and Marine Considerations (for Reclamation)
- 4.5 Hydrology and Drainage Assessment
- 4.6 Environmental Impact and Sensitivity Analysis

Runway Extension Design

- 5.1 Runway Length Requirements and Justification
- 5.2 Runway Width and Pavement Structure
- 5.3 Grading, Earthworks, and Site Preparation
- 5.4 Drainage and Stormwater Management

- 5.5 Lighting, Markings, and Signage
- 5.6 Navigational Aids (NAVAIDs) Integration
- 5.7 Pavement Design and Material Selection

Reclamation Design

- 6.1 Reclamation Area Assessment
- 6.2 Reclamation Techniques and Methodologies
- 6.3 Fill Materials and Sources
- 6.4 Shoreline Protection and Erosion Control Measures
- 6.5 Marine Ecology and Habitat Mitigation
- 6.6 Environmental and Social Impacts of Reclamation

Geotechnical and Structural Considerations

- 7.1 Geotechnical Investigations
- 7.2 Subsurface Conditions and Soil Analysis
- 7.3 Pavement Structural Design
- 7.4 Foundation Design for Associated Infrastructure
- 7.5 Structural Requirements for Reclaimed Areas
- 7.6 Seismic and Climate Resilience Design Considerations

Hydrology and Drainage Design

- 8.1 Existing Hydrology Assessment
- 8.2 Drainage System Design for Runway Extension and Reclamation Areas
- 8.3 Stormwater Management and Flood Prevention
- 8.4 Coastal and Marine Water Management
- 8.5 Erosion Control and Sediment Management Strategies

Environmental Considerations

- 9.1 Environmental Impact Assessment (EIA) Overview
- 9.2 Mitigation Measures for Environmental Impact
- 9.3 Climate Change and Sea Level Rise Adaptation
- 9.4 Noise and Air Quality Impact
- 9.5 Biodiversity and Marine Habitat Protection
- 9.6 Compliance with Environmental Regulations and Permits

Sustainability and Energy Efficiency

- 10.1 Sustainable Design Features
- 10.2 Renewable Energy Options (e.g., Solar, Wind)
- 10.3 Water Conservation Measures
- 10.4 Low-Impact Materials and Resource Efficiency
- 10.5 LEED Certification Potential

Construction Methodology

- 11.1 Phasing and Sequencing Plan
- 11.2 Construction Equipment and Materials
- 11.3 Construction Safety and Risk Management
- 11.4 Environmental and Social Management During Construction
- 11.5 Temporary Facilities and Infrastructure Requirements
- 11.6 Logistics and Access for Material Delivery

Cost Estimates and Budget

- 12.1 Estimated Construction Costs
- 12.2 Detailed Bill of Quantities (BoQ)
- 12.3 Lifecycle Cost Analysis (LCCA)
- 12.4 Phased Funding Requirements

Project Risks and Mitigation Strategies

- 13.1 Identification of Key Risks (Technical, Environmental, Financial)
- 13.2 Risk Assessment and Management Plan
- 13.3 Contingency Planning
- 13.4 Long-Term Monitoring and Maintenance Plan

Stakeholder Engagement and Consultation

- 14.1 Overview of Stakeholder Engagement Process
- 14.2 Key Stakeholder Concerns and Responses
- 14.3 Community Consultation and Feedback
- 14.4 Regulatory and Agency Coordination

Conclusion and Recommendations

- 15.1 Summary of Key Design Solutions

- 15.2 Environmental and Social Compliance Assurance
- 15.3 Final Recommendations for Runway Extension and Reclamation
- 15.4 Next Steps and Implementation Plan

Appendices

- 16.1 Site Plans, Maps, and Layouts
- 16.2 Technical Data Sheets and Design Calculations
- 16.3 Environmental Impact Assessment (EIA) Summary
- 16.4 Geotechnical Reports
- 16.5 Survey Reports
- 16.6 Relevant Regulatory Permits and Approvals
- 16.7 Stakeholder Engagement Summary

This report serves as a living document that evolves from the Conceptual to Final Design and can be adjusted as the design process progresses. The goal is to ensure all parties involved are aligned on the building's design intent, systems, and requirements before moving forward to more detailed design phases. The Final version of this document will be submitted in Stage 7 as the Final Design Report.

Stages 3 – 4

3.3 Preliminary Design Report

The preliminary drawings and principal specifications shall be submitted to the PPA for approval prior to proceeding with the detailed design stage.

The Report shall include, but not be limited to, addressing the following issues:

- Presentation of preferred design solutions for consideration by PPA;
- Report on site investigations and surveys undertaken, including summary of test results and implications on design;
- Geotechnical investigations and findings;
- Environmental and Social Assessment Screening and Action Plan;
- Detailed Engineering Calculations;
- Draft Bid Documentation (using EJCDC Standard Form of Contract to be procured by the Consultant);
- Draft Standard Contract Documentation;

- Design standards adopted;
- Design criteria statement;
- Constructability assessment of each element;
- The likelihood (risks) of encountering underground services;
- Engineer's Cost Estimate of all proposed improvements as designed; and
- Anticipated Time Program for Construction.

Stages 5 – 7

3.3 Design Completion Report

Submit four (4) copies of the Design Completion Report within ten (10.0) months after the effective date of the assignment, to PPA. The Design Completion Report (which is expected to be a more detailed extension of the Preliminary Design report) will mark the completion of the design phase of the services.

The Design Completion Report shall address the following aspects:

- Problems encountered (if any) and how they were overcome;
- Comments on the design standards adopted, with details of any area where they could not be met, with reasons (**NB: NO CODE WAIVERS WILL BE ALLOWED**) ;
- Technical matters concerning the design;
- Comments on the design approach and methodology adopted, and justification of the rationale behind any decisions;
- A schedule of Construction Quantities for the primary and ancillary works;
- An estimate of construction costs, including preliminaries, and provisional sums;
- An estimate of the time required to construct the works;
- A discussion of the preferred construction methodology for the works;
- A copy of design calculations where appropriate;
- A copy each of the Certificate of Design stamped and signed by US Licensed Architects/Engineers;
- A copy of the Certificate of Design Review/Check stamped and signed by US Licensed Architects/Engineers; and
- A copy of all survey data and any relevant reports prepared by the Consultant or by any third party as a result of the commission.

As part of the Design Completion Report the consultant will prepare and provide an Engineer's Estimate for individual components for the whole of the works. This estimate shall be prepared by entering a unit rate against each item in the detailed Bills of Quantities. Unit rates should be based either on recent bid prices for similar work, current ruling contract rates for major works items, or built up from individual current prices of material, plant, fuel and labor that make up the Bill item. This estimate should also include any provisional sums for unforeseen and contingency for works items which are unable to be measured at the time of issuing bidding documents.

The consultant shall undertake a basic Risk Analysis which is to include, but not be limited to, an evaluation of the following risks/issues likely to arise during the works phase:

- Supply of materials;
- Capabilities (skills and resources), of local civil contractors;
- Likely level of interest of international contractors;
- Risk comparison for works contracts packaging options (large / small, geographic);
- Land-use and/or acquisition issues;
- Climatic influences and natural hazards;
- COVID-19 travel restrictions and health risks to workers and communities;
- Material haulage to and from the site;
- Time over-runs;
- Cost blow-out;
- Damage to services; and
- Un-located services.

The Risk Analysis Report shall be included as part of the Design Completion Report.

Include the following as part of the deliverable package:

- Updated Stakeholder Engagement Plan.
- Consultants shall be responsible for the Applications to State EPA for relevant licenses and permits.

Bid documents

The Consultant shall submit within ten (10) months after the effective date of the assignment, three (3) hard copies and digital files (.doc, .xls, .pdf as appropriate) of the Draft Bidding Documents to PPA. The Bidding Documents in strict accordance with relevant AiA Design-Bid-Build Forms shall include, but not be limited to the following:

- Invitation to Bid;

- Bidding Procedure, including Instructions to Bidders and bill of quantities;
- Requirements including technical specification general and specific;
- Conditions of Contract and contract forms AiA Conditions of Contract, most updated version;
- For Tender Construction drawings;
- Engineer's cost estimate, **including supporting unit rates analysis(Basis of Costing Report);**
and
- Earthworks Permits (if issued).

Final Bidding Documents for the approved design shall be submitted to PPA incorporating comments on the Draft Bidding Document from PPA and other authorized personnel within two (2) weeks after receiving such comments.

3.4 Table of Deliverables

The Consultant shall prepare and physically submit all reports listed below in four hard copies (A4 / A3 size), and one electronic format (the latter in commonly available CaD software).

Stage of the Assignment	Duration (months)	Total Person Months
Stage 1 – Field investigations, surveys, and concept designs/options, Client review and approval	12	14
Stage 2 – Concept Designs/Options , Client review and approval	2	8
Stage 3 – Preliminary Stakeholder Consultations, Client review and approval	1	10
Stage 4 – Modelling (Structural, Climate Change, Coastal - Sediment, Hydrodynamic, fluvial, precipitation, wind) Preliminary Designs	6	15
Stage 5 – Environmental and Social Impact Assessment	8	13
Stage 6 – Final Stakeholder Consultations, Client review and approval	2	4
Stage 7 – Final Feasibility Report, Final Designs, Client review and approval	6	5
Total	24	99

Hold Points

The following Hold Points will apply:

- **Stage 1:** At submission of the **Master Plan Upgrade and Options Report** allow four (4) weeks for PPA and US Army Corp of Engineer's review.
- **Stage 2:** At submission of the **Concept Design Selection and Basis of Design Report** allow four (4) weeks for PPA and US Army Corp of Engineer's review.
- **Stage 4:** At submission of **Preliminary Design Report** allow a period of four (4) weeks for PPA and US Army Corp of Engineer's review.
- **Stage 7:** After submission of **Draft Design Completion Report, Draft updated Environmental and Social Management Plan and Draft Bidding Documents** allow a four(4) weeks period for PPA and US Army Corp of Engineer's review and no objection letter.

All bidders are to provide a total of **2 months** of time input for updating the above-mentioned deliverables based on comments from the USACE peer review.

3.5 Consultant’s Team Requirements

Position	Qualification and Experience Requirements
<p><u>Key Experts</u> K-1: Team Leader</p>	<p>Base Degree in Engineering, Business, Law, Economics or another related field. The team leader should have a wide breadth of experience (20+ years) managing multi-faceted teams of varied specializations to deliver infrastructure programs. The team leader will be responsible for the data collection, master plan upgrades, concept design selection, consultations, environmental and social planning, preliminary and detailed designs and collation of bidding documents.</p>
<p>K-2: Senior Coastal Engineer</p>	<p>1st degree in civil engineering, with post-graduate qualification in Coastal Engineering discipline preferred. Shall possess Full membership of international or national professional institution with supporting license /registration number. At least 10 years’ relevant experience in coastal engineering including 8 years of experience of hydrodynamic analyses and modelling, flood risk assessment with hydrologic modelling software such as MIKE21, DELFT or equivalent. Must have experience in design and construction of coastal engineering structures and land reclamation.</p>
<p>K-3: Senior Structural Engineer</p>	<p>1st degree in civil engineering, with a post-graduate qualification in civil/structural-related discipline. Shall possess Full membership of international or national professional institution with supporting license/registration number. Proven recent experience of 15 years in detailed design of structures, preparation of drawings, specifications and BOQ of comparable projects, preferably 3 years of experience on FAA run airports and land reclamation.</p>
<p>K-4: Geotechnical / Materials Engineer</p>	<p>1st degree in civil engineering with post-graduate qualification in geotechnical-related discipline. Proven experience of recent 8 years in geotechnical investigations and materials testing for similar projects, preferably 3 years of experience on FAA run airports and land reclamation.</p>
<p>K-5: Airport Planner</p>	<p>Degree in architecture or related planning discipline. At least 5 years’ experience in design, airport master planning, zoning, etc. on FAA run airports.</p>

<p>K-6: Climate Change Expert/ Environmental Safeguards Specialist/Environmental Planner</p>	<p>The person shall hold relevant degree and should have proven experience in environmental assessment considering direct and indirect impacts during pre-construction, construction, and operation, and identifying costs of mitigation measures and implementation of a monitoring plan and report preparation with familiarity with NEPA planning and environmental standards.</p>
<p>K-7: Social Safeguards Specialist</p>	<p>Degree in gender studies, social science, anthropology, geography or other relevant qualification. At least 10 years' experience of social impact assessment in infrastructure development and / or transportation planning in small island States, including experience in conducting consultations. Specialist expertise in land tenure and access and in the Pacific would be an advantage.</p>
<p>K-8: Licensed Surveyor</p>	<p>The person leading bathymetric and topographical survey shall be a qualified licensed Engineering Surveyor and should have proven experience in survey of airport facilities. He/she shall have recent 5 years relevant experience, preferably 3 years of experience similar to the Pacific Region.</p>
<p>K-9: Costing Engineer/Quantity Surveyor</p>	<p>The person leading the preparation of cost estimates in alignment with AACE Cost Classification System* referenced below and ASTM E 1804-07, 2516-06 and 1557 requirements, should have ten years proven experience in the region costing similar projects. It is expected that supporting market studies would accompany the final priced Bills of Quantities to justify the rates used in the final determination.</p> <p>*56R-08: Cost Estimate Classification System – As Applied in Engineering, Procurement, and Construction for the Building and General Construction Industries</p>
<p>K-10: FAA Grant Writer</p>	<ul style="list-style-type: none"> • Education: Bachelor's degree in English, Communications, Business, Public Administration, or a related field. A Master's degree is preferred. • Experience: <ul style="list-style-type: none"> ○ Proven experience in grant writing, particularly with FAA grants or other federal grants.

	<ul style="list-style-type: none"> ○ Familiarity with aviation, airport infrastructure, or transportation sectors is highly desirable. ● Skills: <ul style="list-style-type: none"> ○ Strong writing and communication skills, with a proven ability to craft compelling narratives. ○ Knowledge of FAA funding processes, eligibility criteria, and application procedures. ○ Proficiency in budgeting, financial forecasting, and managing grant timelines. ○ Excellent organizational skills with the ability to manage multiple grant applications simultaneously. ● Technical: Proficiency with grant management software, Microsoft Office Suite (especially Excel), and FAA application portals. ● Key Performance Indicators (KPIs): <ul style="list-style-type: none"> ● Number of successful FAA grant applications submitted. ● Percentage of awarded grants relative to total applications. ● Timeliness and accuracy of grant submissions. ● Compliance with FAA funding requirements and reporting standards.
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See **Appendix C** for more details.

4.0 Evaluation Criteria

The PPA invites Statements of Professional Qualifications from interested and qualified firms to implement the design services. Firms must demonstrate the minimum qualifications presented below.

Minimum Qualification threshold: **70%**

- Company's past experience in Airport related Projects (30%): Listing of projects, size (USD), and Client
- Company's past experience in FAA Approved Runway Design and development projects (30%): Listing of projects, size (USD), Client,
- The qualification and experience of professional key staff to be assigned to the design team (20%)
- Firm's Technical and Financial Capacity (20%)

Firms are also expected to submit a Fee Proposal that details a time and materials estimate of the proposed hours of work and rates for each professional (**Appendix C**). The final proposed price would be used to determine the lowest bidder.

NB: Consultants or Joint Venture Partners that have been terminated by the Government of FSM over the past five years shall be **disqualified** from this Bid submission.

5.0 Contract Award

Only Qualified Firms will be considered for award. This request for Statements of Qualifications does not commit the PPA to award a contract, to pay any costs incurred in the preparation of a proposal, or to procure or contract for services. The PPA reserves the right to reject any and all Statement of Qualifications submitted with reason.

The award shall be given to the **lowest, qualified** bidder

6.0 Conditions of Contract

FIDIC Client/Consultant Model Services Agreement 2017 (**Appendix D**)

7.0 Submission Requirements

For **bid submission purposes** only, the Employer's address is :

Mr. Ronald Reyes,

Airport Manager,

Pohnpei Port Authority,

P.O. Box 1150,

Dekehtik, Pohnpei FM

96941,

Tel: (691) 320-2793 Fax: (691) 320-2832

The deadline for bid submission is:

Date: Thursday, November 28th 2024 _____

Time: 4 pm(Local Pohnpei Time)_____

Bidders can submit the bid electronically to ronald.reyes@ppa.fm , however they can also submit in a sealed envelope to the PPA Office as well, Second Floor, ***P.O. Box 1150, Dekehtik, Pohnpei FM 96941***, by the deadline date specified in the BDS.

The bid opening shall take place at:

Date: Friday, November 29, 2024 _____

Time: 10 am (Local Pohnpei Time)_____

Venue: PPA Conference Chamber, ***P.O. Box 1150, Dekehtik, Pohnpei FM*** (Local Pohnpei Time)

APPENDIX A – Pohnpei Airport Existing Master Plan

APPENDIX B – Testing and Surveying Details

Objectives

- **Assignment objective:**
 - (a) The type of foundation system to be used;
 - (b) The depth of the foundation;
 - (c) Bearing capacity at the foundation strata with the permissible settlement;
 - (d) Suitability of the excavated earth in backfilling;
 - (e) Quantitative assessment of chlorides and sulfate contents in the groundwater and earth. Recommendations on the use of groundwater for concreting work;
 - (f) Modulus of sub-grade reaction for the design of raft foundations;
 - (g) Other soil parameters required for the design of sub-structure including retaining walls, and reinforced earth walls along roadway;
 - (h) Requirements for stabilization of earth slopes in open excavations;
 - (i) Electrical resistivity of soil;
 - (j) Level of groundwater table and its' expected seasonal variation;
 - (k) Recommendations for the composition of sub-grade for the internal road design;
 - (l) Seismic design parameters and site classification.
 - (m) Bearing capacity of the soil to be used for the design of rigid pavement solution along the road.

1. Scope of Activities

The scope of this consulting assignment will involve undertaking baseline geotechnical field investigations and geotechnical surveys of identified PPA Assets across the Project Site¹.

The services to be provided by the Consultant will be undertaken as follows:

Geotechnical Surveys

The Consultant shall perform all work along with all incidental and related work, including setting out, excavation work, slogging, approach to test locations, offices, stores, and protection of adjacent buildings and structures of services/facilities. No separate payments shall be made on such accounts. The tenderer should, therefore, take into account all such relevant items while quoting his unit rates against the schedule of items.

¹ Runway Protection Zone (500'x1010'x1700') – Magenta line encasing the existing runway



Table 5-9. Runway Protection Zone

RUNWAY PROTECTION ZONE			
	Runway End	9	27
	Approach Category	D	D
	Visibility Minimums	Greater Than 1 Mile	Greater Than 1 Mile
RPZ	Length – L	1,700 feet	1,700 feet
	Inner Width – W1	500 feet	500 feet
	Outer Width – W2	1,010 feet	1,010 feet
	Acres	29.5	29.5
Approach	Length	10,000 feet	10,000 feet
	Inner Width	500 feet	500 feet
	Outer Width	4,000 feet	4,000 feet
	Slope (H=Horiz. V+vert.)	34:1	34:1

Source: FAA AC 150/5300-13

1.1 Work to be provided by the Consultant

The work to be provided by the Consultant, unless specified otherwise, shall include but not be limited to the following:

- (a) Furnish necessary plant and equipment, tools and tackles, instruments, necessary power, fuel, water, labor, supervisions by qualified and experienced engineers and supervisors specialized in the type of investigation, transport of materials, men and equipment, etc., services, full insurance, and all other incidental items as may be

necessary for entire and successful completion of the work as per tender terms, drawings, specifications and instruction of the PPA.

- (b) Locate in the field and in the layout drawing all boreholes/test pits and other field investigation items. Test pits should be located at critical locations of structural engineering interest to be guided by the Geotechnical and Structural Engineer.
- (c) Furnish progressively and periodically field bore logs, investigation observations, and test results with relevant data, pictures, and features in triplicate.
- (d) Prepare and submit a draft (in duplicate) and final (after incorporating comments, if any) geotechnical investigation report as per specification, schedule of items, and instructions of the PPA.
- (e) The Geotechnical Report shall describe the methodologies adopted to secure the described technical outputs and analysis.
- (f) Methodologies for the Geotechnical investigation shall be in accordance with the relevant FAA Advisory Circular, and field investigation best practices.

1.2 Location and Levels

The consultant shall establish the location of all boreholes and field test points and the levels of the existing ground at such locations based on his expert recommendation and the client's design intent.

1.3 Deliverables

- (a) Technical reports and presentations
- (b) Boring logs and field notes
- (c) Laboratory analysis results
- (d) Geophysical survey data and interpretation
- (e) Quantity calculations
- (f) Progress reports

Submittals shall be in e-files and hard copies (3 sets).

Technical Specifications of Topographic, Bathymetric and Boundary Survey

Objectives

- **Assignment objective:**
 - Determine the topographic and bathymetric detail of the Project Site² with particular attention paid to existing occupation patterns, building uses (residential, commercial, etc.), natural and man-made drainage, and all structures and utilities.
 - Prepare a preliminary cadastral General Plan and/or Remaining Portion Plan (if applicable) of the Project Site. The General Plan should be guided by existing occupation and typical surveying standards for individual parcels and access.
 - Produce original cadastral survey plans, including a General Plan and sets of Individual Parcel Plans (Lot Plans), to be approved by the Department of Transport, Communications, and Infrastructure (DoTCI).

Scope of Activities

The scope of this consulting assignment will involve undertaking baseline field investigations and surveys of this Project Site on Dekehtik Island, Pohnpei State.

The services to be provided by the Surveyor will be undertaken as follows:

Stage 1 – Inception Report

The Land Surveyor is expected to present an Inception Report within twenty-one (21) calendar days after the Agreement has been executed. A Notice to Proceed will then be issued at the request of the PPA for the commencement of field activities.

Stage 2 – Topographic and Boundary Surveys

As part of the services, the Land Surveyor is expected to use his/her best professional judgment to carry out and be responsible for:

- (i) Conducting an initial investigation and assembling all technical data which

² Runway Protection Zone (500'x1010'x1700') – Magenta line encasing the existing runway

must be gathered from Ward Sheets, Cadastral Plans, Maps, and research obtained from the local Land Management Division and any other relevant organizations;

(ii) Issuing Survey Notices to affected land occupants prior to the execution of the Services;

(iii) Performing topographic and cadastral surveys inclusive of control points³, site perimeter boundary markers (set in concrete), existing buildings, foundations, drains, walls, fences (chain-link, galvanized, hedge or any other feature used to demarcate occupation habits) streams, roadways, Utility poles, existing underground utilities (water, sewer, power) footpaths, and other features that may exist in order to determine the:

(1) location and boundaries of the Project site in relation to the existing land parcels,

(2) approximate size/location of all structures within or close to the Project site

(3) existing or disused roads, railings, easements, rights-of-way, tracks or pathways that traverse through or close to the Project site

(4) Existing documented road easements

(v) Preparing cadastral survey plans of the project site / road corridor as necessary at a scale consistent with the International Land Measurement Standard: Due Diligence for Land and Real Property Surveying (May 2019) and to be approved by the PPA;

(iv) Ensure that all the cadastral surveys be performed and certified by a Licensed Land Surveyor. The Land Surveyor shall exercise all reasonable skill, care, and diligence which are normally required in performing cadastral surveys and carry out all obligations in accordance with recognized professional standards outlined in the International Land Measurement Standard: Due Diligence for Land and Real Property Surveying (May 2019) and other standards generally observed in the industry for similar services.

³ *Control points are to be coordinated in an appropriate UTM Zone datum and referenced to the perimeter markers by means of accurate bearings (UTM Grid) and distances. A series of control points will be placed at strategic positions. To facilitate this, stakes will be placed into the ground for easy identification. All controls will be observed using a Total Station. A value for X, Y, and Z coordinates will be determined based on observations.

If errors, omissions, ambiguities, inconsistencies, inadequacies, or other defects are found in the survey, they shall be corrected at the Land Surveyor's cost, notwithstanding any consent or approval obtained by the PPA.

Tasks

Field assessments, surveys, and site investigations

Site investigation: The Surveyor shall carry out a visual inspection of the Project Site to assess the type, characteristics, dimensions, and condition of existing road and associated assets, and their surrounding environment.

Topographic and Bathymetric Survey: The Surveyor shall conduct a detailed topographic survey of the existing Runway Protection Zone (Appendix B) and adjoining properties, encroachment into the road reserve (structures, trees, and crops), and a detailed site survey of the existing runway site. The survey should be sufficiently thorough for detailed engineering design purposes, and should clearly identify all structures, fences, hedges, trees, and crops for the purpose of possible future compensation negotiations. The survey area will be extended beyond the above-ground physical runway 9-27 and extend to the Runway Protection Zone (RPZ) as detailed in **Appendix B (Sheet 6)** as required for upstream and downstream river hydraulic modelling and coastal / riverbank protection design purposes. Information for the Topographical Survey will be based on the control points and will include the following: -

- 25m along any stream crossing of both sides of the estimated road centerline
- Details along 15 m width of the estimated road centerline
- Location of drainage network within the Project limits showing the direction of flow of each drain
- Dimensions and invert levels of drains and drainage structures within the Project area limits
- Surface elevations extending to 0.3 meters from the edge of each drain or the adjacent property line as a minimum
- The location and elevations of runway paving
- Location of permanent structures and natural and man-made features that may be required by the purpose of the survey
- Spot elevations covering the entire survey limits showing high points, low points, grade changes, and at sufficient intervals to represent the general character of the terrain
- Description, location, and elevation of benchmarks used in the survey
- Dimensions of curb, sidewalk, and gutter lines of ditch line and the centerline of all roads

- Location of utilities within six meters of any drain or drainage structure within the drainage network. These will include: -
 - Utility corridors
 - Storm, sanitary, or combined sewers – location of all observable manholes and other structures such as culverts, headwalls, catch basins and clean out on the lot or in the street, roads adjoining the lot
 - Water – location of any water mains, valves, regulators, and fire hydrants within three meters of any drain or drainage structure
- Existing contour lines indicating the shape and elevation of the land over the entire Project area limit at intervals of **one (1) meter**
- The location of permanent structures
- Elevations on the top of curbs, gutters, and sidewalks
- North Arrow and Scale Drawing
- Legend depicting the symbols and abbreviations used in the drawing
- Spot elevations covering the entire survey limit showing high points, low points, grade changes, and sufficient intervals to represent the general character of the terrain
- Location and elevation of drainage courses on or near the surveyed parcel

Cadastral/Boundary Survey: The Surveyor shall also carry out research at the appropriate authority in Pohnpei State to determine the status of all land within the surveyed corridor, the documented existing road easement (reserve) and prepare a cadastral plan showing land ownership that may be affected by the proposed works.

Utility Services: The Surveyor will liaise with the service authorities to obtain all available information on the type, location and level of all existing overhead and underground services (including proposals) which will need to be accommodated and /or may cause a potential conflict with the proposed construction activities. Where any uncertainty exists, the Surveyor shall arrange for underground services to be proved by dipping.

Hydraulic and Hydrology, Tidal Fieldwork& Research: The Surveyor will be responsible for accurately determining the catchment area, High Water Mark (historical tidal data and a 6-month period of data from installing tidal gauges), drainage channels, and streams along the longitudinal and cross-sectional profiles.

Utility Services: The produced surveys shall show all information on the type, line, and level of existing services.

Street Lighting: The Surveyor shall make recommendations for any street lighting that is considered necessary in liaison with the power utility authority in each state.

Pavement Furniture: Pavement markings, furniture and traffic signs information will be located on the drawings.

7. Reporting Requirements and Time Schedule for Deliverables

D1 - Inception Report

Within *three (3) weeks* after the effective date of the assignment, the Surveyor shall submit of the Inception Report confirming the detailed methodology for the provision of the services and including a detailed program, manning schedule, Surveyor's organization chart and channels of communication for the project team. The Inception Report will summarize cadastral research for the site; the proposed locations of at least two permanent control points to be established and coordinated; the names of the neighbours to be notified; and the proposed dates for conducting the survey.

D2 - Preliminary General Survey Plans of Site

The preliminary Survey Plans will include the following:

- At least two permanent control points (in concrete and accompanying witness diagrams) in the relevant UTM Zone.
- The legal boundaries and all road easement/reserves with particular attention to be paid to the principles of the changes in riparian boundaries
- All standards and specifications outlined in the Land Surveyors Rules 2012, especially concerning structures on the site.
- The Survey Order Number allotted for the survey.

D3-Topographic and Bathymetric Survey

The topographic survey must include but not be limited to:

- Contours at appropriate intervals. Elevations (Spot heights) at relevant densities between contours, significant changes in slope, as well along drainage systems inclusive of outfalls, and road edges/centerlines at the change of slope and/or defined intervals no greater than 1 meter apart.
- The locations of all structures (Inclusive of cesspits, outhouses, sheds, animal pens, tank stands, abandoned), foundations, fences, and walls with an indication of the type of construction material (concrete, wood, galvanize, etc.)
- The locations of all utility poles, hydrants, water mains, etc., that should be noted in designing the most suitable layout
- All standards and specifications outlined in the International Land Measurement Standard: Due Diligence for Land and Real Property Surveying (May 2019), especially concerning structures on the site.
- A clearly labeled and comprehensive legend. Due to the nature of the Project Site, all features that would affect occupation, need to be identified.

The Bathymetric survey must include but not be limited to :

Data Collection and Equipment

- **Bathymetric Data Collection:** Utilize modern, high-precision bathymetric survey equipment, such as multibeam or single-beam echo sounders, to measure underwater depths and features.
 - **Multibeam Echo Sounder (MBES):** If available, multibeam technology should be used to provide a complete 3D model of the seafloor.
 - **Single-Beam Echo Sounder (SBES):** In the absence of multibeam technology, single-beam soundings may be used, ensuring a tight grid and high-frequency measurements to ensure accuracy.
- **Positioning System:** Employ Differential Global Positioning System (DGPS) for precise location positioning of survey points.
- **Tidal and Water Level Corrections:** Collect tidal data and correct for water level variations during the survey. Use available tidal stations or deploy temporary tide gauges.
- **Seabed Characterization:** Where necessary, supplement the bathymetric survey with side-scan sonar or sub-bottom profiling to identify the nature of the seabed and any potential obstacles, such as debris or rocks.

Data Processing and Analysis

- **Raw Data Processing:** Process all bathymetric survey data to correct for tidal fluctuations, vessel motion, and other relevant factors (e.g., heave, roll, pitch).
- **Surface Mapping:** Develop detailed bathymetric maps and 3D models of the surveyed area, providing both raw and processed data.
- **Depth Contours:** Generate depth contours at specified intervals (e.g., every 0.5 or 1 meter) across the reclamation area.
- **Volume Calculations:** Calculate seabed volumes to be dredged or filled for land reclamation, based on survey data and reclamation design requirements.

Environmental and Geotechnical Considerations

- **Environmental Impact:** Identify sensitive seabed areas (e.g., coral reefs, seagrass beds) that may require protection or mitigation during the reclamation process.
- **Sediment Sampling:** If required, collect sediment samples from the seabed to analyze grain size, composition, and contamination levels. This will help assess the feasibility of using the dredged material for reclamation or disposal.

Quality Assurance and Control (QA/QC)

- **Data Accuracy Verification:** Implement quality control procedures to ensure the accuracy and reliability of the collected data. This includes redundant measurements, calibration of survey instruments, and cross-checks with existing data.
- **Survey Validation:** Validate the bathymetric data by comparing survey results with known benchmarks, or through cross-checking with alternative survey methods (e.g., aerial LiDAR or satellite data).

Reporting and Deliverables

The consultant will deliver the following outputs:

1. **Bathymetric Survey Report:**
 - Description of the survey methodology, equipment used, and quality control measures.
 - Detailed bathymetric maps of the survey area, including depth contours and seabed profiles.
 - 3D models of the seabed, with geospatial coordinates (in an agreed-upon coordinate system).
 - Identification of any seabed features, obstacles, or sensitive environmental zones.
 - Volume calculations for dredging and filling requirements for reclamation.

- Recommendations for further studies or mitigation measures, if required.
2. **Raw and Processed Data:**
- Raw bathymetric data files in appropriate formats (e.g., XYZ or CSV format).
 - Processed bathymetric data with corrections applied for tides and vessel motion.
 - Digital Terrain Model (DTM) of the seabed and GIS files (e.g., shapefiles) compatible with GIS software.
3. **Environmental Observations:**
- Summary of any environmental features or concerns identified during the survey, including recommendations for mitigation if necessary.

D4- Preliminary Cadastral Sub-Division Plans

Based on the findings of the cadastral survey, a sub-division layout is to be produced:

- The subdivision should take into consideration the topographic information, occupancy, and any local zoning standards
- The layout **MUST** be reviewed and agreed upon by the DoTCI before finalization and identifying boundaries on the ground.

D5- Identification of ALL Lot Boundaries to their Respective Occupants based on State Instructions and Alongside Appointed State personnel

Wooden stakes are to be utilized as witnesses to locate boundary markers easily.

- The Land Surveyor, through consultation and planning with the PPA's Community Development Officer, is required to show the occupant of the lot the boundary markers.
- The Community Development Officer will keep records of the occupants showing their boundaries utilizing a Lot Boundary Identification Form.
- This exercise would be done on a phased basis for every 100 occupants.

D6- Final Cadastral Plans

The Survey Plans will include the following:

- At least two coordinated control points in the relevant UTM Zone.
- All standards and specifications outlined in the International Land Measurement Standard: Due Diligence for Land and Real Property Surveying (May 2019), especially as it relates to structures on the site
- All reserves for fire hydrants and any other relevant service feature present on site.

- Identify both the site Perimeter and Sub-Division Surveys on the same plan for approval

D7- Paper and Digital copies of the approved cadastral Survey Plans of the site

- A digital copy of the Survey Plans in AutoCAD vector format is to be provided to the PPA along with a listing of the coordinated points and accompanying witness diagrams
- A second digital copy of the scanned approved General Plan in JPEG format with the signatures of the State and DoTCI will be required for payment to be made
- The approved paper originals shall be submitted within seven calendar days of the receipt of payment for this Deliverable

D8- Final Report

The Final Report shall contain station descriptions and photographs of control points, a copy of the Survey Order Notes, pictures of any noteworthy features on or near the boundaries, a summary of the methodology, and recommendations for further surveys

Final submission

Data to be made available to GoFSM from the Surveyor will include, if and where available:

- Relevant previous reports and outputs relating to the road networks and road assets in each state
- Specific drawings, Cadastrals, details, reports, or other technical data relating to the assets to be improved
- Softcopy of AutocAD files (.dwg) along with associated license to replicate and use as needed

The Client will provide unimpeded access to relevant information that it may hold to assist the Surveyor in this project on “as available” basis.

Office accommodation and logistics: The consultant shall be responsible for providing all accommodation, computing, and drafting equipment and software *etc.* The consultant will be responsible for all land transportation arrangements during the project.

Project Site



V

APPENDIX C – Level of Effort Estimation

APPENDIX D –FIDIC Client/Consultant Model Services Agreement 2017

APPENDIX E –Existing EPA Permitting