ENVIRONMENT IMPACT ASSESSMENT REPORT

For

TANIA BISHOP

TOURIST ACCOMMODATION BUNGALOW.

ON LAND

OOTU PT SEC 66,

VAITUPA TAPERE,

VAITUPA DISTRICT

AITUTAKI

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EXECUTIVE SUMMARY

Miss Tania Bishop, the proponent, is planning to build a single bedroom tourist accommodation bungalow on the land section OOTU Pt Sec66, land size 2297m² in area, in the village of Vaitupa, Aitutaki. This is a bungalow type timber framed building with an area of 94.64m² including the veranda. The land section is on the foreshore with a view of the lagoon. The land section is more rectangular in shape and can be termed as generally flat. It is elevated about 2m above mean sea level.

The aim of this development is to build a single bedroom tourist accommodation bungalow building at this beautiful location.

There is no alternative options decided to date.

The project will be implemented as soon as the EIA and all other relevant permits are approved by the authorities.

Design and construction drawings are completed and these are to be submitted to the relevant Authorities for permit approval.

The construction would either be tendered out locally or selection by quotes.

As soon as all permits are approved the preliminary works will commence keeping in mind to comply with recommendations from this report, relevant standards and legislations.

The Contractor will be responsible for implementing the works in accordance to architect's specifications and the Cook Islands Building Standards and relevant AS/NZ building standards. The Contractor will also be guided by the terms and conditions imposed by the National Environment Services.

The principal environment and health impacts predicted are pollution of ground water and lagoon from non-compliant wastewater treatment and land application system, improper dumping of toxic chemicals on the site, fire, health hazards from improper storage/disposal of solid waste.

The proponent has taken the risk to build by the sea, the risk of building damaged by cyclone sea surges, tsunami and deterioration of building material by rust from sea spray.

Mitigation measures proposed are that;

Wastewater treatment system selected is compliant to the Public Health Sewage Regulations 2014, is installed by registered drain layers/plumbers as approved by the Public Health. Use of compost toilets are encouraged.

Toxic chemicals shall be restricted and proper disposal at waste facility if any are left on site.

Buildings to be constructed to withstand cyclone winds according to Cook Islands and AS/NZS building Standards. Use rust proof materials for beach area. Buildings to be on poles to reduce impact of wave surges. During operation the owner will ensure that her solid waste is properly separated, recycled and disposed at landfill and the sewage system is working properly. Owner should monitor the immediate environment for any detrimental impacts that the development imposes on the environment and likewise, nature has on the development. These are to be recorded, submitted to relevant authorities for advice or immediately mitigated if possible.

The project is being designed within the parameters of the Environment Act 2003, Building Act 2003Building Control and Standards Act 1991 and Building Control Standards Regulations 1991. In addition to these are the requirements of the Public Health Act 2004 and Energy Act 1998.

An Environmental Management Plan (EMP) is provided in this report which sets out the responsibilities of the respective parties in monitoring and mitigating potential impacts. The EMP includes the establishment of communication systems between, owner, contractor, building control, NES and Public Health and regular inspections during and after the construction works.

Glossary of Terms

AEA	Aitutaki Environment Authority
EIA	Environmental Impact Assessment
TOR	Terms of Reference
EMP	Environment Management Plan
NES	National Environment Services
MHWM	Mean High Water Mark
GDP	Gross Domestic Product
Wastewater	water spent or used water of residential, public or commercial origin.

1. INTRODUCTION

The proponent Miss Tania Bishop is seeking the full approval from the National Environment Services (NES) and Aitutaki Environment Authority (AEA) for the proposed tourism development on the foreshore in the village of OOTU.

This EIA report is prepared to assist in the facilitating the approval process for the proposed project construction works.

This report describes the project and the potential risks economically, socially, culturally and environmentally when implemented. The risks are identified and mitigation measures are proposed and put in place to reduce or eliminate potential impacts.

This report will be available for public review and comment prior to final consideration by the Aitutaki Environment Authority.

1.1 Proposal Proponent

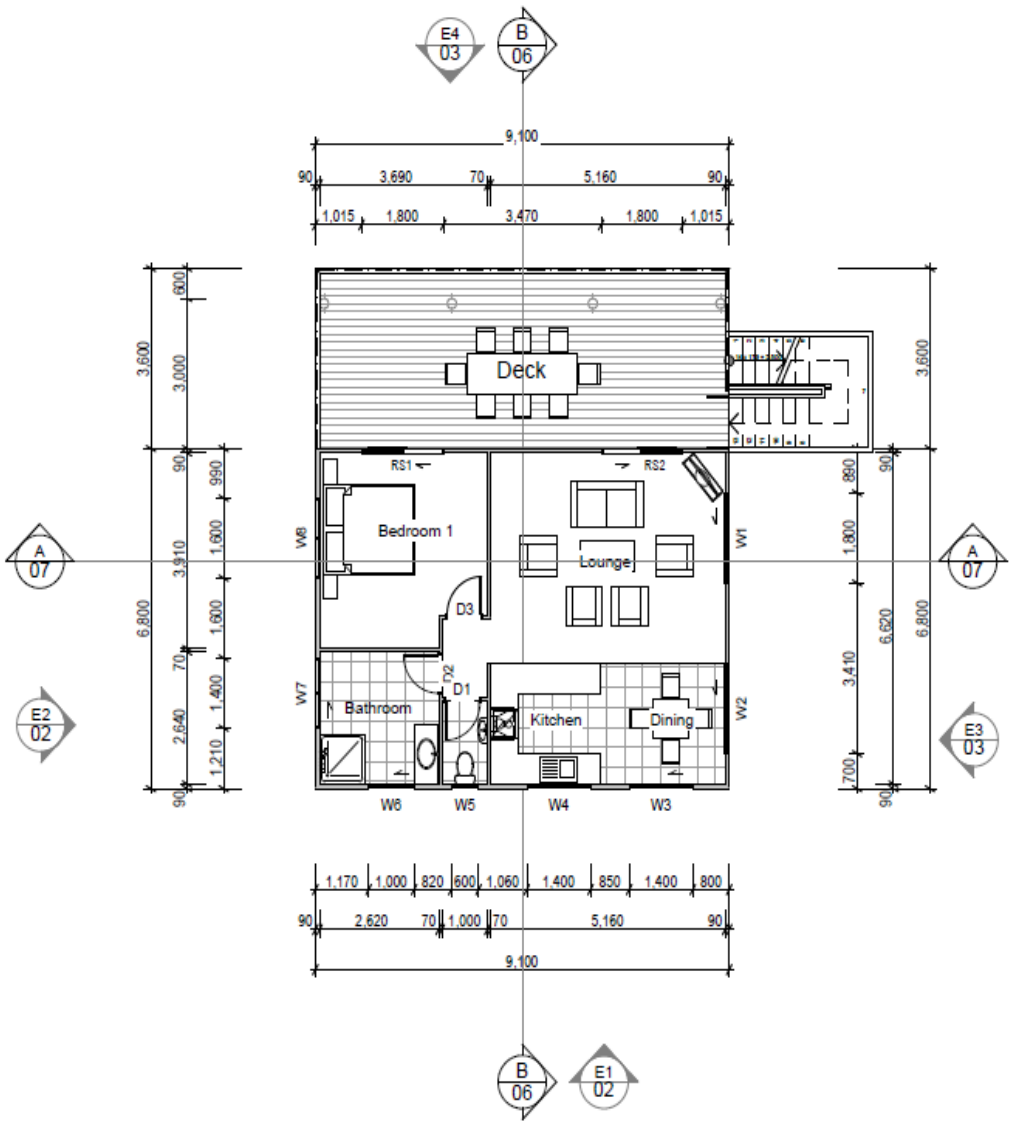
The proposal proponent is Miss Tania Bishop. This is her first project of this kind.

1.2 Proposal Description

The proposal is to build a single self-contained timber frame tourist accommodation bungalow with raised floor approximately 2.5m off the ground level. She plans to build one bungalow and it is proposed that two of her siblings will be building on the same section sometime later.

This is a timber framed building 9.1m wide by 6.8m long and a covered 3.6m decking, with a total area of approximately 94.64m². Gable roof design with pre-painted corrugate iron roof cladding.

The building is designed to be on timber piles with floor structure approximately 2.5m from ground level to minimise damage to building structure from the impacts of extreme weather.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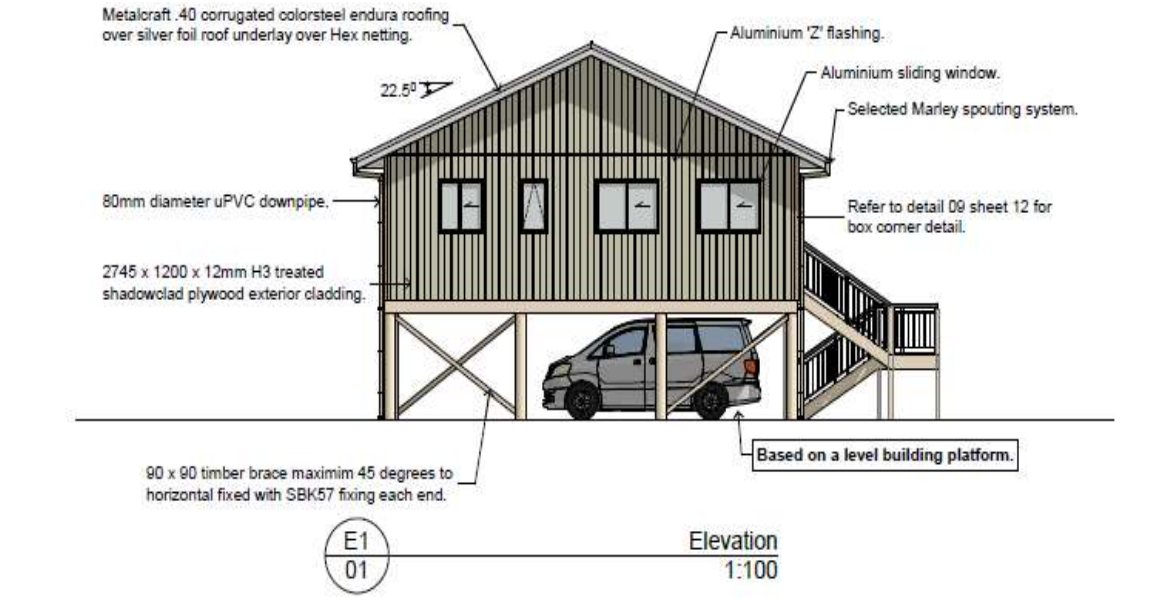

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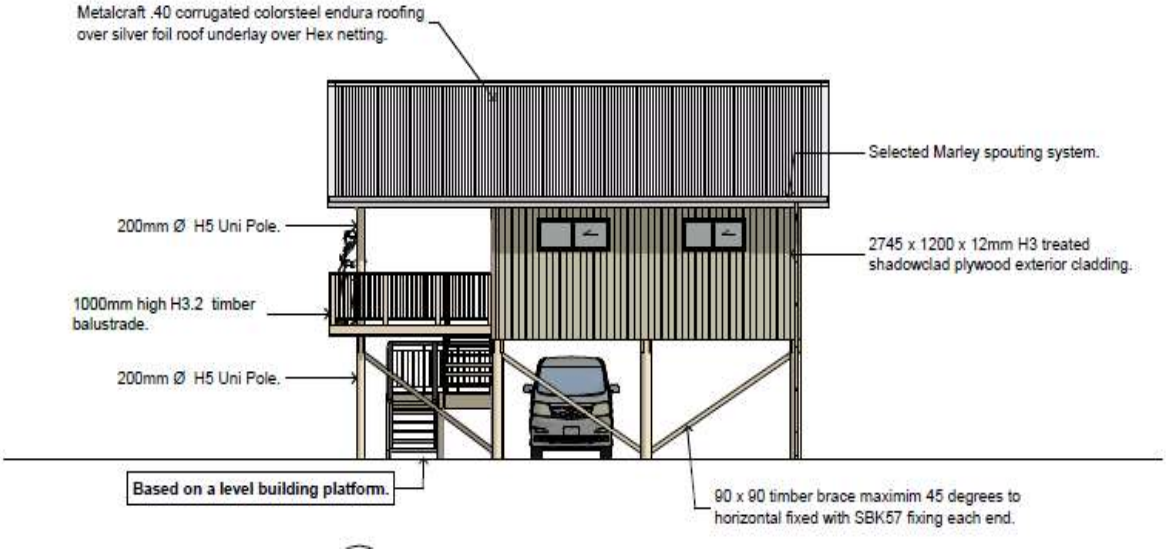
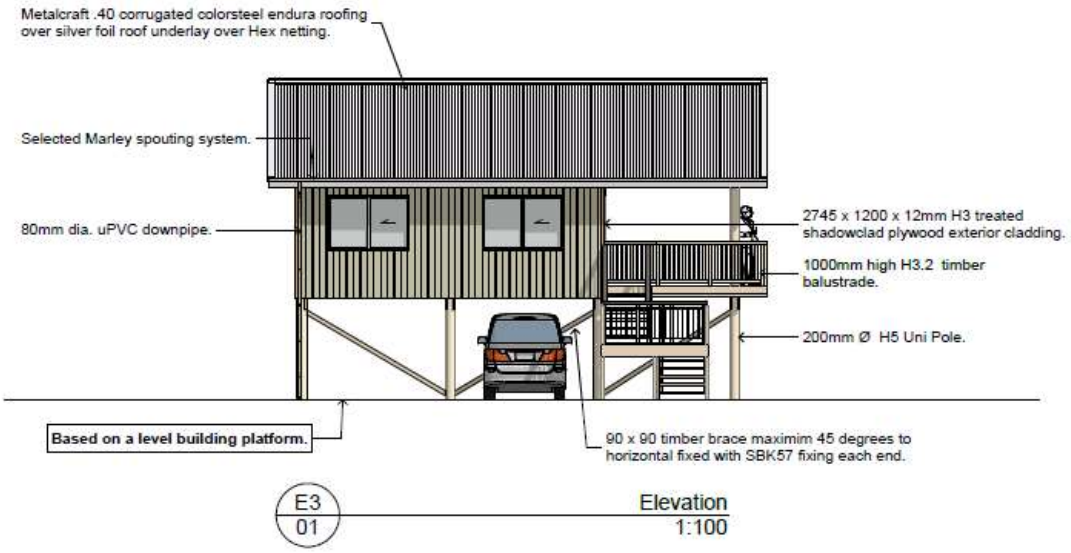
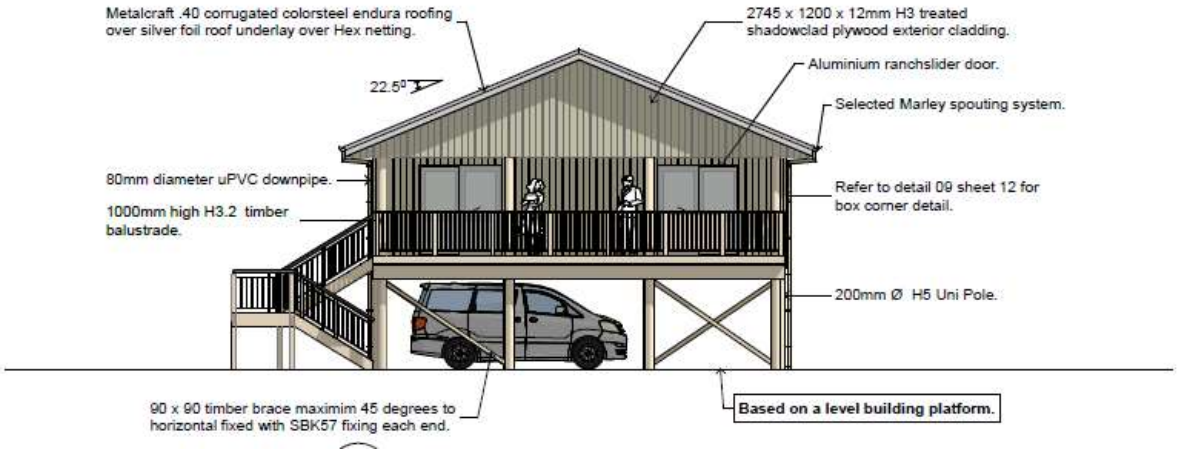






ELEVATIONS

The proposed works will commence as soon as approval for all relevant permits are received. Proponent has selected his contractor and materials are on the island.

The works will commence with setting out profiles for building foundations and service lines to bungalow units.

Profiling

Construction

Installation of services

Finishing works including services connections.

Landscaping

Completion.

1.3 Proposal Objectives and Scope

The main objective of this proposal is to build a single bedroom tourist accommodation bungalow on this beautiful location where the area is predominantly commercial.

There are no alternatives to the overall designs and placing of buildings at this point of time.

The construction of this project is estimated to take up to about 2 months to be completed. At this point of time no works has been carried out on the section.

1.4 ENVIRONMENTAL IMPACT ASSESSMENT (EIA) PROCESS

1.4.1 Methodology of the EIA

a) Application stage

December 2017 the proponent submitted an Environment Significance Declaration form to NES to determine whether a full or partial EIA is required.

This stage involves the preparation and lodgement of an ESD form for the proposal to NES Aitutaki. NES then assesses the proposal under Part 5 Section 36 of the Environment Act 2003 and determined if it would potentially have significant social, economic and environment effects and therefore an EIA would be required.

A Terms of Reference (TOR) for the EIA is then prepared by the NES from information contained in the ESD form and submitted to the applicant as a guide for the preparation of the EIA report.

b) Public notification stage

Section 36(5) of the Environment Act 2003 requires the EIA report to be publicly notified so that interested or affected persons have the opportunity to provide feedback on the

proposal. This formal public consultation period is for a 30 day period from the date the NES notifies the EIA report.

As public concerns/issues are received, the NES will forward this to the applicant for the applicant to satisfactory address these concerns/issues and provide comments back to the NES.

c) Approval stage

As public review concludes any written issues from the public are received by the NES, the NES will forward these to the proponent for a response. When NES is satisfied that all concerns (if any) have been addressed, NES and AEA will deliberate on the approval of a construction permit. There are three possible outcomes:

i. Issue a permit for the proposed project specifying the terms and conditions to which the permit is subject; or

ii. Request that the proponent submit modifications regarding the proposed project; or

iii. Where there are reasonable grounds to do so (taking particular account of the purpose of the Act), refuse to issue a permit for the proposed project and state the reasons for such refusal.

1.4.2 Objectives of the EIA

The objective of the EIA is to identify potential environmental, social and economic impacts from this development and to ensure that any adverse impacts are avoided, minimised and mitigated where possible.
For this proposal the EIA looks at potential impact the;

- Development will have on the section and neighbouring properties,
- Wastewater will have on the quality of ground and lagoon waters
- Cyclonic winds and heavy sea surges on the development
- Way neighbours and the community feels about the development

- Development may impact on the use of scarce natural resources.
- Impact of Climate Change

The EIA will also look at the benefits the development may bring to the community and the nation and how it contributes to the National Goals and Outcomes of our National Sustainable Development Plan (NSDP).

The proposed Environmental Management Plan (EMP) for this project is detailed in section 5.

1.4.3 Submissions

Public submissions on the EIA report shall be lodged to the NES within 30 days from the date of public notice from the general public and other interested parties;

All submissions shall be in writing and addressed to the NES.

The Service shall request comments from any Government department or agency, or person affected by or having expertise relevant to the proposed project or its environmental impact.

1.5 Public Consultation

The proponent to undertake consultation with individuals, Aronga Mana, neighbours, interest groups with specific focus on impact identification and mitigation of adverse social, economic and environmental issues.

1.5.1 Relevant Legislation and Policy Requirement

The project is being designed within the parameters of the Environment Act 2003, Building Act 2003, Building Control and Standards Act 1991 and Building Control Standards Regulations 1991. In addition to these are the requirements of the Public Health Act 2004 and Energy Act 1998.

The Environment Act 2003 provides the legal framework for the administration of any land prior to development. It informs the functions and roles of NES, which amongst other things

embraces the protection and management of the environment and its resources in a sustainable way.

This project is covered under Part 5 Environment Impact Assessment, Section 36 (13) of the National Environment Act 2003.

Section 36 (1) states: No person shall undertake activity likely to cause significant environment impacts except in accordance with a project permit issued under this section. A project permit is obtained from the permitting authority, the AEA. Section 36 (2): A person who proposes to undertake an activity of the kind referred to in subsection (1) shall apply to the permitting authority for a project permit in respect of the activity in accordance with the procedures (if any) prescribe by regulations. Section 36 (3): Every application for a project permit shall be submitted to the Service and shall include an environmental impact assessment, setting out details of:

a) The impact of the proposed project upon the environment, in particular
    i. The adverse effects that the project will have on the environment; and
    ii. A justification for the use or commitment of depletable or non-renewable resources (if any) to the project; and
    iii. A reconciliation of short-term uses and long-term productivity of the resources; and
b) The proposed action to mitigate adverse environmental effects and the proposed plan to monitor environmental impacts arising out of the project; and
c) The alternatives to the proposed project.

The Public Health Act 2004, Section 13 establishes “building health standards” which include provisions of adequate and convenient water supply for human consumption and sanitary purposes; adequate and convenient means for storage and disposal of waste; adequate and convenient toilets; and adequate drainage, lighting, space and ventilation.

Building permits are being applied for from the following authorities, to allow the project to proceed into construction:

National Environment Service; Ministry of Health; and Building Control, Ministry of Infrastructure.

1.5.2 Planning Process and Standards

As described above the planning process for this development is consistent with the current land use and long-term policy framework for the majority of the area and that is mainly for development of the nation's tourism sector.

The planning process includes the designing and positioning of the proposed building to maximise the beach and lagoon view and at the same time protect the building and its surroundings from cyclonic winds and sea surges, and the ground water and lagoon from wastewater pollutants. It is also positioned so any new buildings can fit comfortably on the section. The construction and operational activities shall be monitored and controlled in compliance to the following legislation, standards and codes:

National Environment Act 2003, Section 36 (5) and 50 (8), Public Health Act 2004, Building Act 2003, Cook Island Building Regulation and Code, AS/NZ building standards, Building Control and Standards Act 1991 and Building Control Standards Regulations 1991 and Energy Act 1998.

The proposed works will commence as soon as approval for all relevant permits are received.

The physical works will commence with:

Site preparation

Setting out profiles for building foundations and service drainage

Construction of accommodation units

Finishing works

Landscaping

Commissioning.

2.0 PROPOSAL NEED AND STANDARDS

2.1 Proposal Justification

The proponent is planning to develop this foreshore section to build a tourist accommodation bungalow.

This proposal is on a small scale and any adverse impact to the environment is anticipated to be minor.

2.2 Alternatives to the Proposal

At this point of time there are no alternatives to the proposal.

If there are concerns from the community the proponent would sit and listen to any issue raised and the proponent will then see if these can be resolved. If the concern is the site, the proponent has no alternative sites to this that have beach and ocean view and readily available services nearby.

3. DESCRIPTION OF PROPOSAL/DEVELOPMENT

3.1 Location

The location of proposed develpment is in the Tapere of Vaitupa on the north side of the Island of Aitutaki, on the section Ootu Pt Sec 66, Vaitupa District.

The section is rectangular in shape with an area of 2297m², elevated approximately 2m above mean sea level.

Land is generally flat with the beach boundary gently sloping down the beach.

The section has already been cleared of trees with lawn grass vegetation the predominant ground cover.

Soil is predominantly coral sand with approximately 10-50mm organic at ground surface in some areas.

Survey map.

3.2 Staging

1. Site preparation
2. Setting out profiles for building foundations and service drains
3. Construction of bungalows
4. Finishing works
5. Landscaping

Commissioning.

3.3 Emergency Management

Emergency Plans during construction:

Ensure that all safety measures relating to the construction works are in place. Reduce or eliminate hazards on site. Safety rules and regulations relating to construction site works are enforced and site safe. Check all carpentry tools are safe to use.
Comply with all regulations in relation to workplace safety.

Accidents on-site: transport to hospital if required.

Emergency Access: A clear access way for emergency vehicles on to site to be established and this shall be kept clear at all times.

Full First-Aid kit is recommended to be stored in safe place and easily accessible for workers on site.

Cyclones: in the case of extreme weather warnings the owner and contractor shall ensure that building site is secure and all loose materials on building site shall be stacked securely on site or transported off site to safe areas.
Electricity and water services on site shall be turned off and secured from damages during a cyclone.
Any machinery to be relocated off site.
Work can resume when clearance is given by the relevant authorities.

3.4 Infrastructure Requirement

This proposed development will not require upgrading or relocating of any existing infrastructure during and after construction.

3.4.1 Transport

There is existing public access road to the section and other properties in the area.

The main form of transportation to construction site is by private motor vehicles and delivery trucks.

Volume of traffic generated by workforce, visitors and service vehicles will be minimal.

At this point of time there is no proposal for alternative routes or realignment of any access roads to service the construction.

3.4.2 Storm Water Drainage

There is no existing storm-water drain on site. The soil coral sand and is highly permeable. Surface flooding from sea surges is a possibility however the section dries up as soon as sea surges subsides.

The owner is highly recommended to install roof guttering to avoid scouring of ground around the building during heavy rainfall but more so to catch and store water in tanks to help supplement water from the main water supply system. This also reduces surface water flooding on the section.

3.5 Waste Management

3.5.1 Character and Quantities of Waste Materials

During construction

Solid waste – construction waste, construction material wrappings, workers' food wrappings and empty drink cans and bottles.

Liquid waste - washing equipment, cleaning paint containers on site

During operation

Solid waste– normal household waste, white-ware, e-waste

Liquid waste- sewage, washing on site

Chemical waste if any – use of toxic chemicals, washing powders containing phosphate etc, Contact NES Aitutaki for proper disposal of chemicals.

Mitigation

Wastewater treatment and disposal to comply with Public Health Sanitation Regulation and Code 2014 monitored by Public Health. Experienced designers and installers recommended.

Set up to recycling, reuse and composting sytems. eg aluminium cans, e-waste, organic/food waste, composting. Store e-waste in secure areas for proper disposal by relevant authorities. Encourage reuse of materials to save resources and landfill space.

During construction, minimise waste going to the landfill and this can be achieved by careful use of building materials to avoid wastage, selecting construction waste for re-use and recycling.

3.5.2 Solid Waste Disposal

During construction typical solid waste are; construction waste materials, building material wrappings, workers' food wrappings and empty can drinks or bottles.

It is encouraged to minimise waste going to the landfill and this can be achieved by careful use of building materials to avoid wastage, selecting construction waste for re-use and recycling and food, equipment and material wrappings can be recycled, composted and remaining can be securely stored for the landfill. Drinks containers can be separated into aluminium, glass and plastic for recycling and disposal.

During operation solid waste are classified normal household waste, white-ware, ferrous, e-waste eg printer cartridges, printers, mobile phones, batteries etc.

It is recommended that bins be set up or plastic bottles, glass bottles, aluminium cans, empty food cans and normal household waste. Food waste to be fed to animals or used for composting. Any e-waste to be stored properly away from the elements, contact NES Aitutaki for advice.

The bins shall be securely closed to prevent foul odour and avoid vermin on site.

These shall be properly delivered to landfill and recycling depot.

4. ENVIRONMENT VALUES AND MANAGEMENT OF IMPACTS

4.1 Land

4.1.1 Description of Environment Values

This development is proposed on the land section Ootu Pt Sec 66 in the VaitupaTapere, located on the north side of the island of Aitutaki in the district of Vaitupa.

The section on the foreshore in Ootu located between some tourist accommodation properties. This area of Ootu is predominantly commercial as it is surrounded by tourist accommodation properties.

The land section provides a beautiful view of the lagoon.

View towards lagoon from section

View over section from existing access road.

4.1.1.1 SOILS

Soil on this section is commonly known as sandy gravels or coral sand.

These soils are formed from sand derived from reef coral and consist of somewhat excessively drained coarse-textured soil with rapid permeability. The parent material has been degraded and reworked within the lagoon and progressively deposited during storm events. The storm formed beach ridge fringes the island between modern flood plains and the lagoon. Soils are subject to continual rejuvenation and shows weak profile development.

Soil chemical analysis show that these soils are moderately to strongly alkaline with high free carbonate values and extremely low long-term potassium supply. (Soils of Rarotonga; Leslie 1980)

4.1.1.2 Land-use / Characteristics

The land use in this area of Ootu is predominantly commercial. The section is vacant.

4.1.1.3 Landscape Character

The land section rectangular in shape (2297m²) and is fairly flat. The section is about 2m above mean sea level at its highest point.

Reference height of land above mean sea level.

There are scattered vegetation on site with coconut trees being the dominant species.

It is anticipated that the proposed development could enhance the land and may not affect the present configuration of the land.

4.1.2 Potential Impacts and Mitigation Measures

Potential Impacts.

Increased development could impact on the land and the lagoon ecosystem in terms of pollution to ground water and lagoon, land erosion due to the natural forces of nature.

Mitigation

Proper management of development along the foreshore.

4.1.2.1 Land-use Suitability

The section is suitable for the proposed development for its location. The view is beautiful and there are bars and restaurants in the area. The road to town and to other villages have just been upgraded. The development is small and should not be a nuisance to the neighbours during and after construction. Use of natural resources is very minimal as building materials are normally all imported

The proposed development should not impose physical adverse impact on nature conservation, natural resources, environment, transport corridors, agriculture and other businesses.

4.1.2.2 Land Contamination

The possible land contamination would come from construction waste (paints, cleaning chemicals, oil leaks from machinery) solid waste (poorly secured and uncontrolled solid waste storage and disposal and lastly from liquid waste in the form of untreated effluent. Poorly treated effluent would contaminate the ground water and eventually could have a detrimental impact to the lagoon ecosystem.

Solid waste should not to be dumbed on the section as this could attract vermin on site and could produce leachate which could leak into ground water and contaminate it.

Mitigation measures are noted in 4.3 Wastes.

4.2 WATER RESOURCES & QUALITY

4.2.1 Description of Environmental Values

There is no known groundwater quality test undertaken on this section however ground water testing has been carried around Aitutaki and are found to be generally clean (portable).

Ground water assumed at a depth of 1.5-2m pending on tidal movement. Aitutaki's main reticulated water is supplied from bore water galleries around the island. Some households have either plastic or concrete water tanks to catch water from roof as their main supply of drinking water.

Aitutaki often experiences periods of water water shortage therefore people are encouraged to obtain water tanks for their homes and businesses to supplement reticulated water supply.

Tests on the lagoon waters has been carried out by the Ministry of Marine Resources (MMR) in the lagoon in Aitutaki. Refer to Appendix 5

Water resources can be contaminated by nutrients from animal wastes, sub- standard wastewater treatment systems and chemicals. These seep into the ground water and eventually to the lagoon.

With highly permeable soil the chances of contamination of ground water by surface runoff is high, however there is some treatment by bacteria as this nutrient filters through sand.

3.2.2 Potential Impacts and Mitigation Measures

Impacts – contamination of ground water by substandard wastewater treatment and disposal, agricultural chemicals, animal waste, careless disposal of harmful substances in to the ground
Water shortages during dry months

Mitigation – Implement rainwater harvesting roof catchment 6,000L tanks minimum, install water saving devices in the plumbing, encourage water conservation practice during operation. Protect ground water from pollution from poorly constructed and installed wastewater treatment and land disposal systems.

4.3 WASTE

4.3.1 Description of Environmental Values

There are generally three forms of waste; solid waste, liquid waste, and hazardous waste.

Solid waste: includes building waste, white-ware, vehicles, ferrous materials, cardboard, paper, glass, plastics and normal household waste.

Liquid waste: household sewage (black and grey water) from households and commercial, storm-water runoff,

Hazardous waste includes asbestos, e-waste, toxic chemicals etc

4.3.2 Potential Impacts and Mitigation Measures

Impacts; contamination of ground water impacting on Aiutaki main water source and eventually the lagoon ecosystem this can be a health hazard with people getting sick from drinking contaminated water and can be detrimental to the lagoon ecosystem.

Mitigation:

Propose methods of disposal (including the need to transport wastes off-site for disposal) to be used for any trade wastes, liquid wastes and solid wastes in compliance with relevant regulation and standards;

Liquid Waste

- The treatment of household wastewater for the on-site treatment methods comply with the Public Health Sewage Regulations 2014. The selected wastewater treatment and land application design shall be checked and approved by the Public Health before a building permit is given. The designer and installer are approved designers/installers on the Public Health register.
- Compost toilets are also recommended.
- *To comply with the Public Health Sewage Regulations and Code 2014 for Rarotonga and Aitutaki. Contact Aitutaki Public Health dept. for advice.*
- Disposal of septic sludge, commercial waste, trades waste and solid waste to be carried out by approved contractors.

Solid waste

The potential level of impact on the surrounding community due to nuisance;

Proper collection and storage of waste to avoid bad odour, vermin and insects on site,

Reuse old materials suitable for other uses where possible

Recycle waste where possible

Encourage composting or organic material

Store waste in enclosed bins with no exposure to the elements

Avoid large stockpiles of materials on site

Avoid overloading bins

Avoid storing waste on site for long periods of time

Provide sufficient recycling and waste bins on site
Use licensed contractors for the disposal of waste if available

Dispose of waste on a regular basis or as needed
Secure bins to avoid waste strewn around the property by the wind.

Hazardous waste

Limit use of toxic chemicals, Contact NES Aitutaki for proper disposal of hazardous waste

4.4 SOCIAL

4.4.1 Description of Environmental Values

There area is outside the town area and some level of noise is expected however most of the time it is pretty quiet.

There is a bar and restaurant in the area. The vaka ama canoe club is also in this area. Most of the sports facilities, markets, churches, shops and CBD are some distance from the proposed development.

4.4.2 Potential Impacts and Mitigation Measures

Impact.

Noise nuisance from construction tools, equipment, and machinery and delivery vehicles could be a nuisance to neighbours. Dust is expected to be minimal due to the soil characteristics and grass cover on the section. It is anticipated that there will be no adverse impact to the social lives of the people in the community.

Mitigation.

Set construction works from 8am to 5pm, ensure carpentry tools are serviced and safe to use, ensure equipment and machinery are fitted with noise reduction systems, monitor noise level daily. No works on Sundays.

4.5 HEALTH AND SAFETY

4.5.1 Description of Environmental Values

The health and safety of the workers and the community is paramount on any construction site. The hazards are many on construction sites, with the main ones are faulty carpentry tools and equipment, loose construction materials scattered around the site, people including children wandering on site. Noise and dust. Untidy storage of organic waste on site attracts vermin and improper sanitation system are health hazards.

It is pertinent that the contractor and owner ensures that all safety measures required to protect the workers on site and the general public are in place, and monitored throughout the project duration. Comply with all regulations in relation to workplace safety.

4.5.2 Potential Impacts and Mitigation Measure

This section defines and describes the objectives and practical measures for protecting or enhancing health and safety community values, describes how nominated quantitative standards and indicators may be achieved for social impacts management, and how the achievement of the objectives will be monitored, audited and managed.

Potential Impact

The potential impact is the hazards faced on any construction site. The potential impacts could be fatal or cause serious injuries to workers and the inquisitive public.

Also, there are health concerns resulting from improper disposal of both solid and liquid waste. The main hazard on construction sites are typically uncovered drains, loose building materials scattered around the site, faulty carpentry tools and equipment, lack of warning signage on the site and lack of supervision of inexperienced workers. Injuries are common on any construction site as a result of the above.

Mitigation Measures:

During construction – comply with all regulations in relation to workplace safety. It is recommended that workers should be provided with protection clothing like work boots, ear muffs, gloves, safety glasses and dust masks. Check daily that all equipment's like ladders, electrical tools etc are safe to use.

Ensure workers are properly supervised.

Use of earphones/headphones for music on site should be restricted.

Temporary fencing shall be erected to prevent people, especially children from wandering on site during and after construction hours.

Any excavations shall be properly covered and fenced to prevent people from accidently falling in to it.

Put away electrical tools when not in use.

At all times keep the site clean with building materials secured and properly stockpiled away from immediate worksite.

Must have experienced workers and foreman on site.

Safety procedures to be monitored daily.

4.6 ECONOMY

4.6.1 Description of Environmental Values

The Cook Islands is a small Pacific Island country in free association with New Zealand. It is an upper middle-income country with a resident population of 14,974[1] living in 4,372 households[2] and has one of the highest GDP per capita in the Pacific at NZ$23,487[3].

However economic development in the Cook Islands is hindered by the isolation of the country from foreign markets, the limited size of domestic markets, lack of natural resources, periodic devastation from natural disasters, and inadequate infrastructure. (*countryfacts.com)*

The Tourism sector is a big revenue earner for the country as a whole and contributes about 60% to the country's GDP and remains the largest industry in the Cook Islands.

This proposed development will contribute to the tourism industry and the local economy in terms of employment for contractors, service suppliers, businesses and suppliers in Aitutaki and Rarotonga.

4.6.2 Potential Impacts and Mitigation Measures

Potential impact; a dirty and polluted environment and increase in petty crimes especially at tourist areas could deter tourist coming to the Cook Islands.

Mitigation: continue to educate the people of the Cook Islands to look after the environment. Continue to support initiatives by the Environment Services, Public Health and other environment groups for a clean and healthy environment.

Provide security to tourist premises, maybe harsher penalties for criminals that target the tourism sector.

And most importantly, "smile" and say "kia orana" to our guests.

[1] *Government Statistics Office data, http://www.mfem.gov.ck/statistics/census-and-surveys/census/143-census-2011*
[2] *Cook Islands Census 2011*
[3] *Asian Development Bank June 2016. Macroeconomic Assessment.*

4.7 HAZARDS AND RISK

4.7.1 Description of Environmental Values

Hazards are present on any construction site and it's the contractor's responsibility to minimise these and to reduce the risks of injuries on site.

As described above construction tools, equipment and machinery shall be fully serviced or replaced, workers to be suitably protected with proper protective gears, work site to be fenced off if required with warning signs posted around site.

The proponent is taking a risk building at this location from possible damages to the property from cyclone winds, heavy sea surges, tsunami and the impacts of sea spray on the building material, however the proponent is willing to take the risk.

Risk of fire to the property.

4.7.2 Potential Impacts and Mitigation Measures

As described above construction tools, equipment and machinery shall be fully serviced or replaced, workers to be suitably protected with proper protective gears, work site to be fenced off if required with warning signs posted round site. Construction materials to be properly stockpiled on site.

Put plan in place for minimising damage to property from the impacts of extreme weather.

Recommended to install fire extinguishers and smoke detectors inside the building for personal safety.

4.8 EROSION CONTROL

4.8.1 Description of Environmental Values

Possible damages of beachfront boundary from heavy sea surges, cyclones and tsunamis.

Due to the permeable nature of the soil it is anticipated that the risk of erosion on the section from surface water is minimal or if any. Sand transportation on beach that is longshore intertidal beach sediment movement is natural. It takes away sand and deposits sand back to area, a natural sand movement.

4.8.2 Potential Impacts and Mitigation Measures

Impacts: Gradual land loss from the impact of heavy sea surge scouring of the beach and land section.

Minimise the impact of erosion by vegetating beach front, not changing the natural profile of land and beach. Do not build structures on beach without consulting NES Aitutaki.

4.9 CLIMATE

The climate is generally marked by distinctive wet season (warmer months of Nov - April) and dry season (cooler months of May - Oct). Today rainfall is likely in all months with the heaviest from Jan to March (267mm) to as little as (102mm) in drier season May to Nov.

The day temperature varies between 29° Cels in Feb/March to 26° Cels in July /Aug and night temperatures varies from 23°Cels Feb/March to 19°Cels July/August. Sea temperature varies from 27° Cels in summer to around 24°Cels in the cooler months. Trade wind is south easterly which provides comfortable cool breezes to the area throughout day and night.

It is predicted that as a result of global warming, there will be more frequent and more intensified storms/cyclones which could adversely impact the area and the development.

Impacts

Impacts from tropical cyclones (damaging wind gusts), heavy sea surges, tsunami, flooding, drought (water shortage) and rise in sea level affecting coastal areas.

Mitigation

Tropical cyclones: will be more frequent and more intensified due to global warming. Design with the impacts of Climate Change in mind.
Building structure and materials designed and selected to withstand cyclone winds to CAT4 and to withstand the sea spray impact on building materials. The design is

selected and applied to provide proofing against tropical cyclones, droughts and floods.

Sea level rise and heavy sea surges: the section is 2m above mean sea level and the developer is hopeful that her return in investment will be achieved well before sea level reaches 2m. The developer is aware of the impact of climate change on the property and is preparing plans to counter/minimise these impacts.

The owner knows the risks faced with tsunamis as well.

Drought and increase in temperatures

Design includes the use of natural ventilation and possibly mechanical means to cool the inside of the building in the summer time.

The development plumbing is design to include all water saving fixtures to conserve water. Rainwater harvesting with water tanks are part of the design to reduce demand on main water supply.

Fire

Building materials selected to reduce spread of fire in the buildings. Fire extinguisher located around the building for easy access in case of fire.

Land flooding: because of the high permeability of the soil in the area it is anticipated that flooding from heavy rainfall will be minimal.

5.ENERGY:

The development is estimated to use around 1kw per day. At this point of time the development will depend on island main grid supply.

It is highly recommended that the owner to tap in solar energy for electricity supply in the very near future, saves money and the environment.

IMPACTS	ACTION	BY	MONITORING	BY
Land contamination	Compliant sanitation system. No discharge of toxic substances on site and waterways	contractor	During and after installation.	Public health. Tutaka.
Water contamination	Compliant sanitation system.	contractor	During and after installation	Public health. Tutaka
Waste Solid liquid	Proper recycling and storage/ disposal process for solid waste. Compliant sanitation systems	Contractor/developer	weekly	Developer Developer/Public Health
Noise& Vibration	Operation hours. Check and repair construction and carpentry tools	Contractor/ developer	daily	contractor
access	NA	developer		
Vegetation clearance	No removal of trees at beach front.	Contractor/developer	During and after construction	NES
Health & Safety	Elect safety officer to ensure all Health & Safety requirements are met	contractor	daily	Contractor/developer/public health.
Hazard & Risks	Remove possible hazards, erect warning signs	Contractor/owner	During construction	contractor

5.0 ENVIRONMENT MANAGEMENT PLAN (EMP)

Environment Management Purpose

The purpose of this EMP is to set a plan for the continuous protection of the environment during and post construction in order to minimise or avoid potential adverse impacts to the environment, population and the economy as stated in this EIA report.

Environment Management Objective

To ensure the proposed works are carried out on this development is in compliance with relevant standards and regulations and regular monitoring of the surrounding environment and property is carried out during and after construction to reduce or eliminate adverse impacts reoccurring.

Environment Management Standards

No construction works shall commence until a;

- Wastewater treatment design is approved by Public Health
- Waste water design and installation to be carried out by Public Health approved designers/installers
- EIA approved by NES
- Building permit is approved by the Building Controller.

Inspection of construction works to be carried out by building controller

All works shall be performed with best trades practice.

All construction equipment and carpentry tools shall be checked daily and repaired if found faulty.

Proper supervision to ensure all Health and Safety procedures are in place during construction and that the workers and general public are safe.

A monitoring plan shall be in place for all issues indicated in this EIA.

A complaint register shall be in place to record complaints and also a mechanism to gauge the effectiveness of the monitoring and mitigation process.

Corrective Actions

Any issues arising from the construction works, the relevant authority shall be notified and issues rectified as soon as possible.

Any damages caused by the works outside the worksite shall be fixed/ repaired as soon as possible by the owner and contractor.

Owner Responsibilities

To monitor for any adverse impacts that may occur to the environment and property during and after construction of this development and report immediately to the relevant authorities.

CONCLUSION

The owner is aware of the risks he is taking by building on the foreshore due to cyclones, tsunamis and deterioration of building materials from sea sprays. She is also aware of the adverse impact the development may impose on to the environment and she agrees to undertake mitigation measures to minimise these risk of happening.

With the potential impacts and mitigation measures identified and addressed in this report the developer and contractor are required to monitor and implement these to protect the environment, the community health and the economy.

It is anticipated that potential adverse impact to the environment and the community will not be significant, however the proponent will ensure that careful monitoring is ongoing. This proposal is expected to be beneficial to the proponent and the local economy. Relevant Authorities like NES and Public Health are expected to play their part in monitoring or corresponding to developer/contractor in the case of complaints submitted to NES Aitutaki.

The proponent seeks full EIA approval from the Aitutaki Environment Authority.

6. REFERENCES

"Basic Information on the Marine Resources of the Cook Islands".....by *Ministry of Marine Resources and Government of the Cook Islands and Information Section of Marine Resources and Secretariat of the Pacific Community.*

MMR Report card – Aitutaki lagoon

"Cook Islands Weather".....*Cook Islands Met Services*

"Using Local knowledge to understand Climate Variability in the Cook Islands".....*prepared by Dr Teina Rongo and Celine Dyer , Climate Change Cook Islands, Office of the Prime Minister*.

"Soils of the Cook Islands".....*by Leslie (1980)*

"AS/NZS 1547: 2012".....*Australian and New Zealand Standards.*

"Environment Act 2004".....*National Environment Services, Cook Islands*

"Ministry of Health Act 2014".....*Ministry of Health, Cook Islands*.

Aitutaki Topo map

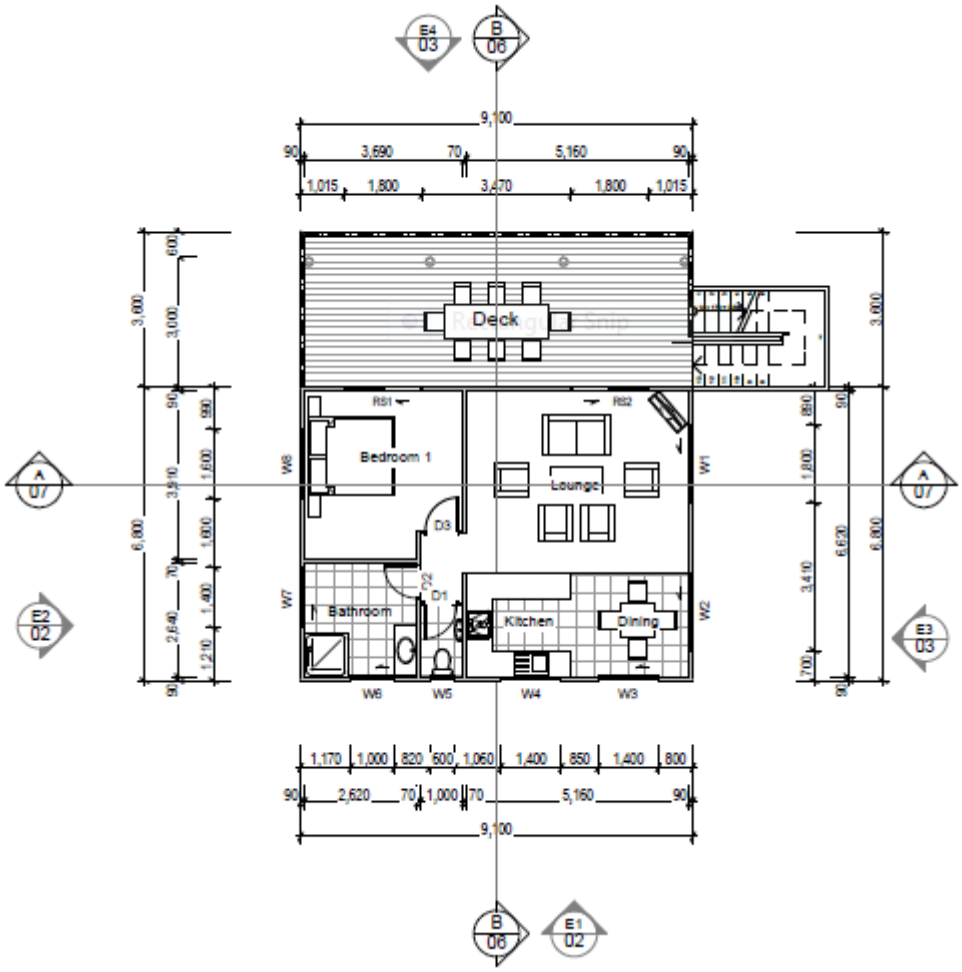
Google Earth

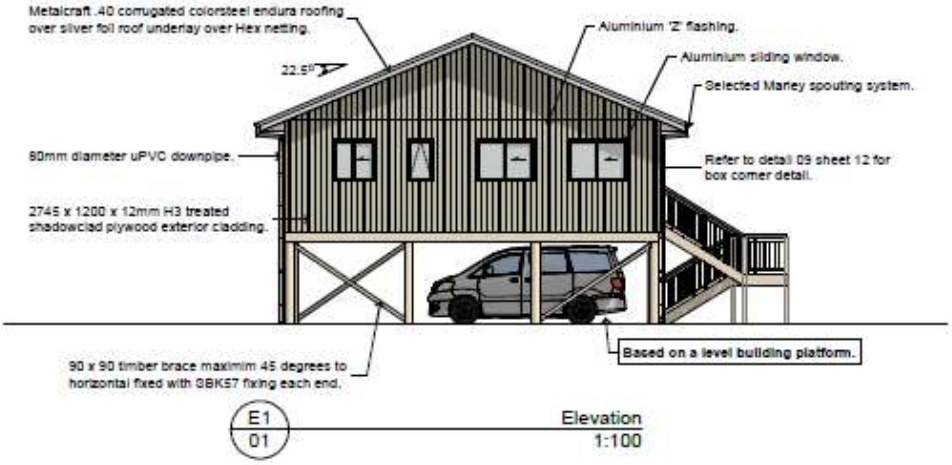
7.0 RECOMMENDED APPENDICES

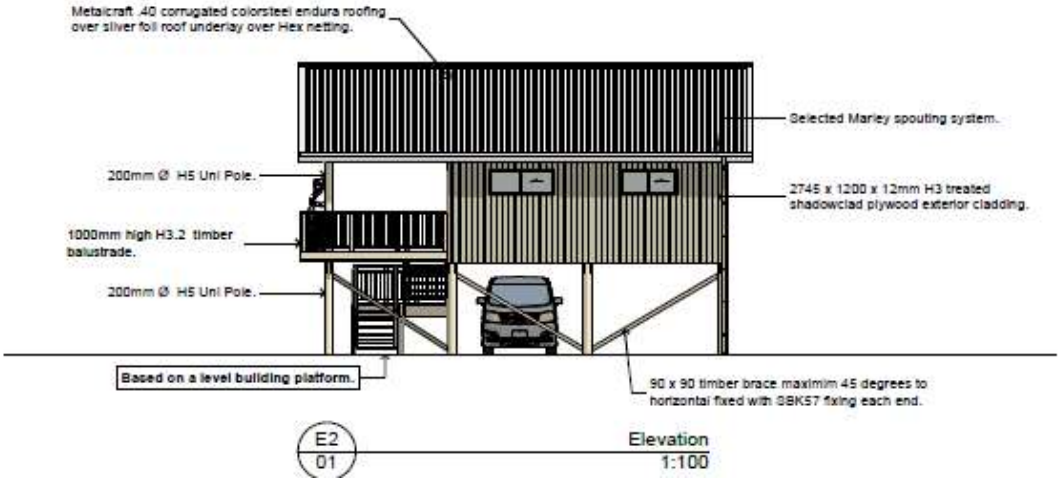
A1 Terms of Reference

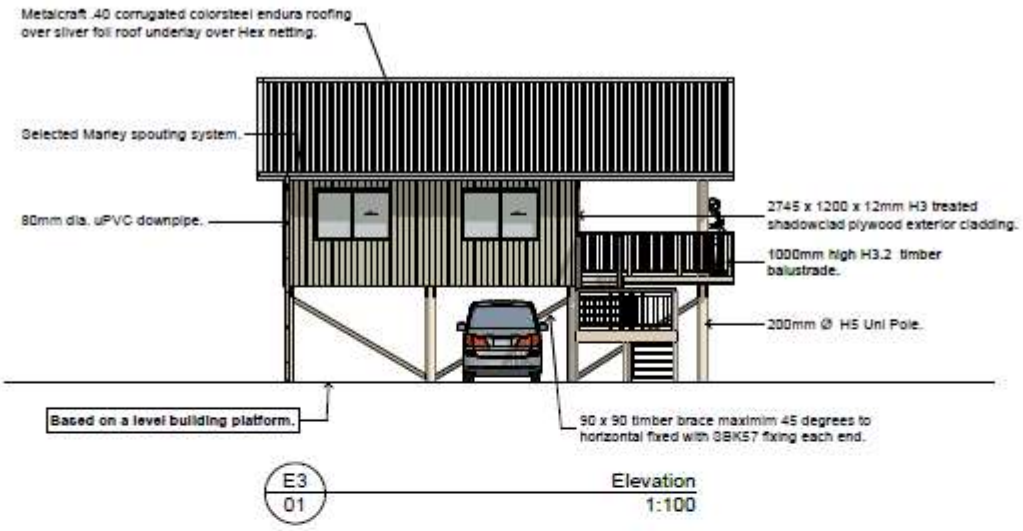
Attached

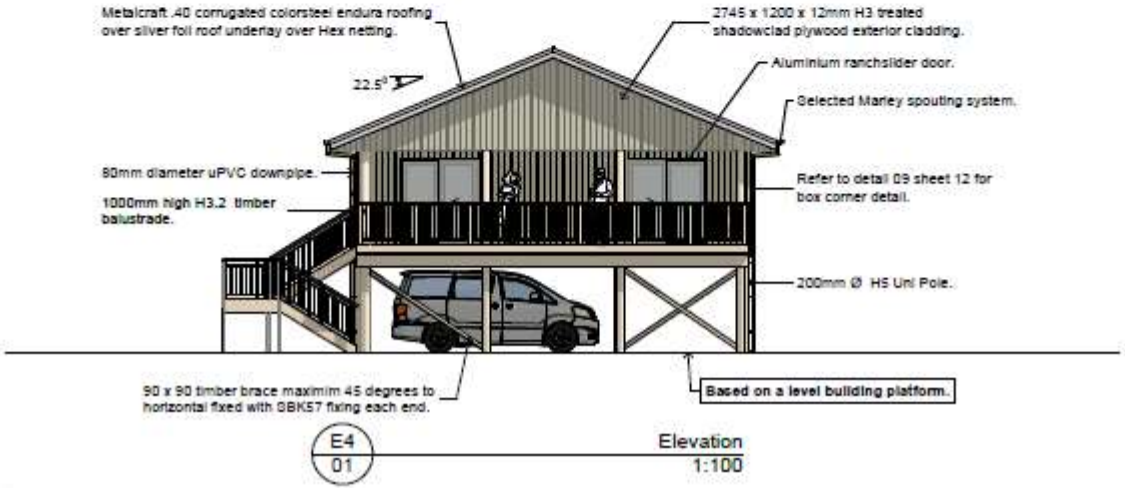
A2 Drawings/maps




Metalcraft .40 corrugated colorsteel endura roofing over silver foil roof underlay over Hex netting.
22.5°
Aluminium 'Z' flashing.
Aluminium sliding window.
Selected Marley spouting system.
90mm diameter uPVC downpipe.
Refer to detail 09 sheet 12 for box corner detail.
2745 x 1200 x 12mm H3 treated shadowclad plywood exterior cladding.
90 x 90 timber brace maximim 45 degrees to horizontal fixed with SBK57 fixing each end.
Based on a level building platform.
E1
01
Elevation
1:100


Metalcraft .40 corrugated colorsteel endura roofing over silver foil roof underlay over Hex netting.
Selected Marley spouting system.
200mm Ø H5 Uni Pole.
2745 x 1200 x 12mm H3 treated shadowclad plywood exterior cladding.
1000mm high H3.2 timber balustrade.
200mm Ø H5 Uni Pole.
Based on a level building platform.
90 x 90 timber brace maximim 45 degrees to horizontal fixed with SBK57 fixing each end.
E2
01
Elevation
1:100


Metalcraft .40 corrugated colorsteel endura roofing over silver foil roof underlay over Hex netting.
Selected Marley spouting system.
80mm dia. uPVC downpipe.
2745 x 1200 x 12mm H3 treated shadowclad plywood exterior cladding.
1000mm high H3.2 timber balustrade.
200mm Ø H5 Uni Pole.
Based on a level building platform.
90 x 90 timber brace maximim 45 degrees to horizontal fixed with SBK57 fixing each end.
E3
01
Elevation
1:100


Metalcraft .40 corrugated colorsteel endura roofing over silver foil roof underlay over Hex netting.
22.5°
2745 x 1200 x 12mm H3 treated shadowclad plywood exterior cladding.
Aluminium ranchslider door.
Selected Marley spouting system.
80mm diameter uPVC downpipe.
1000mm high H3.2 timber balustrade.
Refer to detail 09 sheet 12 for box corner detail.
200mm Ø H5 Uni Pole.
90 x 90 timber brace maximim 45 degrees to horizontal fixed with SBK57 fixing each end.
Based on a level building platform.
E4
01
Elevation
1:100

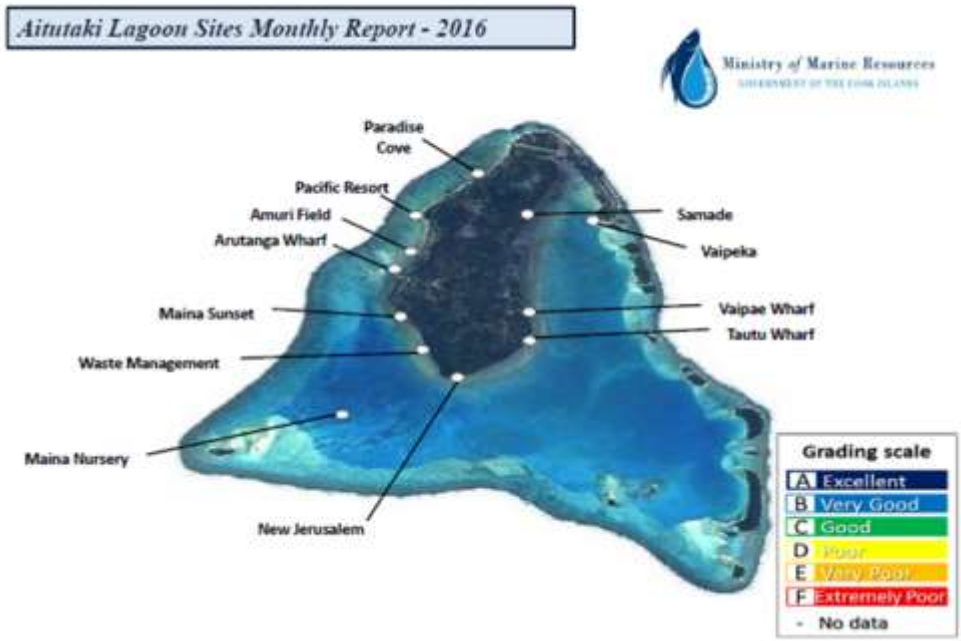
Survey map

A4 Consultation Report

Outcomes of any consultation meetings to be provided by proponent

A5 Specialist Report

MMR Report Card Aitutaki Lagoon Jan 2017



2. LAGOON TOTAL SUSPENDED SOLIDS - AITUTAKI - Milligrams per Litre (mg/L)

Sampling Site	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Samade	1.7											
Vaipeka	0.6											
Vaipae Wharf	9.0											
Tautu Wharf	8.1											
New Jerusalem	7.8											
Waste Management	11.7											
Maina Sunset	10.6											
Arutanga Wharf	3.3											
Pacific Resort	1.1											
Paradise Cove	5.2											
Maina Nursery	0.3											
Amuri field	3.0											

TSS Standards GRADING SCALE	< 1.0	1.0 ≥ 2.5	2.5 ≥ 5.0	5 ≥ 10	10 ≥ 20	> 20
	A	B	C	D	E	F
	Excellent	Very Good	Good	Poor	Very Poor	Extremely Poor

1. LAGOON BACTERIAL COUNTS - AITUTAKI - Most Probable Number of Enterococci per 100 mL (MPN/100mL)

Sampling Site	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Samade	10											
Vaipeka	<1											
Vaipae Wharf	<1											
Tautu Wharf	<1											
New Jerusalem	<1											
Waste Management	10											
Maina Sunset	<1											
Arutanga Wharf	<1											
Pacific Resort	52											
Paradise Cove	<1											
Maina Nursery	<1											
Amuri field	10											

Bacteria Standards GRADING SCALE	< 41	41 ≥ 100	101 ≥ 200	201 ≥ 350	351 ≥ 500	> 500
	A	B	C	D	E	F
	Excellent	Very Good	Good	Poor	Very Poor	Extremely Poor

3. LAGOON DISSOLVED OXYGEN - AITUTAKI - Percent (%)

Sampling Site	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Samade	46.9											
Vaipeka	62.0											
Vaipae Wharf	72.2											
Tautu Wharf	70.1											
New Jerusalem	80.6											
Waste Management	44.8											
Maina Sunset	31.2											
Arutanga Wharf	60.8											
Pacific Resort	57.1											
Paradise Cove	63.0											
Maina Nursery	32.1											
Amuri field	85.0											

Dissolved Oxygen Standards GRADING SCALE	< 95	90 ≥ 95	80 ≥ 90	60 ≥ 80	40 ≥ 60	> 40
	A	B	C	D	E	F
	Excellent	Very Good	Good	Poor	Very Poor	Extremely Poor

A6 Contacts

Tai Nooapii 54 011

Mr Teina Bishop and Miss Tania Bishop, Aitutaki

NES Aitutaki