

ENGINEERING REPORT

POKOINO I RARO Pt. Sec 87A6, 87A4, 87A3, 87A2, 87A1 and
POKOINO Pt. Sec 107,
ARORANGI and AVARUA DISTRICT, RAROTONGA



Applicant: Cook Islands Investment Corporation

18/01/2021

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Introduction

This report is prepared for the proponent, Cook Islands Investment Corporation (CIIC) representative Anne Taoro. The proposed development is the construction a Cook Islands Mental Health Facility. Te Marae Ora Cook Islands Ministry of Health (TMO) has prioritised the need to establish an acute inpatient mental health facility at Rarotonga Hospital. The facility is necessary for treating patients with acute and severe mental illness needing 24/7 care.

The proposed new facility is to be purpose built to support the TMO model of care for improving mental health services and long-term health outcomes. To meet current needs the facility will provide inpatient care for up to four (4) patients at a time.

A site visit with Compliance Division National Environment Service (NES) Compliance staff Phillip Strickland, Ata Hermann (Engineer), Ralph Adams (Builder), Anne Taoro (CIIC), Sally Hosking (CIIC) and the author to inspect the proposed development for potential environmental areas of concern such as development within Inland waters, Foreshore, Wetlands and Sloping land as stipulated under the Environmental Act 2003. The development is defined to an area outside the area of concern and will not cause any environmental impacts on neighbouring properties.

The NES Compliance staff and the author held a discussion on site regarding the intended development and was agreed by the NES staff that the development works will require an engineering report instead of an Environmental Impact Assessment Report (EIA).

The purpose of the report is to provide information to the National Environment Service (NES) for the Rarotonga Environment Authority (REA) to assess and decide on favourable result of the development at the proponents Cook Islands Mental Health Facility.

Location

Site location

The site is located within the Rarotonga Hospital compound, about 500m on the inland side of the Black Rock at an elevation of around 69-70m above mean sea level, as shown in Figures 1.

The land title for Rarotonga Hospital is POKOINO I RARO Pt. Sec 87A6, 87A4, 87A3, 87A2, 87A1 and POKOINO Pt. Sec 107. The size of the section is approximately fifty thousand and one hundred thirty seven square meters (50,137m²), approximately 12.3 acres.

Access way

Site access is shown in Figure 2 which is located off the main Are Maki Hospital road, the formed access road passes between the Hospital Onsite wastewater treatment plant and the Rarotonga Hospital surgical ward leading towards the Pharmacy storage building.

Existing site parking is adjacent to the Pharmacy storage building.

Figure 1: Google Earth Ariel photo Are Maki Rarotonga Hospital, Pokoinu-I-Raro Tapere, Arorangi District

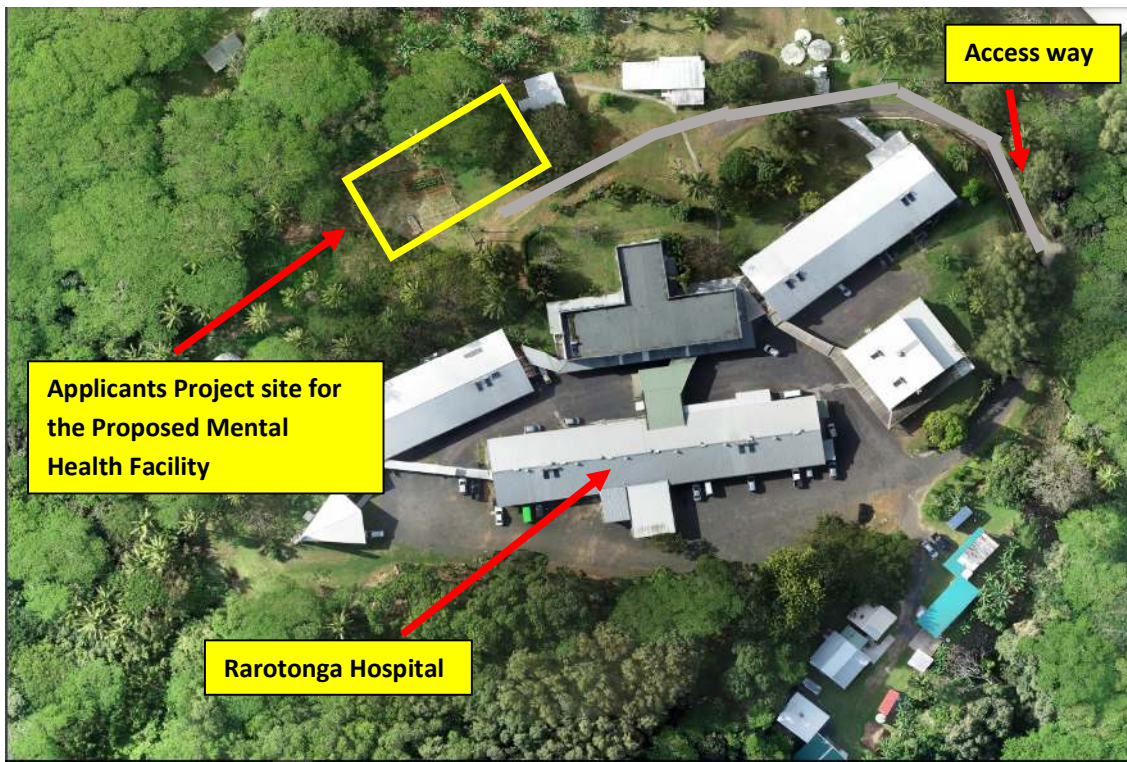


Figure 2: Ariel drone image of Rarotonga Hospital - POKOINO I RARO Pt. Section 87A6 and POKOINU Pt Sec 107

Surrounding Environment

The proposal site is located on the hill slope directly below the Hospital Admin building. The proposal site is on an old earth cut platform that used to accommodate an old nurses accommodation.

The proposed building site is grassed and free of shrubs and trees. To the west and north are large trees and residential buildings north side on hill slope below. On the west next to the proposal site is the old derelict nurse station and the current pharmacy storage. Above the site is the Rarotonga Hospital. The proposal site and area within the hospital compound is regularly maintained by hospital maintenance staff. On the north end of the site there are a two large Albizia (*Falcataria moluccana*) tree's that have been ring barked and marked for safe removal. The existing fence line in front of the old nurse's dwelling structure is covered in a Balloon vine (*Cardiospermum grandiflorum*), mile-a-minute (*Mikania micrantha*) and a banana (plantation on the northern most end).

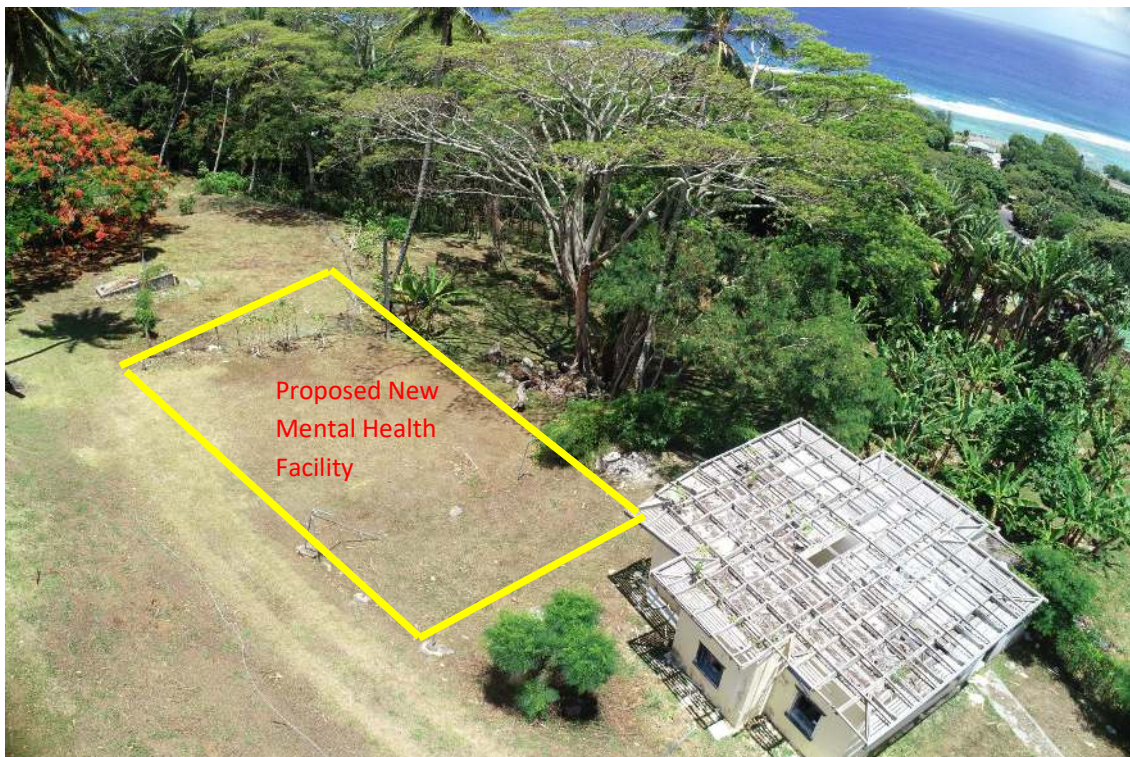


Figure 3: Drone image of Project site.

Geology

Reference has been made to the published report titled 'Geology of the Cook Islands, Bulletin NO. 82 prepared by the New Zealand Geological Survey, 1970'. The report along with the Geological Map of Rarotonga, indicates that the site is underlain by a distinct soil types, 'Te Manga Group formation' volcanic rock 'fringing hills', described as Pokoinu Hill Soils.

Project proposal

The applicant plans to establish an acute inpatient mental health facility at the Rarotonga Hospital. The facility will accommodate patients staying 1 – 30 days. The facility will cater for four (4) patients at a time, therefore will require activities of works to prepare the section for the proposed development. The activity of works as follows;

- i. Site clearance bushes and vegetation
- ii. Topographical survey works of the site
- iii. Proposed layout plan and design
- iv. Permits
- v. Construction

Site clearance

Site clearance involves removing vegetation, trees to provide a clear area for the new building works. It can be carried out in stages if a large area is to be opened up. Keeping some areas undisturbed until required can minimise erosion on site.

Grassed areas

In grassed areas, the grass is skimmed off with an excavator or grader. The grass is usually disposed of offsite or stocked pile for burning.

The topsoil needs to be removed and stockpile onsite for re-spreading. If there is an excess of topsoil it can be used as fill in areas that would not be compromised by long term settlement.

Bush areas

Small trees and scrubs can be grubbed out by excavators. The removed trees can be feed into a chipper for mulch. Mulch can be used as cover for reinstated areas.

Trees

Larger Albizia (*Falcataria moluccana*) trees need to be chopped down safely and burned onsite or removed by a local contractor for fire wood or mulch. The roots need to be removed as well. This is usually undertaken by excavators with claw or ripper fitting to rip the stumps and roots out of the ground.

It is also planned to vegetate parts of the embankment with grass and local plants and trees suitable for the soils in the area.

Excavation is limited to construction of the proposed building foundations and widening of access ways and grading the land around the proposed dwellings. See figure 5.

Displacement of soil will be used for filling and levelling the proposed building site and within the Applicants boundary section.

Topographical survey works

The topographical survey works in figure 4 provides site information such as the physical structures above ground, boundary pegs, fencing, trees, and spot heights which will assist in the design development of the new health facility.

The land is relatively flat from east to west and gently falls towards the ocean with an average slope of 11.6 degrees.

The survey information will assist in the design of the site and location of the building(s), landscaping and other services. It is evident from the initial visit the existing formed road will require some shaping and widening. The widening will likely involve the construction of a small retaining wall uphill of the formed road to hold back and retain the small cut into the lower bank.

Services such as power, water, wastewater, phone and data will be connected to the existing services at the Rarotonga hospital.

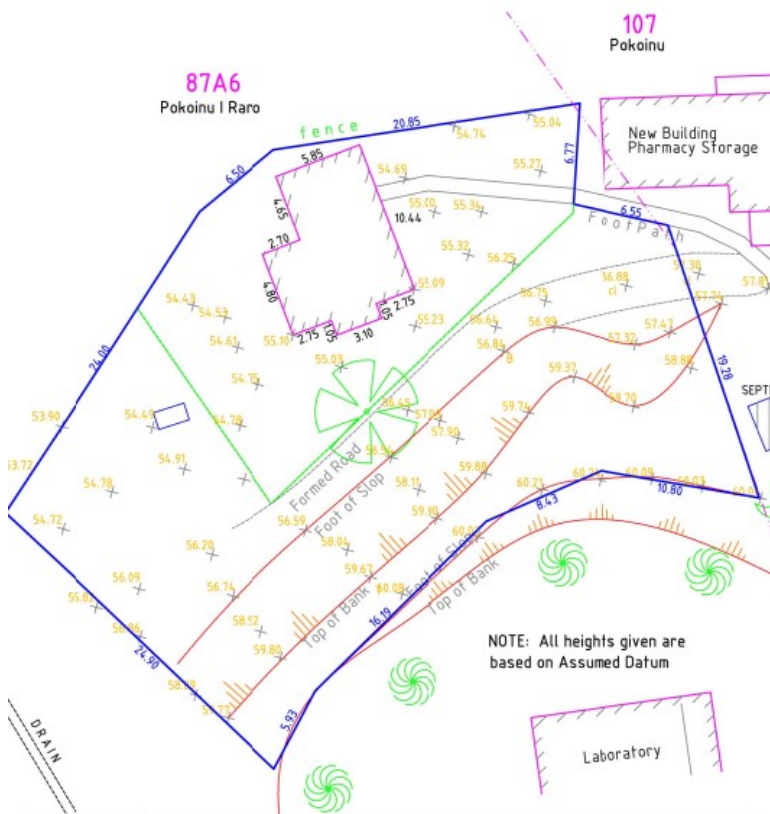


Figure 4 Existing Project Site Topography survey by JAHZANA Agency Ltd - Survey Technician

Demolition Works

The demolition of the existing old nurses dwelling:

Decommissioning, removal and disposal of redundant underground services (sewer lines, communication lines, waterlines and septic tanks);

Decommissioning, demolition and removal of existing old nurses dwelling buildings, and disposal of all other materials, leaving the existing concrete foundation pad and levelling grounds where required;

Dismantling of old chain-link fencing and posts surrounding the old nurses dwelling and disposal of all other materials.

Note: Demolition works should adhere to the Cook Islands Building Code 2019.

Erosion and Sedimentation Controls

Surface water runoff during rainfall on the upslope side of the work area must be collected by means of an interceptor (contour) drain/trench, diverting water away from the work area ideally in sealed pipes to the nearest waterway. It is recommended that surface water must not be allowed to run off onto or over slopes or saturate the ground so as to adversely affect slope stability or foundation conditions.

It is recommended that silt fences be erected along the downslope edge of the development area earth bunds should be utilised during clearing works and placed along the downslope side of the cleared area. The Silt fences should be maintained at all times especially after heavy rain; damaged silt fences should be repaired and re-installed.

To reduce erosion and sediment-laden storm water generated from the site, the following control measures are recommended as best practice in accordance with Auckland Regional Council TP90 and Infrastructure Cook Islands draft regulations.

Vegetation Rehabilitation following earthworks

Vegetation growing on slopes assists in stabilisation by root-binding, prevent erosion and lowering soil moisture content. The existing vegetation cover along the slopes should be maintained and improved where possible. Additional planting of fast-growing and deep-rooting trees (e.g. all native trees and bushes) is recommended.

Surface Stabilisation

Site clearing can be done on a progressive basis, so that only those areas that require to be cleared are done straight away. This will allow for ground cover and top soil to remain in place and to be intact as long as possible.

Surface stabilisation over exposed areas of the work site will take place gradually. Re-vegetation will begin on all areas as soon as works have been completed; therefore reducing the exposure of the bare soils. Examples of stabilisation can include top soiling, grassing and mulching which are effective methods.

Road Metalling

Site access and entry points will be stabilised with metal as soon as practical to minimise erosion and sediment generation.

Layout plan and design

The existing layout of the land allows for the new building to be position downhill of the formed road placed between the existing open drain and old nurse’s dwelling. Parking is currently located next to the Pharmacy storage building, however the new development will need to allow for patient drop-off and staff car parking area. This will require backfilling and compacting of material to filled areas. The soil for the parking area can be sourced from on site

The existing formed road requires widening to four (4) meters, allowing for emergency service vehicle access to the new facility. This will require a 1.0 – 1.5m cut into the foot of the slope next to the formed road.

The construction of a low timber pole retaining wall will consist of timber poles (H4 or H5 treated) cast into the ground with timber rails behind. Drainage material and subsoil drains are placed between the wall and the retained soil to provide drainage.

These wall are very popular as they are quick to build. They also provide good drainage as water can drain out of the gaps between the rails.

The wall will be constructed to a height 0.8 – 1.0m.

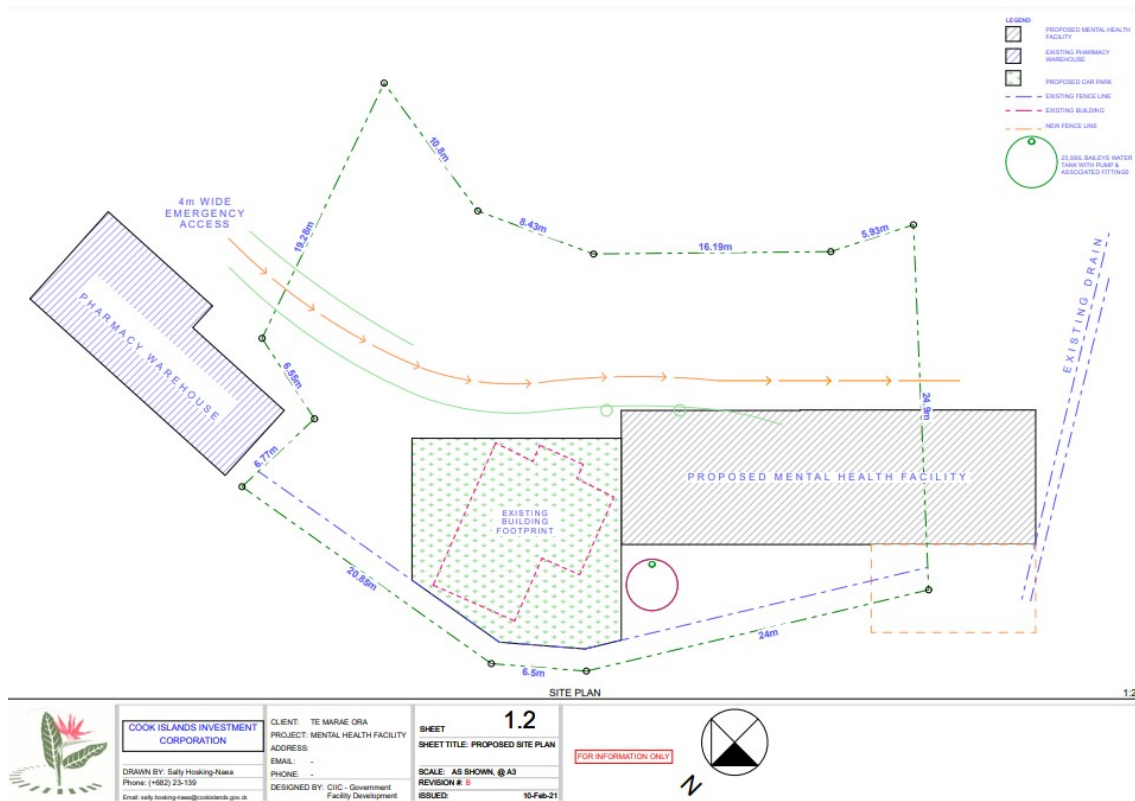


Figure 5: Proposed layout plan

Photos taken in the month of January 2021

Drone image of site access and parking adjacent to the Pharmacy storage building.



Drone aerial image of project site.



East view of existing access road.

Access road widening to four (4) meters.

Construction of a low timber pole retaining wall.



West view of existing access road.

Existing road requires widening.

Construction of a low timber pole retaining wall.



North view of existing access way with existing onsite waste water manhole.



Drone aerial image of the proposed project site.



Table 1: Photos taken 29 January 2021

Contractors and Machinery

The applicant has approached local contractors for quotes and advice on Widening of access road, construction of timber pole retaining wall, demolition works and steel piled foundation works. Contractors such as Raro Welding, Siteworx & T&M Heather Ltd provide a construction advice and preliminary cost estimates. The procurement for construction works will follow the Cook Islands Government Procurement policy for an Open Tender.

Summary

The proponent is willing to work with NES and abide with the requirements of the local authority. The proposed new facility will support the TMO model of care for improving mental health services and long-term health outcomes.

The proposal is; clear the remaining site of vegetation and bushes, collect additional spot height information from the existing topographical survey map, assess the natural layout of the site, plan and design the layout for the development, reshaping of the existing access road to allow for four (4) meter wide access and construction of a low timber pole retaining wall.

The proponent will seek to acquire all the necessary building permits and consents by the authorities (NES, MOH, and ICI) before any construction works commence.

All services such as electrical and telecommunications is still to be discussed with the service providers and until then will the layout be finalized. The sanitation system will be adhered to the Cook Islands Health Regulation requirements.

The building will need to be designed to a category five (5) cyclone rating due to the type of topography of the area, and the appropriate design standards will be used accordingly, New Zealand standard and Cook Islands standards.

The proponent seeks the approval of the authority to carry out the development and until that approval is given the proponent waits of the authority for the approval.

Appendix

Appendix 1: Land survey map from Ministry of Justice

