
Four New Buildings on Sloping Terrain

ENVIRONMENT IMPACT ASSESSMENT REPORT

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Prepared for:
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Islands
National Environment
Services

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Appendices

A – NES EIA Terms of Reference

B – Study Team

C – Site Plan and Cross Section

Glossary of Terms Executive Summary

CEMP Construction Environmental Management Plan

EIA Environmental Impact Assessment

EMP Environmental Management Plan

NES National Environment Service

REA Rarotonga Environment Authority

TOR Terms of Reference

Executive Summary

The aim of this proposal is to develop the sloping property with four new residential dwellings and maintain the existing features of the Pokoinu property.

This Environmental Impact Assessment has been prepared for Eric and Ira Gamez (Landowner), the existing property is moderate sloping, with several basalt rock outcrops and boulders scattered across the slope. The property is located on the downslope of the hospital hill, adjacent to the Pokoinu Ara Metua or commonly known as the Golf Road. An existing residential dwelling occupies the neighboring eastern property.

This proposal is funded by Eric and Ira Gamez, detailed designs, proposal management and construction supervision will be undertaken by competent and experienced contractor.

The Proposal

The proposed development comprise the construction of four residential houses positioned at selected locations within the property as shown on the attached site plan, for design purpose a 8m by 6m dimension house footprint has been adopted. All four dwellings will have the same dimensions, design and construction method. The new dwellings will comprise a timber frame structure supported on pile foundation; the buildings will be constructed in consideration to the existing sloping terrain therefore minimizing large scale excavation. Earthworks will be required to construct an access road and vehicle turning platform.

The proposal aims to minimize disturbance to the existing features, specifically the natural basalt outcrops, therefore the locations of each building including the alignment of the new access road, has been positioned away from the important areas. The basalt outcrops will be maintained, this will aid in further stabilization of the existing slope.

Due to loose boulders observed on the property, the proposal also includes the construction of a safety fence along the property boundary perimeter, combined with the rock and earth bunds, approved earthworks methods, these aim to minimize the risk of falling boulders to the community.

Alternatives Considered

The landowners have acquired the property with the intension of developing with four new residential buildings.

Taking into consideration the property area, sloping terrain and the geological rock outcrop features of the property, it is advisable to undertake development at one time rather than over a number of periods, this is to minimize disturbance to ground sloping conditions.

There is no alternative land for the owner to undertake its proposal for the construction of four new buildings, therefore as an alternative; the landowner is prepared to construct one residential dwelling on the property for the interim.

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In the event the both proposals are not approved, the landowner will be at a disadvantage as there are no alternative lands elsewhere, the landowner have already committed to the acquisition of the Pokoinu property and will comply to all necessary requirements.

Potential Impacts and Mitigation Measures

The proposal comprises the construction of four timber frame buildings supported on timber piles, large scale earthworks will not be required to prepare the building platform as each dwelling will be built in sympathy to the natural slope.

The four building locations have been selected in areas away from the prominent basalt rock outcrop areas, therefore minimizing disturbance to the properties natural feature.

As loose boulders were observed during our site visit, there is a potential risk to the neighboring properties (residential house, main road and golf course) from falling rocks; therefore the proposal also incorporates the construction of a perimeter safety fence, of suitable material and construction methods. In addition the existing rockwalls will be maintained to provide safety and assist with erosion and sediment control. The contractor will undertake all safety precautions when operating earth moving machinery along the slope, earthworks will likely comprise the construction of the access road, which is mainly the filling the road platform utilizing soils and rock from within the property.

Appropriate methods, as outlined in this report will be adhered to, ensuring that all impacts to the environment and community are minimized.

Environmental Management Plan

An outline Environmental Management Plan (EMP) has been prepared and appended to this report, to provide for the protection of the environment and the community, during the construction of the four new residential dwellings and slope safety measures. The Contractor will prepare a detailed Construction Environment Management Plan, once approval is granted; the detailed Construction EMP will be used by both the Contractor and the National Environment Services as a guide to monitor the proposal.

Summary

The landowners have acquired this property with the purpose of developing four new residential dwellings. This is the only property available for the landowner.

The proposal therefore looks at developing the property, providing safety to the community and maintaining the overall natural features of the property.

The objectives of this EIA are to:

- Make sure that possible adverse environmental, social and economic impacts are identified and avoided, remedied or mitigated; and
- Inform the public about the proposal.

1. Introduction

This Environmental Impact Assessment (EIA) report has been prepared to assess the impact of development along the Pokoinu hill slope and providing methods in minimizing risks. This report will identify potential impacts and provide justification for undertaking the proposed proposal components, Alternatives considered would also include measures to mitigate any negative impacts on the environment.

The major findings of this report are based on qualitative and quantitative assessments undertaken during site visits on September 2018. Long term site specific baseline data was lacking and therefore the impact assessment methodology has been restricted to field data collected, consultation, experience and professional judgment. This EIA has been produced in accordance with the Environmental Act 2003.

1.1. Proposal proponent

Eric and Ira Gamez is the landowner and proponent for the Pokoinu property. The property is legally described as *Pokoinu Pt Sec 107F2, Lot 41, Pokoinu Tapere, Avarua District*; the property is rectangular in shape and covers a total area of 1,127m².

1.2. Proposal description

The main proposal comprises the construction of four residential dwelling within the property. Each dwelling has been positioned in areas away from the prominent basalt rock out locations, as shown on the attached site plan.

The proposed building designs were not available prior to the formation of this report, therefore a 8m by 6m rectangular house footprint has been adopted.

All four dwellings will have the same dimensions, design and construction method. The new dwellings will comprise a timber frame structure supported on pile foundation; the buildings will be constructed in consideration to the existing sloping terrain therefore minimizing large scale excavation. Earthworks will be required to construct an access road and vehicle turning platform.

Due to loose boulders observed on the property, the proposal also includes the construction of a safety fence along the property boundary perimeter, combined with the rock and earth bunds, approved earthworks methods, these aim to minimize the risk of falling boulders to the community.

1.3. Proposal objectives and scope

The main objective is for the construction of four residential dwelling for the landowners Eric and Ira Gamez.

The proposal also aims at minimizing the impacts to the existing sloping terrain, by positioning each building away from basalt rock outcrop areas, and the construction of timber-frame structure.

Safety is paramount, to minimize the potential risk of falling rocks, the proposal also includes the construction of a safety fence, maintain existing rockwall and engaging a competent contractor.

1.4. Environmental Impact Assessment process

1.4.1. Methodology of the EIA

The EIA process is an important planning and implementation process for any proposal that has the potential to significantly affect the environment.

The stages as they relate to this proposal are described below.

1) Application stage

This stage involves the preparation of a Terms of Reference (TOR) for the EIA by the NES and the preparation and lodgment of the EIA report by the applicant with the NES.

The NES then assessed the proposal under Section 36 of the Environment Act 2003 and determined that it could potentially have significant environment effects and therefore an EIA would be required.

A TOR was prepared by the NES and this was used as a guide for preparing this EIA report for lodgment with the NES.

2) 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 submissions are received, the NES will provide the applicant with the relevant matters raised, which are to be addressed and comments provided back to the NES.

3) Approval stage

Once the matters raised during the consultation period have been addressed by the applicant, the NES provides a recommendation on the proposal to the Rarotonga Environment Authority (REA) for their consideration and eventual decision. There are three possible outcomes:

- 1) The application is approved. The NES provides the applicant with an EIA Approval with conditions;
- 2) The application is deferred until the applicant has satisfactorily addressed issues raised by the REA; or
- 3) The application is declined.

1.4.2. Objectives of the EIA

The objectives of this EIA are to:

- Ensure that possible adverse environmental, social and economic impacts are identified and avoided, minimized or mitigated; and
- Inform the public about the proposal and receive feedback.

1.4.3. Submissions

All submission is to be sent to NES, within the formal public consultation period of 30 days. As public submissions are received, the NES will provide the applicant with the relevant matters raised, which are to be addressed and comments provided back to the NES.

1.5. Public Consultation

The landowners have consulted with the neighboring property owners with regards to the proposed development. No public consultation was undertaken during the development of this EIA report, it is envisioned that during the 30 day notification period any issues raised by the public will be addressed accordingly.

1.5.1. Relevant Legislation and Policy Requirement

This EIA is a proposal permit application submitted in accordance with Section 36 of the Environment Act 2003. Initial discussions with the NES determined that this approval would be necessary due to the potential for the proposal to cause significant environmental impacts.

1.5.2. Planning Process and Standards

At present there are no existing land uses or long term policy framework for the area, there are no village, district or vaka plans.

In accordance with the Cook Island Environment Act 2003; a Environment Significance Declaration (ESD) form along with a Engineering Report was provided to the National Environment Services on September 2018, the outcome from the Rarotonga Environment Authority (REA) meeting was for a Environment Impact Assessment (EIA) Report for the proposed development, the EIA term of reference was then made available.

All four new residential dwelling will adhere to the current Cook Islands National Building Code 1990 and the Building Control and Act 1991; areas requiring specific engineering design such as the deepen piles, will abide by New Zealand and Australian building code standards, in this case a Structural Engineer will design the foundations accordingly. It is envisioned that all necessary standards will be utilize to ensure the new buildings are safely constructed, design accordingly to the site and conditions.

The Public Health (Sewage) Regulation 2008 indicates that the Pokoinu property falls outside the 'Lagoon Protection Zone' (LPZ) however due to the number of buildings

occupying the property, it is anticipated that all four buildings will be connected on a cluster type system, which will incorporate an approved advance waste water system of high standard capable of on-site treatment and appropriate disposal. The waste water system will be designed by a qualified and registered professional, with installation also by a registered and qualified sanitation installer.

2. Proposal Need and Alternative

2.1. Proposal justification

The landowners have acquired the property with the sole purpose of developing with four new residential dwellings, the landowners have already invested a considerable amount of money and time into this proposal.

This particular area has seen considerable development in recent years, a new dwelling is currently under construction along the top western neighboring property. Two new dwellings have been built some 40m away, on the inland side along the Golf road. This proposal is a continuation of similar development activities, along sloping terrain for the general Pokoinu area.

The demand for residential housing has also increased on Rarotonga, this is evident as more and more dwellings are built across Rarotonga. This proposal therefore seeks to provide support for this demand.

2.2. Alternatives to the proposal

As the landowners have already committed to the acquisition of the Pokoinu property, there is no other land or property available.

As an alternative the landowner is prepared to build one residential house for the interim.

3. Description of the Proposal

3.1. Location of the site

Reference should be made to the attached plans and drawings.

The subject property is legally described as **Pokoinu Pt Sec 107F2, Lot 41, Pokoinu Tapere, Avarua District**; it is irregular in shape and covers a total area of **1,127m²**. The property is located along the downslope Hospital Hill, access to the site is obtained directly from the Pokoinu Ara Metua 'Golf Road'.

3.2. Staging - Description of the proposed works

Stage 1: Site Establishment

Once approval is given, pending the approved proposal option, notification in advance (48 hours) will be given to the community, neighboring properties and government

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authorities prior to any work undertaken. Once everyone has been made aware, and in agreement, then appropriate machinery, equipment and construction material will be mobilized to the site.

The contractor will cordon off the proposal site with appropriate fencing to limit public access into the site, caution and notice signs will be erected to promote site safety awareness.

Heavy plant movement into and out of the property will be at appropriate times, late mornings 9am to 11am and afternoons 1pm to 3pm, so that it doesn't cause disruptions to traffic in Pokoinu.

Stage 2: Safety Fence Construction

The eastern neighboring residential house and Pokoinu 'Golf' Road is at risk of falling rocks, therefore a safety fence will be constructed along the eastern perimeter boundary, the fence to be constructed of steel pole and steel mesh of appropriate strength sufficiently anchored into competent ground.

A experienced and competent contractor will be engaged to undertake the safety fence construction.

The existing rockwall on the property will be maintained to aid in providing safety from falling rock.

Stage 3: Erosion and Sediment Control

Drainage path will be formed to divert surface water away from the work area via interceptor drains, all formed drains will be directed towards a shallow detention sediment pond, to allow sediments to settle prior to discharge to the nearest roadside drain.

The existing rockwall and rock stockpile will be maintained to support sediment retention on the property. Silt fences will be erected at selected locations.

All erosion and sediment control measures will be inspected and monitored daily by the contractor.

Stage 4: Access Road Formation

Utilizing the loose boulders and soils from within the property, a raised road will be constructed to provide access to the upper areas of the property. The removal of loose boulders will minimize the risk of falling rock during and following the completion of the proposal.

Stage 5: Four New Residential Dwelling Construction

The removal of loose boulders also prepares each building platform for construction; a hydraulic excavator will be required to prepare the foundation footing excavation. Each dwelling will be built according to the respective slopes at each location, the existing slope to be maintained.

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It is anticipated that within this two months, architectural plans for each of the **four new residential dwelling** will be developed, along with structural engineering designs and waste water system designs. The building plans will be made available to the government authorities; Infrastructure Cook Islands (ICI) Building Control, National Environment Services (NES) Compliance and Public Health for building permit and approval.

3.3. Emergency management

In the event a natural disaster warning has been issued, being an approaching cyclone, where possible, the contractor will removed off-site all machinery, equipment and construction material. If removal off-site is not achievable, then the contractor is to make secure all loose materials and equipment. Work will recommence once the respective authorities; Police and Emergency Management Cook Islands (EMCI) has issued the all clear notification.

The proposal will incorporate 'site safety' procedures. First Aid will be made available and all contractors will be trained on its proper use, the first aid will be placed in a location easily accessible by all.

The contractor will maintain communication with all those in close proximity to the construction site, with regards to temporary road closure, the contractor will give ample notification outlining when the road will be closed and for how long. The contractor is to ensure the access road is open at all times.

The contractor will engage the relevant service utilities (power, water and phone) to locate and identify their service lines within the property. The relevant utility representatives are to be on-site where earthworks are undertaken in close proximity to their respective services.

3.4. Infrastructure Requirement

All major activities will take place along the sloping terrain of the property, the adjacent sealed Pokoinu Ara Metua (Golf Road) will not be affected.

All service utilities (power line, telecommunication and water pipeline) currently run along the existing road.

3.4.1. Transport

Earth moving machinery and construction materials will be carted onsite via the Pokoinu Ara Metua.

Cartage of materials and movement of heavy machinery will be carried out during the *off-peak* traffic hours, as not to disrupt traffic in the Pokoinu area.

Heavy machinery will likely comprise; 10 ton trucks, front end loader and 14 ton excavator.

3.4.2. Storm Water Drainage

To minimize sediment run-off during the construction phase, the proposal will adopt erosion and sediment control measures; ideally the construction phase be undertaken outside of the cyclone and typical wet season period

Formed drainage path will align to the erosion and sediment control measures contained in this report. All drains to be diverted to the sediment pond prior to discharge to the existing road-side drain.

Exposed areas following earthworks (loose boulder removal) will be covered using compost and mulch to promote grass growth.

Reference to the New Zealand Soil Survey Report 49, titled '1980 Soils of Rarotonga, Cook Islands' prepared by D.M. Leslie, indicates that soil characteristics for the property comprises; clays, silts, loose basalt boulders and basalt boulder outcrops. Overall the subsoil conditions are fairly permeable and free draining.

All heavy plant machinery to be checked on a regular basis to ensure no oils or fuel is leaking within the construction site.

3.5. Waste Management

3.5.1. Character and Quantities of Waste Materials

As the landowners have already undertaken vegetation clearing, where trees and shrub were cleared by chainsaw and bush knife, with periodic controlled burning, therefore it is unlikely that any waste material will be generated.

For the construction of the four residential dwellings, the contractor will have at all time a skip container to collect all waste materials, the skips will then be taken to the Arorangi Waste Management facility for disposal. No landfill to take place on the property.

3.5.2. Solid Waste Disposal

No landfill/disposal is to take place on the property, during and following the construction phase. All waste material generated will be collected and taken to the Arorangi Waste Management facility for appropriate disposal.

4. Environmental Values and Management of Impacts

4.1. Land

4.1.1. Description of environmental values

The property comprises a sloping terrain with prominent basalt rock outcrop at several locations; there has been little development specifically on this property due to the rock outcrops and loose boulders.

The proposal objectives is to maintain the natural features of the property, this will be achieved by limiting construction along the rock outcrop areas. Both the four building locations and access road have been positioned away from the rock outcrop areas.

4.1.1.1. Soils

Reference has been made to the Rarotonga Geological Map, which indicates that the site is underlain by volcanic derived processes. These are residual volcanic group deposits of the Holocene Age.

According to the 1980 Soils Report prepared by D.M. Leslie, the soils in this area have been identified as Pokoinu Hill Soils, typical of Hilly Land, also referred to as Fringing Hill, limited fertility soils on major slopes.

4.1.1.2. Landuse / Characteristics

Due to the nature of the property there has been limited use, the lower flat portion of the property, adjacent to the Pokoinu Ara Metua was previously used for a pig pen, it is understood that fruit trees in this area is a result of pig feeding.

4.1.1.3. Landscape Character

The property comprises a sloping terrain, with inclination ranging from 13° to a maximum of 20°, this is typical to slopes along this area. Basalt outcrops are predominant within the property compared to the neighboring properties.

The proposal aims to maintain the natural characteristics of the property with limiting activities to the basalt outcrops.

4.1.2. Potential Impacts and Mitigation Measures

The proposal objectives have been selected to protect and enhance the land-based environmental values.

Prominent basalt outcrops will be maintained, no large scale earthworks to take place as each new dwelling will be built along the respective slopes. The new access road will utilize materials from within the property.

4.1.2.1. Land use Suitability

The proposal is not likely to significantly alter existing land uses on the site and neighboring area, similar activities have occurred in adjacent properties.

4.1.2.2. Land Contamination

The construction of the new road platform will utilize fill materials (loose boulders and soil) from within the property.

The four new dwellings will incorporate an approved waste water system, which will treat effluent to approve standards.

Waste material generated during the construction phase will be taken off-site to the Arorangi Waste Management facility; no waste landfill is to be stored on-site.

The contractor will ensure that all earth moving machinery and other construction equipment does not discharge any harmful substance into the ground, as outlined in the Environmental Management Plan.

4.2. Climate

Cyclone season is typically experienced between November and March each year, during these periods the Cooks Islands is vulnerable to cyclone events, the climate often experienced comprise heavy rainfall, strong winds and rough seas.

The property is at risk during prolonged heavy rainfall periods, undertaking erosion and sediment control measure at the early stages of the proposal minimizes the risk of erosion especially for exposed areas.

4.3. Water Resource & Quality

4.3.1. Description of Environmental Values

The proposal aims to minimize impacts to the water resources, through applying measures at limiting contaminants on-site, using approved methods and working closely with agencies via monitoring water quality.

All harmful or toxic substances will not be stored on the property.

4.3.2. Potential Impacts and Mitigation Measures

Earthmoving machinery and equipment with harmful or toxic substances such as fuel, oil, and lubricants will not be stored on site; to ensure that these substances do not contaminate the coastal waters.

Erosion and sediment control measures as stated previously aims to reduce sediment discharge into the downstream catchments, which eventually flows into the coastal waters (Nikao Beach).

4.4. Air

4.4.1. Description of Environmental Values

Impact to the air quality is considered minor; the potential for air pollution is likely to be the control burning of cleared vegetation and the discharge by earthmoving machinery. The contractor will ensure that all machineries are serviced and operating effectively.

No burning of waste material on-site.

4.4.2. Potential Impacts and Mitigation Measures

The landowners have already undertaken vegetation clearing, firewood logs have been made from most of the cleared large trees.

Earthwork machineries will operate in open space, smoke discharge from the machines will likely disperse in the hill breeze.

Contractor to ensure all machineries are operating effectively with safe discharge.

4.5. Waste

4.5.1. Description of Environmental Values

The proposal will not generate waste as all the materials imported to the site will be used for the new buildings construction.

All empty fuel and oil containers used for the heavy plant machineries will be removed and not stored on-site.

4.5.2. Potential Impacts and Mitigation Measures

The contractor will ensure that any waste generated by the earthmoving machinery will be temporary stored and transported off site.

4.6. Noise and Vibration

4.6.1. Description of Environmental Values

The proposal site is located along a developed Pokoinu hill slope; much of the noise and vibration will be generated by heavy plant machinery; the contractor will closely monitor noise to appropriate levels.

4.6.2. Potential Impacts and Mitigation Measures

The movement of transport and earth moving plants within the property is likely to generate noise and vibrations. These nuisances will be confined to the area where proposed development will take place; the contractors will operate machinery during normal working hours from 8am to 4pm - Monday to Saturday. Work outside these hours will require construction equipment fitted with noise reduction devices. The contractor

will maintain communications and provide notification to the community regarding machinery movement.

4.7. Nature Conservation

4.7.1. Description of Environmental Values

The vegetation within the proposed construction site comprises regenerated shrubs and native trees. Following construction, landscaping works will re-establish these native plants.

4.7.1.1. Terrestrial Flora & Fauna

The existing flora and fauna of the sloping terrain comprise native plants and shrubs, insects, lizards and crabs. Wandering birds were also observed in the area.

The native plants and animals are typical along the Rarotonga hill slope, the proposal looks to maintain suitable habitat for the local flora and fauna.

4.7.1.2. Aquatic Biology

The property is located along the inland slopes, away from any stream, wetland and coastal area.

No biota surveys or studies were undertaken for the proposal site.

4.7.2. Potential Impacts and Mitigation Measures

Landscaping and vegetation rehabilitation following building construction will encourage local flora and fauna in the area to re-establish their habitat.

The potential effects of the proposal on the nature conservation are considered minor.

4.8. Cultural Heritage

4.8.1. Description of environmental values

It is understood that there is some cultural significance for the property, the nature of the basalt outcrop has some links to the Black Rock area, some 200m away. There is also linkages to the old prehistoric road (Ara Nui o Toi) built by Toi.

4.8.2. Potential impacts and mitigation measures

The proposal is not considered to result in any significant impacts on the cultural heritage values of the site. Furthermore, there are no known historic or cultural sites within close proximity to the site that will be affected by the proposal.

4.9. Social

4.9.1. Description of environmental values

The proposal will not interfere with community activities with the Pokoinu area.

4.9.2. Potential impacts and mitigation measures

During the construction phase, perimeter fencing and warning signs will be erected to provide awareness and safety to the community.

The site supervisor (contractor) will monitor all movement around the proposal site and provide support where needed.

4.10. Health and Safety

4.10.1. Description of Environmental Values

Movement of construction materials and earthwork machinery will be carried out outside peak traffic hours to ensure minimal risk to the public and local community.

During construction, temporary storage of materials and machinery will be position in a safe and secure area, away from the public.

4.10.2. Potential impacts and mitigation measures

The contractor to ensure that health and safety gears are worn at all time, clear visibility of personal both operating machinery and on the ground. The site to have a fully stocked first aid kit and everyone is made aware of its location and safe usage.

During the construction of the new residential buildings, the main contractor is responsible to ensure the safety of both the workers and the local community.

The contractor will ensure that appropriate signs will be erected to notify local residents regarding health and safety protocols.

4.11. Economy

4.11.1. Description of Environmental Values

Development along the Pokoinu hill slope has increased in recent years as more and more houses are built in this area, the close proximity to the hospital, golf course, new Apii Nikao, upgraded Tereora College and the International Airport makes the property an ideal location for residential development.

4.11.2. Potential impacts and mitigation measures

The proposal is for the construction of four new residential dwellings, provides for economic opportunity to support the housing demand, and create jobs for various contractors; fence construction, earthworks, builders and so forth.

4.12. Hazards and Risk

4.12.1. Description of Environmental Values

The potential hazards identified comprise the following:

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- Working on sloping terrain;
- High risk of loose boulders rolling down the slope;
- In-effective wastewater treatment system
- In adequate building material and poor workmanship

4.12.2. Potential impacts and mitigation measures

It is important to engage an experienced and competent contractor to undertake work on sloping terrain.

Safety fence will be constructed at selected locations to minimize the risk of falling/rolling rock towards the neighboring properties.

A registered drain layer will be engage to design and install the new wastewater system; the system is to be an approved system by the Public Health. The site supervisor along with the Public Health inspector will document installation works and monitor system operations for the first six months. The new wastewater system is to treat effluent to safe levels without impacting on the natural environment.

All four new buildings are to be design according to the building code utilizing construction material suitable to site conditions, a builder of good reputation is to be engaged to undertake building construction. Buildings poorly constructed will pose a significant hazard risk during cyclone periods where loose material may become flying debris and hit adjoining properties.

The site supervisor will ensure that appropriate signs and fencing be erected to notify local residence regarding health and safety protocol, danger areas and site requirements. These protocols will guarantee that hazards and risks associated during construction are minimized.

No unauthorized personnel should be permitted onto the site without first seeking approval from the site supervisor.

Continuous monitoring of the weather is advisable during the construction period.

The site supervisor will ensure that site works is well managed, loose material are temporary stored in secure area. At the end of each working day the site is left secured, all machinery are packed, stored and locked away safely, and building materials are covered and anchored down. Where possible, it is recommended that the site is closed off, to discourage unauthorized access into the site after working hours.

4.13. Erosion Control

4.13.1. Description of Environmental Values

The exposed underlying soils following preparation and formation works, including the placement of fill material is vulnerable to erosion, therefore erosion and sediment control

devices and management plans will be established. The main objective is to reduce the risk of erosion across the property, especially into the neighboring properties.

4.13.2. Potential impacts and mitigation measures

Appropriate measures will be undertaken to ensure there is minimal impacts of erosion; exposed areas will be temporarily covered with the filter cloth to minimize scouring during heavy rainfall event, the existing rockwall and rock stockpile bund will be maintained to aid in minimizing soil and sediment erosion.

Silt fence will be installed at key locations, temporary drainage channels will be formed along the proposal site perimeter, diverting all surface flows to a sediment pond prior to discharge into the roadside drain.

5. Environmental Management Plan

5.1. Purpose of this Plan

The purpose of the EMP is to provide for the protection of the environment during the proposed works and to minimize potential adverse environmental, social and economic effects that cannot be avoided. This EMP will be used by the Contractor to prepare a detailed Construction EMP, which will be used throughout the proposed works.

5.2. Environmental objective

To undertake the proposed works in compliance with the conditions of approval, in keeping with the principles of the Environment Act and avoiding wherever possible any significant negative environmental impacts, whether covered by plans and approvals, or not.

5.3. Environmental policies

General environmental principles shall be:

- Construction works and activities will not commence until the EIA and CEMP has been approved;
- Construction works will be undertaken in compliance with all current legislation and any conditions imposed on the EIA Approval;
- The construction works will utilize the best practicable options to ensure adverse environmental effects are avoided, remedied or mitigated.
- Social disturbance as a result of construction will be minimized as far as practicable.
- Areas outside the bounds of permanent works, which were developed or altered in any way, shall be reinstated to the condition as at commencement of the Contract.

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5.4 Summary of Potential Impacts, Mitigation Measures, Monitoring and Responsibilities

Environmental Issue	Mitigation Measures	Locations	Timeframe	Implementation	Monitoring Parameter	Monitoring Frequency	Monitoring Responsibility	Supervision
Impacts on landscape and visual amenity values	The four new building including the new access road will be positioned away from the prominent basalt outcrop areas.	Along the sloping terrain	During the building and road construction period, two months.	Contractor	Visual inspection	Throughout construction works and at completion of works	Site Supervisor	Project Engineer/Manager
Dust nuisance	The grounds especially exposed soils areas will be moistened and where possible covered to minimize dust build up during construction works.	Along the sloping terrain	During the building and road construction period, two months.	Contractor	Visual inspection Feedback / complaints received	Daily monitoring during site development works	Site Supervisor	Project Engineer/Manager
Excessive noise during construction.	<ul style="list-style-type: none"> • Ensure construction during normal working hours 8am to 4pm Monday to Saturday. • Maintain ongoing communication with the local community. 	Along the sloping terrain	During the building and road construction period, two months.	Contractor	Construction noise levels Feedback / complaints received	Daily monitoring during site development works	Site Supervisor	Project Engineer/Manager

Environment Impact Assessment – Four New Buildings on Sloping Terrain

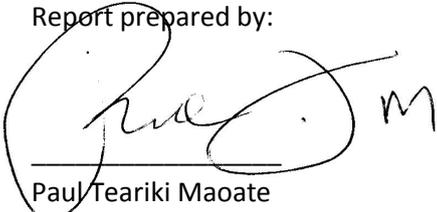
Environmental Issue	Mitigation Measures	Locations	Timeframe	Implementation	Monitoring Parameter	Monitoring Frequency	Monitoring Responsibility	Supervision
Health and Safety	<ul style="list-style-type: none"> • All personal to wear at all times appropriate safety attire. • Everyone is aware of the health & a safety protocol, first aid is available on site at all times. 	Along the sloping terrain	During the building and road construction period, two months.	Contractor	Local community feedback	Daily monitoring	Site Supervisor	Project Engineer/Manager
Site Hazards	<ul style="list-style-type: none"> • Safety fence to be constructed at the early stages to minimize falling/rolling rock to both within the property and the neighboring house and main road • Construction materials and construction equipment are stored away safely at the end of each working day. 	Along the sloping terrain	During the building and road construction period, two months.	Contractor	Site Inspection	Prior, during and following storm events	Site Supervisor	Project Engineer/Manager
Erosion Control	<ul style="list-style-type: none"> • Install and maintain appropriate erosion control devices 	Along the sloping terrain	During the building and road construction period, two months.	Contractor	Site Inspection	Daily monitoring during site development works	Site Supervisor	Project Engineer/Manager

6. Conclusion

This EIA and proposal permit application by the proponent Eric and Ira Gamez, for approval by the NES, to construct four new residential dwelling by way of developing the existing Pokoinu hill side sloping terrain and maintaining the natural basalt outcrop features.

The potential adverse effects of the proposal on the environment and community will not be significant. Concerns and issues raised have been addressed in this EIA where relevant. Consultation with landowners and neighboring properties will be maintained throughout the proposal development duration.

Report prepared by:

A handwritten signature in black ink, appearing to read 'Paul Teariki Maoate', is written over a horizontal line. The signature is stylized and includes a large loop at the beginning and a small 'M' at the end.

Paul Teariki Maoate

New Zealand Certificate in Engineering - Civil (NZCE)

Member of the Institute of Professional Engineers Cook Islands (IPECI)

7. Reference

Leslie, D (1980) Soils of Rarotonga, Cook Islands, NZ Soil Survey Report 49

Waterhouse, BC & Petty DR (1986) Hydrogeology of the Southern Cook Islands, South Pacific

1990 Cook Islands Building Code

McIntyre M (2013) Cook Islands National Action Programme for Sustainable Land Management

Appendix A

National Environment Services Environmental Impact Assessment Terms of Reference

TERMS OF REFERENCE (TOR) FOR AN
ENVIRONMENTAL IMPACT ASSESSMENT (EIA)
REPORT

MR & MRS ERIC & IRA GAMEZ.

**4 NEW BUILDINGS ON SLOPE, POKOINU PART SECTION
107F2, POKOINU TAPERE, AVARUA DISTRICT -
RAROTONGA.**

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 - A3 Study Team
 - A4 Consultation Report
 - A5 Specialist Studies
 - A6 Contacts
-

Part A. Information and Advice on the preparation of the EIA.

1. Introduction

This document forms the Terms of Reference (TOR) for an Environmental Impact Assessment Report (EIA) for (4) four building development. The objective of the TOR is to identify those matters that should be addressed in the EIA report. The TOR is based on the outline of the proposed proposal given as part of the application and also the National Environment Service's (NES) own assessment of the project site.

In order to clarify the nature and level of investigations that are envisaged in the TOR, the proponent may consult further with relevant stakeholders, ie. Government representatives and authorities, community interest organisations and groups to participate in the process especially during the preparation of the EIA to ensure that all matters as conveyed in the TOR are addressed.

An executive summary should be provided in the EIA and be able to be provided separately for public information.

2. EIA Objectives

The objective of the EIA is to identify potential environmental, social and economic impacts of the proposal and to ensure that adverse impacts are avoided where possible. Consistent with this objective, the EIA should be a self-contained and comprehensive document containing sufficient information to make an informed decision on the potential impacts. This document should provide:

- " *for interested bodies and persons*: a basis for understanding the proposal, alternatives and preferred solutions, the existing environment that would be affected, both on and off the site, the impacts that may occur, and the measures to be taken to mitigate all adverse impacts.
- " *for groups or persons with rights or interests in land*: an outline of the effects of the proposed proposal on that land, including access arrangements.
- " *for government decision makers*: a framework against which decision-makers are able to consider the environmental aspects of the proposed proposal in view of legislative and policy provisions and provide sufficient information to decide whether the proposal can proceed; OR as appropriate, set conditions for approval to ensure environmentally sound development and, where required by legislation, recommend an environmental management and monitoring program.
- " *for the proponent*: a definitive statement of measures or actions to be undertaken to minimise any adverse impacts during and following the implementation of the proposed proposal. A draft Environmental Management Plan (EMP) that describes acceptable impacts and environmental

management strategies to agreed performances criteria is the recommended means of achieving this objective.

The proponent is required to address the TOR to the satisfaction of the National Environment Service and the completion of the EIA does not mean that the proposal will necessarily be approved.

The EIA should be a standalone document and it should contain sufficient information and other appended studies/surveys to avoid the need to retrieve previous reports.

3. Stakeholder Consultation

To facilitate the assessment process, the proponent is strongly encouraged to regularly consult with relevant/appropriate stakeholders throughout the EIA process.

It is the responsibility of the proponent, in consultation with appropriate stakeholders, to identify legislation, policies and methodologies relevant to the EIA process, and to determine the appropriate parts of the community to be consulted. Copies of the EIA shall be provided to the community and, on request, to relevant individuals with an interest in the proposal.

4. General EIA Format

The EIA should be written in a format matching the TOR. The EIA must include appendices containing at least the following:

- ~ a copy of this TOR
- ~ a list of persons and agencies consulted during the EIA with their contacts
- ~ the names of, and work undertaken by, all personnel involved in the preparation of the EIA.

Maps, diagrams and other illustrative material should be included in the EIA. The EIA should be produced on A4 size paper capable of being photocopied, with maps and diagrams on A4 or A3 size. An electronic copy of the EIA should also be submitted to the National Environment Service for display on the NES website during the consultation period of the project

Part B. Content of the EIA.

(It is strongly recommended that the Environmental Impact Assessment (EIA) Report follow the heading structure of the Terms of Reference (TOR))

EXECUTIVE SUMMARY

The Executive Summary should be written as a stand alone, able to be reproduced on request and distributed to interested parties who may not wish to read or purchase the EIA as a whole. The structure of the Executive Summary should generally follow that of the EIA but focus on key issues to enable the reader to obtain a clear understanding of the proposal and its potential adverse and beneficial environmental, social and economic impacts and the management measures to be implemented by the proponent to mitigate all residual impacts.

The Executive Summary must include:

- the title of the proposal;
- name and contact details of the proponent, and a discussion of previous projects undertaken by the proponent and their commitment to effective environmental management;
- a concise statement of the aims and objectives of the proposal;
- the legal framework, decision-making authorities and advisory agencies;
- an outline of the background to and need for the proposal, including the consequences of not proceeding with the proposal;
- an outline of the alternative options considered and reasons for the selection of the proposed development option;
- a brief description of the proposal (pre-construction, construction and operational activities) and the existing environment, utilising visual aids where appropriate;
- an outline of the principal environmental impacts predicted and the proposed environmental management strategies (including waste minimisation and management) and commitments to minimise the significance of these impacts.

GLOSSARY OF TERMS

A glossary of technical terms, acronyms and abbreviations should be provided.

1. INTRODUCTION

The function of the introduction is to explain why the EIA has been prepared and what it sets out to achieve. In particular, the introduction should address the level of detail of information required to meet the level of approval being sought (for example, whether the proponent is seeking only a preliminary approval or a full approval from NES).

1.1 Proposal Proponent

Provide details of the proposal proponents, including details of any joint venture, if any.

1.2 Proposal Description

A brief description of the key elements of the proposal should be provided and illustrated. Any major associated infrastructure requirements should also be

summarised. A brief description should be provided of studies or surveys that have been undertaken for the purposes of developing the proposal and preparing the EIA. This should include reference to relevant baseline studies or investigations undertaken previously.

1.3 Proposal Objectives and Scope

A statement of the objectives which have led to the development of the proposal and a brief outline of the events leading up to the proposal's formulation, including alternatives, envisaged time scale for implementation, anticipated establishment costs and actions already undertaken within the proposal area. Describe the current status of the proposal and outline the relationship of the proposal to other developments or actions that may relate whether or not they have been approved. The consequences of not proceeding with the proposal should also be discussed.

1.4 Environmental Impact Assessment (EIA) Process

The purpose of this section is to make clear the methodology and objectives of the environmental impact assessment under the relevant legislation.

1.4.1 Methodology of the EIA

This section should provide a description of the EIA process steps, timing and decisions to be made for relevant stages of the proposal. This section should also indicate how the consultation process (which will be described in detail in section 1.5) would integrate with the other components of the impact assessment, including the stages, timing and mechanisms for public input and participation.

The information in this section is required to ensure:

- that relevant legislation is addressed;
- readers are informed of the process to be followed;
- that stakeholders are aware of any opportunities for input and participation.

1.4.2 Objectives of the EIA

While the TOR provides guidance on the scope of the information requested for the proposal, the TOR should not be seen as exhaustive or limiting. It is important for proponents and their consultants to recognise that there cannot be perfect knowledge in advance of undertaking an EIA of what the EIA studies may find.

In addition, it is essential that the main text of the EIA should address all relevant matters concerning environmental values, impacts on those values and proposed mitigation measures. No relevant matter should be raised for the first time in an appendix or the draft environmental management plan (EMP).

The EIA is a public document. Its purpose is not only to provide information to regulatory agencies, but also to inform the public of the scope, impacts and mitigation measures of the proposal. As such the main text should be written in plain English avoiding jargon as much as possible. Additional technical detail may be provided in appendices. The main text should not assume that a reader would have a prior knowledge of the proposal site. It should not be necessary for the reader to have visited the site to understand the issues involved in the proposal.

In brief, the EIA objectives should be to provide public information on the need for and likely effects of the proposal, to set out acceptable standards and levels of impacts (both beneficial and adverse) on environmental values, and demonstrate how environmental impacts can be managed through the protection and enhancement of the environmental values. Discussion of options and alternatives and their likely relative environmental management outcomes is a key aspect of the EIA.

The role of the EIA in providing the proposal's draft EMP should also be discussed, with particular reference to the EMP's role in providing management measures that can be carried over into conditions that would be attached to NES approval.

1.4.3 Submissions

The reader should be informed as to how and when public submissions on the EIA will be addressed and taken into account in the decision-making process.

1.5 Public Consultation

It is recommended that an open community consultation process be carried out in addition to the legislated environmental impact assessment process. Copies of the draft EIA will be provided to all relevant stakeholders and individuals with an interest in the proposal.

Public consultation should commence as early as possible especially in the Pokoinu Tapere and should be comprehensive and promote discussion on all aspects of the proposal including strategic decision making and design. It may include interviews with individuals, public meetings, interest group meetings, production of regular summary information and updates, and other consultation mechanisms to encourage and facilitate active public consultation.

The public consultation process should identify broad issues of concern and provide information to local community and specific interest groups. Consultation should have a specific focus on impact identification and mitigation of adverse social, economic and environmental issues, and it should directly inform all other relevant components of the EIA (particularly social impact analysis).

Details of the public consultation process and the major issues emerging from that process should be clearly addressed in the EIA. The consultation process should be integrated with the social assessment component of the EIA. Matters which become apparent through the consultation process such as community conflict or concerns which derive from fears about impacts from the proposal on the natural environment should be included in the social impact assessment section of the EIA.

1.5.1 Relevant Legislation and Policy Requirement

This section should explain the legislation and policies controlling the approval process. Reference should be made to the Environment Act 2003 and other relevant Cook Islands laws relevant to the proposal.

This information is required to assess how the legislation applies to the proposal, which agencies have jurisdiction, and whether the proposed impact assessment process is appropriate

1.5.2 Planning Process and Standards

This section should discuss the proposal's consistency with existing land uses or long-term policy framework for the area, if any, and with legislation, standards, codes or guidelines available to monitor and control operations on site.

2. PROPOSAL NEED AND STANDARDS

2.1 Proposal Justification

The justification for the proposal should be described, with particular reference made to the economic and social benefits, including employment and spin-off business development, which the proposal may provide.

2.2 Alternatives to the Proposal

This section should describe feasible alternatives especially in terms of the sites and designs. For example if the Pokoinu Community are not in favour of the proposed site, will there be any alternative site for the project OR are there any alternative designs if the community asked for other alternative designs? Such alternatives, if any, should be discussed in sufficient details to enable full understanding of such options.

3. DESCRIPTION OF PROPOSAL/DEVELOPMENT

3.1 Location

This section should describe the local context of the proposal and associated infrastructure and illustrated on maps at suitable scales, including identification and potential impacts on surrounding land uses. Real property descriptions of the proposal site should be provided. This section shall also demonstrate how the proposal relates to the Pokoinu Tapere and also the Island as a whole.

Maps should show the precise location of the proposal area and in particular the location and boundaries of land tenures, in place or proposed, to which the proposal area is or will be subject

The following information should be provided for all components of the proposal:

- distances to boundaries of land resumptions;
- slopes and elevations;
- site drainage and erosion controls;
- proposals for rehabilitation, if any;
- access arrangements, daily traffic generated, and internal roads.

3.2 Staging

Details of the likely staging of the proposal and timing of the staging are required, if any. A plan showing the likely sequencing of such development stages for the project should be incorporated and indicate the natural features to be retained during the stages and management measures to maintain the natural features during these stages.

The staging of the project should be described and illustrated showing approximate site boundaries, development sequencing and timeframes. The estimated numbers of people to be employed during the life of the project should also be provided.

3.3 Emergency Management

In relation to emergency management, provide:

- details of emergency management plans to be put in place during construction, including procedures and notifications;
- emergency access provisions;
- an assessment of the potential disruption to community utility networks (i.e., water, electricity);
- details as to any permanent and/or temporary road closures or vehicle limitations to existing public road access.

3.4 Infrastructure Requirement

This section should provide descriptions, with concept and layout plans, of requirements, if any, for constructing, upgrading or relocating all infrastructures required supporting the proposed development.

The matters to be considered include such infrastructure as roads (traffic), pedestrian pathways, and power lines and other cables, telecommunications, water etc.

3.4.1 Transport

Describe:

- existing road infrastructure and all other infrastructure contained within the road reserves within of the site boundaries, including private roads and public roads which are expected to be used by construction employees especially for the transportation of materials to the site during construction and operational phases for each stage of development;

Information should also be provided on road transportation requirements on public roads for each of the proposed stages, including:

- Connectivity from the proposed development site to the existing main road. It is anticipated that the proposed scale of development will surely disrupt normal traffic movements at the Pokoinu area;
- The volume, composition (types and quantities), origin and destination of goods to be moved including construction materials, plant, wastes, hazardous materials , if any;
- The volume of traffic generated by workforce personnel, visitors and service vehicles;
- Details of vehicle traffic and transport of heavy and oversize indivisible loads (including types and composition);
- Any alternate proposal for relocation or realignment of access to the project site which will surely be disrupted by heavy transportation during the construction process;

3.4.2 Storm Water Drainage

A description should be provided especially to any existing storm water drainage system in the area, refer to main drainage located on the main road. The EIA should indicate the sources of the drainage water, e.g. road and the potential quality and location of discharge to the lagoon.

Surface water runoffs will also collect on site especially at times of construction therefore will there be any new drainage to be done for that?

storm water collection/drainage systems.

- A detailed environmental management plan that sets out the framework for management and mitigation of environmental impacts including contingencies for managing system failures and incidents.
- A description of any potential releases of contaminants, the environmental impacts and the actions that will be taken to prevent the likelihood of environmental harm.

3.5 Waste Management

3.5.1 Character and Quantities of Waste Materials

Provide an inventory of wastes, likely to be generated by the proposal and methods of disposal having regard to the best practice waste management strategies. In particular, identify proposals for waste avoidance, reuse, recycling, treatment and disposal in the appropriate sub-section below.

3.5.2 Solid Waste Disposal

In general terms describe the proposed location, site suitability, dimensions and volume of any landfill/disposal site requirements for solid wastes generated by the proposal.

4. ENVIRONMENT VALUES AND MANAGEMENT OF IMPACTS

The functions of this section are to:

- Describe the existing environmental values of the area which may be affected by the proposal;
- Describe the potential adverse and beneficial impacts of the proposal on the identified environmental values. Any likely environmental harm on the environmental values should be described;
- Present environmental protection objectives and the standards and measurable indicators to be achieved;
- Examine viable alternative strategies for managing impacts. These alternatives should be presented and compared in view of the stated objectives and standards to be achieved. Available techniques, including best practice, to control and manage impacts to the nominated objectives should be discussed. This section should detail the environmental protection measures incorporated in the planning, construction, operations, decommissioning, rehabilitation and associated works for the proposal. Measures should minimise environmental harm and maximise socio-economic and environmental benefits of the proposal. Preferred measures should be identified and described in more detail than other alternatives.

This section should address all elements of the environment, such as land, water, coast, air, waste, noise, nature conservation, cultural heritage, social and community, health and safety, economy, hazards and risk, in a way that is comprehensive and clear. To achieve this, the following issues should be considered for each environmental value relevant to the proposal:

- **Environmental values affected** · describe the existing environmental values of the area to be affected.
- **Impact on environmental values** · describe quantitatively the likely impact of the proposal on the identified;
- **Monitoring programs** · describe the monitoring parameters, monitoring points, frequency, data interpretation and reporting proposals. Auditing programs: describe how progress towards achievement of the objectives will be measured, reported and whether external auditors will be employed. Include scope, methods and frequency of auditing proposed;
- **Management strategies** · describe the strategies to be used to ensure the environmental protection objectives are achieved and control strategies implemented eg. continuous improvement framework including details of corrective action options, reporting (including any public reporting), monitoring, staff training, management responsibility pathway, and any environmental management systems and how they are relevant to each element of the environment;
- **Information quality** · information given under each element should also state the sources of the information, how recent the information is, how any background studies were undertaken

(e.g. intensity of field work sampling), how the reliability of the information was tested, and what uncertainties (if any) are in the information

4.1 Land

4.1.1 Description of Environment Values

This section describes the existing environment values of the land area that may be affected by the proposal. It should also define and describe the objectives and practical measures for protecting or enhancing land-based environmental values, describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed.

4.1.1.1 Soils

A soil profile for the surrounding Pokoinu area should be conducted at a suitable scale, with particular reference to the physical and chemical properties of the materials that will influence erosion potential and storm water run-off quality.

Information should also be provided on soil stability and suitability especially the proposed site.

4.1.1.2 Landuse/Characteristics

The EIA should provide a description of past and current land tenures and land uses of the site and surrounding areas, AND ALSO Maps at suitable scales showing existing land uses and tenures, and the proposal footprint, should be provided for the entire proposal area and surrounding land that could be affected by the development. The maps should identify areas of conservation value and areas in any locality that may be impacted by the proposal.

4.1.1.3 Landscape Character

This section should describe in general terms the existing character of the landscape that will be affected by the proposal.

The landscape character of the property and its surrounds should be described in the context of landscape ecology and incorporate the concepts of patch-corridor-matrix in describing the pattern of existing vegetation.

4.1.2 Potential Impacts and Mitigation Measures

This section defines and describes the objectives and practical measures for protecting or enhancing the land-based environmental values identified through the studies outlined in the previous section. It should describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed.

4.1.2.1 Landuse Suitability

The potential for the proposal to change existing and potential land uses on the site and adjacent areas should be detailed.

The potential environmental harm caused by the proposal on the adjacent areas currently used for nature conservation, agriculture, urban development, transport corridors, recreation, tourism, other business.

4.1.2.2 Land Contamination

The EIA should describe the possible contamination of land from aspects of the proposals including waste, irrigation with treated effluent, reject product/materials and spills at chemical and fuel storage areas.

The EIA should also address management of any existing or potentially contaminated land in addition to preventing and managing land contamination resulting from project activities.

4.2 Climate

This section should describe the rainfall patterns (including magnitude and seasonal variability of rainfall), air temperatures, humidity, wind (direction and speed) and any other special factors (e.g. temperature) that may affect air quality within the proposed project site. Extremes of climate (droughts, floods, cyclones, etc) should also be discussed with particular reference to water management at the proposal site, including flooding and rainfall-shortfall affecting water supply. The vulnerability of the area to natural or induced hazards, floods should also be addressed. The relative frequency, magnitude and risk of these events should be considered, with particular relevance to the changing climatic conditions, ie, climate change.

The potential impacts due to climatic factors should also be addressed in the relevant sections of the EIA.

4.3 Water Resources & Quality

4.3.1 Description of Environmental Values

This section describes the existing environment for water resources & quality that may be affected by the proposal in the context of environmental values.

i.e. - **Surface waterways**

- **Groundwater**
- **General (temp, salinity, pH, clarity, BOD etc...)**
- **Turbidity of suspends solids**
- **Eutrophications (DO, N, P)**
- **Harmful or Toxic substances**
- **Sanitation (Coliform, E Coli)**

4.3.2 Potential Impacts and Mitigation Measures

This section is to assess potential impacts on water resource environmental values identified in the previous section. It will also define and describe the objectives and practical measures for protecting or enhancing water resource environmental values, to describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed.

Water management controls should be described, addressing surface and groundwater quality, quantity, drainage patterns and sediment movements. The beneficial (environmental, production and recreational) use of nearby surface and groundwater should be discussed, along with the proposal for the diversion of affected creeks and the stabilisation of those works. Monitoring programs should be described which will assess the effectiveness of management strategies for protecting water quality during the construction and operation of the proposal.

Avoid loss of construction materials to water - Adopt work practices which minimise work over water

Prefabricate off-site as far as is practicable

Prevent the deposition of materials through wind action by maintaining a clean site, fixing materials down where necessary and recovering debris

4.4 Air

4.4.1 Description of Environmental Values

This section describes the existing air environment that may be affected by the proposal. Reduction of Potential Air Pollution by ensuring that the pollution of air is minimised

4.4.2 Potential Impacts and Mitigation Measures

This section defines and describes the objectives and practical measures for protecting or enhancing environmental values for air, to describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed. Information should be submitted on the use of new technologies and planning responses such as residential densities, public transport options, etc to reduce air emissions arising from the proposal.

4.5 Waste

4.5.1 Description of Environmental Values

This section should complement other sections of the EIA by providing technical details of waste treatment and minimisation, with proposed emission, discharge and disposal criteria, while other sections describe how those emissions, discharges and disposals would impact on the relevant environmental values.

The purpose of this format is to concentrate the technical information on waste management into one section in order to facilitate its transfer into the EMP.

Ensure that waste is stored and disposed of appropriately, with minimum impacts on the environment

4.5.2 Potential Impacts and Mitigation Measures

This section defines and describes the objectives and practical measures for protecting or enhancing environmental values from impacts by wastes, describes

how nominated quantitative standards and indicators may be achieved for waste management, and how the achievement of the objectives will be monitored, audited and managed.

This section should assess the potential impact of all wastes to be generated and provide details of each waste in terms of:

- on-site treatment methods proposed for the wastes ;
- methods of disposal (including the need to transport wastes off-site for disposal) proposed to be used for any trade wastes, liquid wastes and solid wastes;
- the potential level of impact on the surrounding community due to nuisance;
- proposed discharge/disposal criteria for liquid and solid wastes;
 - Plan works to minimise the waste of materials
 - Reuse old materials suitable for other uses where possible
- Recycle waste where possible
- Store waste from ablution facilities appropriately (eg in tanks)
- 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
- Dispose of waste on a regular basis or as needed
- Maintain records of disposal times and contractors

4.6 Noise and Vibration

4.6.1 Description of Environmental Values

This section describes the existing environment values that may be affected by noise and vibration from the proposal. The area will surely be affected by the noise especially from the heavy machinery during construction.

4.6.2 Potential Impacts and Mitigation Measures

This section defines and describes the objectives and practical measures for protecting or enhancing environmental values from impacts by noise and vibration, describes how nominated quantitative standards and indicators may be achieved for noise and vibration management, and how the achievement of the objectives will be monitored, audited and managed.

The likely noise impacts upon existing residents from both construction of the proposal should be detailed. Transport and access requirements to and from the site should be detailed. The likely impacts of new development on existing transport infrastructure should be investigated.

A discussion should be provided of measures to prevent or minimise environmental nuisance and harm.

- Management of equipment and machinery - Use machinery and equipment with minimal noise output levels
 - Fit all machinery with appropriate noise reduction equipment

- Avoid disturbance to local residents, workers and recreational users - Restrict access to the site during works which cause high level noise impact. Prepare a noise and vibration hazard plan
Maintain levels of noise and vibration to a level of acceptance.

4.7 Nature Conservation

4.7.1 Description of Environmental Values

This section describes the existing environmental values for nature conservation that may be affected by the proposal.

Describe the environmental values of nature conservation significance for the affected area in terms of:

- integrity of ecological processes, including habitats of rare and threatened species or geographically restricted, locally endemic or scientifically significant species or populations;
- conservation of resources;
- biological diversity, including habitats of rare and threatened species or geographically restricted, locally endemic or scientifically significant species or populations;
- integrity of landscapes and places including wilderness and similar natural places;
- aquatic and terrestrial ecosystems in terms of the Biodiversity.

A discussion should be presented on the nature conservation values of the areas likely to be affected by the proposal. The flora and fauna communities which are rare or threatened, environmentally sensitive localities including waterways, riparian zone, and littoral zone, rainforest remnants, old growth indigenous forests, wilderness and wildlife corridors should be described. The description should include a plant species list, a vegetation map at appropriate scale and an assessment of the significance of native vegetation, from a local perspective.

The EIA should identify issues relevant to sensitive areas, or areas, which may have, low resilience to environmental change. Areas of special sensitivity include wetlands, wildlife breeding or roosting areas.

The occurrence of pest plants/weeds and animals in the project area should be identified to prevent and contain the spread and movement of declared weeds and pest animals onto and from the development site.

4.7.1.1 Terrestrial Flora & Fauna

Sensitive or important vegetation types should be highlighted and their value as habitat for fauna and conservation of specific rare floral community types. The existence of rare or threatened species should be specifically addressed, including the existence of any listed threatened species.

The terrestrial vegetation communities within the affected areas should also be located or mapped.

- Any plant communities of cultural, commercial or recreational significance should be identified;
- Location and abundance of any exotic or weed species.

4.7.1.2 Aquatic Biology

A biota surveys/studies of the project site be conducted unless there was previous studies done with reports made available for the EIA.

The description of the fauna and flora present or likely to be present in the area should include:

- fish species, mammals, reptiles, amphibians, crustaceans and aquatic invertebrates occurring in the waterways within the affected area, and/or those in any associated freshwater and marine environment;
- any rare or threatened marine species

4.7.2 Potential Impacts and Mitigation Measures

The EIA should address any actions of the proposal or likely impacts that will occur on the marine environment.

The potential environmental harm to the ecological values of the area arising from the construction and operation of the proposal including clearing, and the direct/indirect effects on marine lives should be discussed. Short-term and long-term effects should be considered with comment on whether the impacts are reversible or irreversible. Mitigation measures and/or offsets should be proposed for adverse impacts.

4.8 Cultural Heritage

4.8.1 Description of Environmental Values

This section describes the existing cultural heritage values that may be affected by the proposal. Describe the environmental values of the cultural landscapes of the affected area in terms of the physical and cultural integrity of the landforms. A cultural heritage study of the area may be required.

4.8.2 Potential Impacts and Mitigation Measures

This section defines and describes the objectives and practical measures for protecting or enhancing cultural heritage environmental values, describes how nominated quantitative standards and indicators may be achieved for cultural heritage management, and how the achievement of the objectives will be monitored, audited and managed.

4.9 Social

4.9.1 Description of Environmental Values

This section describes the existing social values that may be affected by the proposal and should also include future social benefits resulting from the proposal including increased access and mobility.

The social amenity and use of the proposal area and adjacent areas for recreational, industrial, educational, community and government, centres, residential and other relevant purposes should be described. Consideration should be given to:

- Community infrastructure and services, access and mobility;
- Description of how the environmental impacts (noise, dust, water quality, waste treatment etc) of any onsite accommodation, during construction, will be managed;
- Recreational, cultural, leisure, community and sporting facilities and activities in relation to the affected area.

4.9.2 Potential Impacts and Mitigation Measures

This section defines and describes the objectives and practical measures for protecting or enhancing social 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.

The social impact assessment of the proposal should consider the information gathered in the community consultation program and the analysis of the existing socio-economic environment, and describe the proposal's impact, both beneficial and adverse, on the local community. The impacts of the proposal on local residents, community services and recreational activities are to be analysed and discussed.

4.10 Health and Safety

4.10.1 Description of Environmental Values

This section describes the existing community values for public health and safety that may be affected by the proposal. For proposals proposing air emissions, and/or those with the potential to emit odours, nearby and other potentially affected populations should be identified and described. Particular attention should be paid to those sections of the population, such as children and the elderly, who are especially sensitive to environmental health factors.

Consideration must also be given to health and safety aspects of erosion control structures and water storages or other structures that may impact on public health and safety especially for children in and near waterways and drainage infrastructure.

The protection of the health and safety of the public, is to ensure that the hazards and risk to public health and safety is minimised

4.10.2 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.

The EIA should assess the effects on the proposal workforce of occupational health and safety risks and the impacts on the community in terms of health, safety, and quality of life from proposal operations and emissions. Any impacts on the health and safety of the community, workforce, suppliers and other stakeholders should be detailed in terms of health, safety, quality of life from factors such as air emissions, odour, dust and noise.

The protection of the health and safety of the public, is to ensure that the hazards and risk to public health and safety is minimised

- Reduce the potential for risk to the health and safety of the public - Restrict access to the site through use of temporary fencing
Use signage to notify the public of works and nature of potential danger
Notification of residents of works

4.11 Economy

4.11.1 Description of Environmental Values

This section describes the existing economic environment that may be affected by the proposal. The character and basis of the local economy should be described including:

- existing housing market, particularly rental accommodation which may be available for the proposal workforce, transportation etc.
- economic viability (including economic base and economic activity, future economic opportunities)

The economic impact statement should include estimates of the opportunity cost of the proposal.

4.11.2 Potential Impacts and Mitigation Measures

The function of this section is to define and describe the objectives and practical measures for protecting or enhancing economic values, to describe how nominated quantitative standards and indicators may be achieved for economic management, and how the achievement of the objectives will be monitored, audited and managed.

4.12 Hazards and Risk

4.12.1 Description of Environmental Values

This section describes the potential hazards and risk that may be associated with the proposal. An analysis is to be conducted into the potential impacts of both natural and induced emergency situations and counter disaster and rescue procedures as a result of the proposal on existing and proposed sensitive areas such as residential areas, water reserves, roads, places of residence and work, and recreational areas. The degree and sensitivity of risk should be detailed

4.12.2 Potential Impacts and Mitigation Measures

The EIA should define and describe the objectives and practical measures for protecting people and places from hazards and risk, describes how nominated quantitative standards and indicators may be achieved for hazard and risk management, and how the achievement of the objectives will be monitored, audited and managed. Storms and Sea surge may pose risks and procedures to minimise the impacts on the project.

4.13 Erosion Control

4.13.1 Description of Environmental Values

This section addresses the reduction of potential erosion of sand, soil and waterways by ensuring that works are managed to minimise risk of erosion

4.13.2 Potential Impacts and Mitigation Measures

- Manage stormwater appropriately - Establish sediment and erosion controls around stockpiles where appropriate
 - Minimise size of stockpiles
 - Minimise the creation of hard, impervious surfaces
 - Establish diversion drains around disturbed areas
 - Drain stormwater into appropriate infrastructure
 - Minimise the risk of erosion caused by machinery and disturbance to soils/land - Control access points to a limited number
 - Fence off and restrict access to areas with a high potential for erosion (e.g. waterway outlets)
 - Minimise the use of large machinery
 - Store machinery and construction materials away from sensitive areas
 - Minimise the risk of erosion caused by vegetation clearance -Minimise extent of clearance required
 - Progressively mulch and revegetate areas cleared as part of works
 - Prepare revegetation plan for larger operations
 - Use drift fencing to control sand movement created by vegetation clearance
- Restrict access to areas of high erosion potential
 - Beach erosion
 - Sediment deposition

5. ENVIRONMENT MANAGEMENT PLAN (EMP)

The EMP should be developed from the mitigation measures detailed above. Its purpose is to set out the proponents commitments to environmental management. That is, how environmental values will be protected and enhanced.

The EMP is an integral part of the EIA, but should be capable of being read as a stand-alone document without reference to other parts of the EIA. The EMP should not raise any issues or propose mitigation measures not already addressed in the body of the EIA.

The general contents of the EMP should comprise:

- The mechanisms for implementation of the EMP in association with the staging and timing of the development and ongoing management once the development is completed;

- The proponents commitments to acceptable levels of environmental performance, including environmental objectives, i.e. levels of expected environmental harm, performance standards and associated measurable indicators, performance monitoring and reporting;
- Impact prevention or mitigation actions to implement the commitments to the project;
- Corrective actions to rectify any deviation from performance standards;

A complaints mechanism should be established as part of the EMP to address community issues. A complaints register could log details of all complaints received and action taken.

Through the EMP, the EIA's commitments to environmental performance can be used as regulatory controls through conditions to comply with those commitments. Therefore, the EMP is a relevant document for proposal approvals, environmental authorities and permits, and may be referenced by them.

6. REFERENCES

All references consulted should be presented in the EIA in a recognised format

7. RECOMMENDED APPENDICES

A1 Final TOR for this EIA

A copy of the TOR should be included in the EIS. Where it is intended to bind appendices in a separate volume from the main body of the EIA, the TOR at least should be bound with the main body of the EIA for ease of cross-referencing.

A2 Final Project Design/Drawings

All A3 OR A4 drawings and designs be included

A3 Study Team

The qualifications and experience of the study team and specialist sub-consultants and expert reviewers should be provided.

A4 Consultation Report

Outcomes of consultation meetings in the Pokoinu /Avarua community should be recorded and included. The Consultation Report should summarise the results of the community consultation program, providing a summary of the groups and individuals consulted, the issues raised, and the means by which the issues were addressed. The discussion should include the methodology used in the community consultation program including criteria for identifying stakeholders and the communication methods used. The consultation process should be integrated with the social impact assessment component of the EIA. Matters which become apparent through the

consultation process such as community conflict or fears about impacts of the proposal on the natural environment should also be recorded in the social impact assessment of the EIA.

A5 Specialist Studies

Any reports generated on specialist studies undertaken as part of the EIA are to be included as appendices. These may include:

- **geology**
- **soil survey and land suitability**
- **groundwater**
- **flora and fauna**
- **coral survey**
- **noise and air quality**
- **Environmental Action plan to supplement EMP**
- **Site investigations**
- **Excavation plans and equipment**

A6 Contacts

A contact of relevant experts/professionals interviewed or has contributions to the EIA.

Appendix B

Study Team

CURRICULUM VITAE FOR PAUL TEARIKI MAOATE

Name	Paul Teariki Maoate
Profession:	Civil Engineer
Nationality:	Cook Islands
Place of Residence:	Turangi, Ngatangiia, Rarotonga
Membership:	2013 member of the 'Institution of Professional Engineers Cook Islands' (IPECI), chapter of the South Pacific Engineers Association (SPEA)
Education:	1999 New Zealand Certificate in Civil Engineering (NZCE), UNITEC Institute of Technology 2014 Certificate in Project Management, Auckland University of Technology
Countries of Work Experience:	Cook Islands, New Zealand, Australia
Key Experience	<ul style="list-style-type: none"> • Geotechnical Engineering; <ul style="list-style-type: none"> ○ Investigation, design and assessments ○ Earthworks design and monitoring ○ Slope Stability Analysis (Retaining Walls) ○ Erosion and Sediment Control • Water Engineering: <ul style="list-style-type: none"> ○ Water Demand Management; pipeline network, leak detection ○ Hydrology; monitoring and analysis ○ Groundwater investigation • Road Engineering; <ul style="list-style-type: none"> ○ Design, construction supervision and road testing • Engineering Survey/Mapping: <ul style="list-style-type: none"> ○ Quantity Survey, Buildings ○ Computer Aided Designs ○ Mapping, Geographical Information Systems (GIS) • Coastal Engineering <ul style="list-style-type: none"> ○ Harbour, remedial repairs, designs and construction ○ Coastal protection structures; revetments, seawall, groynes • Environmental Engineering: <ul style="list-style-type: none"> ○ Environmental Impact Assessment (EIA) ○ Environmental Management Plans (EMP)
Major Projects	2002 New Dwelling on steep terrain, Western Heights, NZ 2004 Three Kings Quarry; backfill and new development (40 Lots), NZ 2004 Access Road on steep terrain, Whangaparoa, NZ 2005 (80 Lot) Residential Subdivision, Massey, NZ 2006 Rarotonga Pipeline Network Upgrade 2008 Rarotonga Multi-Sport Complex; Earthworks Supervision 2009 Aitutaki Cyclone Recovery; Building & Infrastructure rehabilitation 2010 Muri Sanitation System Upgrade (IWRM) 2012 Climate proof Mangaia Harbour 2013 Manihiki Harbour Upgrade 2016 Cook Islands Renewable Energy; Geotechnical Investigation of Renewable energy sites in the Pa Enua; Atiu, Mauke, Mitiaro & Mangaia

Appendix C

Project Site Plan and Cross Section

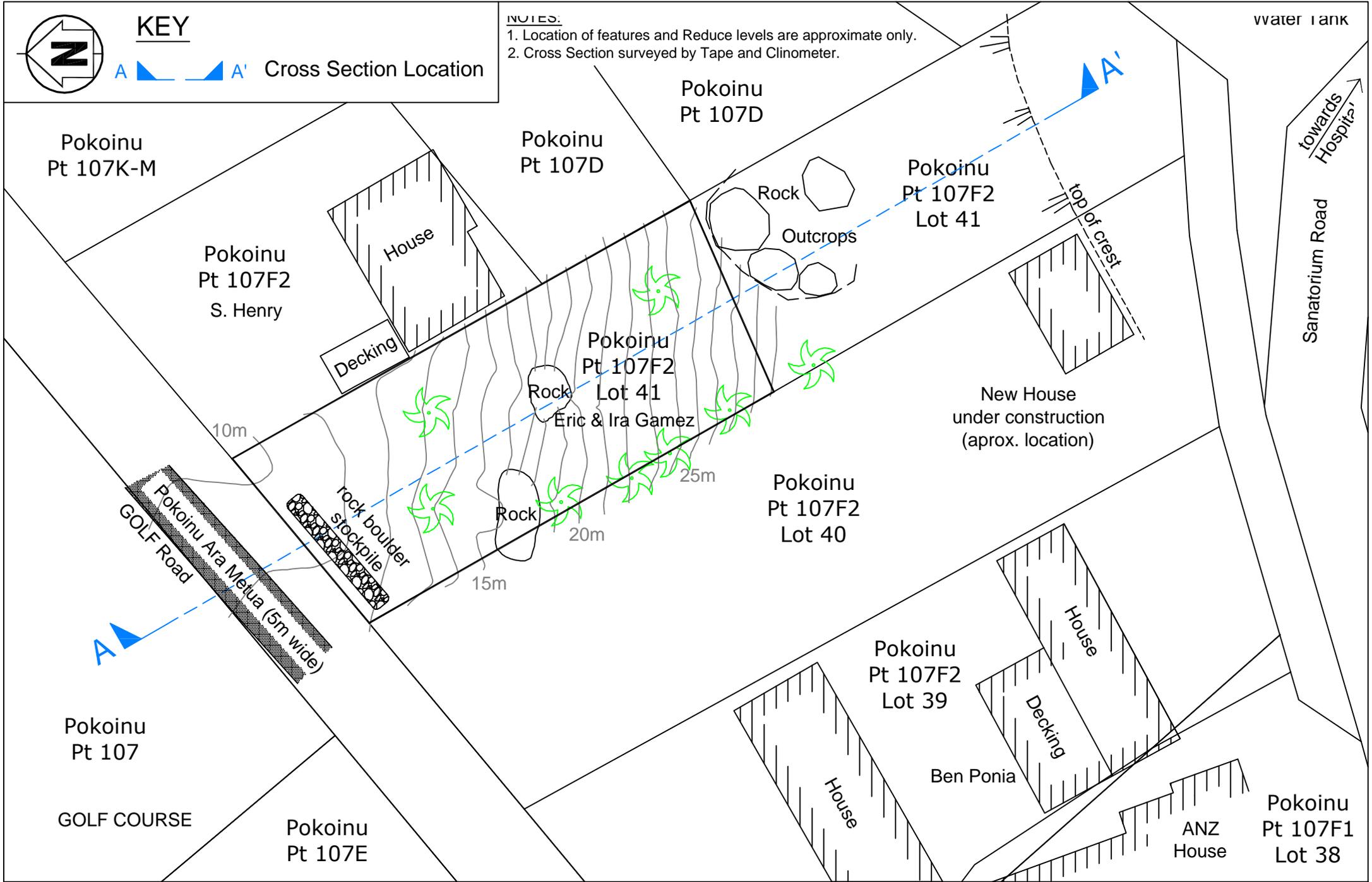


KEY

A  A' Cross Section Location

NOTES:

1. Location of features and Reduce levels are approximate only.
2. Cross Section surveyed by Tape and Clinometer.



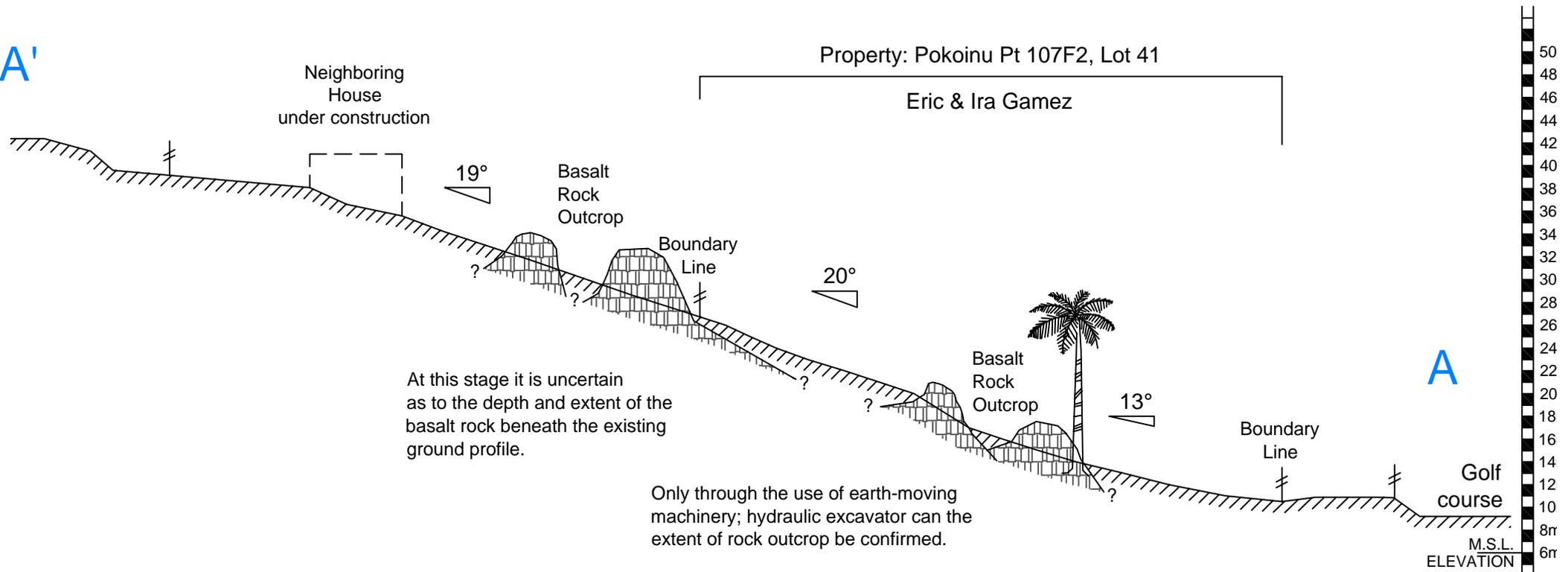
SITE PLAN

ERIC & IRA GAMEZ
CURRENT FEATURES
NIKAO, RAROTONGA

DRAWN: PZ
 CHECKED: PZ
 REV NO: 01
 CAD REF: E1813 plan.dwg

DATE: 20 SEP 2018
 DRAWING NO: E1813
 SHEET 1 OF 6
 SCALES 1:500 at A4

A'



At this stage it is uncertain as to the depth and extent of the basalt rock beneath the existing ground profile.

Only through the use of earth-moving machinery; hydraulic excavator can the extent of rock outcrop be confirmed.

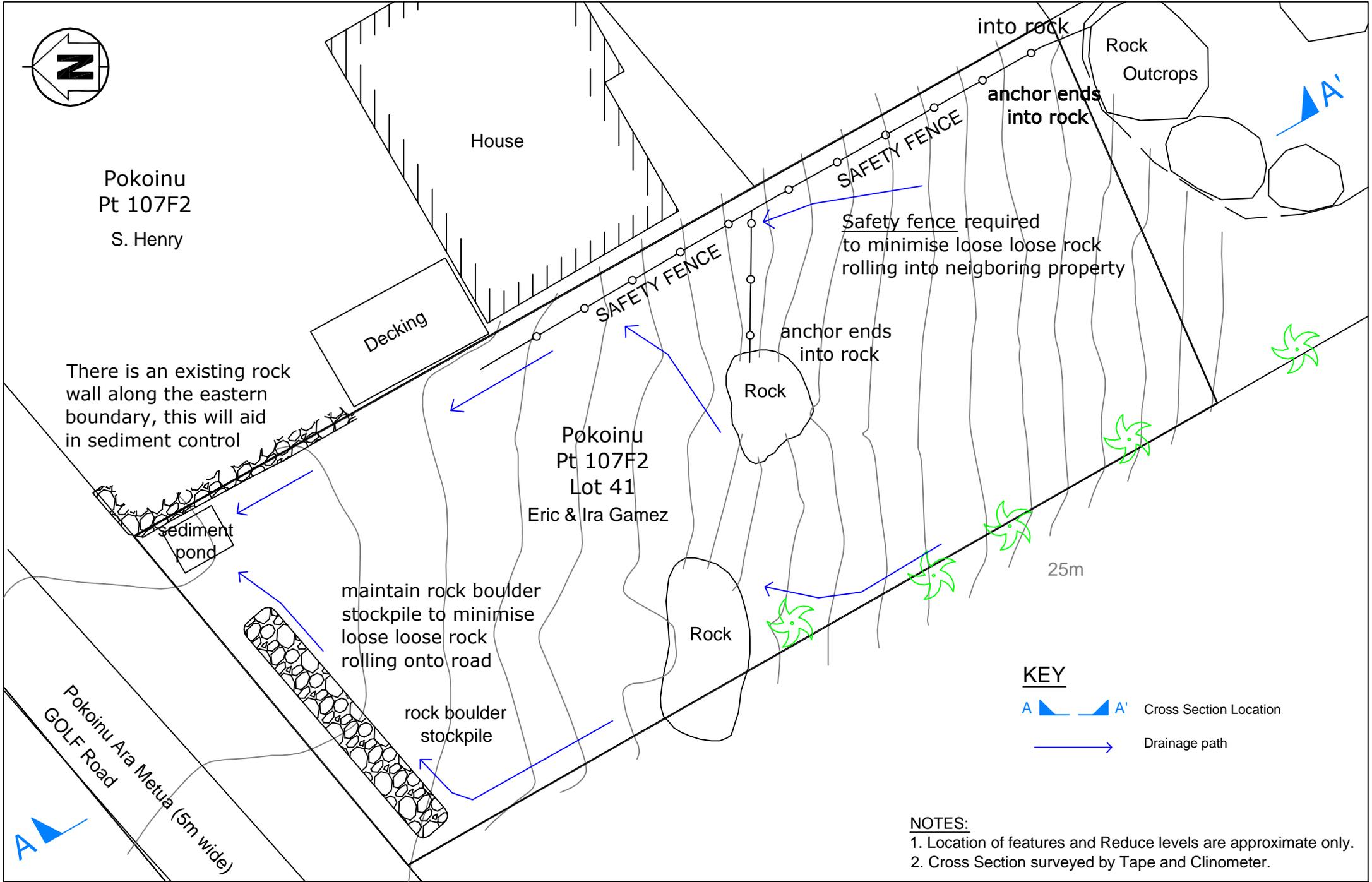
NOTES:

1. Location of features and Reduce levels are approximate only.
2. Cross Section surveyed by Tape and Clinometer.

CROSS SECTION

ERIC & IRA GAMEZ
CURRENT FEATURES
NIKAO, RAROTONGA

DRAWN: PZ	DATE: 20 SEP 2018
CHECKED: PZ	DRAWING NO: E1813
REV NO: 01	SHEET 2 OF 6
CAD REF: E1813 plan.dwg	SCALES 1:500 at A4

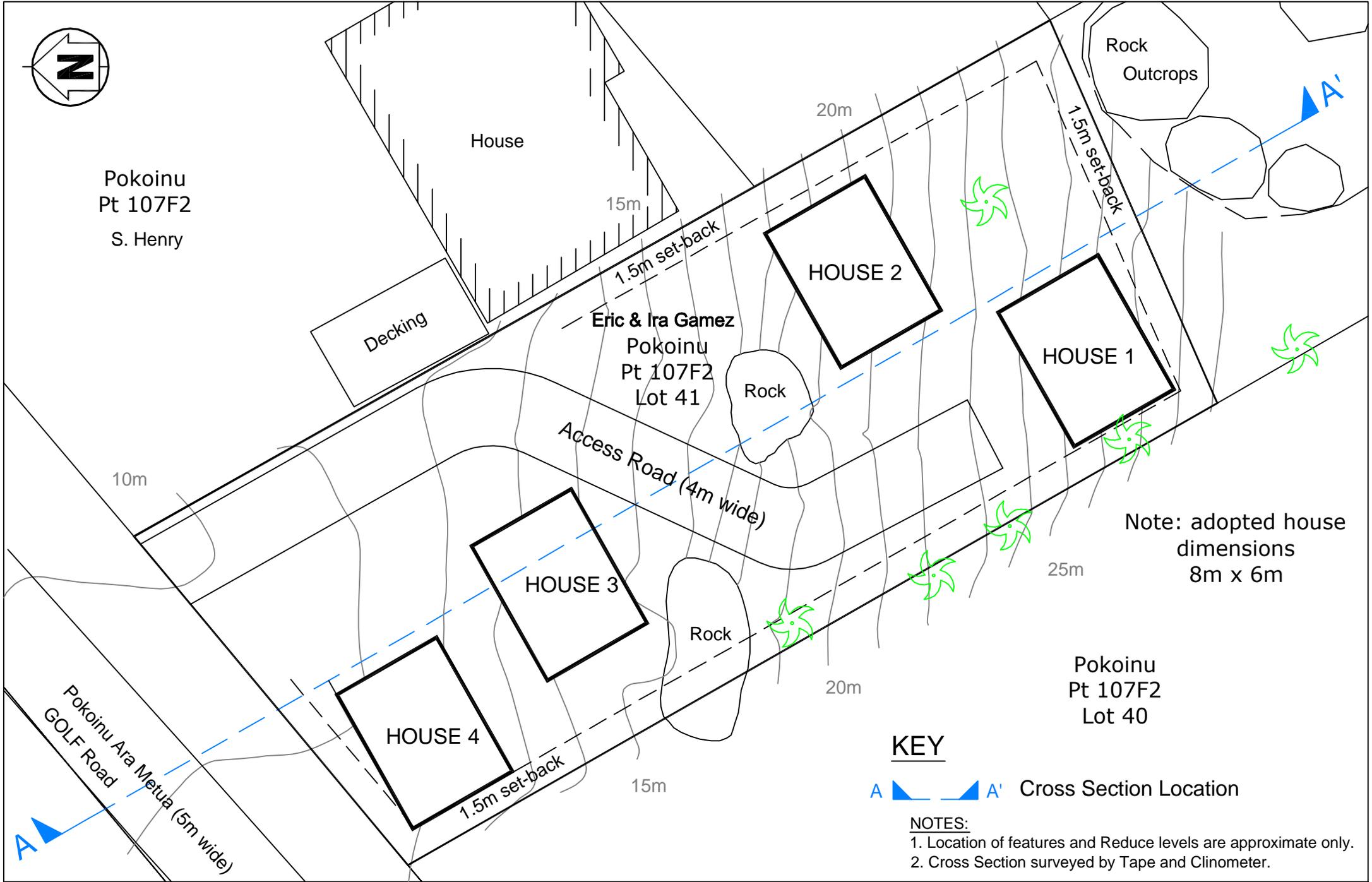


SITE PLAN

ERIC & IRA GAMEZ
EARTHWORKS
NIKAO, RAROTONGA

DRAWN: PZ
 CHECKED: PZ
 REV NO: 01
 CAD REF: E1813 plan.dwg

DATE: 20 SEP 2018
 DRAWING NO: E1813
 SHEET 3 OF 6
 SCALES 1:500 at A4



Pokoinu
Pt 107F2
S. Henry

Eric & Ira Gamez
Pokoinu
Pt 107F2
Lot 41

Note: adopted house
dimensions
8m x 6m

Pokoinu
Pt 107F2
Lot 40

KEY

A A' Cross Section Location

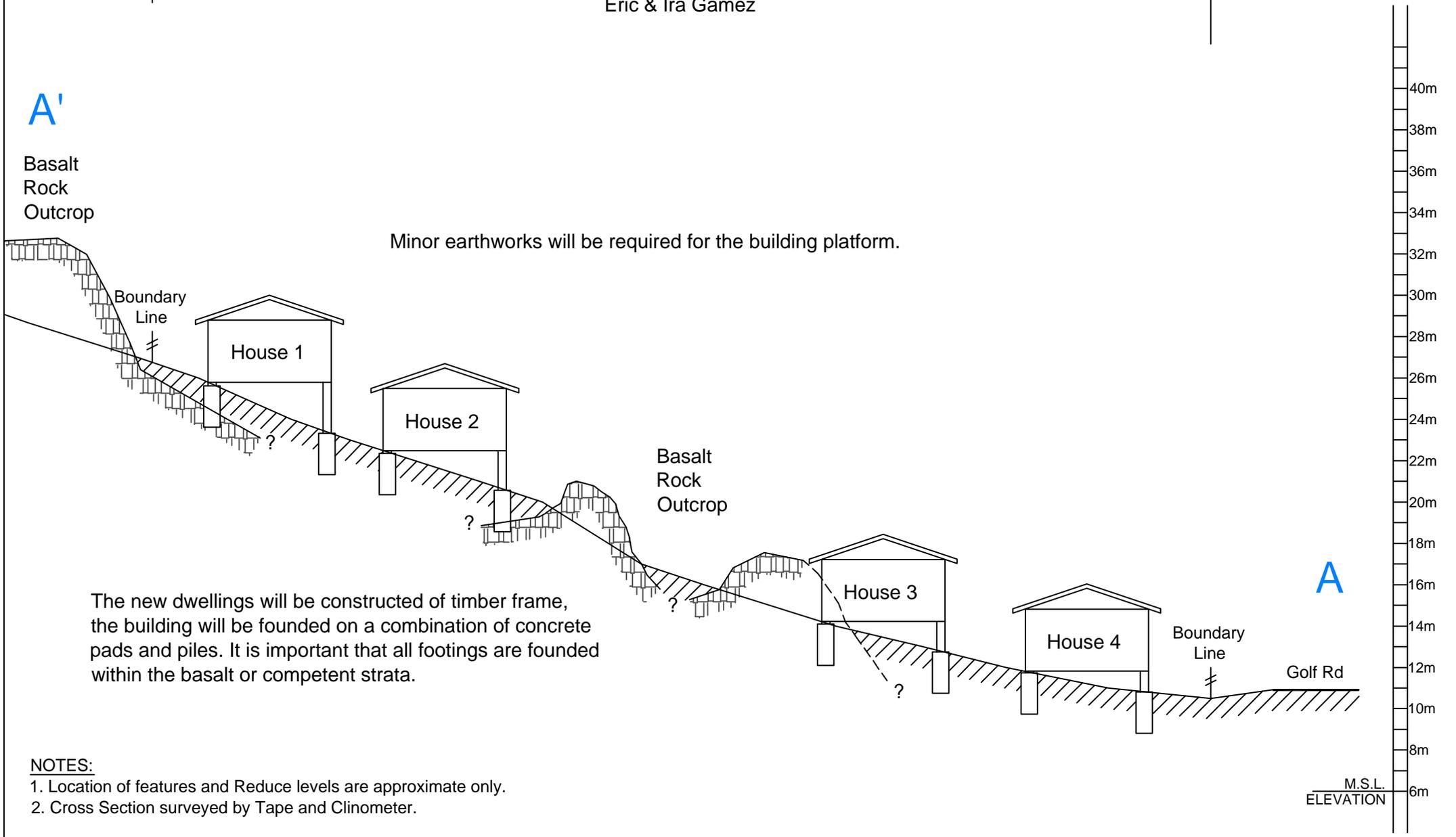
NOTES:

1. Location of features and Reduce levels are approximate only.
2. Cross Section surveyed by Tape and Clinometer.

SITE PLAN	ERIC & IRA GAMEZ	DRAWN: PZ	DATE: 20 SEP 2018
	PROPOSED DEVELOPMENT	CHECKED: PZ	DRAWING NO: E1813
	NIKAO, RAROTONGA	REV NO: 01	SHEET 4 OF 6
		CAD REF: E1813 plan.dwg	SCALES 1:500 at A4

Property: Pokoinu Pt 107F2, Lot 41

Eric & Ira Gamez



CROSS SECTION

ERIC & IRA GAMEZ
PROPOSED DEVELOPMENT - HOUSE
NIKAO, RAROTONGA

DRAWN: PZ	DATE: 20 SEP 2018
CHECKED: PZ	DRAWING NO: E1813
REV NO: 01	SHEET 5 OF 6
CAD REF: E1813 plan.dwg	SCALES 1:500 at A4

Property: Pokoinu Pt 107F2, Lot 41

Eric & Ira Gamez

A'

Basalt
Rock
Outcrop

New Access Rd

Width: 4m

Length: 48m (horizontal length)

16°

NEW ACCESS ROAD

13°

Boundary
Line

House 1

House 2

House 3

House 4

A

Road Formation

FILL utilize soil and rock from
within the property.

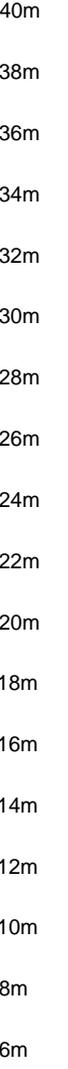
Boundary
Line

Golf Rd

NOTES:

1. Location of features and Reduce levels are approximate only.
2. Cross Section surveyed by Tape and Clinometer.

M.S.L.
ELEVATION



CROSS SECTION

ERIC & IRA GAMEZ

PROPOSED DEVELOPMENT - ROAD

NIKAO, RAROTONGA

DRAWN: PZ

CHECKED: PZ

REV NO: 01

CAD REF: E1813 plan.dwg

DATE: 20 SEP 2018

DRAWING NO: E1813

SHEET 6 OF 6

SCALES 1:500 at A4