
Avarua Wharf Wastewater Improvement

ENVIRONMENT IMPACT
ASSESSMENT REPORT

23 October 2022

Prepared for:
Cook Islands Investment
Corporation

Report prepared by:
TURANGI Geotechnical
Services

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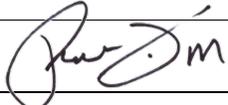
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DEFINITIONS AND LIST OF ABBREVIATIONS

Terms, abbreviations and acronyms	Meaning
CIIC	Cook Islands Investment Corporation
CIG	Cook Islands Government
CIPA	Cook Islands Ports Authority
CEMP	Construction Environment Management Plan
EIA	Environment Impact Assessment
EMP	Environment Management Plan
HSP	Health and Safety Plan
MMR	Ministry of Marine Resources
MSL	Mean Sea Level
NES	National Environment Services
NGO	Non-Government Organisations
TMP	Traffic Management Plan
TOR	Terms of Reference

EXECUTIVE SUMMARY

This EIA Report has been prepared for the Cook Islands Investment Corporation (CIIC), it is responsible for the operation and maintenance of several government buildings and facilities, such as the Avarua Wharf Public Toilets.

This Report is for the installation of a new wastewater treatment system, to facilitate the existing public toilets, located within the Raro Fried Chicken (RFC) building, also referred to as Avarua Wharf Public Toilets. Ongoing and recent stormsurge for the wharf area has contributed to the damage of the existing wastewater treatment system.

Te Marae Ora (TMO) issued an infringement notice to CIIC in May 2022, to advise that the Avarua Wharf Public toilets be temporary closed, and that the existing wastewater system be upgraded to a secondary or advance treatment system.

Technical meeting between CIIC, TMO and Local Plumbing Contractors, resulted in the preferred site for the new treatment system, be located away from the RFC building, over the Vaikapuangi Stream and onto the raised coastal protected 'Greenspace' area.

The key phases of the project comprise:

1. Decommissioning the existing 'failed' wastewater system.
2. Installation of a sealed pump station (chamber), connecting to the existing public toilets.
3. Trench and install 55m long, 'effluent' sewer pressure line, connecting to the pump station.
4. Excavate and install the new Activated Waste Treatment (AWT) system, underground chambers connecting to the sewer pressure line.
5. Formation of a raised box 'Eco-Trench with Denitrification' land application system.

The project is tentatively expected to cost \$70,000, however it will likely rise, with the increase in cost of new materials arriving on the island.

The installation of the new Tertiary Treatment System is expected to be completed in two weeks, pending favourable weather and availability of materials on island.

Alternatives to the project considered:

1. 'Do nothing' approach; this is not considered appropriate as the TMO has already condemned the existing system, and the Avarua Wharf will be without a public toilet.
2. Ministry of Justice (MOJ), shared system; additional cost is expected to run a sewer line some 150m to MOJ existing system, directional drilling will be required to cross under the asphalt 'hotmix' paved road, further cost will be required to upgrade the existing MOJ to cater for the new wastewater loading.
3. Raised Holding Tank; untreated wastewater will be stored in an elevated holding tank, position close-by the RFC building (public toilets). The holding tank will be periodically monitored and emptied, sewage sludge trucks will pump out and cart the sludge to the Rarotonga Waste Facility, sewage treatment ponds.

CIIC and the contractor will develop and pending approval from NES, implement the following plans:

- Construction Environment Management Plan (CEMP)
- Traffic Management Plan
- Health and Safety Management Plan
- Revised RFC Emergency Management Plan

The Project will be undertaken outside of the stream and lagoon water ways. Similar activities have been undertaken, such as utility repairs along the main road, without causing detrimental effects.

Waste generated during the installation of the new treatment system is considered low, and will be removed off site at the end of each working day.

Earthworks will be minor in consideration to the relative small footprint of the new system, all excavated materials will be backfilled, the excess materials will be use to form the raised Land Application System (LAS) mound. No materials will be mined from the site.

CIIC will maintain active communications with key stakeholders and the Avarua community for the full duration of the project, with media release via social media.

This EIA confirms that the effects of this proposal will not be significant. It is considered that with the implementation of the EMP, along with other management plans, any potential effects of the proposal will be minimised.

1. INTRODUCTION

This Environmental Impact Assessment (EIA) report has been prepared to assess the impact of installing a new wastewater treatment system for the existing Avarua Wharf public toilets, and providing methods in minimizing risks. This report will identify potential impacts, provide justification and also include measures to mitigate any negative impacts on the environment. Alternatives considered will also be explained.

The major findings of this report are based on qualitative and quantitative assessments from available resources, including site visits from June to October 2022. In brief the assessment methodology comprise; field data collected, consultation, desktop reviews, experience and professional judgement. This EIA has been produced in accordance with the Environmental Act 2003.

1.1. Proposal Proponent

The Cook Islands Investment Corporation (CIIC) is responsible for the management and operation of public assets that serves the wellbeing of the Cook Islands people.

Cook Islands Investment Corporation (CIIC) is a Government entity charged with the delivery and maintenance of Cook Islands Government assets. This project falls under the Asset Management Division.

1.1.1. Contact details for the proponent/project manager

All general enquiries are to be directed to the 'Project Manager', Vasie Ngatoko-Poila

Contact Details:

- Name: Vasie Ngapoko-Poila, General Manager, Asset Management, CIIC
- Mobile: +682 54475
- Email: vasie.poila@cookislands.gov.ck

1.2. Project Description

CIIC has sought the installation of a new onsite wastewater treatment system to replace the existing system servicing the public toilets and Rarotonga Fried Chicken, at Avarua Wharf, Rarotonga. The proposed location is across from the Banana-court and ANZ bank 'Green space park'. Figure 1 shows the location of the existing holding tank and the proposed new site and layout. Note that the layout is not to scale but is provided to show

approximate layout. A pump station will be installed which will pump effluent across the stream some 55m to the new system for treatment and disposal.



Figure 1: Existing and proposed wastewater system at Avarua Wharf.

New 'Tertiary' Wastewater Treatment System (Green Space)

The new system will be placed underground and to the sides of the open space, adjacent to the armour rock wall, in order to maintain the existing green space.

Improvement to the existing Avarua Wharf Public Toilets will comprise the decommissioning of the existing septic system, located adjacent to the north-west edge of the RFC building. A pump station chamber will be installed at the approximate vicinity of the old septic tank, all waste outlets from the public toilet will gravity discharge towards the new pump station chamber.

The pump chamber will pump effluent via the pressure pipe line towards the septic chamber, located across the Vaikapuangi Stream, within the level grassed area. The entire effluent pressure line will be buried to approve depths (not less than 600mm deep), a ducting and steel clips will be used to secure the pressure (sewer) line to the outside bridge beam, to support crossing over the stream. The total sewer length is some 55m.

Effluent from the septic chamber will pass to a second pump station, the effluent will be pumped up to the Membrane Bioreactor (MBR) for the activated waste treatment process. Once processed, treated effluent from the MBR will pass to the third pump station, the pump station to be pumped to the Land Application System, a raised box Eco Trench with Denitrification area 50m².

Tertiary System Design: Activated Waste Treatment System (AWTS)

1. Membrane Bioreactor: Bio Barrier 1.5
2. Treatment Capacity: +4,000 liters
3. Power usage: Approx. 5kwhr/day
4. Effluent quality: BOB/TSS 2mg. TN 5mg
5. Risk Assessment: 93% reduction TN. Ocfu /100ml
6. Land Application System: Raised box Eco Trench with Denitrification area 50m²

Reference should be made to the attached Site Plan for further details.

New Wastewater System Operation and Monitoring

Raro Plumbing will monitor the new Tertiary System for the first year and provide training to CIIC maintenance staff.

CIIC will continue ongoing monitoring following the handover from Raro Plumbing.

The new system will not require routine septic desludging, as all waste water will be treated through the advance tertiary system.

Routine operation will require inspections of the pump stations and MBR unit to ensure full operation. Frequent inspection will be required during and following storm surge (cyclone) events.

Construction Management

Raro Plumbing with guidance from CIIC will prepare a Construction Environment Management Plan (CEMP), and a Health and Safety Plan for the construction period. The CEMP will include, but not be limited to a Traffic Management Plan (TMP).

These plans will be provided to the National Environment Authority for approval prior to construction commencing. Conditions stipulating the above are suggested as conditions of approval. Construction will be monitored by a suitably qualified engineer appointed by the proponent.

Traffic and Access

The Avarua Wharf is located adjacent to the Main Town Road, traffic is typically congested in the morning 8am and afternoon 4pm, Monday to Friday. The contractor will minimise disruptions to the traffic at these peak times.

Raro Plumbing will apply appropriate measures to cordon off the construction area with barriers and signage. Access to the construction area will be restricted and closed off to the general public.

Parking bays and pedestrian footpaths will be identified and facilitated for, as per the Traffic Management Plan.

Work hours

Works will generally be undertaken between the hours of 7am and 5pm, Monday to Friday. Saturday work which does not create significant noise nuisance will be undertaken with the agreement of the local community. Works will cease and the port will be evacuated in the event of extreme weather events, as is current practice.

Energy

The existing power supply in this area is sufficient for the construction period and for future operations.

Water supply

The existing water supply to the Avarua Wharf area is sufficient for the proposal. Water supply will be used during the construction, to assist with the testing and commissioning of the new system.

Stormwater drainage

The perimeter of the Raro Fried Chicken building comprised of paved road/parking-bay and concrete hardstand. The existing surface is sloped to allowed water to flow into the nearby stream and wharf basin.

The 'Green Space' grassed area allows rainwater to soak into the ground, before seepage to the lagoon. The nearby carpark and road edge has a kerb and channel drain that leads directly to the Vaikapuangi stream.

The contractor will ensure the existing stormwater system is maintained and not altered.

1.3. Project Objectives and Scope

At this stage, the project is to provide for:

- Compliance to the Cook Islands Public Health Sewage Regulations and Code.
- Improve the existing 'failed' wastewater system with an approved, Tertiary Treatment System.
- A fit-for-purpose wastewater system that is durable, ease of operations and easily maintained.
- Reduce impacts to the Environment and the Community.

The environment and social objectives of the project:

- A wastewater system that does not discharge nutrients or pathogens directly into the receiving waterways.
- A wastewater system that is not vulnerable to natural hazard events, such as high seas and coastal inundation.
- A wastewater system that can cater for the Public demand, ease of use and safe.
- A safe working environment for the contractors, RFC staff and the community.
- A wastewater system that has appropriate plans in place to address potential hazards.

Implementation Schedule

The installation of the new 'tertiary' wastewater treatment system is expected to be completed in two weeks, pending favourable weather and available resources on island.

Project Cost Estimates

The project is tentatively expected to cost \$70,000, however it will likely rise, with the increase in cost of new materials arriving on the island.

Outline of events

Regular complaints to CIIC were received, about the RFC public toilets (Avarua Wharf) continued 'blocked' septic tank causing sewage to overflow out along the ground surface, causing bad odour and health-risk to the general public. The close proximity to the stream and harbour basin (lagoon) was also a environment-risk. In the second quarter of 2022, complaints increased and so CIIC has the septic tank regularly emptied by Rarotonga Plumbing Contractors Ltd (RPC) as a temporary measure. On average the holding tank was being emptied every 3 or 4 weeks at a cost of approximately \$1,000 each service. The overflow was largely caused by surface water ingress into the system, poor care and faulty plumbing.

Te Marae Ora (TMO) Public Health issued an infringement notice to CIIC on 2 May 2022 and outlined a number of issues with terms and conditions.

In summary, the infringement notice outlined the following:

1. TMO responded to a complaint from the public of the overflowing septic tank at the Avarua Wharf. Their investigation determined that the sewage system did not meet sanitation regulations and the existing onsite primary wastewater treatment system is within the lagoon protection zone with inadequate capacity for the maximum daily flow. As a consequence, TMO required the temporary closure of the toilet facilities and;
2. To upgrade the existing wastewater treatment system to either a secondary or advanced treatment system in compliance with the Public Health (Sewage Wastewater Treatment and Disposal) Regulations 2014.
3. CIIC was to provide within 20 working days, verified plans towards an upgrade outlining proposed solution(s), timelines and contractor (when available)
4. Upgrade must take place within 2 years from the date TMO receives action plan.
5. The notice further outlined penalties that apply for failure to comply.

After receipt of the infringement notice and following further guidance and advice from the Sanitation Technical Advisor and Health Inspector, Tai Nooapii, the public toilets could remain open but subject to TMO-approved proactive measures and arrangements. CIIC then engaged with local plumbing company, Rarotonga Plumbing Contractors (RPC) to regularly monitor and if required, service the treatment system on a weekly basis or immediately when required.

CIIC then applied for a tender waiver from the Tender Committee to expedite a new installation to service the Avarua Wharf public building. The public space across from the Banana Court was identified as a site to put the new system to move the treatment away from the public building and carpark and risk from sea surge. RPC was engaged to carry out this work.

Alternatives

Two alternatives were considered. One was to pump the wastewater from the Wharf to the Ministry of Justice wastewater treatment system. Due to the expense of cutting the newly laid road and trenching all the way to the system this option was decided against at this time.

A second, recent alternative is to replace the holding tank at the Wharf with a suitably sized tank based on expected loading, raised to prevent surface water ingress with a landscaped mound for protection against sea surge. This holding tank would then be emptied on a regular basis or when full. Events held at the wharf like Vaka Eiva will of course cause the holding tank to be filled faster. A dedicated parking space would be marked to ensure that there is no obstructions to a pump truck accessing the holding tank.

Actions Undertaken and Current Status

Excavation for the treatment tanks started prior to seeking of a permit from the National Environment Service (NES), a regrettable oversight on the part of CIIC personnel. Work is now stopped as per the stop work notice from NES, until a permit is issued.

Relationship to Other Developments

There is an Avarua Town Plan that is in early design stages. At this time, a children's play space is to be located at the current project site. The building for which the new wastewater system will service, is to remain and house oe vaka. Figure 2 shows the proposed and existing site on the Avarua Town Plan. Figure 3 shows a side view of the wharf.

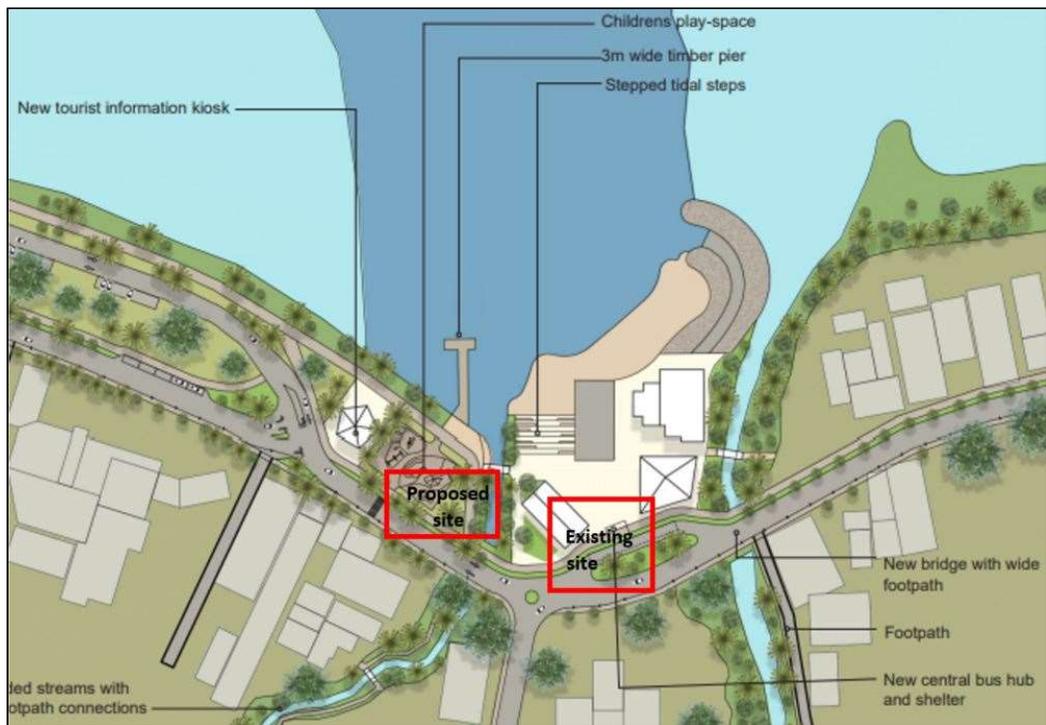


Figure 2: Avarua Town Plan, Future Development



Figure 3: Avarua Town Plan, side perspective view of the proposed development.

Consequences of not proceeding with the proposal

If no upgrade/replacement is carried out, the current problem of overflowing of raw sewage onto public space will continue and have negative effects on diners at the RFC, people taking part in recreation at the wharf, risk of contamination to the marine environment and continue to be in breach of Sewage and Sanitation Regulations 2014.

1.4. Environment Impact Assessment (EIA) Process

1.4.1. Methodology of the EIA

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

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

1) Application stage

June 2022 NES requested that CIIC provide the necessary application documents with regards to development along the foreshore, in this case the installation of a new wastewater system.

CIIC provided an Engineer Report along with the completed Environment Significant Declaration (ESD) Form and submitted to NES on the 27th June 2022.

The proposal was assessed under Section 36 of the Environment Act 2003, the outcome of the assessment determined that the project is likely to cause significant environmental impact, which puts the project in 'Tier Three Activities', and therefore an Environmental Impact Assessment (EIA) would be required.

The EIA Terms of Reference (ToR) prepared by NES was made available to CIIC on September 2022, the EIA ToR forms the basis of this Report.

2) Public notification stage

Section 36(5) of the Environment Act 2003 requires the EIA report 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) Decision 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 notification period of 30 days. As public submissions are received, the NES will provide the proponent with the relevant matters raised, which are to be addressed and commented provided back to the NES.

1.5. Public Consultation

Due to the relative small scale and type of project 'improving an existing wastewater system' it was felt that consultations with key stakeholders was more effective than calling a public meeting with anticipated low attendance.

With technical assistance from Raro Plumbing and TMO, CIIC has held consultations directly with the staff and dinners of Raro Fried Chicken, also consulted were members of the community, canoe association, fisherman, and sightseers to the Avarua Wharf. CIIC also spoke to casual users of the 'greenspace' area.

The outcome of these consultations are as per the following:

- Strong support to maintain the existing public toilets from all those consulted.
- Satisfied that the new wastewater treatment complies with TMO.
- Mixed feelings that the greenspace area will be used for the sewage treatment (expect foul odor), may not be a good place for health-fitness.

Further consultation is expected during the 30 day Public Notification Stage.

1.5.1. Relevant Legislation and Policy Requirement

The National Environmental Services (Tu'Anga Taporoporo) are an organization, which is committed to ensuring the safety of people and the environment. Given the legal authority under the Environment Act 2003, Island Environment Authority will consent to carry out development in 'Specific Areas of Concern' provided that:

- Coastal development or any other environmental impacts have been accounted for and mitigated to both environmental and engineering standards.

The Environment Act 2003 stipulates and enforces Section 50 Part 8 – Protection of foreshore and Cook Island Waters.

The Public Health Sewage Code under the Public Health (Sewage) Regulation 2008 provides for the protection of coastal lagoons from sewage pollution. As the project involves the installation of a new wastewater treatment system, it is imperative that guidelines and standards provided by the Public Health Sewage Code are strictly followed during the installation phase. Under the Code, the project site falls under the Lagoon Protection Zone where higher standards of sewage treatment are needed to protect the coastal lagoon environment from sewage pollution. The new system is approved by the Public Health Department pursuant to Section 18 of the Public Health (Sewage) Regulation 2008.

1.5.2. Planning Process and Standards

The existing land use is one of open public greenspace with a future plan to convert to a play space. The proposal is an attempt to immediately better manage wastewater generated at the building at Avarua Wharf hence the location identified even though there are future plans in place.

The proposal is consistent with policy (Sanitation (Wastewater) Policy) and regulation (Public Health (Sewage and Wastewater Treatment and Disposal) Regulations 2014) that improves the treatment of wastewater in the Cook Islands. The contract with RPC includes

servicing for two years after installation. Annual servicing is required under the Public Health regulations.

The EIA is working to meet the requirements of the Environment Act 2003 and related National Environment Service process.

Pavement cutting will be required at the wharf to dig the trench for the pipe however this does not cross into the road corridor so a permit is not required. Resealing the pavement will be required to return the surface back to an adequate state.

2. PROPOSAL NEED AND STANDARDS

2.1. Proposal justification

Public Health (Sewage) Regulations 2008 and Public Health Sewage Code

The Avarua Wharf Public Toilets is located within an area defined as the Lagoon Protection Zone (LPZ), within this area a higher standard of sewage treatment is required to protect the coastal lagoon from sewage pollution. The New Tertiary Treatment System aims to meet the requirement for waste water treatment within the LPZ.



Figure 4: Raw sewage exposed at the top of the inspection port (photo 25 June 2022)

Environment Act 2003

Ongoing complaints with regards to foul air and septic blockages currently impacts the environment and community, raw effluent discharge into the nearby waters would definitely impact the health of frequent users of the Avarua Wharf, such as fisherman and swimmers. The increase in nutrients would affect the ecosystem encouraging adverse algae growth, impacting water quality, and thus limiting fauna and flora species within the stream, connecting lagoon and wharf passage.

The new Tertiary Treatment System, comprises of a 'Membrane bioreactor' (MBR) it is able to treat sewage using a combination of specialized membranes and activated sludge, MBR can effectively treat waste water to acceptable water quality standards, with sufficient discharge to coastal waters. The Tertiary system, further includes a Land Application System with denitrification process, reducing the amount of nutrient discharge. The proximity of trees and grass would further absorb the remaining nutrient levels.

Community Necessities

Cook Islands Investment Corporation (CIIC) is responsible for the upkeep and operations of several important public buildings and facilities. The current Avarua Wharf Public Toilet is located in a busy area of the Avarua Central Business District (CBD). The Public Toilets serve many users of the Avarua Wharf.

Several annual community events occur or utilize the Avarua Wharf, namely:

- May – Rarotonga International Triathlon, the ‘Boiler Swim’ is a significant triathlon event which involves swimming from the Avarua Wharf.
- April – ANZAC DAY, the Avarua Wharf sits opposite to the Cook Islands World War Memorial Plaque, located next to the Ministry of Justice ‘Court House’. Each year the ANZAC DAY memorial draws large crowds of people.
- November – Vaka Eiva, a major sporting event and biggest paddling completion in the Cook Islands, with invites from around the world. The Avarua Wharf caters for several paddling races.

With the inaugural commencement of the Cook Island Games in 2020, it is likely that future games will utilize the Avarua Wharf for Vaka races, swimming and fishing events.

The Avarua Wharf is home to the Vaka Marumarua Atua, a traditional reconstructed double-hull canoe which serves to teach and encourage Polynesian navigation, the Cook Islands Voyaging Society helps maintain the Vaka and ongoing training.

The respective vaka groups, association teams and individuals actively utilize the Avarua Wharf for training and competitive purposes, the Public Toilets facilitate their needs.

Surf Lifesaving training is often undertaken at the Avarua Wharf, along with Boat Marster training.

Fisherman and diving tours are the main small vessel users of the Avarua Wharf, the public toilet is a comfortable relief for them.

The Rarotonga Fried Chicken is one of the main 24hr eatery, typically popular on the late night weekends. Without the public toilets the RFC would not be able to cater for all diners.

2.2. Alternatives to the Proposal

Alternative 1: ‘Do nothing’ approach

Doing nothing is not considered appropriate. The Te Marae Ora has already served an infringement notice to CIIC in May 2022, clearly stipulating that a upgrade/replacement of the sewage system is required within 2 years.

Without a public toilet at the Avarua Wharf, regular users such as RFC dinners, local fisherman, swimmers, members of the canoeing association and the general public will be disadvantage for much needed toilet facility.

This would also impact events that annually occur around the Avarua Wharf area.

Alternative 2: Ministry of Justice Building, shared system

Wastewater (sewage) from the Avarua Wharf Public Toilet (RFC Building) is pumped directly to the MOJ existing wastewater treatment system. The total length of the sewer line is approximately over 150m, which a directional drill is required to transfer the sewer line below the nearly laid asphalt pavement.

Vodafone Cook Islands are the only local based agency able to undertake directional drilling, however, Vodafone was unable to provide a quote to CIIC regarding this work.

Further assessment of the MOJ existing wastewater system, it is understood that they will also require additional upgrade, which is estimated to be about \$30,000.

This option has a significant high cost, compared to the proposal. Existing underground utilities along the path of the sewer line will be impacted during the construction, and is likely the schedule will be over two weeks long.

Alternative 3: Raised Holding Tank

An appropriately sized wastewater holding tank is placed adjacent to the RFC building, within the Avarua Wharf area. Sewage from the Public Toilets will be pumped directly into the holding tank without any treatment.

The holding tank serves as temporary sewage storage, the holding tank will need to be routinely inspected and emptied when full, to avoid further closure to the Public Toilets. The holding tank will be emptied by sewage pump truck and carted to the Arorangi Waste Management, sewage treatment ponds.

The holding tank will be raised to minimise surface water ingress, especially from storm surge events. Due to the vulnerability of the area to natural hazards, the holding tank structure will need to be 'specifically engineered design' for both durable and climate resilient.

The holding tank poses an increase potential contamination risk, having a high volume, untreated concentrated sewage in close proximity to the stream and lagoon. The risk of leakage to the holding tank, resulting from human error, accidents and natural hazards is considered significant.



Figure 5: Daily debris deposited around the RFC building during the Tropical Depression TD05F (image source; One News, Jan 2022)

3. DESCRIPTION OF PROJECT DEVELOPMENT

3.1. Location of the site

The Avarua Wharf is situated on the northern side of Rarotonga, it lies 1 km to the east of Avatiu Wharf, the international port of entry. There is currently three buildings on the Avarua Wharf, these comprise; Rarotonga Fried Chicken, Canoeing Club and Trader Jacks. The public toilets is located within the Rarotonga Fried Chicken building.

The next nearest Public Toilet is some 280m away to the west, along the Main Road (Ara Tapu) and Te Ara Maire Nui (coastal road).

The coastal properties occupying the Rarotonga Fried Chicken building and grassed area are located on Crown Land, legally described as "Pt 32 Timber Reserve, Gazette 1/12/1904, 161p234 and PT 38A Convey to Crown, 8/9/1922, Takuvaine Tapere, Avarua District"

The Vaikapuangi Stream runs along the western side of the building and wharf structure. A row of armour rocks run along the western stream embankment connecting to the coastal protection armour rock, running adjacent to Te Maire Nui Drive.

All coastal properties are access directly from the main road (Ara Tapu).

The Rarotonga Fried Chicken is surrounded by sealed carpark and driveway. The building is less than 2m above mean sea level, and therefore prone to high seas and storm surge.



Figure 6: Location of the Public Toilet (RFC building) and the proposed treatment site

The Greenspace area is protected by armour rock along the coastline.



Figure 7: Grassed 'Green Space' area, site for the new wastewater treatment system (photo 25 June 2022)

3.2. Staging

No staging required, as the installation of the new wastewater on-site treatment will not restrict the operations of the Avarua Wharf, however the Greenspace area will be temporary closed, and park users are encourage to use the Terevete Park.

The project involves; decommissioning the existing failed septic tank, installation of pump chamber, treatment chamber, excavating 55m of trenching, install bridge ducting and installation of the sewer pressure line. All to be completed in two weeks.

3.3. Emergency management

In the event a natural disaster warning has been issued, being an approaching cyclone or tsunami, 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.

Accidents and emergencies will be managed through the development and implementation of a Construction Management Plan with the necessary equipment and personnel training provided.

RFC Building Emergency Management Plan

This Plan is implemented upon pending adverse weather and during the event. RFC staff maintains an active 24 hour, 7 days a week communication access with regards to adverse weather and hazard notifications, via issued weather bulletins and EMCI media release. The staff on duty will assess and prepare the RFC for building closure.

Where the severity of the hazard is known, such as an approaching cyclone. Authorization will be sort form CIIC with regards to:

- Pump out all waste and deliver to the Rarotonga Waste Facility.
- Disconnect the main power line, remove the meter box.
- Secure all hatches and access points where possible.
- Issue carpark closure notice.

3.4. Infrastructure requirement

The New Wastewater Treatment system is unlikely to run along the main road, the majority of the work will be located along the RFC perimeter parking bay and the greenspace grassed area.

It is the contractor's responsibility to ensure that all structures such as the RFC carpark and footpath, along the trenching path be reinstated to its original conditions, following the installation of the sewer line and trench backfilling.

3.4.1. Transport

The trenching and installation of the sewer pressure line along the RFC building parking bay and driveway is the only area that would hinder traffic movement within the Avarua Wharf area.

Pedestrian movement along the northern seaside of the main road will also be restricted during the installation phase.

The New Wastewater System is located in the 'greenspace' well away from the main road.

The relative small scale of the project will unlikely disrupt normal traffic movements in the Avarua area. The contractor will ensure that all materials, equipment and machineries are delivered to the site outside of peak traffic hours, morning and afternoon.

A 2ton hydraulic excavator will likely be the main heavy plant equipment, supported by a skid-steer loader (Bobcat), the contractor ute and van will likely comprise the construction traffic.

3.4.2. Stormwater Drainage

Both the reclamation soils and natural beach ridge soils in the area, are considered moderate free draining type.

Avarua Wharf

The perimeter of the Raro Fried Chicken building comprised of paved driveway, parking-bay and concrete hardstand. The existing surface is sloped to allowed water to flow into the nearby stream and wharf basin.

The RFC roof, parking bay and adjoining main road are the major source of stormwater for the Avarua Wharf area.

Trench excavations is considered to be minor, with sufficient width and depth to install the sewer pipeline. The 55m trench length is likely to be backfilled at the end of the day, minimising the risk of scouring and sediment flow into the water ways.

Greenspace 'Grassed' Area

The 'Green Space' grassed area allows rainwater to soak into the ground, before seepage to the lagoon. The nearby carpark and main road edge, has a kerb and channel drain that leads directly to the Vaikapurangi stream.

The contractor will ensure the existing stormwater system is maintained and not altered.

3.4.3. Mining of Materials

No materials will be mined from the site, all materials encountered during the earthworks will be reinstated, where excess materials is encountered, this will be used to support the formation of the Land Application System (LAS) raised mound.

The LAS is a vital component of the New Wastewater Treatment System.

3.5. Waste Management

3.5.1. Character and Quantities of Waste Materials

Installation of the New Wastewater Treatment System

Low waste volumes is expected during the installation stage, as this will comprise typical plumbing wastes such as; pipe off-cuts, strapping cables, packaging and empty containers.

All waste generated will be removed, at the end of each working day and no waste to remain at the completion of the works, the contractor is responsible for maintaining a waste free and tidy site.

Operation of the New Wastewater Treatment System

The new on-site treatment system is designed to not generate waste, therefore no sludge removal is required. The new system will treat the Public Toilet wastewater system to appropriate standards.

3.5.2. Solid Waste Disposal

No solid waste, either generated or imported to be disposed in any landfill on the coastal property. All solid waste is to be carted offsite at the end of each day.

No landfill or disposal areas permitted in the area.

4. ENVIRONMENT VALUES AND MANAGEMENT OF IMPACTS

Description of the Baseline Environment

4.1. Land

4.1.1. Description of Environmental Values

Avarua Wharf, RFC parking bay and driveway

Impacts to the land in this area is considered low, as the excavated sewer line trench will be reinstated to its original condition at the completion of the works. The land will continue to serve as a driveway and parking bay.

Greenspace, New Wastewater Treatment System

The new treatment system is in sync with the existing grass, surrounding trees and coastal shrubs offer, excess nutrient from the wastewater system are furthered absorbed by the receiving vegetation.

The installation of the treatment system will reduce the greenspace area slightly, especially along the raised LAS mound.

It is anticipated that the exposed treatment system will garner negative perceptions from the general public, especially those whom use the area for recreational purposes.

4.1.2. Soils

Geology

Both the Avarua Wharf and Grassed Area are located on reclamation land, exposed subsoils nearest the RFC building confirms the subsoil to comprise of Engineered Fill, intermixed coral cobble and white, pale brown clayey silt volcanic soils some sand. The recent septic chamber excavation at the grassed area, shows Engineered Fill, intermixed coral and basalt gravels, with brown clayey sandy-silt soils.



Figure 8: Recent excavated pit some 0.8m deep confirms the presence of FILL material (photo 25 June 2022).

4.1.3. Landuse/Characteristics

Land Tenure

With respect to the Project site, 'Land' in this section refers to the existing wharf and the adjoining land on the western side of the Vaikapuangi Stream, along the old mean high water mark. Figure below shows the area defined as "land" for the purposes of this assessment and also shows the land cadastral boundaries superimposed. The cadastral boundaries (black lines) that run parallel with the shoreline mark the original mean high water mark. From this, it clearly shows that the Project site is reclaimed land, and as such, it is in Crown ownership and under the jurisdiction of the Cook Islands Investment Corporation (CIIC).



Figure 9: Cadastral boundary overlay Avarua Harbour aerial image.

Landscape Characteristics

The landscape of the area is already heavily modified and consists of the existing wharf, the RFC building (public toilets), Canoe Association Shed, Trader Jacks building, paved driveway, parking bay, concrete hardstand, and ramp. Coastal protection armour rock revetment wall runs along the western reclaimed shoreline.

Avarua Wharf, RFC Building

The site has always served as a wharf for almost 200 years, prior to that the Avarua Wharf, traditionally referred to as Tuitui-Kaimoana, was one of several main landing sites for ocean voyaging canoes on Rarotonga.

The Avarua Wharf is Crown Land, described as 'Conveyed to Crown 8/9/1922, Pt 38 Takuvaine Tapere, and Avarua District'.

Greenspace, Grassed area

The Greenspace area once a narrow landstrip that was occasionally used for local market stores, following the impact of Cyclone Sally in January 1987, over 80% of the buildings in Avarua was damaged, both harbours completely blocked.

From the 1990's the Cook Island Government focused on strengthening the Avarua Township foreshore, therefore the beach and lagoon was reclaimed. An additional road lane was added 'Te Ara Maire Nui' within the reclaimed land, an armour rock revetment wall was also constructed along the reclaimed land.

The Greenspace grass area is Crown Land, described as 'Timber Reserve Gaz. 1/1/1904, 161p234, Pt 32 Takuvaine Tapere, and Avarua District'.

4.1.4. Landscape Character

Land Use

The existing uses of the area include:

- Commercial activities including launching of tourism tours, fishing charters and dive charters;
- Community activities in the form of fishing for seasonal fish, launching of fishing boats for individual fisherman or for community fishing activities, sightseeing.
- Annual events, namely; Rarotonga International Triathlon (Boiler swim), ANZAC Day (open space for crowd gathering), Vaka Eiva (canoe paddling competitions)

The Avarua Wharf is home to the Vaka Marumarua Atua, a traditional reconstructed double-hull canoe which serves to teach and encourage Polynesian navigation, the Cook Islands Voyaging Society helps maintain the Vaka and ongoing training.

The respective vaka groups, association teams and individuals actively utilize the Avarua Wharf for training and competitive purposes.

Surf Lifesaving training is often undertaken at the Avarua Wharf, along with Boat Master training.

The Rarotonga Fried Chicken is one of the main 24hr eatery, typically popular on the late night weekends. The neighbouring Trader Jacks is also popular eatery and bar.

Other uses of the area include, fish cleaning and processing by local fisherman, general boat launching and mooring of local fishing boats. Because of its accessibility the area is

regularly used by locals as a common swimming area (especially the harbour and inner channel area).

The installation of the New Treatment System, will not alter the character of the landscape, as the majority of the new system will be underground, apart from the LAS raised mound at the Greenspace area.

4.1.5. Potential Impacts and Mitigation Measures

The LAS raised mound is the main exposed treatment system, the composition of soils to form the mound will support the establishment of grass, already occupying the area.

CIIC will ensure that vegetation regrowth, especially re-establishing the grass growth at all exposed soil areas.

4.1.6. Landuse Suitability

The significant landuse change is that the greenspace grassed area will be used as the on-site treatment system location for the RFC building public toilets. The existing grass area, surrounding trees, free draining soils, and protected shoreline is considered a suitable site for the new wastewater treatment system.

The new treatment system will not restrict usage of the land to; recreation, education (treatment system), awareness and other activities.

4.1.7. Land Contamination

All waste generated during the installation phase will be removed from the site on a daily basis. No heavy plant machinery will operate within the existing stream and harbour waterways.

All excavations including trenches will be backfilled, compacted and reinstated to its original conditions in a timely manner to minimise exposed soils areas.

The new wastewater treatment system, is one of several approved systems by the Public Health, in accordance to the regulation and code. The new system is design to treat wastewater on-site to acceptable standards, without contamination to the ground and surrounding environment.

4.2. Water Resource & Quality

4.2.1. Description of Environmental Values

For almost a decade, the Ministry of Marine Resources (MMR) has been undertaking water quality analysis for Rarotonga lagoons and streams, the water quality monitoring is also undertaken on selected outer islands.

MMR captures water quality information into three main sections:

1. **Nutrients**, the testing parameters include; temperature, salinity, dissolved oxygen, pH, and nitrates and orthophosphates that are the primary nutrients responsible for eutrophication.
2. **Bacteria** levels (i.e., Enterococci and Enterococci bacteria) are also monitored to determine the levels of faecal matter entering the lagoon.
3. **Water Clarity** levels are also monitored, the parameters comprise Total Suspended Solids (TSS) and Chlorophyll a.

The water quality samples are tested at the MMR lab, with results included in the Rarotonga Water Quality Reports and Report Cards, these are available on the MMR website www.mmr.gov.ck.

LEVEL		RECOMMENDED STANDARDS USED		
		Dissolved Oxygen (%)	Enterococci (MPN/100mL)	Suspended Solids (mg/L)
Excellent	A	> 95	< 41	< 1.0
Very Good	B	90 ≥ 95	41 ≥ 100	1.0 ≥ 2.5
Good	C	80 ≥ 90	100 ≥ 200	2.5 ≥ 5.0
Poor	D	60 ≥ 80	200 ≥ 350	5 ≥ 10
Very Poor	E	40 ≥ 60	350 ≥ 500	10 ≥ 20
Extremely Poor	F	< 40	> 500	> 20

Figure 10: MMR water quality grading scale and parameters used.

In summary, the water quality results over the years (2007 to 2013) for the Avarua Wharf area (nearest monitoring station is TJ's or site id RAM20) indicates the following:

1. Nutrient levels are consistently 'poor' with the exception of 2008 and 2011 having a 'good' status.
2. Bacteria levels remain 'excellent' throughout the monitoring period.
3. Water Clarity levels range from 'good' to 'very good' throughout the monitoring period.

4.2.2. Potential Impacts and Mitigation Measures

The project site lies along the outlet of the Vaikapuangi Stream, the stream discharges directly into the Avarua Harbour basin and lagoon. The Vaikapuangi Stream Catchment covers about 84 hectares, with a total stream length of 2km.

Landuse within the stream catchment varies, comprising of government buildings, residential dwellings and business (Banana Court) along the coastal plains. The Takuvaine swamp wetland also adjoins to the stream.

Towards the Maungatea Peak, the inland Taue hillside, comprise of dense native vegetation.

The high nutrient levels entering the marine environment is likely a result of human activities (vegetation clearing) combined with climate impacts such as high intense heavy rainfall. Flooding is typically experienced in the Avarua Town Ara-Metua (Back Road) area.

The recent Tropical Depression and with other high seas event, has also contributed to the nutrient loading at the Avarua Wharf area.

The new wastewater system is design to treat all wastewater to acceptable levels. It is unlikely that the new treatment system will discharge any fluid or sludge directly into the marine environment.

The new system will be captured in CIIC Asset Management program. The new system will be routinely monitored, faults addressed in a timely manner and appropriately funded, as part of CIIC Asset Management Program.

4.3. Waste

4.3.1. Description of Environmental Values

Installation of the New Wastewater Treatment System

Low waste volumes is expected during the installation stage, as this will comprise typical plumbing wastes such as; pipe off-cuts, strapping cables, packaging and empty containers.

Operation of the New Wastewater Treatment System

The new on-site treatment system is designed to not generate waste, therefore no sludge removal is required. The new system will treat the Public Toilet wastewater system to appropriate standards.

4.3.2. Potential Impacts and Mitigation Measures

All waste generated will be removed, at the end of each working day and no waste to remain at the completion of the works, the contractor is responsible for maintaining a waste free and tidy site.

No solid waste, either generated or imported to be disposed in any landfill on the coastal property. All solid waste is to be carted offsite at the end of each day.

No landfill or disposal areas permitted in the area.

4.4. Social

4.4.1. Description of Environmental Values

As mentioned in 4.1 Land, both the Avarua Wharf and Greenspace area is widely used by the community for business (RFC and Trader Jacks, recreation activities (swimming), sporting events (vaka eiva), livelihood (fishing), sharing traditional knowledge (voyaging society) and health-fitness.

Partial areas of the Avarua Wharf (parking bay and drive way) will be closed off from the public during the installation phase, the closure periods is expected not to exceed two days, with ample time to complete the installation work.

Social disruptions is considered minor, as the remaining wharf area is still accessible from other areas, such as the eastern side of the RFC building and entry to Trader Jacks.

People using the greenspace area will be advised to use the Terevete Park for the duration of the project. Once the new treatment system installation is complete, then people can continue to use the greenspace.

4.4.2. Potential Impacts and Mitigation Measures

CIIC will issue a media release to advise the general public with regards to the commencement of the project, the start date and expected completion date.

The contractor will apply site safe practises to ensure the safety of both the general public and the workers. Appropriate safety signs will be installed around the project site, along with barrier fencing and caution tape.

The contractor will develop and implement a traffic management plan, which will also include a health and safety plan. Both plans are required to ensure that safety to the public is maintained at all times and disruptions to the Avarua traffic are kept to a minimum.

4.5. Health and Safety

4.5.1. Description of Environmental Values

Similar to the above heading, *4.4 Social*, the contractor will develop and implement a health and safety plan. During the installation phase, the excavated pits and trenches are a potential health risk to the public, vulnerable to accidents (falling in the trench).

The contractor will ensure that all excavated trenches and chamber pits are appropriately fenced off from the public, where possible; to carry backfilling at the end of each.

4.5.2. Potential Impacts and Mitigation Measures

CIIC will ensure that the contractor implements the activities of the health and safety management plan.

A complete first aid kit is to be made available at all times, and its location made known to all. The contractor will familiarise to the location of the nearest 'Automated External Defibrillator' AED machine, and identify whom has first aid certificate, including RFC staff.

All accidents encountered during the installation phase is to be recorded and included in the contractors progress reporting.

All contractors are to wear the appropriate 'Personal Protective Equipment' (PPE), a minimum of a safety boot and reflective vest. When working under machinery or under objects, appropriate hard-hat is required. Protective Ear-muff to be worn when working with excessive noise power tools, or nearby a loud noise source (generator).

4.6. Economy

4.6.1. Description of Environmental Values

Tourism contributes over 60% to the total GDP of the Cook Islands, prior to the covid pandemic arrivals were in excess of 180k for 2019. The government has since relax covid restrictions and allowed ease of access into the Cook Islands, visitor arrivals were reduced to 30k for 2020 and 2021, with slight increase expected for 2022 (source <https://www.mfem.gov.ck/statistics/social-statistics/tourism-and-migration>)

The Avarua Wharf is located within the main Avarua Township 'Central Business District' (CBD), high volumes of tourist gather or pass along the greenspace and Avarua Wharf area, some are actively involved with annual events such as Rarotonga Triathlon and Vaka Eiva.

The Raro Fried Chicken (RFC) is currently the only 24hr seven days a week 'eatery' on Rarotonga, it is able to cater for visitors and locals.

The Trader Jacks is an iconic restaurant and bar, which is usually filled with tourist.

It is Rarotonga; friendly hospitality, unspoilt natural beauty and simplicity are some values that attracts tourism, however, detrimental wastewater systems would certainly influence negative experience to visitors.

The new wastewater treatment system will complement the existing public toilets (RFC Building), therefore the impact to economy is considered very low.

4.6.2. Potential Impacts and Mitigation Measures

The new wastewater treatment system along with the public toilets, will be included in CIIC Asset Management Plan. The plan will ensure continued operation, maintenance and future improvements of the facility, to maintain active economic growth of the Avarua Wharf and Township area.

4.7. Hazards and Risks

4.7.1. Description of Environmental Values

Rarotonga has experienced several natural hazards this year (2022), namely:

- January mini-tsunami resulting from Tonga's volcanic eruption, the surging waves caused minor-damages to boats moored at both the Avarua and Avatiu Harbour.
- January tropical depression TD05F, the week-long elevated tides and surging waves caused substantial damages along the northern to eastern coastline of Rarotonga. Storm surge debris (rocks, sand, soil, coastal shrubs and coconuts) were regularly deposited during high tide at the Avarua Wharf area.
- July extreme high seas event, a similar week-long elevated tides and surging waves caused further coastal damages, with the worst affected areas along the southern to eastern coastline.

The increase frequency of storm surge at the Avarua Wharf contributed to the damage of the existing public toilet and septic system.

The greenspace ground level is slightly elevated compared to the RFC building ground level and parking bay area. The coastal armour rock revetment wall, provided protection to the greenspace area during all the storm surge events.

4.7.2. Potential Impacts and Mitigation Measures

The new wastewater treatment system is to be included into the existing RFC Building Emergency Management Plan. Where a hazard is likely to occur, the on-duty RFC personal with the approval of CIIC, will shut off the treatment system, especially the pumps. Where possible, close off all valves to limit storm water and sediment entry into the system.

During the installation phase, the contractor will ensure that the both the Traffic Management Plan and Health and Safety Management plans are implemented, to reduce potential risk of accidents.

4.8. Erosion Control

4.8.1. Description of Environmental Values

Expected earthworks for the installation of the new wastewater treatment system comprise a 55m long trench and underground chambers. Excavation work for one of the underground chambers was partially completed in June 2022. The nature of the free draining soils has allowed surface water (rain) to seep within the existing chamber pit, without flooding.

The greenspace 'new treatment system' is located some 10m away from the stream edge, this embankment area along with the rock wall, is occupied by grass, low shrubs and trees.

4.8.2. Potential Impacts and Mitigation Measures

All excavation including backfilling will be carried out during fine weather, no earthworks during rainfall events.

All trenches following the installation of the sewer pumpline, be backfilled before the end of each working day. The top surface is to comprise of compacted granular fill, to minimise sediment flow to the receiving waterways. Timely reinstatement of the final surface, of either concrete or paved be carried out in a timely manner, to further secure the trench excavation alignment.

The excavated material for the underground chamber pits, be temporary stockpiled adjacent to each pit, away from any drainage path. Where required, all stockpiles be securely covered using pvc rolls, to minimise scouring during heavy rainfall events.

5. ENVIRONMENTAL MANAGEMENT

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:

- Installation of the new wastewater treatment works and activities will not commence until the EIA and CEMP has been approved;
- Installation of the new wastewater treatment works will be undertaken in compliance with all current legislation and any conditions imposed on the EIA Approval;
- The new wastewater treatment works will utilize the best practicable options to ensure adverse environmental effects are avoided, remedied or mitigated.
- Social disturbance as a result of the project 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.

5.4. Table 1 Summary of Potential Impacts, Mitigation Measures, Monitoring and Responsibilities

Environmental Issue	Mitigation Measures	Locations	Timeframe	Implementation	Monitoring Parameter	Monitoring Frequency	Monitoring Responsibility	Supervision
Public access restricted to the Greenspace grassed area.	The greenspace grassed area will be closed off, the Public will be advised to use the Terevete Park using signs and media release.	Greenspace grassed area site for the new wastewater treatment system.	Total duration of the installation period, tentative 2 weeks.	Contractor	Complaints received.	Daily observations	Contractor Site Supervisor	Project Manager
Public access restricted along the RFC driveway and footpath.	Temporary closure of the RFC driveway, parking bay and footpath to allow trenching and installation of the sewer pipeline.	RFC driveway, parking bay and footpath.	Tentative 2 to 3 days closure.	Contractor	Complaints received.	Daily observations	Contractor Site Supervisor	Project Manager
Emergency management	Once a hazard warning has been issued or made known, all work will cease, all machinery, equipment and material removed off-site. Work to recommence once all clear notification is issued.	Whole project site; Avarua Wharf and Greenspace area.	Pending the duration of the hazard.	Contractor	Notification reports.	Hazard observations	Contractor Site Supervisor	Project Manager
Stormwater Drainage	No excavations prior or during rainfall events. All trenches along impervious surfaces are	Whole project site; Avarua Wharf and Greenspace area.	Total duration of the installation period, tentative 2 weeks.	Contractor	Progress reports.	Daily observations	Contractor Site Supervisor	Project Manager

Avarua Wharf Wastewater Improvement

Environmental Issue	Mitigation Measures	Locations	Timeframe	Implementation	Monitoring Parameter	Monitoring Frequency	Monitoring Responsibility	Supervision
	backfilled at the end of each day.							
Mining of Materials.	No materials to be mined from the site. All excess excavated material to be repurpose on-site.	Whole project site; Avarua Wharf and Greenspace area.	Total duration of the installation period, tentative 2 weeks.	Contractor	Progress reports.	Daily observations	Contractor Site Supervisor	Project Manager
Waste generated during the installation period.	All waste materials to be removed off site at the end of each working day. No landfill or disposal areas permitted in the area.	Whole project site; Avarua Wharf and Greenspace area.	Total duration of the installation period, tentative 2 weeks.	Contractor	Progress reports.	Daily observations	Contractor Site Supervisor	Project Manager
Water resource and quality.	No heavy plant machinery to operate within the stream or coastal waters.	Whole project site; Avarua Wharf and Greenspace area.	Total duration of the installation period, tentative 2 weeks.	Contractor	Progress reports.	Daily observations	Contractor Site Supervisor	Project Manager
Avarua town traffic.	A traffic management plan will be develop, and implemented. No main road closure at any time. No delivery of materials during peak traffic times.	Avarua Ara-Tapu (main road).	Total duration of the installation period, tentative 2 weeks.	Contractor	Complaints received.	Daily observations	Contractor Site Supervisor	Project Manager

Avarua Wharf Wastewater Improvement

Environmental Issue	Mitigation Measures	Locations	Timeframe	Implementation	Monitoring Parameter	Monitoring Frequency	Monitoring Responsibility	Supervision
Site Safety	A health and safety management plan will be developed and implemented. All accidents are recorded and reported. All workers to wear the appropriate PPE, a minimum of a safety boot and a reflective vest.	Whole project site; Avarua Wharf and Greenspace area.	Total duration of the installation period, tentative 2 weeks.	Contractor	Progress reports.	Daily observations	Contractor Site Supervisor	Project Manager
Excessive noise during the installation period.	Protection ear muffs made available to all workers. The RFC staff are notified in advance.	Whole project site; Avarua Wharf and Greenspace area.	Total duration of the installation period, tentative 2 weeks.	Contractor	Noise levels.	Daily observations	Contractor Site Supervisor	Project Manager
Erosion control.	All temporary excavated stockpiles to be securely covered using PVC rolls. Similar to stormwater drainage activities.	Greenspace area.	Installation period of underground chambers, tentative 4 days	Contractor	Progress reports.	Daily observations	Contractor Site Supervisor	Project Manager

6. CONCLUSIONS AND RECOMMENDATIONS

6.1. Conclusion

This EIA application by CIIC, for approval by NES to install a new wastewater treatment system to facilitate the existing public toilets within the RFC building, and without adversely affecting the environment.

The environment and social objectives of the project:

- A wastewater system that does not discharge nutrients or pathogens directly into the receiving waterways.
- A wastewater system that is not vulnerable to natural hazard events, such as high seas and coastal inundation.
- A wastewater system that can cater for the Public demand, ease of use and safe.
- A safe working environment for the contractors, RFC staff and the community.
- A wastewater system that has appropriate plans in place to address potential hazards.

The key phases of the project comprise:

1. Decommissioning the existing 'failed' wastewater system.
2. Installation of a sealed pump station (chamber), connecting to the existing public toilets.
3. Trench and install 55m long, 'effluent' sewer pressure line, connecting to the pump station.
4. Excavate and install the new Activated Waste Treatment (AWT) system, underground chambers connecting to the sewer pressure line.
5. Formation of a raised box 'Eco-Trench with Denitrification' land application system.

This project is necessary to maintain the operations of the existing Avarua Wharf public toilets, compliance to TMO sewage regulation and code, restrict further contamination to the marine environment. This project will have a positive effect on the economy and improve well-being of both the community and visitors to Rarotonga.

An Environment Management Plan, Traffic Management Plan and Health & Safety Plan will be prepared and made available to NES prior to works commencing. It is considered that with the implementation of the Plans, the potential adverse effects of the proposal on the environment, social values and the economy will not be significant. The project will be undertaken within the Avarua Wharf and Greenspace grassed area. The methodology of works has been used in previous projects of a similar nature around Rarotonga without causing detrimental environmental effects.

6.2. Recommended Conditions of Approval

In addition to NES standard conditions of approval, the following are some suggested conditions of approval, based on mitigation measures proposed throughout this EIA:

- The supervision of the tertiary treatment system is to be carried out registered Public Health Drain Layer, with appropriate Sanitation background and is familiar with the contents of this report.
- The updated technical drawings is to be made available to NES prior to work being carried out.
- A practical completion report is to be made available to NES within 10 days following the completion of the tertiary system installation.
- All machinery shall be operated away from the adjacent waterways, so that any contaminant such leaking fuel or oil does not enter the coastal marine area.

- A Construction Environmental Management Plan shall be prepared and submitted to the NES for approval prior to construction works authorized by this approval being undertaken. The CEMP shall include a Traffic Management Plan and Health and Safety Management Plan.
- Following detailed engineering plans being finalized and prior to any earthworks commencing at the site, a final Environmental Management Plan shall be provided to NES for approval.
- On-going consultation with the Avarua community will be facilitated as required. Progress reports will be released to the public via social media.

7. STUDY TEAM

The following professionals contributed to the development of the EIA Report.

Name	Qualifications	Key Experience
Paul Teariki Maoate	Masters in Business Administration NZ Certificate in Civil Engineering Graduate Certificate in Ridge to Reef Sustainable Development	Experience in Geotechnical, Coastal and Three Waters Engineering. Member of the Institute of Professional Engineers Cook Islands

8. REFERENCES

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Appendix A

National Environment Services EIA Terms of Reference

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

**Cook Islands Investment Corporation (CIIC) – Avarua
Wharf Wastewater Management Upgrade.**

Te Au O Tonga

Avarua

Rarotonga

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- 4.7 Hazards and Risk
 - 4.7.1 Description of Environmental Values
 - 4.7.2 Potential Impacts and Mitigation Measures
- 4.8 Erosion Control
 - 4.8.1 Description of Environmental Values
 - 4.8.2 Potential Impacts and Mitigation Measures

5. Environment Management Plan (EMP)

6. References

7. Recommended Appendices

- A1 Final TOR for this EIA
- A2 Final Project Design/Drawings
- 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 the Cook Islands Project. 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 standalone, 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 **Avarua Community**, 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 **Avarua 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 **Takuvaine** village and also the **Avarua District** 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 Airport Infrastructure and all other infrastructure contained within the reserves within of the site boundaries, including private roads and public roads which are disrupted or 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 disrupt normal traffic movements at the **Avarua** 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 the existing storm water drainage system in the area. The EIA should indicate the sources of the drainage water, e.g. wetlands, 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.

3.4.2 Mining of Materials

A description should be provided especially to identify the existing materials present in the area. The EIA should indicate the sources of where the materials will be mined, the amount of materials that will be mined for the project.

- The general location of the area of which the material will be mined (e.g. Maps, Design etc.)
- 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.
- Any alternate source sites for mining if the proposed site is not enough to complete the work.
- Indicate what equipment's or machinery will be used to carry out the mining phase.
- A description to be provided as to how the mined site will be restored to its natural state after the project is complete.

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 subsection 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 socioeconomic 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 (incl biodiversity and any relevant protected areas), 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 **Avarua** 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, as well as 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 Land use 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 Water Resources & Quality

4.2.1 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 (Coli form, E Coli)

4.2.2 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.

4.3 Waste

4.3.1 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

4.3.2 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

4.4 Social

4.4.1 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.

4.4.2 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.

4.5 Health and Safety

4.5.1 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

4.5.2 Potential Impacts and Mitigation Measure

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

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.

•

4.6 Economy

4.6.1 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.

4.6.2 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.

4.7 Hazards and Risk

4.7.1 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

4.7.2 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.

4.8 Erosion Control

4.8.1 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

4.8.2 Potential Impacts and Mitigation Measures

- Manage storm water 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 area
- Drain storm water 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 re-vegetate areas cleared as part of works
- Prepare re-vegetation 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 **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:

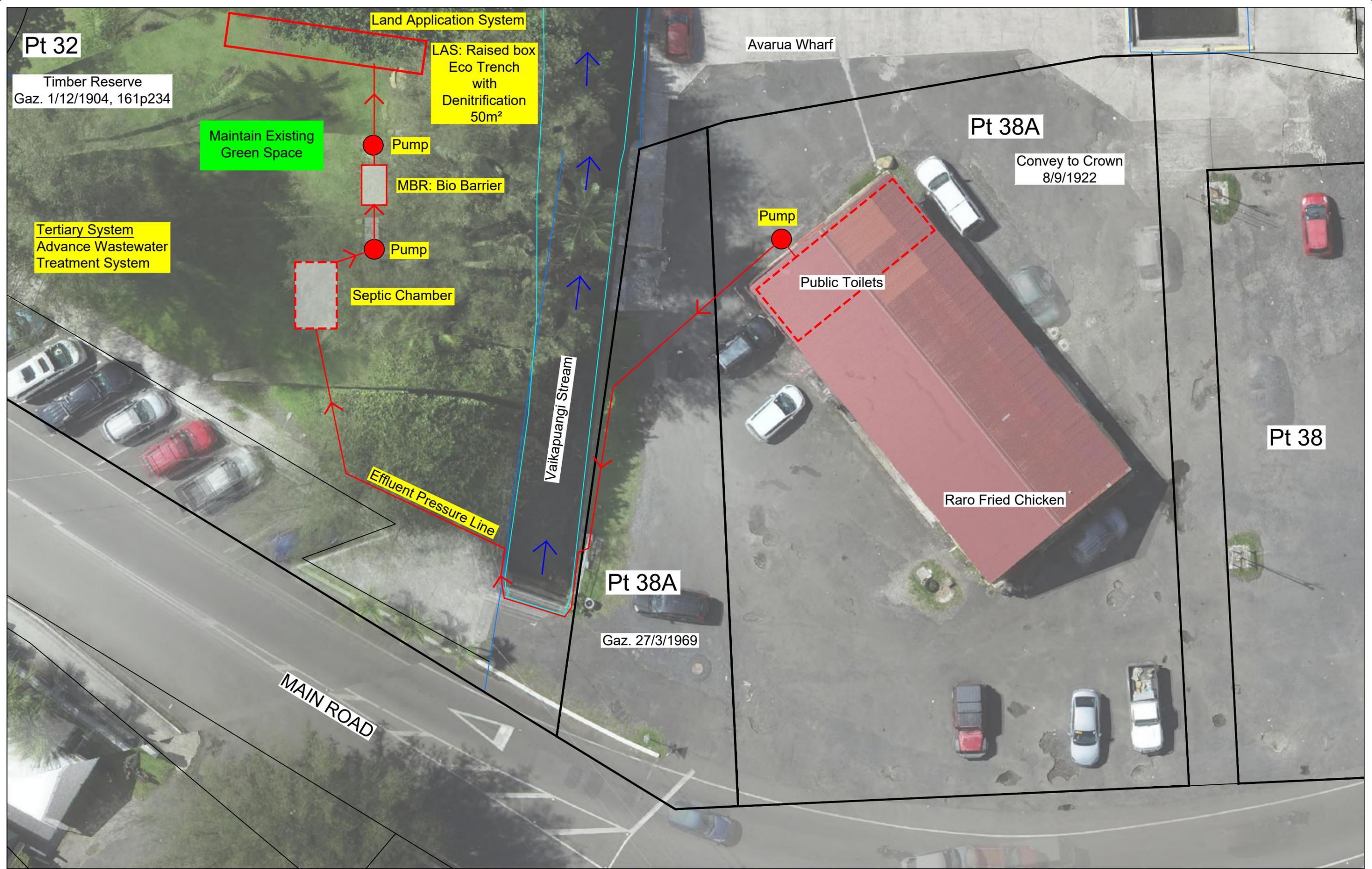
□ geology □ soil survey and land suitability □ groundwater □ flora and fauna □ coral survey □ noise and air quality □ Hydrographical Survey □ Environmental Action plan to supplement EMP □ Site investigations □ Excavation plans and equipment Biodiversity & ecosystems

A6 Contacts

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

Appendix B

Development Plans



Pt 32
 Timber Reserve
 Gaz. 1/12/1904, 161p234

Maintain Existing
 Green Space

Tertiary System
 Advance Wastewater
 Treatment System

Land Application System
 LAS: Raised box
 Eco Trench
 with
 Denitrification
 50m²

Pump

MBR: Bio Barrier

Pump

Septic Chamber

Effluent Pressure Line

Vaikapuangi Stream

Avarua Wharf

Pt 38A

Convey to Crown
 8/9/1922

Pump

Public Toilets

Raro Fried Chicken

Pt 38

Pt 38A

Gaz. 27/3/1969

MAIN ROAD

REVISION:	BY:	APP'D:	DATE:	PROJECT TITLE:	DRAWING TITLE:	CLIENT:	JOB REF:	DATE	SHEET No.	Total No. of SHEETS:
				Avarua Wharf	New Sanitation Plan	CIIC	E2206	26/06/22	S01	S01
				Sanitation Improvement		E2206.dwg	DRAWN BY:	PZ		
						N.T.S.	CHECKED:			

Appendix C
Raro Plumbing Ltd
Proposed Installation



3rd May 2022

To: CIIC

Re: Sanitation upgrade for Raro Fried chicken & Public toilet site.

Existing septic system at RFC & Public toilets needs upgrading as it has failed.

As per discussions with CIIC an option to treat waste at the seaside grassed site next to stream opposite the Banana court complex. Available area 500m².

A sanitation proposal is to decommission the existing septic at Raro Fried/Public Toilets & install a pump station at the site. Effluent is to be piped across the bridge area to area set aside for Wastewater Treatment & disposal.

Raro Fried is to maintain their existing greasetrap as a stand alone system which should be emptied with full.

Two options have been priced & submitted. Option 1: Secondary with Land application system(LAS) of 80m². Option 2: Tertiary with LAS of 50m². Both options are compliant with Current Cook Islands Sewage code & regulations with the ministry of Health Sanitation division appraised of the options.

For your information & consideration.

Regards

Moana Bates

Design & Proposal:

RFC/Public toilets: 2000l normal flow. 4000L special events.

2000m² area. Sea surge prone. Tidal affected. Filled land.

Soil : mixture sand, loam & coral.

Depth to water: 1m to 2m.

Option 1: \$50,000

Decommission existing septic.

Install sealed pump station.

Effluent pressure line

Septic 6000litres.

Pump station to dose AWTS

AWTS:

1. 2 x Biolytix BF6 AWTS.
2. Treatment capacity 4000litres.
3. Power usage: approx. 1kwhr/day.
4. Effluent treatment quality: BOB 10mg. TSS 20mg. TN 30mg.
5. Risk assessment: 79% reduction TN. 3cfu/100ml.

Land Application System: Raised boxed Eco Trench with Denitrification.

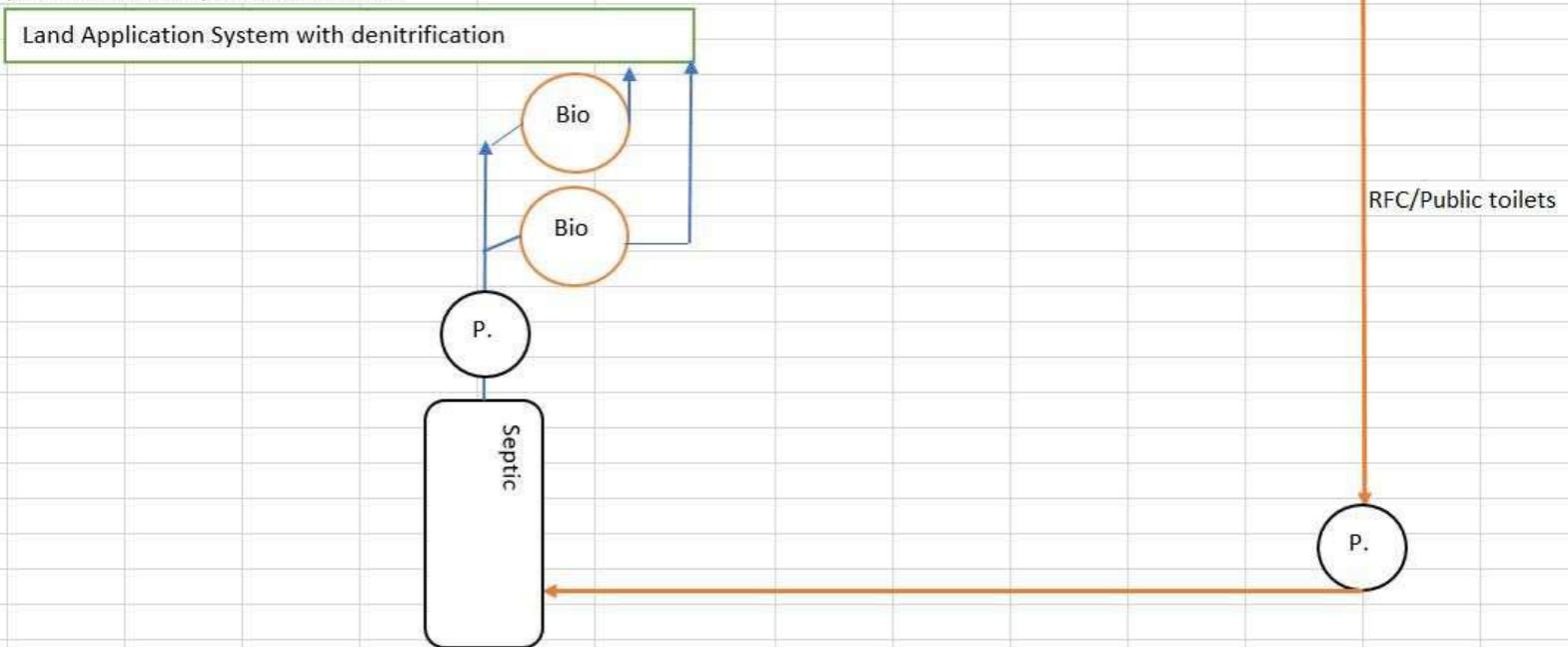
80m².

CIIC: Sanitation upgrade for Raro Fried Chicken & public Toilets

Option 1: Secondary

MOH permit

- a. Decommision existing system.
- b. New pump station & drainage to single tank. Pump station to raised AWTS
- c. Biolytix BF6 Bio pods x 2 installed. Raised
- d. Land Application system with denitrification in available area.
- e. As Built plans & MOH completion certificate.



Option 2: \$70,000

Decommission existing septic.

Install sealed pump station.

Effluent pressure line

Septic

Pump station to dose AWTS.

AWTS:

1. MBR: Bio Barrier 1.5
2. Treatment capacity +4000litres
3. Power usage: Approx 5kwhr/day
4. Effluent quality: BOB/TSS 2mg. TN 5mg
5. Risk assessment: 93% reduction TN. 0cfu/100ml.

Land Application System: Raised boxed Eco Trench with Denitrification.

50m².

Option 2: Tertiary

MOH permit

- a. Decommission existing system.
- b. New pump station & drainage to single tank. Pump station to MBR
- c. MBR installed. Pump station to LAS
- d. Land Application system with denitrification in available area.
- e. As Built plans & MOH completion certificate.

Land Application System with denitrification

