Ngatpang Rock Quarry

An Environmental Assessment to support the Earthmoving Permit application for the proposed operation of the Ngatpang Rock Quarry, Ngatpang State, Palau

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NGATPANG QUARRY CORPORATION
PROPONENT

NECO Group of Companies
P.O. Box 129 Koror, Palau

EA Preparer
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1. Introduction

NECO Engineering Corporation was issued an Earthmoving Permit PEA-053-00 to operate a rock quarry facility identified as “Ngatpang Rock Quarry” and located on a property known as “Turangelbad, Ngeriul, and Iou el Rorou” in the State of Ngatpang in 2000. The quarry was operated to supply materials for the Palau Compact Road Project (PCRP). An aerial photo of the Ngatpang Rock Quarry operation taken in 2006 is shown in Figure 1.

![Ngatpang Rock Quarry in 2006](image)

**Figure 1 – Ngatpang Rock Quarry in 2006**

The quarry ceased operation upon completion of the PCRP and remained close due to low quarry material demand. Earthmoving Permit PEA-053-00 expired on November 30, 2005.

On March 15, 2017, NECO Engineering Corporation entered into a Lease Agreement with the Ngatpang Quarry Corporation. A copy of the Certificate of Title and Lease Agreement are shown in Appendix 1. Ngatpang Quarry Corporation will be the new Operator of the Ngatpang Rock Quarry.

This Environmental Assessment (EA) is prepared to support the Earthmoving Permit application for the proposed operation of the Ngatpang Rock Quarry by the Ngatpang Quarry Corporation, herein referred to as the Project Proponent.

1.1 The Project Proponent

The Applicant/Project Proponent is Ngatpang Quarry Corporation, represented by Chen Hong and Chen Dawei, herein identified as the “Operator”. Ngatpang Quarry Corporation was issued a Foreign Investment Approval Certificate (FIAC) No. 631-2017 on September 29, 2017.
to engage in rock quarry and do business as a corporation in the Republic of Palau. Contact details of Ngatpang Quarry Corporation are provided in Table 1:

<table>
<thead>
<tr>
<th>Name of Project:</th>
<th>Ngatpang Rock Quarry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicant:</td>
<td>Ngatpang Quarry Corporation</td>
</tr>
</tbody>
</table>
| Address:         | P. O. Box 129, Koror  
|                  | Republic of Palau 96940 |
| Telephone No.:   | 778-1688              |
| Fax No.:         |                       |
| E-Mail:          |                       |

A copy of the FIAC 631-2017 is attached in Appendix 2.

1.2 EQPB Cease and Desist Order & Order to Pay Civil Penalty

On August 23, 2017, the former Earthmoving Permit PEA 053-00 holder, NECO Engineering Corporation was issued a Notice of Violation (EQPB Order No. 17-31, EQPB Doc#17-1282) by the Environmental Quality Protection Board (EQPB) due to numerous violations against the EQPB Regulations. EQPB Order No. 17-31 requires NECO Engineering Corporation to immediately cease all earthmoving activities on site until appropriate EQPB permits, including submittal of the EA, are obtained.

A Final EQPB Order No. 17-31, EQPB Doc #18-255, was issued by the EQPB after NECO Engineering Corporation appeared on a public hearing before the Board on November 16, 2017.

Copies of the Notice of Violation and Cease and Desist Order and Order to Pay Civil Penalty (EQPB Doc# 17-1282 and EQPB Doc#18-255) are attached as Appendix 3.

2. Brief Project Description

2.1 Project Location

The Ngatpang Rock Quarry is located on Cadastral Lot No. 011 L04, land known as Turangelbad, Ngerlul and Lou el Rorou in Ngatpang State, Republic of Palau. The quarry is approximately 50,000 m² in total area. Ngatpang Rock Quarry is approximately 1.7 km southeast of Ngatpang State and approximately 24 km to Central Business District of Koror, Republic of Palau. Figure 2 shows the location map of the Ngatpang Rock Quarry.
2.2 Site Development Plan

Figure 3 shows the Quarry site plan showing the access road, existing and proposed structures on site.

2.2.1 Existing and Proposed Structures on Site

The existing structures to remain on site include the office – storage building, barracks, tools room, elevated water storage tank, old generator room, old quarry equipment distribution and control room, toilet facility, septic tank, waste area, explosive storage facility. Figure 4 shows photographs of the existing infrastructures on site.

The proposed structures to be built on site include the new crusher and screening equipment, new distribution and control room, new generator room and oil/fuel storage tank. A kitchen, shower room and leach field to receive the sewage from the existing septic tank will also be constructed.

An assessment of the existing septic tank and design of the new leach field are provided in Appendix 4.
FIGURE 3 – SITE DEVELOPMENT PLAN, NGATPANG ROCK QUARRY
(a) Old Crushing/Screening Plant & Conveyor
(b) Existing Control Room
(c) Tools Room & Water Storage Tank
(d) Barracks, Quarry Office & Storage Rooms
(e) Newly Constructed Kitchen
(f) Existing Toilet Facility
(g) Existing Septic Tank
(h) Explosive Storage Building

Figure 4 – Existing Structures Onsite, Ngat pang Rock Quarry
2.2.2 Quarry Staging Plan

Figure 5 shows the indicative short term staging of quarry development, and how Ngatpang Quarry Corporation presently proposes to develop the quarry.

The staging of development at the quarry will ultimately be dependent on a number of external factors outside Ngatpang Quarry Corporation control e.g. the state of the market, the level of knowledge of subsurface geology, the level of sales and production capacity limits. Figure 5 only illustrates how Ngatpang Quarry Corporation currently anticipates development to occur at the quarry.

The quarry pit design has been carried out to optimize quarry pit development but limit the disturbed area at a given time and ensure the safety of the cut slopes. Ideally, Ngatpang Quarry will be developed with a series of 15 meter high benches.

![Figure 5 – Proposed Quarry Staging Plan, Ngatpang Rock Quarry](image-url)
2.3 Proposed Quarry Operation

The main objective of the quarry operation is to extract the rock from the ground and process it for use as building, construction and road aggregates. The process of transforming rock from the ground into aggregate products comprises of:

- stripping of vegetation, soil and low quality material overlying the rock resource.
- loosening and fragmenting the rock from the ground with the use of explosives and/or heavy machinery.
- excavating the rock by the use of heavy machinery.
- either stockpiling or transporting the rocks to the plant for further crushing and screening into various sizes and grades for sale.

A more detailed description of these activities are presented below.

2.3.1 Vegetation removal and site preparation

This involves removal of vegetation and preparing the site including removal of any structure.

2.3.2 Soil stripping and stockpiling

As the quarry pit expands, soils and subsoils are stripped, transported and stockpiled using motor scrapers, bulldozers and/or excavators and trucks. These materials may be used in the construction of bunds for landscape enhancement and stored for future rehabilitation work.

2.3.3 Overburden stripping and disposal

As the quarry pit expands, overburden materials are stripped, transported and deposited. Such materials have insignificant commercial value but are required to be removed to facilitate extraction of the aggregate resources, employing a similar range of machinery as used for soil/subsoil excavation.

2.3.4 Rock removal

The quarrying of softer aggregate resource types uses excavators and/or bulldozers and loaders to excavate and load materials onto trucks for transport to the processing plant or stockpiles on site.

The quarrying of harder rock requires drilling and blasting with explosives, followed by loading onto trucks using excavators or loaders for transport to the processing plant or stockpiles on site.

Ngatpang Rock Quarry will use drilling and blasting practices typical of similar small-scale quarry operations. All blasts are designed and managed by trained and qualified personnel taking into account a variety of factors including safety requirements. A licensed explosive handler will conduct the required blasting at least twice a month. Typically, 4-inch diameter x 15m blasting holes are drilled and these holes are loaded with either bulk or bagged ANFO
(Ammonium Nitrate and Fuel Oil) and are currently initiated with non-electric detonators to reduce the potential for vibration and air blast.

2.3.5 Rock Processing

Rock is processed into aggregate products, using crushing, screening, washing, blending and conveying machinery. The products are moved by trucks, loaders or conveyor to storage bins or stockpiles.

Ngatpang Quarry Corporation has a new aggregate processing plant that is capable of producing a full range of aggregates. The plant has been specifically designed to maximize the rock resource while at the same time minimizing the potential for adverse environmental effects such as noise and dust.

The plant has been designed with the capability of washing semi-processed and finished aggregate products and a water control and treatment system has been incorporated into the plant to manage aggregate washings. This system is generally a closed circuit system with only makeup water added to compensate for water lost through evaporation or soaked up the aggregate products themselves.

From time to time depending on market conditions, mobile aggregate processing plants are used at Ngatpang Rock Quarry to supplement the fixed plant operation. These plants are subject to the same environmental controls as all other operations on site and are typically located in areas where adverse effects can best be avoided.

2.4 Storage and Distribution

Aggregate products are transported around the site with the use of a range of equipment and processing plant. Wheel loaders are used to load customer’s trucks for distribution off site.

2.5 Storm Water management

Water management is a term used to describe all activities carried out on site to control and utilize surface water runoff and process water. It includes a range of activities such as the construction and maintenance of structures such as drains, ponds, diversion channels and sumps through to the implementation of water monitoring equipment and pumps. Ngatpang Quarry has a Sediment and Erosion Control Plan (ESCP) that sets out the activities that will be carried out at the site over time. A preliminary ESCP is shown in Figure 6.

An existing elevated water storage tank will be used to collect rainwater from the roof of the office-storage building. The rainwater collected will be used in the processing plant and dust suppression.

Settled surface runoff at the sedimentation pond will also be used in dust suppression.
2.6 Rehabilitation Works

Where appropriate and practicable, excavated and disturbed areas are rehabilitated with the placement of overburden and soils and then re-vegetated with suitable species. Progressive rehabilitation shall be undertaken to reduce bare areas while quarrying progresses.
2.7 Manpower & Equipment

A total of eight (8) workers will be employed by Ngatpang Quarry Corporation. Accommodation for the workers will be provided on site. The quarry will be operated from Monday to Saturday, between 6:00 AM and 5:00 PM, depending on the market demand. The workers required for the operation of Ngatpang Quarry is presented in Table 2.

<table>
<thead>
<tr>
<th>Position</th>
<th>Number of People</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quarry Manager/Asst. Manager</td>
<td>2</td>
</tr>
<tr>
<td>Truck Driver</td>
<td>2</td>
</tr>
<tr>
<td>Loader Operator</td>
<td>1</td>
</tr>
<tr>
<td>Excavator Operator</td>
<td>1</td>
</tr>
<tr>
<td>Explosive Hander</td>
<td>1</td>
</tr>
<tr>
<td>Electrician</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
</tr>
</tbody>
</table>

Heavy equipment and machineries are required during operation of the Ngatpang Quarry. The list of equipment and machines intended to be used in the quarry is presented in Table 3.

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crusher</td>
<td>2</td>
</tr>
<tr>
<td>Vibrating Screen</td>
<td>1</td>
</tr>
<tr>
<td>Conveyor</td>
<td>1</td>
</tr>
<tr>
<td>Excavator</td>
<td>1</td>
</tr>
<tr>
<td>Loader</td>
<td>1</td>
</tr>
<tr>
<td>Truck, 20T</td>
<td>1</td>
</tr>
</tbody>
</table>

3. Impact Assessment

3.1 Disturbance of Area

Quarrying requires site preparation that includes clearing of vegetation, stripping of topsoil and removal of overburden soils. These activities potentially lead to more serious environmental impacts, which require measures to prevent or minimize the impacts to the environment.

If disturbance of area is not properly managed and/or minimized, erosion and sedimentation may potentially occur during rainy season and significant dust and particulate matter are expected to be generated.

3.2 Erosion and Sedimentation

More serious impacts, as a result of disturbing the ground, are the potential erosion and sedimentation.
Potential erosion and sedimentation could occur as a consequence of localized alterations and land disturbing activities (grading and excavations). Bare soils will be subjected to erosion and subsequently deposited into the rivers or creeks.

Loose soils are susceptible to erosion, especially if it rains heavily during construction period. Storm water runoff from the site may carry loose soil particles into the ocean, having a detrimental effect on the water quality.

3.3 Sewage Generation

People working in a quarry are expected to generate sewage, particularly the stay in workers. Eight workers are employed by Ngatpang Quarry Corporation and all are staying in the on site accommodation. These workers are projected to generate approximately 600 gallons of sewage per day. The calculation of sewage generation from the Ngatpang Quarry is provided in Appendix 4.

Inadequate provision of toilets for use by workers can lead to ad hoc defecation in secluded areas on the site, thus creating unsanitary conditions and sources of fly infestation.

3.4 Solid Waste Generation

Poor garbage management at the workers’ accommodation would lead to unsanitary conditions including vermin and fly infestation and odours as well as unsightly conditions.

Improper disposal of food cartons and other domestic forms of construction camp or quarry garbage could lead to littering of the site and pollution of the nearby bodies of water.

3.5 Dust Generation & Gaseous Emission

Dust is one of the most visible, invasive and potentially irritating impacts associated with quarrying. Dust may occur as fugitive dust from excavation, from haul roads and from blasting, or can be from point sources such as drilling, crushing and screening. Conditions on site that affect the impact of dust generated during quarrying include the rock properties, moisture, ambient air quality, prevailing winds and proximity to population centers. Dust concentrations and potential impacts tend to decrease rapidly away from the source.

The transport of materials from the quarry site to the consumers would entail use of heavy trucks, which have the potential to produce polluting gaseous emissions and dust.

3.6 Noise

The primary source of noise from a quarry operation is from earthmoving equipment, processing equipment and blasting. Another significant source is the trucks that often accompanies the operation. The impacts of noise are highly dependent on the sound source, topography, land use, ground cover of the surrounding site and climatic conditions.
Construction noise may disturb wildlife and birds.

3.7 Material & Hydrocarbon Spills

Quarry operation may potentially result to fuel and hydrocarbon spill on site, if not properly managed.

The operation involves transport of quarry materials, typically in over-laden and sometimes uncovered trucks, usually results in material spillage and undue road damage.

In the case of fine materials, dusting and spillages occur on the roadways between the quarry site and destination. Dusting degrades local air quality and material spillages worsen driving conditions and increase the risk of road accidents.

4. Mitigating Measures

4.1 Develop and Implement Quarry Staging Plan

• The proposed staging area provided in Figure 5 is recommended to be implemented.

• Minimize the disturbance of area to less than 2 hectares at any given time.

• Implement progressive rehabilitation while extraction of rock material is being undertaken.

4.2 Develop and Implement ESCP

• Erosion and Sedimentation Control Plan (ESCP) required by the EQPB shall be strictly implemented. These erosion control measures include silt fence, berm, sedimentation pond and silt curtains. These structures shall be installed in appropriate locations and regularly maintained throughout the duration of construction activity. The proposed ESCP is shown in Figure 6. The ESCP is a preliminary plan subject to actual site condition.

• Quarrying and earthmoving will not be undertaken during heavy rains.

• All erosion and sedimentation control structures in place shall be inspected regularly and observed, when safe to do so during heavy rainfall to verify efficiency and effectiveness.

• All damaged erosion control structures shall be repaired.

• Additional erosion control measures shall be implemented if found necessary.
4.3 Proper Onsite Disposal of Sewage

- Quarry workers must be provided with adequate toilet facility and sewage disposal system. A new toilet facility will be constructed on site.
- Prior to quarry operation, sewage from the existing septic tank shall be pumped out and disposed at the Malakal Wastewater Treatment Plant.
- A new leach field to receive the septic tank effluent will be designed and constructed. Design of the leach field is provided in Appendix 4.
- Quarry-affected runoff will be diverted into sediment ponds and allowed to settle prior to discharge, if necessary. Otherwise, the water will be left on the pond until it dries up.

4.4 Proper Collection and Disposal of Solid Waste

- Ensure adequate garbage bins are provided at the quarry.
- Ngatpang Quarry Corporation must implement waste segregation at the quarry site.
- Quarry workers must be trained in waste segregation and proper solid waste disposal.
- Organic waste would be composted, i.e., backyard composting, and used for soil improvement (soil conditioning) during landscaping. Branches can be put through a wood chipper to prepare soil cover for garden beds, etc.
- Regular hauling of solid waste from the quarry to the Ngatpang Landfill must be undertaken, at least once a week.
- No burning of waste shall be undertaken on site.

4.5 Dust Control

- Access roads and exposed ground should be regularly wetted in a manner that effectively keeps down the dust.
- Maintain moisture on quarried materials.
- Stockpiles of finer material/product should be wetted or covered with tarpaulin during windy conditions.
- Cover exposed (overburden) soil or storage areas;
- Workers on site should be issued with dust masks during dry and windy conditions.
4.6 Noise Management

- All equipment operating within the quarry area will be properly muffled.
- Quarrying activities, e.g., drilling, crushing, etc., that will generate disturbing sounds should be restricted to normal working hours, i.e., work hours will be limited between 7:00 AM and 6:00 PM, Monday through Saturday.
- No night time activity, that will generate noise, will be performed at the quarry site.
- Local residents should be given notice of intended blasting activities so as to reduce the degree of annoyances.
- Workers operating equipment that generates noise should be equipped with noise protection gear.
- Workers operating equipment generating noise levels greater than 80 dBA continuously for 8 hours or more should use earmuffs.
- Workers experiencing prolonged noise levels of 70 – 80 dBA should wear earplugs.

4.7 Regular Housekeeping

- Quarry site should at all times be kept clean and tidy and appropriate measures should be taken for the storage, handling, transportation and disposal of waste materials.
- All vehicles and machinery shall be maintained in accordance with the original manufacturers’ specifications and manuals to avoid excessive noise, vibrations and vehicle exhaust pollution.
- All plant shall be operated and maintained in accordance with the original manufacturers’ specifications and manuals and in such a manner as to minimize the emissions of hydrocarbons and particulates.
- Ngatpang Quarry Corporation shall take all reasonable measures to prevent spillage and leakage of materials likely to pollute groundwater and any watercourse.
- Spill kit shall be made readily available on site. Workers shall be trained on (a) the use of the spill kit and (b) responding to the spill incidence.
- Relevant emergency contact information (EQPB, Ngatpang State, Fire/Emergency Services, etc.) must be posted on the quarry office.
Appendix 1

Certificate of Title and Lease Agreement
LAND COURT
National Judiciary
Certificate of Title

This Certificate is issued pursuant to 35 PNC § 1315. This is to certify that
Shalum Epison

is/are the owner(s) of an estate in fee simple in land situated in Neitpang
and more particularly described as follows: Cadastral Lot No. 011 L 04,
(formerly Lot 011 L 01 part); Land known as "Turangelbad, Ngeriul, and Iou el Rorau"

containing an area of 342.798 square meters more or less, as shown on the
Bureau of Lands and Surveys Cadastral Plot No. 011 L 01
dated November 14, 2001

In accordance with 35 PNC § 1314, from the date of this Certificate, all transac-
tions involving the land described herein, except any lease or use right for a term
of less than one year, shall be recorded with the Clerk of Courts.

In witness whereof, I have hereunto set my hands and caused the Land Court
official seal to be affixed below this 20th day of August, 2001.

J. Elvino, Namok Senior
Judge of the Land Court

Registered this 20th day of August, 2002, in Book No. A-5 at
Page 105 at the Office of the Clerk of Courts, Republic of Palau.

Clerk of Courts, Republic of Palau

Recorded as Document No. 4204 at the Land Court on this 20th day of August, 2002.

Land Court Register

Erasures on this certificate will render it null and void. If erasure occurs, owner
must surrender this certificate to the Land Court and obtain a new one.
 AGREEMENT

This Agreement is entered into by and between NECD Engineering Corporation ["NE"], a Palau corporation, and Shalum Epstein, both of P.O. Box 129, Palau, PW 96940, and Chen Hong and Chen Dawei ["Operator"], of ________________

RECITALS

a. NE is in the business of, among other things, rock quarrying.

b. Epstein, who owns a controlling interest in NE, also is the owner of Cadastral Lot No. 11, in Ngatang, State, Palau, which includes the parcel thereof shown on the attached drawing, consisting of 50,000 square meters, more or less ["the Quarry Lot"].

c. NE desires to lease the Quarry Lot to Operator for the purpose of conducting its quarry business on the Quarry Lot.

d. Operator, or an affiliate of Operator, intends to construct a hotel on Koror, and requires rock products for such purpose.

e. Operator desires to eventually engage in the quarry business in Palau at the Quarry Lot, and accordingly intends to expeditiously apply for and obtain the licenses and permits that it will need in order to do so. Operator desires to lease the Quarry Lot from Epstein for such purpose.

f. The parties desire to enter into this instrument in order to set forth terms and conditions of their agreements regarding the foregoing and related matters.

Now, therefore, in consideration of the mutual covenants set forth herein, the parties agree as follows:

1. Workers’ costs. Operator shall employ workers for the purpose of conducting its quarry business on the Quarry Lot. Operator shall pay all costs incurred in the recruitment, hiring, transport, and obtaining Palau work permits for such workers, and all other costs, fees, charges, and taxes associated with establishing the Quarry Lot quarry in full operation as a quarry on NE’s behalf.

2. Palau licensing. Operator or a corporation or other business entity formed by Operator for the purpose, shall expeditiously apply for and obtain a Foreign Investment Approval Certificate ["FIAC"] from the Palau Foreign Investment Board and all other licenses, and permits that are required for it to engage in the rock quarrying business in Palau at the Quarry Lot. Operator shall exert its best efforts to obtain such FIAC by April 1, 2018.

3. Lease.
   (a) Epstein hereby, leases the Quarry Lot to Operator for a term of 50 years commencing March 10, 2013, after this agreement is signed.

   (b) As rental for such lease, Operator shall pay to Epstein as follows:

   Chen Hong
   [Signature]
   [Date]

   Chen Dawei
   [Signature]
   [Date]
(c) Operator acknowledges that, not sooner than five (5) years after the commencement date of the term of this lease of the Quarry Lot, Ebspion may desire to avail of other opportunities for the commercial development of the Quarry Lot. In the event that Ebspion desires to make another commercial use of the Quarry Lot, he may give Operator not less than 180 days notice to vacate the Quarry Lot. In the event Ebspion and NE shall, if Operator so requests, assist Operator in leasing other property suitable for its rock quarrying business on terms and conditions similar to those of its lease herein so that Operator can carry on the quarry business on a new quarry lot, and pay Operator's cost of relocating to such new quarry site. In the event that Ebspion gives such notice and that other such an alternative lease cannot be procured by Operator does not desire to continue its quarrying business in Palau, Operator may, at its option, require NE to purchase its quarrying equipment that it utilizes at the Quarry Lot at a price equal to the total price of Operator's investment in all equipment when the Quarry Lot is established.

5. Rock products:
(a) Operator may utilize rock products produced at the Quarry Lot for the construction of rock or its affiliates’ proposed hotel facility at Ngaputchechen Island without any charge or payment for the same.
(b) NE and Ebspion, and their affiliates, may purchase rock products from the quarry operated by Operator at a price equal to the cost of production thereof plus 10% of such cost, or at the lowest price that such products are available for sale by any other producer in Palau at a particular time, whichever is lower.

6. Insurance and indemnity: Operator shall obtain and maintain in effect third party liability and workers compensation insurance, in form and amount satisfactory to NE and Ebspion, in connection with the quarry operations at the Quarry Lot, and shall indemnify, defend and hold harmless NE and Ebspion from and against any liability to, or claims or legal actions by, third parties for property damage, personal injury, and claims arising from or related to NE's and Operator's rock.
8. Assignment. Operator may assign this Agreement to a corporation or other business entity formed by Operator for the purpose of operating a Quarry on the Quarry Lot. No other assignment or grant of any right or interest in this Agreement of the Quarry Lot by Operator or any successor in interest of Operator shall be valid without the express prior written consent of N&T and Epico.

7. Notice of default. Except as herein provided, neither party shall be deemed to be in default hereunder in the payment of any money as herein required or in the performance of any condition or obligation required hereunder unless the other party delivers written notice of such default and the breaching party shall fail to cure such default within ten (10) business days, or, in the event of any obligation not related to the payment of money, fail thereafter to commence to cure such default with reasonable diligence. If either party shall fail to cure a default in the payment of any money as herein required within ten (10) days after its receipt of notice of default, or, in the event of any obligation not related to the payment of money, if the defaulting party fails to commence to cure such default with reasonable diligence after its receipt of notice of default, then the nondefaulting party, in addition to any other rights or remedies it may have by law, shall have the right to terminate this Agreement on giving the defaulting party 60 days written notice of its intention to do so.

8. Interpretation. This Agreement shall be exclusively interpreted, construed and enforced under the laws of the Republic of Palau. The parties hereby consent to such governing law. This Agreement was executed in and shall be exclusively controlled by, and interpreted according to the English language and shall be construed fairly, without reference drawn against the drafting party.

9. Additional documents. Each party agrees at the request of another party, or its agents or attorney(s), to execute any and all additional documents reasonably necessary to perfect and/or otherwise effect the Agreement’s provisions.

10. Entire Agreement. This Agreement contains the parties’ entire Agreement and understandings regarding the subject matter hereof and merges, supersedes, terminates and replaces all of the parties’ prior Agreements, writings, commitments, discussions and understandings with regard thereto. No terms are contractual and not a mere recital, and it shall not be amended, modified or superseded unless in a writing signed by the parties.

11. Binding effect. This Agreement shall bind, and be to the benefit of the parties, and the parties’ respective heirs, assigns, successors-in-interest, and leg representatives, subject to any and all assignment restrictions set forth herein. The foregoing notwithstanding, this Agreement is not a third party beneficiaries contract and shall not be construed to be for any third party benefit and no third party shall have any claim or right of action hereunder.

12. Waiver. No delay, omission or failure to exercise any right or remedy provided for or herein contained shall be deemed to be a waiver thereof or an assent to the event giving rise to such remedy, but every such right or remedy may be exercised by the party exercising such right or
remedy deemed expedient. All such remedies shall be cumulative and non-exclusive.

23. Notices. Any notice required by this Agreement or given in connection with it shall be in writing to the respective address set forth above and effective on confirmed delivery to the appropriate party by personal delivery or three (3) business days after being sent via first class mail postage prepaid.

24. Effect of partial invalidity. The invalidity of any provision of this Agreement will not and shall not be deemed to affect the validity of any other provision. In the event that any provision of this Agreement is held to be invalid, the parties agree that the remaining provisions shall be deemed to be in full force and effect as if they had been executed by both parties subsequent to the disengagement of the invalid provision.

25. Attorney fees. In the event that any action is filed in relation to this Agreement or between the parties hereto, the unsuccessful party shall be liable for, in addition to all the sums that any party may be called on to pay, a reasonable sum of the successful party attorney fees.

26. Paragraph headings. The titles to the paragraphs of this Agreement are solely for the convenience of the parties and shall not be used to explain, modify, simplify, or aid in the interpretation of the provisions of this agreement.

27. Understanding. Each party has (A) read and understands this Agreement and agrees to all of its terms and conditions; (B) independently evaluated the desirability of entering into this Agreement and is not relying on any representation, guarantee or statement not set forth herein; and (C) been afforded the opportunity to consult legal counsel with respect to its rights and obligations set forth in this Agreement and has accepted or refused such counsel and accordingly has negotiated this Agreement.

IN WITNESS WHEREOF, the parties hereto have set their respective hands hereto to the dates set forth below.

Chen Hong
Date: 15/3/2017

Shallum Etsion for Himself and for Necco Engineering Corp
Date: 3/16/17

Chen Da Wei
Date: 15/3/2017
Appendix 2

FIB Certificate
September 29, 2017

Mr. Shalom Ngolechel Epison, Local Agent
Ngatpang Quarry Corporation
P.O. Box 129
Koror, Republic of Palau 96940

Re: Foreign Investment Approval Certificate No. 631-2017
Ngatpang Quarry Corporation

Dear Mr. Epison:

On behalf of the Foreign Investment Board ("FIB"), I am pleased to inform you that the FIB has approved the application of Ngatpang Quarry Corporation, to engage in rock quarry located in Ngatpang on Cadastral Lot No. 011104, Land also known as Turaenbad, Ngerulm and Lou el Korou in Ngatpang State, Republic of Palau. As such, I am enclosing with this letter the original FIA Certificate No. 631-2017.

The final page of the Certificate requires signature of an authorized representative to be obtained before the Certificate will be effective. Please forward a copy of the signed Certificate (page 4 only) to this office as soon as possible.

Additionally, Ngatpang Quarry Corporation is required to establish a $10,000.00 joint bank account with the Foreign Investment Board within sixty (60) days of issuance of the FIA Certificate. Instructions are enclosed.

Sincerely,

[Signature]
Margie Bechel
Acting Executive Officer

Enclosures
Appendix 3

Copy of the Cease and Desist Order and Order to Pay Civil Penalty
BEFORE THE
ENVIRONMENTAL QUALITY PROTECTION BOARD
REPUBLIC OF PALAU

IN THE MATTER OF:
NECO ENGINEERING CORP.,

Respondent.

EQPB NOV No. 17-31
EQPB Doc # 17-1282

SUBJECT: Notice of Violation: Earthmoving Regulations

Notice is hereby given that an inspection by the Palau Environmental Quality Protection Board ("EQPB") of Respondent’s rock quarry located in Ngebtosk, Ngatpang State, yielded evidence of violations. Specifically, the inspection discovered Respondent had conducted unpermitted earthmoving activities without proper erosion control measures and was discharging wastewater into the environment. These actions constitute a violation of EQPB Regulations, including, but not limited to, EQPB Earthmoving Regulations §§ 2401-1-05 & 2401-1-11; Toilet Facilities and Wastewater Disposal System Requirements Regulations §§ 2401-13-04, 2401-13-06, 2401-13-09, 2401-13-10, 2401-13-37, & 2401-13-43; Solid Waste Management Regulations §§ 2401-31-04 & 2401-31-13; and Air Pollution Control Regulations § 2401-71-40.

1. On August 8, 2017, in response to a complaint from the public, EQPB Inspectors conducted an inspection of Respondent’s rock quarry located in Ngebtosk, Ngatpang State.

2. Upon arrival, EQPB Inspectors noted that Respondent’s access road was unsealed resulting in erosion and instability.

3. EQPB Inspectors also noted that Respondent had engaged in rock moving activities as evidenced by a new rock retaining wall and the presence of a jackhammer connected to a generator.

4. Near the rock retaining wall, EQPB Inspectors observed that Respondent had engaged in excavation in three (3) areas where steel footings had been installed.

5. Respondent’s onsite employee informed EQPB Inspectors that Respondent’s nine (9) Chinese employees, who are in the country on tourist visas, had cut the rock using a jackhammer.
6. EQPB Inspectors also noted that extensive filling and grading had been conducted on the property, but no found erosion and sediment control measures in place anywhere on the property.

7. Upon further inspection, EQPB Inspectors found that two new buildings had been constructed: a kitchen and a shower building, neither of which were connected to a wastewater disposal system.

8. EQPB Inspectors found that the shower building discharged greywater directly into the environment.

9. EQPB Inspectors also observed human fecal waste above Respondent's rock washing pond.

10. EQPB Inspectors noted the area where Respondent's workers were depositing their human waste drained into Respondent's rock washing pond.

11. Next to the area where workers were depositing their human waste, EQPB Inspectors noted evidence of burning of solid waste.

12. EQPB Inspectors ordered Respondent's workers to cease all burning of solid waste.

13. EQPB Inspectors also noted various solid waste strewn about Respondent's property.

14. Respondent previously had an EQPB Permit for rock quarrying activities, EQPB Permit PEA-053-00, but that Permit expired on November 30, 2005.

15. Respondent's expired EQPB Permit PEA-053-00 contains multiple General and Special Permit Conditions including, but not limited to, the following:

   - "This permit is issued only to NECO Engineering Corporation and its agents as the Permittees to perform the work specified herein: To operate a rock quarry facility located on the property known as Ngebek in the State of Ngatping. This permit is not transferable to other projects, firms, or agencies. All work shall be completed in accordance with the EQPB Regulations, permit application, plans & specifications, erosion and sedimentation control plan and environmental assessment that are either on file with the Palau Environmental Quality Protection Board (EQPB) or will be approved by EQPB pursuant to this Permit."

   - "Permittee will obey and conform to all laws, regulations, and rules of the Republic of Palau in performing the permitted activity and construction and operation of the project facilities."
• “All activities shall be conducted in accordance with the plans, specifications, terms, representations, and depictions of the approved application as modified by the terms and conditions of this permit.”

• “The layout and construction of the quarry facility and all erosion and drainage control measures shall be as described in the erosion and sediment control plan drawings and details on file at the EQPB office. All the requirements of the plan drawings and details and all conditions listed below shall be implemented as conditions of this permit.”

• “The sediment retention traps and drainage ditches shall be regularly inspected and kept free of sediment build-up which exceeds 25% of capacity or volume.”

• “The access road, sediment retention basins, drainage ditches, culverts, slopes, berms, swales, silt fences, and discharge points shall be inspected weekly and after each major storm. […]”

• “All septic waste at the site shall be discharged to the existing septic tank and leachfield.”

16. On August 10, 2017, EQPB’s Executive Officer spoke with Mr. Ngeletel Epison to inform him of the violations of EQPB Regulations and also verbally ordered Respondent to Stop Work.

You are hereby notified that you have violated the Environmental Quality Protection Act. You are further notified that this violation may result in the imposition of a civil penalty in an amount of up to $10,000 per day, per violation, and an administrative cease and desist order.

This Notice of Violation is provided as a courtesy and should not be construed as a waiver of any enforcement options available to the EQPB under the Environmental Quality Protection Act.

YOU ARE SO NOTIFIED

ISSUED THIS 15th DAY OF AUGUST, 2017.

Roxanne Y. Blissom, Executive Officer
Environmental Quality Protection Board

cc: EQPB Members (1 copy)
    EQPB Compliance
    EQPB Legal Counsel

EQPB NOV No. 17-31
BEFORE THE
ENVIRONMENTAL QUALITY PROTECTION BOARD
REPUBLIC OF PALAU

IN THE MATTER OF:

NECO ENGINEERING CORP.,

Respondent,

EQPB Final Order No. 17-31

EQPB Doc # 18-255

CEASE AND DESIST ORDER
AND
ORDER TO PAY CIVIL PENALTY

NOW COMES the Environmental Quality Protection Board of the Republic of Palau ("EQPB"), pursuant to the Environmental Quality Protection Act, 24 PNC § 101, et seq. ("EQPA"), who hereby makes the following findings of fact and orders the above named Respondent to cease and desist violating the EQPA and rules and regulations promulgated thereunder, and imposes the following civil penalty.

Findings of Fact:

1. On August 8, 2017, in response to a complaint from the public, EQPB Inspectors conducted an inspection of Respondent’s rock quarry located in Ngebtosk, Ngatpang State.

2. Upon arrival, EQPB Inspectors noted that Respondent’s access road was uncapped resulting in erosion and instability.

3. EQPB Inspectors also noted that Respondent had engaged in rock moving activities as evidenced by a new rock retaining wall and the presence of a jackhammer connected to a generator.

4. Near the rock retaining wall, EQPB Inspectors observed that Respondent had engaged in excavation in three (3) areas where steel footings had been installed.

5. Respondent’s onsite employee informed EQPB Inspectors that Respondent’s nine (9) Chinese employees, who are in the country on tourist visas, had cut the rock using a jackhammer.

EQPB Final Order No. 17-31
6. EQPB Inspectors also noted that extensive filling and grading had been conducted on the property, but no found erosion and sediment control measures in place anywhere on the property.

7. Upon further inspection, EQPB Inspectors found that two new buildings had been constructed a kitchen and a shower building, neither of which were connected to a wastewater disposal system.

8. EQPB Inspectors found that the shower building discharged greywater directly into the environment.

9. EQPB Inspectors also observed human fecal waste above Respondent’s rock washing pond.

10. EQPB Inspectors noted the area where Respondent’s workers were depositing their human waste drained into Respondent’s rock washing pond.

11. Next to the area where workers were depositing their human waste, EQPB Inspectors noted evidence of burning of solid waste.

12. EQPB Inspectors ordered Respondent’s workers to cease all burning of solid waste.

13. EQPB Inspectors also noted various solid waste strewn about Respondent’s property.

14. Respondent previously had an EQPB Permit for rock quarrying activities, EQPB Permit PEA-053-00, but that Permit expired on November 30, 2005.

15. Respondent’s expired EQPB Permit PEA-053-00 contains multiple General and Special Permit Conditions including, but not limited to, the following:

   • “This permit is issued only to NECO Engineering Corporation and its agents as the Permittees to perform the work specified herein. To operate a rock quarry facility located on the property known as Ngembok in the State of Ngatpang. This permit is not transferable to other projects, firms, or agencies. All work shall be completed in accordance with the EQPB Regulations, permit application, plans & specifications, erosion and sedimentation control plan and environmental assessment that are either on file with the Palau Environmental Quality Protection Board (EQPB) or will be approved by EQPB pursuant to this Permit.”

   • “Permittee will obey and conform to all laws, regulations, and rules of the Republic of Palau in performing the permitted activity and construction and operation of the project facilities.”

EQPB Final Order No. 17-31

Page 2
• “All activities shall be conducted in accordance with the plans, specifications, terms, representations, and depictions of the approved application as modified by the terms and conditions of this permit.”

• “The layout and construction of the quarry facility and all erosion and drainage control measures shall be as described in the erosion and sediment control plan drawings and details on file at the EQPB office. All the requirements of the plan drawings and details and all conditions listed below shall be implemented as conditions of this permit.”

• “The sediment retention traps and drainage ditches shall be regularly inspected and kept free of sediment build-up which exceeds 25% of capacity or volume.”

• “The access road, sediment retention basins, drainage ditches, culverts, slopes, berms, swales, silt fences, and discharge points shall be inspected weekly and after each major storm. […]”

• “All septic waste at the site shall be discharged to the existing septic tank and leachfield.”

16. On August 10, 2017, EQPB’s Executive Officer spoke with Mr. Ngelechel Etpison to inform him of the violations of EQPB Regulations and also verbally ordered Respondent to Stop Work.


18. On August 17, 2017, during a regularly scheduled Board meeting, the Environmental Quality Protection Board (the “Board”) reviewed Notice of Violation No. 17-31.

19. The Board discussed the above-stated facts including, but not limited to, Respondent’s knowledge of EQPB Regulations, Respondent’s previous violations of EQPB Regulations, the number of EQPB Regulation violations, the areas affected by the unpermitted earthmoving activities, the unpermitted open burning of solid waste, and the intentional discharge of wastewater into the environment.

20. As a result of the discussion, a quorum of the Board members present voted to assess a fine and an order to take corrective actions.

22. On November 16, 2017, during a regularly scheduled Board meeting, Shalom Etpison, Ngelechel Etpison, and their attorney, Siegfried Nakamura, appeared before the Board on behalf of Respondent for a public hearing.

23. Respondent Shalom stated the quarry was originally opened to supply materials for the compact road, but had remained closed since that time because there was not enough demand for materials.

24. Respondent Shalom stated when they decided to reopen, they brought in new equipment and used the onsite quarry materials to begin grading and leveling so trucks could get it.

25. Respondent Shalom also stated they didn’t know their permit had expired back in 2005, but they stopped work when they received notice from EQPB.

26. Respondent Shalom stated the Chinese workers who were onsite during the EQPB inspection left shortly thereafter, but have recently returned since their Chinese employer has now received an FIB license as of September 29, 2017.

27. Respondent Shalom stated that Respondent will become the lessor to the Chinese company who will be operating the quarry.

28. Respondent Shalom also stated that they are working on their permit application and environmental assessment now that the Chinese company has an FIB license.

29. Respondent Shalom offered an old picture of the quarry (apparently the photo was taken in 2006) and stated the scope of the quarry had not been expanded since that time.

30. When asked about the other violations, including the lack of erosion controls, wastewater violations, solid waste violations, and air quality violations, Mr. Nakamura stated they were not disputing those violations.

31. Mr. Nakamura also stated they had advised the onsite workers to follow all environmental laws.

32. Finally, Respondent Shalom requested that the Board reduce the fine.

33. Based on the testimony by Respondent’s representatives, a quorum of the Board members present voted to reduce the Civil Penalty.
Conclusions of Law:

1. The EOPB is authorized to establish and provide for the continuing administration of a permit system, whereby a permit shall be required for the conduct by any person of any activity that results, or may result, in the discharge of any pollutant in the air, land or water. 24 PNC § 129(a). Earthmoving activities, improper solid waste disposal, and improperly designed wastewater disposal systems may result in the discharge of pollutants in the air, land, and/or waters of the Republic of Palau.

2. The Earthmoving Regulations are applicable to all earthmoving activities. Earthmoving Regulation § 2401-1-02. “Earthmoving” is defined as “any construction or other activity which disturbs or alters the surface of the land, […] including, but not limited to, excavations, […] land development, […] and the moving, depositing or storing of soil, rock, coral, or earth.” Earthmoving Regulation § 2401-1-04(K). Respondent engaged in earthmoving activities when Respondent mined rocks, cut and graded the staging area and roads, and built the retaining wall.

3. “Any person who engages in an earthmoving activity within the Republic of Palau shall first obtain a permit from the Board for the proposed activity.” Earthmoving Regulation § 2401-1-05(A). Respondent did not have an earthmoving permit for Respondent’s earthmoving activities.

4. “[A]ll persons engaging in earthmoving activities shall design, implement, and maintain erosion control measures that effectively prevent accelerated erosion, accelerated sedimentation, and polluting of off-site areas.” Earthmoving Regulation § 2401-1-11(B). Respondent failed to implement and maintain erosion control measures.

5. “All public and commercial residences and buildings and structures and all private residences, buildings and structures shall have toilet facilities and wastewater systems as described in these regulations.” Toilet Facilities and Wastewater Disposal Systems Requirements § 2401-13-04. Respondent does not have functioning toilet facilities or wastewater disposal systems.

6. “When no public sewer, intended to serve any lot or premises, is available in any thoroughfare or right of way abutting such lot or premises, drainage piping from any building or structure, public or private, shall be connected to an approved private wastewater disposal system and all toilet facilities shall be of Type 2, unless upon a showing of special mitigating circumstances, the Chairman gives prior written consent to the construction of a Type 3 facility.” Toilet Facilities and Wastewater Disposal Systems Requirements § 2401-13-06(A). Respondent lacks toilet facilities, and Respondent’s greywater sources are not connected to an approved private wastewater disposal system.
7. "... [A] building may be connected to a private sewage disposal system which complies with other provisions set forth in these regulations. The type of system shall be determined on the basis of location, soil porosity, and ground water level and shall be designed to receive all sanitary sewage from the property. The system, except as otherwise provided, shall consist of a septic tank with effluent discharge into a sub-surface disposal field." Toilet Facilities and Wastewater Disposal Systems Requirements § 2401-13-09(A). Respondent's buildings are not connected to a private wastewater disposal system.

8. "No building construction, public or private, may commence without first obtaining a permit from the Board certifying that the following shall be in compliance with these Regulations: (A) Toilet facilities, and, (B) Individual wastewater disposal system or public sewer connection intended to serve such building." Toilet Facilities and Wastewater Disposal Systems Requirements § 2401-13-10. Respondent has waste/wastewater discharging directly into the environment through its employees relieving themselves directly onto the ground and through the direct discharge of greywater into the environment from Respondent's kitchen and shower areas. Respondent does not have a permit for toilet facilities or wastewater disposal systems which comply with EQPB Regulations.

9. "Toilet facilities, wastewater disposal systems and connections from the building drain to the public sewer shall be maintained at all times in good repair and in a clean and sanitary condition. [...] The owner of the property is primarily responsible for the completeness of all structures, good repair, cleanliness and maintenance of the toilet facilities, wastewater disposal systems and connections from a building drain to the public sewer in compliance with all applicable regulations of the Republic of Palau, and any other standard sanitation practices." Toilet Facilities and Wastewater Disposal Systems Requirements § 2401-13-37. Respondent has failed to maintain toilet facilities and wastewater disposal systems in compliance with EQPB Regulations.

10. "It shall be unlawful to dispose of treated or semi treated sewage into any river, stream, pond, well, reservoir, body of fresh water, marine water or onto the ground unless prior written consent is given by the Board or its authorized representative." Toilet Facilities and Wastewater Disposal Systems Requirements § 2401-13-43. Respondent has discharged human waste and greywater directly onto the ground without prior written consent from the Board.

11. "All solid waste shall be stored in such a manner that it does not constitute a fire, health, or safety hazard or provide food or harborage for vectors." Solid Waste Management Regulations § 2401-31-04. "All solid waste containing food wastes shall be securely stored in covered or closed containers which are: (A) Nonabsorbent; (B) Leakproof, (C) Durable; (D) Easily cleanable (if reusable); and, (E) Designed for safe handling." Solid Waste Management Regulations § 2401-31-05. Respondent disposed of solid waste, including food wastes, on the ground of Respondent's property allowing the waste to become food or harborage for vectors. Respondent also burned solid waste, including food wastes, instead of storing waste in covered containers.
12. "A person not included in Section 2401-31-22 owning, operating or managing a property, premise, business establishment or industry has the responsibility of removing accumulated solid waste to an approved disposal facility. [...] No person may deposit solid waste in, on or along a road right-of-way, street, trail, spur, turnaround, tunnel, drainage structure, water of the Republic, public recreation facility or other public or private property." Solid Waste Management Regulations § 2401-31-13(B) & (F). Respondent failed to remove solid waste to an approved disposal facility and instead disposed of solid waste onto the ground or burned it.

13. "No person shall dispose of burnable refuse by open burning, or cause, allow, or permit open burning of refuse including grass, weeds, wire, twigs, branches, insulation, vehicle bodies and their contents, paper, garbage, tires, waste materials, tar products, rubber products, oil, and similar smoke producing materials, within the territorial limits of the Republic of Palau." Air Pollution Control Regulation § 2401-71-40. Respondents' burning of solid waste constitutes open burning of burnable refuse in violation of EQPB Air Pollution Control Regulations.

14. Respondent violated the EQPA, 24 PNC §101, et seq., by failing to comply with EQPB Earthmoving Regulations.

15. Respondent violated the EQPA, 24 PNC §101, et seq., by failing to comply with EQPB Toilet Facilities and Wastewater Disposal Systems Requirements Regulations.

16. Respondent violated the EQPA, 24 PNC §101, et seq., by failing to comply with EQPB Solid Waste Management Regulations.

17. Respondent violated the EQPA, 24 PNC §101, et seq., by failing to comply with EQPB Air Quality Control Regulations.

18. Pursuant to 24 PNC §171(a), the EQPB believes it is appropriate for civil penalties to be imposed for violation of the EQPA as set forth in 24 PNC §101, et seq. and the regulations and standards promulgated thereunder.

**FINAL ORDER**

The EQPB, finding that Respondent's actions violated the EQPA, hereby orders, pursuant to the provisions of 24 PNC § 162(a), that the Respondent immediately undertake the following actions upon receipt of this Order:

- Immediately cease all earthmoving activities until Respondent have applied for and obtained the appropriate EQPB Permits including, if necessary, the submittal of an Environmental Assessment.

EQPB Final Order No. 17-31
• Immediately cease all use of Respondent's shower and kitchen facilities until Respondent has applied for and obtained an EQPB Permit for a private wastewater disposal system and has connected these facilities to the permitted wastewater disposal system. Respondent's EQPB Permit application for a wastewater disposal system shall also include an application for toilet facilities in compliance with EQPB Regulations.

• Immediately provide Respondent's employees with temporary toilet facilities such as a portable toilet.

• Immediately cease all open burning activities. Respondent shall not conduct open burning activities without obtaining the appropriate EQPB Permit. Respondent shall provide proper solid waste containers and said solid waste shall be removed to a permitted solid waste disposal facility on a regular basis so as to avoid the accumulation of solid waste on Respondent's property.

• Pay a civil penalty of Three Thousand Dollars ($3,000.00).

• Post a copy of this Order, in a water and weatherproof manner, at the site. This copy shall be maintained at all times until such time as the EQPB has suspended the operation of the Order.

The Civil Penalty shall be paid by hand delivering a certified check, made payable to the EQPB Environmental Mitigation Trust Fund, to Roxanne Y. Blesam, Executive Officer of the EQPB, at the EQPB Office within ten (10) calendar days of receipt of this Final Order.

A Final Order of the Board may be reviewed only by filing a petition for review with the Trial Division of the Supreme Court, Republic of Palau, within thirty (30) days from the date of receipt of this Final Order.

The issuance of this Final Order does not waive or prohibit the EQPB from pursuing one or more of the cumulative enforcement remedies provided by the Obilil Era Kelulau in Title 24 of the Palau National Code to address the violations identified herein, and does not prejudice the right to seek additional penalties for failure to comply with the substantive provisions of this Order in a timely manner.

ISSUED THIS 20th DAY OF NOVEMBER, 2017.

Benjamin Yobech, Chairman
Environmental Quality Protection Board

cc: File (1 copy)
    EQPB Members
    EQPB Compliance
    EQPB Legal Counsel

EQPB Final Order No. 17-31
Appendix 4

Assessment of the Existing Septic Tank and Design of the New Leach Field
1. **No. of Workers**

Eight (8) workers are currently staying at the Ngetbosk Quarry Barracks. In anticipation of future quarry expansion (if any), a total number of 12 workers is considered in the design of the wastewater treatment.

2. **Existing Septic Tank**

The existing septic tank will be used to receive the daily wastewater generation from the barracks. The septic tank measures 8 ft (L) x 5 ft (W). The depth is approximately 6 ft, which is the usual depth of most of the septic tanks. Please see below photo of the existing septic tank. The existing capacity of the septic tank is:

\[
\text{Volume} = 8 \text{ ft} \times 5 \text{ ft} \times 6 \text{ ft} = 240 \text{ ft}^3 \text{ or } 1,795.32 \text{ gallons}
\]

3. **Wastewater Generation**

Determine if the capacity of existing septic tank is adequate to receive the wastewater generation from the barracks.

A sewage flow of **50 gallons per person per day** is used in calculating the sewage flow from the barracks. This wastewater generation is taken from Table II (Quantities of Sewage Flow) of the EQPB Regulation Chapter 2401-13 (Work or construction camp, semi-permanent).

\[
\text{Daily wastewater generation} = 12 \text{ workers} \times 50 \text{ gallons/person/day} = 600 \text{ gallons/day} < < 1,795.32 \text{ gallons}
\]

Therefore, the existing septic tank is adequate to receive the projected sewage flow from the barracks.

4. **Leach Field Design**

4.1 **Percolation Test**

Results of percolation test conducted on 18 November 2017 on the proposed location of leach field indicate that 1 inch high water drains within 5 minutes.

4.2 **Required Absorption Area**

Leach field absorption area is designed using Table IV (Guidelines for Construction of Septic Tanks and Leach Fields in Palau) of EQPB Regulations Chapter 2401-13. Note that as there were no specific absorption area recommendations for 600 gallons/day of wastewater flow, the wastewater flow more than 600 gallons/day is used in the design.
In this case the recommended minimum absorption area, which is 328 ft$^2$, for a wastewater flow of 750 gallons/day is used.

4.3 Proposed Leach Field Area

Using a trench width of 3 ft, the total length of the leaching area will be:

\[
L = \frac{328 \text{ ft}^2}{3 \text{ ft}} = 109.33 \text{ ft}
\]

Using 3 parallel trenches of 3 ft wide each,

\[
L' = \frac{109.33 \text{ ft}}{3} = 36.44 \text{ say 37 ft}
\]

4.4 Plan of Leach Field
Attachment 1. Photos and Result of the Percolation Test
Appendix 5

Other Engineering Plans