EXECUTIVE SUMMARY

1.0 PROJECT BACKGROUND

1.1 Background of the Project

Project Name:	**Increase in Annual Production of the Gotok Limestone Quarry Project**
Nature of Project:	**Resource Extractive Industry (Quarry)** **Increase in annual production**
Total Area:	**13.0 ha**
Site Location:	**Barangay Iwahig, Rio Tuba and Sandoval, Municipality of Bataraza, Province of Palawan**

1.2 Profile of the Proponent

Name of Proponent:	**Rio Tuba Nickel Mining Corporation (RTNMC)**
Office Address:	29th Floor NAC Tower, 32nd Street, Bonifacio Global City, Taguig, Metro Manila
Contact Person:	Philipp D. Ines Resident Mine Manager
Tel. No./ Fax No.:	(02) 798-7622 loc. 8308

1.3 Profile of the Preparer

EPRMP Preparer:	Gaia South, Inc.
Office Address:	7th Floor Montepino Bldg., Adelantado cor. Gamboa St., Legaspi Village, Makati City
Contact Person:	Liezyl S. Liton-Relleta Project Director
Tel. No./ Fax No.:	(02) 893-5661

Presented in **Table ES1** is the comparative matrix of the current and proposed operation in the quarry and crushing plant.

Table ES1
Comparative components of quarry and crushing plant operations

Component	Existing Operation	Proposed Expansion
MPSA	213-2005-IVB	SAME
ECC	ECC-0707-002-3721 – Gotok Limestone Quarry ECC-CO-1312-0043 – Crushing Plant	New ECC
Area covered in the MPSA	**84.5 hectares**	**84.5 hectares**
Total project area for the quarry operation (within the MPSA)	**14.05 hectares**	**SAME**
ECC Approved quarry area within the MPSA	13.0 hectares	13.0 hectares
Ancillary facilities within the MPSA	0.9 hectares	SAME
Access roads	0.15 hectares	SAME
Total project area for the crushing plant operation (within AMA-IVB-144A and MPSA-114-98-IV)	**3.796 hectares**	**SAME (Note that the crushing plant will remain under ECC-CO-1213-0043)**
Infrastructures	1.895 hectares	SAME
Stockpile area	0.631 hectares	SAME
Access road	0.770 hectares	SAME
Storage area of explosives	0.500	SAME
Total project area outside any MPSA (hauling road)	**6.80**	**SAME**
Common facilities with RTNMC Nickel Operations	26.45	SAME
Annual Production Rate	372,000 WMT per year	725,000 WMT per year
Mine life	Up to 2026	Up to 2022
Method of ore extraction	conventional drilling and blasting technique	SAME
Hauling road	10 km	SAME
Crushing plant	**Note that the crushing plant will remain under ECC-CO-1213-0043**	
Usage	• Limestone crushing	SAME
Components	• Jaw Crusher - One (1) unit, Kurimuto, 3,020 ST, 700 mm x 500 mm x 95 mm CSS/ Discharge • Roll Crusher- One (1) unit Kurimuto 3624 Double Roll Crusher • Vibrating Screen - Two (2) units Triple Deck with 75 mm opening; One (1) unit, NFS 1230, 1200 mm X 3000 mm w/ 100 mm opening, single Deck; One (1) unit, 1200 mm X 3650 mm w/ 25 mm opening, single Deck	• Jaw Crusher - One (1) unit, Terex Jacques, JW 42, 1070 mm x 760 mm • 125mm CSS/ discharge • Roll Crusher- One (1) unit Cone Crusher, Terex- Jaques, TC100 • Vibrating Screen - One (1) unit, Triple Deck, 6' x 16", 80 mm top, 55 mm middle and 30mm bottom; One (1) unit, NFS 1230, 1200 mm X 3000 mm w/ 30mm opening, single Deck; One (1) unit Double Deck Horizontal Screen, 5' x 15', 55 mm top and 3mm bottom deck • Water System
Size Out put	0-30mm	• 0-30 mm • 30-55 mm • 55- 80 mm
Maximum Capacity	110 TPH	250 TPH
Water Source	• Water wells 2 and 3 • Umawi Stream • Mine pit and siltation ponds	• Water wells 2 and 3 • Umawi Stream • Mine pit and siltation ponds Tagpisa Siltation pond (back-up source)
Water requirement	No washing at the pre-modified plant 14 m^3/day (road watering)	1,044 m^3/day (washing plant) 16.5 m^3/day (road watering) 106.5 m^3/day (domestic water

Component	Existing Operation	Proposed Expansion
	106.5 m^3/day (domestic water requirement)	requirement)
Power Source	One (1) 700 kW Diesel Generator Two (2) 350 kW Diesel Generator	SAME
Power requirement	373,912 kW-hr	1,670,438 kW-hr
Fuel requirement	733,100 liters	1,566,100 liters
Manpower requirement	117 (supervisor, operator, driver, utilities and security guards)	213 (supervisor, operator, driver, utilities and security guards)
Project Cost	PhP 221 M	PhP 376,906,207

2.0 PROJECT BACKGROUND

2.1 The Environmental Impact Assessment (EIA) Report

Securing an Environmental Compliance Certificate (ECC) for an expansion project of a resource extractive industry (Environmentally Critical Project) such as this particular project requires an Environmental Performance Report and Management Plan (EPRMP). This study follows the standard EPRMP outline presented in the Revised Procedural Manual for DENR Administrative Order No. 30, Series of 2003 (DAO 03-30).

- Project Description;
- Analysis of Key Environmental Impacts;
- Environmental Risk Assessment;
- Impacts Management Plan;
- Environmental Compliance Monitoring;
- Emergency Response Policy and Generic Guidelines;
- Abandonment/Decommissioning/Rehabilitation Policies and Generic Guidelines; and
- Institutional Plan for EMP Implementation.

To facilitate the start of the study, a Public Scoping Meeting was held last February 27, 2014 at the Gotok Elementary School in Barangay Iwahig, Municipality of Bataraza, Province of Palawan. The meeting was attended by 79 participants from the Department of Environment and Natural Resources (DENR), Palawan Council for Sustainable Development (PCSD), Municipal office, Barangay Council, Indigenous Cultural Community (ICC) members and local stakeholders, church, academe, farmers' sector, local organizations, RTNMC and Gaia South (**Table ES2**). **Annex ES1** includes the Public Scoping Report.

Following the conduct of Public Scoping Meeting, a Technical Scoping Meeting was held in March 31, 2014 at the EIA Conference Room, 2nd Floor EMB Building, DENR Compound, Visayas Avenue, Diliman, Quezon City. The EMB Case handlers facilitated the meeting which was attended by the EMB Review Committee Members, representatives of RTNMC and Gaia South, Inc. **Annex ES2** is the Technical Scoping Checklist.

Table ES2
Participants of the Public Scoping

Sector/ Organization	No. of Participants
Mines and Geosciences Bureau (MGB) Region IVB (MIMAROPA)	1
Environmental Management Bureau (EMB) Region IVB (MIMAROPA)	1
EMB Brooke's Point	1
Palawan Council for Sustainable Development Staff (PCSDS)	1
Municipal Planning and Development Office of the Municipality of Bataraza	1
Barangay Council of Iwahig	3

Sector/ Organization	No. of Participants
Barangay Council of Sandoval	4
Indigenous Cultural Community (ICC) from Brgy. Iwahig	3
ICC from Brgy. Sandoval	2
Farmers' Association of Sandoval	6
Farmers' Association Iwahig	4
Senior Citizens' Group	1
Religious Sector	1
Gawad Kalinga (GK) Highlanders	4
Rural Improvement Club (RIC)	2
Residents from Brgy. Iwahig	3
Residents from Brgy. Sandoval	13
Resident from Brgy. Ocayan	1
Teachers from Sitio Gotok	5
Teacher from Brgy. Sandoval	1
Day Care (DCM)	2
Student from Gotok	1
Rio Tuba Nickel Mining Corp.	14
Gaia South, Inc.	4
Total No. of Participants	**79**

2.2 Limitations of the Study

The Scoping Checklist that was agreed upon during the Technical Scoping Meeting serves as the guide for all the imperative information needed in this EIA. Experts from different field of interest prepared this comprehensive EPRMP based from primary data gathered through actual fieldwork and secondary data sourced from the barangay and municipal offices and other related agencies such as the National Mapping and Resource Information Authority (NAMRIA), Philippine Institute of Volcanology and Seismology (PHIVOLCS), Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), Bureau of Soils and Water Management (BSWM), and Mines and Geosciences Bureau (MGB), among others.

2.3 The Project Team

Table ES3 shows the pool of experts from Gaia South Inc. who was commissioned to prepare this EPRMP document. **Annexes ES3** and **ES4** are the Accountability Statements of RTNMC and Gaia South, Inc., respectively.

Table ES3
List of EIA team members and their respective field of expertise

Consultant/Researchers	Module/Position
Liezyl S. Liton-Relleta	Project Director
Emmanuel G. Ramos, PhD	Team Leader / Geology / Technical Reviewer
Perfecto Evangelista, PhD	Soils and Land use
Thelma D. Dela Cruz, MSc	Environmental Risk Assessment
Judeline Dimalibot, MSc	Terrestrial Fauna
Dhiocel A. Celadiña, MSc	Terrestrial Flora
Davee Drake Medina, MSc	Hydrology/Hydrogeology
Emiterio Hernadez, MSc.	Resource Person for Flood Modelling
Neil James E. Duran	Air and Water Quality
Katherine Escalona, MSc	Freshwater Ecology
Rolando Soncuya, MA	Socio-economics and Public Health
Ozzy Boy Nicopior, MSc	Mapping Specialist
Danica Dela Rosa	Senior Technical Associate
Hanna Bermillo-Arriesgado, MSc	Senior Technical Associate

2.4 The EIA Study Schedule and Area

The MPSA of RTNMC for the Gotok Limestone quarry project covers about 84.5 ha bounded by the coordinates shown in **Table ES4**. From the 84.5 ha, only 13.0 ha was approved by the DENR and PCSD as the active Gotok quarry area. The boundaries of the approved 13.0 ha Gotok Limestone Quarry (**Table ES5**) is within Barangays Iwahig and Sandoval, Municipality of Bataraza, Province of Palawan (**Figure 1.2.1**).

Table ES4. PRS 92' Geographic Coordinates of MPSA

Corner	Latitude	Longitude
1	8°35'50"	117°27'45"
2	8°36'20"	117°27'45"
3	8°36'20"	117°28'15"
4	8°35'50"	117°28'15"

Table ES5 Geographical coordinates of Phase 1 and Phase 2 of the Gotok operations

Corner	Latitude	Longitude
Phase 1		
1	8°36'4.29"N	117°27'48.26"E
2	8°36'4.26"N	117°27'52.05"E
3	8°36'3.21"N	117°27'50.74"E
4	8°35'59.78"N	117°27'50.41"E
5	8°35'58.50"N	117°27'49.56"E
6	8°35'57.59"N	117°27'47.81"E
7	8°35'57.90"N	117°27'46.45"E
8	8°35'58.92"N	117°27'45.32"E
9	8°36'0.93"N	117°27'45.54"E
Phase 2		
1	8°36'17.50"N	117°27'47.30"E
2	8°36'20.00"N	117°27'48.00"E
3	8°36'20.00"N	117°27'52.76"E
4	8°36'18.44"N	117°27'54.16"E
5	8°36'16.66"N	117°27'54.32"E
6	8°36'15.06"N	117°27'54.47"E
7	8°36'13.27"N	117°27'54.92"E
8	8°36'12.11"N	117°27'56.52"E
9	8°36'10.27"N	117°27'58.32"E
10	8°36'08.09"N	117°27'56.93"E
11	8°36'08.70"N	117°27'54.06"E
12	8°36'06.12"N	117°27'53.32"E
13	8°36'06.25"N	117°27'47.86"E
14	8°36'13.10"N	117°27'46.40"E
15	8°36'15.00"N	117°27'46.01"E

On the other hand the limestone crushing plant is situated at the existing operation site of RTNMC. **Table ES6** shows the geographical coordinates of the crushing plant area.

Table ES6
Geographical coordinates of the crushing plant area

Corner	Latitude	Longitude
1	8°33'33.61"N	117°25'36.36"E
2	8°33'30.34"N	117°25'36.36"E
3	8°33'30.34"N	117°25'34.93"E
4	8°33'27.44"N	117°25'34.93"E
5	8°33'27.44"N	117°25'32.14"E
6	8°33'29.00"N	117°25'32.14"E
7	8°33'29.00"N	117°25'31.27"E
8	8°33'30.23"N	117°25'31.27"E
9	8°33'30.23"N	117°25'29.65"E

Corner	Latitude	Longitude
10	8°33'31.98"N	117°25'29.65"E
11	8°33'31.98"N	117°25'31.13"E
12	8°33'32.64"N	117°25'32.22"E
13	8°33'32.64"N	117°25'32.95"E
14	8°33'33.61"N	117°25'32.95"E

The series of activities conducted for the development of this EPRMP is detailed on **Table ES7**.

Table ES7
EIA study schedule

Activity	Period
Environmental and Social fieldwork	March to April 2014
Review of environmental monitoring reports and environmental compliance documents	April
Data gap analysis	May 2014 to June 2014
Draft EPRMP Report Writing	June 2014 to January 2015
Submission of EPRMP to EMB for Technical Screening	December 2015
Review Committee Technical Review	(to be included)
Finalization of EPRMP Report	(to be included)

2.5 The EIA Methodology

The discussion of this EIA revolves around the baseline data parameter requirements indicated in the Technical Scoping Checklist. These data were gathered using scientifically acceptable schemes and were assessed using the scientific methodology/approach required by the DENR. **Table ES8** summarizes the EIA methodology. Provided, as **Annex 2.1.1** is the baseline methodology for each environmental component.

Table ES8
EIA study methodology

Component	Description
Land Use	• Use of Comprehensive Land use Plan (CLUP) of Bataraza; • Use of Palawan Council for Sustainable Development (PCSD) Environmentally Critical Areas Network (ECAN) Map; and • Citation of Municipal and Provincial Resolutions for Land Use Classification.
Geology	• Use of maps and reports from the MGB, PHIVOLCS, other related literature and RTNMC EPRMP 2014.
Pedology	• Use of CLUP Bataraza BSWM reports, project map and NAMRIA Topographic Map with a scale of 1:50,000; • Soil samples from four (4) observation sites collected using a drill-type auger from within the project area; • Physico-chemical analyses of samples (texture, pH, N, OM, P, K, CEC). Analysis was done at the soils laboratory of BSWM. • Heavy metal analysis (Hg, Cr^{+6}, Cu, Cd, As and Pb) was analyzed by Ostrea Mineral Laboratories. • Four erosion susceptibility ratings namely: (1) rainfall, (2) soil properties, (3) land use/vegetation and (4) slope were used to form the final erosion susceptibility rating.
Terrestrial Biology	• Use of NAMRIA Topographic Map; • Terrestrial Flora survey - 16 sampling stations for the closed-canopy and open-canopy ecosystem. The dimension of the quadrat was 20m x 10m. Each quadrat was divided into sub-quadrats using the four cardinal directions. • Terrestrial Fauna survey - three (3) terrestrial vertebrates survey sites/transects and four (4) caves. Information were gathered thru observations using all the senses, and use of field equipment and materials which include binoculars, GPS, digital camera, 3m x 12m nylon mist nets, live and snap traps, flashlights, bird bags, and field notebooks. To monitor the terrestrial vertebrate fauna the following standard procedures were used:

Component	Description
	○ **Bird -** Direct observations while doing the transect walk coupled with mist netting were employed for taxon ○ **Mammals** - Methods used included mist netting for volant or flying species. Live trapping, tracks and sign identification (e.g. droppings, wallowing areas, dens) and direct sighting techniques were used for terrestrial and arboreal (but non-volant) species. ○ **Reptiles and Amphibians (Herps) -** The Visual Encounter Survey was used in the inventory of herps while passing through established transect lines. Frogging was done in the only water body (creek) which was located at the western side outside the area with the tree-cutting permit. ○ **Cave Assessment -** Caves in the vicinity and within the quarry site was assessed according to the provisions of RA 9072, the National Caves and Cave Resources Management and Protection Act of 2001
Hydrogeology	• Use of RTNMC records, PAGASA data, National Water Resources Board records and NAMRIA Map; • The monthly PET in the Gotok area was computed from the RTNMC and CBNC weather data using the FAO Penman-Monteith Method (Allen, et al, 1998); • The monthly AET values were then estimated from the PET values were using the Turc-Pike Equation (Xu, C.Y. and Singh, V.P., 2004); • The annual water balance for the Ocayan river watershed was computed using the Long Term Water Balance Method (Sokolov & Chapman, 1974); and • For the 1D hydrodynamic modeling of the river system surrounding the Gotok MPSA, a free and open source software called ANUGA, developed by Roberts and collaborators from the Australian National University (ANU) and Geoscience Australia (GA) was used
Water Quality	• Use of monitoring reports for the trend of the parameters being analyzed; and • Water quality assessment on four (4) ambient freshwater sampling stations conducted in accordance to the EMB's manual on ambient water quality monitoring. • The parameters considered were pH, total suspended solids (TSS), dissolved oxygen (DO), biochemical oxygen demand (BOD), salinity, fecal coliform, total coliform, *E. coli*, lead, arsenic, cadmium, mercury, chromium hexavalent and Oil and Grease.
Freshwater Ecology	• Five (5) sampling sites were established for the assessment; and • Plankton were collected from 30-L surface water while benthos were collected using modified surber sampler.
Meteorology, Air and Noise	• Use of monitoring reports and PAGASA data; • Three (3) sampling stations were established for the 24-hr ambient air monitoring report. The parameters monitored were PM10, TSP, SO_2, and NO_2; • For the monitoring of the noise level, three (3) sampling stations were established; and • The estimated GHG emission was derived through the GHG emission calculation tool (version 2.4) formulated by the Greenhouse Gas Protocol Initiative using the fuel requirements provided by RTNMC.
Socio-economics and Public Health	• Primary data generated from Key Informant Interviews (KII), Focus Group Discussions (FGDs), field observations and surveys. Participants were municipal officials from Bataraza, barangay officials and representatives from Barangays Iwahig, Sandoval and Rio Tuba. • surveys ; Use of secondary information such as municipal, barangay and rural health profiles, CLUP, Information, Education, and Communication (IEC) documentation, Social Development and Management Plan (SDMP) Reports, RTN Foundation, Inc. documents, RTNMC hospital documents and other related reports.

2.6 Public Participation

At the very start of the application for an ECC, the stakeholders were already involved. This was through the conduct of various IEC campaigns and Public Scoping Meeting wherein the stakeholders were made aware of the proposed project, possible economic benefits and the conduct of an environmental study needed in securing an ECC. **Table ES9** shows some of the recent meetings conducted by RTNMC in which impact barangays participated. Full-list of the IEC activities implemented is provided as **Annex 5.1.2**.

Table ES9. Recent meetings conducted by RTNMC in relation to its current project

Year	Activity	Participants
2016	Conduct of IEC Caravan within Impact Barangays	Residents of Barangay Iwahig, Barangay Sandoval and Barangay Rio Tuba
	Conduct of monthly coordination meeting with ICCs, IPDO and PMC	Tribal Chieftains and IPDO staff
2017	Conduct of IEC within Host and Neighboring barangays	Residents of Barangay Iwahig, Barangay Sandoval and Barangay Rio Tuba
	Conduct of Meetings, FGDs	Members/residents of all impact barangays

During the actual EIA activity, local stakeholders were involved using a participatory method such as Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs).

Matrix of issues and concerns raised during the IEC activities and Public Scoping Meetings are provided as **Annex ES5**.

The public participation does not only include attendance to meetings (e.g. IEC, FGDs, KIIs) but it also extends to the partaking in the monitoring activities of the environmental compliance of the operation of RTNMC. This is through the Multi-Partite Monitoring Team (MMT). Current composition of the MMT is discussed in *Chapter 6*. On the other hand, during IECs the results of the monitoring are also presented to the people to which they can raise questions and RTNMC responds. The IECs are documented. Through this, the public are being notified on the current and future plans/activities of the company. Thus, local participation is highly regarded by the Company.

2.7 Delineation of Impact Areas

The degree of the impact of the project on an area can be categorized as primary and secondary. This is determined based on the proximity of an area to a certain project component.

For this proposed project, the primary impact areas are delineated based on the following:

1. Within the Gotok Active Plan;
2. All the buffer zones as required under the ECC;
3. Located within 200 m from both sides of the haulage roads from quarry area to Kulantuod Junction;
4. The host area for the crushing plant, quarry ancillary facilities and haulage road; and
5. River or stream used as final discharge outlet of the crushing plant.

Barangays Iwahig and Sandoval where the Gotok Limestone Quarry is located and Brgy. Rio Tuba, where the limestone crushing plant is situated, are all host communities and therefore considered as primary impact areas.

The potential impact on the flora and fauna are concentrated within the 13.0-ha approved area (Phase 1 and Phase 2). A 50-m bufferzone delineated around the periphery of approved quarry area is being maintained. Status of the maintenance of the vegetation within the bufferzone is discussed in *Chapter 2*.

On the other hand, areas which are not host to any project components but still experiencing the effect of the operations of the quarry and crushing plant are considered as secondary impact areas. These areas were delineated using the assumption that the effect of noise and dust can still be felt within 1,000 m or 1 km from both sides of the haulage roads and within 1,000 m from the boundaries of the 13.0 ha quarry area and crushing plant. The nearby barangay of Ocayan from where a stretch of the haulage road is located is considered as secondary impact area for this project.

Municipality of Bataraza is identified as the Regional Impact Area (RIA) of the project as the impacts, mostly of social aspect can be experienced. The whole province of Palawan will also be indirectly affected by the proposed project due to social benefits that will arise from the quarry operation. Please refer to **Figure 1.2.6** in ***Chapter 1*** for the map of the project impact areas.

Stated as a conditionality under ECC No. 0201-021-313, *buffer zones of forty (40) meters wide measured landward along river/stream bank's high water line and along the entire periphery of the project site shall be established. Fast growing vegetation, indigenous where possible, shall be planted and maintained in these zones.* **Figure 1.2.7** in ***Chapter 1*** illustrates the buffer zones for this project.

3.0 SUMMARY OF BASELINE CHARACTERIZATION

Table ES9 presents the summary profile of the environment and people in the impact areas of the Gotok Limestone Quarry and processing plant.

Table ES9
Summary of profile of the environment and people

Component	Description
Land Use	Baseline • Based from the latest CLUP, the municipality of Bataraza has four (4) general land uses namely: 1) settlement/built-up areas; 2) agricultural areas; 3) forest areas; and 4) special use areas; • According to the ECAN Map from PCSD, the 84.5 ha MPSA of RTNMC lies within two (2) zones namely: controlled use zone and traditional use zone; • Through the Free and Prior Informed Consent (FPIC) and Certificate of Ancestral Domain Title (CADT), there are no conflicting tenurial/land issues within the MPSA; and • Given the irreversible impacts of the quarry project in the area, RTNMC is also implementing its Reforestation and Rehabilitation Program.
Geology	• The main structural feature in the region is the thrust fault contact between the ultramafic rocks and the older sedimentary and volcanic rocks; • The ultramafic rock that underlies the MPSA of the Gotok Limestone quarry consist of harzburgite, dunite and pyroxenite, in order of decreasing abundance; • The continued operation in the quarry site significantly changed the original landform, slope and underground geomorphology in the project area. The original sloping and rugged terrain will be transformed into crater-like formations after the quarrying operations. As part of the rehabilitation program, RTNMC shall backfill the said craters to maintain a relatively consistently level topography; and • Liquefaction occurs in seismically active areas that are underlain by thick, saturated deposits of unconsolidated sand and silt. Since Palawan is not seismically active and there are no thick, unconsolidated sand and silt deposits in the vicinity of the project site, the area is not prone to liquefaction and subsidence. However, landslide due to heavy rains and erosion might happen.
Pedology	• The soil type in the project area is Bolinao clay and the two (2) soil mapping units are the Bolinao clay 0 – 8% slopes and Bolinao clay 18≥50% slopes; • From the soil analysis: Bolinao clay 18≥50% slopes : ○ Copper and Iron are very low. Zinc is high to very high and Manganese is low. The

Component	Description
	natural fertility of the soil is high; Bolinao clay 0 – 8% slopes on the infilled valley: ○ Copper and Iron are very low. Zinc is very high (2.23 mg/kg) while Manganese is medium. The natural fertility of this soil is medium; Bolinao clay 0 – 8% slopes on broad flat to almost flat terrain: ○ Copper, Zinc and Iron are very low. Manganese is medium. The natural fertility of this soil is low; ○ All heavy metals (Arsenic, Cadmium, Nickel, Cobalt, Lead and Mercury) for all soil types are below the contamination levels as prescribed by the Taiwanese and Dutch standards; and ○ The bare area on Bolinao clay with 18≥50% slopes is with "high susceptibility to erosion while the Forest, Coconut plantations and Shrubland on Bolinao clay with slopes of 0 – 8% are with "slight susceptibility to erosion". • Based on the Composite Erosion Susceptibility Decision Rule of Bruce (1982), the final rating of the area is "moderately susceptible to erosion"; • The continued operation in the quarry site will significantly result to loss of top soil in the project area and with the increase in production, soil contamination with oil and grease will likely occur if not mitigated properly; and • In order to mitigate the impacts of its current operation, RTNMC implements its solid waste and hazardous waste management program.
Terrestrial Ecology	Terrestrial Flora • In general, the vegetation of the quarry area is a limestone forest which had both closed-canopy forest and open-canopy ecosystem; • During the study, seven (7) plant species namely: *Aglaia smithii*, Antipolo (*Artocarpus blancoi*), Ipil (*Intsia bijuga*), Hamindang, Mitrephora (*Mitrephora fragrans*), *Sindora inermis*, Xylosma (*Xylosma palawanense*) that are in the redlist of International Union for Conservation of Nature (IUCN) for threatened plant were recorded; • The impacts of the Gotok Limestone Quarry to the flora biodiversity will be the removal and loss of habitat, loss of important species, and threat to the abundance, frequency and distribution of important local species if not properly mitigated. These impacts will be concentrated on the area where tree cutting was applied for within the MPSA; and • As part of its environmental program, about 1.84 hectares of mined-out portions of the quarry area were completely rehabilitated. RTNMC has planted a total of 496 seedlings of endemic and indigenous forest tree species and vetiver seedlings.
	Terrestrial Fauna • There are 38 bird species, 58% of which are residents, 39% are endemic while 3% are migratory. The Palawan Hornbill, *Anthracoceros marchei*, is under the Vulnerable category. *Pericrocotus cinnamomeus* (Small Minivet) and *Stachrys hypogrammica* (Striped Babbler) are given the Near Threatened category; • Among the 10 species (7 : volant; 3: non Volant) of mammals observed and recorded from the three (3) survey sites, majority are considered as Least Concern except for *Macaca fascicularis philippensis* which is under the Near Threatened category (DENR 2004-15). All species are common, abundant and widespread; • During the survey, six (6) species of amphibians and three (3) species of reptiles were recorded. Seven of which are categorized as Least Concern while one (1) is Near Threatened (DENR 2004-15); and • The felling of trees and the clearing of vegetation will hinder the mobility of wildlife species specially tree and ground dwellers and fragmentation of habitats will occur. Monkeys were observed in Transect 1 and Transect 3 but not in Transect 2, which is in the middle of the two (2) sites. The only access from Transect 1 to Transect 3 is through the trees. If these are cut, then foraging of monkeys will be limited to the site in Transect 1. As for ground dwellers, the animals cannot move from one area to another without vegetation cover. They are in danger of dessication e.g. frogs and toads. Eventually, loss of access will result to loss of species. In the long run, alien or invasive species will proliferate and will prevail over native and endemics.
Hydrogeology	• The Gotok Limestone Quarry lies at the southwestern section of the limestone hill and is drained by an intermittent tributary of the Ocayan River; • The annual rainfall, evapotranspiration, stream discharge and groundwater recharge in the Ocayan River watershed amount to 218.94, 109.41, 91.00 and 18.53 MCM, respectively; • Residents of Barangays Sandoval and Iwahig used to obtain their domestic water requirements from Level 1 water sources consisting of shallow wells and springs; • The aquifers in the vicinity of the project site are replenished from direct rainfall infiltration, infiltration from the tributaries of the Iwahig and Ocayan rivers and

Component	Description
	groundwater movement from high to low areas so the increased production of the quarry will have an insignificant effect on the amount of available groundwater in the vicinity; • the project will not compete with users of groundwater since there are no wells in the immediate vicinity of the quarry and the water source of residents in the area is already supplied by the Level 2 water system of RTNMC and CBNC; • The flood modeling predicts that the Gotok quarry area is not prone to riverine floods for both simulations of baseline conditions and proposed expansion. However, localized flooding may occur on the south and southwest portion of the MPSA; and • As part of RTNMC's stormwater management system, diversion canals, ditches and two silt collector sumps were constructed to reduce instances of flooding as well as a mitigating measure to lessen siltation. This sump is periodically desilted to insure its effectivity during flooding events.

Water Quality	• In the 2014, four (4) sampling stations (two in Oning Creek (freshwater) and two in Rio Tuba River (brackish)) were established by Gaia South for the water quality assessment;
	  ○ All the stations sampled for pH, DO, salinity, BOD, TSS, oil and grease and heavy metals (Cr^{+6}, As, Cd, Pb and Hg) are within the DENR Class C and SC standards; and
	  ○ The bacteriological parameters of the sampled stations failed to meet the DENR standard
	• Water quality monitoring of RTNMC for the Gotok Limestone Quarry Project involves monthly sampling/monitoring of two (2) stations: Oning Spring and Gotok Entry Tunnel. The parameters being monitored are pH and TSS. The pH levels from 2010 to 2014 were relatively within the DAO 2016-08 standard of 6.5 to 9.0. As for the TSS, the values for all stations from 2010 to 2014 monitoring period are under the 80 mg/L limit of DAO 2016-08 for Class C except for second of 2010 at the Gotok Entry Tunnel Station.
	• The quarry operation, which includes ground stripping made a significant alteration to the landscape. During the continued mining operations, it is expected that sediments from exposed and denuded surfaces will contribute to surface run-off and erosion, leading to possible siltation of nearby waterbodies. Stockpiled soil and other waste materials will also be susceptible to erosion during heavy rains.
	• A silt collector sump has been constructed by RTNMC as a mitigating measure to trap the fine particles that may be carried away by runoff water to adjoining areas during heavy downpour. This sump is periodically desilted to insure that effluent water discharging from the sump shall be free of fine particles and will accommodate the increased volume of run-off during heavy downpour.

Freshwater Ecology	• Three of the five (5) sampling sites for freshwater ecology assessment represent Rio Tuba River while the remaining two (2) represent Oning spring; • Rio Tuba River is mostly dominated by marine diatom species with concentrations ranging from more than 30,000 cells per liter to more than a million cells per liter and while Gotok spring is also dominated by diatoms, it is at a lesser extent; • Larval forms of zooplankters were also observed to be the most dominant group in all sampling points; • Not much benthic organisms are observed in Rio Tuba; • The family-based scores indicate that upstream Oning has fairly poor water quality while downstream Oning has poor waters; and • No important aquatic species in Oning is threatened with the increase in the annual production of Gotok limestone quarry project. However, increased input of wastewater from settling ponds may increase the probability of an algal bloom in Rio Tuba River.
Meteorology	• The nearest synoptic station to the project site is located in Puerto Princesa, Province of Palawan; • The area is categorized as Type III climate under the Modified Corona Classification of the Philippine Climate which is characterized by relatively dry condition from January to April and wet throughout the year; • Based from three (3) identified rainfall stations (Guintalunan, Mangingidong and Piersite) at Rio Tuba, the rainy season occurs from May to December wherein October is the rainiest month; • The Northern Palawan area is mostly hit by typhoon, which approximately occurs once a year which is mostly during the last quarter of the year when the tail end of the cold front moves towards the southern part of the Philippines; • Based from PAGASA Climate Change Projections, the highest temperature change is the 2.1˚C increase in 2050 for the months of June-July-August; and

Component	Description
	• In addition, Palawan rainfall events (>200 mm) will increase by 250% by year 2020 and 2050. This significant increase may result to localized flooding of the project site considering that quarry activities are designed to culminate at 2022. This impact is short term, which may occur during extreme rain events.
Air	• Air quality monitoring program of RTNMC for this quarry project monthly measurement and recording of the concentration of particulates on two (2) sampling stations established near the quarry area and another one (1) in the admin compound facing the crushing plant for monitoring and reported in the submitted SMR for the Nickel Mining Project; • The particulate concentration of the three (3) sites are all below the maximum standard of the DENR which is 300 µg/Ncm; • The four (4) parameters (NO_2, SO_2. TSP and PM10) analyzed for ambient air were maintained below the DENR standard limit while regular operation was on – going; and • The increased in production of the quarry and modified crushing plant of the project will have an impact on the area's air quality primarily through elevated levels of dust and to a minor extent, SO_x and NO_x in the mining areas where heavy equipment are being used, along access routes and haul roads and within the vicinity of the crushing plant.
Noise	• The RTNMC established a two (2) sampling station for monitoring the noise level within the vicinity of the quarry operations; • The recorded noise readings for all time period from 2012 to 2013 are above the respective standard limit; • A 24-hr noise level sampling was conducted for three (3) stations within and near the vicinity of the quarry area and hauling road from February – March 2014 and it shows that all the three (3) stations exceeded the maximum standard; • Increase in production capacity is accompanied by increase in transport activities within and around the quarry area thus the level of noise is expected to increase. Residents along the hauling route of the dumptrucks will be directly affected by the noise generated from the vehicles that transport limestones to the crushing plant. In addition, blasting activities shall be performed once a week while hole drilling is performed in non-active benches in preparation for the next blasting operation; and • Monitoring data of RTNMC shows noise levels exceeded the maximum noise level for light industrial area. Mitigating measures for the increased noise level should be intensified in preparation for the additional heavy equipment and vehicles that will be utilized with the increased production.
Socio-economics	*Municipality of Bataraza* • The total population of the Municipality of Bataraza was 63,644 persons based on the 2010 Census of Population and Housing (CPH) equivalent to about 8.2% of the total provincial population, higher than the 6% in 2000; • Based on the 2000 census, ***Palaw'an*** was the leading ethnic group in Bataraza accounting for 31.20% of household population. It is followed by Tagalogs accounting for 18.53% while another IP group, the *Jama Mapun* was third with 10.68% of the household population; • As for the educational system in Bataraza, there were 49 educational facilities catering to the elementary, secondary, and tertiary students: • Thru the proposed project, the Municipality and the impact barangays may benefit from the following: a. Enhancement of employment and livelihood opportunities; b. Increase business opportunities and associated economic activities; and c. Increased revenue of the LGUs. • RTNMC and its sister company CBNC has an integrated social development program composed of the legally mandated Social Development Management Plan (SDMP) and non-SDMP programs that both companies voluntarily implement in favor of the 11 barangays and 24 ICC communities in Bataraza; *Perception survey* • One hundred forty-five (52.35%) out of 277 total respondents were aware that RTNMC is planning to expand the operation of the Gotok Quarry while 129 respondents (46.57%) were not; • About 208 respondents (75.09%) are aware of the positive impacts of mining and 119 of them are living near the quarry area. Some of the positive impacts cited are employment, establishment of business, medical missions and grant of scholarship; • Ninety-seven respondents (35.02%) answered that mining have negative impacts such as shaking of land and flooding for the quarry area and production of bad smell from the crushing area; • One hundred twenty two (44.94%) respondents were in the opinion that the expansion

Component	Description
	project will provide additional positive effects to them while 155 respondents (55.96%) said otherwise. The positive impacts cited are employment, development of communities and nearness to report for work while the negative impacts are flooding, destruction of trees, generation of dusts and landslides; and • When asked about their opinions about the project, one hundred twenty four respondents (44.77%) strongly agree while 72 respondents (25.99%) agree with the proposed expansion of the quarry. Forty-nine respondents strongly disagree with the proposed project while 11 respondents disagree. To summarize, 70.76% approved the project while 21.66% did not approve.
Public Health	• Barangay Rio Tuba listed 19 health related facilities, which include three (3) private medical clinics, one (1) hospital, two (2) maternal and child clinics, a Barangay Health Center, a Family Planning Center, six (6) Day Care Centers and five (5) drug stores. Also, there is the South Palawan Provincial Hospital located in Brooke's Point, about 32 km from the Poblacion area of Bataraza. The RTNFI Hospital, located within the RTN Townsite about 35 km from the town proper which complements the role of the Municipal RHU in health service delivery; • Infant Mortality Rate (IMR) in Bataraza were recorded at 24.55, 16.75, and 11.28 in 2006, 2005 and 2004, respectively; • The leading cause of sickness in the municipality according to the annual health reports starting from 2005 was acute upper respiratory tract infection followed by acute watery diarrhea and malaria; • In Barangay Rio Tuba, the leading cause of death for three consecutive years from 2008 to 2010 was hypertension. Cancer and old age were two (2) other primary causes of mortality in 2010. Other leading causes of death in year 2009 were accidents, with three (3) reported cases, drowning, pancreatitis, pulmonary tuberculosis (PTB), natural cause, diarrhea, asthma, and stub wounds; • Prevalence of malnutrition in Bataraza had been in increasing trend from 2005 to 2007. Reported malnutrition rate were 7.35%, 9.85% and 14.12% in 2005, 2006 and 2007, respectively; • Less than half of the households in Bataraza had access to sanitary toilet facilities. Based on the 2007 records of the Municipal Health Office, only 45% of households had sanitary toilet facilities; and • The proposed expansion of the quarry operations would require additional workers but any additional workers that may be hired by RTNMC would not unduly burden the existing health system in place in Bataraza. However, it is anticipated that the volume of trucks coming from the quarry area to the crushing area in Rio Tuba would significantly increase and may have health implications.

4.0 SUMMARY OF KEY ENVIRONMENTAL IMPACTS AND MANAGEMENT

Presented as **Table ES10** are the key environmental impacts for land, water, air and people and the corresponding management measures. Further details on the mitigating measures are presented in *Section 4.1* of *Chapter 4.*

Table ES10
Impacts assessment and mitigation

List of Key Impacts	Phase Occurrence				Options for Prevention or Mitigation or Enhancement
	Pre-Construction	Construction	Operation	Abandonment	
LAND USE AND CLASSIFICATION					
Change/ inconsistency in land use, slope and subsurface geomorphology The continued operation in the quarry site significantly changed the original landform, slope and underground		✓	✓	✓	• RTNMC shall strictly comply with its approved quarry plan, which involves incremental quarry development and progressive rehabilitation to minimize ground disturbance. • Maintain vegetation cover in the designated buffer zones and in the peripheries of roads

List of Key Impacts	Phase Occurrence				Options for Prevention or Mitigation or Enhancement
	Pre-Construction	Construction	Operation	Abandonment	
geomorphology in the project area. The original sloping and rugged terrain will be transformed into crater-like formations after the quarrying operations. As part of the rehabilitation program, RTNMC shall backfill the said craters or uneven surface to maintain a relatively consistently level topography.					and quarry area.
Encroachment in Environmentally Critical Areas (ECA) The current location of the RTNMC's project site is considered to be under ECA, qualifying based on two (2) categories. First, the area constitutes some endangered flora species. Second, the area is traditionally occupied by Indigenous People (IP). However, through FPIC and Certificate of Ancestral Domain Title (CADT), there are no conflicting tenurial/land issues within the MPSA. It should be emphasized however that Palawan is considered a critical area with its wide biodiversity. **Caves/sinkholes** The widely distributed caves and sinkholes in the MPSA are evident in the distribution of topographic depressions as shown in **Figure 2.1.2**. The extent of these karst features does not appear to be extensive, however, since the 1:50,000 topographic map does not show any depressions or sinkhole features. This may mean that the limestone is limited in both vertical and horizontal extent and that the limestones are yet limitedly affected by dissolution and thus the development of sinkholes is yet limited. To address the potential groundwater and other environmental degradation that may use these caves and sinkholes as pathways, the company deemed it best to avoid these karst features altogether, as can be seen in the proposed quarry development plan. Exclusion of the caves/sinkholes from cutting and quarrying activities as dictated by the terms and condition of the SEP clearance for the Gotok Limestone Project.		✓	✓		• RTNMC shall strictly comply with its approved quarry plan, which involves incremental quarry development and progressive rehabilitation to minimize ground disturbance. • Maintain vegetation cover in the designated buffer zones and in the peripheries of roads and quarry area.
Possible tenurial land issues* There are no conflicting tenurial/land issues within the MPSA through the					

List of Key Impacts	Phase Occurrence				Options for Prevention or Mitigation or Enhancement
	Pre-Construction	Construction	Operation	Abandonment	
FPIC and CADT.					
GEOLOGY/GEOMORPHOLOGY					
Change/ inconsistency in land use, slope and subsurface geomorphology The continued operation in the quarry site significantly changed the original landform, slope and underground geomorphology in the project area. The original sloping and rugged terrain will be transformed into crater-like formations after the quarrying operations. As part of the rehabilitation program, RTNMC shall backfill the said craters to maintain a relatively consistently level topography.		✓	✓		• RTNMC shall strictly comply with its approved quarry plan, which involves incremental quarry development and progressive rehabilitation to minimize ground disturbance. • Maintain vegetation cover in the designated buffer zones and in the peripheries of roads and quarry area. • Maintain the 50 m buffer zone around the known opening of the Gray Cave and other caves in the quarry area. These buffer zones are demarcated on the ground and excluded from all quarry activities to protect the integrity of the natural cave structure and to protect the cave-dependent organisms.
Inducement of subsidence, liquefaction, landslides* Liquefaction occurs in seismically active areas that are underlain by thick, saturated deposits of unconsolidated sand and silt. Since Palawan is not seismically active and there are no thick, unconsolidated sand and silt deposits in the vicinity of the project site, the area is not prone to liquefaction and subsidence. However, landslide due to heavy rains and erosion might happen.		✓	✓		• For potential occurrence of landslides, ensure strict implementation of and compliance with the safety and health program, especially the ERPP. • Ensure that all personnel, workers and contractors are properly oriented of the ERPP and ensure the regular conduct of emergency drills.
PEDOLOGY					
Soil erosion Based on the Composite Erosion Susceptibility Decision Rule of Bruce (1982), the final rating of the area is "moderately susceptible to erosion". Although the slope of the area is 3-5% which is considered as "slightly susceptible to erosion", other factors contributing to soil erosion qualifies the area to the "moderately susceptible to erosion" category. The rain may carry the silt in the drainage system of the quarry area thereby affecting the fertility and productivity of soil around the site. This impact is considered significant and will happen in a long period of time if no effective mitigation procedure is employed.		✓	✓		• RTNMC shall strictly comply with its approved quarry plan to limit the extent of exposed soil. • Maintenance of existing stormwater collection system (interceptors, drains, berms and siltation ponds) and installation of other erosion control structures.
Loss of top soil The continued operation in the quarry site will significantly result to loss of top soil in the project area. This impact is		✓	✓		• Proper stockpiling of recovered topsoil if immediate re-application is not possible. • Use of local provenance species of native plants for rehabilitation (when feasible, vegetation established on rehabilitated land

List of Key Impacts	Phase Occurrence				Options for Prevention or Mitigation or Enhancement
	Pre-Construction	Construction	Operation	Abandonment	
unavoidable and irreversible.					should be similar to the vegetation type and community that was present before quarry started. It is also essential that as much of the local seeds and propagules contained within the top few centimeters of soil be nurtured for later revegetation programs).
Soil contamination with oil and grease The expansion will require additional equipment and vehicles, which use oil and grease. Furthermore, an increase in daily production will result to more frequent hauling of mined ore from Gotok Quarry to the crushing plant. Surface soil contamination with oil and grease will likely occur from leaks and spillages.		✓	✓		• Maintenance of vehicles / heavy equipment strictly within the motorpool. • Regular maintenance of existing storage area for hazardous wastes such as used oil and used oil filter. • Regular maintenance of the oil and water separator shall be done to ensure optimum performance. • Good housekeeping practices including proper handling and clean-up of oil at the motorpool. • Use of auto shut off valves for refueling/re-oiling activities.
Siltation of drainage systems An increase in daily production and hauling activities will result to siltation of drainage systems within the quarry area and along the hauling route. Siltation and sedimentation in the downstream area of the quarry site will be more pronounced during rains. The resulting transport of the sediment will lead to deposition of the materials downstream, along the banks and beds of the rivers, and into the sea. This impact is significant and may occur in a long run if no proper mitigating measure is conducted.		✓	✓		• Installation of sufficient number of diversion canals, interceptors, drains, and berms to avert run-off away from erosion-prone areas. • Regular inspection and maintenance of erosion control structures, drainage channels, culverts and siltation ponds.
Generation of solid and hazardous waste Wastes are being generated from the offices, townsite and other areas where operation is concentrated. This impact affects the aesthetic value of the area and shall cause trajectory diseases from the RTN hospital if not properly contained. Hazardous waste including used oil, batteries and busted lamps/bulbs are also produced from the admin operations, hospital and townsite. Improper waste disposal could also contaminate drainage system in the project site.			✓	✓	• Intensification of the implementation of a Solid Waste Management Program within the quarry area, plantsite, and townsite.
Conversion of soil and rock materials to high valued products The main impact of the project is the conversion of limestone in the ground into a useable and valuable commodity. The mining activities will therefore result into			✓		

List of Key Impacts	Phase Occurrence				Options for Prevention or Mitigation or Enhancement
	Pre-Construction	Construction	Operation	Abandonment	
the conversion of an idle, low valued earth material into a high valued commodity. This positive impact is only applicable during the operation of the activity.					
TERRESTRIAL BIOLOGY					
Threat to abundance and/or loss of important local flora and fauna species The impacts of the Gotok Limestone Quarry to the flora biodiversity will be the removal and loss of habitat, loss of important species, and threat to the abundance, frequency and distribution of important local species. These impacts will be concentrated on the area where tree cutting was applied for within the MPSA. The area where tree cutting was applied is approximately 10.6 hectares. Quarrying is one example of open-pit mining, which removes surface (and subsurface) materials wholly including vegetation. The felling of trees and the scraping off of ground vegetation will result to the destruction of habitats including roosting and feeding sites of terrestrial fauna, both vertebrates and invertebrates. The area with MPSA for the Gotok Limestone Quarry harbors mostly residents and endemic species of birds, mammals and herps. Removing the trees and the entire vegetation will mean the destruction of roosting and feeding sites which will eventually result to the gradual loss and/or disappearance of endemic species. The removal of the surface soil and original vegetation will most likely cause alien and invasive species of plants and animals to proliferate. Hence, during abandonment, these organisms will prevail and it is not certain if and when original flora and fauna will return. The loss of roosting, nesting and feeding sites brought about by the cutting of trees will lead to the decrease of the number of species and population of wild fauna specially those which are forest and tree dependents. Volant mammals will not be affected if the hill where Maginhawa and Inugon Caves are located will not be touched or disturbed. The creek at the western side (this is where the water flows		✓	✓		• Balling and transplanting of important and threatened plant species of appropriate size. When the balled plants recovered in the nursery they shall be used and transplanted in the buffer zones of the quarry area as well as in the reforestation areas of the company • Propagation of threatened and ecologically important tree species that were found in the project area. This can be adopted as flagship species of RTNMC and will be incorporated as part of the strategy of the company in promoting biodiversity conservation.

List of Key Impacts	Phase Occurrence				Options for Prevention or Mitigation or Enhancement
	Pre-Construction	Construction	Operation	Abandonment	
underground), will eventually be covered with earth and soil because of erosion caused by quarrying. This will affect the habitats of amphibians (mostly frogs) in the area. The presence of *Hoplobatrachus rugulosus* in the pond in the farm beside the hill where the Maginhawa Cave poses danger to the endemic and indigenous species present in the area.					
Hindrance to access to wildlife The felling of trees and the clearing of vegetation will hinder the mobility of wildlife species specially tree and ground dwellers, fragmentation of habitats will occur. Monkeys were observed in Transect 1 and Transect 3 but not in Transect 2, which is in the middle of the two (2) sites. The animals were seldom seen in Transect 2 because there were very few fruiting trees in the area. The only access from Transect 1 to Transect 3 is through the trees. If these are cut, then foraging of monkeys is limited to the site in Transect 1. As for ground dwellers, the animals cannot move from one area to another without vegetation cover. They are in danger of dessication e.g. frogs and toads. Eventually, loss of access will result to loss of species. In the long run, alien or invasive species will proliferate and will prevail over native and endemics.					• Conduct of felling or cutting of trees by section to give time for the animals to adapt to a more suitable habitat.
HYDROLOGY AND HYDROGEOLOGY					
Change in drainage morphology The area of the Gotok Limestone Quarry Project will be limited to the approved 13.0 ha area within the MPSA.			✓		• Construction of diversion canals on open areas to divert surface runoff to the two existing silt collector sumps constructed within the vicinity of the quarry area..-
Change in stream depth The river bed of the downstream portion of Ocayan River may be affected during operation due to earth movement.			✓		• Maintenance of the existing collector sumps within the area.
Inducement of flooding Using the final elevation of the mining area in the flood model (100-year flood return) revealed no major changes in the flood characteristics of the areas downstream of the MPSA based on the comparative results of the two scenarios (**Figures 2.2.7** and **2.2.8**). Within the MPSA, however, depression storage at the downstream-most portion of the mining area which is visible under the pre-development scenario would become			✓	✓	• Improvement and continuous maintenance of the existing drainage channels and sediment control structures within the quarry area.

List of Key Impacts	Phase Occurrence				Options for Prevention or Mitigation or Enhancement
	Pre-Construction	Construction	Operation	Abandonment	
moderately larger in scope once the project progress. **Considering climate change scenario** The climate change projections of PAGASA indicate that rainfall will become more during the rainy season and become less during the dry season. Increasing rainfall intensities will increase the frequency of flooding.					
Depletion in water resources/competition in water use The increased production of the quarry will have an insignificant effect on the amount of available groundwater in the vicinity since Gotok Hill is small and groundwater recharge mainly comes from direct rainfall infiltration throughout the area. Moreover, the project will not compete with users of groundwater since there are no wells in the immediate vicinity of the quarry and the water source of residents in the area is already supplied by the Level II water system of RTNMC and CBNC.					
WATER QUALITY					
Deterioration of water quality *Rio Tuba River* Rio Tuba River is the catch basin of both the industrial and domestic waste in the area. The modified crushing plant produces 313,200 m^3 of wastewater annually. This wastewater is directed to a settling pond. Overflow of the pond is discharged into the Rio Tuba River after it passes thru Upper Kinurong and Lower Kinurong settling ponds. The advantage of the river is the regular inundation of saltwater that dilutes organic materials and allows precipitation of organic matter in the water column. The process allows clarification of water periodically. The ecological process, however, deposits much organic matter into the bottom of the river and increases the sedimentation rate. Benthos, although limited in the brackish environment, is also disadvantaged by the frequent and fast deposition rate.			✓		• Installation and maintenance of the siltation pond designed to contain the wastewater coming from the crushing plant. • Regular maintenance of the drainage system within the offices and motorpool area.

List of Key Impacts	Phase Occurrence				Options for Prevention or Mitigation or Enhancement
	Pre-Construction	Construction	Operation	Abandonment	
As a catch basin, limiting nutrients to plankton growth also enters the river periodically. Extra nutrient increases the probability of harmful algal bloom occurrences. Consequently, it may increase the probability of fish kill events; spat kills and even unsightly algal accumulation. Current ecological condition of the river points that algal bloom is present. *Oning Spring* Oning Spring, on the other hand, may not be affected in terms of ecological index or water quality, but rather on the overall dynamics, aesthetics, and history of the spring. The proposed maximum depth of 25 masl may affect the cavern where the river disappears and would likely be irreversible. The water quality of the creek that drain the vicinity of the quarry will not experience any adverse impact since surface runoff from the quarry does not reach this creek. The surface runoff is collected in two (2) silt collector ponds and readily infiltrates into the ground.					
Increase in surface run-off and sedimentation of surface water bodies As documented, the quarry operation, which includes ground stripping made a significant alteration to the landscape. During the continued mining operations, it is expected that sediments from exposed and denuded surfaces will contribute to surface run-off and erosion, leading to possible siltation of nearby waterbodies. Stockpiled soil and other waste materials will also be susceptible to erosion during heavy rains.			✓		• Re-evaluation of the existing design of the stormwater collection system and installation of additional components shall be done if needed. • Regular monitoring of the drainage facilities and siltation pond(s) particularly during the rainy season to ensure optimum performance. • Regular cleaning of drainage channels from sediments and debris that may inhibit the flow of water. • Strict implementation of the quarry plan within the approved area.
Contamination of water resources from oil and grease The expansion will require additional equipment and vehicles, which use oil and grease. Furthermore, an increase in daily production will result to more frequent hauling of mined ore from Gotok Quarry to the crushing plant. Surface water contamination with oil and grease will likely occur from leaks and spillages.			✓		• Proper material handling and equipment maintenance. • Good housekeeping practices including proper handling and clean-up of oil at the motorpool site and at the contractor's area.
FRESHWATER ECOLOGY					
Threat to existence and/or loss important local species and			✓		• Installation and maintenance of the siltation pond designed to contain the wastewater

List of Key Impacts	Phase Occurrence				Options for Prevention or Mitigation or Enhancement
	Pre-Construction	Construction	Operation	Abandonment	
Threat to abundance, frequency and distribution of freshwater species No important aquatic species in Oning is threatened with the increase in the annual production of Gotok limestone quarry project. However, increased input of wastewater from settling ponds may increase the probability of an algal bloom in Rio Tuba River.					coming from the crushing plant.
METEOROLOGY					
Change in local climate According to projection of PAGASA, Palawan rainfall events (>200 mm) will increase by 250% by year 2020 and 2050. This significant increase may result to localized flooding of the project site considering that quarry activities are designed to culminate at 2022. This impact is short term, which may occur during extreme rain events.			✓		• Progressive rehabilitation and maintenance of the vegetation along the buffer zones. • Re-evaluation of the existing design of the stormwater collection system and installation of additional components shall be done if needed. • Regular monitoring of the drainage facilities and siltation pond(s) particularly during the rainy season to ensure optimum performance. • Regular cleaning of drainage channels from sediments and debris that may inhibit the flow of water. • Strict implementation of the quarry plan within the approved area.
GREENHOUSE GAS EMISSION					
Contribution in terms of Greenhouse Gas Emission Due to the additional requirement of heavy equipment for the proposed increase in production, the GHG Emission is expected to increase. Progressive rehabilitation and maintenance of the vegetation along the buffer zones shall be implemented to aide in the sequestration of the increased GHG emissions from the increased number of vehicles and heavy equipment. Aside from this, regular maintenance of all heavy equipment shall be practiced.			✓		• Progressive rehabilitation and maintenance of the vegetation along the buffer zones.
AIR QUALITY AND NOISE LEVEL					
Degradation of air quality The increased in production of the quarry and modified crushing plant of the project will have an impact on the area's air quality primarily through elevated levels of dust and to a minor extent, SO_x and NO_x in the mining areas where heavy equipment are being used, along access routes and haul roads and within the vicinity of the crushing plant.			✓		• Maintenance of vegetative cover along peripheries of the quarry area. • Installation of windbreakers in the quarry area and the vicinity of the crushing plant to prevent the proliferation of dust particles during dry and windy days. • Implement a lower drop height during limestone loading and speed limit of service vehicles, hauling trucks and other heavy equipment. • Regular water spraying specially on unpaved stretch of the haulage route. • Covering hauling trucks with tarpaulin or

List of Key Impacts	Phase Occurrence				Options for Prevention or Mitigation or Enhancement
	Pre-Construction	Construction	Operation	Abandonment	
					canvas to prevent the unwanted discharge of materials and dusts. • Installation of tire-washing platform at the Kulantuod junction.
Increase in ambient noise level Increase in production capacity is accompanied by increase in transport activities within and around the quarry area thus the level of noise is expected to increase. Residents along the hauling route of the dumptrucks will be directly affected by the noise generated from the vehicles that transport limestones to the crushing plant. Within the quarry area, sources of noise are the blasting operation, which is performed using dynamites and ANFO (Ammonium nitrate/Fuel oil) and the hole drilling operation. With the increase in production, blasting activities shall be performed once a week while hole drilling is performed in non-active benches in preparation for the next blasting operation. In addition, the number of heavy equipment used in the quarry operation (drilling, blasting, stockpiling, loading and hauling) such as backhoes, wheel loaders, bull dozer, breaker, drilling equipment, and dumptruck shall be augmented to support the increased production of 725,000 MT. This may result to an increase in the ambient noise level not only within the quarry area but also at the nearby communities.			✓		• Maintenance of existing vegetation near the quarry area to serve as noise barrier. • Proper vehicle and heavy equipment maintenance. • Proper scheduling of equipment operation to avoid disturbance to the nearby communities. • Proper monitoring of noise level especially during blasting activity around the quarry area and nearby communities.
SOCIO-ECONOMICS					
Displacement of settlers *Barangay Rio Tuba* -- The influx of migrants seeking employment and livelihood opportunities created by the mining operations triggered the rapid urbanization of Rio Tuba from 1996 up to the present. Rio Tuba had a population of 7,663 persons in 2000 and the number of inhabitants more than doubled by 2010, with a population of 16,577 persons. Correspondingly, the demand for living space increased resulting in the appreciation of land prices in Rio Tuba, especially along the Macadam Road. The increase in land prices is also being felt in the nearby barangays of Sumbiling, Ocayan, Sandoval and Igang-Igang.					

List of Key Impacts	Phase Occurrence				Options for Prevention or Mitigation or Enhancement
	Pre-Construction	Construction	Operation	Abandonment	
Barangays Iwahig and Sandoval - The 84.5-ha MPSA covering the Gotok Quarry area (located in Brgys. Iwahig and Sandoval) is uninhabited and the expansion of the quarry will not displace any type of settler or occupant. The surface owners and/or occupants have been paid by the company for their surface rights before the start of the quarry operations and there are no issues or concerns in relations to the purchase of the surface rights of the whole MPSA area. The surrounding areas/parcels of lands are agricultural and are planted by coconuts and rice. These crops continue to grow and produce and there are no reported adverse effects of the quarry operations to the agricultural sector. RTNMC is very aware that their mining operations (including the quarry operations) would result in an increase in demand for decent housing for their employees and workers. Hence, aside from the GK housing project, which has targeted the IPs in the area, regular employees of RTNMC and CBNC are provided with free housing either within the RTNMC Townsite or elsewhere. Aside from the free housing opportunity, water and electrical supply are also subsidized for the regular employees of the two companies. The operations of the mine have resulted in additional demand for housing, which is partially addressed by the private sector especially in Rio Tuba. Households provide halfway houses or temporary shelter to their relatives and town mates who are desirous to partake in the employment or livelihood opportunities created by the mining operations. Some households have developed their housing areas to rent rooms or bed spaces for casual workers or migrants who are desirous to work in the mine. There is a possibility that the informal settlement located in Sitio Marabajay, Rio Tuba will expand to accommodate additional informal dwellers seeking to partake in the benefits being derived from RTNMC such as employment, livelihood opportunities and improved delivery of					

List of Key Impacts	Phase Occurrence				Options for Prevention or Mitigation or Enhancement
	Pre-Construction	Construction	Operation	Abandonment	
basic services. It would be more appropriate if RTNMC would seek LGU intervention through the municipal and barangay officials on the further influx of informal dwellers because they have the legal mandate to maintain public order and protect the public good. Overall, RTNMC is addressing the increase in housing demand brought about by its mining operations including the quarry operations through the IP housing program and in-house housing projects. In addition, the increase in housing demand has created and energized the housing sector and the residents have taken advantage of this opportunity to build additional housing units, remodel old houses and restructure their homes to earn additional income from this housing demand.					
Change/conflict in land ownership There will be no change/conflict in land ownership as the quarry area is uninhabited.					
Cultural/ lifestyle change (especially on Indigenous People) The *Palaw'an* Tribe in Bataraza is on a crossroad of development. Their choices are to go up further to the mountains and minimize interactions with the lowlanders to preserve their cultural identity and traditional ways or embrace the modern ways of information technology, latest techniques in upland agriculture, with all the accessories of modernity but lose or dilute their traditional ways and cultural identity. The *Palaw'an* IP group has been perceived by many of the residents in the direct and indirect impact barangays as a special and privileged group because they are the recipients of special benefits from RTNMC and CBNC such as the Gawad Kalinga Project providing for free housing for the Palaw'ans, free medical services and medicines in the RTN Hospital, fishing and farm equipment. In addition, they have their ILS and have priority for scholarships provided by RTNMC. The SDMP is also disaggregated so that there are specific budget allocations for the IP group in each barangay.			✓		• Program awareness on the preservation of tribal practices. • Conduct of ethnographic study to document culture and traditions. • Establishment of a centralized tribal museum to house the cultural artifacts that may be gathered by the tribe.

List of Key Impacts	Phase Occurrence				Options for Prevention or Mitigation or Enhancement
	Pre-Construction	Construction	Operation	Abandonment	
Based on the FGDs and KIIs, there are active and deliberate efforts by some tribal elders to preserve their cultural identity by buying back their musical instruments and teaching some promising youth to learn to play these musical instruments. There are some GK areas where the circular pattern of the Palaw'an is still evident and reflective of their traditional spatial orientation.					
In-migration The two (2) main reasons for migrating to Bataraza were livelihood and the migrants' family. In the crushing area, livelihood is higher than in the quarry area. There is a general tendency that migrants tend to settle in Rio Tuba because of greater livelihood opportunities that in other adjacent areas.			✓		• Priority employment of qualified locals. • Provision of appropriate skills training for workers including local hires to control unnecessary increase in local population. • Proper record-keeping of in-migration survey.
Threat to the delivery of basic services/ resource competition Rather than a threat, this is perceived to be a positive impact given the efforts and programs implemented by RTNMC in the water supply, power supply, communications, health resources, peace and order, education facilities and recreational/sports facilities.			✓		• Provision of adequate school facilities and educational materials; training for teachers.
Generation of local benefits (Employment) Some of the benefits from the project implementation include: a. Enhancement of employment and livelihood opportunities; b. Increase business opportunities and associated economic activities; and c. Increased revenue of the LGUs.			✓	✓	• Prioritization of qualified local residents in employment. • Introduction of livelihood projects (skills training for local community as part of SDMP). • Proper maintenance of rehabilitated infrastructure /facilities will enhance this positive impact. • Pertinent fees to be paid promptly.
Traffic congestion Increase in production capacity is accompanied by increase in transport activities within and around the mining area thus the traffic congestion is expected to increase as well.			✓		• Creation and maintenance of a flag man in Kulantuod Junction to warn in-coming vehicles of emerging dump trucks from the quarry site . • Maintenance of traffic aids and street sweepers.
PUBLIC HEALTH					
Threat to public health and safety The proposed expansion of the quarry operations would require additional workers but any additional workers that may be hired by RTNMC would not unduly burden the existing health system in place			✓		• Improvement of facilities of RTN Hospital • Continue Health Monitoring Study. • Implement dust suppression measures such as covering of trucks during hauling. • Regular watering of haulage roads specially along or near the residential and office areas. • Strict implementation of the use of Personal

List of Key Impacts	Phase Occurrence				Options for Prevention or Mitigation or Enhancement
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in Bataraza. However, it is anticipated that the volume of trucks coming from the quarry area to the crushing area in Rio Tuba would significantly increase and may have health implications.					Protective Equipment (PPE) among workers. • Ensure that vehicles used are well maintained and suitable for the terrain. • Adopt and implement the safest methods/ technology. • Ensure that persons doing specialized tasks are fully trained. • Strictly implement safety protocols. • Conduct of training programs/drills for all workers and employees that will include safe job procedures, basic firefighting procedures, good housekeeping, OHSAS Systems, emergency preparedness and response, defensive driving, and first aid. • Establishment of clear and adequate signages mainly in accident-prone areas. • Avoid operation during inclement weather • Maintain proper security and cordon off hazardous areas. • Provision of well-ventilated work area. • Improvement in the provision of health facilities/services available to workers and employees during emergencies. • Continue monitoring of workers' health. • Conduct of regular information campaigns to update worker's health and safety responses.

Summary of the Performance Assessment

Land

For its environmental management, RTNMC has conducted earth balling activities, progressive rehabilitation program and maintenance of bufferzones within the periphery of the quarry area among others. To further increase the effectivity of management program, additional mitigating measures mentioned in the matrix of Impact Assessment and Mitigation (**Table ES10**) are recommended.

Water

To ensure the compliance with the environmental standards, one of the mitigating measures implemented by RTNMC was to provide drainage canals that lead to two (2) collector sumps. This measure ensures that fine particles from the open area will not be carried away by runoff water to adjoining areas during heavy downpour. The sumps served as catch basin and allow infiltration of the collected water back into the ground. These sumps are periodically desilted to maintain efficiency specially during heavy downpour where increased volume of run-off is expected.

In the assessment of the water quality monitoring data for Oning Spring (WQM1-Station 14) and Gotok Entry Tunnel (WQM2- Station 15), the data showed that the pH and TSS are generally within the DENR standards. However to strengthen the monitoring, this study

recommended to include monitoring of one of the collector sumps located at the southwest potion of the MPSA as water quality station for effluent. Samples of the effluent should be collected whenever there is an overflow.

Air

The air quality monitoring shows that the TSP trends for both stations located within the vicinity of the quarry show values that are below the standard limit set by the DENR (300 µg/Ncm). To further monitor/assess the impact of the quarry as well as the effectiveness of the mitigating measures, this study recommended to include GK Gotok, a residential area, in the monitoring program. A station located near the crushing plant shall also be monitored.
In terms of the predicted increased noise level, current mitigating measures should be intensified in preparation for the additional heavy equipment and vehicles that will be utilized with the increased production. To be able to mitigate the exceedance in noise level, equipment will strictly be operated within working hours and blasting operation will be properly scheduled and announced so as not to cause disturbance to nearby communities. Silencer will be maintained in each equipment.

People

RTNMC and its sister company CBNC has an integrated social development program composed of the legally mandated Social Development Management Plan (SDMP) and non-SDMP programs that both companies voluntarily implement in favor of the 11 barangays and 24 ICC communities in Bataraza.

SDMP II covered the years 2009 to 2013 and actual disbursements amounted to PhP 276.654 million. This was shared with CBNC with RTNMC shouldering approximately one third of the total amount. The largest amount (PhP 93 million) was spent on education. This was followed by social services with PhP 76 million, livelihood programs with PhP 42 million and finally health and sanitation with PhP 116 million. The amount of health and sanitation did not include the amount spent for the RTNFI hospital, which had a separate budget.

Aside from the projects under the SDMP, RTNMC implements the non-SDMP program which is a joint project of the company and CBNC for the host and neighbouring communities of Bataraza. This program is funded by corporate funds of both companies and is separate and distinct from the legally mandated SDMP program. This program is implemented by RTNFI, a private foundation.

For the period from 2009 to 2013, the total amount spent under the non-SDMP program totaled PhP 686.507 million. Again, the share of RTNMC is approximately one third of the total amount.

In *Chapter 5* of this EPRMP, the study recommends several projects that the impact barangays and RTNMC may consider.

5.0 PROPOSED MONITORING PLAN

To ensure the effectivity of the mitigating measures and compliance of the proposed expansion to all environmental laws, the proposed environmental monitoring program is presented as **Table 6.1.1** in *Chapter 6.*

6.0 CONTINGENT LIABILITY AND REHABILITATION FUND (CLRF)

A Memorandum of Agreement (MOA) was entered on 28 July 2003 among RTNMC, CBNC, MGB-IVB, Provincial Government of Palawan, Municipal Government of Bataraza, PCSD, residents of Brgy. Rio Tuba, residents of Sitio Gotok, Brgy. Iwahig, *Katutubong Palawan*, HARIBON Foundation, and Bataraza Christian Muslim Palawano Asso., Inc. (BACHRISMUPAL). The MOA states that pursuant to *Section 181* of the *DENR Administrative Order (DAO)*, a Mine Rehabilitation Fund (MRF) shall be established. The current MRF of RTNMC/CBNC is in two (2) forms: Monitoring Trust Fund (MTF) and Rehabilitation Cash Fund (RCF). The MTF committed as per MOA to cover the expenses of the monitoring activities is PhP 50,000.00 and the current amount deposited in the Development Bank of the Philippines (DBP) is PhP 62,266.61.

On the other hand, the RCF committed as per MOA to ensure compliance with the approved rehabilitation activities is PhP 5,000.000.00 and the current amount deposited is 5,496,378.55. In addition, an Environmental Trust Fund (ETF) amounting to PhP 250,000.00 was established by RTNMC. The current amount deposited under the ETF is PhP 249,066.46.

Annex 6.5.1 shows the signed MOA while **Annex 6.5.2** includes the Statement of Account from the government bank indicating the available funds as of September 30, 2015.

As mentioned previously, the CLRF of the Gotok Quarry is part of the CLRF created for the operation of the HPP of CBNC. However, for the monitoring expenses of the MMT, RTNMC does not utilize the MTF. Instead of withdrawing the deposited fund, RTNMC uses its operational fund.

Once the separate ECC for the Gotok Limestone Quarry has been issued, an Environmental Protection and Enhancement Program (EPEP) and Final Mine Rehabilitation/ Decommissioning Program (FMRDP) shall be formulated for the operation of the Gotok Quarry and the Crushing plant. Subsequently, the CLRF fund exclusively for the said project shall be created.