EXECUTIVE SUMMARY

ES 1. Project Brief

ES 1.1 Project Fact Sheet

<table>
<tr><td>Project Name</td><td>Proposed Increase in Extraction Volume of the Cagayan Offshore Magnetite Mining Project</td></tr>
<tr><td>Project Location</td><td>Municipalities of Aparri, Buguey and Gonzaga
Province of Cagayan</td></tr>
<tr><td>Project Type</td><td>Resource Extractive Industry (Magnetite Extraction)</td></tr>
<tr><td>Project Size</td><td>1,902.5939 hectares (Gonzaga)
3,096.6419 hectares (Buguey and portion of Aparri)
4,999.2358 hectares (Total)</td></tr>
<tr><td>MPSA No.</td><td>• 338-2010-II OMR</td></tr>
<tr><td>ECC Reference Number</td><td>• ECC-CO-1409-0021
Date Issued: May 20, 2016</td></tr>
<tr><td>Project Components</td><td><table><tr><th>Existing</th><th>Proposed (modification)</th></tr><tr><td>• 1.3 MMT production rate
• 1 Siphon vessel (dredge barge)
• 3 Separator Barges
• 1 Panamax Vessel
• Gravity Separator
• Magnetic Separator
• Hopper / Chute
• Generator Set</td><td>• 30 MMT production rate
• 4 Siphon vessels equipped with generator sets, magnetic and gravity separators and hoppers / chute
• 12 LCT / Storage Barges
• Anchors handling tugs</td></tr></table></td></tr>
<tr><td>Project Duration</td><td>25 years</td></tr>
<tr><td>Manpower Requirements</td><td>Administraton: 29 personnel
Operation and Maintenance: 45 personnel
Onshore (Environmental and Social Division): 192 personnel</td></tr>
<tr><td>Project Cost</td><td>PhP 6,023,625,006.00</td></tr>
<tr><td>Project Proponent</td><td>JDVC Resources Corporation</td></tr>
<tr><td>Office Address</td><td>Unit 504 Galleria Center, EDSA corner Ortigas Avenue,
Barangay Ugong Norte, Quezon City 1110, Metro Manila</td></tr>
<tr><td>Authorized Representative for the Principal Proponent</td><td>Mr. Louis Santos
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Telephone Number: (02) 8727-9005
Email Address: admin@philkairos.com</td></tr>
<tr><td>ECC Application</td><td>For ECC Amendment</td></tr>
</table>

JDVC Resources Corporation (hereinafter referred to as the “Company”) holds a Mineral Production Sharing Agreement (MPSA No. OMR 338-2010-II) with the Republic of the Philippines for a 14,240-hectare mining area. The Company has a Partial DMPF mining concession and commercial extraction of minerals like magnetite iron sand, titanium, vanadium and other valuable minerals with a life of 25 years and renewable for another 25 years.

MPSA-338-2010-II-OMR was approved on June 2010 as a contract between the Republic of the Philippines and Bo Go Resources Mining Corporation (Bo Go). It was transferred to JDVC Resources Corporation by Bo Go on November 25, 2011 by virtue of a Deed of Assignment. The Deed of Assignment was duly registered with MGB Region II, Tuguegarao City, Cagayan on January 27, 2012 and was duly approved by Department of Environment and Natural Resources (DENR) Secretary.

The Environmental Compliance Certificate (ECC-CO-1409-0021) was issued to JDVC for its proposed “Cagayan Offshore Magnetite Mining Project” covering the 4,999.2358-hectare area of MPSA No. 338-2010-II-OMR-Amended A located in Gonzaga, Buguey and Aparri, Cagayan, allowing a maximum production rate of 1.3 million dry metric tons of magnetite iron sand concentrate per annum last May 20, 2016. The proponent, thru the amendment of this ECC, intends to apply for increase in the production rate from 1.3 MMT to 30 MMT.

The Mines and Geosciences Bureau (MGB) approved the Declaration of Mining Project Feasibility (DMPF) for the said 4,999.2530-hectare area of MPSA No. 338-2010-II-OMR-Amended A, thereby, authorizing JDVC to proceed to the Development and Operating Periods, including extraction and commercial disposition of magnetite sand and other associated minerals, subject to compliance with certain conditions.

ES 1.2. Project Location and Accessibility

MPSA Number 338-2010-II-OMR containing an area of 14,240 hectares is located 14-15 kilometers away from the shore of the municipalities of Sanchez Mira, Pamplona, Abulug, Ballesteros, Aparri, Buguey, and Gonzaga in the Province of Cagayan (as shown in **Figure 1-1**). Out of the 14,420 hectares, JDVC Resources Corporation has decided to take a portion of the mining tenement located within the municipal waters of Aparri, Buguey and Gonzaga as its operation area having and approximate are of 4,999.2358 hectares (as shown in **Figure 1-2**). Shown in Figures **1-4**, **1-5** and **1-6** are the maps of each municipalities of the affected coastal communities.

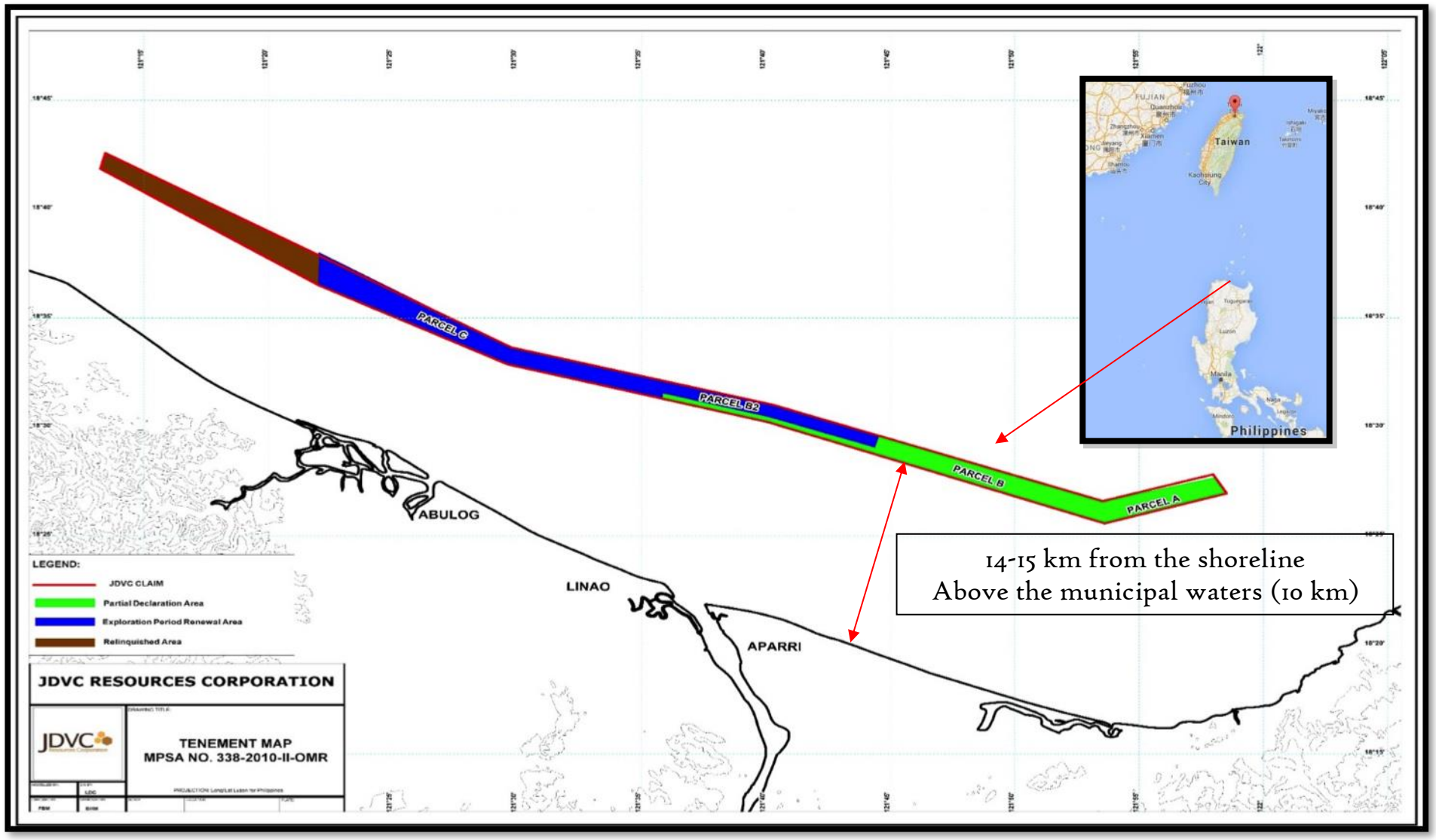

Figure 1-1 Location of the Proposed Project

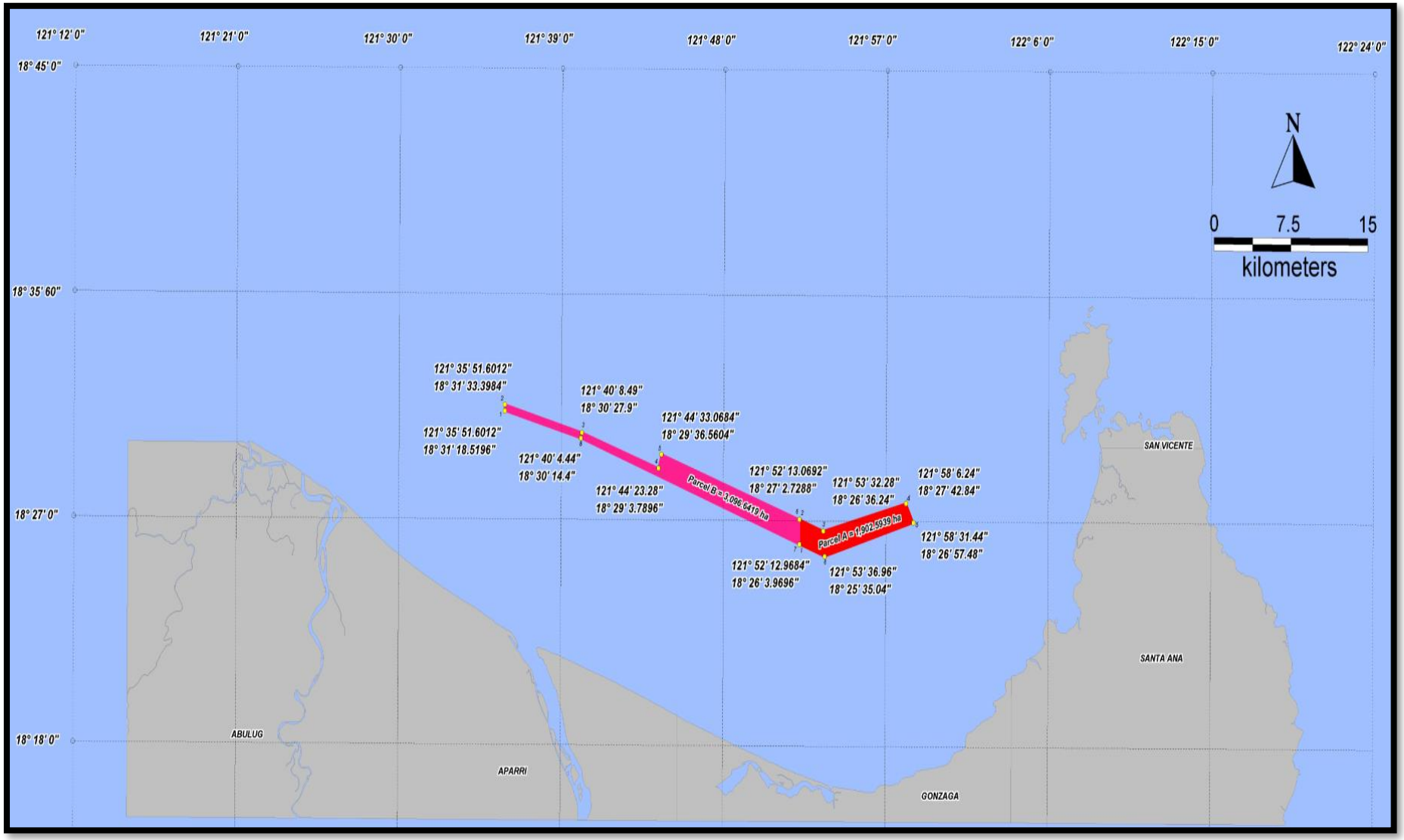

Figure 1-2: Location of JDVC's partial DMPF Area

Figure 1-3: Satellite Image of the whole MPSA area and partial DMPF area (in yellow)

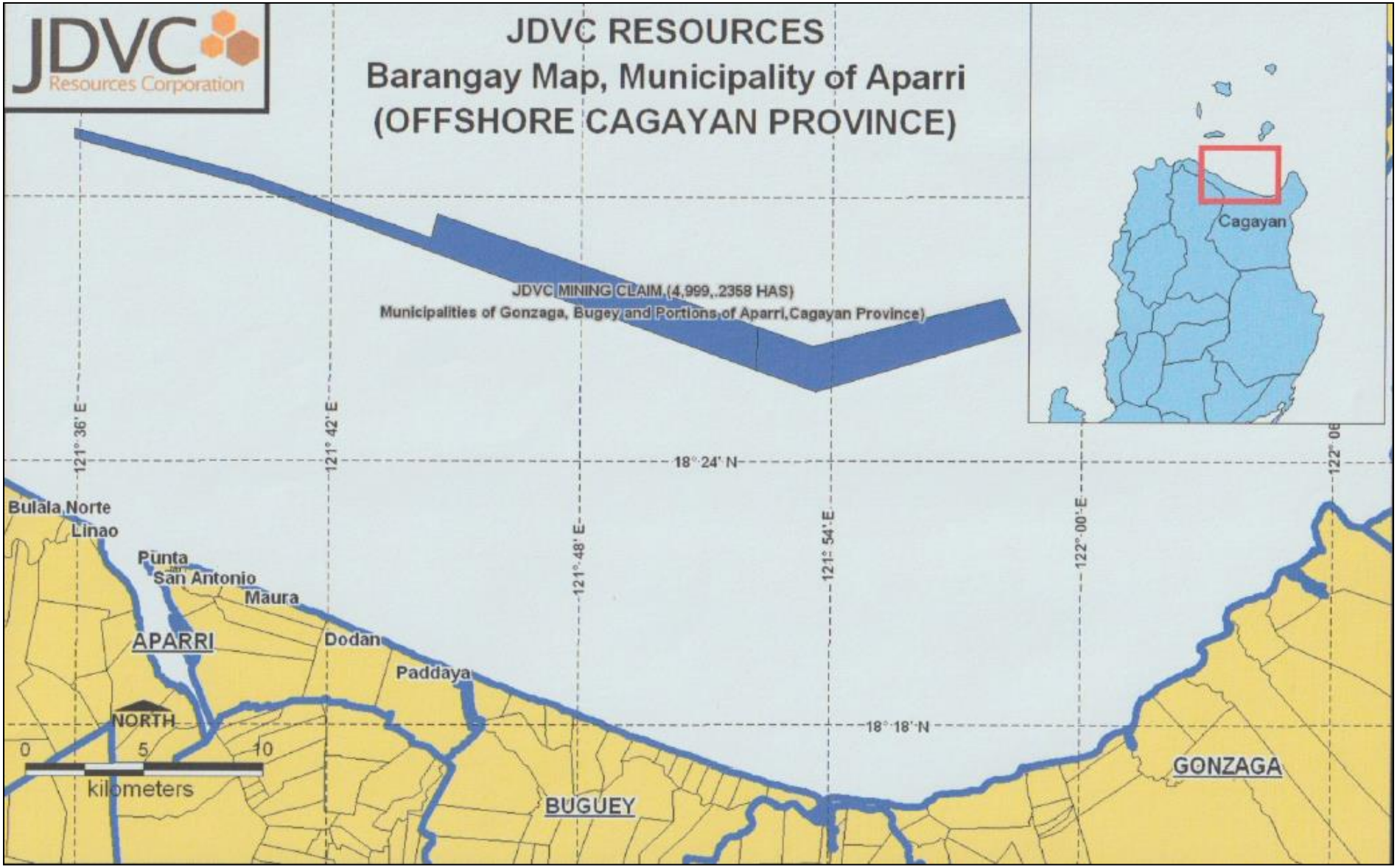

Figure 1-4: Map showing the affected Coastal Barangays in the Municipality of Aparri

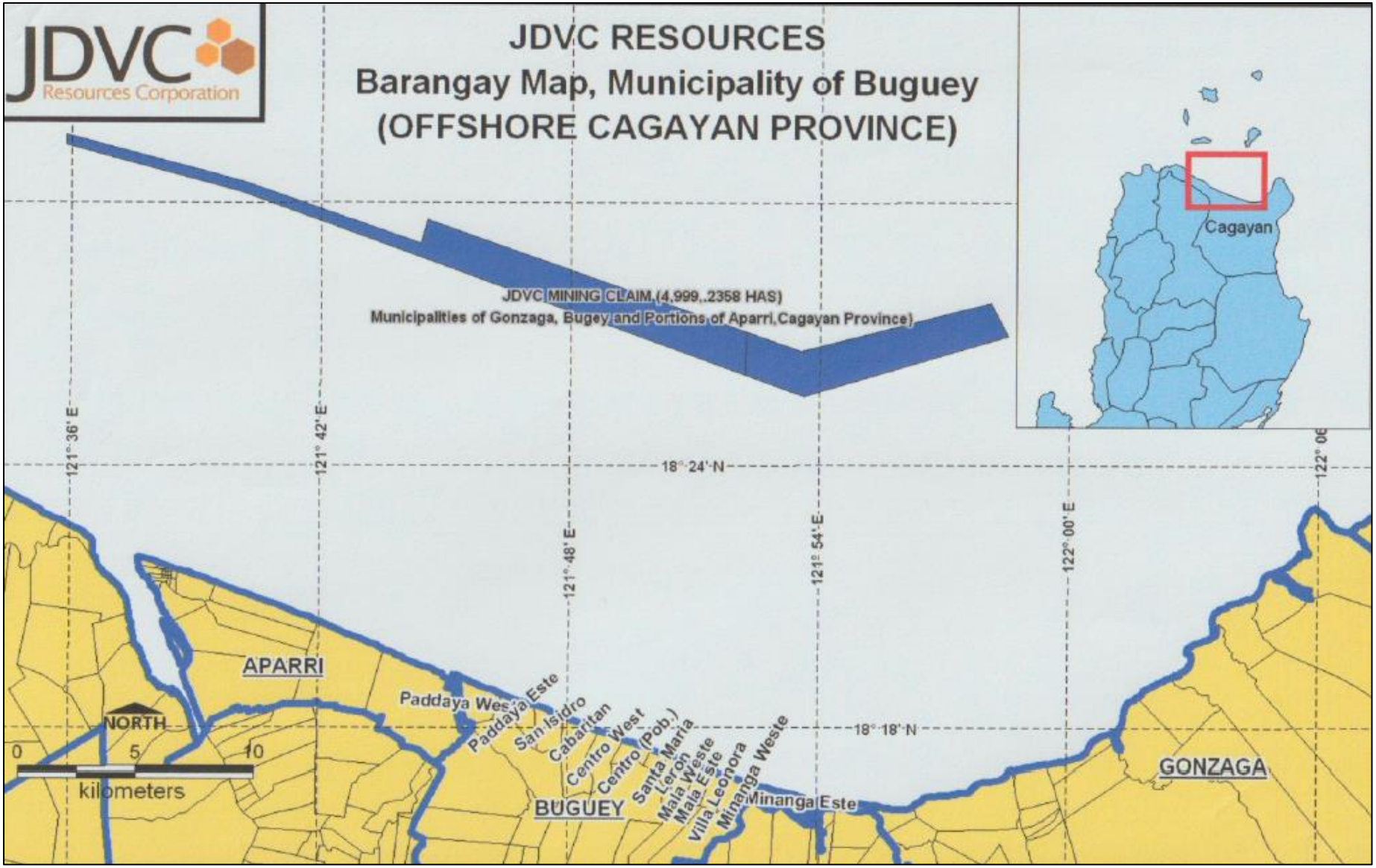

Figure 1-5: Map showing the affected Coastal Barangays in the Municipality of Buguey

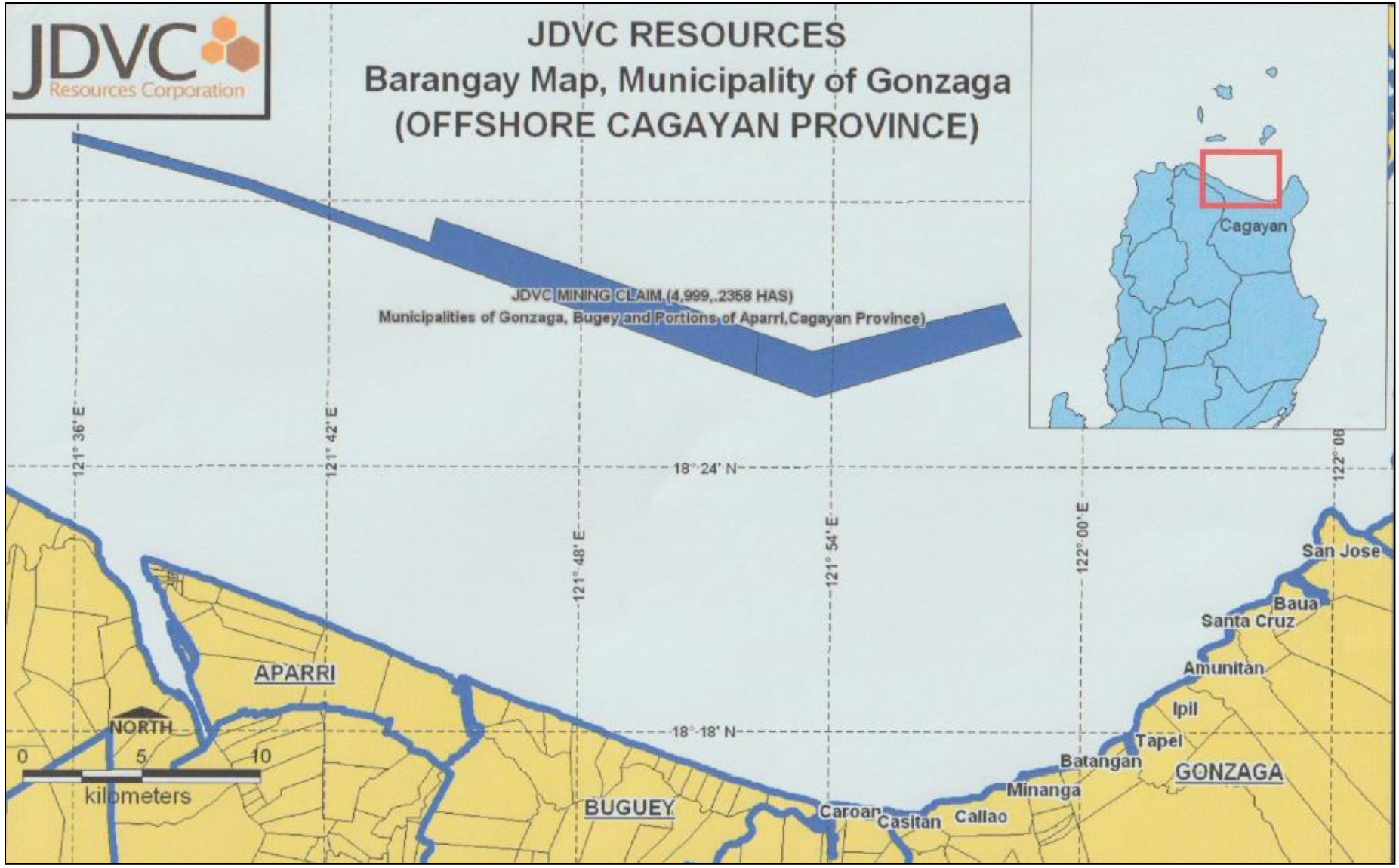

Figure 1-6: Map showing the affected Coastal Barangays in the Municipality of Gonzaga

Accessibility to the Project Area

The MPSA area embracing 14,240 hectares is situated within the municipal waters of the Municipalities of Sanchez Mira, Pamplona, Abulug, Ballesteros, Aparri, Buguey, and Gonzaga in the Province of Cagayan. Tuguegarao City is about 485 kilometers north of Manila via the Maharlika Highway and can be accessed through air transport by Air Philippines and Cebu Pacific and through land by different bus transports, i.e., Victory Liner, Dalin Liner, RCJ Lines, Florida Transport Inc., etc. The Municipality of Gonzaga is in northwest of Tuguegarao City and can be reached from Tuguegarao via Pan-Philippine Highway passing thru Iguig-Alcala-Gattaran-Lallo National Road. Municipality of Buguey is 1 and a half hour away from the Municipality of Gonzaga via land. Municipality of Aparri is accessible from Manila via commercial airlines to Tuguegarao City and by land travel via private cars or buses (2-3 hours), thereafter. Public buses also travel directly from Manila to Gonzaga on a regular basis. Land travel from Manila usually takes 12 to 14 hours.

The Province of Cagayan has one national port and several municipal ports. Republic Act 7922 created the Cagayan Special Economic Zone and Free Port (CSEZFP) at Sta. Ana, Cagayan to be managed by the Cagayan Economic Zone Authority (CEZA). The Port of Irene, which will be the main port of entry for all the vessels and equipment that will be used during the offshore mining operations, is located in Sta. Ana, Cagayan. It can be reached by plane (1 hour) and by bus (11 hours) via Tuguegarao, and then by bus or van (2-3 hours) from Tuguegarao. If by private car, it would take about 12-14 hours depending on the number of stopovers.

The project area is located about 14 kilometers offshore and parallel to the coast of the said coastal municipalities, can be reached by motorized boat (*banca*) or any marine vessel. Travel to the portion of the tenement area directly north of the Cagayan River mouth using a motorized boat usually takes 1.5 to 2 hours.

Direct and Indirect Impact Areas

In accordance with Annex 2-2 of the Revised Procedural Manual (RPM), Sec 3.a, the Direct Impact Area (DIA) is initially delimited at the pre-EIA stage as “the area where ALL project facilities are proposed to be situated and where all operations are proposed to be undertaken.” Based on that definition, the DIA is the 4,999.2358-hectare project area in Gonzaga, Buguey and Aparri.

Potential Indirect Impact Areas (IIA) at the pre-EIA stage, on the other hand, generally refers to the influenced area that could be indirectly affected by the proposed exploration and operation activities. The (indirect) impact area is composed of the entire coastline of Aparri, Buguey and Gonzaga municipalities. This area includes eight (8) coastal barangays in Aparri namely: Bulala Sur, Bulala Norte, Linao, Punta, Minanga, San Antonio, Maura, Dodan, Paddaya; thirteen (13) coastal barangays in Buguey to include Paddaya Weste, Paddaya Este, San Isidro, Cabaritan, Centro West, Centro, Santa Maria, Leron, Mala Weste, Mala Este, Villa Leonora, Minanga Weste and Minanga Estes; and eleven (11) coastal barangays in Gonzaga consisting of Caroan, Casitan, Callao, Minanga, Batangan, Tapel, Ipil, Amunitan, Santa Cruz, Baua and San Jose

ES 1.3. Project Rationale

The increase in production capacity aims to contribute to the increasing demand of iron and steel due to the rapid development of the Philippines and global market demand on steel. The construction sector is a major contributor driven by demand for private residential and office buildings and infrastructure spending by the government, which led to an upswing in demand for steel products. Philippine-based iron and steel manufacturers have expanded their production capacities in the long products sector, but still fall short of domestic demand, mainly because of the absence of an integrated steel mill.

ES 1.4. Project Components

The extraction component of the proposed project will all be operating offshore, or beyond 14 – 15 kilometers from the shoreline and there will be no permanent structures to be built in the project area. There will be no ore / mineral processing on board the siphon vessel, only extraction of magnetite sands will be involved in the mining operation with the use of magnetic separator. The operation of the siphon vessels will be subcontracted to local shipping company that can provide the required services of the Proponent. **Table 1-1** shows the proposed modification of the project expansion in terms of its components.

Table 1-1: Proposed Modification

I. Existing	II. Proposed
• 1.3 MMT production rate • 1 Siphon vessel (dredge barge) • 3 Separator Barges • 1 Panamax Vessel • Gravity Separator • Magnetic Separator • Hopper / Chute • Generator Set	• 30 MMT production rate • 4 Siphon vessels equipped with generator sets, magnetic and gravity separators and hoppers / chute • 12 LCT / Storage Barges • 4 Anchor handling tugs • 4 Support Tug Boats

Siphon Vessel (Cape Size Vessel)

The Siphon Vessel will acts as the offshore floating production and storage vessel. It uses its differential pressure suction system to suck the sand and water from the sea bottom to vessel deck where the equipment (e.g. Differential Suction Systems with airlift system, arrays of Magnetic Separators and Distributors, Transport Conveyor, etc.) are located. The proprietary suction system with air lift capability will suck gross sand from sea bottom to be directed to our rotary slurry distributor and onwards to our array of magnetic separators. The tables below shows the description and itemized layout of the siphon vessel.

Magnetic Separator

Magnetic Separators are arranged in three (3) stages. One (1) Roughing Single Magnetic Separator (RSMS) and Two (2) Final Stage Magnetic Separator (FTMS) for every set will separate the magnetite sand from the slurry. Magnetite content of sand suction from the sea bed is 10 percent by weight.

Anchor Handling Tugs

Anchor Handling Tug is part of the complement for the offshore mining operations which sole responsibility is to move and position anchor blocks used in securing the Siphon Vessel and Drill Barge. The tugboat will assist in Foreign Vessels to load Magnetically separated Iron Ore from siphon vessel and it will also be used to retain the Oil Spill Response Equipment to be used in case of emergencies (Oil Spills, Etc.)

Landing Craft (LCT) / Storage Barges

Landing Craft or LCT is part of the complement for the offshore mining operations which will be alongside the Siphon Vessel to receive Magnetite Iron Sand. It will also be used as transport magnetite iron sand from vessel to Foreign vessel for onward foreign delivery.

Existing Facilities (Onshore)

The admin office and staff house which are already existing, used during the exploration drilling activities has been established in CEZA. Power is supplied by CAGELCO and communication facilities by mobile phones and internet are also pre-existing. This onshore facility is not covered by this application.

Table 1-2: Description of the Siphon Vessel

Length Over All (LOA)	100.548 M (330 Feet)
Beam	36.576 (120 Feet)
Depth MLD	7.620 M (25 Feet)
Design Draft	abt. 6M
Deck Loading	25 T/M^2
Equipment	• 2 cranes; • 12 sets (1 x 3 or 36 magnetic separator), and; • Anchor Handling tug filled with oil spill response system

ES 1.5. Process and Technology

1.5.1 Method and Technology of Offshore Mining

The process of magnetic separation is a mechanical process where the iron sand will be attracted to the magnet and will separate it from the pure sand (waste materials) using magnetic separator on board the siphon vessel. The main processes for the project are: mineral extraction, sand and water separation, magnetic separation, and storage before importation. There will be no chemical process involved in the operations.

The sand extraction process will be conducted using the main facility of the project. Siphon Vessel are vessels that extract materials through a suction hose connected to the vacuum pump. The pump produces a vacuum, which pulls the materials into the suction hose. For extraction of compacted materials, dredgers have a cutter head at the end of the suction tube. The cutter head is used to loosen the materials and feed it to the opening of the suction tube.

The extracted sand will then be properly stored in the ship's holding compartments for processing in the magnetic separator. The sand and water separation process will be conducted on the piling barges. The materials will be transferred from the suction vessel to the piling barge through a hopper or chute. The denser materials are then processed in the magnetic separator. It will pass through a two-stage magnetic separation process. The non-commercially important sand will then be returned to the seabed using a separate pipe and

pump. The discarded sand shall be brought as close as possible to the sea bottom, in order to minimize the suspension of the fine sediments during operations.

The denser materials are then separated using a magnetic separator. This process will separate the magnetic sand, those that are attracted by a magnet, from those that are not. Magnetite is the most magnetic mineral on earth based on published records. **Figure 1-7** is a diagram of the magnetic separation process.

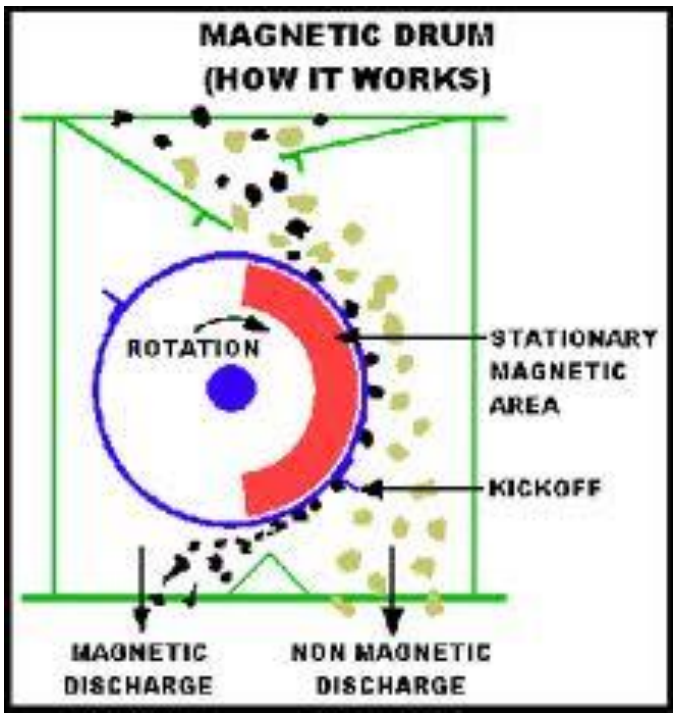

Figure 1-7. Magnetic Separator

As discussed above, the project will utilize mechanical processes in extracting the commercially viable sand. All activities, as shown in **Figure 1-8**, from the extraction using the siphon vessel, to the processing which will use magnetic separators, up to the storage and exportation of the sand, will be done offshore.

Figure 1-8: Flowchart of Mining Operation

ES 2. Process Documentation of the Conduct of EIA Study

ES 2.1 EIA Methodology

The preparation of the EPRMP is in accordance with the steps indicated in the Revised Procedural Manual (RPM) for DAO 2003 – 30. The conduct of public participation activities are based on the guidelines as indicated in DAO 2017-15 (Guidelines on Public Participation under the Philippine EIS System).

The EIA Team followed the Participatory Impact Assessment Method (PIAM) wherein the stakeholders were involved in the conduct of the EIA through project briefing, focused group discussions, and formal scoping meeting as prescribed in DAO 2017-15.

Data gathering involved infield surveys for the assessment of the existing physical and biological conditions of the project site. Based on the standard EIA procedures, collection of secondary data was sourced from the concerned government agencies and offices, desktop research and literature review of relevant studies. The succeeding tables show the methodologies employed during the study.

Table 1-3: Data Gathering Matrix

Methodology	Source Person/s	Gathered Data/Activity Conducted
Primary Data		
Meetings	EIA Study Team and Proponent	• Project information, project site boundary, and conceptual site layout and plans
Consultations Perception Surveys Interviews	EIA Study Team	• Perception of the Project • Level of awareness on the proposed project • Municipal Profiles • Anecdotal accounts of past earthquakes, typhoons, flooding and storm surges in the area
Infield Surveys and Fieldworks using the following methodologies: • Site inspection • Coastal Mapping • Rapid Bioassessment for freshwater macroinvertebrate • Transect-quadrat method for marine ecology survey • Grab sampling for water sample collection • Gas Bubbler and Pararosaniline Method for SOx and NOx • High Volume and Gravimetric Method for TSP and PM_{10} • Noise meter for ambient noise level	EIA Study Team	• Marine Ecology Assessment of the Project Site • Marine Water Quality Assessment • Ambient Air Quality and Noise Level Assessment
Secondary Data		

Methodology	Source Person/s	Gathered Data/Activity Conducted
Desktop Research and Literature Review	• Philippine Statistics Authority (PSA) • LGUs of Aparri, Buguey and Gonzaga	• Physical, biological, socio-economic and demographic profiles of the municipalities of Aparri, Buguey and Gonzaga
Desktop Research	• Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) • Philippine Institute of Volcanology and Seismology (PHIVOLCS) Mines and Geosciences Bureau (MGB)	• Climatological normal and extremes • Risks and hazards Geological data and maps
Other Sources	• Feasibility Study of the project • Integrated (Amended) Environmental protection and Enhancement Program of the project • Final Mine Rehabilitation and/or Decommissioning Plan of the project • Final Exploration Report (FER) of the project	

Stakeholders' Engagement / Public Participation

The Information, Education and Communication (IEC) campaign was conducted last November 7 and 29, 2019 with the pre-scoping, perception survey and distribution of IEC materials on the EIA process. A public scoping for the proposed expansion of the project was conducted last January 30 and 31, 2020. Present during the activity were the LGU officials of the affected municipalities, barangay council members and concerned stakeholders from the host coastal barangays, and representatives from other concerned government agencies and NGOs. Representatives of proponent were also present.

ES 2.2 EIA Study Team

The proponent, JDVC Resources Corporation, has contracted the services of Philkairos, Inc. as a third party consultant in the preparation if the EIS. The EIA study team is composed of specialists who have extensive experiences in the conduct of baseline characterization and impact assessments for similar projects.

Table 1-4: EIS Study Team

Name of Preparers	Field of Expertise
Jose Leonilo A. Espineli (IPCO-088)	Project Director
Maria Luisa M. Gutierrez (IPCO-097)	Project Manager
Hillel Cabria	Geology and Geohazards
Raymond Rodolfo	Geology and Geohazards

Name of Preparers	Field of Expertise
Rodolfo Romarate Jr.	Water Quality Specialist Marine Ecology Specialist
Isabel B. Espineli	Sociologist
Jan Julio A. Espiritu	Environmental Impact Assessment
Deza Mae P. Mondragon	Environmental Impact Assessment
Ana Karmela S. Miranda (IPCO-070)	Research Assistant
Demelyn Macalinao	Research Assistant
Rexadi Roy Zamora	Mapping

ES 2.3 EIA Study Schedule

The overall schedule of activities conducted is presented as follows:

Table 1-5: EIS Preparation Schedule of Activities

ACTIVITIES	MONTHS							
	1	2	3	4	5	6	7	8
1. Planning with Technical Experts								
2. Gathering of baseline and secondary information								
3. Interpretation and analysis								
4. EIS Report Preparation								
5. EIS Review and Evaluation								
6. Public Consultations								

ES 2.4 EIA Study Area

The Direct and Indirect Impact Areas of the proposed project in terms of biophysical and socio-cultural impacts are summarized in **Table ES-5**.

Table 1-6: Impact Areas of the Project

Area Classification	Area Coverage
Direct Impact Areas	**In terms of biophysical impact:** • The 4,999.2358-hectare project area within the municipalities of Aparri, Buguey, and Gonzaga; • Surrounding areas and seabed in the channel where the offshore mining project is located
Indirect Impact Areas	**In terms of biophysical impact and socio-cultural impact:** • The (indirect) impact area is composed of the entire coastline of Aparri, Buguey and Gonzaga municipalities. This area includes eight (8) coastal barangays in Aparri namely: Bulala Sur, Bulala Norte, Linao, Punta, Minanga, San Antonio, Maura, Dodan, Paddaya; thirteen (13) coastal barangays in Buguey to include Paddaya Weste, Paddaya Este, San Isidro, Cabaritan, Centro West, Centro, Santa Maria, Leron, Mala Weste, Mala Este, Villa Leonora, Minanga Weste and Minanga Estes; and eleven (11) coastal barangays in Gonzaga consisting of Caroan, Casitan, Callao, Minanga, Batangan, Tapel, Ipil, Amunitan, Santa Cruz, Baua and San Jose as the primary beneficiaries of the SDMP that will benefit the provincial and regional level from potential revenues and taxes of the project

ES 3. EIA Summary

3.1 Project Alternatives

The project considered other alternatives for the current project based on considerations of facility siting, development design, process/technology selection and resource utilization. The consequences of not proceeding with the project were also discussed.

The project is within the area bounded by the coordinates stipulated in the MPSA by virtue of the Deed of Assignment in favor of JDVC Resources Corporation and as approved by the Mines and Geosciences Bureau. No alternative sites were considered inland or within the vicinity of Cagayan River since this will not be practical from economic point of view and in addition, the construction of site facility inland will have greater negative social impacts to the community.

The proponent considered the extraction of magnetite starting only within mine operational area from a distance of 14 – 15 km away from Cagayan shoreline. This is to prevent the negative impact of disturbed sand on the quality of water that was traditionally used by the people for fishing.

The best practical technology that would result to reduced pollution and damage to environment and people.

The extraction for magnetite sand will simply utilize a siphon vessel. The extracted sand will then be temporarily stored, dewatered, and separated from the non-magnetite sands on board barges. All the processes for extraction will be strictly mechanical, no chemicals will be used. In addition, all phases of the operation, from the extraction up to the magnetic separation, will be done offshore. The process is smaller in scale compared to the extraction methods to be used inland.

Only magnetite materials will be extracted. Caution will be practiced by the proponent to keep the edge of the pipe as close as possible to the sea floor to lessen the agitation of the sand, which may cause the deterioration of the quality of the water, which will impact negatively on marine organisms.

Such process entails less impact to the environment in general. The method to be used will depend on a number of factors including the depth to the seabed, the degree of consolidation of the sands, ocean weather conditions, capital and operating costs, etc. At this early stage the preferred option is the plain siphon.

The negative environmental impact of the magnetite offshore extraction and recovery process is NIL. The extraction process is via siphon vessel with magnetic separator, and processing apparatuses on board. This system is no hazard at all and no social complication as the siphon vessel is stationed at the ocean far from the shore. The siphoning action of the siphon vessel for magnetite sand offshore based on findings of the experts and specialists does not produce significant sea bottom topography disturbances due to the following reasons:

1. There is no explosive use, hence there is no blasting activities;
2. There is no permanent structure buried to the sea bottom;

3. The siphoning area underneath the sea agitated by the siphon pipe/s, while it can cause localize turbidity, would immediately cave in upon pull out of the siphon pipe/s due to continuing action of the sea under current;
4. The magnetic separator on the siphon vessel would only qualify about 10% average for quality grading required hence, will return back to the same area the 90% of the lesser grade magnetite Iron Sand;
5. The sand mounts with lesser magnetite that can be created by the return after magnetic separation under the sea may even become series of new fishing areas during calm season nearer the shorelines, and
6. The continuing replacement every time it rains allow continuing replacement of the 10% extracted for higher grade as separated for export shipment.

ES 3.2 Baseline Characterization, Impacts Management and Monitoring Plan

3.2.1 Impacts on Land

There will be no significant impacts on land during all phases of magnetite extraction in the offshore areas of Aparri, Buguey, and Gonzaga. All extraction and mining activities will be done at least 15 km away from the shores of these towns.

Based on the baseline assessment, the host municipalities are highly susceptible to flooding due to the topography and the coastal barangays are considered low-lying flood plains based on the regional and MGB maps. These areas are moderately susceptible to erosion due to poor vegetation and weak soil structure along the river system.

3.2.2 Impacts on Water

Since the project site is located approximately 14-15 km away from the shoreline of the coastal municipalities and from the outfall of the river, the project will not have a significant impact on the depth and drainage of the river. The host municipalities are endowed with deep wells and productive aquifers. But since the project is located approximately 14 – 15 kilometers away from shore, the water supply both for drinking and for utilities, will be sourced and processed on-shore. Estimated daily domestic consumption is 30 cubic meters. No water requirement is needed for the operation.

In terms of marine water quality and ecology, significant impacts would be the loss of benthic types, conversion of substrate/habitat and changes in community structure, siltation, sedimentation, turbidity, and water pollution due to oil spills. Mitigating measures such as, regular monitoring of water quality based on DENR standards for Class SC, provisions of pollution control devices to prevent will be implemented to reduce or prevent negative impacts to the marine environment. Offshore extraction of magnetite sand can increase the water turbidity which, can result to a sedimentation. The crew will keep the edge of the suction pipe as close as possible to the ocean floor to lessen the agitation of the sand which, may cause the deterioration of the quality of water. All offshore mining operation MUST have one (1) tugboat equipped with Oil Spill response equipment, one (1) fast boat and personnel that are adequately trained to address oil spills.

To mitigate impacts on increased turbidity, an accordion type pollution prevention curtain or screen shall be installed to surround the suction and discharge lines. Also, the pollution prevention curtain or screen can be used to reduce the impact of silts and sand from rivers flowing into the basin.

Residual effects are moderately significant, water pollution may have an adverse effect on marine water quality and ecology if not mitigated.

3.2.3 Impacts on Air

There will not be much impact on air except for the emission of diesel powered magnetite separator. Pollutants include CO_2, SOx and NOx. The emission will be easily dispersed because of high velocity wind in the sea. All equipment (e.g. Generators) on board are designed as silent types to avoid noise generation exposure even to siphon vessel crew. The Vessel's main engine is housed inside the engine room with sufficient sound absorbing insulation installed. The proponent will comply with the regulations from the MARPOL (Maritime Pollution) 73/78 and those set-forth by the Marine Environmental Protection Rules and Regulations of the Philippine Coast Guard (PCG) will be adopted. Residual effects are temporary and will cease after closure

3.2.4 Impacts on People

The operation of the project may result in several impacts to the communities. The project is located approximately 14 – 15 kilometers away from the shore, likewise, the office of its employees are located in the existing facilities of CEZA. Hence, there will be no displaced settlers and/or properties, ownership of land, and right of way conflict. The effects may include in-migration during development and operation, out-migration upon closure, safety and health risks to the employees and workers and the communities, peace and order in the area.

During Operation, the mining activity will fuel economic growth, safety and health risk employees/workers and the communities. Upon closure, the potential impact will be on the economic aspects and psycho-social concerns on job, livelihood, and opportunities loss because of the seizure of the operation. The implementation of the project will not alter the lifestyle of the resident. On the other hand, improved community services through the company's SDMPs and CSRs are also expected from the project. The company's community relations officers have to conduct regular or annual social functions like sports competition to be able to gain good social relationships among in-migrants and local residents with respect to their ethnicity or culture. The enhancement may remain permanent depending on the cooperation of the communities.

To mitigate potential impacts due to in-migration, the following management measures shall be implemented:

- Implement priority local hiring policy for qualified local workers;
- Coordinate with barangay or/and municipal LGU as to relevant ordinance on providing opportunities for local employment;

- Conduct consultation with barangay LGUs on requirements and process of hiring to maximize employment of local residents;
- Require and monitor contractor commitments on providing local employment;
- Coordination with the municipal and barangay peace and order councils to ensure peace and order; and,
- Coordination meetings shall also be undertaken regularly with the LGUs to identify threats and vulnerabilities in the society as well as to develop programs to prevent foreseen social problems.

Table 1-7. Summary of Main Impacts, Mitigation Measures and Residual Effects

Project Activity	Potential Impacts	Option for Prevention, Mitigation and/or Enhancement	Target Efficiency
Operational Phase			
1. Positioning of the Siphoning vessels with the use of Anchor Handling Tugs	Disturbance to marine biodiversity	• Limiting the movement of the vessels in the marked project / mining area once positioned per block. • Siphon vessels will be operated in the boundaries of the mining block to enforce a form of progressive mining. This process will give the impacted organisms time to recolonize the previously mined out area.	• 1% to very minimal impact to marine biodiversity. • Reversible effect to the environment.
2. Use of Siphon vessels in extracting the magnetite iron sand 3. Processing of extracted san in the magnetic separator with sand and water separation process 3. Transport/loading of magnetite iron sand from Siphon vessels to foreign vessel thru conveyor belt for export	Disturbance of marine biodiversity	• Minimizing/reducing the movement of the vessels in the marked project / mining area once positioned per block. • Siphon vessels will be operated in the boundaries of the mining block to enforce a form of progressive mining. This process will give the impacted organisms time to recolonize the previously mined out area.	• 1% very minimal impact to marine biodiversity. • Reversible effect to the environment.
	Increased water turbidity which can result to sedimentation due to extraction of magnetite sand from the seafloor and non-magnetic sands returned to the sea	• Use of suction pipe to extract the sand and return the non-magnetic sand to the seafloor. A pollution prevention curtain or screen / silt curtain will be used to lessen the impact of turbidity. • Regular water quality monitoring to mitigate and prevent negative impacts of pollution to marine water • The water for disposal should pass the parameters for class SD.	• 100% Compliance with Clean Water Act and its implementing rules and regulations
	Contamination of water body due to oil spills from equipment/vessel	• Regular checking of all equipment including vessels for leakage will be done. Oil spill kit on standby. • Immediate clean-up of affected areas when necessary	• 100% implementation of environmental best practices in handling marine vessels including proper management practices in handling fuels for regular

Project Activity	Potential Impacts	Option for Prevention, Mitigation and/or Enhancement	Target Efficiency
		• The company will include strategies to prevent and/or mitigate the negative impacts of oil spill in water body and marine life.	maintenance of vessel and equipment. • 100% compliance with MARPOL 73/78 for the prevention of pollution from ships • Separate storage and proper handling and labelling of used oil for identification • In case of oil spill, an oil spill response equipment and qualified personnel will be available on the anchor handling tug or vessel. • Short term; Irreversible effect to the environment
	Emission of CO_2, SO_2 and NO_2	• The proponent will ensure that the siphon vessels and suction equipment are in good condition. • The vessels will document the regular maintenance activities of the extraction equipment and the vessel itself. No maintenance work will be conducted offshore to minimize the risk of spillage of oil. • International and local rules and regulations on minimizing air pollution will be implemented during operations.	• 100% conduct of assessment, monitoring, and maintenance of all vessels and equipment involved in this project will be strictly implemented. • 100% compliance with MARPOL (Maritime Pollution) 73/78 and Marine Environmental Protection Rules and Regulations of Philippine Coast Guard (PCG) • Long term, Reversible effects to the environment

Project Activity	Potential Impacts	Option for Prevention, Mitigation and/or Enhancement	Target Efficiency
	Noise generation	• Use of low noise diesel generator set with enclosure and muffler for the vacuum pump. • Regular maintenance of equipment and vessels to maintain good working condition. • Equipment including vessels will be operated at low speed and/or power whenever practical and switched off when not in use.	• 100% compliance with DENR Air quality standards, noise level set by DENR and EQPL. • Regular inspection and maintenance of vessels and equipment prior to start of daily operations. • Long term, Reversible once operations are done.
	Disturbance of local/traditional fishing grounds	• Operational area will be set on an annual basis so as to better identify the municipality affected. The proponent and it's CRU in cooperation with the LGU will identify projects that will be included in the SDMP to be implemented by the project. • Buffer zones from the vessels to allowable distance of 500 m for fishing boats	• 1% to very minimal impact to marine biodiversity. • Reversible effect to the environment.
	Maritime Traffic	• Coordinate with PCG and/or PPA on the traffic routes or schemes that are likely to be used by large vessels	• 100% compliance with the government agencies with jurisdiction in the Philippine waters • Long term, Reversible
	Possible accidents and exposure to occupational hazards	• Provision of PPE to all workers and implementation of strict safety protocols especially when onboard the vessels • Conduct safety orientation prior to employment • Conduct regular trainings and drills (at least twice a year) in handling and responding to accidents and disasters	• 100% compliance to DOLE and Occupational Health and Safety Standards and Guidelines • Short term, Irreversible
4. Other mine operational activities	Entry of migrant workers with families which might cause health problems due to	• The company will prioritize employment of qualified local residents. Proponent will coordinate with every barangays in terms of employment	• 100% conduct of population survey and monitoring of

Project Activity	Potential Impacts	Option for Prevention, Mitigation and/or Enhancement	Target Efficiency
	diseases, overuse of public utilities /services, competition of resources, social conflicts, peace and order, increase in pollution due to solid and liquid wastes	• Management of entry of migrant workers by increasing and/or training barangay tanods to be deployed in areas where migrant workers reside. • Proponent provide Health clinic with a Doctor, Nurse and Health workers. Health certificate for workers prior to hiring into the project. • Partner with LGUs in the implementation of the Social Development and Management Program.	migrant workers in coordination with LGU • Short term, Reversible
	Possible proliferation of diseases	• Require health examination and submission of health certificate prior to employment • Require fit to work certification for returning workers from illness • Implement proper health and sanitation protocols and facilities	• 100% compliance to DOLE and Occupational Health and Safety Standards and Guidelines • Short Term, Reversible
	Possible effects on health and sanitation	• Workforce will be provided with clean and potable water and sanitary toilets • Domestic wastes segregation shall be practiced and strict implementation of solid waste management	• 100% compliance to DOLE and Occupational Health and Safety Standards and Guidelines • Short term, Reversible
	Generation of Solid/Domestic Wastes	• Proper segregation and disposal to the accredited collector and disposal facility • The company will promote the 3R's of solid waste management • Color-coded garbage bins/trash bins placed in relevant areas	• 100% compliance with RA 9003 • Collected wastes shall be weighed to monitor volume of generated wastes • Long term, Reversible
	Domestic solid wastes maybe indiscriminately disposed in adjacent areas	• A solid waste management plan will be strictly enforced;	• 100% compliance and implementation of management plan • Long term, Reversible

Project Activity	Potential Impacts	Option for Prevention, Mitigation and/or Enhancement	Target Efficiency
	Generation of Hazardous wastes - Production of waste oil during maintenance activity of the vessels and the equipment	• The proper storage and documentation of the used oil and oily rags will be implemented as stated in RA 6969. The waste will then be properly disposed of using PPA or DENR accredited waste handlers/ transporters. • Grease traps installed to prevent discharge of oily material	• 100% in compliance with RA 6969 in proper handling and management • Long term, Reversible
	Generation of sewage	• Provision of septic vaults and usable toilets for the workers/staffs for infectious wastes	• 100% compliance and implementation of RA 9275 • Long term, Reversible
	Generation of employment opportunities	• Prioritizing qualified residents from affected Municipalities • Only qualified locals will be hired for operation phase • Possible conduct of training programs to develop and enhance skills of residents for a high chance of employment	• 100% compliance to DOLE and Occupational Health and Safety Standards and Guidelines • Long term, Reversible
	Increase in government revenues	• As part of the proponent's corporate social responsibility, the local government together with the affected communities will benefit from the project by hiring of local workers, remit taxes to the LGU, and implement Social Development Programs (SDP). While the national government will benefit from to the high demand and use of magnetite sand in steel manufacturing industry.	• 100% assurance that due and fair benefits shall be given to the LGU
Abandonment Phase			
1. Pulling out of marine vessels from the mining area	Marine water pollution from oil and grease, etc.	• The proper storage and documentation of the used oil and oily rags will be implemented as stated in RA 6969. The waste will then be properly disposed of using PPA or DENR accredited waste handlers/ transporters.	• 100% compliance and implementation of RA 9275 • 100% implementation of environmental best practices in handling marine vessels

Project Activity	Potential Impacts	Option for Prevention, Mitigation and/or Enhancement	Target Efficiency
			including proper management practices in handling fuels for regular maintenance of vessels and equipment. • Separate storage and proper handling and labelling of used oil for identification • In case of oil spill, an oil spill response equipment and qualified personnel will be available on the anchor handling tug or vessel. • 100% compliance with MARPOL 73/78 • Long term, Reversible
	Maritime traffic congestion	• Coordinate with PCG and/or PPA on the traffic routes or schemes that are likely to be used by large vessels	• 100% compliance with the government agencies with jurisdiction in the Philippine waters