T & T Resources
and Mining Corporation

Executive Summary of the Environmental Impact Statement

T&T Northern Cagayan Sand Project

Municipalities of Aparri, Buguey, and Gonzaga, Cagayan Province

EXECUTIVE SUMMARY OF THE ENVIRONMENTAL IMPACT STATEMENT

A. Project Description

I. Basic Project Information

Project Name	:	**T&T Northern Cagayan Sand Project**
Nature of Project	:	Resource Extractive Industry – Mining and Quarrying Project - Extraction of metallic and non-metallic minerals (off-shore) - Mineral processing project
Proposed Average Annual Extraction Rate	:	62 million dry metric tons (DMT) of marine sand
Proposed Average Annual Concentrate	:	2.5 million DMT of magnetite concentrate and other associated minerals
Commodity	:	Magnetite and other associated minerals, and marine sand
Location of Dredging and Facilities	:	Offshore areas of the Municipalities of Aparri, Buguey,and Gonzaga, Cagayan Province
Permit	:	MPSA 339-2010-II-OMR
Total Project Area	:	5,000 hectares out of the 14,710.00 hectares covered by the MPSA
Mining Method	:	Dredging
Concentrate Separation Method	:	Wet High-Intensity Magnetic Separator (WHIMS) and Low-Intensity Magnetic Separator (LIMS)
Mine Life	:	12 years
Project Components	:	Vessels – TSHD (dredging); Cape-sized bulk carriers; support vessels Magnetite processing unit

The proposed Project is foreseen to boost, in part, the mining industry's overall contribution to the nation's GDP, as well as to those, by extension, of secondary industries like construction. With increased urbanization and population growth, a continuous upsurge of construction activities is inevitable. Steel, one of the many essential materials in construction, needs iron to be produced.

The proposed Project is projected to provide a boost in the income of the local government units, as well as contribute in the sustainable development of the communities through the programs, employment opportunities, and emergence of income generating activities relative to the economic activity brought about by the project.

II. Project Components

Project Components		Details
Dredging Activities	Permit	- MPSA 339-2010-II-OMR
		- Total of 5,000 hectares
	Location	Offshore of the Municipalities of Aparri, Buguey, and Gonzaga, Cagayan Province
	Technology/components	- Trailing Suction Hopper Dredger

Project Components		Details
		- Cape-sized bulk carrier with magnetite processing unit (200,000 to 300,000 DWT capacity) - Cape-sized bulk carrier for STS (50,000 DWT capacity) - Support vessels (60-person capacity)
	Extraction Method	Dredging
	Annual Extraction Rate	62,000,000 DMT
	Commodity	Magnetite and other associated minerals, including marine sand
Magnetite Processing	Technology/components	- Off-shore processing on magnetite processing unit aboard the vessel - Wet High-Intensity Magnetic Separator (WHIMS) and Low-Intensity Magnetic Separator (LIMS)
	Annual Production Rate	- 2,500,000 DMT
Waste Management	Pollution Control	- TSHDs controlled overflow of fines with green valve system - Silt curtains

Mining projects are site-specific because mineral extraction can only be undertaken where economic deposits occur. Given such, T&T chose the location due to the substantial magnetite deposit based on conducted exploration. Moreover, the 5,000-hectare area is in consonance with Section 39.e of DAO 2010-21 to wit, "*A stipulation that each mining area after relinquishment shall not be more than 5,000 hectares for metallic mineral…*" Moreover, the company has authority over the area by virtue of the issued MPSA.

Given its cost-effective and streamlined implementation, the company will utilize TSHDs for its dredging operations. This vessel could work in calm or turbulent waters, such as at entrance channels or far out to sea where weather and waves may be more active. Unlike stationary vessels, TSHDs also have no anchors or cables and are self-propelled so they could move about freely. In addition, they could work at very great depths or in shallow waters. Moreover, it has a green valve system that aids in the management of fines generated during dredging.

For magnetite processing, magnetic separation is the technology being utilized. It is a process that takes advantage of the natural magnetic properties between minerals in the feed. Commercial magnetic separation units follow a continuous separation process on a moving stream of dry or wet particles passing through low or high magnetic field. Magnetic separators being utilized are drum, cross- belt, roll, high-gradient magnetic separation (HGMS), high-intensity magnetic separation (HIMS) and low-intensity magnetic separation (LIMS) types. Considering the type of mineral deposit that will be extracted, for the proposed Project, T&T shall utilize a combination of wet high-intensity magnetic separator (WHIMS) and low-intensity magnetic separator (LIMS).

The WHIMS shall be used for paramagnetic minerals, while LIMS will be used primarily for manipulating ferromagnetic materials or paramagnetic of high magnetic susceptibility and/or of large particle size.

III. Process/Technology

Dredging

In a Trailing Suction Hopper Dredger, dredging takes place through the suction pipes installed alongside the vessel. The dredged material is loosened and collected through the drag heads located at the lower end of the suction pipes. Dredge pumps in the vessel or integrated in the suction pipe, lift the mixture of sand and water into the hopper well.

In precis, the sand extraction process utilizing TSHD involves the following steps:

- The TSHD will sail empty to the designated sand source area.
- Once in the sand source area, the suction pipes are lowered onto the seabed, the pumps are started, and dredging commences. While dredging, the sand-water mixture is brought up through the suction pipes and pumped into the hopper.
- The dredged material settles in the hopper and excess process water with (part of) the fines component of the dredged material is evacuated through the overflow system. The latter can be adjusted to optimize production and align the sand quality with the requirements.
- When the draught of the TSHD reaches the dredging load mark or when circumstances do not allow further loading, sand mining will be suspended and the suction pipes will be hoisted on deck.

Magnetite Processing

Magnetite will be separated from the marine sand using a combination of wet high-intensity magnetic separator (WHIMS) and low-intensity magnetic separator (LIMS). Magnetite-bearing sand shall flow into a pipe and each gate valve at each cargo hold will be opened by hydraulic control. The gate valve shall then be closed to prevent overflow onto the deck area and maintain the vessel's stability. The modification of the drainage system shall take about 10-16 hours to attain at least a 10% Transportable Moisture Limit (TML).

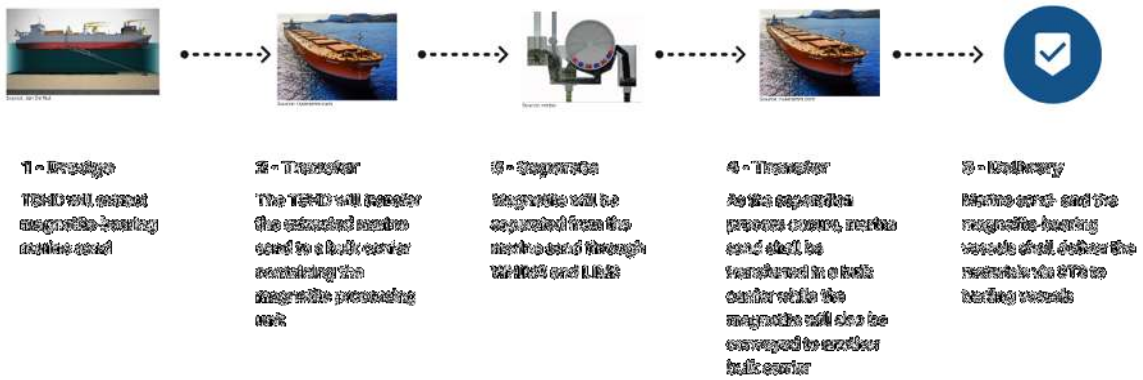
On top of the deck, the crawler crane shall pick up the dredged sand using an attachable 33 tons grabber and load it into a hopper in the middle between the cargo hold. The crawler crane will move freely and pick up from each side of the dredged sand inside the cargo hold. However, if a critical angle and radius are attained, the sliding hatch shall be closed to prevent crane crashes due to overload. At the bottom of the hopper, a flat conveyor shall move the dredged sand and pass it through the magnetic separator.

The residue of the dredged sand shall be moved through a conveyor into a bulk carrier. At the same time, the collected magnetite concentrate shall be transferred through a separate conveyor into another bulk carrier. This operation runs simultaneously to ensure the vessel's stability on each side. Assuming both bulk carriers are fully loaded with 100,000 DWT, both vessels shall be cast off for Ship-to-Ship Transfer (STS) with trading vessels. STS operation will take 4-5 days to be completed, depending on the ship crane and loading master. Anchor Handling Tug Supply (AHTS) vessels shall assist the bulk carriers in and out of 100,000 DWT for safety purposes.

The dredging vessel shall resume operation and reload dredged sand to 100,000 DWT during this period.

Dredging and the consequent magnetic separation shall be carried out by the company upon confirmed commission of magnetite and marine sand supply to prevent stagnation of extracted materials in the vessels, and ensure continuous transport of materials to consumer.

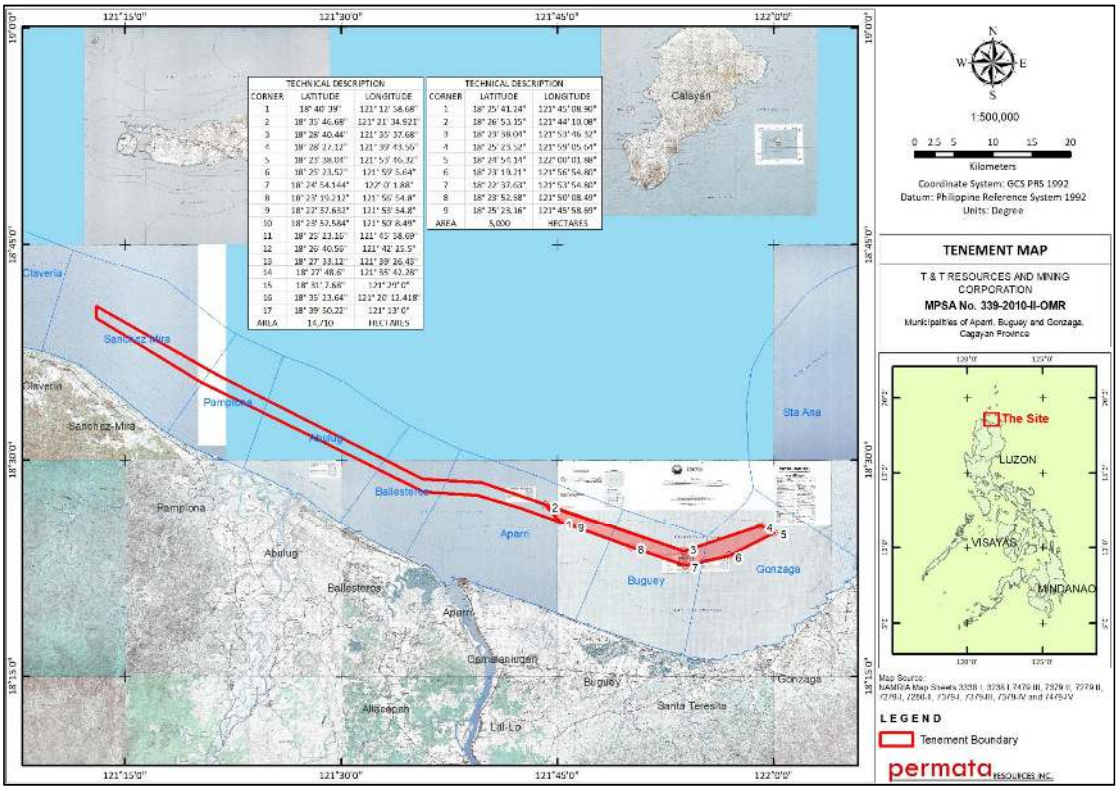
Operating time is estimated at approximately 60% of total hours in any year, equivalent to approximately 8.4 months every year. This estimate allows for typhoon periods, operating delays, preventive maintenance schedule (PMS), and among others.



General Process Flow of the Proposed Project

B. Project Location

The proposed T&T Northern Cagayan Sand Project (Project) is encompassed by MPSA 339-2010-II-OMR covering the Municipalities of Sanchez Mira, Pamplona, Abulug, Ballesteros, Aparri, Buguey, andGonzaga, all in the Province of Cagayan. Of the 14,710.00-hectare MPSA area, the Project shall cover 5,000 hectares within the municipal waters of Aparri, Buguey, and Gonzaga.



Project Tenement, Proposed Project Area, and Municipal Water Boundaries

C. Project Proponent

T & T Resources

and Mining Corporation

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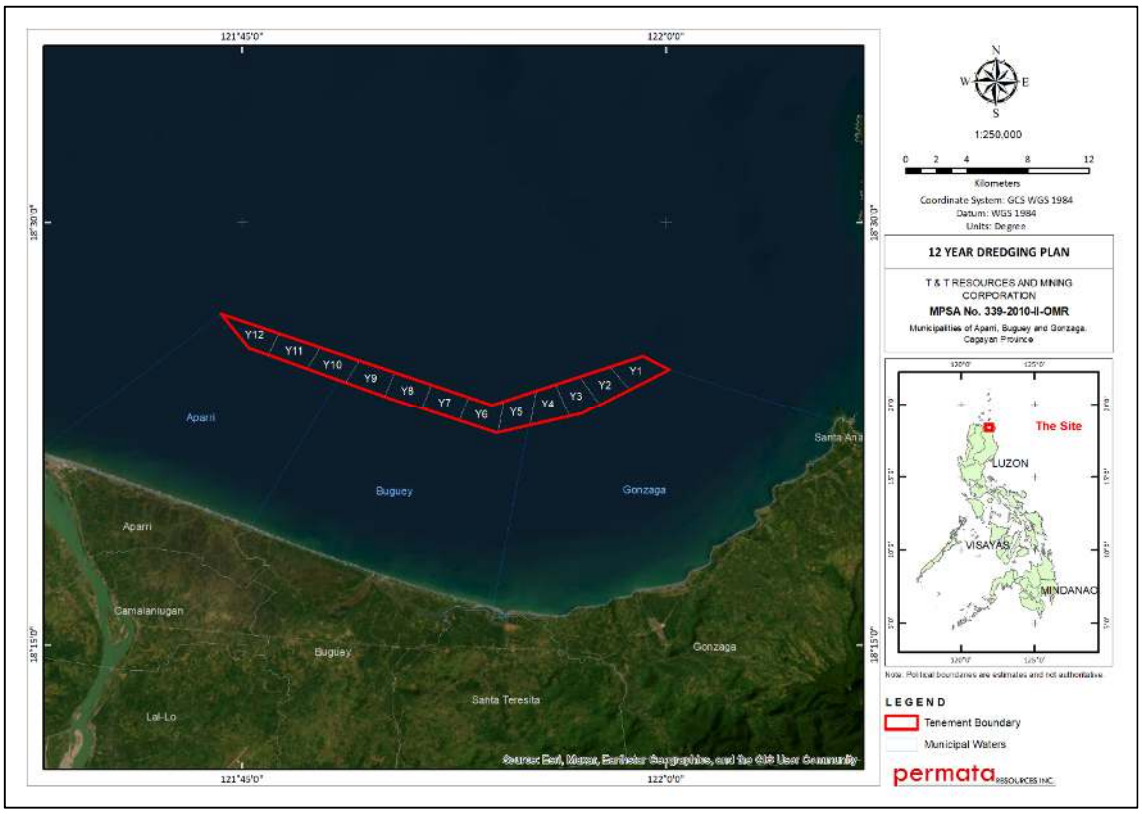
D. Projected Dredging Activities



E. Identified Stakeholders

The direct impact area of the Project is the 5,000-hectare dredging area where all project activities are proposed to be undertaken. Indirect impact areas are those outside the project boundaries that may be affected by the Project, including the nearby tenement areas. In terms of the physical and biological environment, indirect impact areas include the coastal barangays near the municipal waters where the dredging area is located. In terms of indirect socio-economic impacts, areas include those of the adjacent barangays and the whole municipalities of Aparri, Buguey, and Gonzaga, all in Cagayan Province.

Municipality	Barangay	Approximate Distance from the Proposed Site
Aparri	Punta Centro 2, Maura, Dodan and Paddaya	11.2 km to 15.7 km
Buguey	Paddaya-Weste, Paddaya-Este, San Isidro, Cabaritan, Centro-West, Centro-Poblacion, Sta. Maria, Leron, Mala-Weste, Mala-Este, Villa Leonora, Minanga-Weste, Minanga-Este	11.2 km
Gonzaga	Caroan, Casitan, Callao, Minanga, Butangan, Tapel, Ipil, Amunitan, Sta. Cruz, Baua, San Jose	10.2 km to 12.1 km
Nearby tenement areas	JDVC Resources Corporation Peniel Resources Mining Corporation J&M Resources Mining and Exploration Corporation	**Error! Reference source not found.**

F. Summary of Impacts and Management, Monitoring Plan and Residual Effects after Mitigation

Project Activity	Affected Resource/Area	Impacts	Option for Prevention, Mitigation or Enhancement	Monitoring Parameter	Residual Effect
Dredging and appurtenant activities	Marine Water Quality	Sedimentation	Controlled overflow of fines from vessels; Installation of silt curtain around the active dredging area; Limit dredging during inclement weather, i.e., strong winds and waves Dredging shall be carried out in phases an in accordance to the approved work program.	pH, temperature, oil and grease, conductivity, Ammonia as NH3, Nitrate as NO3, Phosphate, BOD, COD, TSS, Thermo tolerant Coliform	None as no permanent structures not equipment will be established in the project area. Moreover, impacts posed will only be evident during operationalization of TSHDs
		Possible oil and grease, waste, and wastewater spills	Installation of silt curtain around the active dredging area; Compliance to MARINA, PCG, MARPOL and DENR guidelines for waste management and disposal for vessels (e.g., Memorandum Circular No. 10-14 Prevention of Pollution from Sewage, Memorandum Circular No. 07-14 Prevention of Pollution from Garbage); Limit dredging during inclement weather, i.e., strong winds and waves		
	Bathymetry and shoreline configuration	Change in shoreline configuration	Regular monitoring of bathymetry, through echosounders or other	Bathymetry and shoreline configuration	Change in bathymetry

Project Activity	Affected Resource/Area	Impacts	Option for Prevention, Mitigation or Enhancement	Monitoring Parameter	Residual Effect
		and bathymetry	equivalent survey-grade equipment; Dredging vessel to be provided with positioning and depth sounding systems, i.e., GPS and echosounder, to check accuracy of dredging (horizontal and vertical); Ensure dredging is undertaken within the project site and in accordance with the dredging plans prepared prior to project operation.		
	Marine Ecology	Impairment of ecological structures and functions (e.g., fish and macro-invertebrate reproduction) Migration of fish out of disturbed areas	Establishment of buffer zones Crafting of a Fisheries Improvement Plan that include enhancement activities in coordination with the LGUs and BFAR; Controlled overflow of fines from vessels; Installation of silt curtain around the active dredging area when necessary.	Harmful Algal Bloom causing plankton (HABs), cells/L Marine wildlife monitoring	-
		Harmful Algal Bloom-causing plankton (HABs), cells/L Marine biodiversity			
	Noise	Disturbance to marine fauna	Phasing and systematic conduct of dredging operations Noise monitoring Operational modifications and maintenance measures to reduce noise (e.g., propeller cleaning, underwater hull surface maintenance, and selection of ship speed)	Marine wildlife monitoring	-
	Community	Loss of income from fishing Safety of fishermen	All fishing gears that are dislocated will be replaced with new materials; Deploy marker buoys at strategic locations along project boundaries during dredging works;	Employment, community projects initiated by the proponent, other benefits of the community	-

Project Activity	Affected Resource/Area	Impacts	Option for Prevention, Mitigation or Enhancement	Monitoring Parameter	Residual Effect
			Support fisheries management programs to ensure fish stock reproduction and habitat restoration through formulation of a Fisheries Improvement Plan; Support adoption of income-generating livelihood projects involving women in fisheries and strengthening organized fisher groups; Support advocacy and IEC for responsible fishing practices; Support to coastal management initiatives of the municipalities involved; Support conduct of training on fisheries law enforcement and monitoring, control and surveillance; Support LGU initiative to establish a close season/close area where fish and crab spawning aggregates are occurring seasonally; Alternative or supplemental livelihoods livelihood for fishers; Dredging shall be carried out in phases an in accordance to the approved work program. Coordination and timely dissemination of scheduled operations to pertinent stakeholders.	from the project	
Unintended activities (e.g., oil spill, pipe rupture)	All	Sedimentation Impairment of ecological structures Loss of income from fishing	Limit dredging during inclement weather, i.e., strong winds and waves; Regular monitoring and maintenance of vessels and equipment; Establishment and implementation of a Shipboard Oil Pollution Emergency Plan in accordance with MARPOL and/or PCG MC 09-14;	Vessel seaworthiness/ documentation	-

Project Activity	Affected Resource/Area	Impacts	Option for Prevention, Mitigation or Enhancement	Monitoring Parameter	Residual Effect
			Dredging shall be carried out in phases an in accordance to the approved work program.		

For mining projects, however, a financial mechanism called the Contingent Liability and Rehabilitation Fund (CLRF) is established in lieu of the EMF and EGF. This CLRF is an environmental guarantee fund mechanism that ensures the just and timely compensation for damages and progressive and sustainable rehabilitation for any adverse effect a mining operation or activity may cause. This fund is further broken down as follows: Environmental Trust Fund (ETF), Mine Rehabilitation Fund (MRF), MWTF Reserve Fund (MWTFRF), and Final Mine Rehabilitation and Decommissioning Fund (FMRDF).

The MRF is established and maintained by each operating mine as a reasonable environmental deposit to ensure the availability of funds for the satisfactory compliance with the commitments and performance of the activities stipulated in the EPEP/Annual EPEP and this comes in two (2) forms: the Monitoring Trust Fund (MTF), which covers the maintenance and other operating budget for the transportation and travel expenses, cost of laboratory analysis, and other reasonable expenses incurred by the multi-partite monitoring team in the amount of PhP150,000.00 which is replenishable every quarter; and the Rehabilitation Cash Fund (RCF), which is being used to ensure compliance with the approved rehabilitation activities and schedules for specific mining phase including research as defined in the EPEP/AEPEP in the amount equivalent to ten per cent (10%) of the total amount needed to implement the EPEP or Php 5 Million, whichever is lower.

Alternatively, the FMRDF is the cost used to implement the final mine rehabilitation and decommissioning plan which is after the life of the mine.

The MWTFRF are pertinent costs collected based on the amount of mine waste and tailings generated by a mining project and are used for payment of compensation for damages caused by mining pollution. Mine wastes costs Php 0.05/MT produced while Tailings costs Php 0.10/MT produced. Conversely, the ETF is used for payment to mining-related compensable damages other than those caused by mine waste and tailings and should be at least Php 50,000.00.

For the implementation of the Social Development and Management Program, an SDMP fund shall be established by the company. This fund should be 1.5% of the operating cost and should be utilized in this manner: 75% of the 1.5% is for the development of the host and neighboring communities (i.e. skills development/training, provision of health facilities, etc.); 10% of the 1.5% for the development of mining technologies and geosciences (i.e. expenditures for scholars on mining technology and geosciences); and 15% of 1.5% for the development and institutionalization of Information, Education, and Communication (IEC) (i.e. publication of IEC materials on social, environment, and/or other issues).

T&T is committed in establishing the above needed funds after approval of all pertinent permits/documents.

G. Preparer

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