ENVIRONMENTAL IMPACT STUDY

NAGAPI RIVER MAINTENANCE AND RESTORATION

BRGY IRIRON, CALINTAAN, OCCIDENTAL MINDORO

SUBMITTED TO:
ENVIRONMENTAL MANAGEMENT BUREAU - REGION 4B
ROXAS BLVD., ERMITA MANILA

SUBMITTED BY:
OVADA DEVELOPMENT PHILS. INC.
409 PENINSULA COURT, PASEO DE ROXAS, MAKATI CITY

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1. The Province of Occidental Mindoro is one of the most flood prone provinces in the Country.
2. Being host to at least 18 heavily silted rivers, the annual occurrence of floods is almost as certain as sunrise with the advent of rain.
3. Being primarily consisting of agricultural communities, flood damage affects the very source of livelihood of the Mindoreños.
4. The Municipality of Calintaan, located in the southern part of the Province, is among those severely affected by massive flooding during the rainy season.
5. The Municipality is an agricultural community largely depending on the production of palay, corn and onions. The Municipality along with the Province is a major supplier of rice and onions to Metro Manila.
6. Being of mountainous terrain and host to a number of rivers that tend to overflow during rains, the damage brought about by the floods affect not only the communities' livelihood but also restricts the flow of food supply to Metro Manila.
7. The topography of Occidental Mindoro is generally rugged, with narrow strips of coastal lowlands. Its terrain is characterized by successive mountain ranges, valleys, and elongated plateaus, with rolling lands along the coastal region.

   Areas with slope gradient of 30% and above represent 57% of the total land area while those with gradient of 0-18% account for 42% and 18-30% gradient is only 1%.

8. In its effort to relieve its communities of the perennial threat of floods, the provincial leadership, in coordination with the DENR, the DPWH, the EMB, and the MGB is implementing DENR Administrative Order No. 2020-12 which seeks to Rationalize the Dredging Activities of Heavily Silted Rivers in the Province of Occidental Mindoro. A copy of DAO No. 2020-12 is attached.

9. The DAO is a guide for the Private Sector to participate in the National Government's efforts to address the issues of flooding in the various LGUs.

10. The abovementioned Inter-Agency Committee (IAC) which consist of the Governor as Chairman, the DENR Regional Executive Director as Vice-Chairperson and the DPWH MIMAROPA Regional Director, the EMB MIMAROPA Regional Director and the MGB MIMAROPA Regional Director exercises oversight on the River Dredging Program of the Province.

11. The IAC has evaluated the rivers of the Province and in its Resolution No. 7 has determined 18 heavily silted rivers and has accordingly classified these into Large, Medium and Small Categories.

12. In the IAC's Reso 18, the IAC resolved that the Province will reopen its invitation for inactive applications to interested and qualified proponents the opportunity to participate in the dredging activities on the abovementioned heavily silted rivers.

13. In April 2022 Ovada Development Phils. Inc. filed with the PGO and IAC its intent to conduct study and plan to implement a River Maintenance and Restoration Project at the Nagapi River, located at the Municipality of Calintaan in Occidental Mindoro.

As defined in the Proposed Activities, the River Maintenance and Restoration Project is a project of the Province of Occidental Mindoro, the project will involve the following:

a. The conduct of environmental, social and Technical Studies to establish the actual conditions of the river, the hydrodynamics between the river and the sea, the quality of the materials that must be removed in order to define the methodologies for the safe and proper conduct of work.
b. The design of a River Maintenance and Restoration Program to unclog the river and encourage the free flow of water to the sea and an applicable where extracted materials can be used to recover their beachfront and to dispose of excess materials.

c. Where applicable and feasible to define and create water impoundment sites to store water for use by the farmers during the dry season.

14. It is noted that during the dry season, the farms are largely barren while during the rainy season the farms tend to be flooded, seriously limiting the livelihood activities. It is the wish of the communities there for water impounding facilities.

About the Municipality

1. Calintaan is a third class municipality. It has a population of 30,190. It is politically subdivided into seven (7) barangays occupying a land area of 38,250 hectares. The economy of Calintaan is mainly agricultural and its major crop is rice. Other crops produced and sold in the Municipality include corn, legumes, coconuts and bananas. Industries such as fishing, livestock, poultry, banana processing, and buri craft are also important to the economy.
2. The Municipality of Calintaan, located in the southern part of the Province, is among those severely affected by massive flooding during the rainy season.
3. The Municipality is an agricultural community largely depending on the production of pala, corn and onions. The Municipality along with the Province is a major supplier of rice and onions to Metro Manila.
4. Being of mountainous terrain and host to a number of rivers that tend to overflow during rains, the damage brought about by the floods affect not only the communities' livelihood but also restricts the flow of food supply to Metro Manila.
5. The increasing frequency of typhoons passing through MIMAROPA Region as observed in the last 5 years brought about by the global changes in weather makes it imperative that preventive measures be taken with urgency.
6. The Municipality has identified the following rivers that has recently caused "waist to chest deep" floods the past several years:
    a. Nagapi River in Brgy, Iriron and Brgy. Malpalon
    b. Anahawin River in Brgy. Poblacion and Brgy. Poy Poy
7. The Municipality has only a few irrigation installations and depends largely on natural streams that flow along the periphery of the farmlands. These streams flow out to the rivers.
8. As these rivers are shallow and their exits are blocked by materials that have accumulated over the years, an increase in the volume of water tend to

overflow the riverbanks and to find ways to the sea via the farmlands and the residential areas thereby damaging crops along the way and severely restricting community activities for days even weeks.

9. The Municipality supports the aspirations of the Province to institute measures to stern the perennial issues of flooding.
10. The Municipality believes that a stable and safe physical environment is a vital component to build the Municipality's economic Development.
11. A safe and stable physical environment will support the Municipality's thrust to develop the cultivation of fruit trees and perennials.
12. A safe and stable environment will encourage local investments in high value crops without fear of destruction by floodwaters or spoilage due to delays in transporting out of the Province.
13. The Municipality understands that the Project activities will be highly mechanized and that job opportunities to locals will likely be only the unskilled labor and auxiliary services. Hence, assurance of a stable physical environment is channeled towards developing the resources of the Municipality agriculture.
14. As to the protection of the Protected Areas within their jurisdiction, the project site will not encroach on any protected area nor will there be any indirect impact on these due to their remote location.

Materials to be Extracted

1. Materials to be extracted consist of mud, stone and sand.
2. Materials extracted out of the project will be used to backfill the eroded portions of the shoreline and certain low lying areas. In excess, usable materials will be shipped for use in infrastructure projects in South Luzon and Metro Manila.
3. The estimated quantity to be extracted is 1,400,000 CBM per year at a rate of 150,000 CBM per month; the Project timeline to complete is 2 years to 3 years.

Republic of the Philippines
Department of Environment and Natural Resources
Visayas Avenue, Diliman, Quezon City
Tel Nos. 929-6626 to 29; 929-6633 to 35
929-7041 to 43; 929-6252; 929-1669
Website: http://www.denr.gov.ph / E-mail: web@denr.gov.ph

DENR ADMINISTRATIVE ORDER
NO. 2020 - 12

OCT 07 2020

SUBJECT: **RATIONALIZING DREDGING ACTIVITIES IN HEAVILY-SILTED RIVER CHANNELS WITHIN THE PROVINCE OF OCCIDENTAL MINDORO PURSUANT TO THE DENR-DPWH-DILG-DOTC JOINT MEMORANDUM CIRCULAR NO. 1 SERIES OF 2019**

Pursuant to Section 2, Article XII of the 1987 Constitution, the Department's mandate under Executive Order No. 292 or the Administrative Code of the Philippines, and Section 5.4 of DENR-DPWH-DILG-DOTr Joint Memorandum Circular No. 2019-01, in order to protect and properly manage the disposition of sand as well as restore the natural state and water flow of the heavily-silted river channels in the Province of Occidental Mindoro, the following guidelines are hereby prescribed:

I.

GENERAL PROVISIONS

Section 1. *Coverage*. This Order shall cover the implementation of the DENR River Restoration thru Dredging Activities as embodied in Section 5.4 of the DENR-DPWH-DILG-DOTr Joint Memorandum Circular No. 2019-01 in heavily-silted river channels in the Province of Occidental Mindoro.

Section 2. *Scope of Operations.* In order to open heavily-silted river channels of Occidental Mindoro, the areas starting from the coastline of river deltas extending all the way upstream, in accordance with the DPWH Dredging Master Plan, shall be designated as exclusive River Dredging Zones (RDZ) by the Inter-agency Committee created under Item VII, Section 1 of this Administrative Order. Dredging activities shall be allowed within the RDZ, quarrying is strictly prohibited.

Section 3. *Rationale and Objectives*

a. The flow of materials and sediment from the upland that flank down major river channels thereby causing its aggradation became the long-term direct culprit of massive flooding in the various barangays and municipalities of the Province of Occidental Mindoro.

b. It is necessary to protect and properly manage the utilization of the sand and gravel in the Province of Occidental Mindoro to improve the water flows of its river systems, ensure the integrity of the various protective dikes and infrastructures, thereby reduce risks to lives and properties.

c. In order to restore the natural state and water flow of the heavily-silted river systems and improve its hydraulic capacity thereby eliminate flooding, large-scale dredging and desilting operations, based on a comprehensive dredging plan, must be implemented.

Section 4. *Declaration of Policies*

a. The exclusive authority of the province to issue permit to extract sand, gravel and other quarry resources, pursuant to the ordinance of the Sangguniang Panlalawigan, under Republic Act No. 7160 is covered by Section 5.1 of JMC 2019-01 or the Dredging with Commercial Utilization of Dredged Materials in favor of a mining permit holder under the Industrial Sand and Gravel (ISAG) or Commercial Sand and Gravel (CSAG) quarry permit.

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Chief, Records Management Division

b. River Restoration through Dredging Activities under Section 5.4 of JMC 2019-01 does not cover an ISAG or CSAG regime since the activity to be undertaken is dredging and not quarrying. This will not preclude, however, the entitlement of the Province of Occidental Mindoro to the share from the commercial disposal of the dredged material in addition to the undertaking of the permit holder to restore the river thru dredging.

c. Local Government Units are entitled to their equitable share derived from the utilization and development of the national wealth within their respective areas under the Section 138 of the Local Government Code of 1991.

d. The State is allowed by the Constitution to enter into agreements with private sector entities to bolster the national economy through the sustainable utilization of minerals.

e. Disposal of dredged or extracted materials under this Order shall be governed by the principle according to which the government expects a reasonable return for its utilization, while holders of dredging clearance expect a reasonable return for its dredging operations while restoring the river to its original state.

Section 5. *No Funding from the Government.* No funding from the government shall be made for the conduct of dredging activities by the private sector. Holders of Dredging Clearance shall provide the financing, technology, management and personnel necessary to implement dredging activities within the exclusive RDZ.

II.

QUALIFICATIONS OF LARGE-SCALE DREDGING OPERATORS

Section 1. *Who May Apply.* Any citizen of the Philippines or a SEC-registered corporation, partnership, or association established to engage in construction, and development and/or dredging operations, with technical and financial capability to undertake large-scale flood control dredging and desilting operation in the Province of Occidental Mindoro .To implement efficient and cost-effective large-scale dredging operations, individual corporations may pool their resources, organize themselves and apply as a consortium.

Section 2. *Financial Capacity*. Applicants must possess the financial capacity prescribed by the Inter-Agency Committee to undertake dredging operations

Section 3. *Technical Competence*. In addition to the above requirements, only applicants capable of implementing large-scale dredging activities for flood mitigation or prevention purposes in the heavily-silted river channels within the Province of Occidental Mindoro, based on their technical knowledge and verifiable previous track record conducting such activities, as properly vetted, duly certified and approved by the appropriate DENR and DPWH offices.

Section 4. *Other requirements*. In addition to the above-stated requirements, the proponent shall:

a. Deploy all their equipment within 30 days from the Notice to Proceed (NTP) to be issued by the Provincial Government and the equipment shall be under the name of the company, either chartered or leased, and capable of undertaking large scale dredging activity.

b. Post a Cash Bond to be determined by the Inter-Agency Committee to be held in an account for the Province of Occidental Mindoro, to ensure compliance with this Order and other applicable environmental laws, rules and regulations.

c. Secure the required clearances from the appropriate government office including a certification of no pending case relating to compliance with existing environmental laws, rules and regulations, and an undertaking that it will never be involved in such.

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Chief, Records Management Division

VII.

MONITORING AND ENFORCEMENT

Section 1. ***Creation of Inter-Agency Committee.*** An Inter-agency Committee shall be created, composed of the following:

a. Governor of the Province of Occidental Mindoro as Chairperson;
b. DENR Regional Executive Director IVB as Vice-Chairperson;
c. DPWH Regional Director IVB as Member;
d. MGB Regional Director IVB as Member; and
e. EMB Regional Director IVB as Member.

Section 2. ***Powers and Functions of the Inter-Agency Committee.*** The inter-agency committee shall have the following powers and functions:

a. Serve as oversight for the implementation of this Administrative Order and monitoring of the dredging operations;
b. Shall recommend the suspension and/or cancellation of permits and/or clearances; and
c. Shall propose policies and programs to rationalize the dredging operations.

VIII.

FINAL PROVISIONS

Section 1. ***Subjectivity to Other Laws.*** This Order shall be subject to the Constitution, and all pertinent laws, guidelines and issuances.

Section 2. ***Repealing Clause.*** All Orders, issuances, rules and regulations, or parts thereof which are inconsistent with this Order are hereby repealed or modified accordingly.

Section 3. ***Separability.*** The provisions of this Order are hereby declared to be separable. If any part or provision of this Order shall be declared invalid, the remaining portions or provisions shall not be affected thereby and shall be construed as if it did not contain the particular invalid term or provision.

Section 4. ***Suppletory Clause.*** In case of violation and/or non-compliance with the provisions of this Administrative Order, the pertinent penal provisions under R.A. 7942, Presidential Decree No. 1586 and other applicable laws, rules and regulation shall be applied suppletory hereto.

Section 5. ***Effectivity.*** This Administrative Order shall take effect fifteen (15) days following its complete publication in a newspaper of general circulation and registration with the Office of the Administrative Register.

Issued on OCT 07 2020, in Quezon City.

ROY A. CIMATU
Secretary

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
SENR058950

PUBLICATION: The Manila Times
December 16, 2020

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JANE G. BAUTISTA
Chief, Records Management Division

Republic of the Philippines
Inter-Agency Committee
Provincial Capitol, Mamburao
Occidental Mindoro

RESOLUTION NO. 7
Series of 2020

WHEREAS, the Department of Environment and Natural Resources (DENR) issued DENR Administrative Order No. 2020-12 with the subject of Rationalizing Dredging Activities in Heavily-Silted River Channels within the Province of Occidental Mindoro pursuant to the DENR-DPWH-DILG-DOTC Joint Memorandum Circular No. 1 Series of 2019;

WHEREAS, Section 2 (b) Title VII of the above-mentioned Administrative Order states that "the inter-agency committee shall have the following powers and functions.. shall propose policies and programs to rationalize the dredging operations";

WHEREAS, to provide immediate and adequate assistance to our countrymen affected by floods due to the heavily-silted river systems in the Province of Occidental Mindoro, it becomes imperative for this Body to issue resolutions that will create an operating structure for dredging operations in said Province;

NOW, THEREFORE, on motion of MGB Regional Director IV-B Engr. Roland A. de Jesus, duly seconded by other members present, **BE IT RESOLVED**, as this body hereby resolves in its meeting duly assembled *"to authorize Governor Eduardo B. Gadiano of Occidental Mindoro to publish a Notice to Public allowing the sending of Letters of Intent for only fifteen (15) calendar days by proponents of dredging activities for the following rivers located in Occidental Mindoro:*

RIVER	LOCATION	RIVER CLASSIFICATION
1. Tubili River	Barangay Tubili, Paluan	Small River
2. Paluan River	Barangay 6, Paluan	Small River
3. Abra de Ilog River	Barangay Wawa, Abra de Ilog	Large River
4. Pagbahan River	Barangay Talabaan, Mamburao	Medium River
5. Mamburao River	Barangay 7, Mamburao	Large River
6. Sta. Cruz River	Barangay Poblacion, Sta. Cruz	Medium River
7. Salagan River	Barangay Lumangbayan, Sta. Cruz	Large River
8. Amnay River	Barangay Pag-asa Sablayan	Large River
9. Patrick/Viga River	Barangay San Agustin, Sablayan	Large River
10. Baclaran River	Barangay Pinagturian, Sta. Cruz	Large River
11. Mompong River	Barangay Sta. Lucia/San Nicolas, Sablayan	Large River
12. Anahawin River	Barangay Poypoy, Calintaan	Medium River
13. Nagapi River	Barangay Iriron, Calintaan	Small River

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14. Lumintao River	Barangay Malawaan, Rizal	Large River
15. Busuanga River	Barangay Central/Adela, San Jose	Large River
16. Labangan River	Barangay Mangarin, San Jose	Medium River
17. Caguray River	Barangay Caguray Poblacion, Magsaysay	Large River
18. Tuguilan River	Barangay Tayamaan, Mamburao	Small River

APPROVED AND SIGNED this 11th day of November 2020 at the Luxent Hotel, 51 Timog Avenue, Quezon City.

EDUARDO B. GADIANO
Chairperson

MA. LOURDES G. FERRER
Vice-Chairperson

YOLANDA L. TANGCO
Member

ROLAND A. DE JESUS
Member

FOR:
MICHAEL DRAKE P. MATIAS
Member

Project Components

The Proposed River Maintenance and Restoration Project at Nagapi River in the Municipality of Calintaan, Occidental Mindoro is designed to mitigate the perennial threat of floods that have caused considerable damage to crops in the past.

The project aims to address the flooding issues covering the following:

1. The source at the upstream;
2. Downstream where water exits and;
3. At various points in the mid-stream to enable a pragmatic and real solution to the province's flooding issues.

The following current concerns brought about by climate changes are key considerations:

- Rising sea levels
- The changing weather patterns where there is extreme heat and extreme rains
- The change in the trajectory of recent typhoons where they now tend to exit via the MIMAROPA (Region 4B), flooding risks are expected to worsen if corrective actions are not taken immediately.

The following is a summary of the results of the surveys and studies conducted:

1. The river mouth is blocked by a wide river delta consisting of soil, rocks and mud and the river channel is only a few inches deep due to heavy siltation.
2. The upstream channel is literally dry in summer and flooded in the rainy season.
3. Barangay Iriron is host to 2 river mouths (Nagapi and Anahawin River) which are both heavily silted, the river exit of Nagapi River in the north portion of the barangay is totally blocked by soil and virtually at the ground level.
4. The Anahawin river mouth at the south has a meandering channel that has caused the proximity of the river bank and nearby farms to erode. It tends to open a new exit towards the sea.
5. The coastline is receding towards the farmlands and residential areas.
6. As there is no riverbank to hold the water in place, the overflow of water finds its way to sea via the farmlands and residential areas. Hence, the inland barangays are all affected by the overflow of water from the abovementioned major river channels which are almost all heavily silted to be at the same level of the ground.

The following mitigating measures are proposed in view of the need to implement urgent measures to bring immediate relief from the threat of floods:

1. Creation of an exit channel through the river delta to facilitate the free flow of water to the sea.
2. Deepening of the upstream river channels to increase the water holding capacity and complemented by bank protection measures.
3. Coastal protection measures to dissipate the energy of waves hitting the coastline and minimize coastal erosion and minimize the saltwater intrusion into the farmlands.

Foreshore recovery and enhancement procedures will likewise be investigated for Barangay Iriron to protect the coastline, the residences and the access road.

As for the inland barangays, a number of options are being investigated and will be the subject of further studies. A separate application for ECC shall be subsequently filed for the identified mitigating measures.

This River maintenance and restoration measures include the deepening of river channels to increase their water holding capacity as well as creation of catch basins water impounds areas at strategic areas to temporarily hold excess water flow or better yet to store these surface water to complement the Municipality's irrigation resources instead of letting this valuable resource simply flow out to sea. As mentioned above, these will be the subject of further studies.

Considering the scope and scale of the flooding concerns of the Provincial, the project will be implemented in Phases as follows:

Phase 1

1. The conduct of studies and surveys at the coastal areas which are the most susceptible to flooding and coastal erosion
2. The coordination and clearance of the planned activities with the relevant regulatory agencies
3. The creation of an exit channel through the river delta at Barangay Iriron.
4. Deepening of the river channels and riverbank protection measures.
5. The deepening of river channels at the head of the River at the upstream barangays and at selected sites throughout upstream to increase their water holding capacity to contain the water flow within the channels and mitigate their unwanted exit via the farmlands and residential areas

Phase 2

1. Identification of areas that may be converted into catchment basins and phased implementation of the catch basins
2. Design and implementation of water impounding facilities for irrigation purposes

Phase 3

1. Identification and implementation of long-term solutions in the coastal areas and at the up-stream
2. Maintenance of measures implemented in Phase 1 and 2

Process Documentation

Occidental Mindoro, has jurisdiction over the project site and the project, The Studies were conducted by the Ovada Development Phils. Inc. Team to identify specific concerns that focused on the environmental Liaison works with the DENR-EMB-Region 4B-Roxas Blvd Manila, DPWH, MGB R4B and the local government officials of the Barangays and Municipality of Calintaan, Occidental and socio-economic issues and alternatives to be addressed in the study.

Terms of Reference of the EIA Study

The conduct of an EIA Study and the Preparation of the Environmental Impact Statement (EIS) Document for the Proposed Nagapi River Maintenance and Restoration Program at the coastal area of the Municipality of Calintaan, Occidental Mindoro is pursuant to the requirements set forth under the DENR Administrative Order No. 30, Series of 2003.-30, its revised Procedural Manual and the requirements of the DENR-EMB.

EIA Team

The conduct of an EIA Study and the Preparation of the EIS Document is a product of a joint and coordinated effort of the Proponent and the Preparer Team Members:

Table 2.1 EIS Preparers for the Proposed Nagapi River Maintenance and Restoration Program/Project

EIS Team Composition	Designation
A. Proponent	
Catherine Q. Argel	Director - Operations
B. Field Work and Technical Design	
Arielle Ramirez	Civil Engineer
Stephanie Gilbuena	Civil Engineer
Daniel Singzon	Coordinator, Marine and Land Based Studies
Pastor Adonis Acuña	Coordinator, Community Understanding
Rodelo "pewee" Marasigan	Coordinator, Public Participation
C. Project Owner's	**Inter-Agency Committee**
Reggie Unson	
Patricia Frances Unson	
Harold Castillo	

The EIS Preparers' Accountability Statement is included in **Attachment 2.**

EIA Study Schedule

This EIS document was prepared for a total of 9 months. The Team is currently still in the process of doing detailed studies to draw up comprehensive plans for long-term solutions.

Due to the Government's urgent need to take immediate action to mitigate the threat of heavy flooding which the Province communities experience almost yearly at the advent of rain, and at its worst in November and December, the team understood the urgency to submit the requirements to the EMB-Region 4B within the least possible time, thus the Preparers decided to "divide" the work in 3 Phases where "URGENT" measures will be implemented (Phase 1) at the river deltas and the coastal areas to ensure proper and unhampered exit of water and simultaneously at the river heads where flood waters emanate.

Phase 2 will be for the identification of areas and installation of catchment basins at the upstream and midstream.

Phase 3 will be for the identification of long term solutions and for the definition of a maintenance program where the communities and the contractors will collaborate their efforts to continuously enjoy the benefits of the project.
The document preparation timetable is shown in *Table 2-2*.

Table 2.1 EIS Document Preparation Schedule

Activities	Timeframe (Months)				
	1	3-4	5-6	7-8	9
Scoping and other Preliminary Activities					
Data Gathering and Site Visits					
Impact Prediction, Identification and Assessment					
Environmental Management Measured Identification					
EIS Document Preparation, Documentation and Submission					

EIA Study Area

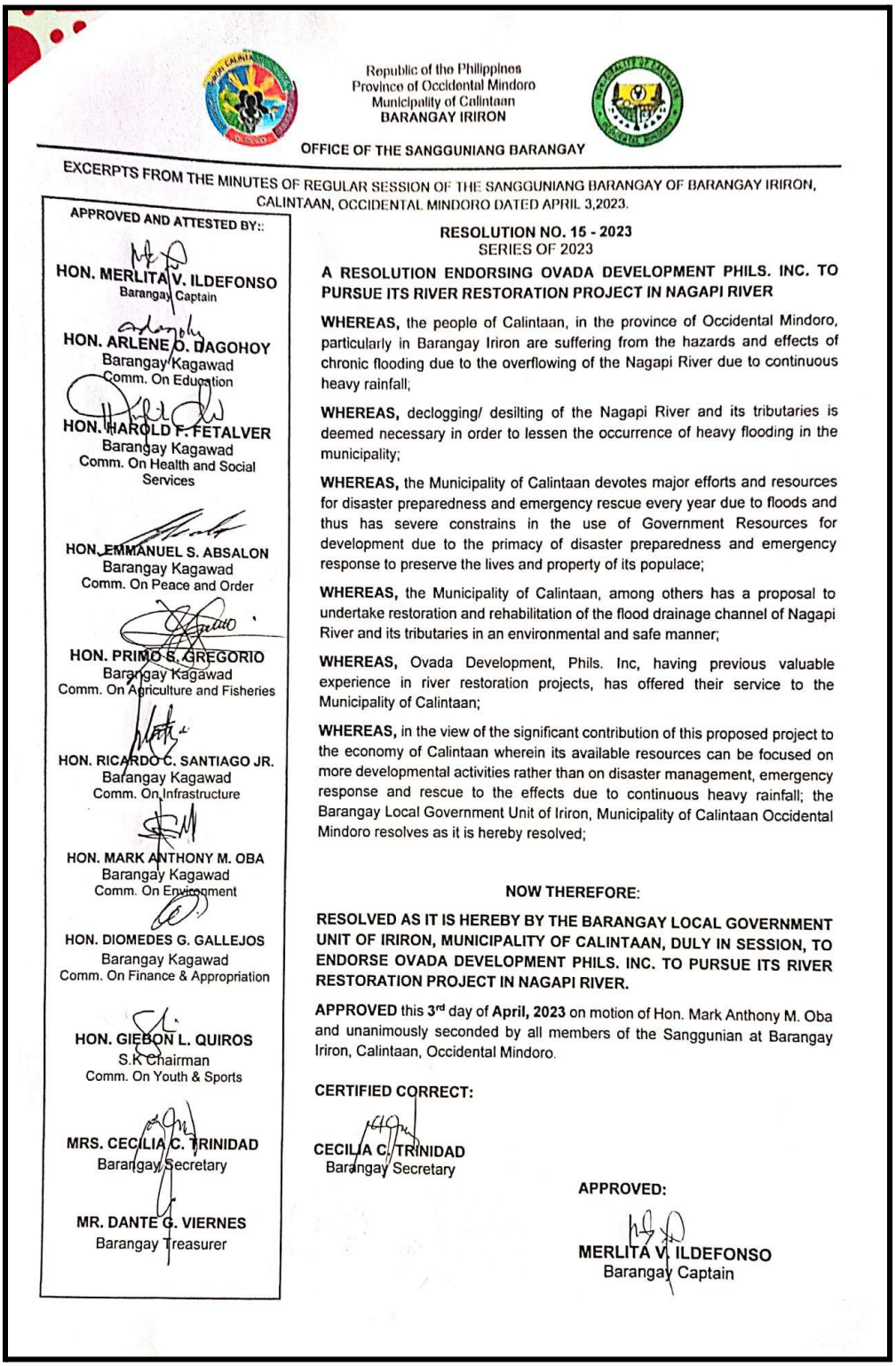
The study area includes the coastal area of Brgy. Iriron. The area is host to a river mouth that is heavily silted and is most susceptible to severe flooding based on the consultations conducted and recommendations of the concerned LGUs which was agreed upon and translated into the respective LGU Resolutions (copies attached as Fig. 4.1). Its vicinity as shown in Photo 2-1. (Site coordinates shown in Table 3.1)

Figure 2.1 Study Area Map at the Coast of Calintaan

Table 3.1 Proposed Nagapi River Channel Coordinates

Point	**Nagapi Delta Clearing**	
	Latitude	Longitude
1	12.6040020103704	120.932284746782
2	12.6054485667606	120.931578136939
3	12.605707815842	120.930734416848
4	12.6054466740693	120.929049857865
5	12.6091389553077	120.927859971072
6	12.6031341667584	120.915052557194
7	12.5958580452336	120.917029833898
8	12.5995021349753	120.930621857251
9	12.6038588084649	120.929440867342
10	12.6046860153409	120.93122827718
11	12.6040020103704	120.932284746782
Point	**Nagapi River Channel**	
START	1394381.677	275233.715
END	1396675.325	277487.271

Barangay Resolution



Republic of the Philippines
Province of Occidental Mindoro
Municipality of Calintaan
BARANGAY IRIRON

OFFICE OF THE SANGGUNIANG BARANGAY

EXCERPTS FROM THE MINUTES OF REGULAR SESSION OF THE SANGGUNIANG BARANGAY OF BARANGAY IRIRON, CALINTAAN, OCCIDENTAL MINDORO DATED APRIL 3,2023.

APPROVED AND ATTESTED BY::

HON. MERLITA V. ILDEFONSO
Barangay Captain

HON. ARLENE O. DAGOHOY
Barangay Kagawad
Comm. On Education

HON. HAROLD F. FETALVER
Barangay Kagawad
Comm. On Health and Social Services

HON. EMMANUEL S. ABSALON
Barangay Kagawad
Comm. On Peace and Order

HON. PRIMO S. GREGORIO
Barangay Kagawad
Comm. On Agriculture and Fisheries

HON. RICARDO C. SANTIAGO JR.
Barangay Kagawad
Comm. On Infrastructure

HON. MARK ANTHONY M. OBA
Barangay Kagawad
Comm. On Environment

HON. DIOMEDES G. GALLEJOS
Barangay Kagawad
Comm. On Finance & Appropriation

HON. GIEBON L. QUIROS
S.K Chairman
Comm. On Youth & Sports

MRS. CECILIA C. TRINIDAD
Barangay Secretary

MR. DANTE G. VIERNES
Barangay Treasurer

RESOLUTION NO. 15 - 2023
SERIES OF 2023

A RESOLUTION ENDORSING OVADA DEVELOPMENT PHILS. INC. TO PURSUE ITS RIVER RESTORATION PROJECT IN NAGAPI RIVER

WHEREAS, the people of Calintaan, in the province of Occidental Mindoro, particularly in Barangay Iriron are suffering from the hazards and effects of chronic flooding due to the overflowing of the Nagapi River due to continuous heavy rainfall;

WHEREAS, declogging/ desilting of the Nagapi River and its tributaries is deemed necessary in order to lessen the occurrence of heavy flooding in the municipality;

WHEREAS, the Municipality of Calintaan devotes major efforts and resources for disaster preparedness and emergency rescue every year due to floods and thus has severe constrains in the use of Government Resources for development due to the primacy of disaster preparedness and emergency response to preserve the lives and property of its populace;

WHEREAS, the Municipality of Calintaan, among others has a proposal to undertake restoration and rehabilitation of the flood drainage channel of Nagapi River and its tributaries in an environmental and safe manner;

WHEREAS, Ovada Development, Phils. Inc, having previous valuable experience in river restoration projects, has offered their service to the Municipality of Calintaan;

WHEREAS, in the view of the significant contribution of this proposed project to the economy of Calintaan wherein its available resources can be focused on more developmental activities rather than on disaster management, emergency response and rescue to the effects due to continuous heavy rainfall; the Barangay Local Government Unit of Iriron, Municipality of Calintaan Occidental Mindoro resolves as it is hereby resolved;

NOW THEREFORE:

RESOLVED AS IT IS HEREBY BY THE BARANGAY LOCAL GOVERNMENT UNIT OF IRIRON, MUNICIPALITY OF CALINTAAN, DULY IN SESSION, TO ENDORSE OVADA DEVELOPMENT PHILS. INC. TO PURSUE ITS RIVER RESTORATION PROJECT IN NAGAPI RIVER.

APPROVED this 3rd day of **April, 2023** on motion of Hon. Mark Anthony M. Oba and unanimously seconded by all members of the Sanggunian at Barangay Iriron, Calintaan, Occidental Mindoro.

CERTIFIED CORRECT:

CECILIA C. TRINIDAD
Barangay Secretary

APPROVED:

MERLITA V. ILDEFONSO
Barangay Captain

Figure 4.1 Barangay Resolution

EIA Summary

Project Alternatives

There is an urgent need to pursue the Project for the safety and peace of mind of the communities living within the vicinity of the Project area. While a variety of engineering interventions have been investigated in the past, these proved too expensive and were only partially implemented as these were allocated only a small percentage of the required budget to make a positive impact.

An objective assessment of the flooding problem in Brgy. Iriron, Calintaan highlights that the river channels have become too shallow due to siltation accumulated over the years causing river water flow to find new exits in the event of rain, unfortunately these new water exits are through the farmlands and residential areas of the Municipality. Hence causing significant damage to crops.

The real and long-term solutions therefore are:

- De-clog the river mouth by opening a channel to allow river wáter to flow out to sea unhampered. The length and width of the channel must be sufficient to direct the flow to the deeper portion of the coast to prevent scouring of the foreshore that leads to beach erosion.
- Deepen the inland river channels and to remove obstructions in the river that obstruct the flow of water to the sea.
- Deepening will employ the ⅓ of the channel methodology of the DPWH.

1. Project Description

Name of Project	**River Maintenance and Restoration Project By the Brgy. Iriron, Calintaan, Occidental Mindoro**
Location	**Brgy. Iriron, Calintaan, Occidental Mindoro**
Nature of Project	**River Maintenance and Restoration** **The proponent intends to implement the following to maintain the river:** • Creation of a channel through the river delta to encourage the free flow of river water to the sea via measures to delay re-blockage. • Deepening of the river channels in specified areas. • Removal of materials that impede the natural flow of water via the river channels and river delta. • Installation of river bank protection measures.
Project Type	**DENR DAO 2020-12**
Project Owner	**Province of Occidental Mindoro**
Project Proponent	**OVADA DEVELOPMENT PHILS. INC.** 5th Floor, Unit 513 Peninsula Court, Paseo de Roxas Salcedo Village, Makati City 1200
Contact Person(s)	**Ms. Catherine Q. Argel** Director - Operations Contact No. 0917 186 5250 Email: ovadadevphilsinc@yahoo.com

1.1. Project Location and Area

a. Project Location Map

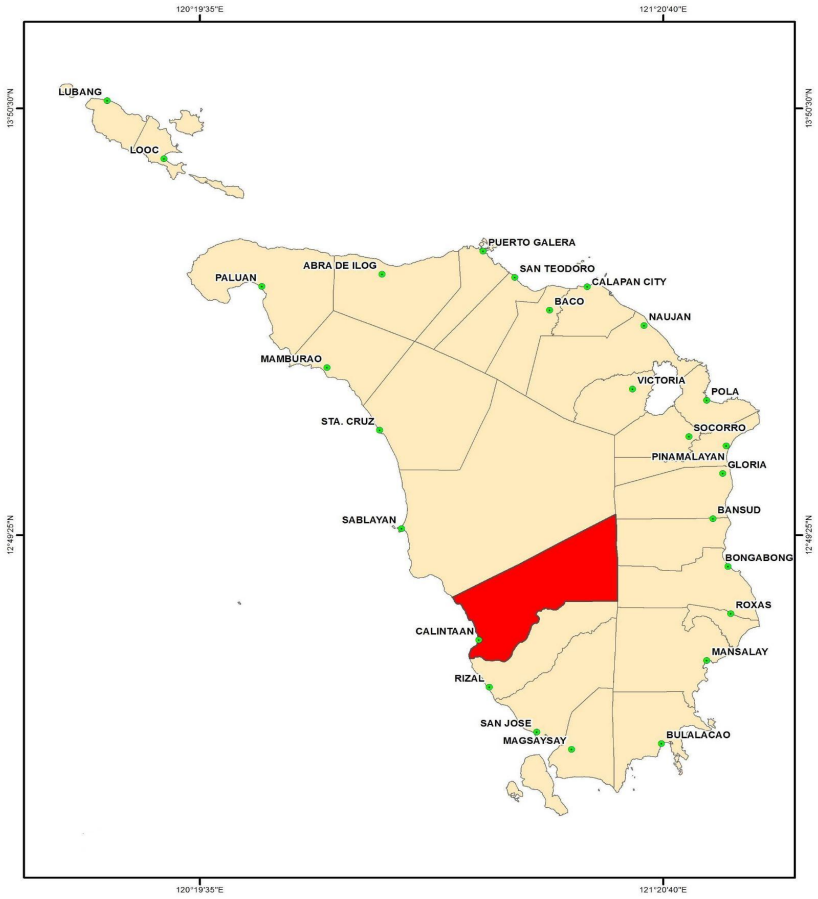


Figure 1.1 Province Geographical Location – Nagapi River Maintenance and Restoration at the Municipality of Calintaan, Occidental Mindoro

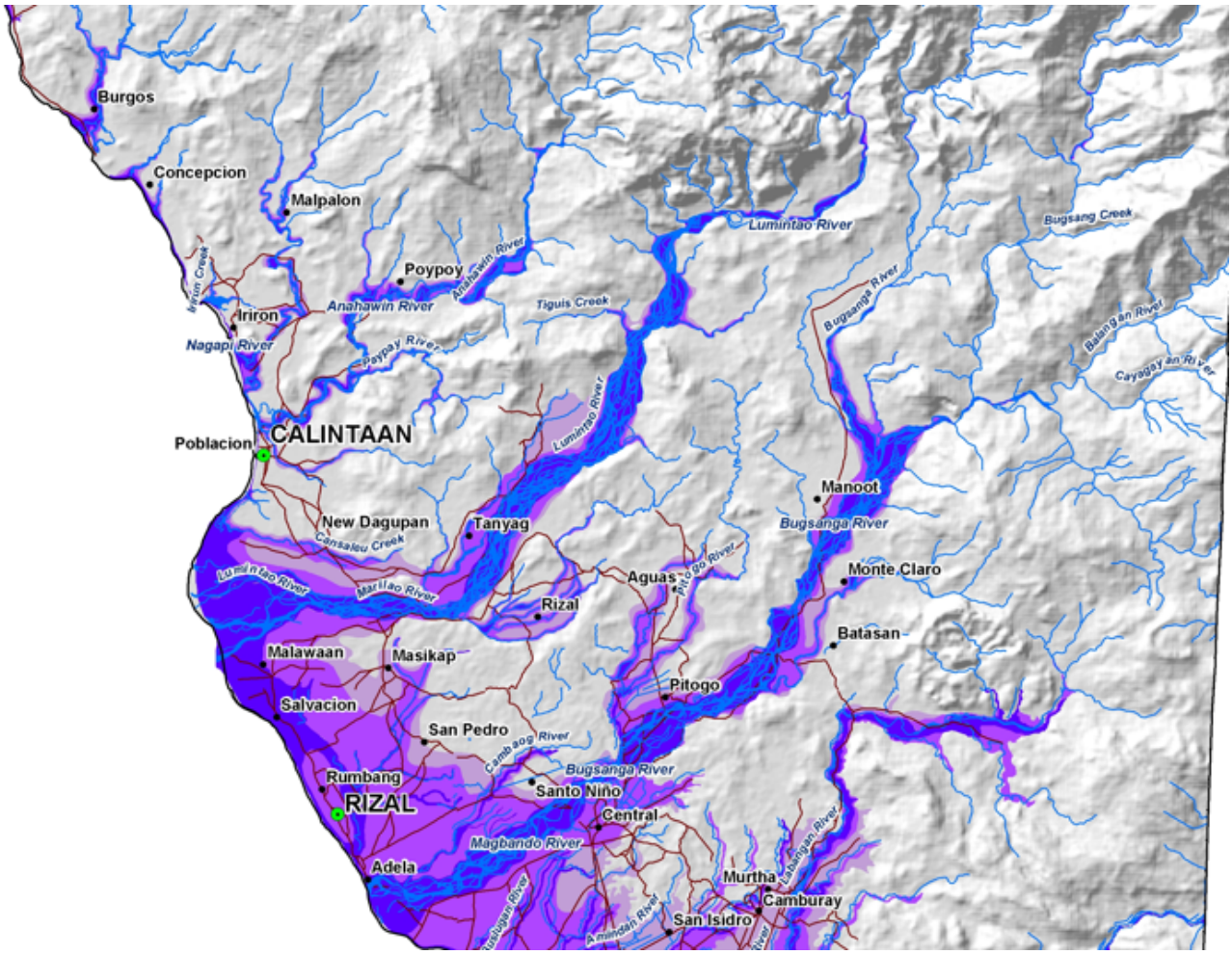
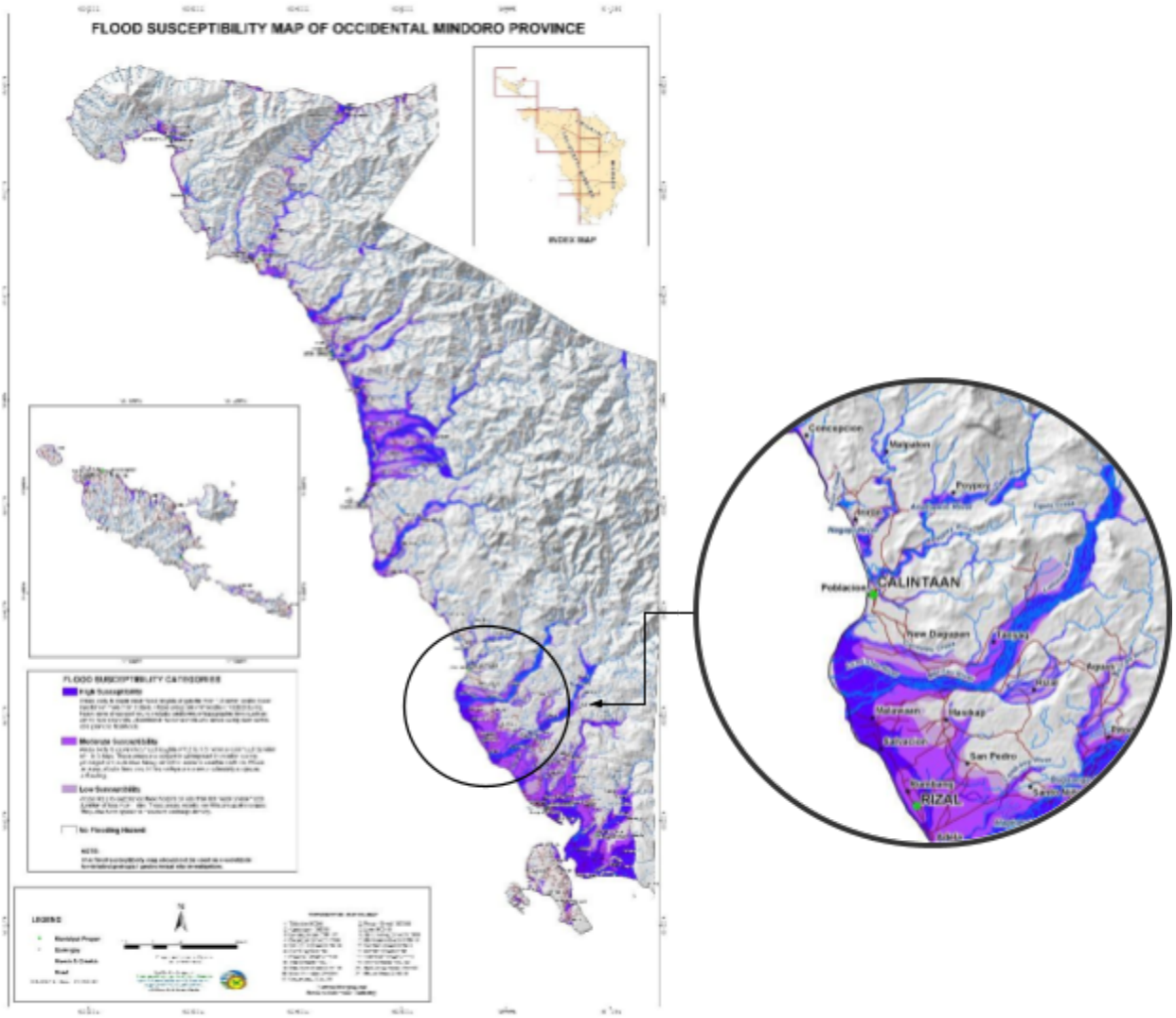


Figure 1.1 Municipality Geographical Location – Nagapi River Maintenance and Restoration at the Municipality of Calintaan, Occidental Mindoro



1. Flood Susceptibility Map of Calintaan, Occidental Mindoro

<u>Stockpile Area Development</u>

A stockpile area shall be designated and developed nearest to the barge entry point and parallel with the river. Drainage and canals connected to the silt ponds/traps shall be developed at the perimeter of the stockpile area.

b. Geographic coordinates of project area

Table 3.2 Proposed Nagapi River Channel Coordinates

Point	**Nagapi Delta Clearing**	
	Latitude	Longitude
1	12.6040020103704	120.932284746782
2	12.6054485667606	120.931578136939
3	12.605707815842	120.930734416848
4	12.6054466740693	120.929049857865
5	12.6091389553077	120.927859971072
6	12.6031341667584	120.915052557194
7	12.5958580452336	120.917029833898
8	12.5995021349753	120.930621857251
9	12.6038588084649	120.929440867342
10	12.6046860153409	120.93122827718
11	12.6040020103704	120.932284746782
Point	**Nagapi River Channel**	
START	1394381.677	275233.715
END	1396675.325	277487.271

c. Vicinity Map

Project Location and Accessibility

The Proposed River Maintenance and Restoration project is located in the downstream section of the Nagapi River in the Municipality of Calintaan. Barangay Iriron, Calintaan, Occidental Mindoro, Philippines.

The Municipal center of Calintaan is situated at approximately 12° 34' North, 120° 56' East, in the island of Mindoro. Elevation at these coordinates is estimated at 10.7 meters or 35.2 feet above mean sea level.

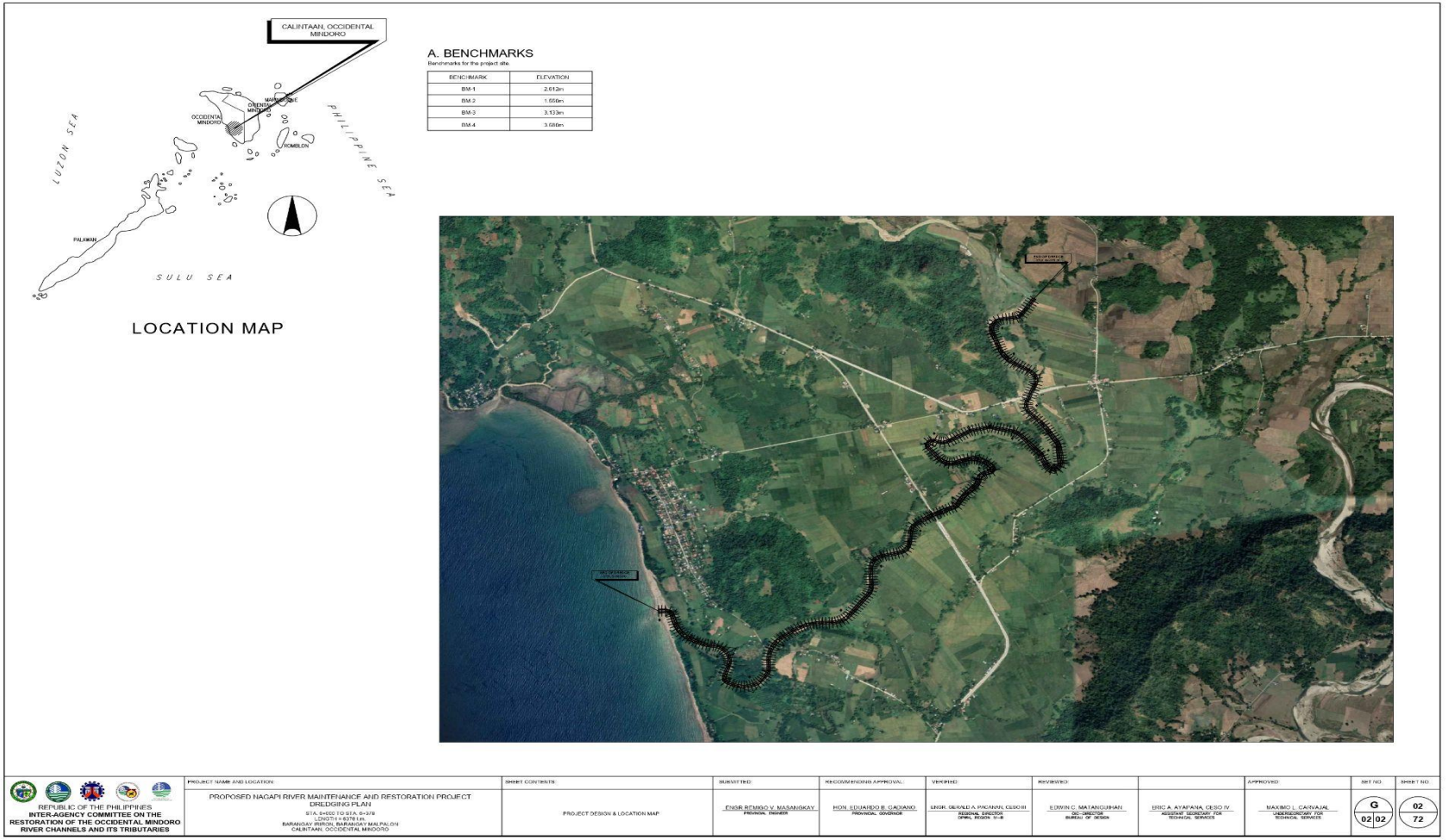
Project Coverage Area - Offshore

The offshore section of the project will be undertaken along the coastal areas of the Municipality covered by the Barangay Iriron. Due to the pervasive nature of flooding in the Municipality and the winding channels as shown in the flood susceptibility map below as provided by the MDRRMO, the work is programmed to address the flooding issue downstream where the flooding is at its worst. Hence the scope of this EIS in order to aim for immediate relief from the threat of flooding or at least to reduce the risk.

Nagapi River Project Area

Project Coverage Area - Upstream

The land based section of the project will start at the river exit at Brgy. Iriron and traverse the length of the river up to 6 km upstream at Brgy. Malpalon.



Protected Areas - Provincial

MT. IGLIT-BACO National Park

The Mts. Iglit-Baco National Park (MIBNP) was proclaimed by virtue R.A. No. 6148 dated Nov. 11, 1970. As such, it is an initial component of the National Integrated Protected Areas System under. Mts. Iglit-Baco NP encompasses at least eight (8) major river systems and has a rugged terrain composed of slopes, river gorgers and plateaus.

Portions of the Park are covered by upland hardwoods, such as *Anthocephalus Chinensis, Artocarpus Blancoi*, Ficus nota, Hawili, Alibangbang and Balinghasai. The larger plants indigenous to the site which are rarely seen in some other regions are Kalantas tree, Tindalo, Almaciga and Kamagong. The Park also harbors the endangered Jade vine.

The Park is the habitat of the endemic Tamaraw (*Bubalus Mindorensis*), which is one of the most seriously endangered large mammals. Because of the endangered Tamaraw, the Park was initially established as "game refuge and bird sanctuary". The Park has been declared as an ASEAN Heritage site. Other forms of wildlife can also be found in the Park like the Phil. Deer, Wild Pig and Mindoro Cloud Rat as well as a number of bird species which are endemic to the island such as Mindoro Imperial Pigeon, Mindoro Scops Owl, Black-hooped Coucal, Scarlet-collared Flowerpecker and Heart Pigeon.

Mount Iglit-Baco National Park covers large areas of the central part of the island of Mindoro on the Philippines. It is situated near Mt. Baco (2,488 m a.s.l.) and Mt. Iglit, the latter reaching 2,364 m a.s.l.

MOUNT CALAVITE WILDLIFE SANCTUARY

The Mount Calavite Wildlife Sanctuary, located in Paluan municipality, Occidental Mindoro province, was formerly declared as a game refuge and bird sanctuary, by virtue of Executive Order No. 9 on 28 January 1920. This declaration became the main basis of the Department of Environment and Natural Resources to work out for the proclamation of the MCWS as a protected area, under the wildlife sanctuary category, in accordance with the National Integrated Protected Areas Systems Act, or RA 7586. Presidential Proclamation No. 292, issued on 23 April 2000, declared the MCWS covering a total land area of 18,016.19 hectares. The Congress has still to enact a law that would finally establish MCWS as a final component of the NIPAS.

APO REEF

Apo Reef is the second largest contiguous coral reef in the world and the largest one in the Philippines. The Apo Reef Natural Park consists of the three islands. Apo Reef is the largest among the three islands. It has a shallow lagoon with a depth of 2 meters to 10 meters surrounded by mangrove forest which serves as source of food, nursery and spawning ground of several coastal and marine species of fauna and sanctuary of birds. Its diverse corals are approximately 34 sq. km. of reef where different species of fish, marine mammals and invertebrates thrive.

Apo Reef, the largest atoll like reef in the Philippines, is a submerged platform that is a submerged of a 34 sqkm sub triangular northern m and southern atoll like reefs separated by a 30-m deep channel that is open to the west The channel runs east to west from 1.8 m to 30 m deep with a fine white sand bottom numerous mounds and patches of branching corals under the deep blue water.

The main geographical features of Apo Reef is submerged. There are three islands that mark it on the surface, the Apo Island, Apo Menor (Binangaan'; and Cayos del Bajo Tinangkapang). The largest is Apo Island (22.0) hectares which harbors mangroves and beach vegetations, whereas Binangaan is rocky limestone island with relatively few vegetation and Cayos del Bajo (200-300 sq.m.) is a coralline rock formation with no vegetation.

Name	Legal Basis	Legal Status	Proximate Distance from Project Area
Mts. Iglit-Baco National Park	Proclamation No. 557, s. 1969	Legislated	6km
Apo Reef Natural Park	Proclamation No. 868, s. 1996	Legislated	40km
Mt. Calavite Wildlife Sanctuary	Proclamation No. 292, s. 2000	Legislated	106km
Calavite & F.B. Harrison Game Refuge and Bird Sanctuary	E.O. 9, s. 1920	Initial Component	20km


Mt. Calavite Wildlife Sanctuary
Calavite & FB Harrison Game Refuge and Bird Sanctuary
Mts. Iglit-Baco National Park
Apo Reef Natural Park
Nagapi River
Google Earth
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat / Copernicus
Data LDEO-Columbia, NSF, NOAA
N
80 km

Protected Areas - Municipal

NAME	NEAREST POINT FROM PROJECT AREA
Wawa Reef	1 km
Concepcion Fishery Reserve	3 km
Marsumbol Marine Reserve	4.3 km

1.2. Development Framework

Being an agricultural community, the Municipality is largely dependent on the production of palay, corn and onions. The Municipality along with the entire province is a major supplier of rice and onions to Metro Manila.

Being of mountainous terrain and host to a number of rivers that tend to overflow during rains, the damage brought about by floods affect not only the community's livelihood, but also severely restricts the flow of food supply to Metro Manila.

As determined during the surveys and historical investigations, the River bends of the river channel are mostly clogged by material that have accumulated over the years.
The river mouth/exits are blocked by a significant river delta that has extended up to 1km offshore. As river deltas tend to form based on the opposing forces that play between the outward flow of the river water carrying sediments and the wave activity and undercurrent which push back the sediments to the shore, the Project is designed to clear the river exit with sufficient width and depth to deter/delay the replenishment of materials that tend to block the river mouth.

The planned 800 m width and 1500 m length and designed depth of 3-4 meters at the mouth with 5% gradient of slope leading to the offshore provide sufficient delay of replenishment.

The aim of the project to alleviate the threat of floods will translate to a safer and more stable physical environment that will encourage increase in production of current crops. A stable, predictable environment will also encourage the cultivation of perennials such as fruit trees and other high value crops.

1.3. Alternatives

There is an urgent need to pursue the Project for the safety and peace of mind of the communities living within the vicinity of the Project area. While a variety of engineering interventions have been investigated in the past, these proved too expensive and were only partially implemented as these were allocated only a small percentage of the required budget to make a positive impact.

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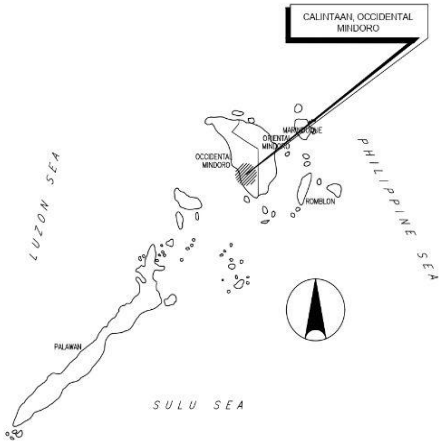
The real and long-term solutions therefore are:

- De-clog the river mouth by opening a channel to allow river wáter to flow out to sea unhampered. The length and width of the channel must be sufficient to direct the flow to the deeper portion of the coast to prevent scouring of the foreshore that leads to beach erosion.
- Deepen the inland river channels and to remove obstructions in the river that obstruct the flow of water to the sea.

1.4. Size, General Water Use, and Components

a. The River is primarily utilized of irrigation of the nearby farmlands

b. Project Location Maps



LOCATION MAP

A. BENCHMARKS

Benchmarks for the project site.

BENCHMARK	ELEVATION
BM-1	2.612m
BM-2	1.556m
BM-3	3.133m
BM-4	3.586m

REPUBLIC OF THE PHILIPPINES
INTER-AGENCY COMMITTEE ON THE RESTORATION OF THE OCCIDENTAL MINDORO RIVER CHANNELS AND ITS TRIBUTARIES

PROJECT NAME AND LOCATION:	SHEET CONTENTS:	SUBMITTED:	RECOMMENDING APPROVAL:	VERIFIED:	REVIEWED:		APPROVED:	SET NO.	SHEET NO.
PROPOSED NAGAPI RIVER MAINTENANCE AND RESTORATION PROJECT DREDGING PLAN STA. 0+000 TO STA. 6+378 LENGTH = 6378 Lm. BARANGAY IRIRON, BARANGAY MALPALON CALINTAAN, OCCIDENTAL MINDORO	PROJECT DESIGN & LOCATION MAP	ENGR. REMIGO V. MASANGKAY PROVINCIAL ENGINEER	HON. EDUARDO B. GADIANO PROVINCIAL GOVERNOR	ENGR. GERALD A. PACANAN, CESO III REGIONAL DIRECTOR DPWH, REGION IV-B	EDWIN C. MATANGUIHAN OIC-DIRECTOR BUREAU OF DESIGN	ERIC A. AYAPANA, CESO IV ASSISTANT SECRETARY FOR TECHNICAL SERVICES	MAXIMO L. CARVAJAL UNDERSECRETARY FOR TECHNICAL SERVICES	G 02 02	02 72

c. Dredging Activities

Onshore Dredging Operations

Sample of Extraction Methods for the Land Portion of
the Proposed Nagapi River Maintenance and Restoration Project/Program

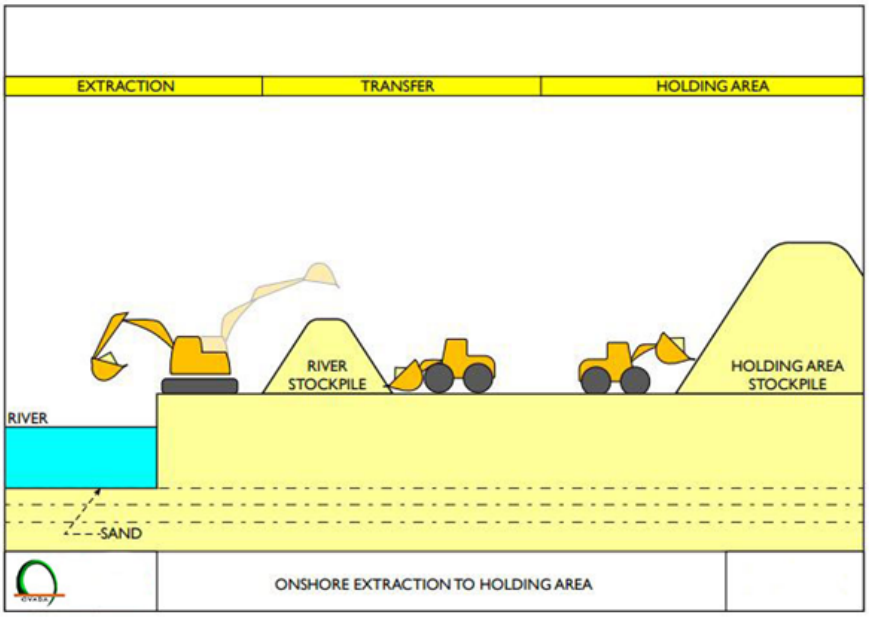


Diagram of the Proposed Onshore Extraction to Holding Area
for the Proposed Nagapi River Maintenance and Restoration Project/Program

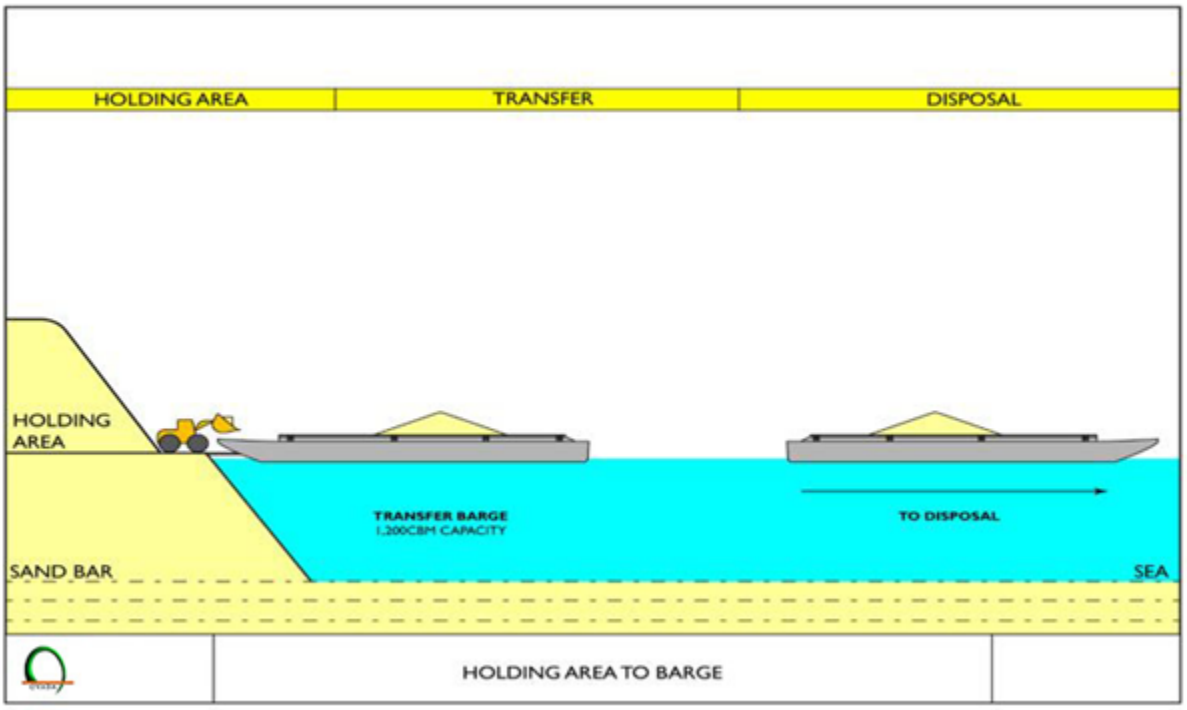


Diagram of the Holding Area to Barge to Disposal
for the Proposed Nagapi River Maintenance and Restoration Project/Program

Offshore Dredging Operations

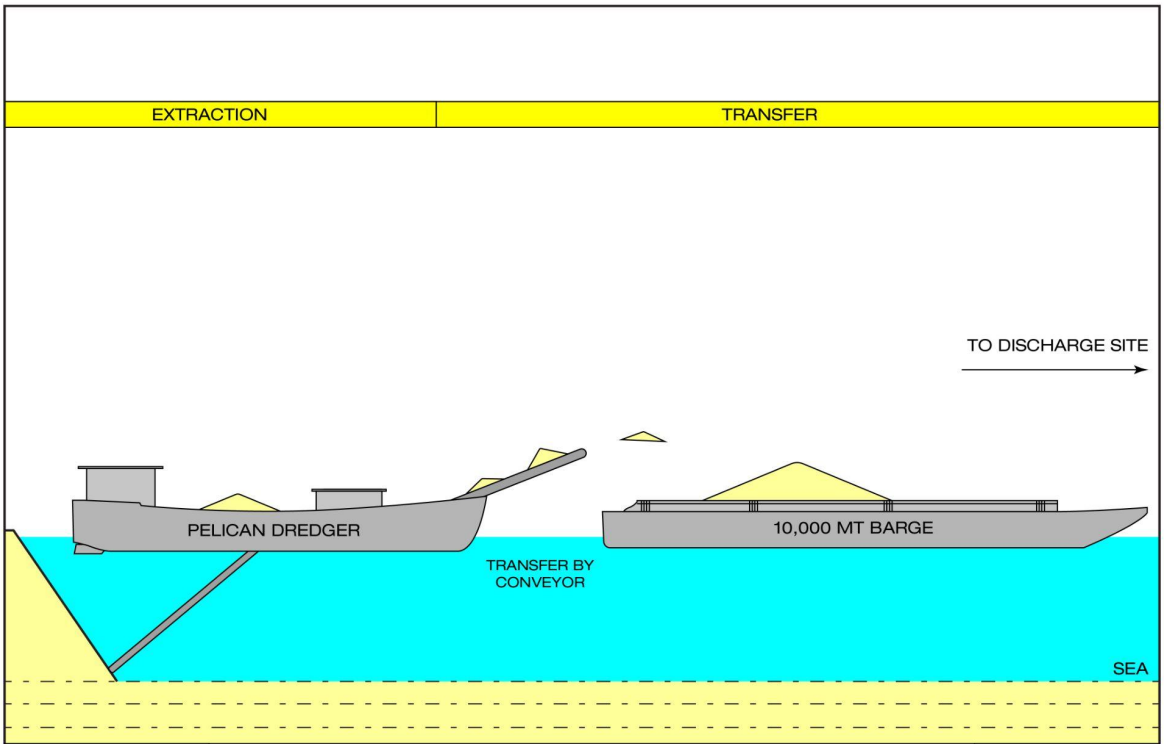


Diagram of Suction Dredger loading to Transfer Barge

d. The offshore operations will not require the use of groundwater.

Drinking water will be supplied from local water refilling stations.

Utility water will be supplied by accredited water suppliers for marine vessels.

The operations will also not require electric power from the grid. Marine vessels are self-sustained vessels equipped with its own power and sanitary systems which are regularly inspected by the PCG for compliance.

As to the land facilities, such as staff houses and quarters, power will be supplied from solar/electric systems as the power required will be at the level of a simple household.

e. The Project does not contemplate the construction of major infrastructure at the site. The Project will focus on the deepening of river and exit channels. The materials to be extracted are tested at 2.7 density and greater and are observed to settle within 3 minutes after being disturbed. Hence, silt curtains are not included in the project plans.

1.5. Schedule of Dredging

TIMELINE		QTY (cu.m.)	LOCATION	SUB TOTAL (cu.m.)
YEAR 1	MONTH 1	150,000	DOWNSTREAM	
	MONTH 2	150,000	DOWNSTREAM	
	MONTH 3	150,000	DOWNSTREAM	
	MONTH 4	150,000	DOWNSTREAM	
	MONTH 5	100,000	DOWNSTREAM	
	MONTH 6	0		
	MONTH 7	0		Year 1
	MONTH 8	100,000	DOWNSTREAM	1,400,000
	MONTH 9	150,000	DOWNSTREAM	
	MONTH 10	150,000	DOWNSTREAM	
	MONTH 11	150,000	DOWNSTREAM	
	MONTH 12	150,000	DOWNSTREAM	
YEAR 2	MONTH 13	150,000	UPSTREAM	
	MONTH 14	150,000	UPSTREAM	
	MONTH 15	150,000	UPSTREAM	
	MONTH 16	150,000	UPSTREAM	
	MONTH 17	100,000	UPSTREAM	
	MONTH 18	0		
	MONTH 19	0		Year 2
	MONTH 20	100,000	UPSTREAM	1,400,000
	MONTH 21	150,000	UPSTREAM	
	MONTH 22	150,000	UPSTREAM	
	MONTH 23	150,000	UPSTREAM	
	MONTH 24	150,000	UPSTREAM	
TOTAL		2,800,000		

Project Development Plans and Components

Material to be Removed

The materials to be removed from the river delta, the river mouth and the upstream channel consist mainly of silt, mud, sand and stones.

Quantity of Materials to be Removed

The planned depth of the river channel is 4-6 meters on the upstream end portion of the project area while 6 meters at the mouth of the river going off-shore with a proposed step wave barrier (depth) of 6 meters up to 15 meters Westwards.

Channel 1 kilometers wide and 1 km long will be established to traverse the Nagapi River Delta. The 1000-meter width is necessary in order to prevent the river mouth from being filled with deposits that come from replenishing the nature of coastal sand as a result of wave activity.

Thus, the estimated quantity of materials to be extracted as a result of the river deepening is about 1,800,000 to 3,000,000 cubic meters per annum. The rate at which the deposits fill-up the river system is so fast, specifically during the on-set of the rainy season. It is then envisioned to extract such volume per annum.

Targeted Dredging Output and Project Life

To remove the present volume of the river deposits, approximately around 1,500,000 to 2,000,000 cubic meters from river exits, it will take an approximate 3-year period in order to ensure the planned depth of the river be attained and in order to address the fast rate of river deposit replenishment at an approximate rate of 20 percent per year.

The proposed annual extraction of 1,800,000 to 3,000,000 cubic meters per annum is based on the prepared dredging plan of 3,000,000 metric tons for 300 working days in a year. Depth of surface dredging at any given time/cycle shall be one (1) meter from the general surface of the river bed. Most of the year, a portion of the river segment is solidly dry and where heavy trucks and equipment traverse.

Potential additional volume would be the annual replenishment from upstream as a result of erosion and river current deposition during the rainy season. The volume of materials deposit will determine the life of the dredging activities to be undertaken.

1.6. General Stages of Development and Activities

Pre-Operation/Development Phase - Onshore/Land Based

Site Preparation

Stabilization of river embankment shall be undertaken. Cleaning and clearing of surface wastes and vegetation (if any) will be conducted to have a smooth flow of traffic to the entering and outgoing trucks in the area.

Development and Maintenance of Access Road

The project will commence upon securing all the necessary permits and clearances to all concerned government agencies and institutions.

The project will initially start with the development of an access road network system. Feeder roads into and starting from downstream to upstream shall be developed.

Work Area Survey and Delineation

Work area coordinates will be established and marked for easy locating the area of concern and to delineate its boundaries. Caution/ safety signages will also be installed.

Stockpile Area Development

A stockpile area shall be designated and developed nearest to the barge entry point and parallel with the river. Drainage and canals connected to the silt ponds/traps shall be developed at the perimeter of the stockpile area.

Installation of Bank Protections

In the upstream area, bank protection will be installed at critical points (e.g. river bends and areas near existing structures). These will further reduce the likelihood of erosion along the river banks.

Bank protection options include the use of armor rocks, geobags, reinforced concrete blocks or gabion boxes, optimized per specific location of installation.

Operation/Development Phase - Onshore/Land Based

Barge Entry Point Development

Barge entry points shall also be excavated to an area in order to accommodate a certain number of barges. Loaders and backhoes shall be used on such activities. Excavated materials shall be hauled by dump trucks into the temporary stockpile areas. Upon excavation, buffer zones shall be strictly observed and an elevated excavation shall be undertaken on the upstream portion of the river.

Desilting/Dredging/Excavations Phase

This phase will involve the desilting/excavation of sediments at the stretch of Nagapi River. The initial phase is primarily to excavate an opening at the mouth of the river along the shoreline for the entry of "transfer barges" that will be used to load the sediments toward the spoil materials stockpile area and/or to the designated boat carrier. Backhoes will be used on the desilting/excavation activities on the river channels.

The desilting/dredging/excavation shall be done directly from the river mouth/shore using a backhoe-pay-loader combination. Desilted materials are loaded to dump trucks which will directly unload the materials to the designated stockpile areas and/or boat carrier. Desilting/Extraction sequence is from the center of the river segment towards upstream.

During the desilting phase, strict observance of easement on both sides of the river pursuant to PD 1067 "Water Code of the Philippines" or at least 9 meters and reckoning from the line reached by the highest flood which does not cause inundation. Dredging shall comply with the 1/3 of the river methodology as required by DPWH.

The desilting/dredging of the river mouth (where the river meets the sea) and the installation of bank protection to extend the replenishment period of the river opening and direct the force of the water towards the sea (instead of towards the vegetative areas) shall be ensured.

The existing landforms/beach ridges and configurations including temporary artificial waterway, shall not be disturbed.

The dredging of the Nagapi River shall be done in such a way that it will not cause erosion of the original river banks on both sides. The desilting/dredging cycle is repeated until the optimum river depth is attained. The river flow shall be maintained at the center of the bed/channel.

Hauling, Stockpiling and Loading Activities

The excavated/desilted materials from the river channels will be hauled by dump trucks to the temporary stockpile areas and/or load directly to the barge. The barge will load the materials to the designated disposal areas.

For onshore operations, a stockpile and traffic management plan shall be prepared in order to prevent or minimize clogging of incoming and outgoing dump trucks at the rehabilitation areas and temporary stockpile areas.

There are areas intended for temporary stockpile areas of extracted materials prior to loading at the designated sea vessel/carrier. The stockpile areas will be applied for Foreshore Lease. The stockpile will be provided with silt ponds for silt mitigation measures and to avoid siltation of the nearby/adjacent water bodies. Feeder road shall also be developed in order to protect the stability of the existing river embankment.

Stockpiling shall commence at the center to form a mound. A retreating sequence will follow in dumping the desilted materials at opposite directions forming a stabilized stockpile that has four (4) feeder ramps on its sides.

Stockpiling shall be undertaken during daytime. Regular maintenance schedule of equipment shall be strictly observed. Silt Traps and silt ponds shall be regularly dredged. Spoils and spillage shall be regularly collected and disposed of.

The excavated/desilted materials will be hauled by dump trucks to the barges. Barges shall be loaded within their capacities. Barging will not be undertaken during windy hours.

Pre-Operation/Development Phase - Offshore/Marine Based

Site Preparation

Construction of a loading ramp along the stockpile area shall also be undertaken.

Development and Maintenance of Access Roads and Channel

The project will commence upon securing all the necessary permits and clearances to all concerned government agencies and institutions. .

Traffic flow for marine vessels and land-based equipment will be established.

Work Area Survey and Delineation

Work area coordinates will be established and marked for easy locating the area of concern and to delineate its boundaries. Caution/ safety signages will also be installed.

Stockpile Area Development

For the offshore operations, no stockpiling will be utilized. Instead, material extracted from the offshore area will be loaded directly to transfer barges that will transport them to a designated disposal area.

Operation/Development Phase - Offshore/Marine Based

This phase will involve the desilting/excavation of sediments at the stretch of Nagapi River. The initial phase is primarily to excavate an opening at the mouth of the river along the shoreline for the entry of "transfer barges" that will be used to load the sediments toward the spoil materials stockpile area and/or to the designated boat carrier. Cutter suction dredgers will be used on the desilting/excavation activities on the river mouth and delta.

At the river mouth, which is located in Barangay Iriron, Calintaan, the water depth is less than 18 inches at the drainage channel. Water flow is hindered by a submerged river delta towards the sea, and extending more than 500-meters to

the North and 500-meters to the South. The peculiarly formed river delta obstructs and slows down the water flow and so that the river water finds new exits usually through farmlands and residential areas.

The "pragmatic" solution is to deepen the river channels starting from the exit channel gradually going towards the upstream. As both the left and right river banks are completely forested, the removal of obstructions and deepening activities will utilize marine equipment such as suction dredgers and barges while the land-based excavators will be deployed at the upstream.

From the river delta towards the upstream covering an area of about 8-20 hectares. A suction dredger will open 500 meter wide and 1500 meter long and 4-6 meter deep channel towards the river mouth which is currently only about 50 meters wide which narrows down to 40 meters going up stream.

The channel will unhamper the outflow of water out to sea while the deepened river bed will increase the water holding capacity of the area. The 500-meter width of the channel will deter the replenishment of material from the left and right peripherals thus delaying the rebuilding of the river delta from sediments being transported by wave action during high tide.

As both the right and left river banks are densely forested areas buffering farmlands, an on-site spoils area is not an option so as not to disturb the forested areas. Debris and other material removed from the river bed and river delta will be loaded onto a transfer barge for offsite disposal.

During the desilting phase, strict observance of easement on both sides of the river pursuant to PD 1067 "Water Code of the Philippines" or at least 9 meters and reckoning from the line reached by the highest flood which does not cause inundation. Dredging shall comply with the 1/3 of the river methodology as required by DPWH.

The desilting/dredging of the river mouth (where the river meets the sea) and the installation of bank protection to extend the replenishment period of the river opening and direct the force of the water towards the sea (instead of towards the vegetative areas) shall be ensured.

The existing landforms/beach ridges and configurations including temporary artificial waterway, shall not be disturbed.

The dredging of the Nagapi River shall be done in such a way that it will not cause erosion of the original river banks on both sides. The desilting/dredging cycle is repeated until the optimum river depth is attained. The river flow shall be maintained at the center of the bed/channel.

1.6.1. Abandonment Phase

Abandonment in this context is understood as terminating project operations. It will include the dismantling of installed equipment, facilities and other activities after its lifespan. The equipment and other appurtenances will be either sold to interested clients or transferred to another site. However, the fact that the proponent secured necessary clearances and permits in its operations, it simply shows that abandonment before the project lifespan is a remote possibility, unless due to a force majeure. In the event of an unlikely abandonment, the following will serve as a guide for the removal of the project's equipment:
All solid wastes are collected, stored, and disposed of efficiently and safely. Solid wastes resulting from the demolition of the operation shall be disposed of properly and restoration of the site shall be undertaken.

The Land

Land Use, Classification and Visual Features of the Area

Removal of the installed lite site structures will entail a slight modification of soil surface such as leveling and stabilization but will not involve large land mass movement which may alter existing features of the area. This impact is primary but insignificant and short term.

Also, Ovada's operation will not entail any activities that modify land or soil surfaces, thus no soil physiographic changes and terrain modification is expected to occur. This impact was assessed to be primary, significant and long term.

Geology and Terrain

In case the Project Proponent nor the management decide to abandon or terminate the project's operation due to severe damages brought about by calamity or any other circumstances, the abandonment activities will involve dismantling of installed facilities and structures.

Removal of the installed structures will entail only a slight modification of soil surface and no major land mass movement which may result in

physiographic changes in soil structures and occurrence of soil erosion. This impact is primary but insignificant and short term.

Terrestrial Biology

The demolition activities will not cause the loss of some floral composition of the site which provides a good sanctuary and nesting place to some faunal species. The removal of vegetation causes the disturbance and loss of the sanctuary and nesting place of faunal species in the area. The faunal species may transfer to other places thus resulting in the decrease of the composition and in the number or diversity of faunal species presence in the area. This impact is primary but insignificant and short term.

The Water

Surface and Ground Water/Hydrology

Removal of project structures creates ruins and debris, if not properly collected, will mix to loosen soil particles and be washed out to the existing river/drainage systems in the area. This causes clogging of waterways. The clogging of waterways may result in changes in existing drainage patterns and will affect water quality. These impacts are primary but insignificant and short term.

Water Quality

Removal of project structures creates ruins and debris, if not properly collected, will mix to loosen soil particles and be washed out to the existing river/drainage systems in the area. This causes clogging of waterways. The clogging of waterways resulted in changes in existing drainage patterns and will affect water quality. These impacts are primary but insignificant and short term.

The removal of facilities and structures during the abandonment phase entail activities involving heavy groundwork that caused loosening of soil particles and structures which will result in the increase of turbidity by the

water column and/or soil erosion and sedimentation. These impacts are primary but insignificant and short term.

The influx of demolition workers may cause the increase in the BOD loading of the local water surface. During the abandonment stage, there would be a possible increase in the sediment load of surface run-off due to presence of workers in the area and the demolition activities such as site clearing, leveling and grading especially during the rainy season.

The Air

Meteorological Condition and Air Quality

Demolition activities entail the use of demolition vehicles and equipment, movement of people to haul and remove the unwanted facilities, ruins and debris of structures in Ovada's work site and its vicinity. The coming in and out of such vehicles and people, increase the occurrence of dust and total suspended particulates in the air. It will also produce noise and might increase the existing ambient noise level in the demolition area. These impacts are primary but insignificant and short term.

The People

Population

Abandonment of the project operations cause the loss of jobs of terminated employees. This might affect the decrease in population in the area due to the transfer of people to other places to look for other employment opportunities. These might cause a decrease in population and household number in the area. These impacts are primary but insignificant and temporary in nature.

Cultural Exchange Opportunities

The termination of the project's operations will cause the decrease or loss of the infusion of visitors (foreign and local) that would promote cultural exchange opportunities within the locality, province and in the region. This impact is primary, significant and long term.

Employment and Economic Opportunities

The possible termination of the project workers will increase unemployment rate and loss of jobs. These may affect the financial and living status of the workers. These impacts are primary, insignificant and short term.

Health and Safety Risk

The abandonment activities entail demolition of existing facilities and structures. These activities will not create falling debris and ruins of the abandoned facilities as those that will be built by the project are temporary and will be of light materials only. Exposure of workers to risks e.g. falling debris and structures are low. This impact is primary, insignificant and short term.

Contribution to Local and National Economy

The abandonment of the project's operations will cause the termination and loss of the tax revenues received by the barangay and of the municipality. This will affect the income of the barangay and of the municipality received from such operation.

Solid Wastes Generation

The abandonment phase will create ruins and debris structures brought by the demolition activities. These cause an increase in solid wastes in the area. This impact is primary, insignificant and short term.

1.7. Organization, Management and Manpower

Manpower Requirements

Considering that the project is relatively medium scale, manpower necessary for the completion of the project will be minimal. The manpower requirement is about 10 to 15 persons inclusive of both the skilled and non-skilled workers.

Table 3.1 Lists of Manpower Requirements

Manpower	No.
Dredging Operations Manager	1
Admin	1
Accounting	2
Environmental Officer/PCO	1
Community Relations	1
Safety Officer	1
Dredging Operations Foreman	1
Dredging Crews	10
Stockpiling Foreman	1
Loader/Backhoe Operators	4
Drivers	12
Liaison Officer	1
Totals	**36**

Table 3.2 Lists of Equipment/Vehicles to be Used

Description	Units
Backhoes	2
Dump Trucks	4
Loaders	1
Dredgers	2
Service vehicles	2
Totals	**11**

Organizational Structure

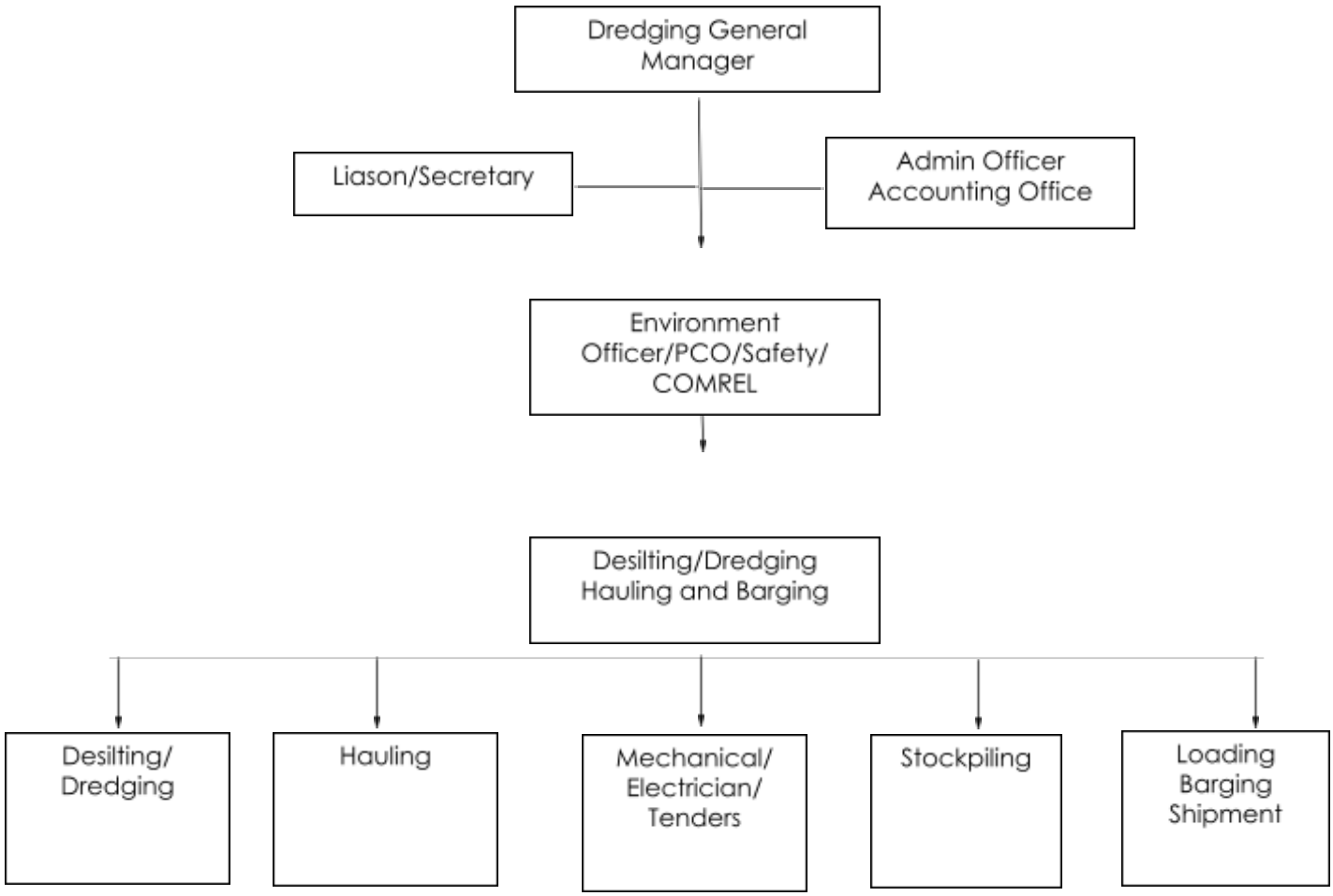


Figure 3.1 Organizational Structure

1.8. Project Schedule and Cost

Indicative Total Project Investment Cost (Philippine Peso)

The estimated capital cost for the project operation is approximately PhP 146,761,856.34 broken down as follows:

Parameter	Costs (PhP) (@ 720 Days Operations)
A. On-Shore	
Excavators, Loaders, Trucks	58,400,000
Maintenance	8,760,000
Fuel, Oil	284,700,000
B. Off-Shore	
Cutter Suction Dredger	82,620,000
Suction Dredger	153,000,000
Crane, Tug And Barge	108,000,000
Fuel, Oil	234,000,000
Subcon And Materials For Underwater Works	
C. Administrative	
Salaries	2,000,000
Environmental Health And Safety	15,000,000
Social Development Programs	75,000,000
Taxes, Statutory Fees	189,000,000
Capital Expenses	**1,210,480,000**

In terms of investments

A. The Project does not contemplate the construction of major infrastructure at the site.
   The Project will focus on the deepening of river and exit channels.
B. The materials to be extracted are tested at 2.5 and greater and are observed to settle within 3 minutes after being disturbed. Hence, silt curtains are not included in the project plans.

2. Ecological Profile and Assessment of Impacts of Land Development

2.1. Study Area Coverage

a. Land

About the Municipality

15. Calintaan is a third class municipality. It has a population of 30,190. It is politically subdivided into seven (7) barangays occupying a land area of 38,250 hectares. The economy of Calintaan is mainly agricultural and its major crop is rice. Other crops produced and sold in the Municipality include corn, legumes, coconuts and bananas. Industries such as fishing, livestock, poultry, banana processing, and buri craft are also important to the economy.
16. The Municipality of Calintaan, located in the southern part of the Province, is among those severely affected by massive flooding during the rainy season.
17. The Municipality is an agricultural community largely depending on the production of pala, corn and onions. The Municipality along with the Province is a major supplier of rice and onions to Metro Manila.
18. Being of mountainous terrain and host to a number of rivers that tend to overflow during rains, the damage brought about by the floods affect not only the communities' livelihood but also restricts the flow of food supply to Metro Manila.
19. The increasing frequency of typhoons passing through MIMAROPA Region as observed in the last 5 years brought about by the global changes in weather makes it imperative that preventive measures be taken with urgency.
20. The Municipality has identified the following rivers that has recently caused "waist to chest deep" floods the past several years:
    a. Nagapi River in Brgy, Iriron and Brgy. Malpalon
    b. Anahawin River in Brgy. Poblacion and Brgy. Poy Poy
21. The Municipality has only a few irrigation installations and depends largely on natural streams that flow along the periphery of the farmlands. These streams flow out to the rivers.
22. As these rivers are shallow and their exits are blocked by materials that have accumulated over the years, an increase in the volume of water tend to overflow the riverbanks and to find ways to the sea via the farmlands and the residential areas thereby damaging crops along the way and severely restricting community activities for days even weeks.

Topography

The topography of Occidental Mindoro is generally rugged, with narrow strips of coastal lowlands. Its terrain is characterized by successive mountain ranges, valleys, and elongated plateaus, with rolling lands along the coastal region.

Areas with slope gradient of 30% and above represent 57% of the total land area while those with gradient of 0-18% account for 42% and 18-30% gradient is only 1%.

Geological Features

The Municipality of Calintaan lies in the south-central area of Mindoro and is politically divided between the municipalities of Sablayan, Rizal and San Jose in Occidental Mindoro, and the municipalities of Bongabong and Mansalay in Oriental Mindoro. It has a rugged terrain composed of slopes, river gorges, mountains and plateaus. Mount Baco rises to an elevation of 2,488 meters (8,163 ft) above sea level. Mount Iglit reaches 2,364 meters (7,756 ft) and can be found south of Mount Baco.

The Municipality is crossed by eight major river systems, including the Lumintao, Anahawin and Nagapi Rivers which empty into the South China Sea. It is home to four ethnic groups on the island: the Batangas Tagalog, Mangyan, Hanunuo and Bangan. The Mangyans depend on the forest for their subsistence, where they engage in traditional farming and hunting for food. There are also areas of grasslands turned into pastures, as well as areas of slash-and-burn agriculture.

Soil

Types of soil in Calintaan vary from different types of loam and clay which are suitable for cultivation, pasture or forestry to hydrosol and river wash which are good for wildlife.

In terms of soils, 39% (or 11,167 ha) belong to the Louisiana clay loam series. Other series in the watershed include San Miguel silt loam (23% or 6,778 ha), San Manuel loam (12.1% or 3,484 ha), Undifferentiated mountain soils (11.7% or 3,389), Bulacan clay loam (7% or 1,936 ha), and San Manuel sandy loam (1% or 392 ha).

Climate

Climate data for Calintaan, Occidental Mindoro													
Month	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Year**
Average high °C (°F)	30 (86)	31 (88)	32 (90)	32 (90)	31 (88)	30 (86)	29 (84)	29 (84)	29 (84)	29 (84)	30 (86)	30 (86)	30 (86)
Average low °C (°F)	21 (70)	21 (70)	22 (72)	24 (75)	25 (77)	25 (77)	25 (77)	25 (77)	25 (77)	24 (75)	23 (73)	22 (72)	24 (74)
Average precipitation mm (inches)	30 (1.2)	26 (1.0)	39 (1.5)	58 (2.3)	192 (7.6)	283 (11.1)	341 (13.4)	323 (12.7)	317 (12.5)	231 (9.1)	119 (4.7)	56 (2.2)	2,015 (79.3)
Average rainy days	10.3	8.3	12.4	16.3	23.5	27.1	28.4	27.3	27.6	26.3	19.2	13.6	240.3
Source: Meteoblue (Use with caution: this is modeled/calculated data, not measured locally.) [14]													

Table 4.1 Climate data for Calintaan, Occidental Mindoro

Terrestrial Biology

Table 4.1 Terrestrial Fauna Found Within the Vicinity of Calintaan, Occidental Mindoro

Common Name	Scientific Name	Distribution
A. REPTILES		
House Lizard	*Sphenomorphus sp.*	Very common
B. AMPHIBIANS		
Toad	*Bufo marinus*	Very common
Frog	*Rana sp.*	Very common
C. MAMMALS		
Mouse Deer	*Tragulus nigricans*	Engangered
Tamaraw	*Bubalus mindorensis*	Endangered
Daga	*Rattus norvegicus*	Very common
House Mouse	*Mus musculus*	Very common
D. DOMESTICATED FARM ANIMALS (MAMMALS)		
Cat (Domesticated)	*Felis domestica*	Very common
Dog (Domesticated)	*Canis familiaris.*	Very common
E. INSECTS		
Bee	*Apis indica*	Very common
Grasshopper	*Gastrimargus marmoratus*	Very common
Dragonfly	*Labellia sp.*	Very common
Wasp	*Vespa sp.*	Very common
Common housefly	*Musca domestica*	Very common
Mosquitoes	*Culex sp.*	Very common
Ants	rmica sanguinea	Very common
Spider	*Theridion sp.*	Very common
Butterfly	*Papilio sp.*	Very common

b. Water

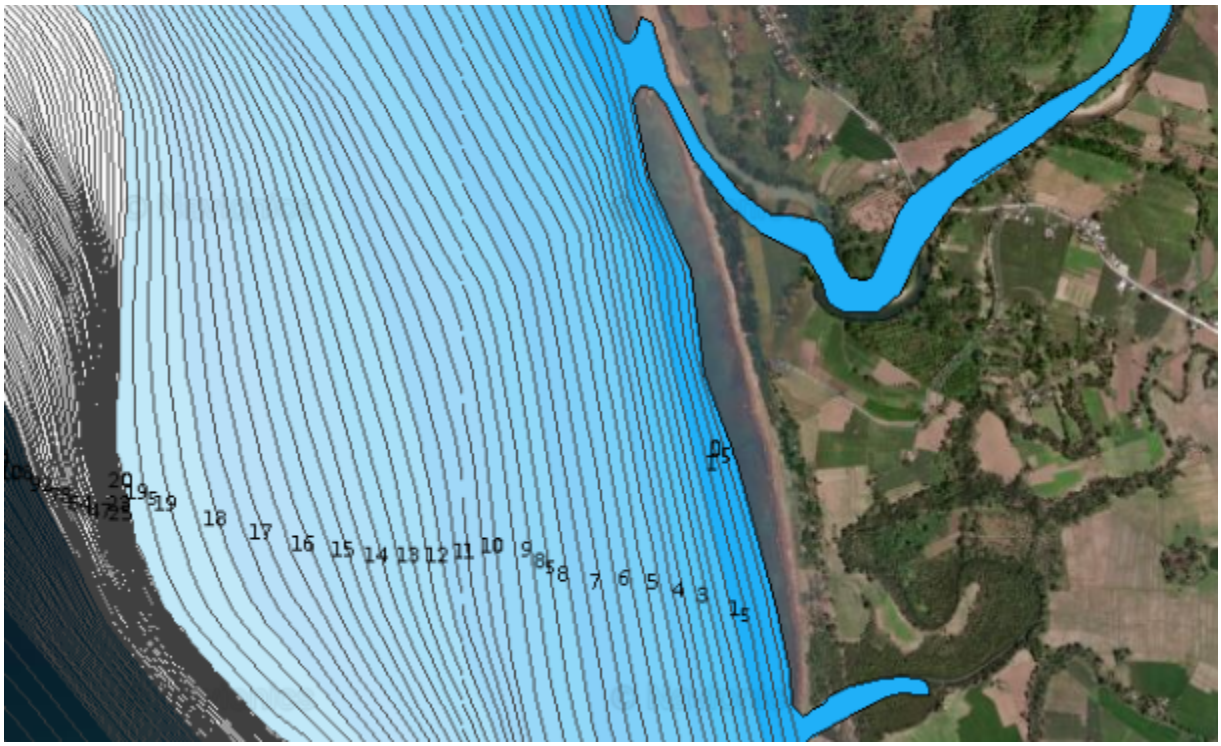
Nagapi River is currently an unclassified river. Water from the River is primarily used for irrigation.

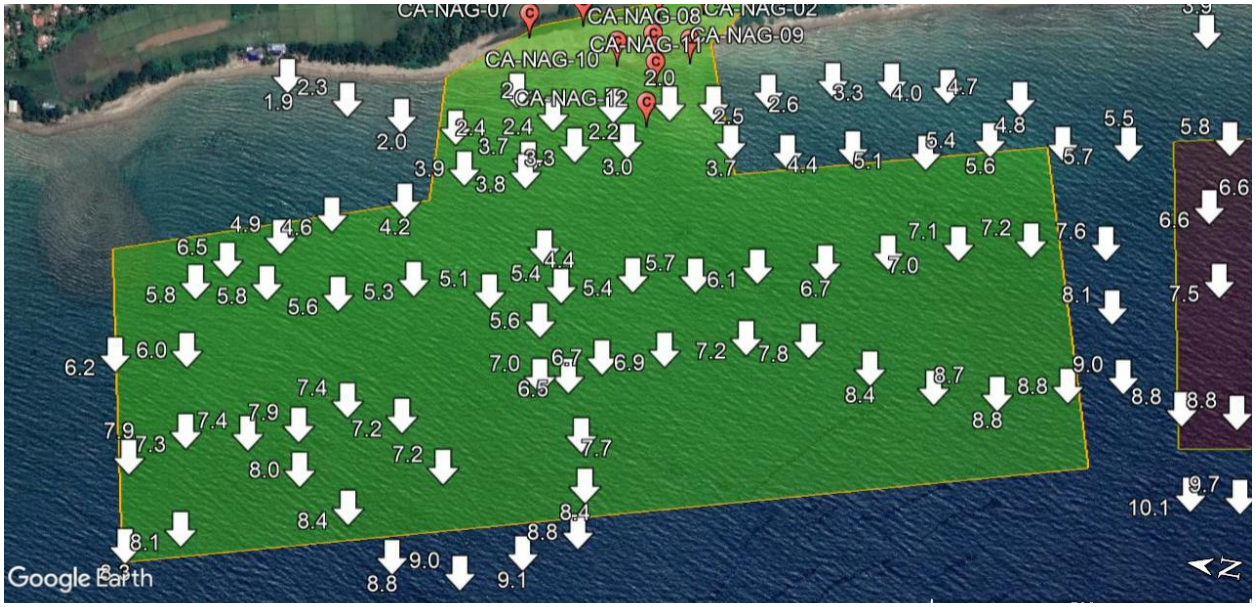
Water Resources

Calintaan has water sources such as springs, groundwater, rivers and surface water. Springs are generally in rolling slopes in the rural barangays. Some are developed for household consumption because of the good quality of water discharge. Calintaan has two (2) rivers namely: Anahawin and Nagapi rivers. These rivers carry clear and fresh water and are mainly used for agricultural irrigation. While in the coastal built-up areas, groundwater is hard due to dissolved salts.

Bathymetry

At 200 meters from the shoreline of the mouth of the Nagapi River, water depth was measured at the very shallow depth that needs to be deepened and widened for the better flow of water outward to the sea. The seabed is composed of marine sand, silt and mud.





- **Freshwater and Marine Ecosystem**

MARINE AND AQUATIC SPECIES		
Common Name	**Scientific Name**	**Distribution**
YellowFin Tuna	*Thunnus albacores*	
Round Scad	*Decapterus punctatus*	Very Common
Sardines	*Sardina pilchardus*	Very Common
Anchovy	*Engraulidae sp.*	Very Common
Slipmouth	*Leiognathidae sp.*	Very Common
Mud clams	*Polymesoda erosa*	Very Common

c. People

Demography

Calintaan is politically subdivided into 7 barangays.

- Concepcion
- Iriron
- Malpalon
- New Dagupan
- Poblacion
- Poypoy
- Tanyag

According to the 2015 Census, the age group with the highest population in Calintaan is *10 to 14*, with 3,768 individuals. Conversely, the age group with the lowest population is *80 and over*, with 181 individuals.

Combining age groups together, those aged *14 and below*, consisting of the young dependent population which include infants/babies, children and young adolescents/teenagers, make up an aggregate of 37.28% (11,120). Those aged *15 up to 64*, roughly, the economically active population and actual or potential members of the workforce, constitute a total of 58.56% (17,467). Finally, the old dependent population consisting of the senior citizens, those aged *65 and over*, total 4.15% (1,239) in all.

The computed Age Dependency Ratios mean that among the population of Calintaan, there are 64 youth dependents to every 100 of the working age population; there are 7 aged/senior citizens to every 100 of the working population; and overall, there are 71 dependents (young and old-age) to every 100 of the working population.

The median age of 21 indicates that half of the entire population of Calintaan are aged less than 21 and the other half are over the age of 21.

	Barangay	Population percentage (2020)	Population (2020)	Population (2015)	Change (2015-2020)	Annual Population Growth Rate (2015-2020)
1	Concepcion	12.97%	3,916	3,652	7.23% ▲	1.48% ▲
2	Iriron	15.28%	4,613	3,934	17.26% ▲	3.41% ▲
3	Malpalon	7.53%	2,274	2,572	-11.59% ▼	-2.56% ▼
4	New Dagupan	17.89%	5,402	5,272	2.47% ▲	0.51% ▲
5	Poblacion	22.72%	6,859	7,173	-4.38% ▼	-0.94% ▼
6	Poypoy	11.26%	3,399	3,293	3.22% ▲	0.67% ▲
7	Tanyag	12.35%	3,727	3,930	-5.17% ▼	-1.11% ▼
	Calintaan Total		**30,190**	**29,826**	**1.22% ▲**	**0.26% ▲**

Table 4.1 Population Growth of Calintaan, Occidental Mindoro

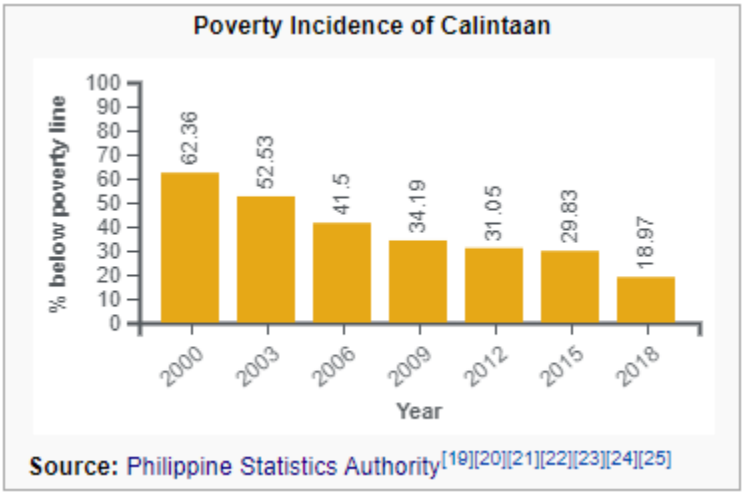
Population census of Calintaan		
Year	**Pop.**	**±% p.a.**
1970	7,949	—
1975	10,740	+6.22%
1980	14,416	+6.06%
1990	18,117	+2.31%
1995	21,687	+3.43%
2000	23,503	+1.74%
2007	26,779	+1.82%
2010	28,148	+1.83%
2015	29,826	+1.11%
2020	30,190	+0.24%

Source: Philippine Statistics Authority[15][16][17][18]

Table 4.2 Population Census of Calintaan, Occidental Mindoro

Economy

The annual regular revenue of Calintaan for the fiscal year of 2016 was ₱113,813,516.79.

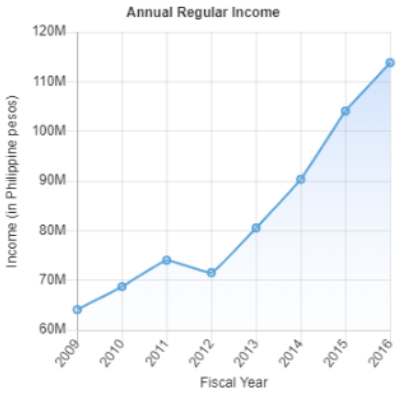


The economy of Calintaan is mainly agricultural, and its major crop is rice. Other crops produced and sold in Calintaan include corn, legumes, coconuts, and bananas. Practices such as fishing, livestock, poultry, banana processing (banana chips) and buricraft (the production of goods made from buri fibers such as buntal) are also important to the economy.

Income

Fiscal Year	Annual Regular Income	Change
2009	64,102,947.23	–
2010	68,729,609.18	7.22% ▲
2011	74,048,721.41	7.74% ▲
2012	71,550,151.26	-3.37% ▼
2013	80,537,008.83	12.56% ▲
2014	90,338,667.71	12.17% ▲
2015	104,079,746.95	15.21% ▲
2016	113,813,516.79	9.35% ▲

End notes:
- *Annual Regular Income* = Locally Sourced Revenue + Internal Revenue Allotment (IRA) Current Year + Other Shares from National Tax Collection
- *Locally Sourced Revenue* = Real Property Tax (General Fund) + Tax on Business + Other Taxes + Regulatory Fees + Service/User Charges + Receipts from Economic Enterprises



Based from reports from the Bureau of Local Government Finance (BLGF) and the Department of Budget and Management (DBM)

Total operating income for the fiscal years 2007 to 2011, comes from local taxes and outside sources like the Internal Revenue Allocation and other national taxes. • For FY 2011, Revenue from Local Sources was Php 17,618,907, and from External Sources Php 139,994,177.

Tourism

- Mts. Iglit-Baco National Park - mountaineers who are climbing Mts. Iglit and Baco and relatives and friends of Calintaan residents. Only place in the world where one can find the biggest remaining population of the tamaraw (Bubalus mindorensis); features Mt. Baco (2,488 meters above sea level) and Mt. Iglit or "Fungso Mangibok" (2,364 masl), where the most number of tamaraws roam.
- Malpalon - is just beside Poypoy, the jump off to Mts. Iglit and Baco, which is in every Filipino mountaineers' bucket list. The trail is well established and is not that difficult.

2.2. Ecoprofile and Assessment of Impact

The ecoprofile, impact assessment and corresponding approach/ method shall be guided by the prescriptions in Section 3.

3. Carrying Capacity Assessment (Specifically on the SILT/Sediments)

The river channels are clogged at certain points and average water depth is -18 inches during summer. The river caused knee deep floods in the rainy season.

3.1. Environmental Management Goal and Indicator Limits

a. Land

Extracted materials will be used as infill to buffer the shoreline. To prevent saltwater seepage into farm lots. Extracted materials will also be used to fill up low lying areas.

b. Water

- **Marine and Freshwater**
- **Irrigation waters**
  Deepening of the upstream channel will take into consideration the level of intake of the irrigation canals.

c. People

- The project will not restrict the community's access to the river

3.2. Carrying a Capacity Analysis

Identified portions of the upstream deepening of the river channels will be done at 1-2 meters depth only. The ⅓ of the river methodology of the DPWH will be implemented.

4. Environmental Management Program (EMP)

4.1. Environmental Plan Framework and Strategic Components and Environmental Management System (EMS)

Please refer to the EMS Matrix at section

4.2. Impact Management in the design of dredging activity

Description of Environmental Impact Management

The nature of the dredge work will all result to reversible impacts primarily due to replenishment. The methodology is to delay such replenishment.

4.3. Water Quality Management Program

- **Water Quality Monitoring Plan**

  TSS, Fecal coliform, Oil and Grease

  No significant effect is projected for these aspects
- **Coastal Resources Management Plan**

  In context of the project and in coordination with the LGU and NGAs.
- **Irrigation Water**

  The baseline data will be determined prior to commencement of operations.

4.4. Social Management and Management and Development Program

- **Resolution of Conflicting Issuances**

  No conflicting issuances were raised.
- **Compensation Plan for affected stakeholders**

  A bond amounting to PHP1,000,000.00 will be deposited to the Province to compensate for any damage caused by the project
- **Social Development Plan**

  Refer to SDP matrix
- **Information, Education and Communication Program (IEC)**

  Refer to the IEC matrix

4.5. Environmental Risk Management Plan for the River System

- **Safety Management System**

  2 units of service vehicles are being programmed to facilitate the transport to remote areas of the Barangays. These vehicles will also serve as emergency vehicles.

  The project will maintain first aid facilities at site manned by trained personnel. Coordination with the RHU will also be established.

  Injuries that require hospital care will be attended to by clinic and hospital personnel and facilities at San Jose and Sablayan which are about 45 minutes away.

- **Emergency Response Plan in case of oil spill**

  Marine vessels to be deployed to the work area will be required to each have Safety Officers onboard, oil spill prevention routine inspections and equipment such as skimmers, sorbents and dispersants to be used in case of oil spills.

  - Skimmers remove oil from the water's surface. The skimmed oil is then stored in tanks awaiting disposal. Booms are used to concentrate the oil to make it thick enough to be skimmed off the surface.
  - Booms are the most common piece of equipment used to contain an oil spill. A boom is a floating barrier that can be towed or anchored into place. All booms have a freeboard above the water to collect the oil and a skirt below the water to stop the oil moving under the boom.

    Booms can be used:

    - along shorelines or at sea
    - to contain oil until it is recovered
    - to prevent oil from entering sensitive areas or to divert it to less sensitive areas
    - to stop oil from stranding on shorelines.
  - Sorbents are materials that attract and hold oils. Most sorbents rely on oil being absorbed into them, like a sponge, but others rely on

the oil adhering to the sorbent material. Sorbents can be in the form of booms, pillows, pads or snares. They are generally made from polypropylene or polyethylene and can be wrung out and reused.

- Dispersants are chemicals that help remove oil from the sea surface by breaking oil slicks into small droplets. The small droplets are then dispersed and diluted into the underlying seawater by wave action where they are broken down by bacteria.

- **Compensation Fund**
  A bond amounting to PHP1,000,000.00 will be deposited to the Province to compensate for any damage caused by the project.

5. Social Development Plan/Framework (SDP) and IEC Framework

5.1. Social Development Program

Table 6-3. Summary Matrix of Proposed Social Development Plan/Framework

Concern & Program Components	Program Objectives	Responsible Community Member/ Beneficiaries	Government Agency/ Non-Government Agency and Services	Proponent	Time Frame	Source of Fund
Economic Assistance Program						
Priority Hiring for local residents	To identify a pool of qualified local workers for employment within the project	Qualified local residents	Government of Occidental Mindoro	HR Manager	Operation Phase	Project Operation Cost
Skills Training	Develop skills that will prepare the people in the coming employment opportunities	Selected local residents	Government of Occidental Mindoro	HR Manager	1 month before actual hiring Regular training scheduled twice a year thereafter	Project Operation Cost

Livelihood Programs	To generate self-employment opportunities Enhancement of home-based industries and provision of self-employment opportunities	Selected number of local residents, women and out of school youths	Government of Occidental Mindoro	HR Manager	1-2 weeks annually during operation	Project Operation Cost
B. Educational Assistance Program						
Apprenticeship and on-the-job training	To provide work experience to college students and new graduates and prepare them for their chosen career paths	Selected and qualified college students and new college graduates	Government of Occidental Mindoro DSWD Dept. of Education TESDA	Community Development Officer	Annually for about 5 to 10 new college graduates	Parts of Operation Cost
C. Health Assistance Program						
Regular health monitoring of workers	To conduct yearly health examination to	Workers/ Employees	Brgy. Health Unit Municipality Health Unit DOH	Pollution Control Officer	Annually	Project Operation Cost

	workers/employee					
D. Community Assistance Program						
Regular monitoring of existing source of water supply	To further check the level of applicable contaminants from existing groundwater and drainage systems	Workers/ Employees, Adjacent Residents	Brgy. Health Unit Municipality Health Unit DOH	Pollution Control Officer	Quarterly during operation	Project Operation Cost

5.2. Information and Education Campaign

Good relationship between the proponent, its workers and the adjacent communities has been developed through effective information, education and campaign programs. This plan involves a series of meetings, seminars, video film showings, community dialogues and consultations with the project stakeholders. The IAC is aimed to increase the awareness of all concerned stakeholders about the project, its benefits to the community and the possible consequences the project may bring during the operational phase. The plan is presented in *Table* 6.2.

Table 6-5. Information, Education and Communication Plan

Project Topic	Campaign Objectives	Target Audience	IEC Methods	Information Medium	Time Frame/ Frequency	Indicative Cost
Project operation	To inform the general public of the description of the project, its nature and benefits to be derived	Local residents DENR-EMB	Group Methods Multisectoral	Meetings with all concerned agencies and institutions	From project conceptualization up to implementation	PhP 25,000.00
EIA Results	To inform project stakeholders that the proponent complied with the all environmental requirements including securing the concerned permits and clearances The proponent has prepared environmental impact assessment studies	Local Residents DENR-EMB	Group Methods Multisectoral	Primers Brgy. Assembly	After securing ECC	PhP 25,000.00

Project Topic	Campaign Objectives	Target Audience	IEC Methods	Information Medium	Time Frame/ Frequency	Indicative Cost
Monitoring	To inform the public that: - objectives of the monitoring - the frequency of monitoring	Local Residents	Group Methods	Public meetings Primers Reports	All stages of project development	PhP 25,000.00
Employment	To inform project stakeholders/ general public of employment opportunities	Local residents	Group Methods Multisectoral	Brgy. Assembly Posters	Within project operation	PhP 25,000.00

6. Environmental Compliance Monitoring

6.1. Self-Monitoring and Reporting Plan

The SMR will comply with the presented form of the EMB

6.2. Environmental Guarantee and Monitoring Fund Commitment

The Environmental Guarantee and Monitoring Fund will comply with that prescribed by the IAC.

7. Demobilization/Decommissioning Policy

The ruins and debris of the building structures will either be sold or re-used depending on their usability. The condemnation activities will be undertaken according to accepted procedures to protect the adjacent properties, the public and the environment.

After the cessation of the project operation, necessary rehabilitation measures will be implemented. All structures will be properly dismantled.

Abandonment in this context is understood as terminating project operations. It will include the dismantling of installed equipment and other activities after its lifespan. The equipment and other appurtenances will be either sold to interested clients or transferred to another site. However, the fact that the proponent secured necessary clearances and permits in its operations, it simply shows that abandonment before the project lifespan is a remote possibility, unless due to a force majeure. In the event of an unlikely abandonment, the following will serve as a guide for the removal of the project's equipment:

1. All solid wastes are collected, stored, and disposed of efficiently and safely;
2. Solid wastes resulting from the demolition of the operation should be disposed of properly; and
3. Restoration of the site.

8. Institutional Plan for EMP Implementation

An institutional structure for the establishment of an environmental management section specifically for the proposed project is recommended. In the interim that such a department is not likely to be formed by the completion of the project, it is suggested that the Safety/Environment Officer temporarily handles all environmental concerns of the project.

The Proponent assures the implementation of the following environmental management activities:

- Regular monitoring of air and noise quality in coordination with the concerned EMB-Regional Office;
- Regular and Proper Disposal of Wastes shall make an arrangement to the respective/concerned LGUs with regards to the regular disposal of solid and liquid wastes to be generated by the project operation;
- Designation of a Pollution Control Officer to ensure the implementation of the various environmental management activities necessary for the project operation.

- Conduct ECC Conditions Compliance Reporting**.** Compliance to DENR-EMB environmental standards particularly those related to water and wastewater effluent will be regularly monitored and reported to the EMB. Reporting of the results of environmental monitoring will be undertaken by the designated PCO.

Ecological Profiling and Assessment of Impacts of Land Development

1. Land

1.1. Land Use and Classification of Nearby Areas Including ECA

The vicinity of the Project are primarily farmlands.

2. Water

2.1. Hydrology/Hydrogeology

2.1.1. The main aim of the Project is to unclog the river channel to enable the flow of water at its natural rate.

2.1.2. This will entail deepening of the middle ⅓ of the channel.

2.1.3. The project will consider the elevation of the irrigation intakes.

2.2. Oceanography

2.2.1. Minimal change is expected as the opening of the river exit is small relative to the area.

2.3. Water Quality

2.3.1. The project will not touch the water table

2.3.2. Nor the surface water

2.3.3. The turbidity will be local and immediately reverts to the original

2.4. Freshwater Ecology

2.4.1. The project does not present any threat to existence and/or loss of species of important local and habitat.

2.5. Marine Ecology

2.5.1. No threats to existence or loss of species are expected as the work will be confined to a small area.

3. Air

3.1. Noise

The Proposed River Maintenance and Restoration at Nagapi River system minimally increases the existing ambient noise level in the area due to movement of people, vehicles and heavy equipment inside and outside the project area. The resulting noise levels are not expected to cause nuisance to the surrounding receptors which include residential communities, of which, the nearest is more than a half kilometer away from the project's site.

Additionally, land operations are only scheduled from morning to afternoon. Further reducing the noise impact in the area during night time.

4. People

4.1. In-migration proliferation of informal settlers

In-migration due to project workers will be minimal as the project is not labor intensive. Non skilled labor and support services will be provided by local residents. In-migration will come due to enhanced business opportunities.

4.2. Threat to delivery of basic services/resource competition

The project will not compete with existing supply of water and electricity. The project will have a large requirement of water. Power will be provided by solar power generators.

4.3. Threat to public health and safety

The project will strictly comply with existing COVID-19 protocols.
There will be minimal contact with locals as the project work will be done from a considerable distance from populated areas.

4.4. Generation of local benefits from the project (highlight)

4.4.1. Enhancement of employment and livelihood opportunities
4.4.2. Increased business opportunities and associated economic activities
4.4.3. Increased revenue of LGUs

4.5. Traffic congestion

The land operations will cause a temporary increase in the coming in and out of visitors, vehicles and equipment. While the project is not expected to cause traffic congestions along each barangay in the Municipality of Calintaan, Occidental Mindoro the company will provide traffic management plan and sufficient parking spaces for its land based vehicles.

The increase in traffic is expected along the project site going to the temporary stockpile areas. The Proponent will provide entrance and exits for traveling vehicles to and from the stockpile areas.

Marine traffic will be limited to 1 to 2 vessels (arriving and departing) per day.

Carrying Capacity Assessment

Silt/Sediment Management

The maximum silt/sediments to be dredged per month are as follows:

TIMELINE		QTY (cu.m.)	LOCATION	SUB TOTAL (cu.m.)
YEAR 1	MONTH 1	150,000	DOWNSTREAM	
	MONTH 2	150,000	DOWNSTREAM	
	MONTH 3	150,000	DOWNSTREAM	
	MONTH 4	150,000	DOWNSTREAM	
	MONTH 5	100,000	DOWNSTREAM	
	MONTH 6	0		
	MONTH 7	0		Year 1
	MONTH 8	100,000	DOWNSTREAM	1,400,000
	MONTH 9	150,000	DOWNSTREAM	
	MONTH 10	150,000	DOWNSTREAM	
	MONTH 11	150,000	DOWNSTREAM	
	MONTH 12	150,000	DOWNSTREAM	
YEAR 2	MONTH 13	150,000	UPSTREAM	
	MONTH 14	150,000	UPSTREAM	
	MONTH 15	150,000	UPSTREAM	
	MONTH 16	150,000	UPSTREAM	
	MONTH 17	100,000	UPSTREAM	
	MONTH 18	0		
	MONTH 19	0		Year 2
	MONTH 20	100,000	UPSTREAM	1,400,000
	MONTH 21	150,000	UPSTREAM	
	MONTH 22	150,000	UPSTREAM	
	MONTH 23	150,000	UPSTREAM	
	MONTH 24	150,000	UPSTREAM	
TOTAL		2,800,000		

Environmental Risk Assessment

To minimize the risks of oil spills, the Proponent has set policies for both the offshore and land based sectors of the operations to allot personnel and facilities for monitoring equipment usage and conditions, and uphold worksite safety and risk reduction.

For marine vessels, regular inspections of onboard facilities including fuel tanks and storage will be conducted. Refueling operations will be done offsite e.g. at PPA operated ports near the project area engaging only accredited suppliers.

For land based equipment and vehicles, proper handling and storage of fuel containers will be observed. Safety Officers will be assigned to specifically monitor the land based operations.