I. PROJECT DESCRIPTION:

The purpose of **BACLARAN RIVER DREDGING PROJECT** will not only revert the original course of the river as determined from the available NAMRIA Maps and DPWH Plans through deepening and widening but it will also to open the river mouth / estuary to be able to unload the water coming from the mountains including the river run materials to Mindoro Strait. Dredging will mitigate the risk of flooding in the surrounding areas or communities and eventually focus on the restoration and rehabilitation of Baclaran River. The dredged materials will be stockpiled in a designated stockyard for further segregation (sand and gravel) according to sizes while some will be directly carried to remote locations for reclamation purposes.

Baclaran River is a relatively new river as it was previously a tributary of Amnay River originating from Sitio Anayasan and Balugo of Barangay Pinagturilan within the Municipality of Sta. Cruz. The main channel of Baclaran River stretches almost 16 kilometers from the river mouth up to the foot of the mountain range on the eastern section of the municipality. A relatively small river based on its 89 square kilometer watershed, Baclaran River flows generally westward towards Mindoro Strait – Apo East Pass. The river has the characteristics of an anastomosing river which has interconnected channels that enclose the active floodplain (Makaske, 2001). Its bends are moderately sinuous, increasing as it transitions downstream. During the dry season river flow has low energy flow, therefore, remobilization of river deposits is likely occurring during wet season.

Thus, a 3,000 cubic meters per hour capacity Cutter-Suction Dredger (CSD) equipped with state of the art technology shall be employed to dredge the river mouth / delta and it's attributes in tandem with the conventional backhoe-dozer-dump truck method in removing river run materials of the subject river is urgently necessary to ensure the safety of the nearby residential communities, damage to the bridges, increase the carrying capacity of the river, resurface the river water and restore aquatic habitat and vegetation. Physically, it also alters the waterway banks and even build-up channel plugs and levees.

The Local Government Code empowers the province to do preventive actions or implement risk reduction by way of providing services to the people in the form of drainage, sewerage, flood control, reclamation projects, and other emergency measures, as may be necessary during and in the after-math of man-made and natural disasters. Thus, the Provincial Government of Occidental Mindoro through Resolution No. 12 series of 2022 dated 11 January 2022 of the Inter-Agency Committee (IAC) composed of the Provincial Government of Occidental Mindoro, DPWH, DENR, MGB and EMB authorizes R.V. LABORTE BUILDERS to dredge the mouth, lower reaches and the upstream of Baclaran River including the marine area (to open the river mouth).

Photo No. 1_Panoramic view of the river delta or the mouth of BACLARAN RIVER using DJI Mavic 2 Zoom Drone. Note that the mouth or the river delta was stalled by silt materials or sediments that prevents the flow of the water including the river run materials to the receiving Mindoro Strait.

Photo No. 2_Panoramic view of the BACLARAN RIVER using DJI Mavic 2 Zoom Drone showing distributary stream to the right joining Barahan River due to the opening or the mouth of Baclaran River were heavily silted therefore water will find another way to empty its load to Mindoro Strait.

Photo No. 3_Panoramic view showing that crops such as corn and onion were planted to the large portion of the original path of BACLARAN RIVER creating diversion of water to low lying parts of the river system that causes flooding and erosion.

Photo No. 4_Panoramic view showing the Dike Road on both sides of BACLARAN RIVER to prevent flooding hazard to Barangays Ilvita and Claudio Salgado of Sablayan on the left and Barangays Pinagturilan and Barahan of Sta. Cruz to the right within the Province of Occidental Mindoro.

Photo No. 5_Panoramic view of BACLARAN RIVER has shallow depth in this portion that our service vehicle can pass up to the center of the river.

1.1 Project Location and Area:

The portion of Baclaran River to be dredge and restore is located at Barangay Claudio Salgado within the Municipality of Sablayan in the Province of Occidental Mindoro.

Sablayan is the central municipality of mainland Occidental Mindoro. It is bounded on the north by the municipality of Santa Cruz in the province of Occidental Mindoro, and the municipalities of Baco, Naujan, Victoria and Socorro in the province of Oriental Mindoro; on the east by the municipalities of Pinamalmayan, Gloria, Bansud, Bongabong and Mansalay in the province of Oriental Mindoro; on the west by Mindoro Strait; and on the south by the municipality of Calintaan in the province of Occidental Mindoro. It is about 87.80 kilometers south of Mamburao, the provincial capital, and 87.60 kilometers north of San Jose, the business and financial center of the province.

Sablayan is the largest municipality in the country. It has a total land area of 229,559.1741 hectares. This area comprises almost 39 percent of that of the province of Occidental Mindoro. The urban core constitutes three adjacent barangays which are Buenavista, Poblacion and Santo Niño. This has an aggregate land area of 3,842.9161 hectares corresponding to 1.67 percent of the total municipal land area while the rest are rural barangays.

The municipality is guarded by two sentinel islands known as Pandan Grande and Pandan Piqueño, each having an approximate land area of 35.9828 and 31.9610 hectares, respectively. These islands also serve as windbreaks for the municipality making the town cove ideal hiding place for boats during storms. Another island covered by the judicial territory of Sablayan is the Apo Island located within the world-renowned Apo Reef Natural Park (ARNP). It lies approximately 22 nautical miles southwest of the project area and 53 nautical miles northeast of Calamian Islands in northern Palawan. The reef covers a water area of 15,792 hectares and a land area of 29 hectares. Pandan Island is approximately 6.3 nautical miles while the foot of Mount Iglit-Baco National Park is approximately 26 aerial kilometers from the project area.

Sablayan has 22 duly constituted barangays. Ten of these are coastal barangays namely: Buenavista, Burgos, Claudio Salgado, General Emilio Aguinaldo, Ibud, Ligaya, Poblacion, Santa Lucia, San Nicolas, and Santo Niño while seven are forest fringe (Batong Buhay, Burgos, Ligaya, Malisbong, Pagasa, San Agustin, and Tuban) and the rest are interior barangays (Ilvita, Lagnas, Paetan, San Francisco, San Vicente, Tagumpay, and Victoria). Like many municipalities, cities and provinces

in the country, Sablayan also faces boundary disputes with adjacent territories.

Based on the "Detailed Engineering Design Report 2021 for the proposed BACLARAN RIVER DREDGING PROJECT" conducted by DPWH MIMAROPA and Provincial Government of Occidental Mindoro given to a dredging contractor – R.V. LABORTE BUILDERS with the following coordinates on the table listed below with varying elevation starting from 0 meter at the mouth to 9 meters at the middle and 15 meters above mean sea level (amsl) at the upstream of Baclaran River.

Table No. 1_Geographic coordinates of the dredging area (using WGS 84 datum).

Corner	Latitude	Longitude
1	12°58'4.18"	120°46'3.71"
2	12°58'14.56"	120°46'13.23"
3	12°58'27.37"	120°46'16.54"
4	12°58'38.73"	120°46'18.44"
5	12°58'42.27"	120°46'25.08"
6	12°58'50.40"	120°46'28.09"
7	12°58'46.24"	120°46'30.82"
8	12°58'44.70"	120°46'45.83"
9	12°58'52.84"	120°47'2.88"
10	12°58'46.45"	120°47'18.65"
11	12°58'51.14"	120°47'24.67"
12	12°58'50.56"	120°47'37.70"
13	12°58'42.97"	120°47'51.89"
14	12°58'51.77"	120°48'1.72"
15	12°58'45.51"	120°48'18.21"
16	12°58'53.82"	120°48'34.56"
17	12°58'47.30"	120°48'48.96"
18	12°58'53.72"	120°49'8.60"
19	12°58'46.61"	120°49'20.23"
20	12°58'56.71"	120°49'34.40"
21	12°58'53.53"	120°49'44.62"
22	12°58'48.36"	120°49'40.27"
23	12°58'50.98"	120°49'36.53"
24	12°58'41.07"	120°49'22.30"
25	12°58'47.51"	120°49'8.99"
26	12°58'44.13"	120°48'56.06"
27	12°58'39.68"	120°48'43.66"
28	12°58'47.59"	120°48'40.50"
29	12°58'38.79"	120°48'17.16"
30	12°58'45.88"	120°48'3.44"
31	12°58'38.04"	120°47'56.57"
32	12°58'43.64"	120°47'38.40"

33	12°58'42.71"	120°47'23.23"
34	12°58'45.91"	120°47'5.11"
35	12°58'38.23"	120°46'43.86"
36	12°58'40.84"	120°46'28.99"
37	12°58'34.31"	120°46'21.80"
38	12°58'18.02"	120°46'22.58"
39	12°58'6.90"	120°46'14.02"
40	12°57'56.26"	120°46'5.01"

Dredging Area – 167 hectares (approximately)

Table No. 2_Geographic coordinates of the marine area

Corner	Latitude	Longitude
1	12°58'4.18"	120°46'3.71"
2	12°57'58.16"	120°45'45.26"
3	12°57'46.10"	120°45'50.55"
4	12°57'54.60"	120°46'5.28"

Marine Area / Navigational Zone – 19 hectares (approximately)

1.1.1 Impact Areas

The area subject for Environmental Impact Assessment (EIA) Study was based on the perceived direct and indirect impact areas of the proposed dredging project is from the marine area (to open the river delta), mouth, lower reaches and portion of upstream of Baclaran River in Sablayan, Occidental Mindoro as identified by the consultants during the site inspection and verification.

As stipulated in DAO No. 2003-30, direct impact area for the dredging & desilting project is considered as the shoreline, marine area (tenurial instrument), navigational area, riverbank, bridges, freshwater ecosystem, estuarine area and the host barangay specifically all along the 500-meter radius from the boundary of the property or dredging area of Baclaran River where it will be altered in terms of physical environment while the indirect impact area is identified as those or outside of the primary impact area, which is identified as the nearby barangay and farmlands including barangay access roads.

The combined impacts of the proposed development and the existing developments in the area can be more accurately defined, once the project activities commence including the Environmental Monitoring Plan (EMoP). These impact areas are specific to the project but the effects or influences in the other developments in

the vicinity of the proposed project site could potentially contribute the cumulative impacts on the environment.

For Socio-Economics, data were gathered from FGD with the host community, Barangay Claudio Salgado Officials particularly with the residents of Purok 3, Purok 2, Purok 1 and from Sablayan Municipal Planning and Development Office through their Community-Based Monitoring System (CBMS). In addition, a Comprehensive Land Use Plan (CLUP) was formulated for the Municipality served to shed light on future social and land use condition in the area. The socio-cultural impact of this project may uplift the economy of the host Barangay – Claudio Salgado as well as within the Municipality of Sablayan coming from taxes and job employment.

Table No. 3_Impact Areas of the Project:

AREA CLASSIFICATION	AREA COVERAGE
Direct Impact Areas	**Biophysical impact:** The 167-hectare dredging area (at the delta or mouth, lower reaches and the upstream of Baclaran River) and the 19-hectare marine area as tenurial instrument to open-up the river mouth / delta
	Socio-cultural impact: Barangay Claudio Salgado, being the host community will benefit from the project's Social Development Programs (SDP) and Corporate Social Responsibility (CSR)
Indirect Impact Areas	In terms of biophysical impact: • Surrounding communities of Barangay
	In terms of socio-cultural impact: • Surrounding Barangays and Indigenous People Community, if any

Figure 1_ Satellite Image showing the geographical coordinates of the project area **(River – red and Marine – white polygon, respectively)**.

Figure 2_The Primary and Indirect Impact Area is the 500m radius from the boundary of the project area or the river delta.

1.2 Project Rationale

The Local Government Code empowers the province "*to do preventive actions or implement risk reduction by way of providing services to the people in the form of drainage, sewerage, flood control, reclamation projects, and other emergency measures as may be necessary during and in the after-math of man-made and natural disasters.*"

To address the very root of the problem, a Barangay Resolution from Barangay Claudio Salgado and its residents requested the Provincial Government of Occidental Mindoro through the Municipality of Sablayan to take action on the recurring flooding hazard within the community of Purok 1, 2, and 3 and its vicinity that could cause substantial damage to their lives, properties and crops during rainy season.

The Department of Public Works and Highways (DPWH) requested for the participation of the private entities to dredge the river systems affecting the concerned communities of the entire province Occidental Mindoro at "*no cost to the government of the Republic of the Philippines*". Thus, the Inter-Agency Committee (IAC) composed of the Provincial Government of Occidental Mindoro, DENR, DPWH, MGB and EMB conducted a thorough and meticulous process of selecting private companies with qualifications and capabilities to dredge or desilt the Baclaran River.

The IAC through a selection process awards Baclaran River to R.V. LABORTE BUILDERS as the Dredging Contractor to dredge / de-clog / desilt the river channel from the river delta all the way to the upstream including the marine area as navigational zone to open the river mouth. The dredging operation will be supervised by the DPWH District Engineer's Office to conform with the approved dredging plans.

1.3 Project Alternatives

The Inter-Agency Committee (IAC) granted the proposed dredging area to R.V. Laborte Builders based on the approved DPWH Dredging Plan and DPWH Dredging Clearances / Permit after complying all the necessary requirements of all the government agencies concerned.

The result of the exploration activity and other secondary information gathered at various government agencies guided the proponent to pursue the dredging and desilting project. Location was considered as the most economical sources considering vessel will navigate only 130-200 kilometers from prospective reclamation sites within CALABARZON and MIMAROPA Area including METRO MANILA.

There are different kind of dredgers and other methods to dredged and desilt / de-clog the subject river. Among them are the Trailing Suction Hopper Dredger, Cutter-Suction Dredger, Auger Suction, Grab Dredger, Backhoe Dredger, Pneumatic Dredger, and the conventional method using Backhoe-Loader-Dump Truck Tandem among others. Cutter Suction Dredger (CSD) is ideal or suitable for small river because of its size and capability to dredge and grind stones during suction. The dredging system is executed by lowering the ladder into the dredging area, and as the ladder hit the target dredging area, the cutter attached to the bottom of the ladder is activated and operated at a precise depth. The sand dredged by the equipment and the water are then extracted simultaneously by the pump and transported and delivered to barges or sand carrier using an extension pipe as conveyor. It operates on an almost continuous dredging cycle resulting to economic and maximum economy and efficiency. Dredging takes place while the vessel is moored by means of spuds and/or anchors and combines cutting action for rocklike formation with suction. The use of silt curtains at the dredging site shall also be implemented to reduce further turbidity.

If the proposed project will not continue, the benefits of having additional employment opportunities for qualified residents of the host barangay as well as the social development for the community such as livelihood projects, skills training, scholarship programs and medical assistance as well as the substantial increase in local taxes, multiplier effect of the project such as business opportunities, support to social services and other opportunities for the community and the LGU will be lost / gone. However, "No Project Option" means no additional environmental impact such as siltation, disturbance of marine environment and potential oil spill from dredging vessel and equipment but the recurrence of flooding hazard will continue to affect the lives of Barangay Claudio Salgado.

The municipality is guarded by two sentinel islands known as Pandan Grande and Pandan Piqueño and is approximately 6.3 nautical miles from the project area. These islands also serve as windbreaks for the municipality making the town cove ideal hiding place for boats during storms. Another island covered by the judicial territory of Sablayan is the Apo Island located within the world-renowned Apo Reef Natural Park (ARNP) known for its coral reef and various marine species living on it. It lies approximately 22 nautical miles southwest of the project area and 53 nautical miles northeast of Calamian Islands in northern Palawan. The reef covers a water area of 15,792 hectares and a land area of 29 hectares. Other notable landmark is the Mount Iglit-Baco National Park home of the critically endangered and elusive Tamaraw or Mindoro Dwarf Buffalo (scientific name: *Bubalus Mindorensis*) where the foot of the mountain is approximately 26 aerial kilometers from the project area.

1.4 Project Components

The dredging operation of Baclaran River will start to deepened the marine area (tenurial instrument) covering an area of approximately 17 hectares based on the Seismic Data and Bathymetric Measurement conducted by Trinav Surveys before opening the mouth of the river (delta) following the original contour or pattern of the river from lower reaches up to upstream having a width that varies from 90 meters to 250 meters wide.

R.V. Laborte Builders will construct temporary dikes or gabion as retaining walls to guarantee that it will not cause damage to any infrastructure based on the approved DPWH Dredging Plan. During construction of the retaining walls, sand materials shall be excavated with a depth that varies from 2 meters up to 5 meters (maximum depth) on the line of dredging area. The dredging channel shall be protected by sand bagging both sides in order to prevent erosion. Sounding shall be conducted every 100 meters of the dredge channel for the calculation of volume or by drop survey of vessel. For safety of all workers and crew during typhoon season or if there are announcement of tropical depression or huge swelling to arrive at Mindoro Strait, the Engineers shall suspend the dredging activities and vessel shall automatically hide their barges, vessel and suction dredger to a safer place at Pandan Bay or Sablayan Pier. The DPWH Technical Staff as well as the Provincial Engineers Office representative shall monitor the conventional method and dredging operation up to 24 hours per day for seven (7) months or as long as the weather permits.

1.5 Process / Technology Options

The method of dredging operations to be implemented by herein proponent shall be the **Cutter-Suction Dredging Method** and **Conventional Method** using **Backhoe-Dozer-Dump Truck Tandem.**

a. Cutter-Suction Dredger:

Using the data acquired from the "bathymetric measurements, seismic profiling, marine assessment, cross-section analysis, depth sounding and geotechnical report including geologic assessment" of Baclaran River including the marine area as access point or navigational zone, the ship shall be positioned in the area that a Cutter-Suction Dredger can safely and efficiently remove sand materials. The said survey, provides information as to subsurface topography of the intertidal zones, depth of water, thickness of sand profile, boulders and basement, among others.

a.1 Description and Process Operation of Cutter-Suction Dredger

The process technology includes dredging by suction, vessel loading and transporting of materials to the different locations of prospective clients. It can also be stored or stockpiled at the designated stockpile area near the proposed dredging site as presented.

The dredging operation shall be undertaken using the two (2) Cutter-Suction Dredger (CSD) (**Figure 4 & 5**) having a capacity of 3,000 cubic meters per hour are allotted for this project. The materials dredged from the river delta and upstream shall be discharged aboard on three (3) Floating and/or Split Hopper Barges (**Figure 6 & 7**) with carrying capacity of 2,000 cubic meters each are on standby that take turns to be filled through a specialized floating discharge hose to be transferred to a 6,000 cubic meter capacity Sand Carrier Vessel (**Figure 8**) or via conventional loading at causeway / port through backhoe or clamshell-type crane for disposition to prospective clients in different locations.

The CSD to be commissioned is a specialized on-propelled vessel, equipped with 2 hydraulic spuds and anchors to move itself around the dredging area and a powerful rotating cutter head to remove all kinds of material including rock, clay, silt and sand. It is very effective when deployed in the construction and maintenance of ports, harbors and approaches, rivers and estuaries, land reclamation and coastal defenses. R.V. Laborte Builders shall deploy the herein CSD to remove substantial volume of sand at the river mouth and reduce significantly the overly deposited river run materials.

A CSD is positioned on spuds and anchor winches to ensure the vessel is firmly anchored during dredging. The cutter ladder is lowered. By pulling on the side wires, the cutter head is moved sideways, swinging around the main spud. The cutter suction dredger moves forward by means of the spud carriage.

The cut material together with a large quantity of water is drawn into the suction mouth. The sand, soil and water mixture are then transported by the dredge pump through the large discharge pipeline for further transport to the waiting or stationary hopper barge in the vicinity of the CSD. The dredging channel to be created shall maintain the angle of repose to minimize slope failure.

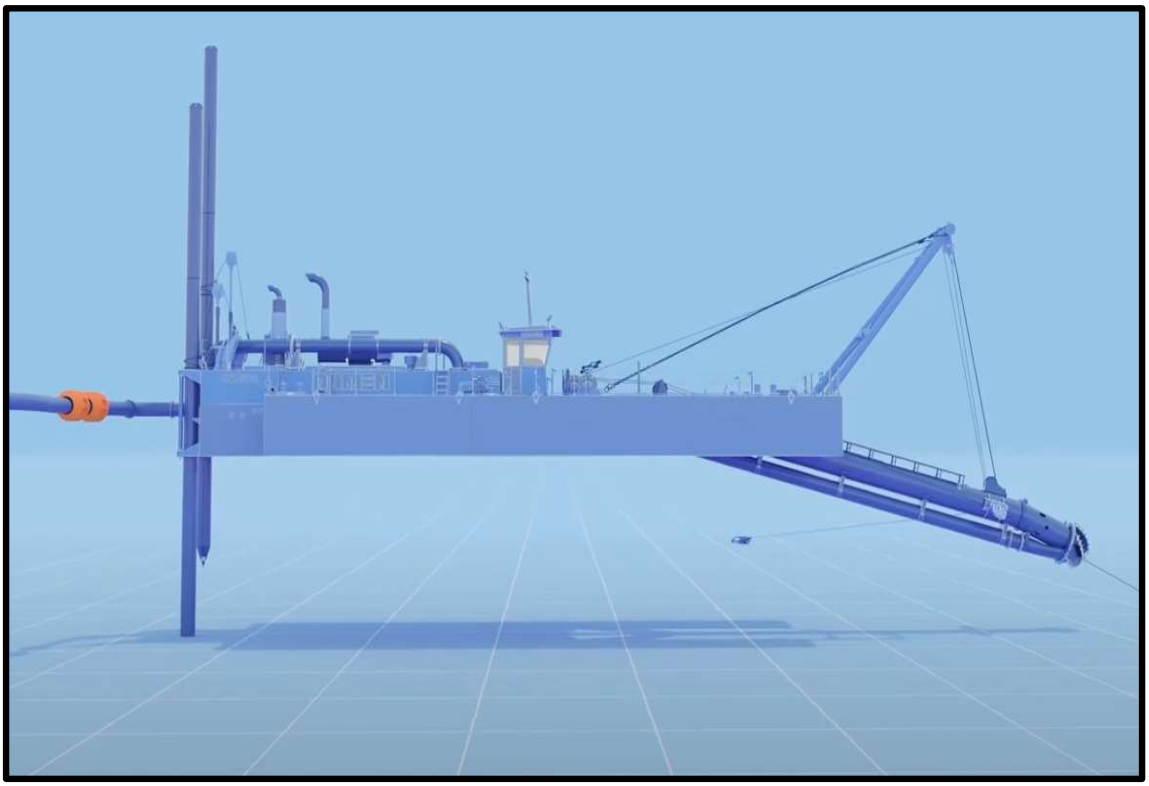

Figure No. 4_Side View of the Damen CSD 450, showing 2 spuds to position the dredger steadily.

Figure No. 5_This Cutter-Suction Dredger with ID "Damen CSD 450" will be employed initially in the project.

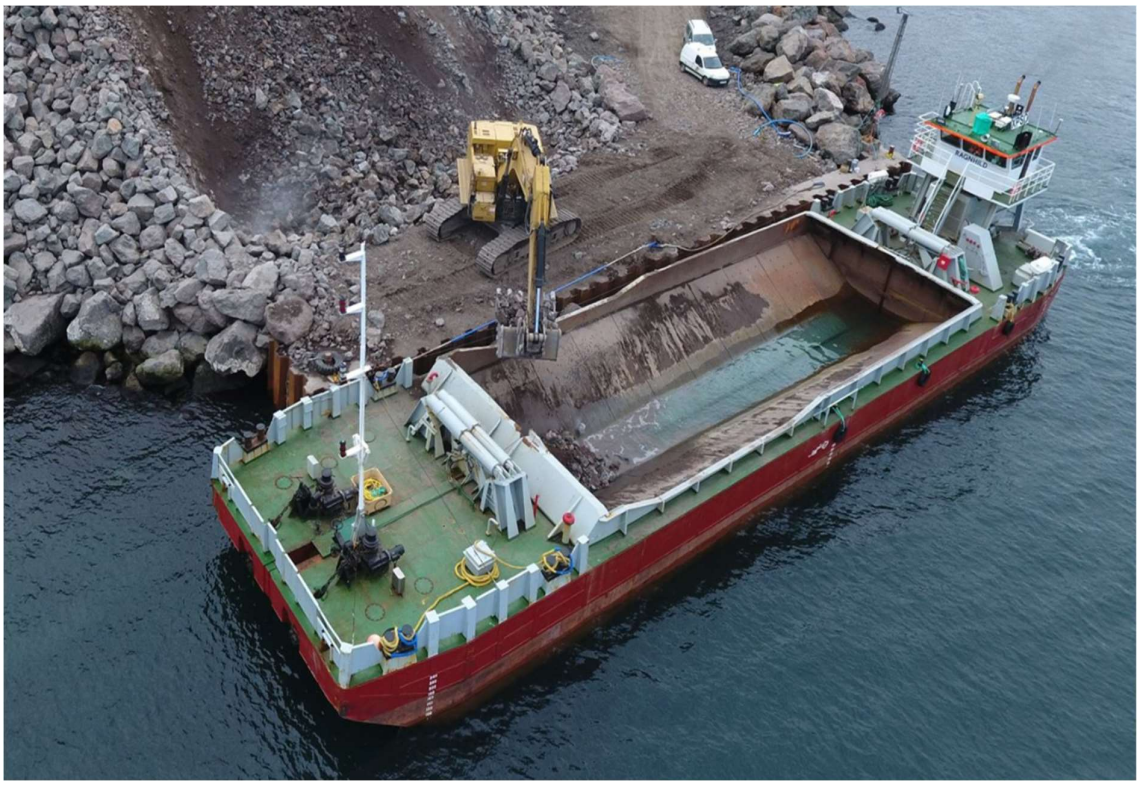

Figure No. 6_Typical Split Hopper Barge for reclamation projects.

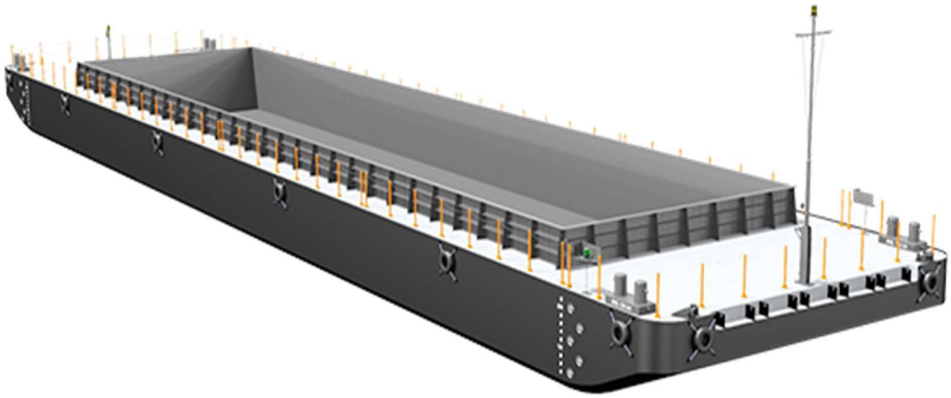

Figure No. 7_Typical Floating Hopper Barge.

Figure No. 8_This Sand Carrier Vessel with ID "An Da Kang 689 and Xin Yi 9577" can be employed in the project and readily available for deployment.

a.2 Cutter Suction Dredger Capacity and Specification:

Table No. 4_Dredger Capacity & Specification

MAIN DATA	DIMENSION
Gross Tonnage	115
Length overall	33.15 m
Lenght b.p.p.	22.60 m
Beam	6.95 m
Moulded Depth	1.80 m
Max. draught	1.05 m
Suction pipe diameter	0.45 m
Discharge pipe diameter	0.45 m
Swing width	34 m at maximum dredging depth
Maximum suction capacity	3,000 cubic meter / hour
Max. dredging depth	12 m
Min. dredging depth	2 m
Anchoring system	Spud carriage
Total installed power	709kW @ 1,600 rpm
Cutter power	110 kW
Cutter diameter	1.5m

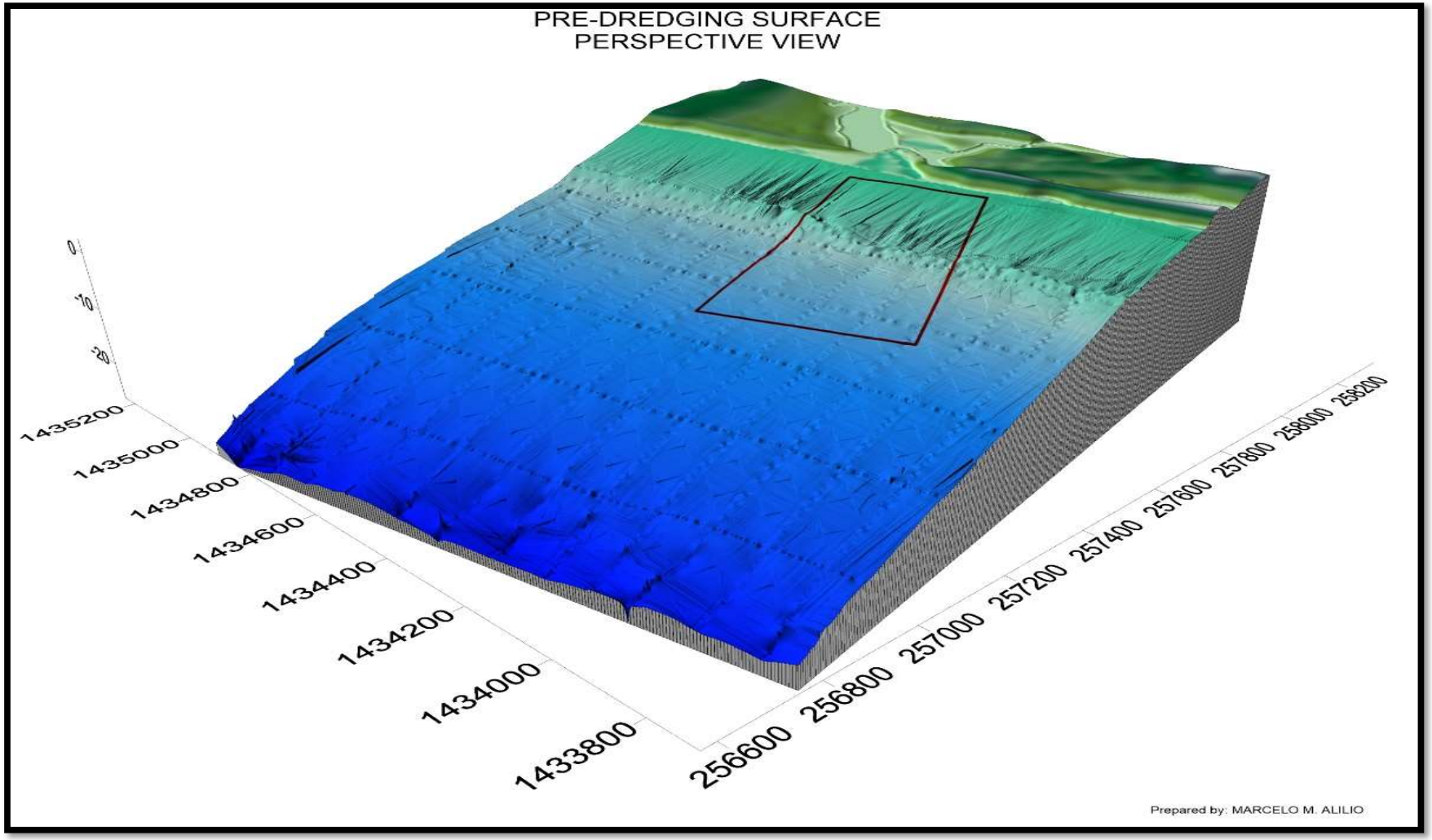

Figure No. 9_3D View of the pre-dredge surface.

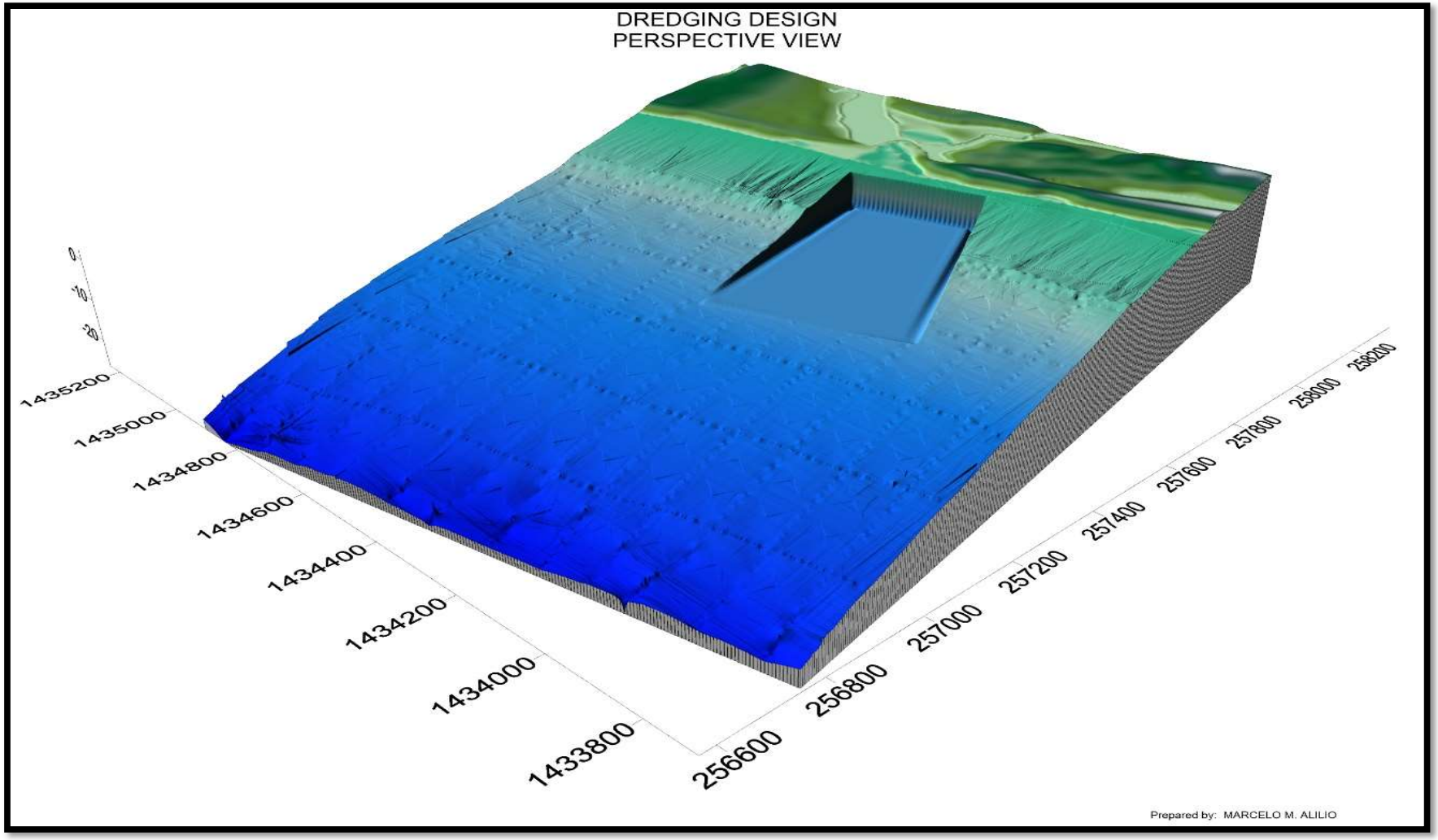

Figure No. 10_3D View of the combined bathymetric and topographic surface near Baclaran River showing the **Navigational Zone Polygon** and the **Dredging Design Surface Excavation Limit**.

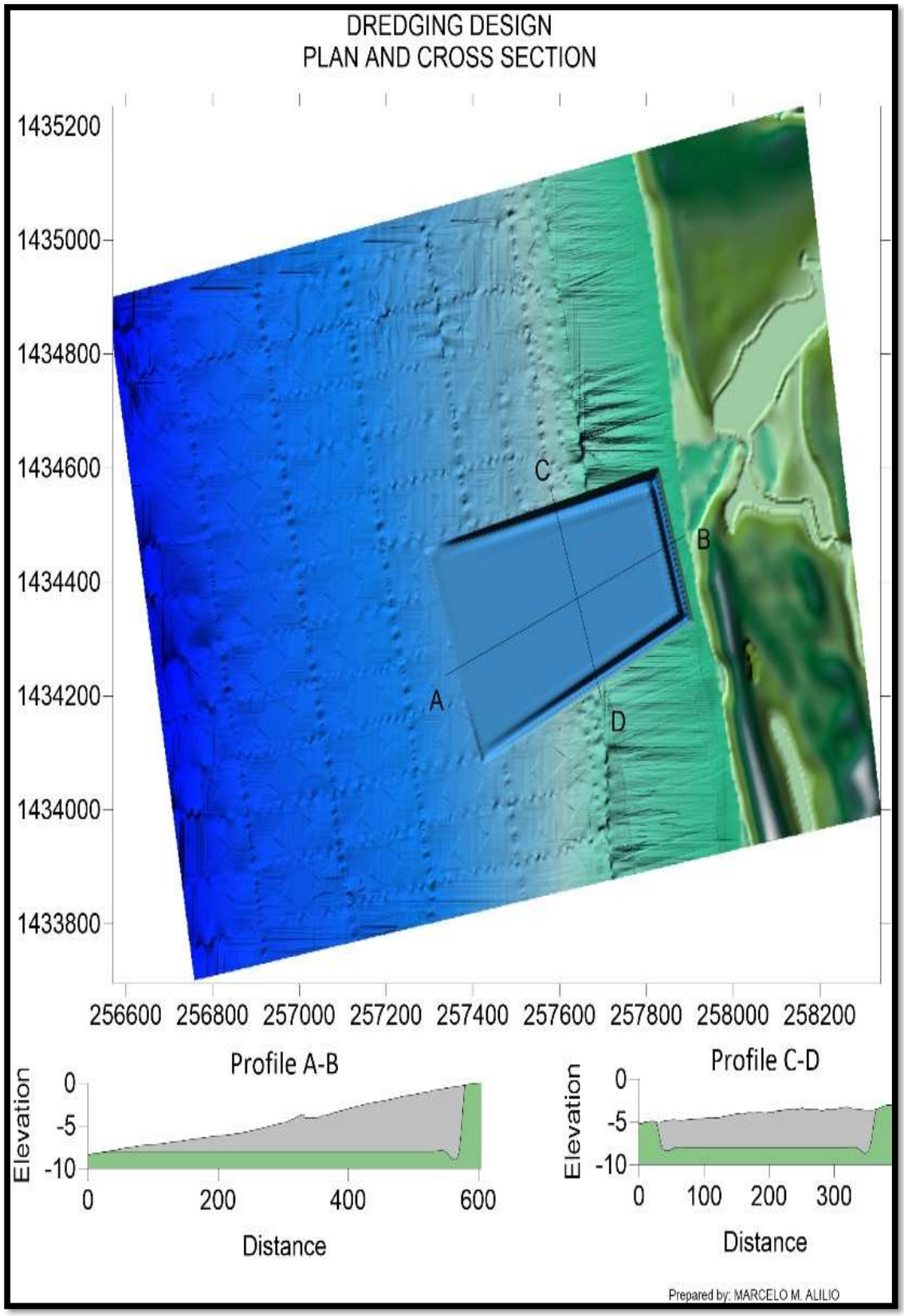

Figure No. 11_Plan view and cross sections showing the upper and lower surfaces and the dredging limit. Gray area is the materials to be excavated.

Using the pre-dredge (Figure 9), dredge design surfaces (Figure 10) and the navigational zone polygon as limits, we were able to calculate the volume of dredge materials using the Surfer 18 as follows:

Grid Volume Computations

Wed Mar 15 07:34:56 2023

Upper Surface
Grid File Name: D:\JuliusCariño\Baclaran\Baclaran_LS.grd
Grid Size: 1541 rows x 1771 columns

X Minimum: 256570
X Maximum: 258340
X Spacing: 1

Y Minimum: 1433695
Y Maximum: 1435235
Y Spacing: 1

Z Minimum: -26.698571703369
Z Maximum: 2.3947662950324

Lower Surface
Grid File Name: D:\JuliusCariño\Baclaran\dredging_design.grd
Grid Size: 1541 rows x 1771 columns

X Minimum: 256570
X Maximum: 258340
X Spacing: 1

Y Minimum: 1433695
Y Maximum: 1435235
Y Spacing: 1

Z Minimum: -26.698571696234
Z Maximum: 2.3947662949279

Polygon Boundary
File Name: D:\JuliusCariño\Baclaran\navi_zone_poly.shp
Number of Polygons: 1
Volume: Inside

Volumes

Z Scale Factor: 1

Total Volumes by:
Trapezoidal Rule: 627406.82787134
Simpson's Rule: 627405.81171625
Simpson's 3/8 Rule:627413.50077598

Cut & Fill Volumes
Positive Volume [Cut]: 627932.75968588
Negative Volume [Fill]: 525.9318145494
Net Volume [Cut-Fill]: 627406.82787133

Areas

Planar Areas
Positive Planar Area [Cut]: 184510.78278485
Negative Planar Area [Fill]: 4437.7172151454
NoData Planar Area: 2536851.5
Total Planar Area: 2725800

Surface Areas
Positive Surface Area [Cut]: 186409.77920285
Negative Surface Area [Fill]: 4438.5058135691

b. Conventional Method: Backhoe-Dozer-Dump Truck Tandem

Initial Dredging Lake shall be identified strategically on ground and shall be developed to be the initial source of sand to be removed. A backhoe-dozer tandem shall be used in this task. Two (2) to three (3) dredging lakes shall be developed progressively, to increase the volume of sand to be removed.

From the dredging lakes, backhoes/clamp shells shall extract water-laden sand and immediately stockpiled the sand near the reach of the bucket. The development of the said lakes shall be in accordance with the direction of the dredging plan. The dozer-loader shoves the sand and load it to the hauling trucks. The loaded trucks are then unloaded the sand to the floating hopper barge steadily anchored in the causeway/port until fully loaded. The barges sail towards the mother vessel to unload the sand using the vessel's clamp shells.

Dredging
LAKE DEVELOPMENT

- 30-50 meters in diameter
- In the direction of the plan

Backhoes/ Cranes
EXTRACT SAND & STOCKPILES ALONG SIDE

- Loader hauls and load unto trucks
- Loaded Trucks to mobile rotary screen and/or directly to Barges to unload

BARGES to Mother Vessel

- Series of Clam Shells upload sand to the mother vessel
- Onboard backhoe in barges assists clam shells of the mother vessel

Figure No. 12_Using Backhoe for extraction of sand.

Figure No. 13_Using Dozer-Loader to shove sand for stockpile.

Figure No. 14_Dump truck for loading using the port to the barges.

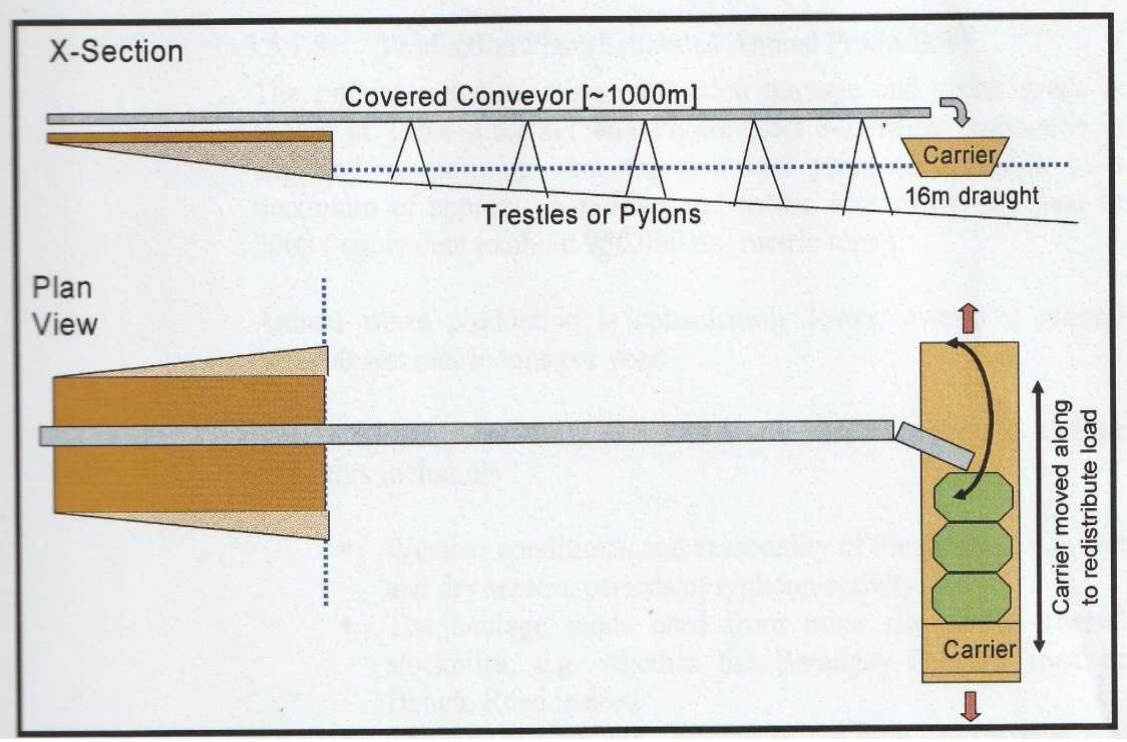

Figure No. 15_Diagrammatic Representation of a Trestle / Pylon Conveyor Loading System to load a Bulk Ore Carrier.

A 1000-ton per hour trestle conveyor loading facility designed to allow sand material-shipment in most weather conditions. The trestle conveyor will allow the direct loading of sand materials to bulk carriers offshore (a distance of 250-300 meters), eliminating the need for barging and trans-shipment.

A detailed seismic and bathymetric survey has already been undertaken to locate the best position for the trestle / pylon conveyor, as well as to locate the best anchorage area for the bulk carrier.

c. Navigational Traffic Scheme

The herein proponent shall follow the Rule 10 of the Convention on the International Regulations for Preventing Collisions at Sea (COLREGS). The COLREGS are the rules of the road that vessels must obey at sea to avoid collisions. The proponent shall strictly follow the international navigational traffic rules, as follows:

1. A vessel using a traffic separation scheme shall: **a.)** proceed in the appropriate traffic lane in the general direction of traffic flow for that lane; **b.)** so far as practicable keep clear of a traffic separation line or separation zone; **c.)** normally join or leave a traffic lane at the termination of the lane, but when

joining or leaving from either side shall do so at as small an angle to the general direction of traffic flow as practicable;

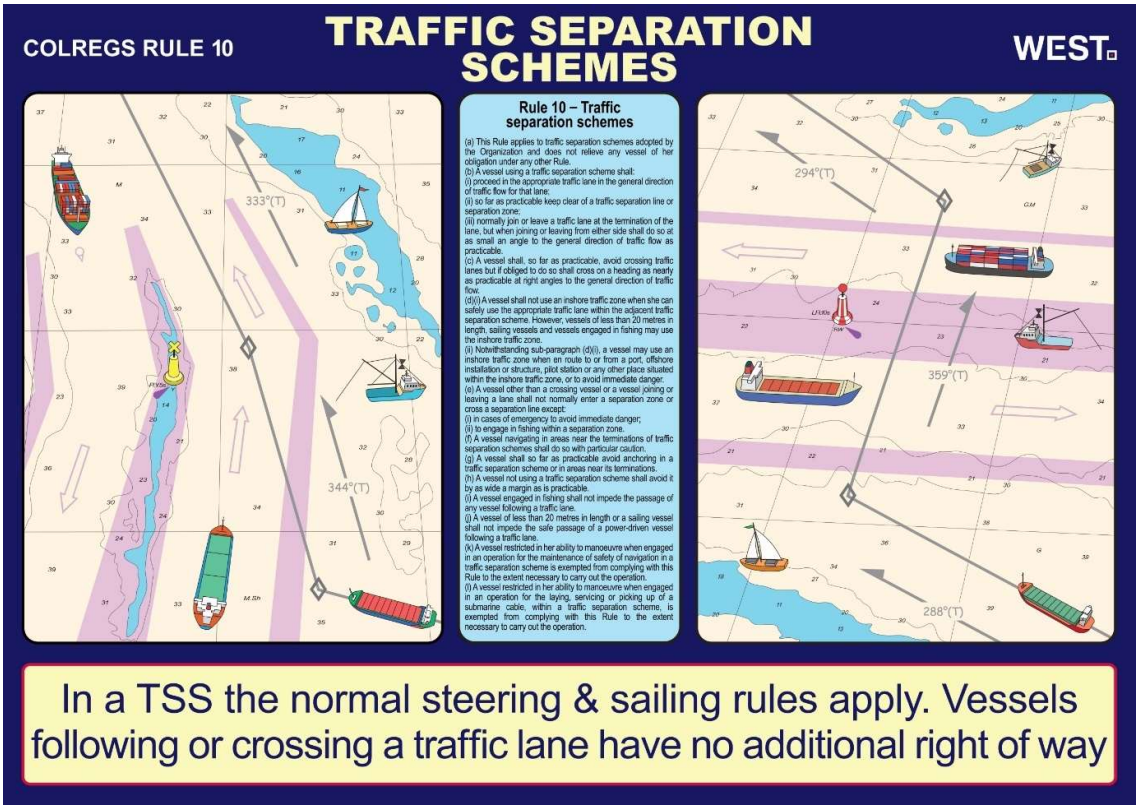

Figure No. 16_Schematic Form of Navigational Traffic Scheme using Rule 10.

2. A vessel shall, so far as practicable, avoid crossing traffic lanes but if obliged to do so shall cross on a heading as nearly as practicable at right angles to the general direction of traffic flow;
3. A vessel other than a crossing vessel or a vessel joining or leaving a lane shall not normally enter a separation zone or cross a separation line except: in cases of emergency to avoid immediate danger and to engage in fishing within a separation zone;
4. A vessel navigating in areas near the terminations of traffic separation schemes shall do so with particular caution;
5. A vessel shall so far as practicable avoid anchoring in a traffic separation scheme or in areas near its terminations; and
6. A vessel not using a traffic separation scheme shall avoid it by as wide a margin as is practicable.

The Philippine Coast Guard (PCG), Philippine Port Authority (PPA) and Maritime Industry Authority (MARINA) will issue an approved Navigational Traffic Scheme for the project before its operation.

Photo No. 6_Dozen of Bulk Carriers in Claver, Surigao Del Norte were simultaneously loaded with Nickel Ore following Rule No. 10, the COLREGS, Navigational Traffic Scheme.

1.6 Project Size

Baclaran River Dredging Project to cover the mouth, lower reaches and portion of upstream having an area of approximately 167 hectares to include the navigational zone at marine area (tenurial instrument to create an opening for Baclaran River) of approximately 19 hectares situated at Barangay Claudio Salgado within the Municipality of Sablayan in the Province of Occidental Mindoro.

1.2.1 Resource Estimates

The data generated during the course of the various stages of the exploration, specifically the high-resolution seismic reflection profiling, bathymetric measurements, subsurface geotechnical investigation and geological sampling through drilling were all considered in the estimation of the resource.

Based on the **Initial Bathymetric, Depth Sounding & Cross-Section Analysis Report** and **Subsurface Geotechnical Investigation (Annex A & B)** at Baclaran River was conducted by set of experts such as Geologist, Geological Engineer and Civil-Geotechnical Engineer last April 2021 suggests that the subject river is continuing in the deposition of sediments from its mountain sources from the eastern section

which is relatively high in volume having a **total volume estimate of 2,283,308.11 cubic meters** of combined sand, gravel, pebble and other sediments based on the 5 meters assumption of thickness of deposits while from the **DPWH Detailed Engineering & Design Report (Annex C)**, the total estimated volume of combined sand, gravel, pebble and other sediments from Baclaran River is roughly **2,421,514.25 cubic meters.**

The mineable marine sediment resources in the navigational zone occurs within the numerous sediment layers based on the **Report on the Seismic Reflection Profiling and Bathymetric Measurements on Baclaran River (Annex D)** conducted by TRINAV SURVEYS, the volume of dredged materials needed to be excavated from the seabed is approximately **627,406.80 cubic meters** (assumption: 2.6 specific gravity). The total dredge area limit as extracted from ArcGIS is **189,986.55 square meters** while the total area of the positive cut is **184,510.78 square meters** as determined by Surfer 18 because some portion of the navigational zone is deeper than the 8 meters dredging floor limit and need not to be dredged. Granting that the capacity of the Cutter Suction Dredger to be used is 3,000 cubic meters per hour and operating at 14 hours per day, it takes only about 418.3 hours equivalent to 17.43 ≈ **18 days to complete the dredging or deepening of the proposed navigation lane**, as designed above see **Figure 9 to 11**.

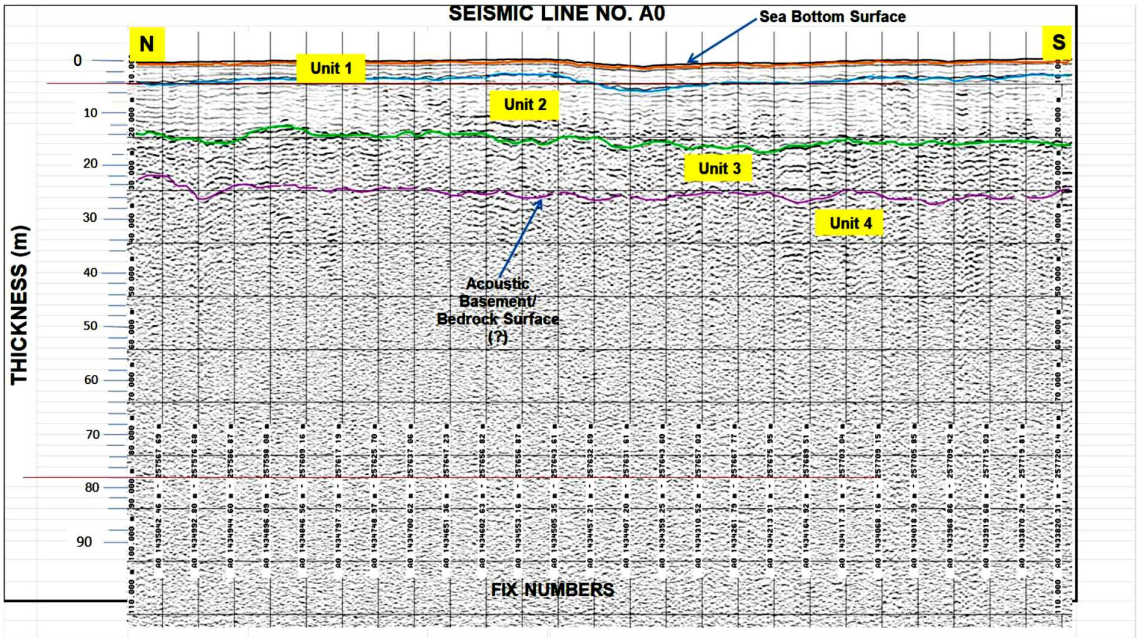

Figure No. 17_Seismic Profile of Line A-0 of Baclaran River.

Unit 1 basically characterized by seismic reflection free patterns grading to faint parallel along the nearshore portions to inclined

parallel, mottled / chaotic reflectors towards seaward/sloped areas which are inferred to consist essentially of mud to muddy sand (nearshore) to fine sand to sandy sediments (offshore / sloped areas). Unit 1 has an estimated average thickness of about 11 meters. Thickness is around 5 meters along the nearshore and gets deeper offshore; Volume of Unit 1 for 1 square kilometer is approximately 11 million cubic meters of sand / silt materials. Total sediment volume (from seabed to the bedrock) is 33 million cubic meters for an area of 1 square kilometer.

The target volume for the conventional type using Backhoe-Loader-Dump Truck Tandem is approximately 20,000 cubic meters per month of river-run materials or 1,000 truckloads or more depending on the weather condition and availability of all the equipment and manpower.

It will take CSD three (3) hours of dredging operation to fill up the 6,000 cubic meter capacity Sand Carrier Vessel via Floating Hopper Barge and 3-4 hours to drain the water from the dredged materials. To fulfill the annual extraction of 3,000,000 cubic meters of dredged material combined production during the maximum operation will take the 6,000 cubic meter capacity Sand Carrier Vessel an average 8 to 10 trips per month.

Table No. 5_Projected combined volume of river-run materials to be dredged per annum

CUTTER-SUCTION DREDGER TO VESSEL METHOD	
Dredging Capacity	**3,000 cubic meters / hour**
Working Days per Month	**26 – 30 days**
Ideal Loading Time per Ship including the draining/drying time	**14 hours – suction** **4 hours – drying**
Trips per month	**8-10 trips**
Extraction Rate per day (cubic meters)	**42,000 m^3**
No. of Unit Operation	**2 dredgers**
Maximum Extraction Rate per Annum	**3,000,000 m^3**
Operation @ 80% Efficiency	**2,400,000 m^3**
CONVENTIONAL METHOD: BACKHOE-DOZER-DUMP TRUCK TANDEM	
Loading Time (18 hours Operation)	**5 days minimum**
	7 days maximum
Working Days per Month	**26 – 30 days**
No. of Unit Operation	**1000 truckloads per month**
Extraction Rate per month (cubic meters)	**20,000 m^3**
Minimum Extraction Rate per Year	**140,000 m^3**
Maximum Extraction Rate per Year	**240,000 m^3**

1.7 Development Plan, Description of Project Phases and Corresponding Timeframes

Phases to be described by identifying main activities with special attention to those with significant environmental impacts and corresponding projected implementation timeframes (i.e. pre-construction, construction, operation, abandonment).

1.6.1 DESCRIPTION OF PROJECT PHASES

1.6.1.1 Pre – Development & Construction Phase

Prior to the implementation of the project, conduct of significant studies are being done. These include preliminary design, detailed engineering study, impact study to include geohazard identification and environmental impacts assessments. All the necessary information, plans, and designs will be gathered and prepared relative to the requirements and in compliance with the existing laws and regulations applicable to the project. Jurisdiction over the project site, clearances, permits and all other administrative requirements of concerned agencies will also be completed.

The proponent is in the process of securing the necessary permits, certifications and licenses from the government agencies concerned such as the DPWH, PPA-Marina, PCG, BFAR / MAO, MGB, LGU, Province of Occidental Mindoro, among others. The herein proponent is requesting the EMB MIMAROPA for the Environmental Compliance Certificate (ECC).

The Field Office and other support facilities like stockpile area, waste dumps area, staff house, motor pool and nursery will be constructed on a 5-hectare lot located southeast of the Dredging Area across the bank of Baclaran River (on-shore / land).

During the pre-construction phase the following activities are to be undertaken:

- Conducted a high-resolution seismic reflection profiling, bathymetric measurements, marine assessment and geological sampling through drilling was all considered in the estimation of the resource;
- Topographic and Boundary Survey based on the area designated by the DPWH;
- Site Investigation for the causeway or port construction;
- Gathering of pertinent data from LGU;

- Procurement of vehicles and equipment;
- Call for tender of bids for the purpose of selecting qualified bidders as service providers for the dredging project;

Upon ocular investigation, R.V. Laborte Builders will construct a Port / Causeway in the area upon the issuance of Foreshore Leased Agreement (FLA) from DENR-MIMAROPA and/or CENRO-SABLAYAN through the consent of PPA-Marina (if needed).

A quality assurance / quality control program during construction and commissioning ensures that equipment is purchased and built according to the design requirements, while meeting all applicable legal and technical standards and codes. The dredging project is recommended to have a quality assurance/quality control program in place to prevent equipment failures that could result from:

- Use of faulty parts / materials due to improper delivery controls;
- Improper fabrication, installation, or repair methods.

The operator's manual should provide guidance and mechanisms to assure that appropriately qualified and trained personnel are used for specified vessel and piping fabrication and for installing safety critical equipment and instrumentation.

Hazard management during construction and commissioning of dredging project should have a procedure in place during the construction and the commissioning of the seabed quarry. Typically, risk assessments as described in the above section on Safety Report / Declaration also apply during the Operations Phase. Pre-Start-up Safety Reviews are often being used during commissioning.

1.6.1.2 Dredging Operation

The dredging methods to be employed are the Cutter-Suction Dredgers from the navigational zone, river mouth and lower reaches while the Conventional Backhoe-Dozer-Dump Truck Tandem at some portion of the lower reaches until the upstream of Baclaran River.

The dredging operation is intended to remove substantial volume of river materials to ease and reduce the swelling of the river that threatens or could again damage the properties and farms within the vicinity. R.V. Laborte Builders will initially dredge and remove the silt at the navigational zone to open up the river mouth and to

be increased gradually upon full understanding of the dynamics of the river run materials. The activity will be properly coordinated with the concerned government agencies to ensure that the objective of solving the drainage and flooding problems in the municipality will be attained.

The dredging operation shall be undertaken using the two (2) Cutter-Suction Dredger (CSD) having a capacity of 3,000 cubic meters per hour are allotted for this project. There are three (3) Split and/or Floating Hopper Barges with a carrying capacity of 2,000 cubic meters each and/or a 6,000 cubic meter capacity Sand Carrier Vessel are on standby that take turns to be filled with the dredged materials for disposition to prospective clients in different locations.

Upon issuance of the ECC and other permits and clearances, the dredging site shall now be developed based on the dredging plan approved by the DPWH, as follows:

1. Construction of Site Office on a container van;
2. Perimeter boundary survey covering the 167-hectare dredging area;
3. Development of "dredging lakes" as source of sand to be extracted using backhoe. The said lake measures around 30-45 meters in diameter. Additional dredging lakes shall be added progressively.
4. Development of the stockpile area;
5. Installation of safety signs and lighting fixtures;
6. Installation of buoys and lighted markers on the 19-hectare navigational zone;
7. Development of temporary earthen ramp to cross the nearby riverbanks;
8. Construction of causeway or port to load the sand materials;
9. An option to install a 1000-ton per hour trestle conveyor loading facility designed to allow sand material-shipment in most weather conditions; and
10. To mobilize the required equipment together with the necessary personnel and materials to jumpstart the project.

The herein proponent shall require all personnel involved in the development and operation to implement and install safety measures such as radio communication equipment, visible safety signs, well-lighted working areas, emergency clinic and the wearing of Personal Protective Equipment (PPE's) among others.

1.6.1.3 Abandonment

The decommissioning and abandonment plan has its focus on protecting public health and safety, improving or eliminating environmental damage and liabilities, and allowing the land use to be similar to its original use or an acceptable alternative.

The decommissioning plan shall be executable at any time throughout the lifetime of the dredging activity. This plan shall also take into account environmental rehabilitation. Environmental rehabilitation shall include the removal of all surface facilities and dredging equipment at Baclaran River and Mindoro Strait.

The formulation of the detailed decommissioning plan will be done by the proponent within the specified timeframe as part of the post-ECC requirement. It will be submitted for approval to the EMB MIMAROPA, IAC and all other concerned government agencies on the activities such as Environmental Site Assessment to determine contaminants left by the operation, method and equipment to be used for dismantling of structures, clean-up or remediation plan and demobilization scheme before proceeding.

The proponent shall conduct sub-bottom profiling and bathymetry, post coastal marine assessment, freshwater sampling and marine sampling prior to permanent cessation of the dredging area. Equipment, structures and other facilities will be assessed regularly for the project to continue its operation beyond its lifespan.

For purposes of compliance to ECC conditions, a detailed Abandonment Plan shall also be undertaken by R.V. Laborte Builders for submission and approval of EMB at least six (6) months before the scheduled abandonment.

1.8 Manpower Requirements

It shall be a policy of the proponent to hire qualified local applicants based on the following order of priority.

Table No. 6_Manpower Requirement

POSITION / PERSONNEL	REQUIREMENT PER SKILL
Operation / Resident Manager	1
Captain / Dredger Operator	2
Dredging Ship Crew	20
Shift Foreman	8
Community Relations Officer	1

Safety & Pollution Control Officer	1
Quality Control Engineer	1
Mechanic & Welder	2
Accountant	1
Samplers	6
Nurse	2
Logistics	1
Clerk / Checker	2
Driver Liaison	2
Backhoe Operator	4
Bulldozer / loader Operator	2
Crew for land-based operation	35
Security Guards (on Contract)	10
Total	**101**

1.9 Indicative Project Investment Cost

The indicative project cost for the BACLARAN RIVER DREDGING PROJECT is estimated at **ONE HUNDRED FORTY MILLION FOUR HUNDRED THOUSAND (PhP140,400,000) PESOS**. A summary of the capital cost is shown on the table below.

Table No. 7_Breakdown of initial expenditures / capital cost

DESCRIPTION	ESTIMATED COST (PHP)
Permitting	10,000,000
Cutter-Suction Dredger Rental	50,000,000
Land-based (backhoe, dozer-loader, dump trucks) Heavy Equipment	60,000,000
Service vehicles and facilities	4,000,000
Contingency allowance (10% of equipment and facilities)	6,400,000
Three months working capital	10,000,000
Total	**140,400,000**
Social Development Plan	TBD
Safety and Health Program	TBD
Local Taxes (Business Permit, etc.)	TBD