

# BAYAWAN CITY RIVER FLOOD MITIGATION AND DISASTER RISK REDUCTION PROJECT THROUGH DREDGING METHOD

## EIS SUMMARY FOR THE PUBLIC

### 1. PROJECT DESCRIPTION

#### PROJECT FACT SHEET

Name of Project : **Bayawan City River Flood Control Project Thru Dredging Method**  
Locatio : Bayawan River, Bayawan City, Negros Oriental  
Nature of Project : Dredging for Flood Mitigation and Disaster Risk Reduction

Proponent Name : **Local Government Unit of Bayawan City**  
Address : Bayawan City, Negros Oriental  
Authorized Signatory : Hon. Pryde Henry A. Teves  
Contact Details : (035) 531-0020 to 21  
Email Address : [mayorbayawan@gmail.com](mailto:mayorbayawan@gmail.com)

Proponet Name : **Marisand Resources Co., Ltd.**  
Address : Sitio Baas, Brgy. Pagsabungan, Mandaue City, Cebu  
Authorized Signatory : Mr. Philip Tan  
Contact Details : (032) 345-9525 / (032) 345-9526  
Email Address : [marisandresources@gmail.com](mailto:marisandresources@gmail.com)

EIS Consultant : **POIEL Engineering and Management Services**  
Address : Unit 121, Urban Deca Homes, H. Cortes St., Kasambagan, Cebu City  
Contact Details : (0906) 560-3761 / (0998) 965-6787  
Email Address : [dredging@poielcebu.com](mailto:dredging@poielcebu.com)

#### 1.1 PROJECT TYPE, COMPONENTS AND SIZE

The project aims to mitigate and reduce the risk of flood occurrences along Bayawan River. This is done by reconfiguring the river channel to accommodate the volume of water estimated to occur during a 50-year return period. Precision dredging will be employed starting from the mouth of the river up to 6 km upstream and will be guided by Detailed Engineering Design as approved by DPWH.

The project, when implemented, is only a part of the overall strategic alternative for flood control and mitigation for Bayawan River. Marisand Resources Co., Ltd. will dredge the channel with no financial obligation on the part of the city government. Moreover, the company will contribute Five Pesos (Php5.00) per cubic meter of dredged materials to the city government that will be shipped out of Bayawan City. A Private-Public Partnership (PPP) Agreement has been entered into on this regard.

The river channel design will have a dredging depth of 4 meters at the river mouth and gradually reducing to about 1.70 meters at the end of the 6km dredging length. The trapezoidal channel that will be formed during dredging will have a minimum 10-meter setback from each side of the riverbank. Excluded from the dredge zone is the 2-km total no-dredge length downstream and upstream of the Bayawan Bridge.

Dredging will also include channel maintenance from sediments flow over the 3-year dredging operations. From the HECRAS modelling, estimated sediments flow is 25,000 cubic meters per day based on 100-year return period. This is equivalent to about 9,125,000 cubic meters per annum or 27,375,000 cubic meters over the 3-year period of the Project.

Dredging will also be done at the 2-km length by 600 meters width of the estuary to deepen and take out sediments caused by deposition and accretion. This will serve as the anchorage and navigation route of the dredging vessels during project implementation and by the fishing vessels going in and out of the fish port (after project implementation). The seaward section of the estuary will be dredged to 15 meters deep and gradually descend to 2-meters deep at the 100-meter line from the shoreline. There will be a 100-meter no-dredge zone from the shoreline towards the sea. At the river mouth, dredging depth will be 4 meters.

The other major component of the Project is the establishment of Fishport at the mouth of Bayawan River. The river mouth is the traditional “fishport” of the city. With the deepening of the river channel, the city government will improve the fishery sector by establishing a permanent fish port at the mouth of the river. The proposed fish port will have a dimension of 180 meters by 300 meters or an area of 54,000 square meters or 5.4 hectares, including horizontal development. Dredged area is about 4 hectares. The proposed Fish Port will have a depth of 4 meters.

**Table 1 – Dredging Volume**

<b>DESCRIPTION</b>	<b>LIMITS</b>	<b>VOLUME (cu.m.)</b>
River Channel (channel development)	4000m effective dredging length by 4m deep at the mouth gradually reducing to 1.7m deep at the 6-km end of Project by average 60m width	684,000
River Channel (channel maintenance)	Estimated 9,125,000 cu.m./year over 3 years dredging operation	3,000,000

from sediments flow)		
Navigation Route and Docking Area	700m effective width x 2000m coastline with depth of 15m at the seaward side reducing to 2m near shoreline while maintaining 4m depth at 80m rive width	7,950,000
Proposed Fish Port	Total of 4-hectare fish port area by 4m deep	160,000
<b>TOTAL</b>		<b>11,794,000</b>

The primary impact of the Project is very significant along the river banks or its riparian zone. This is about 300 meters inland along the river banks. Meanwhile, at the river mouth, possible excessive siltation can be carried by water current and is estimated to run about 2 km as identified during the survey conducted for water quality.

The secondary impact areas would include navigational lanes during the hauling of dredge materials out of Bayawan City within Philippine territorial waters. The Project will adhere to an approved navigational route and other requirements mandated by regulatory agencies such as PPA and MARINA.

## 1.2 PROCESS/TECHNOLOGY

### Extraction and Dredging Process

Cutter suction dredger, which is made up of a vessel with suction pump, will be used for this operation. During operation, the suction arm on the dredger will be lowered to the required depth for dredging. Pumps onboard will then be started up for the extraction to proceed.

The extracted materials will initially consist of water, clay and sand particles. A bucket filtration system within the dredger will filter the dredged materials which will then be temporarily stored within the dredger. A conveyor belt on the side of the dredger will then transfer the dredged materials onto a conveyor barge which is be berthed alongside with it.

### Pollution Control and Waste Management

There are always impacts to dredging activities but these may be minimized with careful planning and execution of the Project. Some mitigating measures which will be employed during dredging operations are the following:

- a. Improve accuracy – This can be achieved using GPS to determine the exact station and through the channel sounding survey prior to dredging;
- b. Reduce turbidity – Turbidity is due to suspended sediments and this can be avoided through careful navigation of the dredging vessel in shallow water;
- c. Reduce spill and loss – Employ an oil recovery system and limit overflow.

d. Regular emission test – Vessels shall be subjected to regular emission tests to ensure that they comply with emission standards.

e. Solid waste management - Regular collection of waste onboard the vessels will be imposed in coordination with the LGU.

### 1.3 RESOURCE UTILIZATION

Desiltation by dredging is a proven method in increasing the carrying capacity of waterways to contain excessive amounts of river surface run-off during floods brought about by periods of heavy rainfall. Bayawan River in its meandering lower segments in the floodplain area and at its mouth or confluence with the Sulu Sea has reached a stage of maturity, therefore rendering the area as very highly flood prone.

Various studies were conducted before selecting dredging method as the preferred option for flood mitigation.

First, a pre-feasibility study for Bayawan River dredging was conducted by students Negros Oriental State University, headed by Mr. Hernulfo Ruelo, a respected geologist and Bayawan resident. The same team also conducted sedimentological analysis to determine the dominant sediments and sediment sizes found in Bayawan River. The result shows negligible quantities (no commercial value) of minerals.

Mr. Ruelo also conducted a Public Opinion survey to determine the initial response and opinions of the community members towards the proposed dredging. Results indicated that 97% of the respondents believe that dredging the Bayawan River is important.

Various public consultations were also conducted at affected barangays, resulting to these barangays passing barangay resolutions in support of the dredging project.

These activities were followed by initial scoping, public scoping and technical scoping as the Proponents prepare the ECC application.

## 2. PROJECT LOCATION

Bayawan City is a second-class component city of the 3<sup>rd</sup> Congressional District of the province of Negros Oriental. It is located southwest of Negros Island at coordinates 9°22'00.14" N and 122°47'59.01". It has a land area of 699.08 sq. km., the largest in the province. Bayawan is bounded in the north by the municipality of Mabinay, in the east by the Cities of Tanjay and Bais, in the southeast by Sta Catalina, and Basay in the northwest. The city is politically subdivided into 28 barangays. It is linked by an all-weather asphalt-concrete 2-lane provincial road for about 102 kilometers from Dumaguete City, the provincial capital of Negros Oriental.

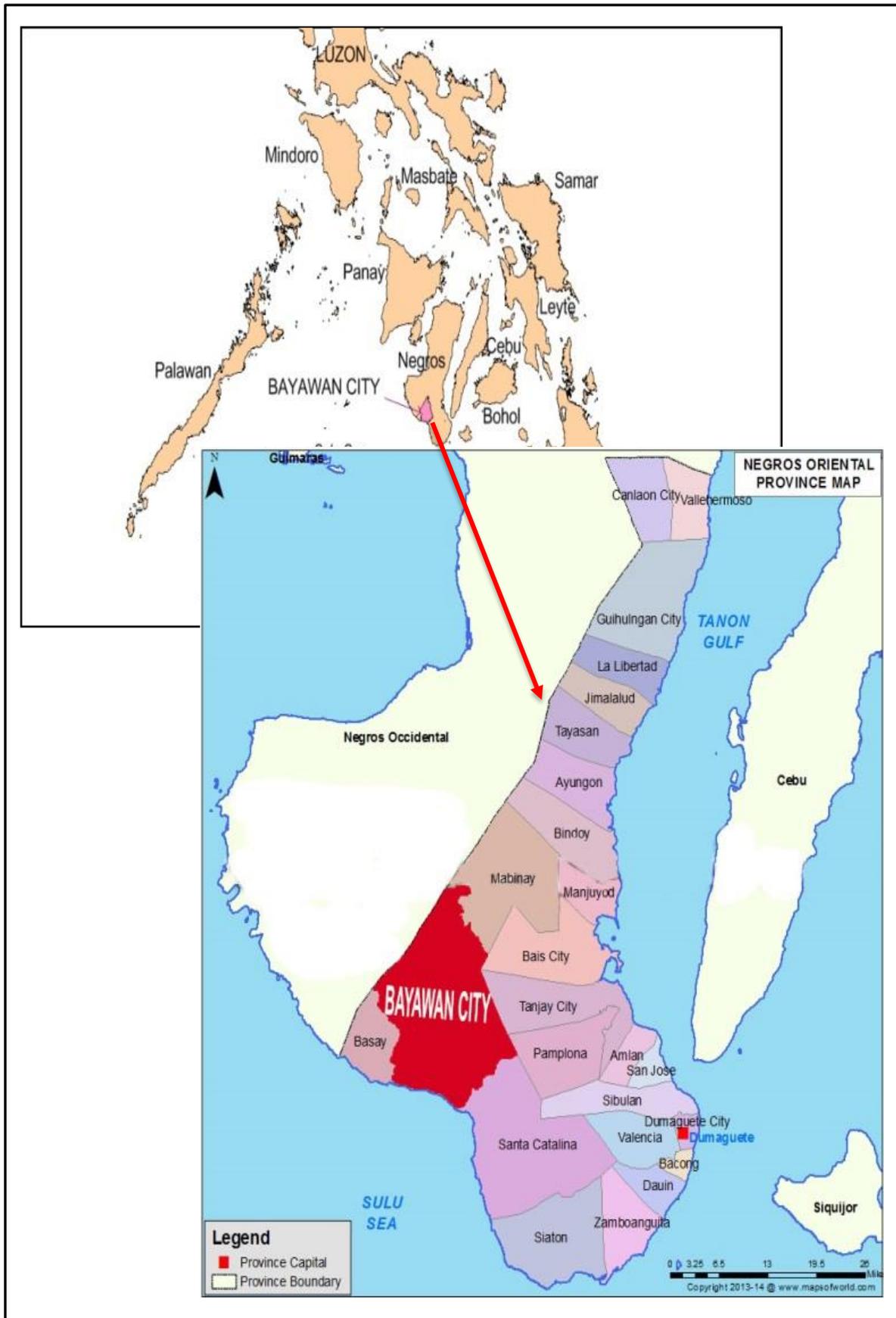


Figure 1 – Bayawan Location Map

The Project site starts at the estuary and mouth of the river and extends up to 6 kilometers upstream. Bayawan River Project site is situated at the Poblacion, extending up to Barangay Nangka. The river mouth can be easily accessed through the City's boulevard at Poblacion-Suba. Downstream and upstream sections of the river can also be seen from the main bridge at the national highway. Some riverbank sections can also be accessible in the upstream barangays and sitios of the City.

Project Site

The Project site is the Bayawan River, which is one of the largest rivers in Negros Oriental. Its catchment area is about 4.5 sq. kms. and stretches up to 6 kms. Bayawan River drains at Tolong Bay which is part of Sulu Sea. It passes at populated areas of which are at the center of Bayawan City. The Project will cover about six (6) kilometers reckoned from the estuary. The total project area is 2,120,000 square meters.

Table 2 below shows the geographic coordinates of the project site cited every one (1) kilometer interval based on PRS 92 Datum:

**Table 2 – Geographic Coordinates of Project Site**

STATION	LONGITUDE	LATITUDE
Sta. 0+000	122°47'35.20" E	9°21'36.41" N
Sta. 1+000	122°47'58.30" E	9°22'0.75" N
Sta. 2+000	122°48'2.87" E	9°22'28.26" N
Sta. 3+000	122°48'19.93" E	9°22'22.29" N
Sta. 4+000	122°48'25.03" E	9°22'37.50" N
Sta. 5+000	122°48'42.73" E	9°22'47.47" N
Sta. 6+000	122°48'39.32" E	9°23'16.20" N
Fishport	122° 47.639'E	9° 21.825'N
Navigational Route 1	122°78.51611'E	9°36.5233'N
Navigational Route 2	122°78.18583'E	9°35.58778'N
Navigational Route 3	122°79.78277'E	9°35.08306'N
Navigational Route 4	122°80.13805'E	9°36.075'N

Figure 2 below shows the Project Topographic Plan, including the 1-kilometer stations for the entire dredging plan.



## Project Alternatives

Flooding is a serious problem in Bayawan City. Sandwiched between the Bayawan and Sicopong Rivers, Bayawan City is highly susceptible to flooding during rainy days. In October 13, 2013, three days of successive torrential rains brought Bayawan City to its knees. P50.9M and P40M worth of agriculture and infrastructure, respectively, were destroyed by floods. Damage to business establishments was pegged at P8M and another P1.8M for textbooks for a total of P100.1M. Six persons, including a policeman rescuer, were killed by the rampaging floodwaters. Thirty-six families lost their homes and about 20,000 people were evacuated.

There are (two) 2 primary objectives for undertaking this dredging operation:

- a. To increase the river channel capacity and its ability to convey runoff water during heavy rains along the meandering channel towards its outlet at the river's mouth;
- b. Deepen the river's mouth for easy access of fishing boats to the Bayawan fishport.

### **3. PROJECT PROPONENT**

The Project will be undertaken through a Private-Public Partnership between the City Government of Bayawan and Marisand Resources Co. Ltd.

Marisand Resources Co., Ltd. is another one of Mr. Kuan Gee Tan's companies established in the country that engages in environmental rehabilitation and conservation. Marisand is embarking on flood control and disaster risk reduction; as well as port development projects.

The partners of Marisand Resources Co. Ltd. are as follows:

Limited Partners:

Tan, Kuan Gee

Lim, EE Kok

General Partners:

Hazel T. Arbening

Marivel E. Bulilan

The City Government has put together a Technical Management Team (TMT) to oversee the Project.

The TMT is composed of the following:

- Chairman: Engr. Eric Torres – City Engineer – Team Leader  
 Vice Chairman: Hernulfo B. Ruelo – Asst. Team Leader, Technical Consultant  
 Members:
1. Engr. Kenneth S. Artes - CPDO / City Planning Office
  2. Engr. Edward Ryan Torreda - CDRRMO
  3. Engr. Randy Pamilaga - Engr. III / City Engineering Office
  4. Mr. Ion Joseph T. Bollos - SEMS IV / CENRO-Bayawan
  5. Ms. Erjien R. Tenefrancia - Aquaculturist / City Agriculture Office
  6. Mr. Angelo Gasendo - Stat IV / City Mayor’s Office
  7. Mr. Lito Lomonggo - PDO / City Mayor’s Office
  8. Hon. Rogelio Carbo - Brgy. Captain / Brgy. Suba
  9. Hon. Juvy Zamora - Brgy. Captain / Brgy. Banga
  10. Hon. Reynaldo Navara - Brgy. Captain / Brgy. Ubos

**4. PROJECTED TIMEFRAME OF THE PROJECT IMPLEMENTATION**

The implementation of the Project will be consistent to what has been stipulated in the MOA between Bayawan City LGU and Marisand Resources Co Ltd.

The estimated volume of dredge materials as provided for in the MOA for the first 6 km of the river is about 10,000,000 cu m. If dredging of the first 6 km is done in less than 3 years, then the proponent can apply for another ECC for the subsequent river reach.

**5. SUMMARY OF MAJOR IMPACTS AND RESIDUAL EFFECTS**

KEY ENVIRONMENTAL ASPECT	POTENTIAL IMPACT	PARAMETER TO BE MONITORED
The Land	Coastal erosion/ deposit ion	Change in Coastline configuration
The People	noise	dB(A)
	Navigational Traffic	No. of fishers affected
	resource use	Use disturbance
Impact on Water	Increase in turbidity	TSS
	Saline intrusion	salinity
	Change in Flow Regime of channel	Channel depth
	Presence of Oil and Grease from machineries	Oil and grease, DO
Impact on Air	Degradation of Ambient Air	TSP, PM <sub>10</sub> , NO <sub>2</sub> , SO <sub>2</sub>

**6. IDENTIFIED STAKEHOLDERS**

Fisherfolk will be directly affected by the Project because implementation shall hinder their access to the river and to the current docking area. However, a temporary docking area has

been assigned in Barangay Villareal, which will be used while the dredging operations are ongoing.

Residents of riverside Barangays Suba, Banga, Ubos, Nangka and Poblacion may also be affected as these barangays are covered as direct and indirect impact areas. Monitoring and mitigating measures will be put in place to minimize the impact to these affected barangays.

Sand and gravel permittees have also been identified as stakeholders since the Project may disrupt their operations. However, only one sand and gravel permittee has been identified in the city of Bayawan and he has not raised any objections relating to the Project.

## **7. PROJECT PROPONENT'S STATEMENT OF COMMITMENT**

Marisand Resources Co. Ltd., in partnership with the City Government of Bayawan, is committed to implementing the Project in accordance with the approved design and environmental impact analysis including its necessary mitigating measures to prevent the negative impacts of dredging activities. Marisand Resources Co. Ltd. has the expertise, equipment and financial capability to undertake the Project.

## **8. INFORMATION ON WHERE TO GET A COPY OF THE EIS**

For those who wish to get further information on the Project and the Project's Environmental Impact Statement, you may contact either of the following:

### **POIEL Engineering and Management Services**

Unit 121, Urban Deca Homes, H. Cortes St., Kasambagan, Cebu City

Contact Details : (0906) 560-3761 / (0998) 965-6787

Email Address : [dredging@poielcebu.com](mailto:dredging@poielcebu.com)

### **Technical Management Team**

Hernulfo Ruelo – 0917-5808327

Edward Ryan Torreda – 0915-5339179

Lito Lomongo – 0906-6219343