

MALOMA RIVER DREDGING PROJECT
EXECUTIVE SUMMARY FOR PUBLICATION

In accordance with Section 12 of DAO 2017 – 15

1. PROJECT DESCRIPTION

Project Type	Dredging, Environmental Mitigation; Disaster Risk Reduction; Climate Change Adaptation
Project Components	<ol style="list-style-type: none"> 1. Buffer zone (river channel) between the river banks and a pilot channel, 1/3 of river width, both sides, therefore totaling 2/3 of river width 2. Buffer zone 50m from Maloma River and Lower Maloma Steel Bridge, for the full river width, wherein to install ground sill geotube, -2m from lahar surface 3. Armor rock shield around each bridge column, starting from ground surface to the level allowed for depth of extraction; 4. Pilot channel at the middle 1/3 of the river width, in this case constant 40m wide, 2 meters deep and 2,300 meters long from 363 meters upstream of Maloma River to 350m from shoreline; 5. Buffer zone 200m from shoreline to dredging basin 6. Transport of dredged materials 7. Cost recovery through sale of dredged materials, subject to appropriate government regulations
Project Size	<ol style="list-style-type: none"> 1. Buffer Zone total area 48.35 2. Pilot channel dredging area 40m x 2,000m x 2m 3. Dredging basin 150m x 150m by 4m deep (2.25) 4. Continuous removal of sediments from designated pilot channel and dredging basin as these are refilled by natural processes, until stable riverbed elevation is reached at 8meters below (current) ground surface at lower Maloma River, measured every November of each year 5. Estimated lahar volume to be extracted is 12,120,375.00 m³.
Process Technology	<ol style="list-style-type: none"> 1. Embedment of 2m diameter geotube protection / ground sill 50m from bridges, -2m depth; 2. Protection of armor rock to surround bridge columns, starting from the depth of allowed dredging to lahar surface 3. Extraction to create 40m wide pilot channel, 2 meters deep 2,000m long; 4. Embedment of geotube retaining walls of dredging basin at river mouth by -2m below surface, to facilitate sediment inflow under normal rain condition 5. River bank protection by >40m easement and natural slope repose 6. Fair weather extraction by amphibious dredger 7. Haul out/ transport by water mode (barge) 8. Replenishment of dredging areas by natural sediment transport 9. Marine ecosystem protection by 200m land barrier between dredging basin and shoreline

Resource Utilization	42.81 tons diesel to dredge 12.120 million m3 lahar Not a water intensive undertaking thus no water use competition
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Criteria for selecting Project Alternative

The option selected by the Project creates a rallying point for the replication of similar extraction strategy for local sand and gravel permit holders to cooperate toward effecting flood reduction, river re-training and protecting government infrastructures. The option is defined as :

1. Having lesser social conflict and therefore may yield a good demonstration model
2. Central river channel dredging, keeping equidistance from both banks
3. Pilot dredging channel is only 30% of river width
4. Pilot dredging depth is an initial trial depth to observe actual sediment transport behavior and pattern; observe scouring forces on bridge columns
5. Bridge ground sill or mattress protects against massive sediment movement underneath bridge to protect bridge stability, while allowing sediment flow at uppermost .5 meters of lahar surface
6. Bridge column protection made of piled armour rock starting from ground level to the depth allowed for dredging. The armor rock will adjust to ground surface elevation at lowering of lahar level

This option has the following advantages:

1. Preserves bridge stability
2. Encourages increased natural sediment transport processes, to shorten period to effect flood reduction services
3. Maloma River has fewer sand and gravel permit holders, entailing lesser social conflict in operation, easier demonstration project
4. Uses available natural materials to liquidate project costs to deliver flood control service instead of incurring government expenditures to deliver the same service
5. Sustainable approach to flood reduction compared to engineered solutions which will eventually be overtaken by continuing downflow of lahar from upper reaches of Mt. Pinatubo

Proposed location map is attached in Figures 1 and Figure 2 is the site development lay-out.

The Primary Project Impact Area is Barangay Maloma. The secondary impact areas are Barangays flanking the Lower Maloma River namely Sitio South and North Laoag, Tondo and Anonang who will be among the first to experience reduction in flooding. The regional impact area are upstream barangays flanking Upper Maloma River.

Project Proponent and Incorporators are attached in Annex A.

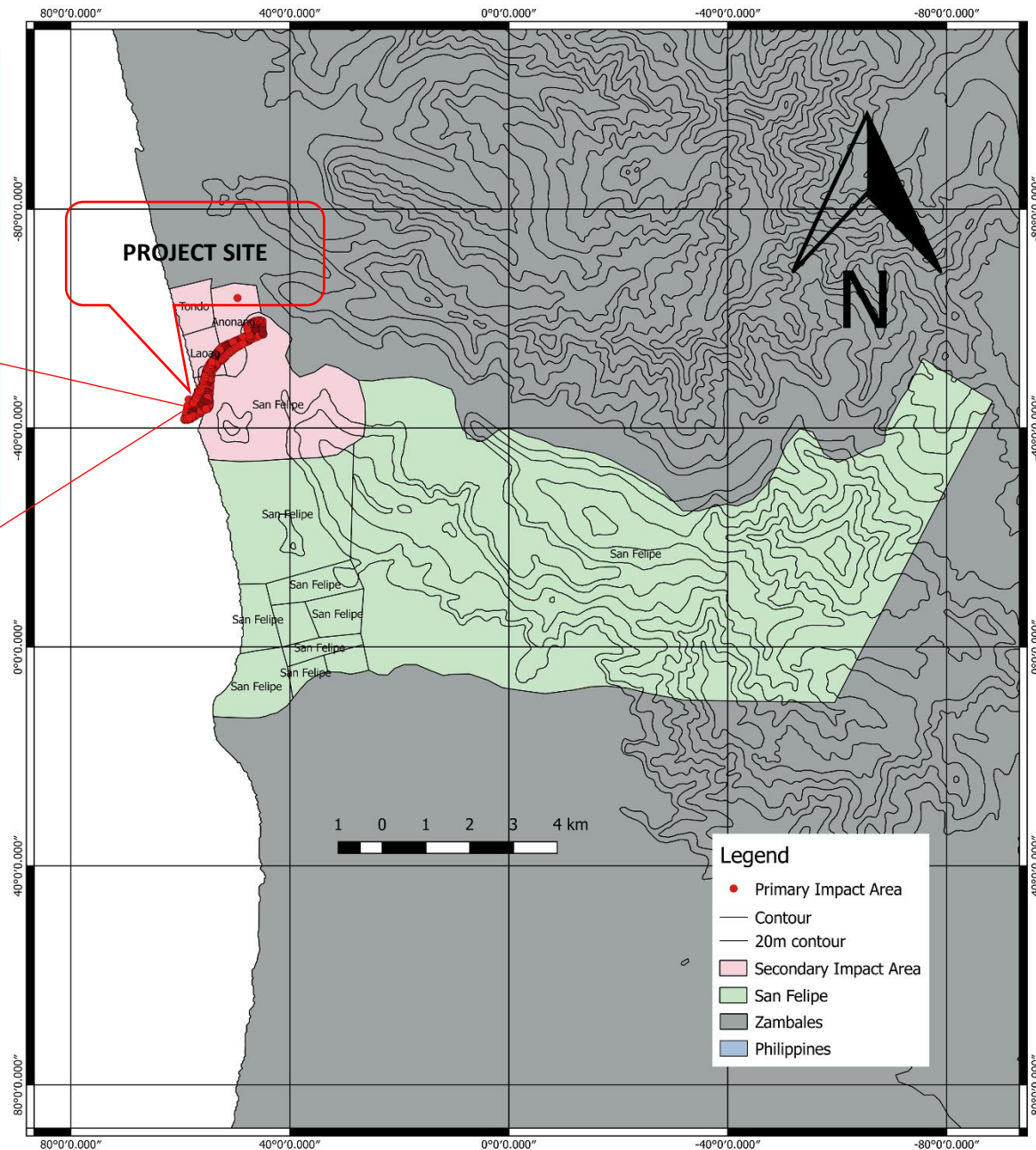
Public Consultation Meeting Venue

Coordinates: 15.05430° 120.06818° or 15°03'15.5"N 120°04'05.4"E

Elevation: 1 m

Link: [View in Google Maps https://goo.gl/maps/7AdFFcKqy7F2](https://goo.gl/maps/7AdFFcKqy7F2) (pls copy and paste this in your google map to search direction, thank you)

Project Implementation Timeframe : Starting 3rd quarter 2018



PROJECT LOCATION MAP

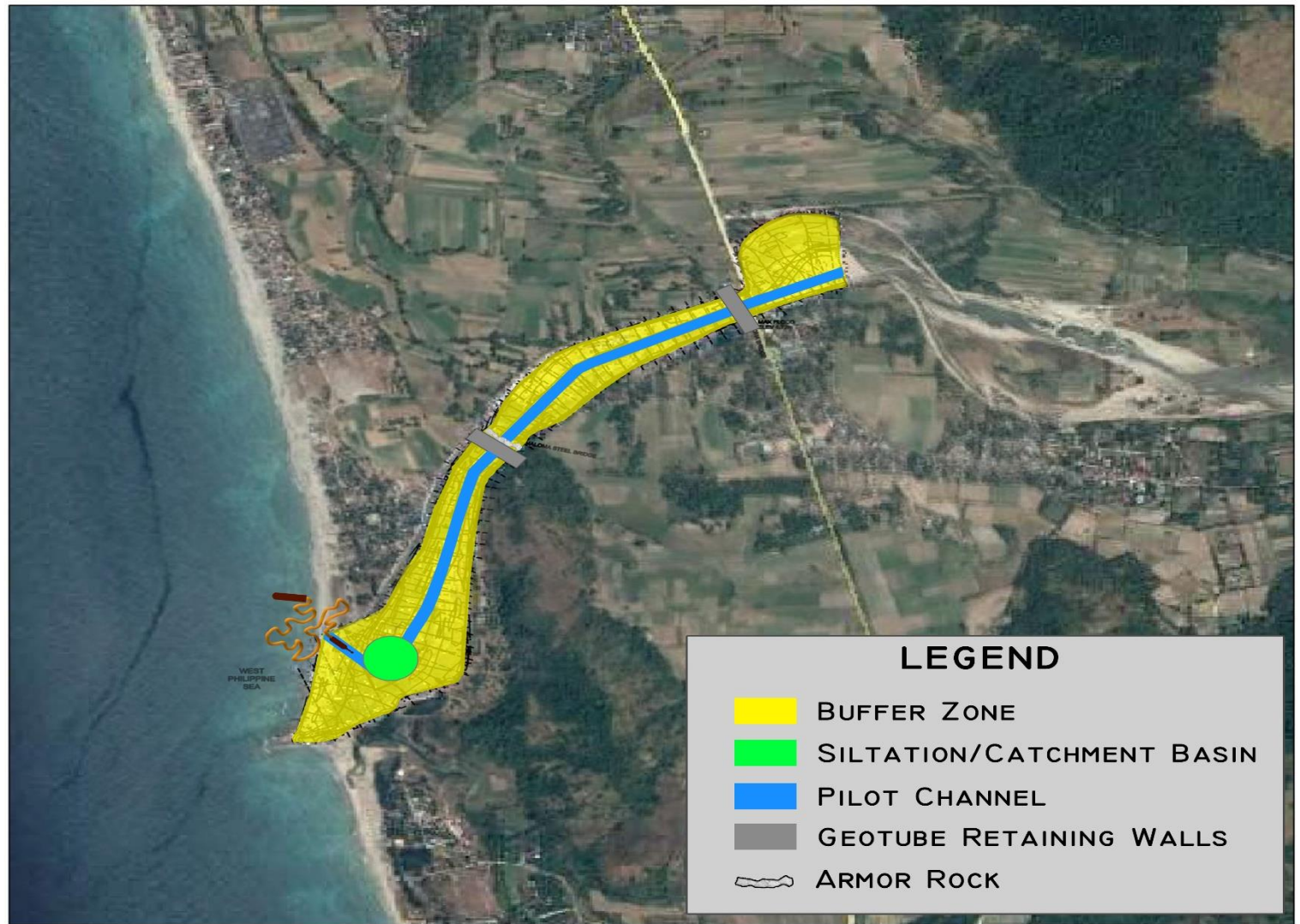


Figure 2 Site Development Map

Concise Integrated Summary of the Main Impacts and Residual Impacts After Mitigation

Main Impact	Issue	Issue Raised in Scoping?	How the Issue is Addressed in the Project / Mitigating Measure	Residual Impacts
Land Module				
	Undermining of Dike Infrastructures	✓	Project dredging design will ensure dikes are protected through ample easement baseline bank elevation have been recorded and these will be monitored in quarterly basis, and strengthening of bank protection measures will be implemented based on project performance. After project completion, a ten-year decommissioning phase to monitor dike & bridge stability will be sustained before Proponent is cleared of liability. This will be ensured through the Environmental Guarantee Fund of 1% of gross income deposited in escrow account and managed by the MMT.	Adequately protected dikes and bridges
	Management of dredged materials – will these not re-flow into the river	✓	Haul out of river bank. Final disposition will be outside of Project site	Improvement of storm drainage function of the river
	Negative impact of dredging to the influence Barangays	✓	Reduction of flooding by dredging the river to restore its flood-carrying capacity. Maintenance of the dredging basin within the center of the river channel to train the river main stream to take center axis	Reduced flooding Restored river ecosystem Restored river use for transport
Water Module	River channel retraining		Pilot channel will be carved at central axis of river to train stream flow	Improved storm drain handling
	Storm effect during project operation		Stop operation and bring equipment to safety at first storm warning	none
Air Module	Green house gas emissions from heavy equipment	✓	Project will install catalytic converters, particulate matter filters in petroleum-fed equipment, and cause tree planting to offset CO ₂ emission	Cleaner emissions from project equipment, carbon neutral project
Water Module	Water siltation, degradation of marine environment	✓	Provision of silt dam at river mouth, between dredging basin and the sea. Provision of silt curtain at entrance and exit channel for bringing out dredged materials	Controlled project siltation impact on marine environment

Main Impact	Issue	Issue Raised in Scoping?	How the Issue is Addressed in the Project / Mitigating Measure	Residual Impacts
People Module	Destabilization bridges	✓	Provision of protection against bridge column scouring such as ground sill with increasing height as river bed elevation lowers over time and corresponding armor rock shield	Stable bridge
People Module	Broadening local access to economic opportunity	X	Prior permittees in project area will be respected. They will co-exist with project to extract their permitted annual volume, except assigned or outsourced production contracts. Only existing permit holders will renew their extraction permits annually	Maintaining local economic situation associated with sand and gravel businesses
	Royalties / Local Excise Tax		Project will pay local excise tax	
	What to do with the stream connecting from Sto Tomas that drains to Maloma River	✓	Ideally, to dredge that channel to improve flood carrying capacity. However it is not included in project scope at this time. We will try to address it in next Phase.	Restoration of land use in swath over-run by flow from Sto. Tomas River
	Guarantee to complete the Project, see to the restoration of river channel to original condition	✓	Project will establish an Environmental Guarantee Fund (EGF) equivalent to 1% of Gross Income from the sale of dredged materials, for the purpose of providing emergency bridge financing to subsidize operations and ensure continuity of dredging operations under contingent commercial conditions. The EGF shall be managed by the MMT whose Chairmanship shall be as directed by the DENR.	Restoration of Maloma River Channel to original depth
LGU San Felipe	Local Livelihood		Project will give priority employment to residents of San Felipe, specifically the residents of Maloma. It will provide training for interested persons to gain knowledge, skills and capability to maintain employment with the Project. A Social Development Program will provide social safeguard / livelihood development for the poorest of the poor such as pumice stone gatherers.	Improved social capital in Maloma and San Felipe

Identified Stakeholders

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1. The Project beneficiaries are residents of San Felipe who will gradually observe reduction in flooding, experience reduction in crop damage, reduction in risks and hazards to safety brought by storms (except extreme Signal No. 3 and 4). Residents of Barangay Maloma, Sitio South and North Laoag, Tondo and Anonang as secondary impact Barangays will be among the following group of people who will benefit from the flood control service. Residents of regional impact Barangays Yangil, Caragay, Balintagak, Kalilingan and Maligaya will, over a longer period of time, experience reduction flood extent and frequency.
2. Sand and Gravel permit holders who may have overlapping claims on Project area :
Manuel R. Nuexca
Melany Tan
Jose Perry de Leon
Manolo B. Nuexca
Ofelia Huang
Amador Mangiduyog
3. Provincial Government of Zambales
4. Municipal Government of San Felipe
5. Department of Public Works and Highways, Region III Office, Flood Control Units
6. Mines and GeoSciences Bureau, Central Office
7. Project Proponent's Statement of Commitment and Capability to implement necessary measures to prevent adverse impacts is signified through their Sworn Statement of Accountability

A copy of the Project Environmental Impact Statement will be available at www.emb.gov.ph/eia/