ENVIRONMENTAL PERFORMANCE REPORT AND MANAGEMENT PLAN
ECC AMENDMENT (ECC-CO-1601-0003)

ENVIRONMENTAL MANAGEMENT BUREAU
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ECC Amendment for the 360-Hectare Pasay Reclamation Project to Include Inter-Island and Mainland-Connecting Bridge Structures

FINAL REPORT
April 2026

Submitted by:

CITY GOVERNMENT
OF PASAY

EXECUTIVE SUMMARY

ES.1 PROJECT FACT SHEET

The Pasay City Government (the "City") through its Joint Venture (JV) partner, the SM Smart City Infrastructure and Development Corporation (SM SCIDC), intends to include the **Inter-Island and Mainland-Connecting Bridge Structures** of the "360-hectare Pasay Reclamation Project" (the "Pasay 360" Project) under the amended ECC with Reference No. ECC-CO-1601-0003 issued on 13 March 2025. These Interconnecting Bridges were not included in the previous amendment due to lack of proof of authority over its landing areas in the mainland. This ECC amendment for the Bridge Development covers only the project's horizontal works. All locators, investors, and other third parties undertaking vertical developments are responsible for obtaining their own respective ECCs or required environmental permits prior to implementation.

Project Fact Sheet

Table ES-1 Project Fact Sheet

Project Name	360-hectare Pasay Reclamation Project (Pasay 360 Project) - Proposed Amendment of the Environmental Compliance Certificate for the 360-Hectare Pasay Reclamation Project to Include Inter-Island and Mainland-Connecting Bridge Structures	
Project Location	Along the waters of Manila Bay in Barangay 76, Pasay City, NCR, Philippines	
Nature of Project	For existing ECC 3.3 Reclamation and Other Land Restoration Projects greater than 25 hectares For ECC amendment as component Bridges and viaducts (including elevated roads), new construction > 50 m but < 5km	
Project Capacity/Size	360 hectares	
Project Components	Components covered under ECC-CO-1601-0003 (Amended) issued on 13 March 2025 remains the same Inclusion of the Interconnecting Bridges and its Temporary Support Facilities	
Area Clearance	AC-NCR-2019-003 issued by DENR Central Office on 15 August 2019	
ECC Application	Amendment of ECC-CO-1601-0003 (Amended) issued by DENR EMB Central Office on 13 March 2025	
Project Proponent:	Pasay City Government or the "City"	
Joint Venture Partner	SM Smart City Infrastructure and Development Corporation	
Office Address of the Project Proponent:	City Government of Pasay Pasay City Hall F.B. Harrison Street, Pasay City	
Contact Person/ Designation:	Atty. Severo Cañete Madrona Jr. City Legal Officer	Atty. Leah Quiambao JV Managing Head Raymond Cabanilla, EnP JV Pollution Control Officer
Contact Information:		
EPRMP Preparer (2025):	San Environmental Consultancy Services Inc. (SANECS)	
Office Address of the Preparer (2025):	9999 Mt. Pulog St., Umali Subd., Batong Malake, Los Baños, 4030, Laguna, Philippines	
Contact Person/ Designation:	Jan Paolo Polisco Team Leader – EIA Preparer	
Contact Information:		

ES.2 EIA PROCESS DOCUMENTATION

ES.2.1 EIA Team

Table ES-2 EIA Team

Name	Role	EIA Preparer Registration Number	Technical Study Conducted
EPRMP 2025			
Jan Paolo Pollisco	Team Leader	276	Project Management
Jay Richard Siasoco	Sr. Environmental Specialist	662	Environmental Impact Assessment / Updating of PD and EMP
Engr. Ernesto Flores	Sr. Environmental Specialist	129	Environmental Impact Assessment/ Updating of PD and EMP
Jeremiah Acena	Traffic Impact Specialist	-	Traffic Impact Assessment and Traffic Management Plan
Lemuel Austin Constantino	Map Preparer	-	GIS Mapping
Clarence Rei Nabing	Assistant Writer Consolidator	623	Research Associate

The 2024 Environmental Performance Report and Management Plan (EPRMP) for the Reconfiguration of Pasay 360, prepared by the Planning and Development Research Foundation, Inc. (PLANADES), served as the primary reference document for this report. San Environmental Consultancy Services, Inc. (SANECS) subsequently updated the EPRMP to incorporate the proposed Inter-Island and Mainland-Connecting Bridge Structures.

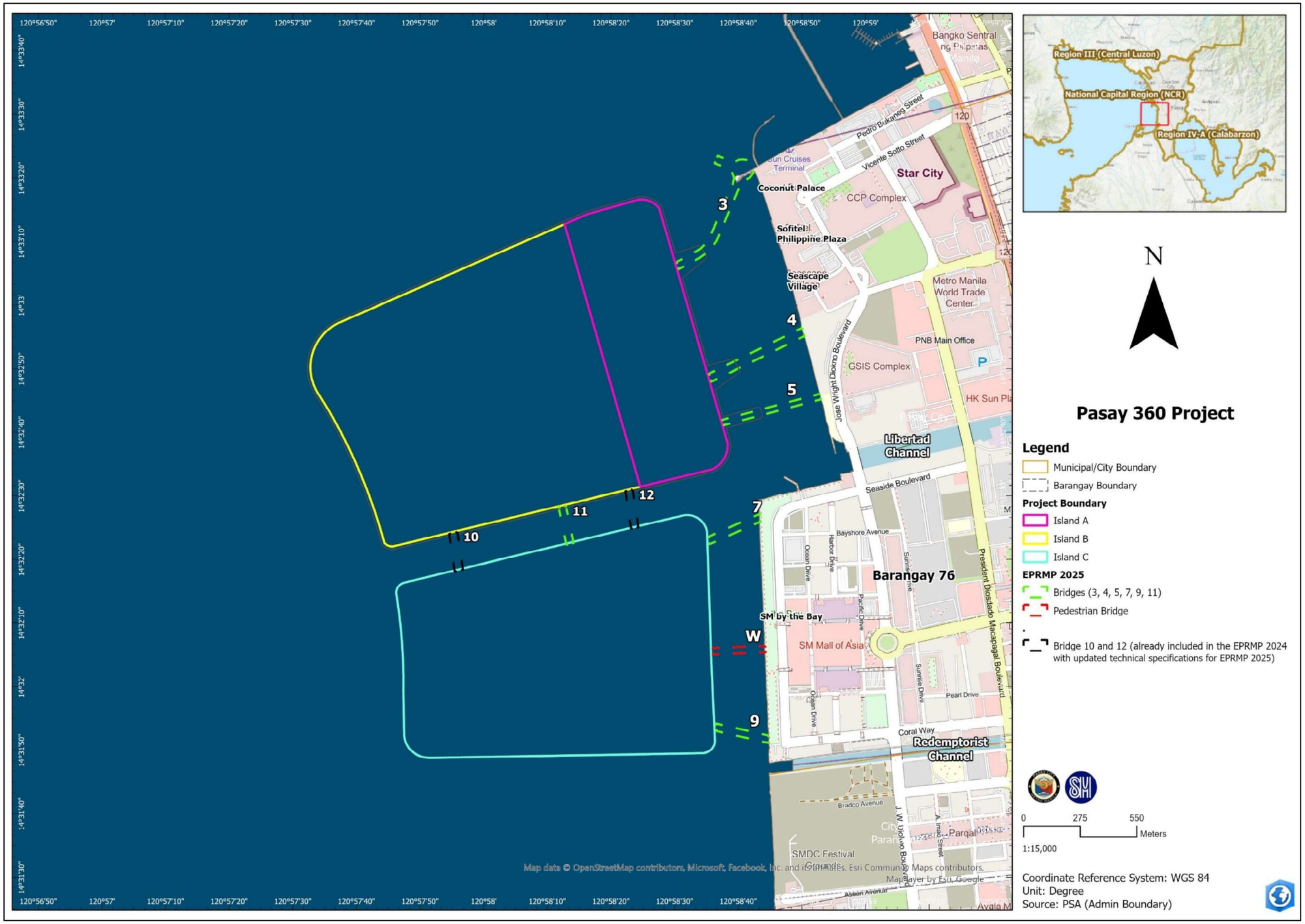
ES.2.2 EIA Study Schedule

Table ES-3 Study Schedule

EIA (EPRMP) Activities	Date
EPRMP 2025	
First EIARC meeting	20 January 2026
Second EIARC meeting	4 March 2026
Third EIARC Meeting and ECC drafting	8 April 2026
EPRMP 2024	
Terrestrial Flora	16 and 17 April 2024
Terrestrial Fauna	16 and 17 April 2024
Water Quality Sampling	23 April 2024
Marine Ecology Survey	6 to 7 April 2024
Ambient Air Quality and Noise Sampling	24 January 2024 and 9 to 12 April 2024
People/ IEC	29 April 2024 to 18 May 2024
First EIARC meeting	30 August 2024
Second EIARC meeting	17 September 2024
Third EIARC meeting	25 September 2024
Issuance of ECC (amendment)	13 March 2025

Study Area

Pasay 360 Project including the proposed Inter-Island and Mainland-Connecting Bridge Structures are situated along the waters of Manila Bay within the political jurisdiction of the City of Pasay specifically under Barangay 76.



Source/ Reference: Open Street Map and NAMRIA/PSA, 2020

Figure ES-2 Pasay 360 Project with the Updated Locations of the Interconnecting Bridges

ES.2.3 The EIA Methodology

The EIA methodology (Table ES-4) for the inclusion of the Inter Island Connecting Bridges remains the same with the methodologies of EPRMP 2024 with the addition of traffic impact assessment.

Table ES-4 EIA Methodology

Module	Brief Methodology
Traffic	The analysis, in general, follows the classic four-stage transport model. The final output is the flows on links within the study area, for the target planning horizon (2050), indicated by their Level of Service (LOS)/ Vehicle-Capacity (V/C) ratio. This is followed by proposals on the necessary traffic management measures based on the evaluation of impacts on traffic from Pasay 360 development. Transport surveys were conducted to gather data that will serve as inputs to the traffic analysis. Specifically, surveys for traffic counts, trip rates, travel time, signal phasing/timing and queuing, and a public transport inventory were conducted. The treatment of the pedestrian footbridge will be subsumed in the analysis involving land use (Trip Generation) given its scale relative to the whole development.
Other Modules	Same with EPRMP 2024

ES.3 EIA SUMMARY

ES.3.1 Summary of Alternatives Considered in terms of Siting, Technology Selection/Operation Processes and Design for the Inter Island Connecting Bridges

There are two options considered for the elevation profile for the Inter-Island Connecting Bridges and the summary of environmental impacts is presented in the table below.

Table ES-5 Alternatives for the Elevation Profile

Potential Impacts	Elevated Bridge	At-Grade Roads
Change in drainage morphology	Allow water to flow	Hinder the flow of water
Impacts to Navigation Access	Allow water vehicles to pass through	Blocks the navigation
Impacts to Marine Ecology	Less impact areas	Higher impact areas in the water

For the construction Inter-Island and Mainland-Connecting Bridge Structures, “No Project” would mean that there will be no direct and smooth access to the reclamation islands. The reclamation island will only be accessible via boat. In “With Project” scenario, people including their things will conveniently travel towards reclamation islands without having to ride a boat.

ES.3.2 Integrated Summary of the Main Impacts and Residual Effects after Applying Mitigation

Table ES-6 Summary of the Main Impacts and Residual Effects after Applying Mitigation

Phase	Activities	Potential Impacts	Affected Environment	Options For Prevention/ Mitigation/ Enhancement	Residual Effects after Applying Mitigation
Construction of Inter-Island and Mainland-Connecting Bridge Structures Construction along the waters of Manila Bay in Barangay 76 Construction along the landing areas at the mainland within Barangay 76 Construction of temporary support facilities for the bridge construction such: Site Offices; Clinic/Medical Facility; Mesh Hall/Catering Facility, Welfare Facility & Workers' Accommodation Building; General Material Laydown Area (on-site); Precast Yard (Provision only, same as current); Materials and Machineries/ Tools Storage and Maintenance Yard; Equipment Yard; Movable / Transferable Jetty (Passenger Jetty); Temporary Berthing Area w/ Rock Revetment (For Logistic); Concrete Batching Plant; Fuel Storage Facility; Water Supply; Power Supply (Temporary Facilities); Washing Bay; Temporary Site Access; Bentonite/Polymer Storage Facility; Material Testing Facility; Sanitation Facilities; and Materials Recovery Facility & Hazardous Waste Facility					
Pre-construction phase	Permitting	Project Delays	Land Use	Secure applicable permits and clearances from the concerned government offices	Minimal as long as mitigating measures are implemented
	Geotechnical and Feasibility Study	Possible encroachment in the ECA such as natural hazards, flooding, storm surge, etc. Bridge Collapse	Land Use	Preparation, consideration and implementation of the results of the Geotechnical Interpretation Report, EGGAR, Hydrodynamic Modelling Study and Flooding Impact Study, among others to the Project design. Mounting of foundations, and bridge construction will follow the provisions of DPWH standards, National Building code and the Structural code of the Philippines All storm drainage system designs will comply with the latest editions of the Sanitation Code of the Philippines and the National Plumbing Code of the Philippines.	Minimal as long as mitigating measures are implemented
Construction Phase	Construction along the waters of Manila Bay	Change in marine water quality	Water	Implement Turbidity Management Plan (TMP) Regular water quality monitoring	Minimal as long as mitigating measures are implemented

Phase	Activities	Potential Impacts	Affected Environment	Options For Prevention/ Mitigation/ Enhancement	Residual Effects after Applying Mitigation
	Construction along the landing areas at the mainland Construction of temporary support facilities for the bridge construction (earthworks, mobilization, excavation, among others)			Issuance of stop work order when required, based on onsite monitoring results and actual visibility, in accordance with TMP.	
		Increase in turbidity due to seabed disturbance	Water	Controlled direct placement of foundation by barges. Appropriate bridge construction method will be employed. A column or steel box/ cylindrical wall/ protection wall will form as an enclosure to the foundation or piles to prevent the water or sediments from seeping out. The water containing soil or sediment inside the casting will be carefully pumped using a hose that will be transferred to a designated spoil disposal area or may be pumped out near the casting when the water is generally static Other project components will be built on the land prior to the delivery in the bridge viaduct section Spoil Disposal Areas especially the excavated soil from the foundation will also be strategically located to avoid leakage to Manila Bay	Minimal as long as mitigating measures are implemented
Construction Phase	Construction along the waters of Manila Bay	Vessel Collision	People	Compliance with Maritime Industry Authority (MARINA),	Minimal as long as mitigating measures are implemented

Phase	Activities	Potential Impacts	Affected Environment	Options For Prevention/ Mitigation/ Enhancement	Residual Effects after Applying Mitigation
				Philippine Coast Guard (PCG) and international regulations. Proper training of vessel crew and personnel. Proper implementation of approved Vessel Traffic Management Plan Preparation and Implementation of Barge Access Plan and Safety. Height of the bridge will be considered to allow boats to pass through.	
Construction Phase	Construction along the landing areas at the mainland Construction of temporary support facilities for the bridge construction	Traffic density and traffic-related accidents increase	People	Separate pedestrian walkway (Personnel Entrance and Exit) and access for vehicles (Vehicle Entrance and Exit) Set up warning strips for isolation The main activity areas for personnel and construction machinery are separated Avoidance of cross-operation of various construction machines Assigning of watcher or / linemen No overloading. Keep linemen at its post to observe and give signal to moving vehicles	Minimal as long as mitigating measures are implemented

Phase	Activities	Potential Impacts	Affected Environment	Options For Prevention/ Mitigation/ Enhancement	Residual Effects after Applying Mitigation
				Implementation of Traffic Management Plan which include proper lane designation, speed limit, trucks deployment schedule, traffic signs, CCTV, and traffic marshals among others.	
Construction Phase	Construction along the waters of Manila Bay	Alteration of water flow Change in drainage morphology/ change in stream water depth	Water	Location of the foundation of the bridge will be strategically located with appropriate distance with each other to avoid hindrance to the flow of water	Minimal as long as mitigating measures are implemented
Operation Phase	Operation of bridges (Bridge and Pedestrian)	Traffic density and traffic-related accidents increase	Land People	Implementation of Traffic Management Plan which include proper lane designation, speed limit, trucks deployment schedule, traffic signs, CCTV, and traffic marshals among others.	Minimal as long as mitigating measures are implemented
Operation Phase	Operation of bridges (Bridge and Pedestrian)	Degradation of air quality Emissions due to the consumption of fuel from vehicles	Air quality People	Support to reforestation and greening program activities	Minimal as long as mitigating measures are implemented
Operation Phase	Operation of bridges (Bridge and Pedestrian)	Increase in noise	Noise	Installation of appropriate noise barriers.	Minimal as long as mitigating measures are implemented
Operation Phase	Operation of bridges (Bridge and Pedestrian)	Change in drainage morphology/ change in stream water depth	Hydrology/ Hydrogeology People	Maintenance/ clean-up of bridge that are distributed in the alignment to allow free flowing of rain or running waters and avoid clogging. Support LGU programs to Manila Bay clean-up projects. Preparation and Implementation of Barge Access Plan and Safety.	Minimal as long as mitigating measures are implemented

ES.3.3 Risks and Uncertainties Relating to the Findings and Implications for Decision Making

The main risks and uncertainties relating to the findings and implications for decision making for the construction of Inter-Island Connecting Bridges are as follows:

Table ES-7 Risks and Uncertainties

Risks and Uncertainties	Action Plan to Prevent Risks
Project Delays due to permitting issues.	• Secure applicable permits and clearances from the concerned government offices (ECC, Contract of Lease, PRA and CCP Board Resolution on the landing points, etc.)
Possible encroachment in the ECA such as natural hazards, flooding, storm surge, etc. Bridge Collapse	• Preparation, consideration and implementation of the results of the Geotechnical Interpretation Report, EGGAR, Hydrodynamic Modelling Study and Flooding Impact Study, among others to the Project design • Mounting of foundations, and bridge construction will follow the provisions of DPWH standards, National Building code and the Structural code of the Philippines
Increase in turbidity due to seabed disturbance	• Controlled direct placement of foundation by barges. • Appropriate bridge construction method will be employed. A column or steel box/ cylindrical wall/ protection wall will form as an enclosure to the foundation or piles to prevent the water or sediments from seeping out. • The water containing soil or sediment inside the casting will be carefully pumped using a hose that will be transferred to a designated spoil disposal area or may be pumped out near the casting when the water is generally static • Other project components will be built on the land prior to the delivery in the bridge viaduct section • Spoil Disposal Areas especially the excavated soil from the foundation will also be strategically located to avoid leakage to Manila Bay. Potential Impact: Solid Waste generation which includes slag, scales, and used maintenance materials
Potential Impact: Vessel Collision	• Preparation and Implementation of Barge Access Plan and Safety • Height of the bridge will be considered to allow boats to pass through
Traffic density increases and Traffic-related Accidents	• Separate pedestrian walkway (Personnel Entrance and Exit) and access for vehicles (Vehicle Entrance and Exit) • Set up warning strips for isolation • The main activity areas for personnel and construction machinery are separated • Avoidance of cross-operation of various construction machines • Assigning of watcher or / linemen • No overloading • Keep linemen at its post to observe and give signal to moving vehicles • Implementation of Traffic Management Plan which include proper lane designation, speed limit, trucks deployment schedule, traffic signs, CCTV, and traffic marshals among others.

Risks and Uncertainties	Action Plan to Prevent Risks
Alteration of water flow Change in drainage morphology/ change in stream water depth	• Location of the foundation of the bridge will be strategically located with appropriate distance with each other to avoid hindrance to the flow of water. • Maintenance/ clean-up of bridge that are distributed in the alignment to allow free flowing of rain or running waters and avoid clogging. • Support LGU programs to Manila Bay clean-up projects.

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1. PROJECT DESCRIPTION

EPRMP 2024 – ECC released on 13 March 2025

The City through its (JV partner, the SM SCIDC, reconfigured the physical layout of its Project referred to as "reclamation and horizontal land development of three hundred sixty (360) hectares" or the "360-hectare Reclamation Project" (the "Pasay 360" Project) under the original ECC (ECC-CO-1601-0003). The reconfiguration of Pasay 360 aims to enhance water circulation and mitigate potential flooding. The Project is described in the ECC as follows:

> *"The project shall cover the reclamation and horizontal land development of three hundred sixty (360) hectares along the Coast of Manila Bay, City of Pasay. The project is bounded by the coordinates as listed in its Environmental Impact Statement (EIS).*
>
> *The proposed project will include construction of major/primary internal access roads and bridges, and support facilities such as drainage systems, electricity, water supply and pollution abatement facilities involving wastewater treatment systems."*

EPRMP 2025 - This ECC Application

Amendment of the ECC of the 360-Hectare Pasay Reclamation Project (ECC-CO-1601-0003) to Include Inter-Island and Mainland-Connecting Bridge Structures

The Pasay City Government or the "City" through its Joint Venture (JV) partner, the SM Smart City Infrastructure and Development Corporation (SM SCIDC), intends to include the **Inter-Island and Mainland-Connecting Bridge Structures** of the "360-hectare Reclamation Project" (the "Pasay 360" Project) under the amended ECC (ECC-CO-1601-0003) which was issued on 13 March 2025. This ECC amendment for the Bridge Development covers only the project's horizontal works. All locators, investors, and other third parties undertaking vertical developments are responsible for obtaining their own respective ECCs or required environmental permits prior to implementation. The details of the Project are summarized in Table 1.1.

Table 1.1 Project Factsheet

Project Name	360-hectare Pasay Reclamation Project (Pasay 360 Project) - ECC Amendment of the 360-Hectare Pasay Reclamation Project to include Inter-Island and Mainland Connecting Bridge Structures
Project Location	Along the waters of Manila Bay in Barangay 76, Pasay City, NCR, Philippines
Nature of Project	For existing ECC 3.3 Reclamation and Other Land Restoration Projects greater than 25 hectares For ECC amendment as component Bridges and viaducts (including elevated roads), new construction > 50m but < 5km
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	Office on 13 March 2025	
Project Proponent:	Pasay City Government or the "City"	
Joint Venture Partner	SM Smart City Infrastructure and Development Corporation	
Office Address of the Project Proponent:	City Government of Pasay Pasay City Hall F.B. Harrison Street, Pasay City	
Contact Person/ Designation:	Atty. Severo Cañete Madrona Jr. City Legal Officer	Atty. Leah Quiambao JV Managing Head Raymond Cabanilla, EnP JV Pollution Control Officer
Contact Information:	09998813054 scmadrona@gmail.com	leah.quiambao@smsmartcity.com mon.cabanilla@smsmartcity.com
EPRMP Preparer (2025):	San Environmental Consultancy Services Inc. (SANECS)	
Office Address of the Preparer (2025):	9999 Mt. Pulog St., Umali Subd., Batong Malake, Los Baños, 4030, Laguna, Philippines	
Contact Person/ Designation:	Jan Paolo Polisco Team Leader – EIA Preparer	
Contact Information:	jppollisco@gmail.com | +639178284270	

Proof of Authority over the Project Site (Bridges)

The proof of authority over the project site of the Inter-Island Connecting Bridges which can be found in **Appendix A** are as follows:

Proof of Authority within the landing Points within PRA property (Islands AB and C)

- PRA Resolution No 6046 Series of 2024 – Approval of the Pasay Reclamation Projects Access Plan

Proof of Authority within the landing Points within the Mainland

- Lease agreement is still on finalization.

1.1. PROJECT LOCATION AND AREA

The proposed bridges and its temporary support facilities are still located within the political jurisdiction of the City of Pasay particularly in Barangay 76 which include the following:

- Bridge 3;
- Bridge 4;
- Bridge 5;
- Bridge 7;
- Pedestrian Bridge W;
- Bridge 9;
- Bridge 11; and
- Temporary support facilities for the construction of the bridges.

The proposed bridges will be connected to the approved Philippine Reclamation Authority (PRA) location of the reclamation islands as presented in Figure 1.1 and Figure 1.2. The geographic coordinates of the reclamation islands can also be found in Appendix H.

The geographic coordinates of these bridges including its landing areas are presented in Table 1.2 and Figure 1.3. This also include the locations of Bridge 10 and 12 with updated technical

specifications. Geographic photos of the proposed location of these bridges are shown in Figure 1.7 and Figure 1.8. The latest drone shot of the project is presented in Figure 1.6. The location of temporary facilities for the construction of Bridges is shown in Figure 1.4.

Table 1.2 Geographic Coordinates of the Bridges

Points	WGS 84 Datum	
	Latitude	Longitude
Bridge 3		
A	14°33'05.2963"N	120°58'30.7426"E
B	14°33'06.3301"N	120°58'30.4419"E
C	14°33'18.18"N	120°58'38.81"E
D	14°33'18.59"N	120°58'40.17"E
Bridge 4		
A	14°32'47.6650"N	120°58'35.8702"E
B	14°32'48.8484"N	120°58'35.5260"E
C	14°32'56.4473"N	120°58'50.0984"E
D	14°32'55.0775"N	120°58'50.4143"E
Bridge 5		
A	14°32'40.0904"N	120°58'38.0730"E
B	14°32'40.7500"N	120°58'37.8811"E
C	14°32'46.1468"N	120°58'52.7231"E
D	14°32'45.4816"N	120°58'52.8996"E
Bridge 7		
A	14°32'22.4506"N	120°58'35.4546"E
B	14°32'23.5775"N	120°58'35.4171"E
C	14°32'27.1210"N	120°58'43.4280"E
D	14°32'25.9994"N	120°58'43.4776"E
Pedestrian Bridge W		
A	14°32'5.0428"N	120°58'36.0346"E
B	14°32'6.0835"N	120°58'35.9999"E
C	14°32'6.4134"N	120°58'44.2415"E
D	14°32'5.3729"N	120°58'44.2817"E
Bridge 9		
A	14°31'53.0559"N	120°58'36.5680"E
B	14°31'54.1362"N	120°58'36.5172"E
C	14°31'52.2798"N	120°58'44.7266"E
D	14°31'51.2028"N	120°58'44.7625"E
Bridge 11		
A	14°32'28.2006"N	120°58'11.8167"E
B	14°32'28.4516"N	120°58'12.8552"E
C	14°32'22.6112"N	120°58'14.0704"E
D	14°32'22.3596"N	120°58'13.0321"E
Already included in 2024 (With updated technical specifications in EPRMP 2025)		
Bridge 10 (Bridge 6 in EPRMP 2024)		
A	14°32'24.0401"N	120°57'54.6102"E
B	14°32'24.3317"N	120°57'55.8158"E
C	14°32'18.4013"N	120°57'56.6950 "E
D	14°32'18.1093"N	120°57'55.4896"E
Bridge 12 (Bridge 5 in EPRMP 2024)		
A	14°32'30.7376"N	120°58'22.3103"E
B	14°32'30.9893"N	120°58'23.3512"E
C	14°32'25.0730"N	120°58'24.2626"E
D	14°32'24.8272"N	120°58'23.2196"E

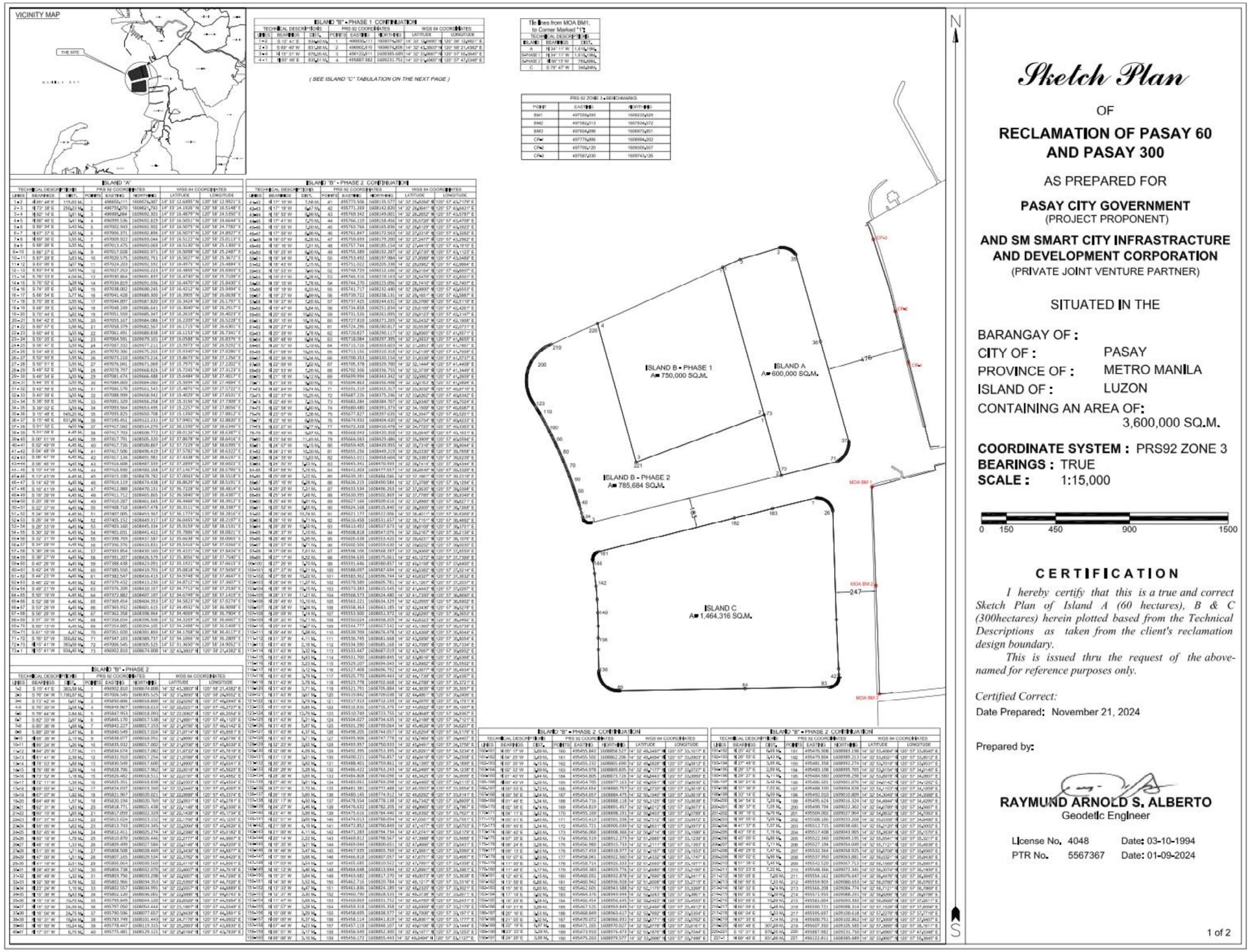


Figure 1.1 Geographic Coordinates Points of the Reclamation Islands ½

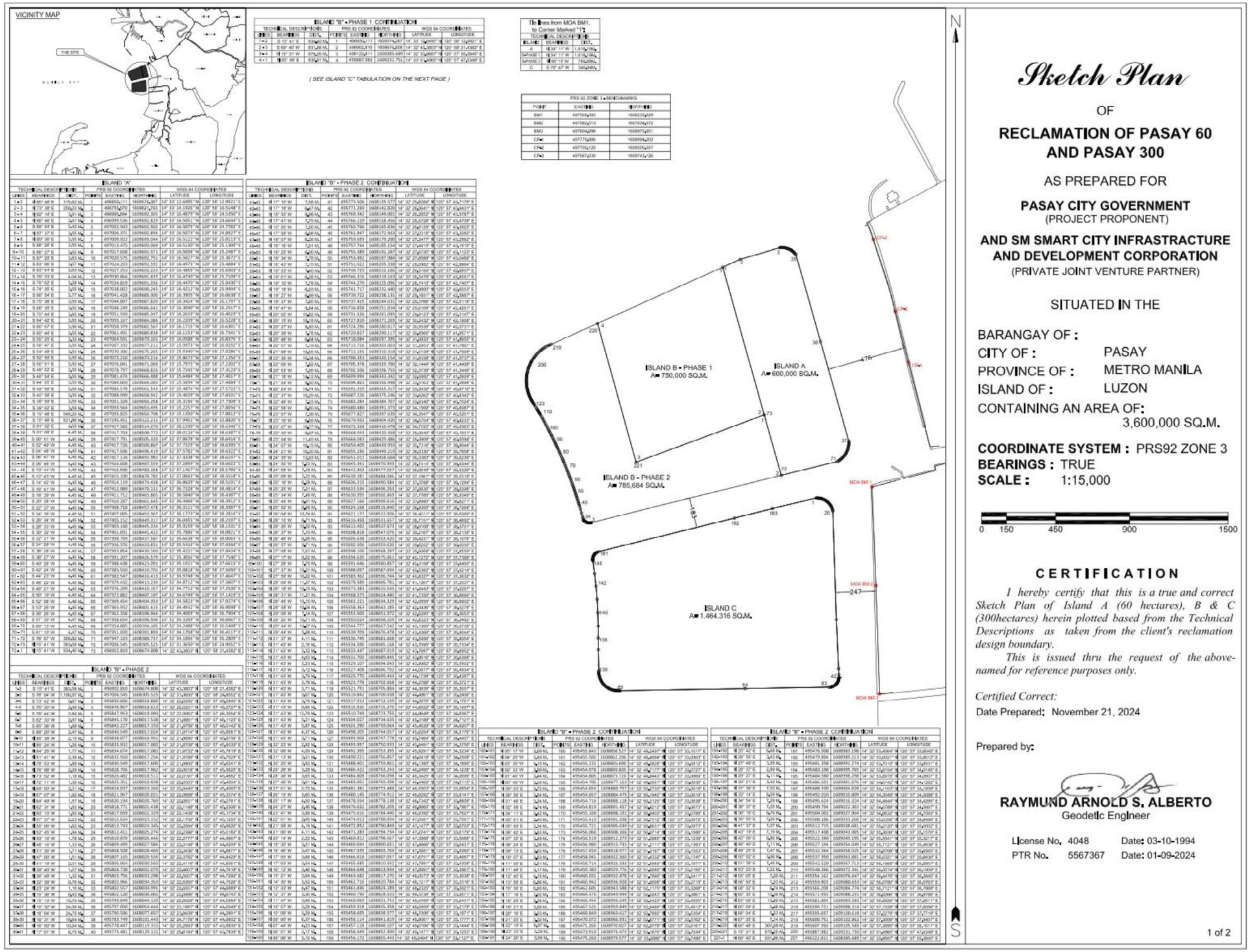


Figure 1.2 Geographic Coordinates Points of the Reclamation Islands 2/2

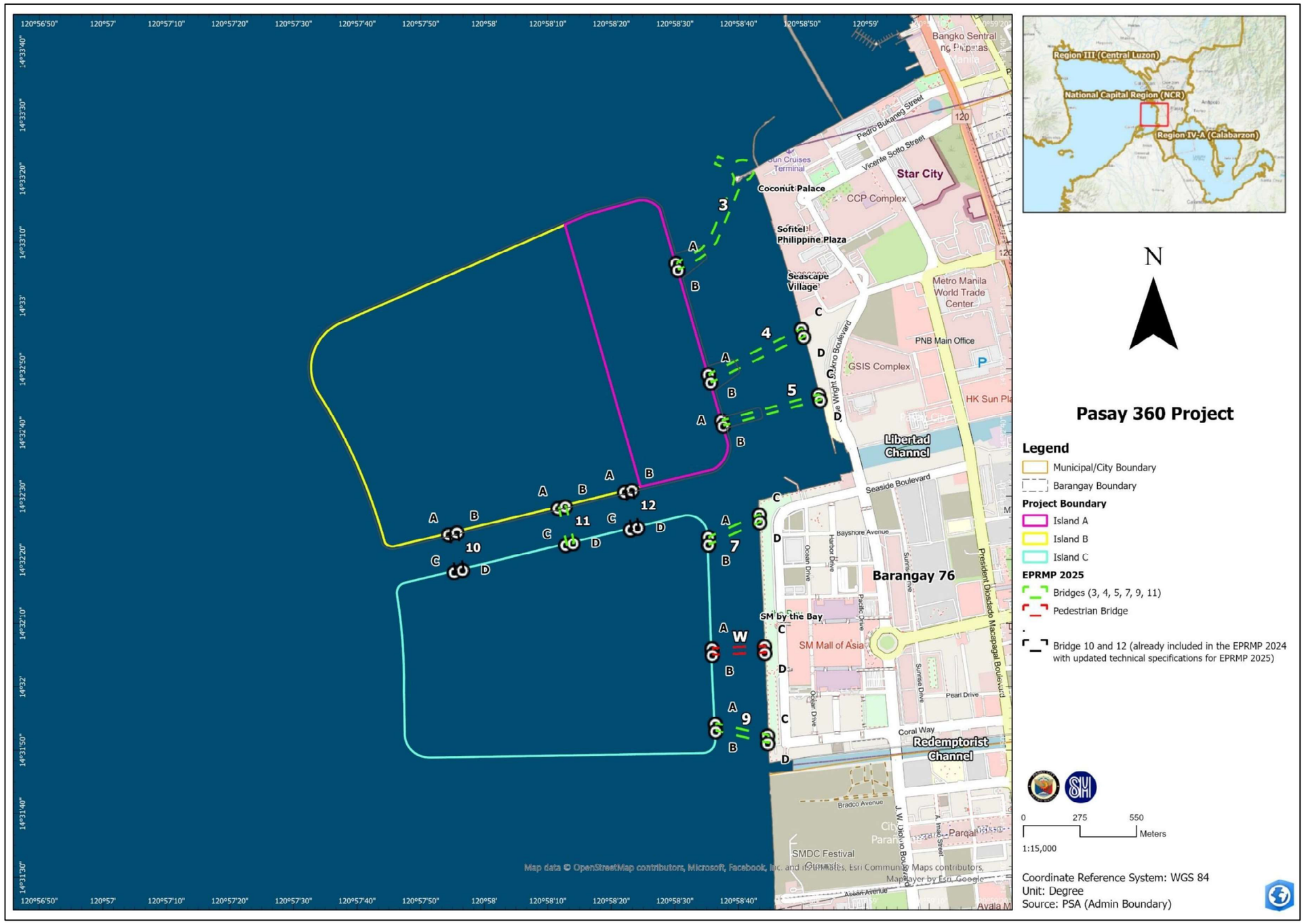


Figure 1.3 Geographic Coordinates Points of the Bridges

Location of the Temporary Support Facilities for the Construction of Inter-Island and Mainland-Connecting Bridge Structures



Assigned Box #	Facility/Space Allocation
1 Temporary Berthing Area	Guard post
	Disembarkation/Waiting/Induction area.
	Holding/Inspection area for deliveries.
	Contractor's and CM staff satellite office (Container)
	Staff pantry
	Service vehicles parking area.
	Washing bay.
	Fuel Tank
	Generator
	Waste Bins
	Toilets/Washroom
	Equipment yard/parking area
2 Temporary Berthing Area	Guard post
	Disembarkation/Waiting/Induction area.
	Holding/Inspection area for deliveries.
	Service vehicles parking area.
	Washing bay.
	Generator
	Waste Bins
	Toilets/Washroom
	Equipment yard/parking area
3 Maintenance Depot/Equipment Yard	Contractor's maintenance office (Container)
	Service vehicles parking area.
	Covered maintenance/repair area
	Spare parts and tool storage.
	Temporary power facility/generator.
	Washing bay.
	Waste Bins
	Toilets
	Workers' rest area/mess hall
4 Power supply/Electricity Substation	Materials Warehouse/storage.
	Fuel storage facility
	Hazardous waste facility, waste bins
	Pre-cast yard/Pre-cast storage area
5 Administration/Office building	Client's office
	Contractor's and CM staff office (Container)
	Material testing/laboratory
	Medical facility/clinic.
	Ambulance parking
	Staff Mess Hall/ Pantry
6 Associated infrastructure facilities and buildings	Water supply.
	Service vehicles parking area.
	Generator
	Waste Bins
	Toilets

Figure 1.4 Location of the Temporary Support Facilities for the Inter-Island and Mainland-Connecting Bridge Structures

Project Site Accessibility

From the capital city of the Philippines, Manila the Project site near SM MOA can be reached by land travel via Padre Burgos Ave, Roxas Boulevard/R-1 at J.W. Diokno Blvd to Seaside Blvd. Approximate Travel time is 30 minutes. Then from SM MOA the planned of access is shown in Figure 1.5. For air travel, the nearest airport is the Manila International Airport Terminals 1 to 3 which are approximately 4km from the Project site. From the airport, the site can be accessed through land transportation vehicles. Approximate travel time is 18 to 30 mins.

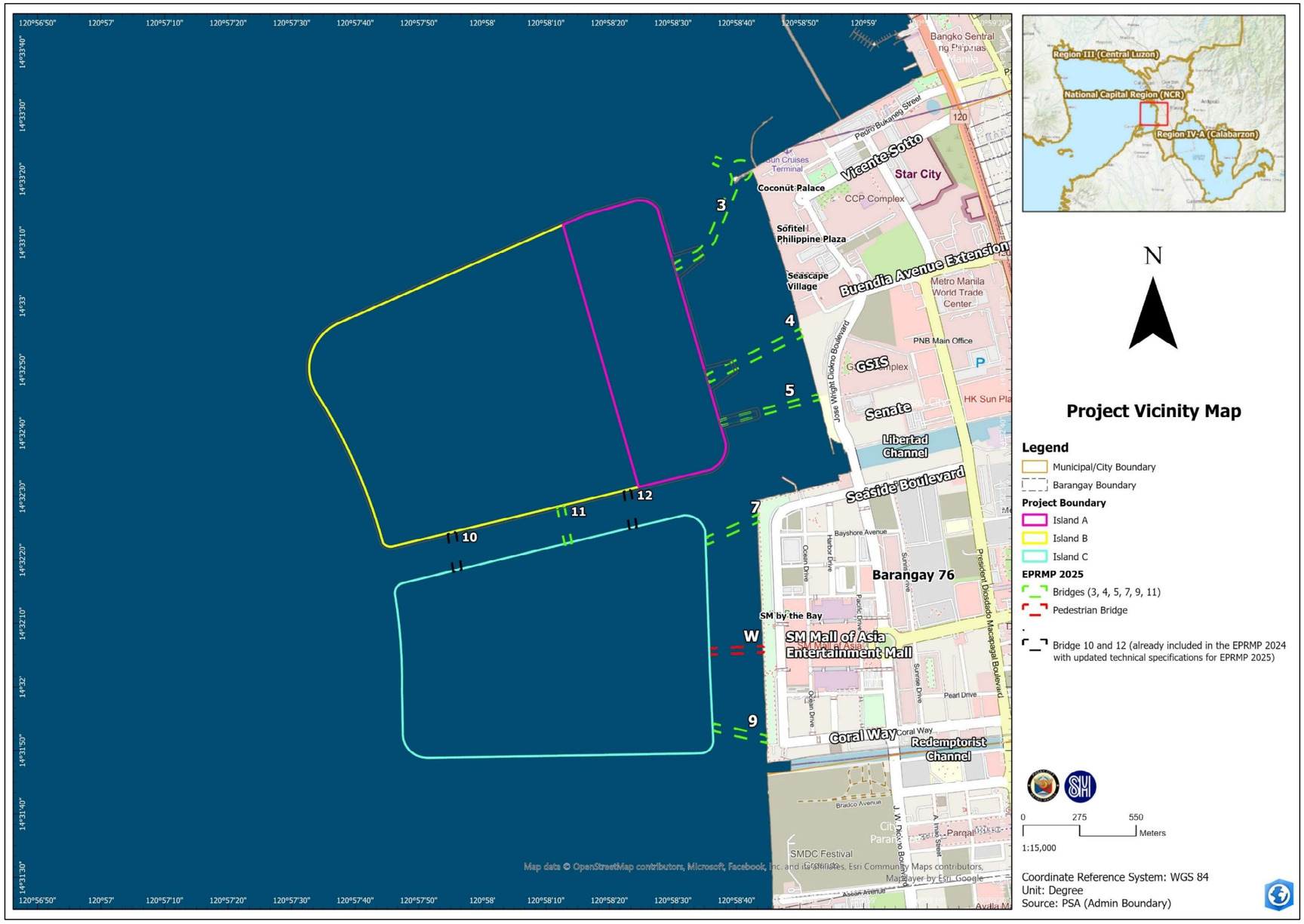
The plan for access to the project site (Figure 1.3) indicates proposed bridges connecting the following major roads (Vicente Sotto St., Diokno Blvd., Seaside Blvd., and Coral Way) to the Project site. The islands within the project will also be interconnected with each other. Accessways (bridges, viaducts, roads or others as may be determined.) from the mainland and inter-island shall be finalized through the Detailed Engineering Design and Final Masterplan with the approval of PRA.

Direct and Indirect Impact Areas

The EPRMP study was based on the assessment of the direct and indirect impact areas of the proposed Project as shown in Table 1.3.

Table 1.3 Direct and Indirect Impact Areas

Impact areas	Remarks	Approximate Buffer from the Project Boundary
Direct Impact Areas (DIA)	In terms of biophysical impact: The waterways and aquatic resources along the coast of Pasay City that will be directly affected by the project due to the change of land formation from water to land	- Channel at the East of Project area including Libertad and Redemptorist Channels - Coastal water of Pasay City 500 meters West of the project site - Coastal waters of Pasay City North of the project site - Coastal waters of Pasay City South of the project site
	In terms of socio-economic impact (local hiring and generation of local benefits):	- Barangay 76
	Potential impact to natural hazards (i.e. storm surge, flooding, and tsunami):	- Coastal area of Barangay 76 including Libertad and Redemptorist Channels
Indirect Impact Areas (IIA)	In terms of socio-economic impact (local hiring and generation of local benefits):	- Remaining Barangays of Pasay City

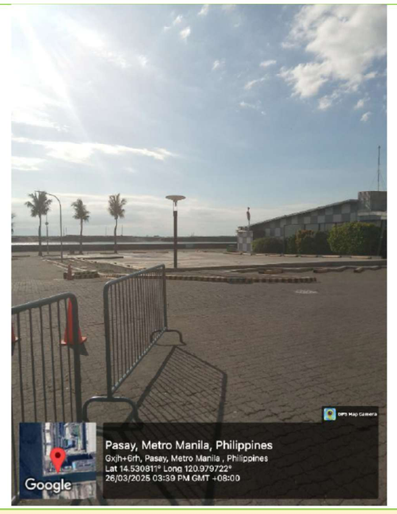


Reference: Open Street Map and NAMRIA/PSA, 2020

Figure 1.5 Project Vicinity Map Including Locations of the Inter-Island and Mainland-Connecting Bridge Structures



Figure 1.6 Project Site Aerial Photo (06-April-2026)

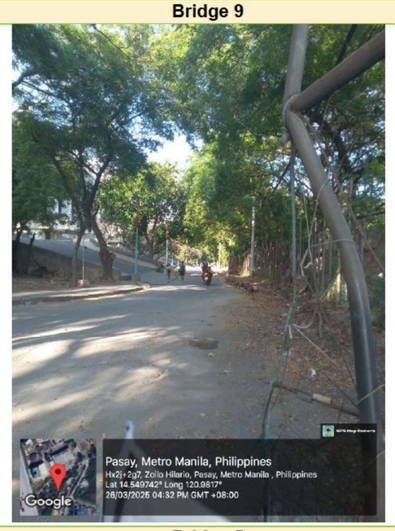


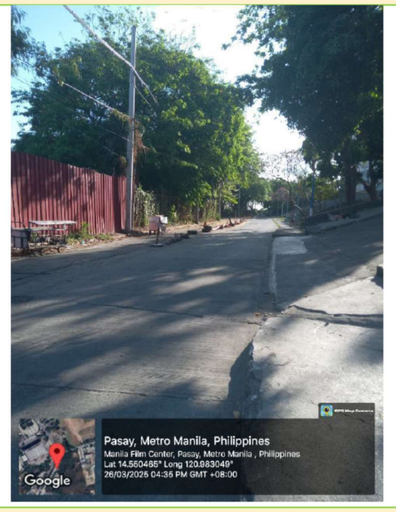




Bridge 9

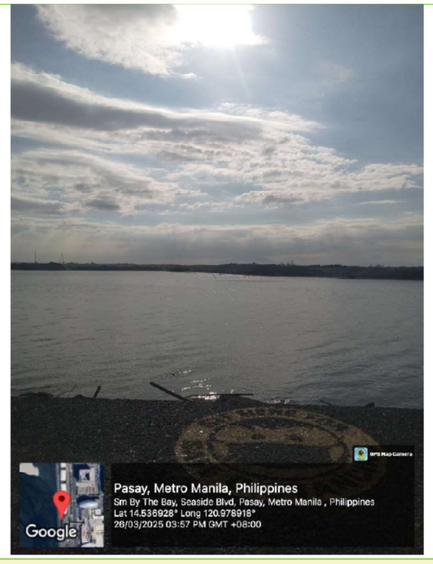


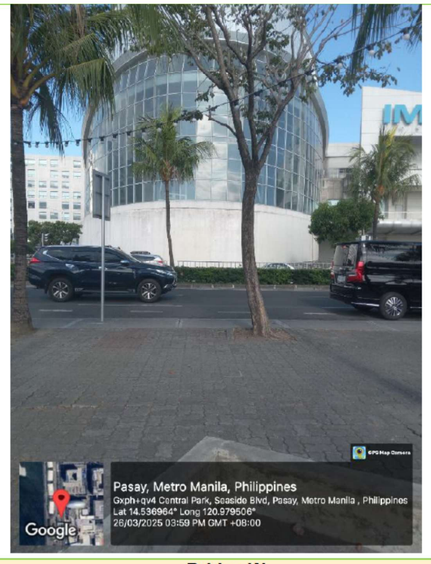


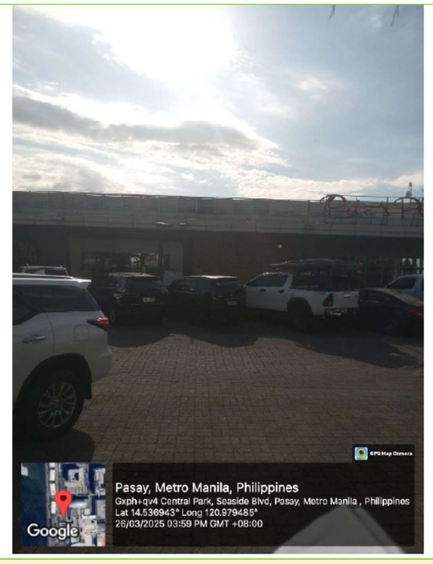


Bridge 5

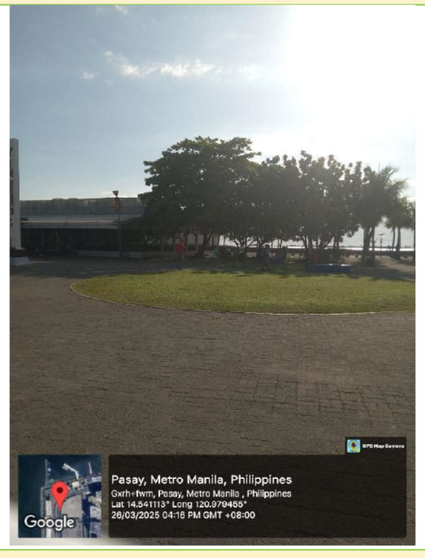
Figure 1.7 Geotagged Photos of the Proposed Locations of the Interconnecting Bridges for Island AB

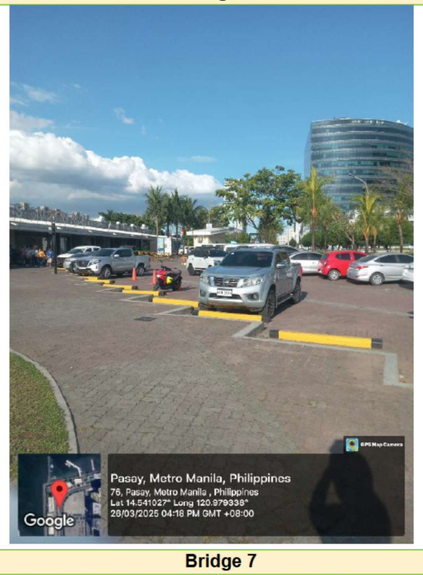






Bridge W







Bridge 7

Figure 1.8 Geotagged Photos of the Proposed Locations of the Interconnecting Bridges for Island C

1.2. PROJECT RATIONALE

The additional project Bridges will provide an efficient and direct access to Pasay 360 specifically Bridges 3, 4, 5, 7, 9 and 11 will be used for both vehicular transport and pedestrian (this also include Bridge 10 and 12 with updated technical specifications) while Bridge W will be used solely for pedestrian which is connected to SM Entertainment Mall.

1.3. PROJECT ALTERNATIVES

The consideration for this project involves the siting, technology selection, and resources alternative as discussed in this section.

1.3.1. SITING

The Interconnecting Bridges will be located directly to the nearest road adjacent to the reclamation islands and to the mainland. There is no other location of the bridge aside from the proposed connection points.

By siting it with the nearest road, minimal area and impacts is expected than connecting it to other roads. Hence, no other locations have been considered except for the proposed.

1.3.2. TECHNOLOGY SELECTION/ OPERATION PROCESSES

The general consideration is that the Project shall provide connectivity to Pasay 360. Given the overall context of the connection to the Islands, the proponent sees the connection as more suitable for an elevated bridge rather than at grade roads, railways including subway for the following reasons:

- Bridge is always open as compared with railways or subway;
- Bridge will allow freely flowing of water as compared with at-grade roads.
- The inter-island connecting bridge will be directly connected with the mainland roads as compared with the location of the nearest railways;
- The distance from the mainland is short on which railways are not economically feasible;
- Trains will require higher maintenance time as compared with roads;
- Bridge will have better mobility and carrying capacity in moving goods and cargo than railways;
- Elevated bridge will have lower impact as compared with at-grade and railways since this will require lower affected areas.
- Bridges are a more financially viable option compared to rails; and
- Bridges will be easier to construct and maintain compared to rail.

Overall, an elevated bridge is the best suitable option for a road traveling along the Manila Bay.

1.3.3. COMPARISON OF ENVIRONMENTAL IMPACTS FOR EACH ALTERNATIVE

There are two options considered for the elevation profile for the Inter-Island Connecting Bridges and the summary of environmental impacts is presented in Table 1.4.

Table 1.4 Alternatives for the Elevation Profile

Potential Impacts	Elevated Bridge	At-Grade Roads
Change in drainage morphology	Allow water to flow	Hinder the flow of water
Impacts to Navigation Access	Allow water vehicles to pass through	Blocks the navigation
Impacts to Marine Ecology	Less impact areas	Higher impact areas in the water

1.3.4. "WITH PROJECT" AND "WITH NO PROJECT" OPTIONS

For the construction of Inter-Island Connecting Bridges "No Project" would mean that there will be no direct and smooth access to the reclamation islands. The reclamation island will only be accessible via boat. In "With Project" scenario, people including their things will conveniently travel towards reclamation islands without having to ride a boat.

1.4. PROJECT COMPONENTS

The approved project components based on ECC-CO-1601-0003 (Amended) issued on 13 March 2025 as well as the proposed modifications for this ECC amendment application is presented in Table 1.2. The discussion of the major components for this ECC application which focuses on the bridges is found in Section 1.4.1.

Table 1.5 Summary of the Proposed ECC Modifications

Components	Particulars/ Details	
	ECC-CO-1601-0003 (Amended) Issued on 13 March 2025	Proposed Modification in this Application
Major Components Facilities covered by ECC-CO-1601-0003 (Amended) issued on 13 March 2025 and its proposed modifications		
Islands	Island A: 60 hectares Island B: 153.5684 hectares Island C: 146.4316 hectares Total: 360 hectares	No changes.
Water Channels	Island A to mainland: 476 meters Island B to C: 183 meters Island C to mainland: 247 meters	No changes.

Components	Particulars/ Details	
	ECC-CO-1601-0003 (Amended) Issued on 13 March 2025	Proposed Modification in this Application
Bridges Note: • Bridges 1 and 2 is not included in this ECC amendment as this will be handled by Pasay Harbor City Corporation (PHCC) according to Philippine Reclamation Authority (PRA). These are the bridges connecting Pasay 265 (PHCC) to Pasay 360 There is no Bridge No. 6 in the PRA approved document	Bridge No. 1 • No details yet • Not included in the application • Subject to separate application	Bridge No. 3 (Bridge 1 before) • Type: Beam Bridge • Length: ±514.9 m • Width: ±32 m • Number of lanes: 6 lanes (3 lanes per direction)Number of bike lanes: 2 (1 lane per direction)
	Bridge No. 2 • No details yet • Not included in the application • Subject to separate application	Bridge No. 4 (Bridge 2 before) • Type: Beam Bridge • Length: ±490.87 m • Width: ±37 m • Number of lanes: 8 lanes (4 lanes per direction)Number of bike lanes: 2 (1 lane per direction)
		Bridge No. 5 • Type: Beam Bridge • Length: ±474.35 m • Width: ±21 m • Number of lanes: 4 lanes (2 lanes per direction)Number of bike lanes: 2 (1 lane per direction)
	Bridge No. 3 • No details yet • Not included in the application • Subject to separate application	Bridge No. 7 (Bridge 3 before) • Type: Beam Bridge • Length: ±263.55 m • Width: ±32 m • Number of lanes: 6 lanes (3 lanes per direction) • Number of bike lanes: 2 (1 lane per direction)
	Pedestrian Bridge • No details yet • Not included in the application Subject to separate application	Pedestrian Bridge W • Type: Beam Bridge • Length: ±348.17 m Width: ±32 m
	Bridge No. 4 • No details yet • Not included in the application • Subject to separate application	Bridge No. 9 (Bridge 4 before) • Type: Beam Bridge • Length: ±252.23 m • Width: ±32 m • Number of lanes: 6 lanes (3 lanes per direction) • Number of bike lanes: 2 (1 lane per direction)
	Bridge No. 5 • Type: Beam Bridge • Length: 225 meters	Bridge No. 10 (Bridge No. 5 before) • Type: Beam Bridge • Length: ±184.16 m

Components	Particulars/ Details	
	ECC-CO-1601-0003 (Amended) Issued on 13 March 2025	Proposed Modification in this Application
	• Width: 46 meters • Number of lanes: 10 lanes (5 lanes per direction)	• Width: ±37 m • Number of lanes: 8 lanes (4 lanes per direction) • Number of bike lanes: 2 (1 lane per direction)
		Bridge No. 11 • Type: Beam Bridge • Length: ±183.15 m • Width: ±32 m • Number of lanes: 6 lanes (3 lanes per direction) • Number of bike lanes: 2 (1 lane per direction)
	Bridge No. 6 • Type: Beam Bridge • Length: 225 meters • Width: 35 meters Number of lanes: 6 lanes (3 lanes per direction)	Bridge No. 12 (Bridge No. 6 before) • Type: Beam Bridge • Length: ±183.77 m • Width: ±32 m • Number of lanes: 6 lanes (3 lanes per direction) • Number of bike lanes: 2 (1 lane per direction)
Vertical Containment Structure	9,614.75 linear meters containment wall (seawall) around the entire perimeter of the reclaimed area consisting of a combination of rock mound	Total Linear Meters: 5,815.572 meters based on current design
Wave Deflector	Concrete with water sump	Based on current design, wave deflector is not required. The current wave wall configuration, with a crest at the top, is considered sufficient to mitigate overtopping based on the design calculations.
Support Facilities	• Drainage System (Stormwater pipeline and STP pipeline) • Electricity, Water and Communication Systems • Water supply system during reclamation phase • Street lighting	No changes.
Temporary Support Facilities covered by ECC-CO-1601-0003 (Amended) issued on 13 March 2025		
Temporary Access Bridges	Temporary access bridges to be constructed through sand filling with concrete pavement as carriageway and slope protection (rocks and geotextile):	Temporary Access Bridge No. 1 is the Bridge No. 5 in this amendment.

Components	Particulars/ Details	
	ECC-CO-1601-0003 (Amended) Issued on 13 March 2025	Proposed Modification in this Application
	1. Between the leased 215.70 m2 area within the Cultural Center of the Philippines (CCP) in mainland and Island AB: • 476-meter temporary access bridge with 20 kPa design load capacity. • Width: 9 meters 2. Island AB and Island C: • 180-meter temporary access bridge • Width: 9 meters The temporary bridges will be used for the access of vehicles, equipment, material, and personnel during the reclamation and horizontal development.	
Precast Yard	Covers a total area of 31,770 m^2 with the following components: • Prefabricated area • Concrete Block Mattress (CBM) storage area • Geotextile processing area • Generator placement/ power distribution • Access road • Water tanks • 28 units of 1,000 liters Intermediate Bulk Container fuel storage tank (diesel) with a footprint area of 6m x 6m located at least 15 meters away from the generator. This will be used for vehicles, equipment, and generator sets. • Precast Yard Site Office • Maintenance area and Material Storage Area	No changes.
Site Office	Steel insulated, air-conditioned cabins/site office container	No changes.
Rock Stockpile	Four (4) rock stockpiles with the following footprint areas: • Rock Stockpile 1 – 150mx350m • Rock Stockpile 2 – 400mx150m	No changes.

Components	Particulars/ Details	
	ECC-CO-1601-0003 (Amended) Issued on 13 March 2025	Proposed Modification in this Application
	• Rock Stockpile 3 – 200mx200m • Rock Stockpile 4 – 200mx200m	
Pipeline Stockpile	• Foot print area: 200 m x 276 m	No changes.
Materials Recovery Facility (MRF), Hazardous Waste Facility	Steel and galvanized iron (GI) sheets with a footprint area of 41,892 m^2	No changes.
CBM Stockpile	35m x 140m stockpiles located in the following • North side of Island C • East Side of Island C • South Side of Island C	No changes.
Clinic	Steel insulated cabin with aircon with 12.51 m^2	No changes.
Movable/ Transferable Jetty	Jetty Steel Type and Jetty Pontoon made of high Density-Polyethylene (HDPE) hollow cylinder located at the following: • Southern side of Island AB • Northeastern part of Island C • Southeastern part of Island C	Temporary Jetty 2: No changes Temporary Jetty 2: Location: Southside Island AB J15 Temporary Jetty 3: Location: Northside Island C Q17
Temporary Rock Wharf	Four (4) rock wharfs with 42.82 m length and 50 m width to be constructed from boulders and rock with precast mooring to be used for docking and access of landing-craft tank. The rock wharf will be located at the following: • One (1) unit in the northern side of Island AB • One (1) unit western side of Island AB • Two (2) units in the western part of Island C	No changes.
Sanitation Facility	Portalets with a ratio of 1:20 (portalet to man power ratio)	No changes.
Temporary Support Facilities for the Construction of the Bridges		
Site Offices	-	Steel Insulated cabin with aircon
Clinic/Medical Facility	-	Steel Insulated cabin with aircon Area: 36m^2
General Material Laydown Area (on-site)	-	Laid on sand/ ground with boundary soft barricades; for off-site work areas, there will be a temporary G.I. sheet fence (or equivalent) to secure the area.

Components	Particulars/ Details	
	ECC-CO-1601-0003 (Amended) Issued on 13 March 2025	Proposed Modification in this Application
Materials and Machineries/ Tools Storage and Maintenance Yard	-	Steel Insulated cabin, concrete bedding, steel frame structure with steel railing for gantry cranes. Enclosed by a steel fence
Equipment Yard	-	On level ground with safety enclosure
Movable / Transferable Jetty (Passenger Jetty)	-	Steel pipe, plate, chain, floating tank and rubber tyre
Temporary Berthing Area w/ Rock Revetment (For Logistic)	-	Lifting Equipment, Geotextile, Sand, Rocks and Concrete Anchor weights
Fuel Storage Facility	-	By Supplier. Typically consist of steel frame structures, oil storage tanks, pumps, pipings, gensets, steel cabins.
Water Supply	-	Water Trucks, Pumps and Storage Tanks
Power Supply (Temporary Facilities)	-	Steel frame, GI Sheets and Genset
Washing Bay	-	Covered Area, Power Spray
Temporary Site Access	-	Dike road (sand/rock) or steel stationary barge resting on concrete blocks or steel decking temporary bridge
Bentonite/Polymer Storage Facility	-	Pre-fabricated steel silo(s) on reinforced concrete foundation
Material Testing Facility	-	Steel Insulated cabin, Steel and GI Sheets
Sanitation Facilities	-	Portalets and/ or Toilet cubicles with temp. effluent storage tanks - both serviceable by DENR-accredited company
Materials Recovery Facility & Hazardous Waste Facility	-	Steel and GI Sheets

Note: This ECC amendment for the Bridge Development covers only the project's horizontal works. All locators, investors, and other third parties undertaking vertical developments are responsible for obtaining their own respective ECCs or required environmental permits prior to implementation.

1.4.1. MAJOR COMPONENTS FOR THE BRIDGES

The additional project components are as follows:

- Bridge 3;
- Bridge 4;
- Bridge 5;
- Bridge 7;
- Pedestrian Bridge W;
- Bridge 9;
- Bridge 11; and
- Temporary support facilities for the construction of the bridges.

The technical descriptions of these bridges are summarized in Table 1.6 while the details and site location of these bridges are found in Figure 1.9 to Figure 1.10. This also include the locations of Bridge 10 and 12 with updated technical specifications stated in the amended ECC dated March 13, 2025.

Table 1.6 Bridge Technical Description

Bridges	Location	Function Type	Type	RROW Width, m	Centerline Length Edge to Edge, m	Number of Lanes	Number of Bike Lanes	Made Shift/ Made of	Superstructure	Superstructure Height (min and max)	Substructure	Substructure Height (min and max)
Bridge 3	Island A/B to Seaside Boulevard	Vehicular and Pedestrian	Beam Bridge	±32	± 514.90	3+3	1+1	Pre-stressed concrete bridge	Pre-stressed concrete bridge with steel railings and drainage system	2.0m to 2.3m (pre-stressed concrete bridge)	Reinforced concrete piers and pier caps on pile foundations; abutments on both ends of the bridge	4.626m to 7.596m
Bridge 4	Island AB to J.W. Diokno Blvd	Vehicular and Pedestrian	Beam Bridge	±37	±490.87	4+4	1+1	Pre-stressed concrete bridge	Pre-stressed concrete bridge with steel railings and drainage system	2.0m to 2.3m (Pre-stressed concrete bridge)	Reinforced concrete piers and pier caps on pile foundations; abutments on both ends of the bridge	5.002m to 7.768m
Bridge 5	Island A/B to Marina Way	Vehicular and Pedestrian	Beam Bridge	±21	± 474.35	2+2	1+1	Pre-stressed concrete bridge	Pre-stressed concrete bridge with steel railings and drainage system	2.0m to 2.3m (pre-stressed concrete bridge)	Reinforced concrete piers and pier caps on pile foundations; abutments on both ends of the bridge	7.961m to 7.961m
Bridge 7	Island A/B to Seaside Blvd.	Vehicular and Pedestrian	Beam Bridge	±32	±263.55	3+3	1+1	Pre-stressed concrete bridge	Pre-stressed concrete bridge with steel railings and drainage system	2.0m to 2.3m (pre-stressed concrete bridge)	Reinforced concrete piers and pier caps on pile foundations; abutments on both ends of the bridge	4.749m to 7.194m
		Pedestrian		±32.00	±348.17	-	-					

Bridges	Location	Function Type	Type	RROW Width, m	Centerline Length Edge to Edge, m	Number of Lanes	Number of Bike Lanes	Made Shift/ Made of	Superstructure	Superstructure Height (min and max)	Substructure	Substructure Height (min and max)
Bridge W	Island C to MOA		Beam Bridge					Pre-stressed concrete bridge	Pre-stressed concrete bridge with steel railings and drainage system	2.0m to 2.3m (pre-stressed concrete bridge)	Reinforced concrete piers and pier caps on pile foundations; abutments on both ends of the bridge	3.800 m to 8.000 m
Bridge 9	Island C to Coral Way	Vehicular and Pedestrian	Beam Bridge	±32	±252.23	3+3	1+1	Pre-stressed concrete bridge	Pre-stressed concrete bridge with steel railings and drainage system	2.0m to 2.3m (pre-stressed concrete bridge)	Reinforced concrete piers and pier caps on pile foundations; abutments on both ends of the bridge	4.749m to 7.194m
Bridge 11	Island A/B to C	Vehicular and Pedestrian	Beam Bridge	±32	± 183.15	3+3	1+1	Pre-stressed concrete bridge	Pre-stressed concrete bridge with steel railings and drainage system	2.0m to 2.3m (pre-stressed concrete bridge)	Reinforced concrete piers and pier caps on pile foundations; abutments on both ends of the bridge	3.488m to 3.638m
Already Included in EPRMP 2024 But with Some Modifications												
Bridge 10	Island A/B to C	Vehicular and Pedestrian	Beam Bridge	±37	± 184.16	4+4	1+1	Pre-stressed concrete bridge	Pre-stressed concrete bridge with steel railings and drainage system	2.0m to 2.3m (pre-stressed concrete bridge)	Reinforced concrete piers and pier caps on pile foundations; abutments on both ends of the bridge	3.109m to 3.239m

Bridges	Location	Function Type	Type	RROW Width, m	Centerline Length Edge to Edge, m	Number of Lanes	Number of Bike Lanes	Made Shift/ Made of	Superstructure	Superstructure Height (min and max)	Substructure	Substructure Height (min and max)
Bridge 12	Island A/B to C	Vehicular and Pedestrian	Beam Bridge	±32	± 183.77	3+3	1+1	Pre-stressed concrete bridge	Pre-stressed concrete bridge with steel railings and drainage system	2.0m to 2.3m (pre-stressed concrete bridge)	Reinforced concrete piers and pier caps on pile foundations; abutments on both ends of the bridge	3.155m to 3.305m

*Note: **To be firmed up in the Detailed Engineering Design and Final Project Masterplan. Please note that as the project is still in the tendering phase for the DED, final bridge designs may vary depending on future requirements from relevant authorities and outcomes of detailed soil investigation (SI) reports.*

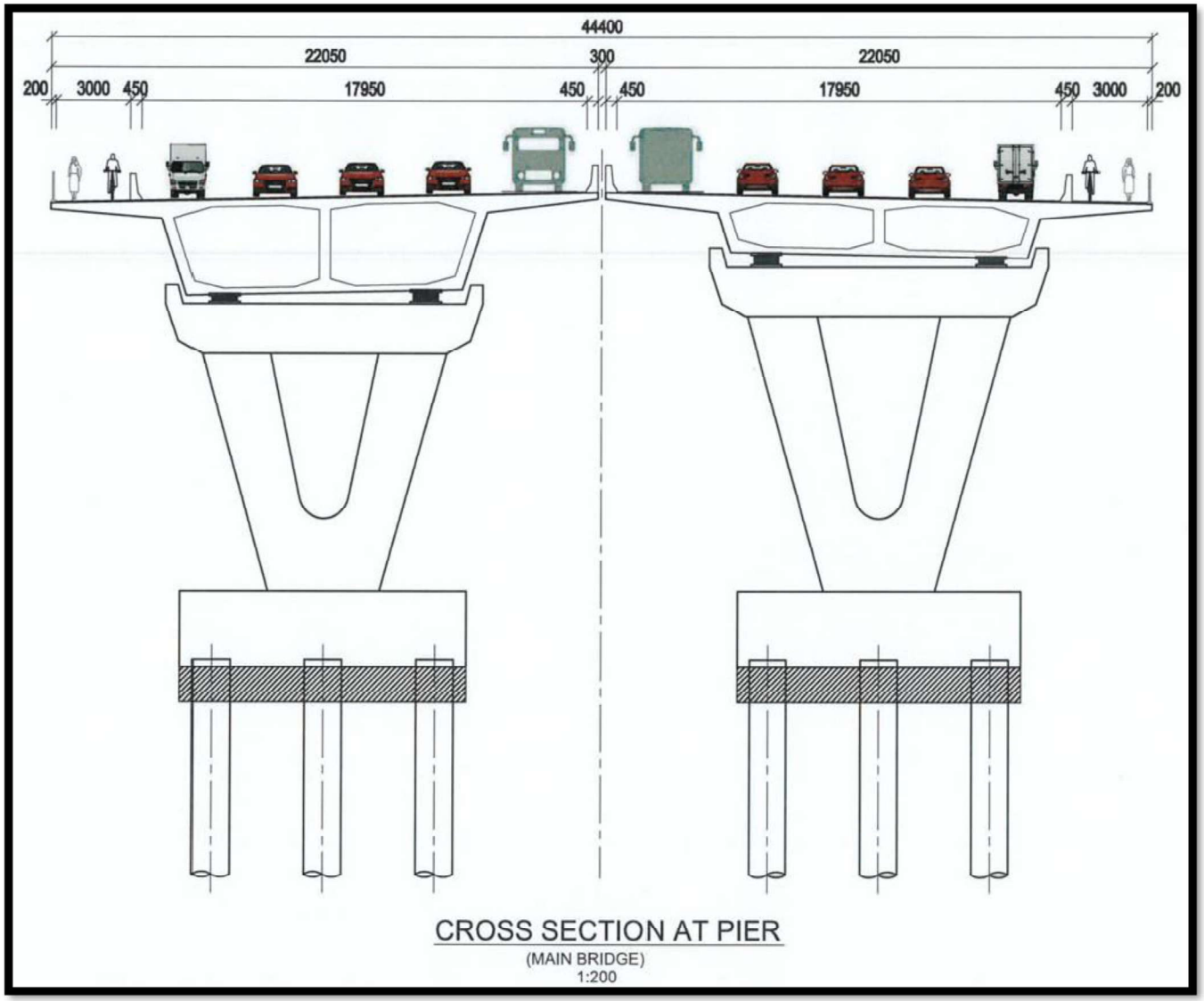


Figure 1.9 Cross Section View of Concrete Bridge

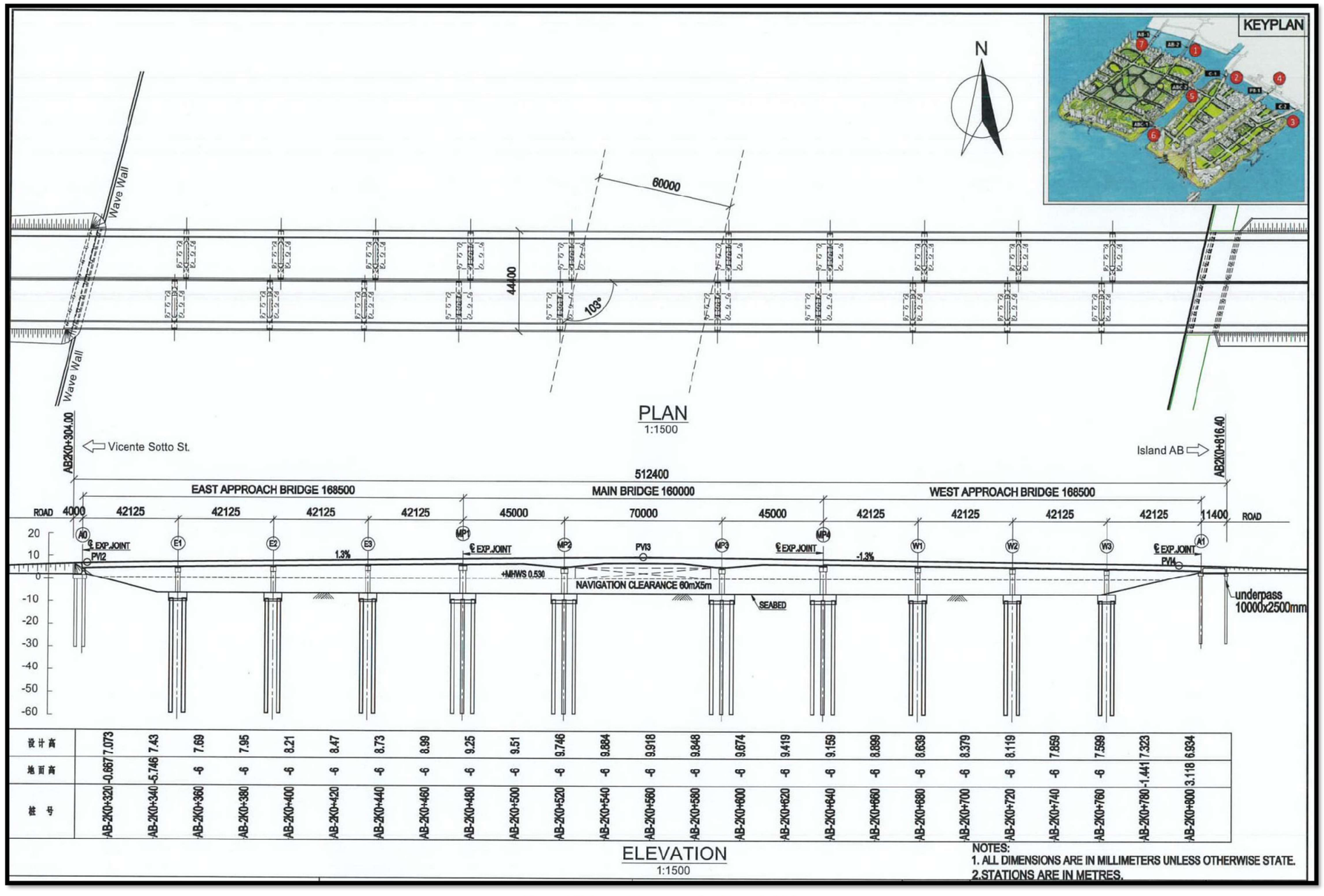


Figure 1.10 General Arrangement of Concrete Bridge

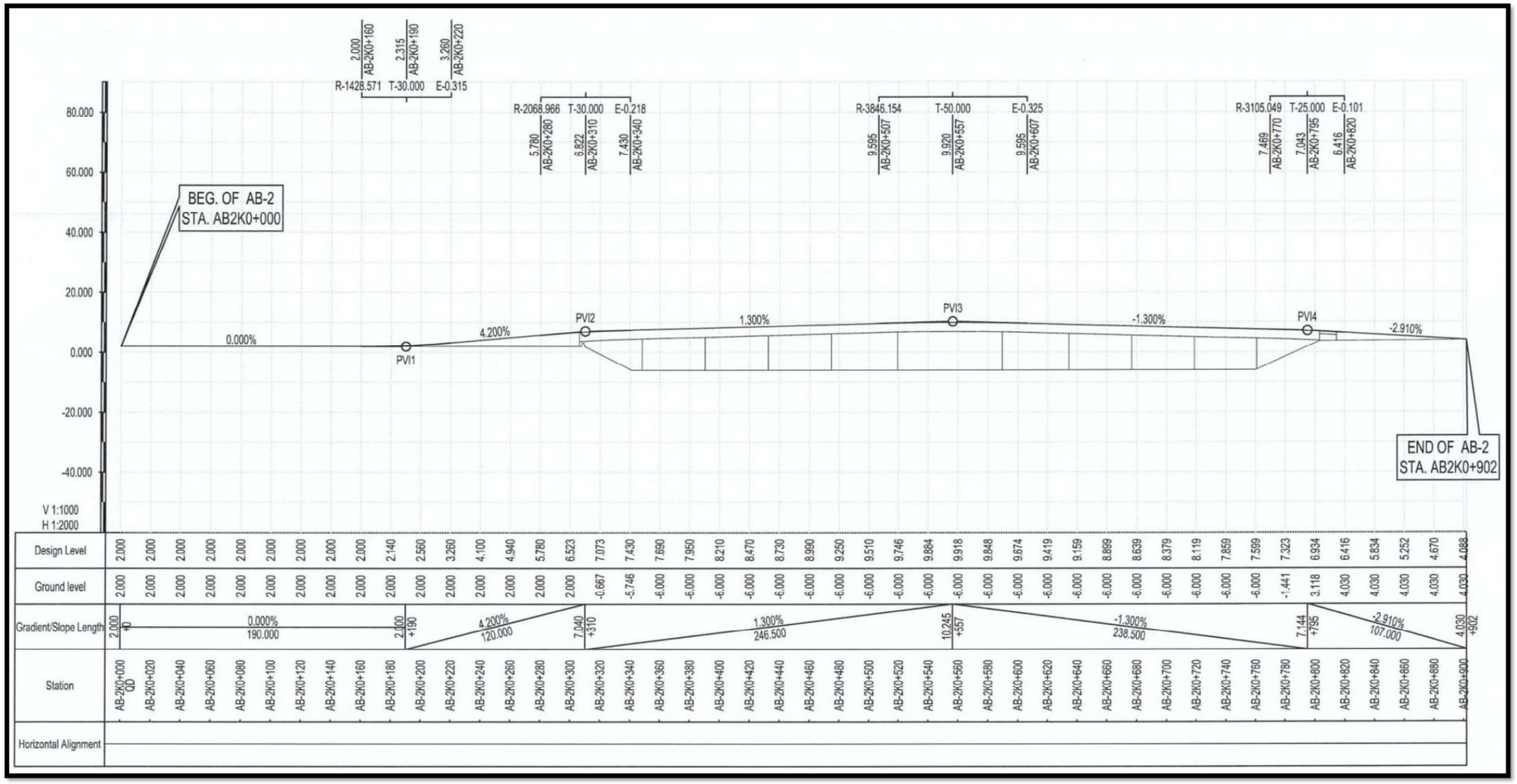


Figure 1.11 Road Profile of Vehicular and Pedestrian (Concrete) Bridge

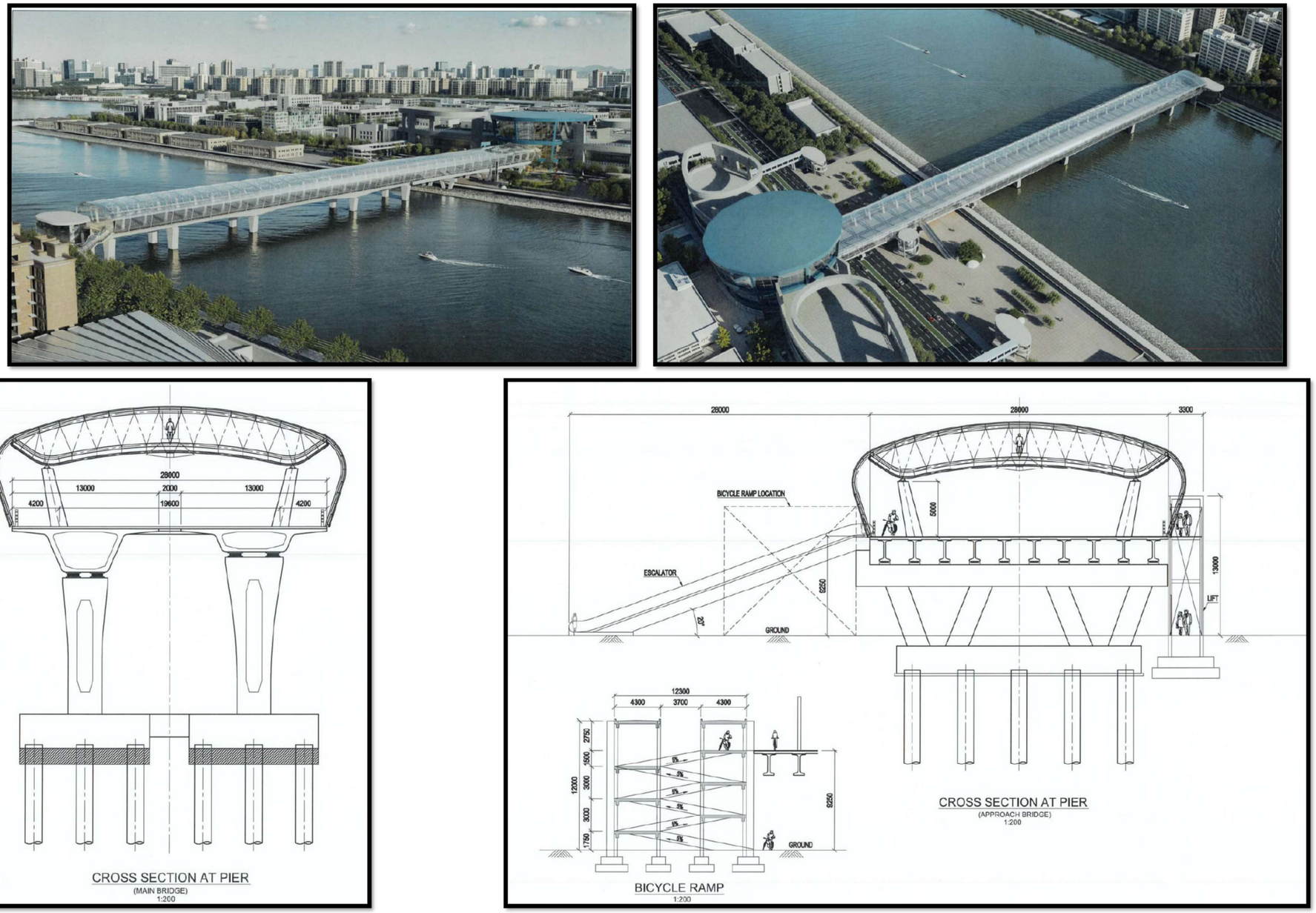


Figure 1.12 Perspective and Cross Section View of Pedestrian Bridge W

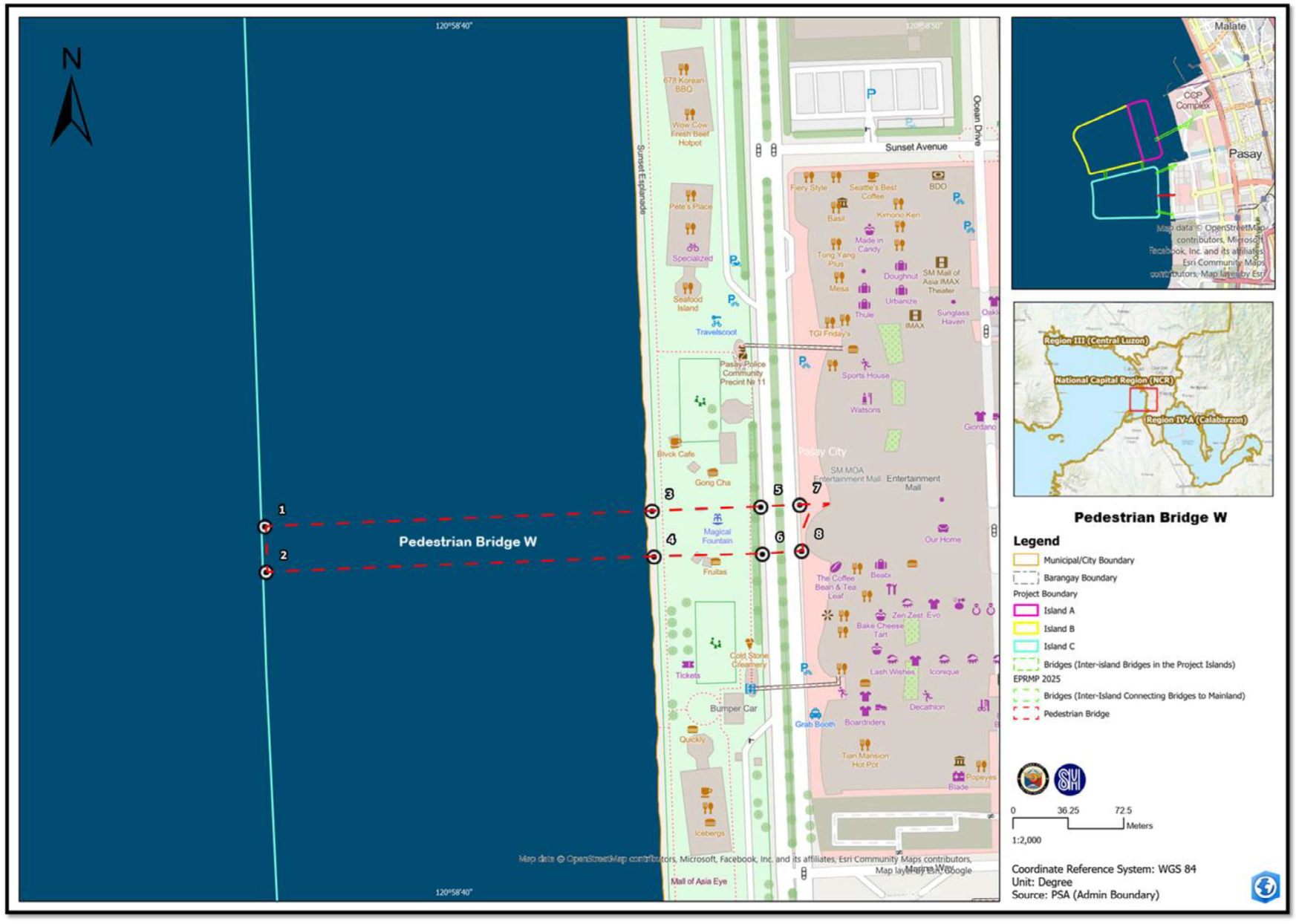


Figure 1.13 Road Plan of Pedestrian Bridge W

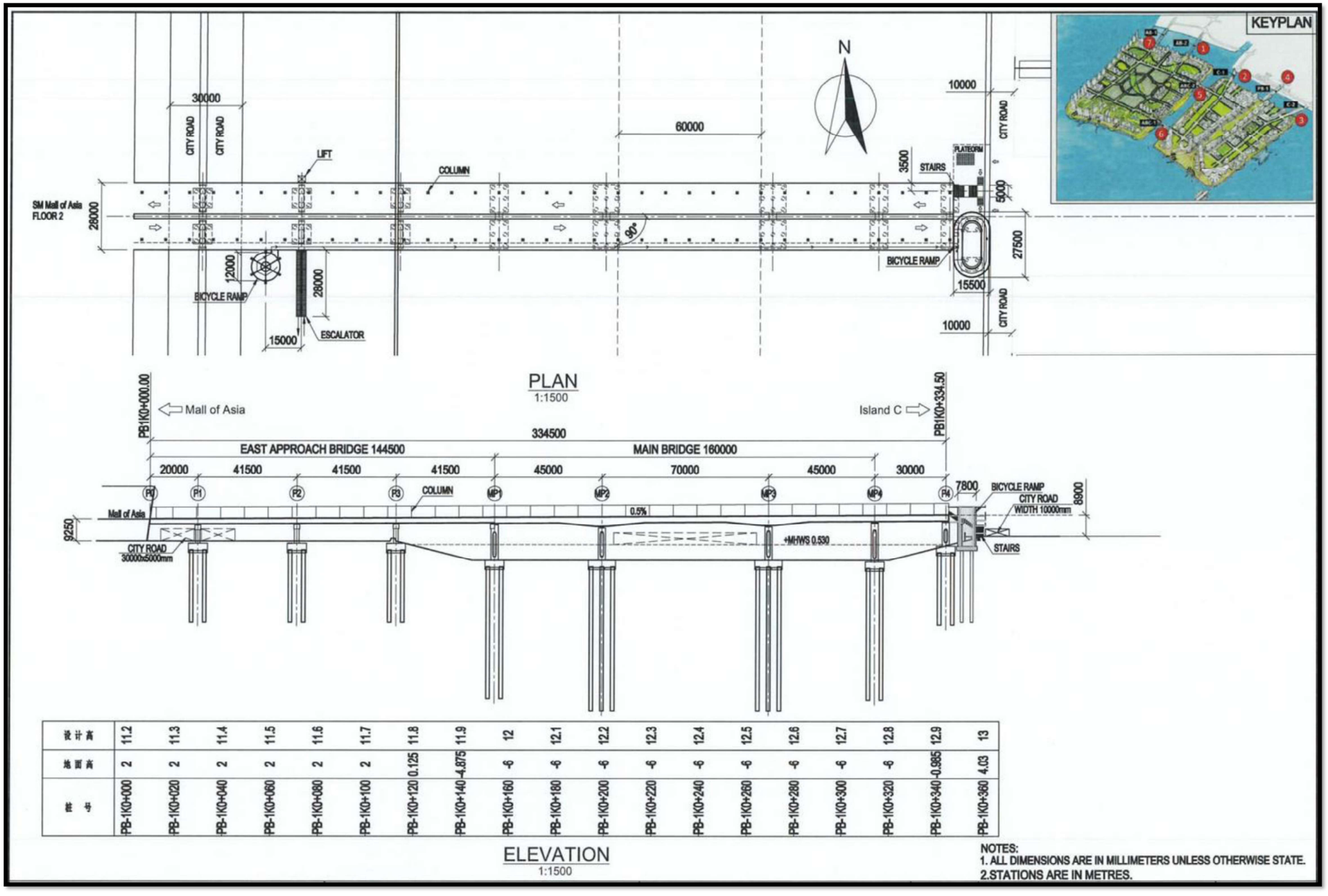


Figure 1.14 General Arrangement of Pedestrian Bridge W

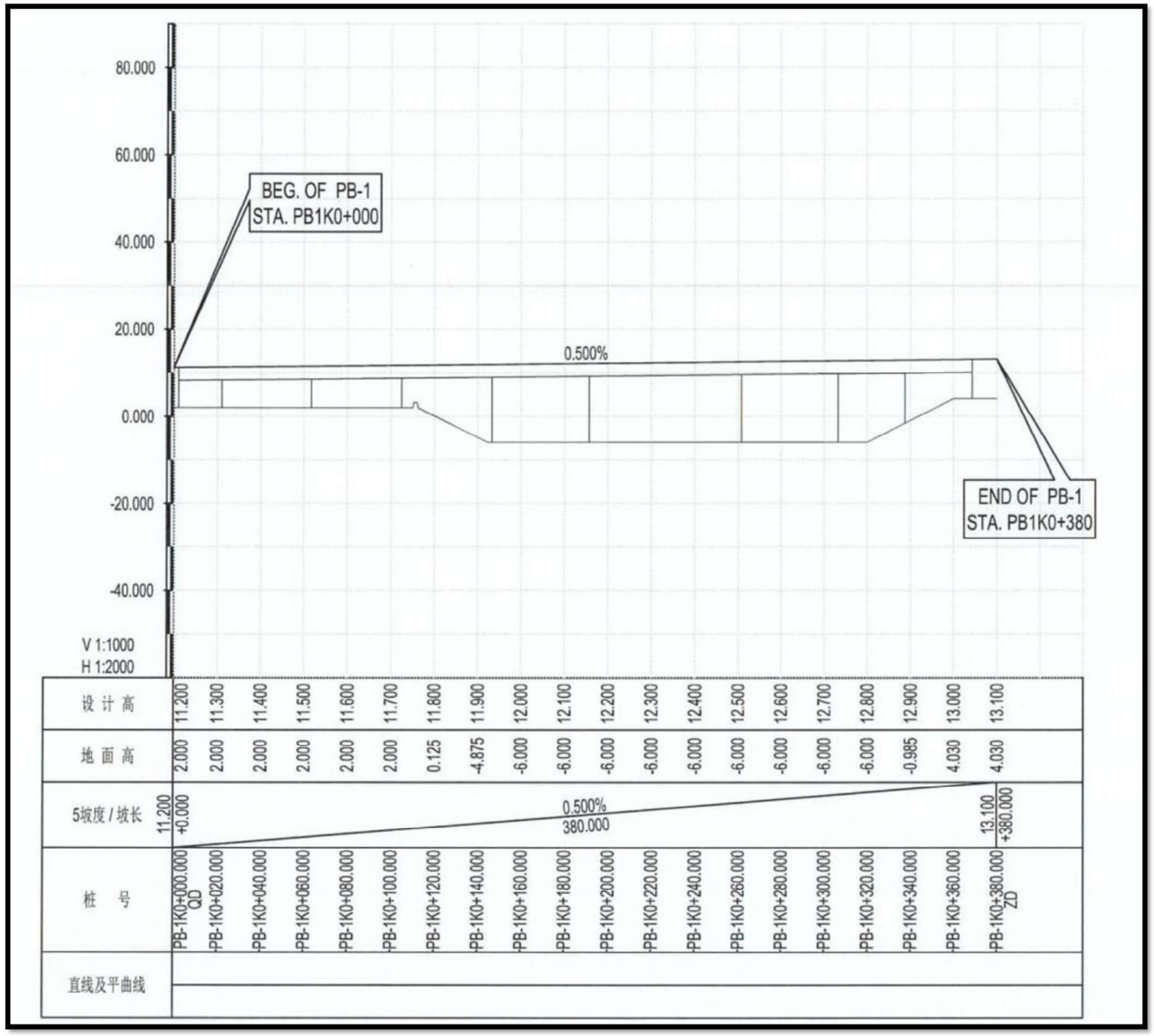


Figure 1.15 Road Profile of Pedestrian Bridge W

1.4.2. TEMPORARY SUPPORT FACILITIES AND POLLUTION CONTROL DEVICES FOR THE BRIDGES

The temporary support facilities including its pollution control facilities temporary support facilities for the construction of the Inter-Island and Mainland-Connecting Bridge Structures are summarized in Table 1.7 while the site layout of these is found in Figure 1.16. The location of temporary support facilities will be potentially within the reclamation site to be identified by CON and approved by EMP/ ENG.

Table 1.7 Temporary Support Facilities for the Construction of the Inter-Island and Mainland-Connecting Bridge Structures

Temporary Support Facilities	Technical Description / Material Description	Purpose	Construction/ Installation	Decommission	Location in Figure 1.20
Temporary Support Facilities					
Site Offices	Steel Insulated cabin with aircon	Used as work space for site personnel	Placement of containers on designated area	Site clean up	5
Clinic/Medical Facility	Steel Insulated cabin with aircon Area: 36m^2	For immediate treatment of injuries	Placement of containers on designated area	Site clean up	5
General Material Laydown Area (on-site)	Laid on sand/ ground with boundary soft barricades; for off-site work areas, there will be a temporary G.I. sheet fence (or equivalent) to secure the area.	For storing materials and general work areas	Clean and clear designated area for stockpile Placing of cones or temp. G.I. sheet to act as fence	Site clean up	3
Materials and Machineries/ Tools Storage and Maintenance Yard	Steel Insulated cabin, concrete bedding, steel frame structure with steel railing for gantry cranes. Enclosed by a steel fence	For storing and maintenance of materials, tools, and equipment	Placement of containers on designated area Placement of small rocks as base Installation of precast concrete bedding Installation of steel frame structure and gantry cranes	Dismantling of the maintenance yard Site clean up	3

Temporary Support Facilities	Technical Description / Material Description	Purpose	Construction/ Installation	Decommission	Location in Figure 1.20
			Steel fence installation		
Equipment Yard	On level ground with safety enclosure	To serve as the temporary yard of equipment (idle or after duty hours)	Ground leveling and installation of safety enclosure	Site clean up	3
Movable / Transferable Jetty (Passenger Jetty)	Steel pipe, plate, chain, floating tank and rubber tyre	For passage of staff and workers	Excavate or prepare designated area Fabrication of jetty and install near the shore	Dismantling of the jetty Site clean up	NA for HD
Temporary Berthing Area w/ Rock Revetment (For Logistic)	Lifting Equipment, Geotextile, Sand, Rocks and Concrete Anchor weights	Load/ Offload of the Construction materials and Heavy Equipment. The purpose of rock revetment is to provide erosion protection. Load/ Offload Construction materials and Heavy Equipment for bridge construction.	Preparation of the berth, Load/Offload and Logistic Communication process.	Site clean up Dismantling	1,2
Fuel Storage Facility	By Supplier. Typically consist of steel frame structures, oil storage tanks, pumps, pipings, gensets, steel cabins.	Fuel supply for all Marine and Land Equipment	Excavator, leveling and compaction of the ground Construction of the foundation Assembly of the fuel storage facility components	Site clean up Dismantling of the fuel storage facility	4
Water Supply	Water Trucks, Pumps and Storage Tanks	For Road Maintenance, Toilets and Other uses	Leveling and compaction of the ground Placing the storage tanks at designated location	Site clean up Dismantling	6

Temporary Support Facilities	Technical Description / Material Description	Purpose	Construction/ Installation	Decommission	Location in Figure 1.20
Power Supply (Temporary Facilities)	Steel frame, GI Sheets and Genset	Power supply for site operation	Placement of power supply	Site clean up Dismantling	4
Washing Bay	Covered Area, Power Spray	For Site equipment maintenance	Excavation of Leveling and compaction of the ground Construction of the foundation Construction of the concrete lining Setting up of the washing system and drainage system Installation of power supply, steel grating, etc	Site clean up Dismantling of wash bay	1,2,3
Temporary Site Access	Dike road (sand/rock) or steel stationary barge resting on concrete blocks or steel decking temporary bridge	Additional site access due to increase in construction activities		Site clean up Dismantling	1,2
Bentonite/Polymer Storage Facility	Pre-fabricated steel silo(s) on reinforced concrete foundation	Storage of soil stabilizer for bore piling/deep excavation activities	Leveling and compaction of the ground Placement of containers on designated area Placement of small rocks as base Construction of foundation Installation of steel silo(s)	Site clean up Dismantling	3
Material Testing Facility	Steel Insulated cabin, Steel and GI Sheets	On-site testing facility for materials	Leveling and compaction of the ground	Site clean up Dismantling	6

Temporary Support Facilities	Technical Description / Material Description	Purpose	Construction/ Installation	Decommission	Location in Figure 1.20
		used/to be used for construction activities (e.g. concrete, wire strand, reinforcement bar, etc)	Placement of steel insulated cabin Steel fence installation		
Pollution Control Devices					
Sanitation Facilities	Portalets and/ or Toilet cubicles with temp. effluent storage tanks - both serviceable by DENR-accredited company	Sanitation facilities	Placement of portalets	Removal and haul out of portalets and storage tanks and disposal by DENR-accredited company Site clean up	6
Materials Recovery Facility & Hazardous Waste Facility	Steel and GI Sheets	For storing and disposal of waste and chemicals	Fabrication and Installation of steel members	Site clean up	3

Location of Temporary Support Facilities: Potentially within the reclamation site to be identified by CON and approved by EMP/ ENG

Table 1.8 Existing Precast Yard

Description	Location	Components	Sub-components
Precast Yard (Existing)	North side of Island AB. Above Pipeline stock pile	Pre-fabrication Area	180 pcs-capacity Mattress Bed
			2 units Gantry Cranes
			280m Gantry Rails
			Concrete waste basin
		Concrete Block Mattress (CBM) Storage Area	CBM Storage 1 to 4
			CBM Storage Repair Area
		Geotextile Processing Area	Geotextile Processing Area
			Geotextile Storage Area
		Generator placement/power distribution	
		Access Road	Vehicular/Manpower Access
		Water Tanks	
		Fuel Storage (28 units IBC tanks)	
		Precast Yard Offices	Office Workspaces
			Meeting Room
			Curing Room
			Laboratory

Description	Location	Components	Sub-components
			Light Vehicle Parking Area
			Muster Area
			Toilet cubicles
		Maintenance Area and Material Storage	Materials Storage Room
			Tools Storage
			Material Storage (open yard)
			Chemical Storage Area
Rock Storage	North side of Island AB. Left side of Precast Yard and Pipeline stockpile	Rock Stockpile 1	Weigh Bridge
	West side of Island AB.	Rock Stockpile 2	
	Upper west of Island C side near rock wharf 3	Rock Stockpile 3	
	Lower west side of Island C near wharf 4.	Rock Stockpile 4	

A distinct preliminary Basis of Design Report exists for the plans and designs of support facilities, including drainage design. This Basis of Design Report will be revised in conjunction with the Feasibility Study and Preliminary Design as the design and studies advance to later phases.

The proposed size of land to be allocated for each support facility is summarized in the table below.

Table 1.9 Estimated Land Area for the Support Facility

Item	Purpose	Approx. dimension (m)	Est. Area (m2)	Island
1	Temporary Berthing Area	55 x 70	3,840	C
2	Temporary Berthing Area	65 x 131	8,500	AB
3	Maintenance Depot/Equipment Yard	65 x 112	7,290	AB
4	Power supply/Electricity Substation			
5	Administration/Office building	60 x 69	4,130	AB
6	Associated infrastructure facilities and buildings			

1.4.2.1. TEMPORARY BERTHING AREA

Load/ Offload of the Construction materials and Heavy Equipment.

1.4.2.2. MAINTENANCE DEPOT/ EQUIPMENT YARD

This area will include parking spaces designated for maintenance vehicles, storage for spare parts, workshops, and amenities and facilities for staff.

1.4.2.3. POWER SUPPLY / ELECTRICITY SUBSTATION

A temporary power supply or electricity substation is necessary to ensure electricity availability throughout the construction phase.

1.4.2.4. ADMINISTRATION / OFFICE BUILDING

A facility for administration and office purposes is typically necessary for bridge construction of this magnitude. This building will house accommodation for inspection personnel and office staff, as well as storage for records related to inspection activities and equipment.

1.4.2.5. ASSOCIATED INFRASTRUCTURE FACILITIES AND BUILDINGS

Apart from the bridge described above, the project will also need to include the associated support facilities/buildings for construction purposes.

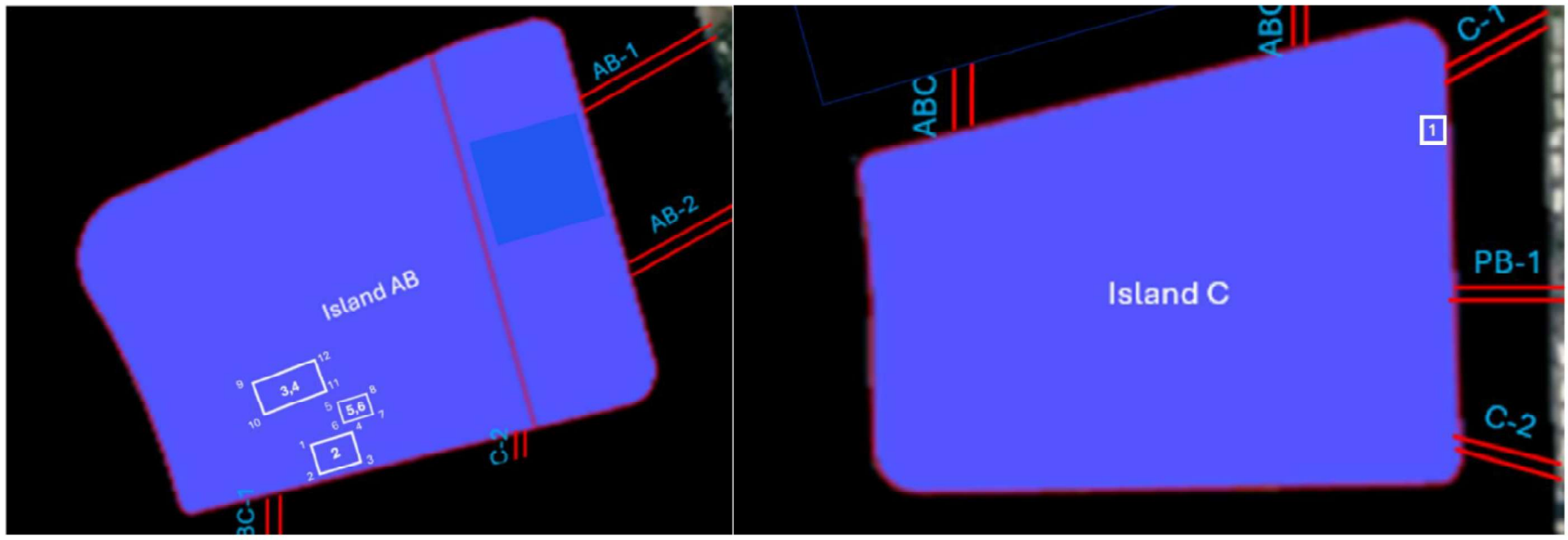


Figure 1.16 Location of the Temporary Support Facilities for the Construction of Inter-Island and Mainland-Connecting Bridge Structures

Table 1.10 Details of the Temporary Support Facilities for the Construction of Inter-Island and Mainland-Connecting Bridge Structures

Assigned Box #	Facility/Space allocation	Approximate Dimension	Estimated Area, m²	Island Located
1 Temporary Berthing Area	Guard post Disembarkation/Waiting/Induction area. Holding/Inspection area for deliveries. Contractor's and CM staff satellite office (Container) Staff pantry Service vehicles parking area. Washing bay. Fuel Tank Generator Waste Bins Toilets/Washroom Equipment yard/parking area	55 X 70	3,840	C
2 Temporary Berthing Area	Guard post Disembarkation/Waiting/Induction area. Holding/Inspection area for deliveries. Service vehicles parking area. Washing bay. Generator Waste Bins Toilets/Washroom Equipment yard/parking area	65 X 131	8,500	AB
3 Maintenance Depot/Equipment Yard	Contractor's maintenance office (Container) Service vehicles parking area. Covered maintenance/repair area Spare parts and tool storage. Temporary power facility/generator. Washing bay. Waste Bins Toilets Workers' rest area/mess hall	65 X112	7,290	AB
4 Power supply/Electricity Substation	Materials Warehouse/storage. Fuel storage facility Hazardous waste facility, Waste Bins Pre-cast yard/Pre-cast storage area			
5 Administration/Office building	Client's office Contractor's and CM staff office (Container) Material testing/laboratory Medical facility/clinic. Ambulance parking Staff Mess Hall/ Pantry	60 X 69	4,130	AB
6 Associated infrastructure facilities and buildings	Water supply. Service vehicles parking area. Generator Waste Bins Toilets			

1.5. PROCESS TECHNOLOGY

The process technology for the reclamation islands, as previously presented in the submitted EPRMP (2024), is covered under ECC-CO-1601-0003 (Amended), issued on 13 March 2025. The construction methodology for the reclamation islands follows the PRA-approved Dredging and Reclamation Methodology. Detailed information on the reclamation process technology is provided in Appendix I.

For this ECC application, the process technology specific to the proposed bridges is discussed in the succeeding sections.

1.5.1. DESIGN CRITERIA AND CONSTRUCTION METHODOLOGY

The bridge design and reference standards will adopt the relevant Philippine and international design standards, including but not limited to:

- DPWH Design Guidelines, Criteria, and Standards (DGCS) Volume 2C
- Department Orders such as D.O. No. 75 and D.O. No. 30
- Other applicable local and international standards relevant to bridge design

The SM Pasay 360 project is conceived as a reclaimed mixed-use community development located in Manila Bay, within the jurisdiction of the City of Pasay. This initiative has recently received a substantial revision to its master plan, which includes the consolidation of two of the originally three islands linked by six vehicular and pedestrian bridges, along with one pedestrian bridge, complemented by road networks within the island to enhance accessibility to various developments.

The bridge structures can be categorized into the following different components:

Bridges – The standard viaduct structures of the bridges will be built over seawater, featuring columns of varying heights to ensure adequate navigation clearance for the safe operation of shipping at the project location. A consistent span arrangement is implemented to standardize construction methods and reduce the overall duration of the construction schedule.

Road network – Roads will be built on the land, facilitating a smooth connection to all developments across the island.

An option selection exercise has been conducted for each component to identify the most effective solution for these structures.

A. Bridge Form

The design of the proposed bridges will be of the beam bridge type, established on bored piles and supported by piers, utilizing precast prestressed girders and a concrete slab. The initial structural concept for the bridges – substructure and superstructures are shown in Figure 1.17 and Figure 1.18, respectively.

B. Offshore Bored Piling Construction

The process of constructing offshore bored piles (Figure 1.19) primarily entails the accurate setting and positioning of pile locations, drilling operations, fabrication and placement of rebar cages, concrete pouring, and treatment of the pile tops. Initially, the construction team

employs measuring instruments to precisely identify and establish the pile locations. Subsequently, an offshore drilling rig is utilized to penetrate the seabed, with the drill bit reaching the specified depth while employing stabilizing fluids such as slurry. Upon achieving the necessary drilling depth, the rebar cage is constructed and positioned within the hole to provide support for the concrete. Concrete is then either pumped or conveyed into the hole to ensure consistent filling and to create a robust pile. Once the concrete has cured, treatment of the pile top is performed to guarantee that it is level and prepared for connection to the subsequent structure. Throughout this procedure, meticulous oversight of drilling depth, rebar cage placement, and concrete quality is crucial to adhere to design specifications and to ensure the overall integrity of the construction.

Substructure

(1) 39.6 m Standard section :

The substructure is divided into two parts, utilizing pier columns with caps. The cap beam has a width of 19.4m and a height of 1.5m. The pier columns consist of three cylindrical piers with a diameter of 1.6m each. An I-shaped pile cap is used, measuring 6.3m in length, 2m in height, and 2.65m in width. The pile foundation consists of bored cast-in-situ piles with a diameter of 1.3m. Based on the surrounding geological conditions, the estimated pile length is 45m.

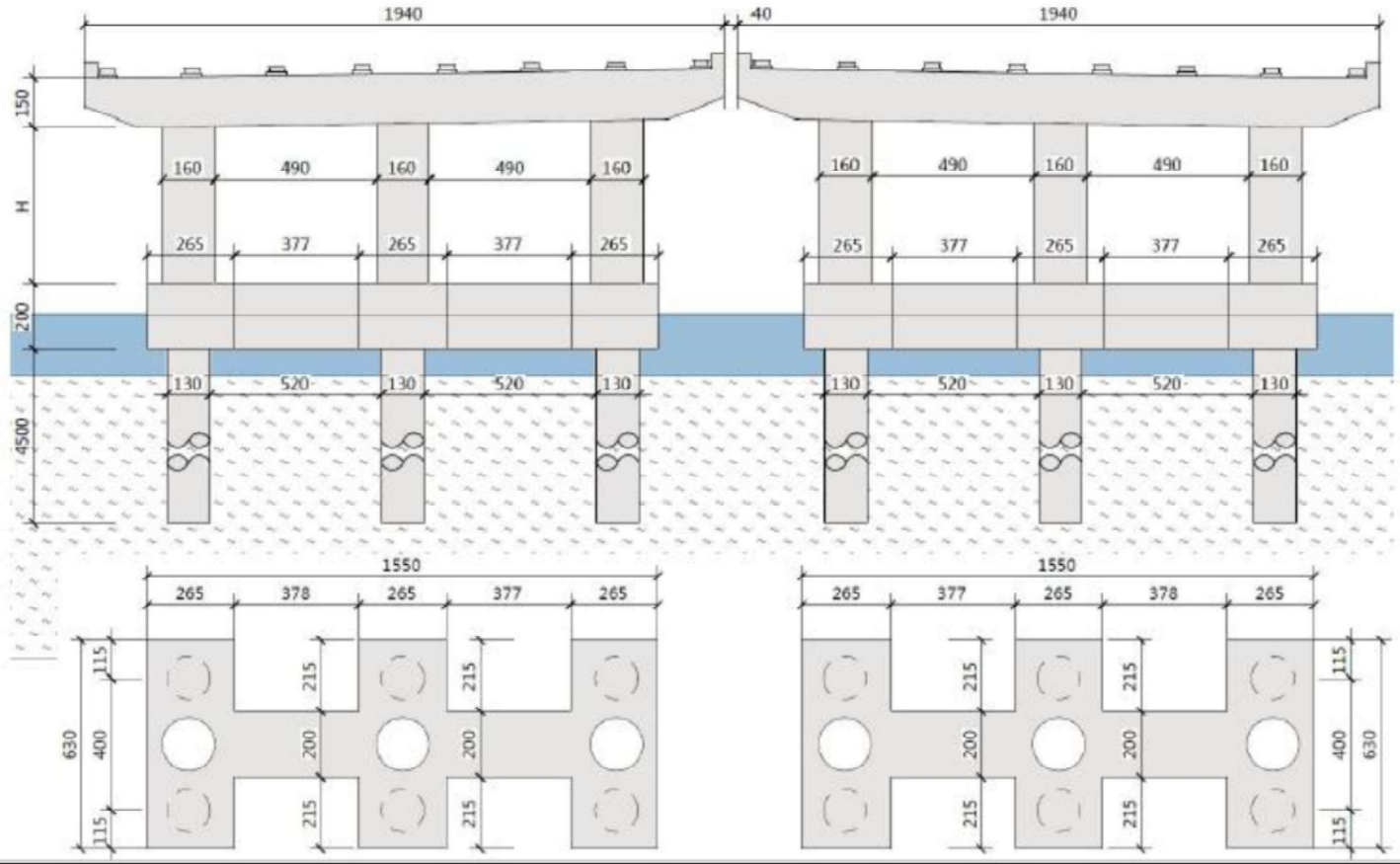
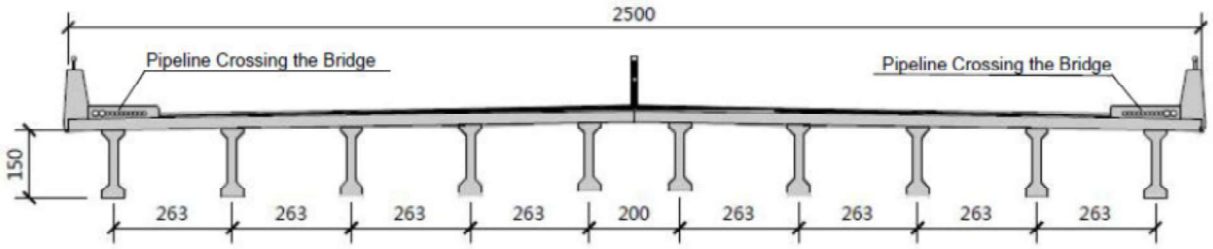


Figure 1.17 Initial Structural Concept for the Bridges - Substructure

Superstructure

(1) 25.0 m Standard section：

The superstructure has beams with a height of 1.5m, arranged horizontally with 10 beams spaced at 2.63m apart. The bridge deck consists of a 25cm-thick reinforced concrete cast-in-situ slab, and the pavement layer is paved with 10cm of asphalt concrete.



(2) 39.6 m Standard section：

The superstructure has beams with a height of 1.5m, arranged horizontally with 16 beams spaced at 2.57m apart. The bridge deck consists of a 25cm-thick reinforced concrete cast-in-situ slab, and the pavement layer is paved with 10cm of asphalt concrete.

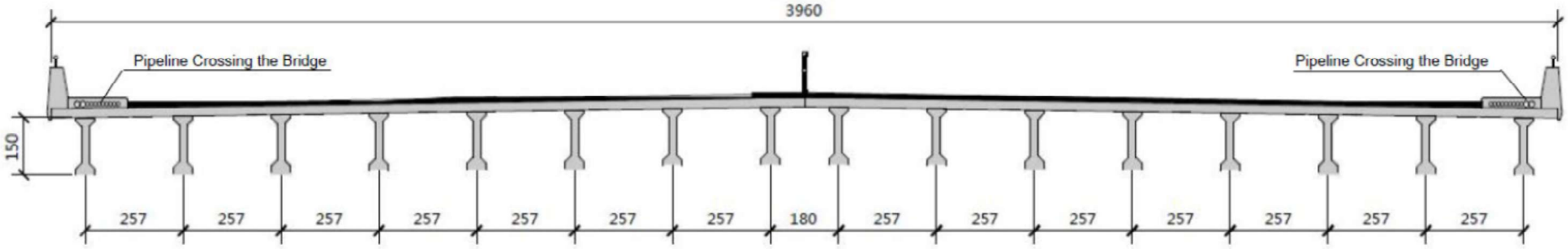


Figure 1.18 Initial Structural Concept for the Bridges - Superstructure

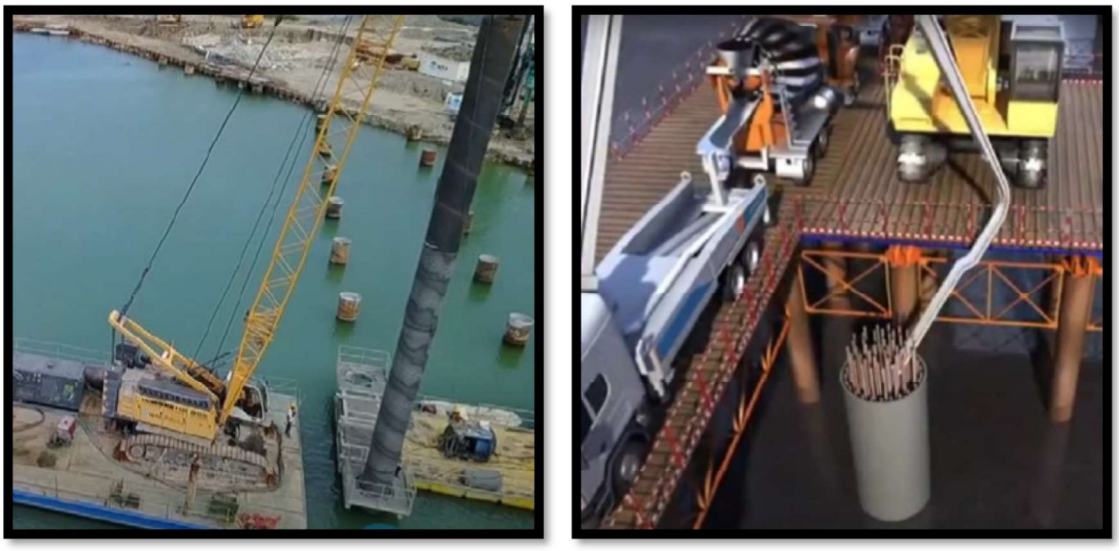


Figure 1.19 Offshore Pile Foundation Construction

C. Construction of Abutment and Wingwall

The construction of abutments and wingwalls follows after the completion of the offshore bored piles and pile caps. The works begin with accurate survey setting-out, followed by excavation to the required founding level. Depending on soil conditions, temporary shoring may be installed to maintain safe working conditions.

Once excavated, the foundation surface is leveled and prepared, and a lean concrete layer is placed. Reinforcement for the footing and wall is installed according to the structural drawings, ensuring proper spacing, cover, and stability. Formwork is then erected to achieve the correct dimensions and alignment.

Concrete is poured in a continuous manner and properly vibrated to ensure compaction and avoid voids. After achieving sufficient strength, the formwork is removed, and curing is carried out. Wingwalls are constructed similarly, including the installation of weep holes and drainage elements to relieve water pressure.

Backfilling is performed in controlled layers using approved material, compacted to the specified density to ensure stability of the approach embankment. Throughout this process, inspections and quality checks are conducted to verify compliance with design requirements.



Figure 1.20 Construction of Abutment and Wingwall

D. Construction of Pile Cap and Piers

The construction process for offshore pile caps (Figure 1.21) primarily involves positioning the cap, installing formwork, tying rebar, pouring concrete, and curing. After the completion of the pile foundations, formwork for the cap is set up. Typically, steel or wooden formwork is utilized to guarantee that the cap's dimensions and strength conform to the required standards. Subsequently, rebar tying is performed, where rebar nets or cages are installed according to design specifications, ensuring accurate spacing, quantity, and placement of the rebar. Following the completion of rebar tying, the concrete pouring commences. This process should be executed in layers, with each layer being vibrated to achieve proper compaction and prevent voids or defects. Throughout the pouring process, it is essential to maintain strict oversight of the concrete's quality and pouring speed to ensure the concrete's strength.



Figure 1.21 Pile Cap Construction

E. Construction of Offshore Piers and Cap Beams

The construction procedure for offshore bridge piers and pier head/cap (Figure 1.22) beams primarily involves the erection of pier columns, the assembly of pier head/cap beams, and associated support and connection activities. Pier columns are generally constructed from

concrete. During the construction phase, formwork is established, and rebar is secured to guarantee that the pier columns conform to the specified dimensions and strength criteria. Once the rebar is properly bound, concrete is either pumped or poured directly into the formwork. This pouring process necessitates layered vibration to ensure the concrete achieves optimal compactness. After the concrete has set, the formwork is dismantled, and curing is performed to ensure the concrete attains the required design strength. For the pier head/cap beam construction, scaffolding and formwork are initially erected atop the bridge pile cap to maintain stability and accuracy during the building process. The rebar installation for the pier head/cap beam is executed according to design specifications, and following the binding of the rebar, concrete is poured. During this pouring phase, careful attention is required to ensure the uniformity and compactness of the concrete to prevent the formation of voids and cracks. Once the pier head/cap beam has been poured, curing is carried out to facilitate a gradual increase in strength, after which the formwork is removed.

The post-tensioning process for a bridge pier head/cap beams typically happens after the concrete gained sufficient strength and involves placing high-strength steel tendons within ducts in the concrete. Once the concrete has gained sufficient strength, hydraulic jacks will be used to tension the tendons, which are then anchored in place. Finally, the ducts are filled with grout to protect the tendons and ensure the structure's durability.

Throughout the construction process, rigorous quality control is imperative. Monitoring the strength of the concrete and the positioning of the rebar is crucial to ensure that the offshore bridge piers and pier head/cap beams fulfill design specifications, providing adequate load-bearing capacity and durability.



Figure 1.22 Construction of Piers and Pier Head

F. Installation of Bridge Bearings

Bridge bearings transfer loads from the superstructure to the substructure, accommodate movements, reduce vibrations, and maintain alignment to ensure the stability and longevity of bridges. The construction procedures for bridge bearings typically involve ensuring the bearing seat area is clean, level, and within specified tolerances. Positioning the bearings accurately using temporary supports, then secure them with anchor bolts. Installing formwork around the bearings and pour grout to fill any voids, allowing the grout to cure according to the technical specifications. Finally, inspect the bearings for correct positioning and alignment, document the process, and gradually transfer the load onto the bearings, making any necessary adjustments to ensure proper function.

G. Installation of Girders

The installation process of girders (Figure 1.23) offshore commences with their production and subsequent transportation. Typically manufactured in a precast facility, girders are then delivered to the construction site via marine transport, such as barges. Throughout the transportation phase, precautions are taken to ensure the girders are not damaged.



Figure 1.23 Installation of Girders

H. Auxiliary Structure

Bridge expansion joints

Bridge expansion joints are crucial for accommodating movements due to thermal expansion, contraction, and dynamic loads, preventing structural damage and ensuring the bridge's longevity. Their construction involves cleaning and preparing the joint area, installing the joint components, and sealing the joints to prevent debris and water infiltration. Proper installation and maintenance are essential to ensure the joints function effectively and protect the bridge's integrity.

Bridge railing

Bridge railings (Figure 1.24) are essential auxiliary structures of a bridge, primarily designed to ensure the safety of pedestrians and vehicles, while also serving additional functions. Their roles can be elaborated as follows:

Safety Protection: The foremost purpose of bridge railings is to offer safety protection, preventing pedestrians, vehicles, or other objects from inadvertently falling off or colliding with the bridge. This is particularly crucial for bridges spanning coastal regions, where railings effectively mitigate safety hazards.

Traffic Guidance: Additionally, bridge railings assist in directing traffic. By incorporating specific visual markers or shapes in their design, they aid drivers and pedestrians in assessing the travel path, thereby preventing deviations from the designated driving area. This is especially vital on intricate or narrow bridges, where railings help uphold traffic order and facilitate smooth movement by clearly delineating boundaries.

Collision Protection: Typically, bridge railings possess certain collision-resistant characteristics. In the event of a traffic incident, the railings can absorb a portion of the impact force, thereby diminishing the likelihood of vehicles colliding directly with the bridge structure or plummeting off the bridge. This aspect is particularly significant for highways, where railings must not only provide physical protection but also be engineered to endure substantial impact forces.

Aesthetic and Decorative Function: Beyond their safety functions, bridge railings contribute significantly to landscape design. The design of numerous bridge railings emphasizes aesthetics and artistry. This is especially true for urban bridges or those located in tourist areas, where the form, material, and color of the railings often harmonize with the surrounding environment, becoming an integral part of the bridge's landscape. The decorative design of railings not only enhances the visual attractiveness of the bridge but also aligns with the architectural style of the city or the natural landscape, enriching the overall artistic quality of the scenery.



Figure 1.24 Bridge Railing

Hazard risk assessment and mitigation measures (Bridge components specific)

Bridges connecting the islands to the mainland and interconnecting bridges over the water must prioritize stability. To ensure the stability of the structures, the following hazards have been identified including the impact on bridge components and proposed mitigation measures.

Table 1.11 Hazard Risk Assessment

Hazard	Impact on Bridge Components	Proposed Mitigation Measures
Ground Shaking	Shear failure in columns; displacement of the deck from the bearing pads and potential unseating of the bridge deck from the abutment seats.	Use of Lead Rubber Bearings (LRB) for seismic isolation to decouple the deck from ground motion.
Liquefaction	Loss of lateral support for piles, leading to tilting or sinking of pile caps.	Deep piling into non-liquefiable layers. Ground improvement may be provided as well in the surrounding bridge footprint.
Lateral Spreading	Horizontal displacement against the abutments, as the reclaimed soil moves toward the water.	Installation of relief piles or high strength tie-backs or the use of

Hazard	Impact on Bridge Components	Proposed Mitigation Measures
		geotextile reinforced soil behind the wingwalls.
Storm Surge	Hydrodynamic uplift forces on the girders	Use of shear keys to prevent lateral shifting
	Chloride intrusion into concrete elements.	Use of high-performance concrete with fly ash to reduce permeability.
Settlement	Differential settlement between the bridge (on piles) and the approach road (on fill), creating a difference in elevation.	Use of approach slabs to provide a smooth transition and prevent the bridge bump.

The finalized engineering designs for these components, including the proposed mitigation measures are dependent on the results and recommendations of the Engineering Geological and Geohazard Assessment Report (EGGAR).

Differential Settlement

The design limits for bridge settlement can be referenced to AASHTO Chapter 10, Section 10.5.2.2 Tolerable Movements and Movement Criteria Commentary specifying that angular distortions between foundations greater than 0.008 rad in simple spans and 0.004 rad in continuous spans should not be permitted in settlement criteria.

If monitoring shows that settlement is approaching or exceeding the AASHTO limits, the following mitigation measures may be employed:

Table 1.12 Differential Settlement

Condition	Mitigation Measure	EPRMP Implementation
Differential Settlement > Allowable	Hydraulic Jacking	Provisions in the bridge seat design to allow for hydraulic jacks to lift the girders and insert permanent steel shims to level the deck.
High Expected Subsidence	Two-Stage Construction	Delaying the final casting of the bridge seals and approach slabs until a specified percentage of consolidation (e.g., 90%) is achieved.
Abutment Rotation	Tie-backs/Soil Anchors	If the wing walls or abutments tilt due to lateral spreading, high-tensile anchors are installed to "tie" the structure back into stable reclaimed fill.
Excessive Approach "Bump"	Sleeper Slabs	Installation of adjustable sleeper slabs that can be pressure-grouted from beneath to raise the road level as the reclaimed land settles.

The finalized engineering designs for these components, including the proposed mitigation measures for Differential Settlement allowable, High Expected Subsidence, Abutment Rotation and Excessive Approach are dependent on the results and recommendations of the Engineering Geological and Geohazard Assessment Report (EGGAR).

Slope Stabilization and Erosion Control

To protect bridge approaches, abutment slopes, and adjacent embankments, the following mitigation measures will be implemented to prevent erosion, surface instability, and undermining during construction and long-term operation:

1. Structural Slope Protection
   - Riprap Revetment (Hand- or Machine-Placed):
     Install graded stone revetment along exposed slopes and riverbanks to resist erosion, wave action, and localized scour.
   - Grouted Riprap / Stone Pitching:
     Apply in high-velocity or high-energy flow zones to minimize voids and prevent dislodgment.
   - Gabion or Mechanically Stabilized Earth (MSE) Walls:
     Construct retaining systems on steep or confined slopes to provide mass, lateral resistance, and long-term stability.
   - Toe Protection:
     Place riprap or gabion toe keys at the slope base to prevent undercutting and progressive failure.

2. Surface Erosion Mitigation
   - Geotextile/Geomats:
     Install erosion-control blankets on freshly cut or filled slopes to minimize surface runoff erosion and to allow vegetation to establish.
   - Vegetative Cover:
     Grassing immediately after final grading to stabilize the upper soil layer and reduce runoff velocity.

3. Drainage Control Measures
   - Surface Drainage:
     Provide lined catch drains, berm drains, and down-drains to direct runoff away from slope faces and prevent erosion gullies.
   - Subsurface Drainage:
     Install weep holes, perforated pipes, or granular subdrains behind retaining structures to relieve pore water pressure and avoid slope softening.
   - Diversion Channels:
     Construct diversion ditches above the slope to intercept and safely divert upstream runoff.

4. Construction-Phase Controls
   - Temporary Slope Protection (During Works):
     Use tarpaulins, straw mats, or temporary geomats to protect exposed soil until permanent works are installed.
   - Sequenced Excavation & Filling:
     Carry out excavation in stages and compact fill in layers to avoid over-steepened temporary faces.

1.5.2. DESCRIPTION OF THE POLLUTION CONTROL DEVICES AND WASTE MANAGEMENT SYSTEM

A comprehensive Waste Management Plans for solid, hazardous wastes, and sewage are strictly implemented in in the Project and will be adopted during the bridge construction.

Wastewater

This will essentially be generated by personnel on board the sea crafts (dredging vessels and rock haulage barges) which are self-contained having their individual toilet and waste collection facilities. Wastewater will be discharged through third-party waste treaters.

In house sanitation facilities includes toilets in barges and use of approved portable toilets in the reclaimed land. The disposal is through accredited waste handling entities as shown in Plate 1-1. Use of approved portable toilets on reclaimed land.



Plate 1-1 Sanitation System

For sewage disposal management, regular disposal is conducted by authorized service providers. Sewage from the portalets is siphoned and directed to an accredited Sewage Treatment Plant (STP), where it undergoes treatment process. The STP will then issue a certification as proof of acceptance and treatment of wastes, validating the proper and environmentally responsible handling of sewage disposal within the framework of established agreements and regulations.

Wash Bay Discharge:

To ensure environmentally responsible handling of wash bay discharge, the wash bay discharge will be treated by a common treatment method that includes retention and filtration, which could also incorporate a grease trap when necessary. Silty water generated from the wash bay will be diverted into a retention or silt pond, which is designed to temporarily hold and allow suspended solids to settle. The pond will be appropriately sized based on the expected discharge volume and prevailing rainfall conditions. Following retention, the water will pass through a filtration system which may consist of multi-layer rock filters integrated with geotextile fabric. At this stage, fine sediments will be filtered and reduce turbidity. Following which, the filtered water can be reused for non-potable usages such as general cleaning and dust suppression.

Accumulated silt and any chemical contaminants will be safely collected and disposed of by a DENR-accredited third-party waste contractor, ensuring compliance with the Ecological Solid Waste Management Act (RA 9003) and other relevant environmental laws.

Turbidity Control

Construction of bridge

Appropriate bridge construction method will be employed. A column or steel box/ cylindrical wall/ protection wall will form as an enclosure to the foundation or piles to prevent the water or sediments from seeping out (*Figure 1.25*).

The water containing soil or sediment inside the casting will be carefully pumped using a hose that will be transferred to a designated spoil disposal area or may be pumped out near the casting when the water is generally static.

Other project components will be built on the land prior to the delivery in the bridge viaduct section.

Spoil Disposal Areas especially the excavated soil from the foundation will also be strategically located to avoid leakage to Manila Bay

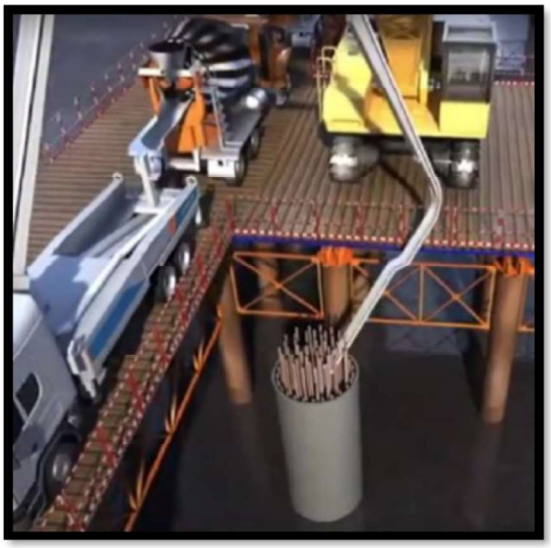


Figure 1.25 Offshore Pile Foundation Construction with Enclosure

Bridge Construction – Proposed Methodology

The bridge construction is anticipated to begin with bathymetric and geotechnical investigations to confirm seabed conditions, water depths, and subsurface soil characteristics. Depending on the results of these investigations, initial site preparation works may then be undertaken as necessary.

Sand fill will generally be placed hydraulically in controlled layers to gradually raise the platform to the required elevation. If soft ground conditions are encountered, ground improvement measures—such as prefabricated vertical drains or surcharge loading—may be implemented to accelerate consolidation and improve foundation stability. Upon completion of filling works, vibro-compaction may be carried out to achieve the required density and bearing capacity.

After reaching the design levels, suitable slope protection—such as concrete block mattresses—may be installed to reduce erosion and scouring from waves, currents, and tides. Environmental protection measures will be implemented throughout the works, which may include turbidity control (e.g., installation of sediment traps) and controlled filling operations.

The specific measures to be applied will depend on actual site conditions and will be finalized in accordance with the Turbidity Management Plan procedure. Please note that the above outlines only the general approach. The final and detailed construction methodology will be submitted by the contractor upon mobilization and may vary depending on the contractor's means, methods, equipment, and detailed engineering assessments.

Air Pollution Control Device (APCD)

The seacrafts will have their individual smokestacks to serve as equivalent APCD which will be connected to the exhaust of the pump engines.

Materials Recovery Facility

Solid waste management involves proper segregation of both on-shore and off-shore wastes (Plate 1-2). Contractor, as part of their Social Development Program, hires local cleaners for clean-ups of coastal wastes. During off-shore operations, the Waste Service Provider operates their own vessel capable to collect wastes from our operational vessels.

On-site waste management involves process and practices used to handle, segregate, and dispose of waste materials generated on site and wastes from the sea. The project disposes a significant volume of waste monthly. The majority of these wastes are collected from the Project shores through the company's clean-up efforts. These collected wastes are stored and segregated in the MRF until disposal by DENR-accredited waste service providers. The MRF is a temporary facility made from repurposed metal pipes and is consists of 6 sections for recyclables, wood, metals, general waste, plastics, and paper/boxes.

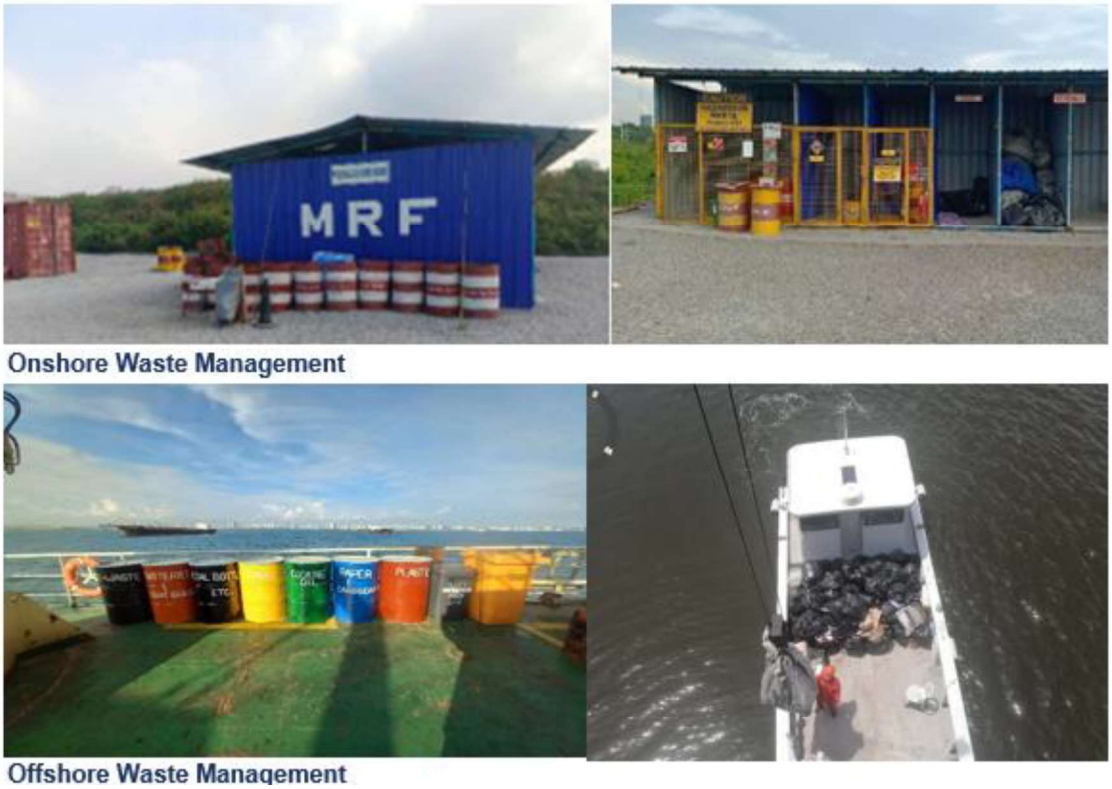


Plate 1-2 Existing Materials Recovery Facility

Hazardous Waste Storage

The MRF also has a designated hazardous waste section (Plate 1-3), consists of 3 partially closed areas for liquid and solid hazardous wastes. The project generates various hazardous wastes such as used oil and other oily wastes e.g., contaminated rags and gloves. The facility is designed to provide open-air ventilation to the stored hazardous waste. Secondary containment, such as drip trays, is provided inside the hazardous waste storage area for liquid hazardous wastes. Spill kits, fire extinguishers, gloves, eye protection, and hazard signages are also provided.

Safety Data Sheets (SDS) are posted in the MRF containing all the necessary safety information regarding the wastes stored. Necessary permits are secured prior to disposal of hazardous wastes. Permit-to-Transport and Certificates of Treatment are also secure. DENR-accredited hauler will collect the hazardous wastes and transport it to a DENR-accredited TSD Facility. Certificate of treatment will be released 45 days after hauling.



Plate 1-3 Existing Hazardous Waste Storage in the Project Site

Other Wastes

The perceived relevant wastes for the proposed project are silts. Silts are the solid wastes from the dredging of undesired seabed materials. Other type of wastes is deemed not applicable for this type of project since no appreciable amount of garbage or solid wastes will be generated from the activities involved.

1.5.3. DESCRIPTION OF THE OPERATIONS AND MAINTENANCE OF FACILITY

The maintenance facilities for the Project are located outside the Project site premises which include bunk house, vehicle washing facility, vehicle maintenance services, change oil machineries, among others that are outsourced.

1.6. PROJECT SIZE

The project size of the project components that will be included for the Amendment of the ECC Covering the Inter-Island and Mainland-Connecting Bridge Structures of the 360-Hectare Pasay Reclamation Project (ECC-CO-1601-0003) can be found on Table 1.6.

1.7. DEVELOPMENT PLAN, DESCRIPTION OF PROJECT PHASES AND CORRESPONDING TIMEFRAMES

As of Q1 2026, the actual reclamation islands construction progress for the land development is 87.70%. The reclamation update and activities are as follows:

- Completed filling of sand at Island AB and C up to 1.5m MLLW
- Surcharging at Island AB and C, and surcharge removal/ land levelling at Island AB
- Marine vibro-compaction at Island AB and C
- Onshore vibro-compaction at Island AB and C
- Pre-fabricated Vertical Drain (PVD) installation at Islands AB and C. Completed as of Islands AB and C
- Coastal revetment works at Island AB, including Wave Wall

The indicative target completion date for the reclamation activities is on May 2028 as shown in Table 1.14.

All activities conducted are within the scope of EPRMP (2024), which is covered under ECC-CO-1601-0003 (Amended), issued on 13 March 2025.

For the Bridge development phase which is the focus of this ECC amendment the discussion can be found on the succeeding sections.

1.7.1. PRECONSTRUCTION PHASE

The preconstruction activities for the construction of the Inter-Island Connecting Bridges include updating of the Environmental Performance Report and Management Plan (EPRMP) in order to secure an amended ECC, securing proof of authorities and necessary clearances to concerned government offices.

1.7.2. CONSTRUCTION PHASE

List of Construction Equipment / Vehicles

The construction vehicles that will be used for the construction of the bridge are the floating barge, crane barge, piling rig, impact hammer, rotary drilling rig, floating crane, concrete pump truck, tower crane, formwork system, excavator, dump truck, concrete mixer truck, mobile crane, & etc.

Construction Methodology

The construction methodology for both the water and landing areas of the bridges are as follows:
a) Mobilization (Site setup, material delivery, permits, workforce)
b) Piling Works (Foundation & deep foundations)
c) Substructure (Piers, pier caps, abutments)
d) Superstructure (Girders, deck slab, bearings)
e) Surface Work & Touch-up (Pavement, barriers, lighting, utilities)
f) Demobilization

1.7.3. OPERATIONAL PHASE

The operations phase (Table 1.13) will provide an efficient and direct access to Pasay 360 specifically Bridges 3, 4, 5, 7, 9, 10, 11 and 12 will be used for both vehicular transport and pedestrian while Bridge W will be used solely for pedestrian which is connected to SM Entertainment Mall.

Table 1.13 Bridge Operations

Bridge	Purpose
3	Vehicular and Pedestrian
4	Vehicular and Pedestrian
5	Vehicular and Pedestrian
7	Vehicular and Pedestrian
W	Pedestrian
9	Vehicular and Pedestrian
10	Vehicular and Pedestrian
11	Vehicular and Pedestrian
12	Vehicular and Pedestrian

1.7.4. DECOMMISSIONING/ ABANDONMENT/ REHABILITATION

Demobilization of Temporary Facilities

Temporary facilities during the bridge construction which include: Site Offices; Clinic/Medical Facility; General Material Laydown Area (on-site); Precast Yard; Materials and Machineries/ Tools Storage and Maintenance Yard; Equipment Yard; Movable / Transferable Jetty (Passenger Jetty); Temporary Berthing Area w/ Rock Revetment (For Logistic); Fuel Storage Facility; Water Supply; Power Supply (Temporary Facilities); Washing Bay; Temporary Site Access; Bentonite/Polymer Storage Facility; Material Testing Facility; Sanitation Facilities; and Materials Recovery Facility & Hazardous Waste Facilityshall be properly removed to give way of the project operations. During the abandonment phase of the temporary facilities, the Project Proponent as well as their contractor shall:

- Properly manage and dismantled all temporary facilities;
- Develop waste management procedures and sort materials according to types;
- Reusable materials may be sold to junk shop or donated to the community;
- All other waste shall be segregated and dispose properly;
- Solid and Hazardous waste shall be properly hauled by a DENR accredited waste haulers;
- Portalets shall be properly siphoned and collected by the siphoning contractor;

- The inventory of waste produced as well as the certificate of treatment, hauling records, manifest form, etc. shall be reported in SMR and CMR;
- Conduct land and water restoration and rehabilitation activities, if applicable.

Decommissioning of the Bridges

The lifespan of the proposed bridges is around 50 years. Should there be a need to abandon, change ownership or to rehabilitate the project, or change in LGU land use plan, necessary permits and approval will be secured to the DENR EMB, concerned LGUs and government offices. The project will be properly rehabilitated following the guidelines by DENR EMB which is the revised procedural manual of DAO 2003-30 or whatever that is available at the time of decommissioning. A letter of request to relief the ECC, including the decommissioning/ abandonment/ rehabilitation plan will be prepared and submitted to DENR EMB for at least six months prior to its abandonment.

The abandonment plan will be composed of the following activities:
a) Assessment & Preparation: Secure permits, assess structure, and set up safety measures.
b) Superstructure Removal: Dismantle deck, girders, and transport materials via barges.
c) Substructure Removal: Extract piers, abutments, and piles using controlled methods.
d) Site Restoration: Dispose of waste, recycle materials, and restore the area.

Table 1.14 Project Timeline for Reconfiguration Reclamation Works and Horizontal Development

Project Activities	2025				2026				2027				2028			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Pre-construction																
Amended ECC Issuance																
Construction Phase																
Reclamation (Island Reconfiguration)																
Horizontal Development																
Decommissioning Phase of Temporary Facilities for Reclamation Works																
Decommissioning Phase of Temporary Facilities for Horizontal Development																
Operation Phase (not part of ECC)																

Table 1.15 Project Timeline for Amendment of the ECC Covering the Inter-Island and Mainland-Connecting Bridge Structures

Project Activities	2025				2026				2027				2028			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Pre-construction																
EPRMP Preparation																
Soil Investigation Works																
Bridge Construction Design																
Permitting and Clearances (PRA, DENR, Building Permit, etc)																
Construction Phase																
Mobilization (Site setup, material delivery, permits, workforce)																
Piling Works (Foundation & deep foundations)																
Substructure (Piers, pier caps, abutments)																
Superstructure (Girders, deck slab, bearings)																

Surface Work & Touch-up (Pavement, barriers, lighting, utilities)																
Demobilization / Decommissioning Phase of Temporary Facilities for Bridge Development																
Operation Phase																

1.8. MANPOWER

During Bridge Construction

The Inter-Island and Mainland-Connecting Bridge Structures will employ an estimated 10 to 50 workers during pre-construction, 200 to 1,000 workers during construction and about 10 to 20 workers during operations as shown in Table 1.16. Priorities are also given to qualified residents of the city in filling up the manpower requirements of the project.

Table 1.16 Manpower Requirements

Project Phase	Skills Requirement	Tasks to Perform	Estimated Manpower Requirements
Pre-Construction	General site workers, surveyors, crane/ heavy machinery, barge operator etc.	• Pre-drilling • Surveying • Ground investigation	< 5% of total workers in construction (10 to 50 workers)
Construction	Concreting, formwork/falsework erection, reinforcement fixer, crane/heavy machinery, barge operator, welders, truck/lorry drivers, general site workers, surveyors, precast factory workers, etc.	• Site office and temp facilities • Foundation construction – onshore, off-shore • Bridge substructure • Bridge superstructure • Drainage and lighting	Approx. 200 to 1,000 workers at the peak of a 3-year construction
Operation	Inspectors, security officer, technicians for repair and maintenance,	• Security • Operation • Maintenance and Repair • Inspection	10-20 worker/officer

During Construction Phase/ Reclamation Works

The proposed project will employ an estimated **1,200 to 1,500 persons** will be used during the peak construction stage (reclamation and horizontal). Priorities are given to qualified residents of the city in filling up the manpower requirements of its consultants and contractors during the construction stage of the project and of its locators.

1.9. PROJECT COST

The estimated project cost for the construction of the Inter-Island and Mainland-Connecting Bridge Structures is Php 2,084,308,840.00.

2. ASSESSMENT OF ENVIRONMENTAL IMPACTS

2.1. THE LAND

The summary of baseline data for the Land module is presented in Table 2.2.

Table 2.1: Summary of Baseline Data – Land Modules

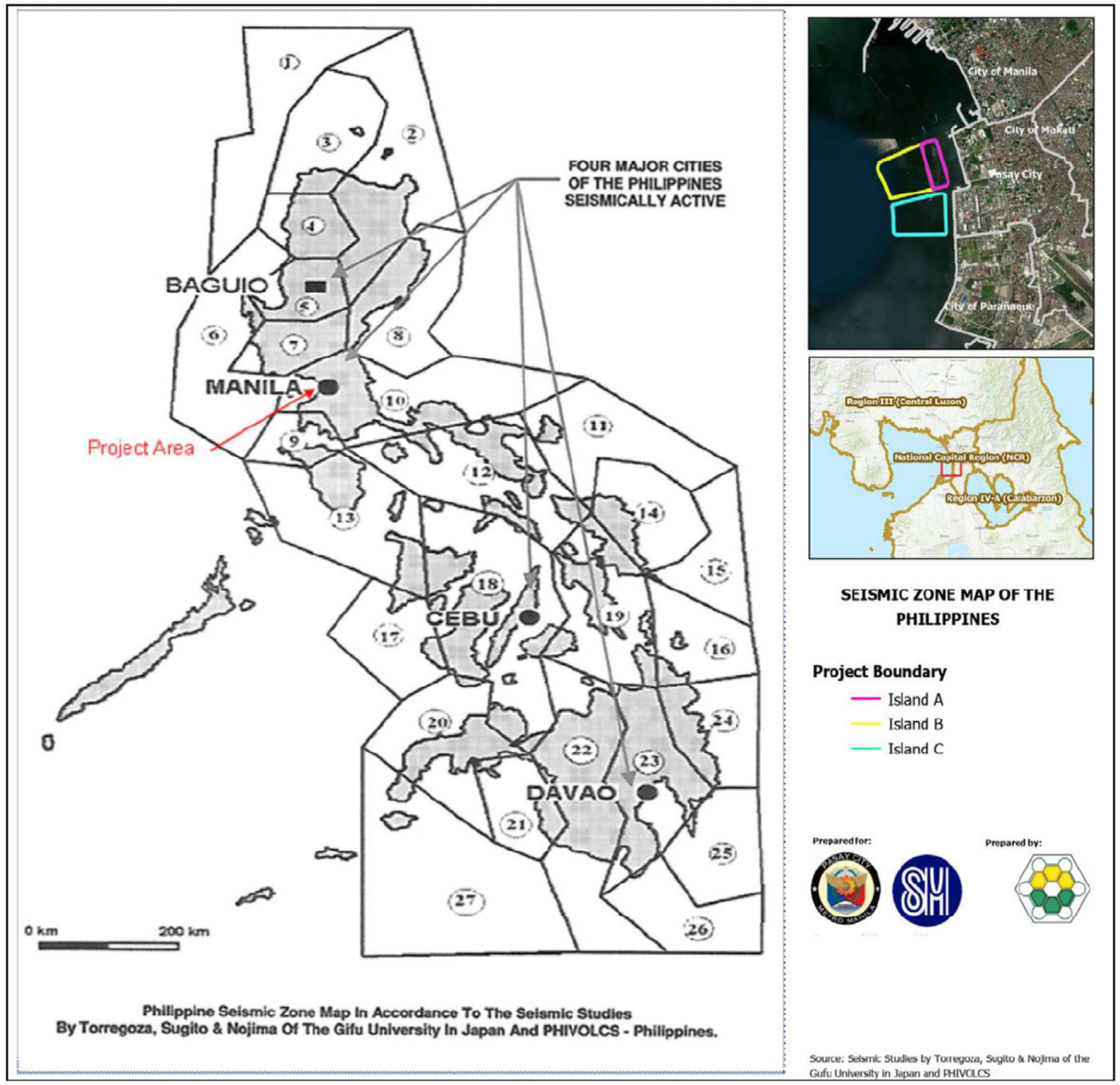
Module	Summary of Baseline Data 2024	ECC amendment (2025) to include the Inter-Island and Mainland-Connecting Bridge Structures
Land Use and Classification	The Pasay City Comprehensive Land Use Plan (CLUP) for the period 2014 to 2022 provided the spatial strategy to support the development intentions of the city for the plan period. The CLUP conveyed the land reclamation intentions of the Pasay City, and the Pasay 360 is within the planned unit development, special institutional zone, and parks and recreation zones of the 2016 Pasay City Zoning Map. The Pasay City is now in the final stages of updating its Comprehensive Land, Water, and Air Use Plan (CLWAUP) covering the period 2023-2034. The CLWAUP already reflects the reclamation project with SM SCIDC. The proposed project site is surrounded by waters specifically the Manila Bay, and on its right side on the mainland are built-up areas. The project site is not being used in any of the following water-based activities or projects: • As navigational lane; • As areas for significant or commercial fishing; • As port; • As a water-based settlement (e.g. boat people); • As a source of bulk water supply; and • As a source of commercial/economic supply of fish and other marine species. The nearest legislated protected area and nearest Ramsar site from the Project is the Las Piñas-Parañaque Wetland Park (LPPWP which is at ±3.15 km away. The project site is not situated in any certified Ancestral Domain.	Same
Geology/ Geomorphology/ Geohazards	The bottom topography of Manila Bay is gently sloping from its mouth at about 1 m per km of horizontal distance. The bay is mostly shallow with an average depth of 17 m and about 64 percent of its surface has	Same

Module	Summary of Baseline Data 2024	ECC amendment (2025) to include the Inter-Island and Mainland-Connecting Bridge Structures
	less than a 10-m depth, mainly at the northern half. The southwestern sector of the Bay is deeper with depths greater than 100 m. Spots of shallow areas, with depth of less than 5 m, are found along the coastline. The project area mainly consists of sedimentary deposits of Quaternary era. This formation is a result of erosion and re-deposition of former sediments which generally consists of unsorted fluvial and river deposits. Both the effects of climate processes and tectonic young activities caused a miscellaneous alluvium of different types, thickness and grain sizes to be formed. The subsoil is generally weak (soft or loose) with thick sequence of Quaternary alluvium made up principally of unconsolidated strata of silty and clayey sand and high plasticity clay. The Project site is located within two (2) environmentally critical areas: (1) geologic hazards and (2) water bodies.	Philippine Earthquake Model (2017) is added as reference.
Pedology	The geotechnical investigations/studies were used in assessing the possible subsurface conditions at the project area. The subsurface materials encountered within the 40.0 m depth of drilling can be generalized as consisting of alluvial soils underlain by weathered rocks. This subsurface condition is consistent with the geology of the area, where alluvial sediments (also referred to as Manila Deltaic deposits) are underlain by weathered tuffaceous rocks that belong to the Guadalupe Tuff Formation (GTF), the regional bedrock.	Same
Terrestrial Ecology - Flora	Transect 1 was established along the Original Island A Reclamation Site. Transect 2 was established along the coastal area of Manila Bay in the MOA Seaside. The area was open to the public and a common spot for different activities such as biking, jogging, etc. No threatened species were identified.	Same
Terrestrial Ecology - Fauna	A total of 23 species was observed during the primary survey. Out of all the encountered species, only one (1) was endemic to the Philippines, the Philippine Pygmy Woodpecker (*Picoides maculatus*). The majority of surveyed species belonged to migratory species, having 12 species in total or 52.17%. This was due to the area being located in a coastal area where most migratory species pass through. Moreover, Resident and introduced species amounted to 30.44% and 13.04% of the total encountered species, respectively. No threatened species were identified.	Same

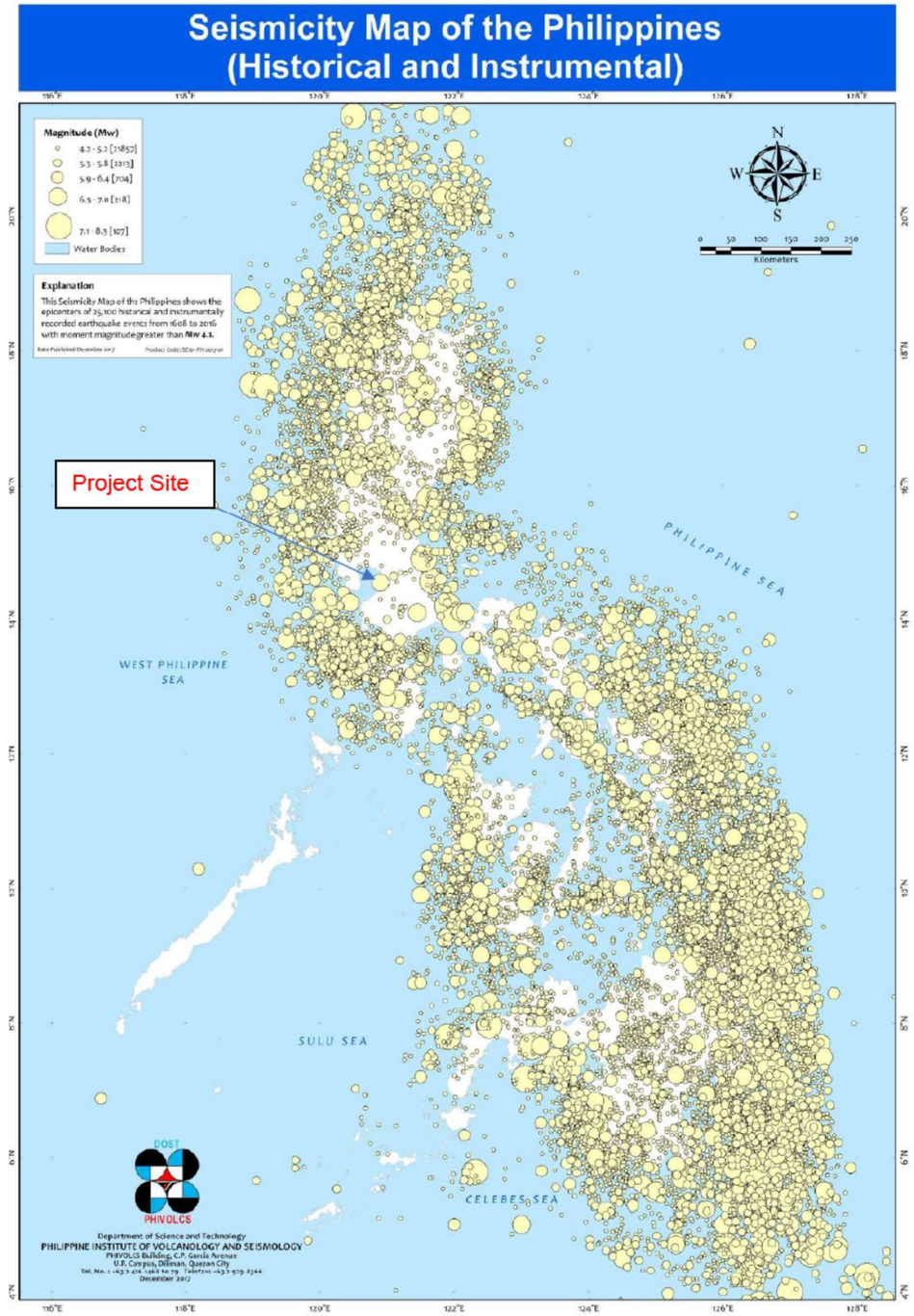
2.1.1. UPDATED SECTIONS

2.1.1.1. TECTONIC SETTING

The Philippine Archipelago consists of several areas of rifts and opposing trench-arc systems. The Philippine Seismic Zone Map (Figure 2.1) in accordance to the Seismic Studies of Torregoza, Sugito and Nojima of the Gifu University in Japan and PHIVOLCS (2002) presents 27 zones. Based on this map the project area falls under Zone 10 where the historical maximum magnitude is 7.6. The figure also shows the Philippine Earthquake Model (2017) Seismicity Map on which the project site is located between 6.5 to 7.0 magnitude (historical and instrumental).



Source: Seismic Studies by Torregoza, Sugito & Nojima of the Gufu University in Japan and PHIVOLCS , 2002



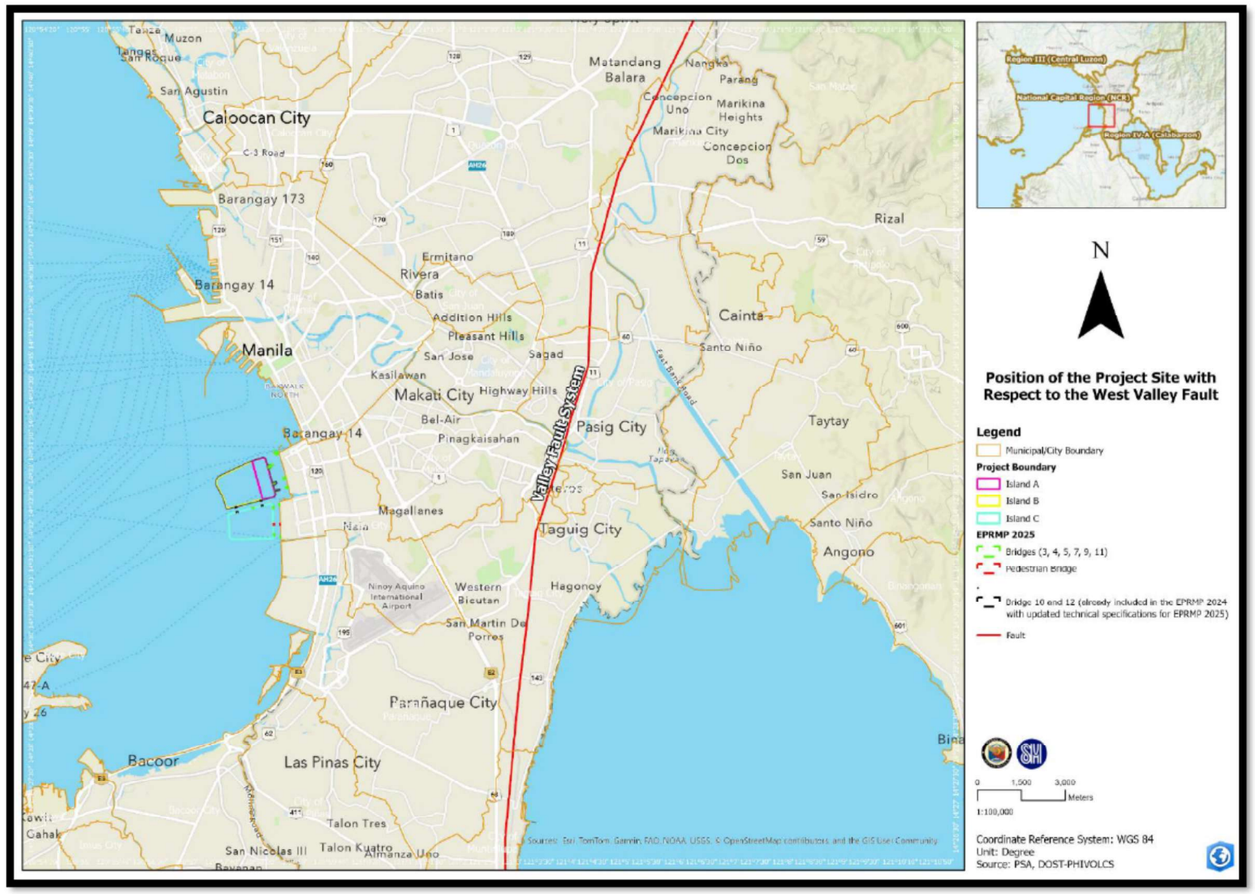
Source: PHIVOLCS. The Philippine Earthquake Model (2017)

Figure 2.1 Seismic Zone Map of the Philippines

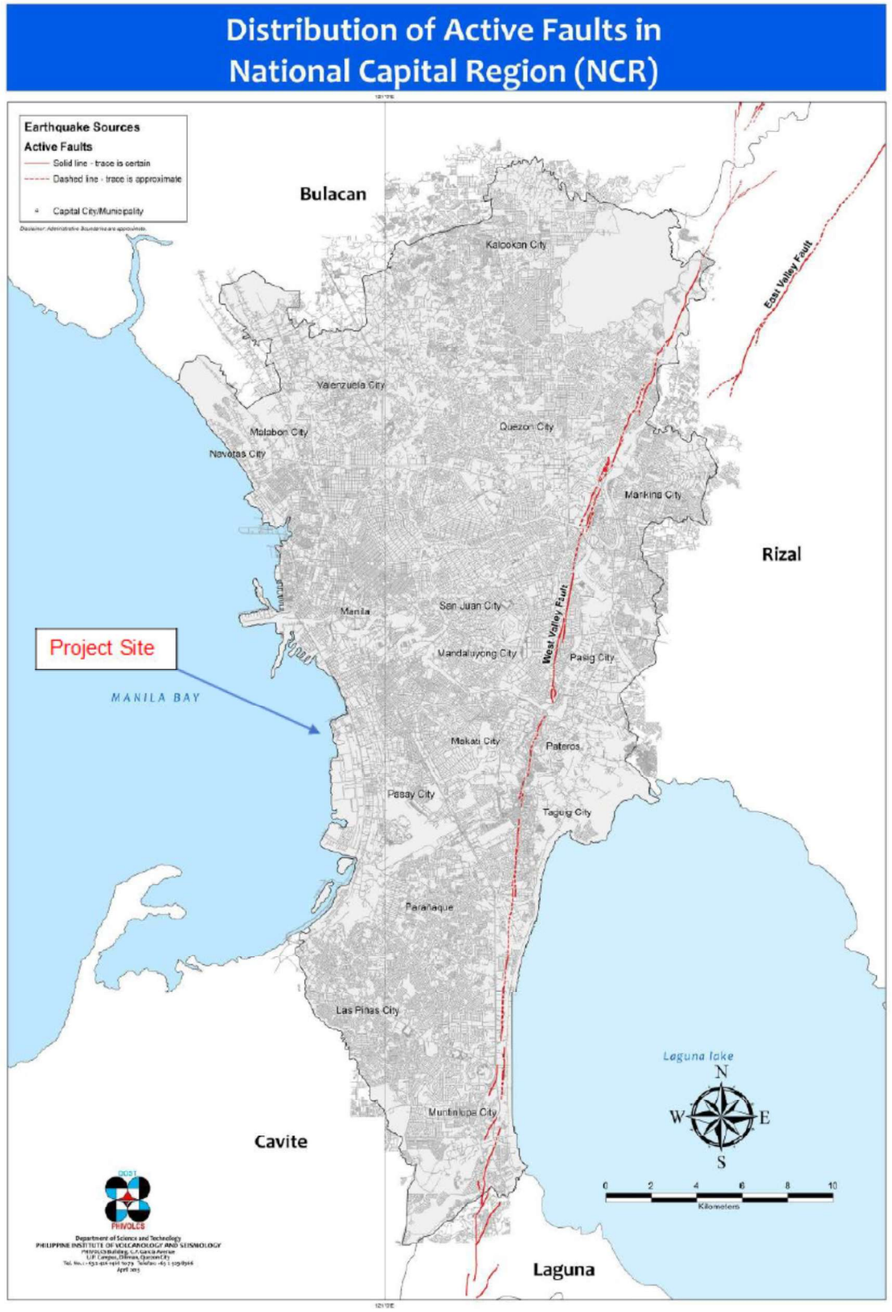
Potential Sources of Earthquake

Based on historical and instrumental data, the following have been identified to be the locus of major earthquakes that have significantly impacted the metropolis and nearby areas in the past: 1) West Valley Fault System, 2) Philippine Fault Zone, 3) Lubang Fault, and 4) Manila Trench.

West Valley Fault System (WVFS). The West Valley Fault System, a newly classified active fault based on recent mapping and trenching work conducted by Punongbayan and others (1990), is a potential earthquake source. Based on the Certification provided by PHIVOLCS WVFS is about 8.0 km east of the project area (Figure 2.2).



Source: PHIVOLCS – Punongbayan, et al., 1992



Source: PHIVOLCS. The Philippine Earthquake Model (2017)

Figure 2.2 Position of the Project Area with Respect to the West Valley Fault

2.1.1.2. GROUND ACCELERATION

The estimated horizontal and vertical peak accelerations during an earthquake likely to occur in an area are useful information for designing buildings and other structures to withstand seismic shaking. Maps of Acceleration in Medium Soil and Rock are presented in Figure 2.3 to Figure 2.4**.** Ground acceleration maps from the Philippine Earthquake Model (2017) were also presented. Results shows that the area is between 0.3 to 0.4 acceleration in g.

In order to determine the ground acceleration that a site can experience in case of a major earthquake, the attenuation model of Fukushima and Tanaka is applied (Thenhaus et al, 1994). A design earthquake is assumed to occur at a point along the causative fault that is nearest to the site. Correction factors are then applied depending on the type of foundation material.

The attenuation model of Fukushima and Tanaka (In Thenhaus, 1994) is written as:

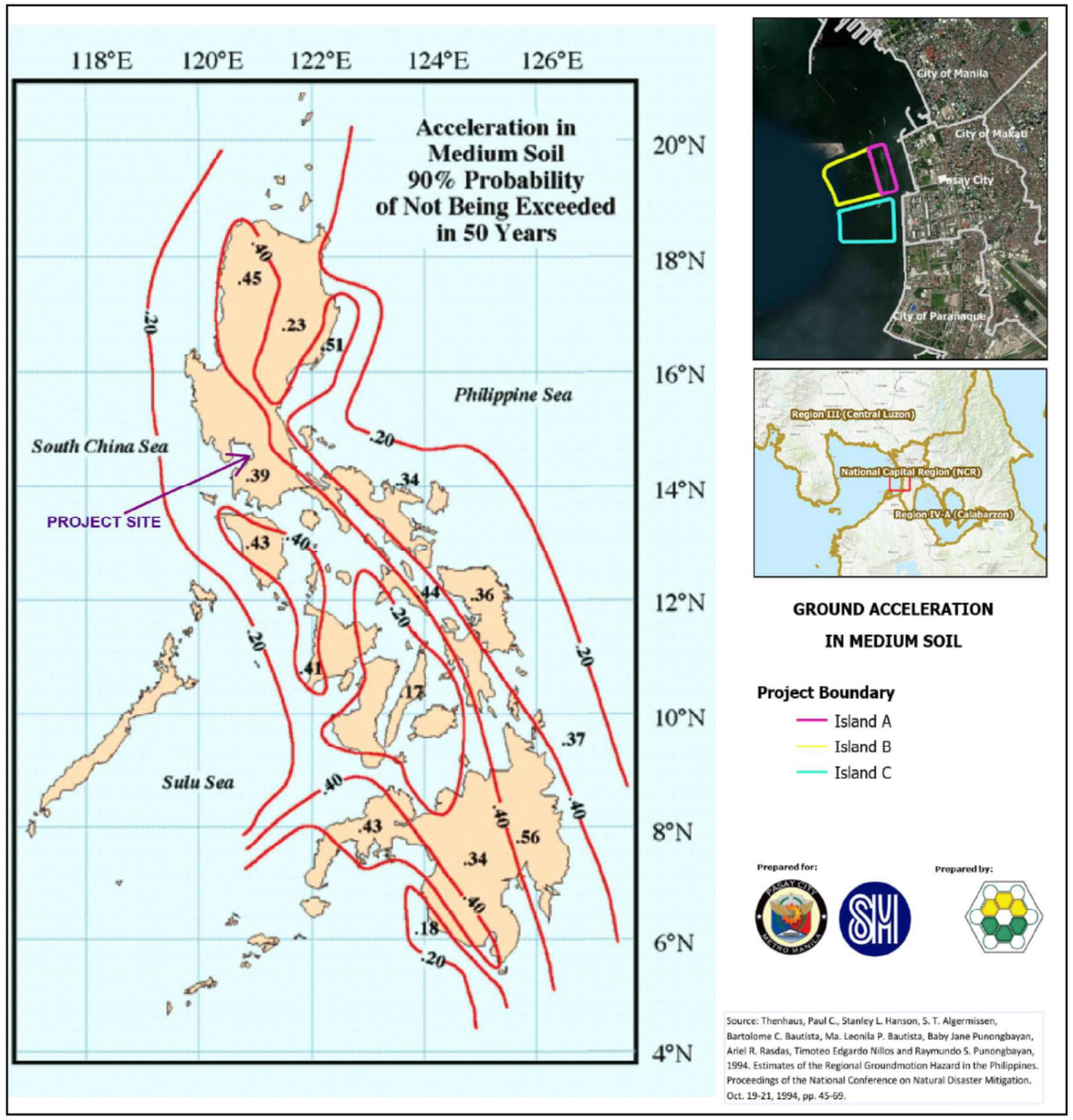
$$\log_{10} A = 0.41M - \log_{10} (R+0.032x10^{0.4\,M}) - 0.0034R + 1.30$$

where:

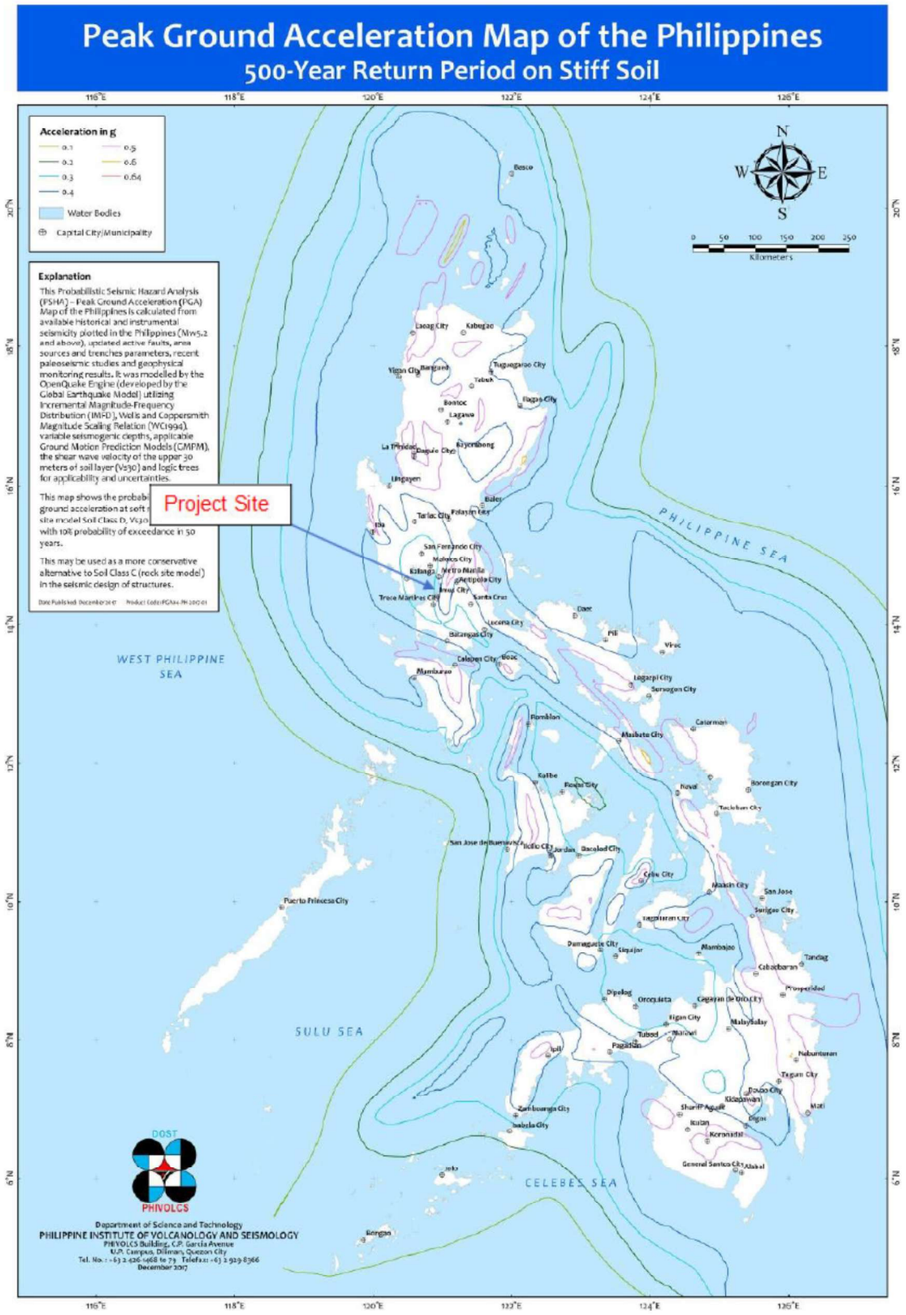
A = mean peak acceleration (cm/sec^2)
R = shortest distance between the site and the fault rupture (km)
M = surface-wave magnitude.

Correction factors are applied depending on the type of foundation material: rock, 0.6; hard soil, 0.87; medium soil, 1.07; and soft soil, 1.39.

The most logical causative fault is the Philippine Fault. It may be considered as a near-source earthquake generator. The Philippine Fault is probably the most active of earthquake generators in the country. Though presently inactive, both the West Valley Fault, the Lubang Fault and Casiguran Fault can also be considered as potential earthquake generators.

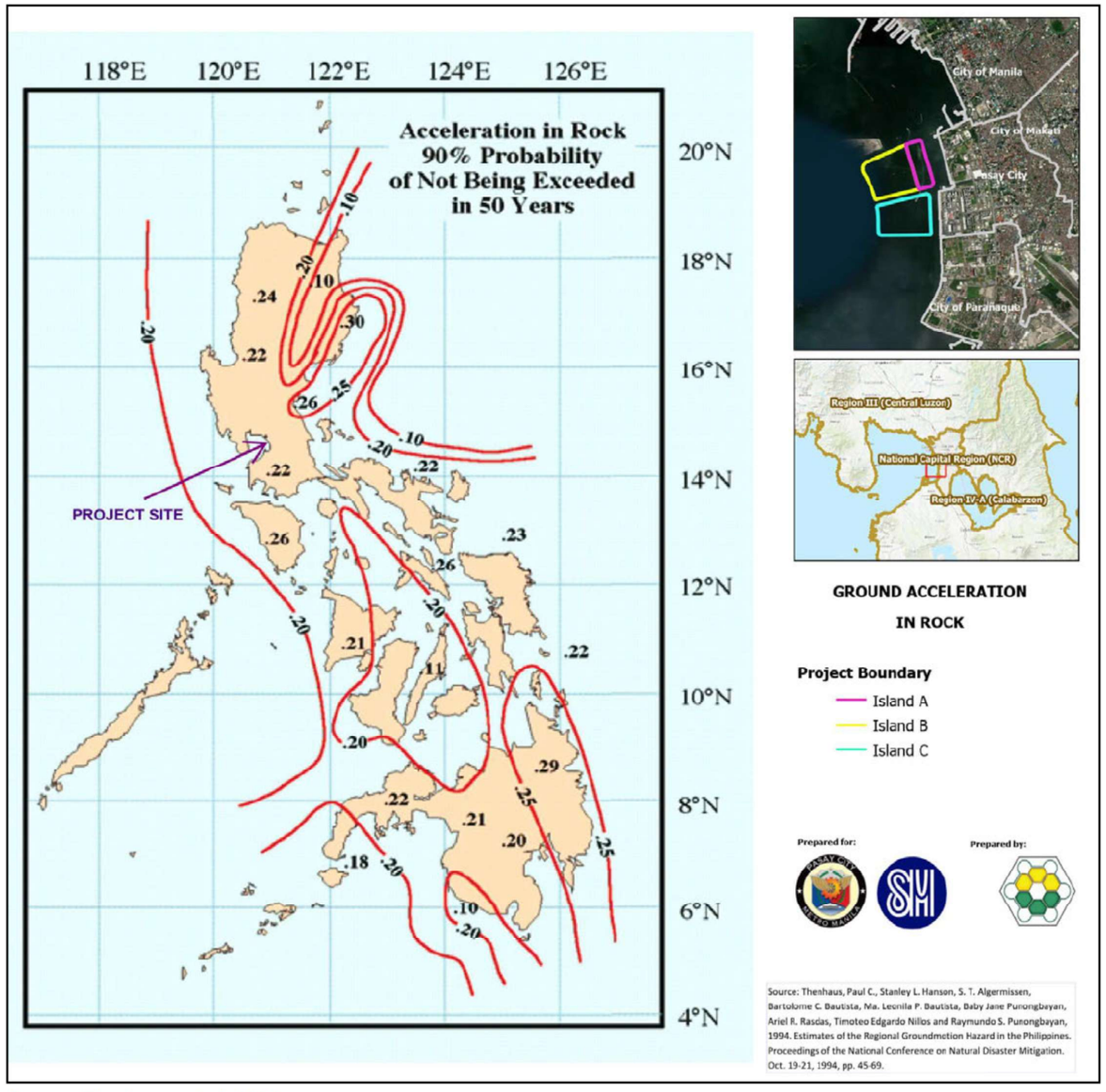


Source: Thenhaus, et al, 1994

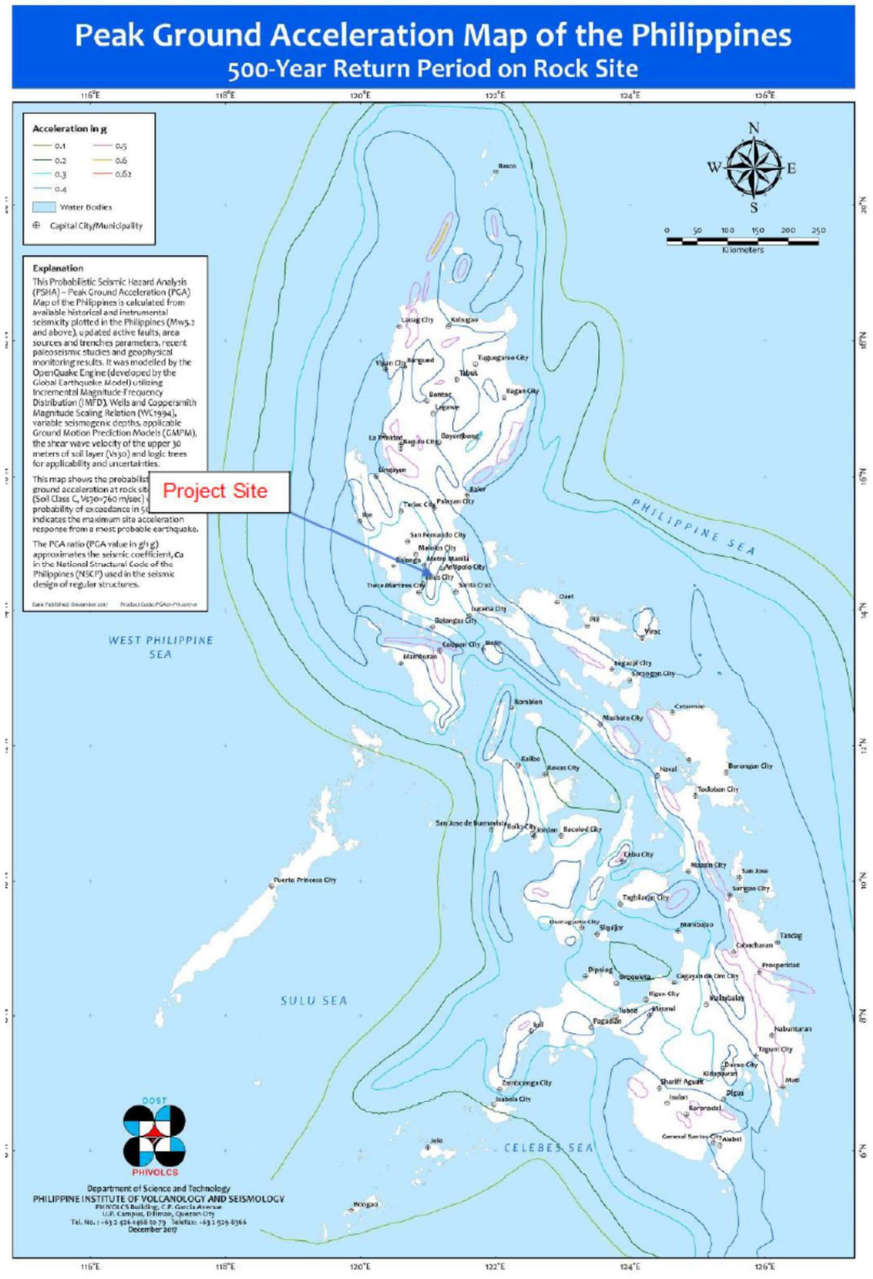


Source: PHIVOLCS. The Philippine Earthquake Model (2017)

Figure 2.3 Ground Acceleration in Medium Soil



Source: Thenhaus, et al, 1994



***Source: PHIVOLCS**. The Philippine Earthquake Model (2017)*

Figure 2.4 Ground Acceleration in Rock
Source: Thenhaus, et al, 1994

2.2. THE WATER

The summary of baseline data for the Water module is presented in Table 2.2.

Table 2.2: Summary of Baseline Data – Water Module

Module	Summary of Baseline Data 2024	ECC amendment (2025) to include the Inter-Island and Mainland-Connecting Bridge Structures
Hydrology/ Hydrogeology	The seabed bathymetry clearly indicates that the water along the coastline of Pasay City is generally shallow which ranges from 3 to 10 meters. Manila Bay is the catchment for numerous river systems that drain the surrounding land areas. In addition to the Pampanga River and Pasig River, other major rivers discharging directly into Manila Bay are: Meycauayan, Navotas-Malabon-Tullahan-Tenejeros, Talisay (Bataan), Imus (Cavite) and Maragondon (Cavite). Thus, deposition within the Bay is very active. The project does not block, impede nor disturb the drainage system from the Pasay City mainland, and thus has no impact on the occurrence of flooding in Pasay City and nearby areas. The water between the reclamation and the shore and the northern boundary of the other reclamation area provides a much wider drainage area than that of the Libertad Channel itself. Based on the Simulating Waves till Shore (SWASH) results, the new islands will result in a sheltering effect, protecting the existing mainland from direct wave impact. As a result, the flood risk of the existing land due to overtopping water (from waves) will significantly be reduced. In the existing situation without presence of the new islands, during severe storm conditions (typhoon) waves will hit the land in full force. Such waves combined with high water levels (storm surge) result in large quantities of water to overtop the coastal defense, resulting in local flooding of the nearshore areas. The proposed islands will have a positive impact on the hinterland in terms of protection against these waves. The edges of the proposed islands will consist of revetments with wave walls and are designed to provide protection against normal and typhoon generated waves.	Sediment Dispersion Study dated 11 February 2026 is attached as Appendix F (also see also discussion below) FES2022 is the latest available reputable global tidal model and the latest available bathymetry and landform in Manila Bay have been used. Grading of Total Suspended Solid (TSS) graphs has been modified accordingly. Please see Slope Stabilization section on the discussion of Erosion Control (Section 1.5.1 (last paragraphs))
Water Quality	Based on the marine water quality results of 2024 at the Manila Bay sampling stations, all parameters are within the water quality guideline values for Class SB except that some stations have high values of fecal coliform and temperature. Noting the water quality baseline data on 2012 and 2016, high fecal coliform values were also recorded even without the Project. For SW12 at the	The water quality trend analysis is discussed in Chapter 5.2.2 of this EPRMP.

Module	Summary of Baseline Data 2024	ECC amendment (2025) to include the Inter-Island and Mainland-Connecting Bridge Structures
	Libertad Channel as compared with Class C water, the parameters that exceeded the WQG values are BOD, Phosphate, Fecal Coliform and Temperature. This station is located upstream of the Project and the exceedance in water quality values may be attributed with other sources in the upstream. High level of fecal coliforms were also recorded in the EIS 2016 nearest baseline station in SW12. For SW13 at the Drainage outfall, the sampling results were compared to both Class C (Freshwater) and Class C (Effluent) and the results show exceedances in BOD, Color, Phosphate, Fecal Coliform, TSS and Temperature. Note that SW12 and SW13 have no river classification and that the class of water indicated therein is for comparison only.	
Marine Ecology	The 2024 surveys revealed the complete absence of corals and reef associated benthic life forms across the proposed reclamation project. Not even coral rubble or remnants of old dead corals in the impact area of the reclamation project were seen, indicating that coral animals have not been existed in the area ever since. There are no mangroves in or near the proposed reclamation site. The nearest mangroves, albeit more than 3.10 kilometers away, are found in the LPPWP. No seagrass communities were found during the two-day survey. Not even isolated patches of small algal assemblages and associated epiphytes were encountered on the seabed. Except for the presence of mussels (*Perna viridis*) and oysters (*Crassostrea sp*) in the rocky seawall along Island A, no benthic macro-invertebrates were seen in muddy seabed during manta tows, six spot dives and in sediments collected.	Same

Sediment Dispersion Study

The sediment dispersion study (**Appendix F**) for Pasay 360 has been completed. The seasonal averaged TSS concentration and sediment deposition have been determined for both the dry and wet seasons. The present sediment transport study suggested that the maximum TSS and deposition occur during wet season. For the baseline scenario, the TSS concentration in wet season varies generally in the range of 10 mg/L – 20 mg/L in most channels except very close to the outfall, consistent with recent site measurements. If the baseline results are used as the background TSS concentration, the post-construction impact can be determined by comparing it. In the post-construction phase, the TSS concentration generally also varies from 10 mg/L – 20 mg/L along all channels, except very close to the outfall, similar to that of the baseline scenario. Based on the result, it is concluded that the construction does not cause a major impact to the TSS concentration. The maximum range of

TSS concentration based on the 1D analysis extraction points location is 33 mg/L, complying to the DENR WQG requirement of <50 mg/L for the class SB. Based on the DENR WQG, the TSS concentrations for both the baseline and post-construction conditions fall within the Class SB limit.

For the sediment deposition, it has been determined that the rate is approximately within 0.5 cm over 2 months during the wet season, indicating that the deposition is generally insignificant. Note that this assessment assumes that the TSS sediment type is clay/silt and tends to remain in the water column for a long period of time before settling. This study is intended as a high-level assessment, focusing on the general evaluation of TSS concentration influenced bynearby discharges across different seasons. A more detailed sediment transport study would require extensive data, however, this not necessary in this stage since the measure TSS already comply with the current DENR WQG.

Erosion problem can also be of concern because of the wave conditions at the site. To minimize the risk of erosion under extreme wave conditions, rocks will be provided to protect the revetment and affected channels.

2.3. THE AIR

The summary of baseline data for the Air module is presented in Table 2.3.

Table 2.3: Summary of Baseline Data – Air Module

Module	Summary of Baseline Data 2024	ECC amendment (2025) to include the Inter-Island and Mainland-Connecting Bridge Structures
Climate	The project site falls under Type 1 climate. This type of climate has two pronounced seasons: • Dry from November to April; and • Wet during the rest of the year (May to October). The Project site is situated in an area traversed by 20 cyclones in 12 years (5 tropical cyclones in 3 years). Based on the Port Area Manila Synoptic Station which is ~3.6 km from the nearest project boundary, the records of rainfall near the project site show the advent of rainy seasons in the month of May, and the peak of rainy reasons on the month of August, while the wettest months are July, August and September. Predicted range of temperature change in NCR in 2050 is 1.8 to 2.1°C while seasonal rainfall change is from -38.5 to 3.7%.	Same
Air and Noise Quality	All ambient air parameters measured in the baseline are within the ambient air guideline values.	The results of the ambient noise monitoring conducted during the reporting period indicate that the

Module	Summary of Baseline Data 2024	ECC amendment (2025) to include the Inter-Island and Mainland-Connecting Bridge Structures
	Stations A1 and A3 exceeded the noise standard limit for evening and nighttime, sources of noise mainly due to the entertainment activities, e.g. band, music and other form of entertainment, that usually start early evening up to late nighttime.	measured noise levels across all monitoring stations generally remained within the applicable DENR noise standards for the project area. The recorded values showed minor variations across monitoring periods, which may be attributed to normal fluctuations in background noise from nearby urban activities, vehicular movement, and other existing sources in the surrounding environment. No persistent or significant increase in noise levels attributable to project-related activities was observed. Overall, the monitoring results indicate that noise conditions in the vicinity of the project site remain within acceptable limits, demonstrating that the implemented mitigation and management measures are effective and that the project continues to comply with the applicable regulatory noise standards. While baseline noise data are available from the EIS study EIS study (sampling date: 2013 and 2014), direct comparison with the current monitoring results should be interpreted with caution since the baseline monitoring stations used in the EIS are located in different sampling locations from the present CMR and CMVR monitoring stations. Nevertheless, the current monitoring results indicate that ambient noise levels in the vicinity of the project remain within the applicable regulatory standards and that project activities have not resulted in significant adverse noise impacts. The monitoring data are presented in Chapter 6 of this EPRMP.

2.4. THE PEOPLE

The summary of baseline data for the People module is presented in Table 2.4.

Table 2.4: Summary of Baseline Data – People Module

Module	Summary of Baseline Data EPRMP 2024	ECC amendment (2025) to include the Inter-Island and Mainland-Connecting Bridge Structures
People	Pasay is a first class, highly urbanized city with 201 barangays. Based on the 2020 census, Pasay recorded a total population of 440,656 representing 3.27% of the total population of the NCR. The direct impact barangay for this Project is Barangay 76. The population of the barangay is 19,604 in 2020. Pasay City is the so-called "travel city" because of the presence of Ninoy Aquino International Airport. Pasay City is envisioned to be a premiere city and world-class travel destination. It is strategically located on a territory where many shopping malls, hotels, restaurants, casinos, and convention centers are flourishing. The Project site is located offshore and in the proposed reclamation island. Philippine Registry of Cultural Property (PRECUP) Registered Properties and Local Cultural Properties are not located within the proposed Project. Based on the list, there are no cultural registered properties and historical markers within the 1-km buffer from the reclamation islands. The nearest PRECUP in the reclamation Island in the category of Works of National Artist is the Gloria Maris Restaurant which is approximately 500m. On the other hand, based on the list of Pasay City, the multifaceted urban tourism activities include 16 cultural and recreational attractions, 13 historical and cultural heritage spots (3 are NHCP sites), and five (5) crowd puller cultural and tourism activities. The nearest of which is the Conrad Manila categorizes as cultural and recreational attractions which is approximately 350m away from the nearest Project Boundary. The nearest historical and cultural heritage based on the City is the House of Mr. James C. Rockwell at 1155 F.B. Harrison Street. which is 1.73 km away from the nearest reclamation boundary. **Household Perception Survey to**	The baseline socio-economic conditions presented in the EPRMP 2024 remain applicable for this ECC Amendment. The proposed Inter-Island and Mainland-Connecting Bridge Structures are located within the EPRMP study area and adjacent to the same project influence area previously assessed under the approved reclamation project. Hence, the baseline data and characterization of the receiving environment presented in the EPRMP continue to represent the existing conditions of the project area. No significant changes in the socio-economic baseline conditions have been identified that would alter the previous assessment.

Module	Summary of Baseline Data EPRMP 2024	ECC amendment (2025) to include the Inter-Island and Mainland-Connecting Bridge Structures
	Residents of Barangay 76 Pasay (Sample Size:100) On project awareness and acceptance, 66% are aware of the 360-hectares reclamation project. Although not all of the respondents know about the project, 95% agreed to having the reclamation project at their barangay for the reasons of perceived opportunities for employment, land expansion, financial and educational assistance, livelihood assistance, reliable infrastructure, support to vulnerable sectors, economic growth, and healthcare assistance. Other respondents mentioned of risks like decrease in fishing area, environmental destruction, flooding, traffic congestion, and overcrowding. **Household Perception Survey to Fisherfolks (Sample Size:30)** On project awareness and acceptance, 73.7% are aware of the 360-hectares reclamation project. Those who are aware have slight understanding of the project (81.8%). Although not all of the respondents know about the project, 80% or 24 respondents agreed to having the reclamation project for the reasons of perceived opportunities for employment, land expansion, financial and educational assistance, livelihood assistance, healthcare assistance, and continuance of fishing activities.	
Traffic	-	See Traffic Impact Assessment (TIA) and Traffic Management Plan (see Appendix G)

3. IMPACT MANAGEMENT PLAN

The Supplemental Environmental Management Plan (Table 3.1) for the Inter-Island Connecting Bridges considers the following:

- Construction of Inter-Island and Mainland Connecting Bridges
- Construction along the waters of Manila Bay in Barangay 76
- Construction along the landing areas at the mainland within Barangay 76
- Construction of temporary support facilities for the bridge construction

The major risk and mitigating measures identified are as follows:
1. Potential Impact: Project Delays due to permitting issues.
Mitigating measures:

- Secure applicable permits and clearances from the concerned government offices (ECC, Contract of Lease, PRA and CCP Board Resolution on the landing points, DPWH Letter of No Objection, etc.)

2. Potential Impact: Possible encroachment in the ECA such as natural hazards, flooding, storm surge, etc. / Bridge Collapse
Mitigating measures:

- Preparation, consideration and implementation of the results of the Geotechnical Interpretation Report, EGGAR, Hydrodynamic Modelling Study and Flooding Impact Study, among others to the Project design
- Mounting of foundations, and bridge construction will follow the provisions of DPWH standards, National Building code and the Structural code of the Philippines
- Mitigations under Chapter 1 Design Criteria and Construction Methodology will be considered

3. Potential Impact: Increase in turbidity due to seabed disturbance
Mitigating measures:

- Controlled direct placement of foundation by barges.
- Appropriate bridge construction method will be employed. A column or steel box/ cylindrical wall/ protection wall will form as an enclosure to the foundation or piles to prevent the water or sediments from seeping out.
- The water containing soil or sediment inside the casting will be carefully pumped using a hose that will be transferred to a designated spoil disposal area or may be pumped out near the casting when the water is generally static
- Other project components will be built on the land prior to the delivery in the bridge viaduct section
- Spoil Disposal Areas especially the excavated soil from the foundation will also be strategically located to avoid leakage to Manila Bay4. Potential Impact: Solid Waste generation which includes slag, scales, and used maintenance materials
- Mitigations under Chapter 1 Design Criteria and Construction Methodology will be considered

4. Potential Impact: Vessel Collision
Mitigating measures:

- *Preparation and Implementation of Barge Access Plan and Safety.*
- *Height of the bridge will be considered to allow boats to pass through*

5. Potential Impact: Traffic density increases and Traffic-related Accidents
Mitigating measures:

- Separate pedestrian walkway (Personnel Entrance and Exit) and access for vehicles (Vehicle Entrance and Exit)
- Set up warning strips for isolation
- The main activity areas for personnel and construction machinery are separated
- Avoidance of cross-operation of various construction machines
- Assigning of watcher or / linemen
- No overloading.
- Keep linemen at its post to observe and give signal to moving vehicles
- Implementation of Traffic Management Plan (see **Appendix G**) which include proper lane designation, speed limit, trucks deployment schedule, traffic signs, CCTV, and traffic marshals among others.

6. Potential Impact: Alteration of water flow / Change in drainage morphology/ change in stream water depth
Mitigating measures:

- *Location of the foundation of the bridge will be strategically located with appropriate distance with each other to avoid hindrance to the flow of water.*
- *Maintenance/ clean-up of bridge that are distributed in the alignment to allow free flowing of rain or running waters and avoid clogging.*
- *Support LGU programs to Manila Bay clean-up projects.*

Table 3.1 Supplemental Environmental Management Plan for the Inter-Island and Mainland Connecting Bridges of Pasay 360

Phase	Activities	Potential Impacts	Affected Environment	Options For Prevention/ Mitigation/ Enhancement	Responsible Entity	Cost	Guarantee/ Financial Arrangements
Construction of Inter-Island and Mainland Connecting Bridges • **Construction along the waters of Manila Bay in Barangay 76** • **Construction along the landing areas at the mainland within Barangay 76** • **Construction of temporary support facilities for the bridge construction such as Site Offices; Clinic/Medical Facility; Mesh Hall/Catering Facility, Welfare Facility & Workers' Accommodation Building; General Material Laydown Area (on-site); Precast Yard (Provision only, same as current); Materials and Machineries/ Tools Storage and Maintenance Yard; Equipment Yard; Movable / Transferable Jetty (Passenger Jetty); Temporary Berthing Area w/ Rock Revetment (For Logistic); Concrete Batching Plant; Fuel Storage Facility; Water Supply; Power Supply (Temporary Facilities); Washing Bay; Temporary Site Access; Bentonite/Polymer Storage Facility; Material Testing Facility; Sanitation Facilities; and Materials Recovery Facility & Hazardous Waste Facility**							
Pre-construction phase							
Pre-construction phase	Permitting	Project Delays	Land Use	Secure applicable permits and clearances from the concerned government offices (ECC, Contract of Lease, PRA and CCP Board Resolution on the landing points, DPWH Letter of No Objection, etc.)	Project Developer (SM SCIDC) Contractor	Part of permitting and development cost	Project Developer Project Developer Contract / Agreement with the Contractor/s
	IEC / Stakeholder Consultations	Misinformation / Lack of knowledge about the Project	People	Install project billboards IEC campaign Coordination with Pasay City LGU	Proponent Project Developer Contractor	Part of project development cost	Project Developer Project Developer Contract / Agreement with the Contractor/s
	Geotechnical and Feasibility Study	Possible encroachment in the ECA such as natural hazards, flooding, storm surge, etc. Bridge Collapse	Land Use	Preparation, consideration and implementation of the results of the Geotechnical Interpretation Report, EGGAR, Hydrodynamic Modelling Study and Flooding Impact Study, among others to the Project design. Mounting of foundations, and bridge construction will follow the provisions of DPWH standards, National Building code and the Structural code of the Philippines	Project Developer Consultant	Part of project development cost	Project Developer

Phase	Activities	Potential Impacts	Affected Environment	Options For Prevention/ Mitigation/ Enhancement	Responsible Entity	Cost	Guarantee/ Financial Arrangements
				All storm drainage system designs will comply with the latest editions of the Sanitation Code of the Philippines and the National Plumbing Code of the Philippines.			
Construction Phase							
Construction Phase	Hiring of Manpower	Generation of Employment including Gender and Development and Vulnerable Sectors, and Business Opportunities	People	Prioritize hiring of local qualified workers from the DIA and IIA Prioritize local contractors and local suppliers Coordinate with the LGU's Public Employment Services Office (PESO) with regard to employment of workers/staff Identify issues and concerns involving various sectors as maybe necessary in the provision of SDP.	Project Proponent-PESO Project Developer Contractor	Project Construction Cost	Project Developer Contract / Agreement with the Contractor/s
Construction Phase	Construction along the waters of Manila Bay Construction along the landing areas at the mainland Construction of temporary support facilities for the bridge construction	Solid waste generation	Water and Land	Proper collection and segregation of solid waste among vessels, lay-down area and other areas within the project by an accredited third-party waste service provider	Project Developer/ Contractor	Project Construction Cost	Project Developer Contract / Agreement with the Contractor/s
		Change in marine water quality	Water	Implement Turbidity Management Plan (TMP) Regular water quality monitoring Issuance of stop work order when required, based on onsite	Project Developer/ Contractor	Project Construction Cost	Project Developer Contract / Agreement with the Contractor/s

Phase	Activities	Potential Impacts	Affected Environment	Options For Prevention/ Mitigation/ Enhancement	Responsible Entity	Cost	Guarantee/ Financial Arrangements
	(earthworks, mobilization, excavation, among others)			monitoring results and actual visibility, in accordance with TMP.			
		Increase in turbidity due to seabed disturbance	Water	Controlled direct placement of foundation by barges. Appropriate bridge construction method will be employed. A column or steel box/ cylindrical wall/ protection wall will form as an enclosure to the foundation or piles to prevent the water or sediments from seeping out. The water containing soil or sediment inside the casting will be carefully pumped using a hose that will be transferred to a designated spoil disposal area or may be pumped out near the casting when the water is generally static Other project components will be built on the land prior to the delivery in the bridge viaduct section Spoil Disposal Areas especially the excavated soil from the foundation will also be strategically located to avoid leakage to Manila Bay	Project Developer/ Contractor	Project Construction Cost	Project Developer Contract / Agreement with the Contractor/s
		Oil and grease contamination	Water	Proper implementation of hazardous waste management plan.	Project Developer/ Contractor	Project Construction Cost	Project Developer Contract / Agreement with the Contractor/s

Phase	Activities	Potential Impacts	Affected Environment	Options For Prevention/ Mitigation/ Enhancement	Responsible Entity	Cost	Guarantee/ Financial Arrangements
				Provision of appropriate drip trays. Chemical and fuel tanks/storage areas must be bunded with at least 110% of storage capacity of the largest tank. Maintenance of hazardous waste storage facility. Provision of appropriate spill kits and booms, in case of accidental spillage Practice good maintenance of machineries and equipment to reduce oil losses.			
		Dust pollution emanating from open areas	Air	Conduct dust suppression activities, e.g. green net installation and water truck sprinkling or road spraying (3 times or more as needed per day during dry season) Conduct regular Air Quality Monitoring and compare with baseline data.	Project Developer/ Contractor	Project Construction Cost	Project Developer Contract / Agreement with the Contractor/s
		Noise pollution from the operation of heavy equipment	Air	Take sealing measures or sound-absorbing materials to reduce the noise intensity of generators and equipment engines Conduct noise monitoring during	Project Developer/ Contractor	Project Construction Cost	Project Developer Contract / Agreement with the Contractor/s

Phase	Activities	Potential Impacts	Affected Environment	Options For Prevention/ Mitigation/ Enhancement	Responsible Entity	Cost	Guarantee/ Financial Arrangements
				active works. Ensure mufflers are installed in all equipment. Conduct regular preventive maintenance servicing. Control the working hours and reduce unnecessary equipment movement at night Temporary fence of construction area must be installed			
		Change in the local micro-climate e.g. local temperature Contribution in terms of greenhouse gas emissions	Meteorology/ Climatology	Support to reforestation and greening program activities	Project Proponent/ Project Developer	Project Construction Cost	Project Proponent/ Developer Contract / Agreement with the Contractor/s
		Generation of domestic wastewater from temporary facilities	Water	Provision of portalets in project area, and toilet facilities in every vessel. Regular siphoning by accredited STP facility.	Project Developer/ Contractor	Project Construction Cost	Project Developer Contract / Agreement with the Contractor/s
		Generation of solid waste	Water and Land	Collection and disposal of solid waste by an accredited 3rd party Waste Service Provider (WSP)	Project Developer/ Contractor	Project Construction Cost	Project Developer Contract / Agreement with the Contractor/s
		Generation of hazardous wastes such as used oil, used batteries, contaminated rags, busted bulbs and lamps	Water and Land	Provision of a Hazardous Waste Storage Area with proper labeling, segregation and storage of wastes. Issuance of Hazardous Waste	Project Developer/ Contractor	Project Construction Cost	Project Developer Contract / Agreement with the Contractor/s

Phase	Activities	Potential Impacts	Affected Environment	Options For Prevention/ Mitigation/ Enhancement	Responsible Entity	Cost	Guarantee/ Financial Arrangements
				Generator ID from DENR Collection, transport, treatment, and disposal by a DENR accredited 3rd party hauler and TSD			
	Use of power generating sets and fossil fuel using equipment	Fossil fuel emissions	Air	Use of diesel fuel (low sulfur fuels) in all gensets. Regular inspection and preventive maintenance servicing of all generators and equipment.	Project Developer/ Contractor	Project Construction Cost	Project Developer Contract / Agreement with the Contractor/s
Construction Phase	Construction along the waters of Manila Bay	Vessel Collision	People	Compliance with Maritime Industry Authority (MARINA), Philippine Coast Guard (PCG) and international regulations. Proper training of vessel crew and personnel. Proper implementation of approved Vessel Traffic Management Plan Preparation and Implementation of Barge Access Plan and Safety. Height of the bridge will be considered to allow boats to pass through.	Project Developer/ Contractor	Project Construction Cost	Project Developer Contract / Agreement with the Contractor/s
Construction Phase	Construction along the landing areas at the mainland	Traffic density increase and Traffic-related Accidents	People	Separate pedestrian walkway (Personnel Entrance and Exit) and access for vehicles (Vehicle Entrance and Exit)	Project Developer/ Contractor	Project Construction Cost	Project Developer Contract / Agreement with the Contractor/s

Phase	Activities	Potential Impacts	Affected Environment	Options For Prevention/ Mitigation/ Enhancement	Responsible Entity	Cost	Guarantee/ Financial Arrangements
	Construction of temporary support facilities for the bridge construction			Set up warning strips for isolation The main activity areas for personnel and construction machinery are separated Avoidance of cross-operation of various construction machines Assigning of watcher or / linemen No overloading. Keep linemen at its post to observe and give signal to moving vehicles Implementation of Traffic Management Plan which include proper lane designation, speed limit, trucks deployment schedule, traffic signs, CCTV, and traffic marshals among others.			
Construction Phase	Construction of temporary support facilities	Occurrence of Accidents Threat to Health and Safety	People	Induction and PPE to be given to all the new workers and staff toolbox to be conducted prior to each activity Mandatory of PPE compliance Provide proper barricading and signage to be installed. Security Personnel to be deployed to control the entry and exit of Equipment, Materials and Workers	Project Developer/ Contractor	Project Construction Cost	Project Developer Contract / Agreement with the Contractor/s

Phase	Activities	Potential Impacts	Affected Environment	Options For Prevention/ Mitigation/ Enhancement	Responsible Entity	Cost	Guarantee/ Financial Arrangements
				Safety Officer and First Aider will be assigned 24/7 to ensure the implementation of Safety Management System All moving equipment's will be controlled by certified operator and assisted by trained spotter, Temporary fence of operational area must be installed During night operation proper illumination will be provided and night work permit to be applied. Welfare Facilities to be ensure in place prior to start the activities: Toilet, Rest Shelter, Storage of Materials Provision of water and Security booth. Basic requirements for all heavy/light vehicle must be provided as well as operator certification, Rucker's Personal Conveyance (TPC's), License, Vehicle registration, etc. Proper Waste Management implementation			
Construction Phase	Construction along the waters of Manila Bay	Alteration of water flow Change in drainage morphology/ change in stream water depth	Water	Location of the foundation of the bridge will be strategically located with appropriate distance with each other to avoid hindrance to the flow of water.	Project Developer/ Contractor	Project Construction Cost	Project Developer Contract / Agreement with the Contractor/s
Construction Phase	Construction activities	Threat to Public Health and Safety Occupational Health and Safety Hazards	People	Implement a construction safety and management plan. Provision of medical station and standby nurse Create measures to protect	Project Developer/ Contractor	Project Construction Cost	Project Developer Contract / Agreement with the Contractor/s

Phase	Activities	Potential Impacts	Affected Environment	Options For Prevention/ Mitigation/ Enhancement	Responsible Entity	Cost	Guarantee/ Financial Arrangements
				workers and community against spread of communicable diseases Provide appropriate safety signs/warning Provision of PPE (visibility vest, life vest, etc.) Conduct emergency preparedness & response trainings Restrict site access of visitors or unauthorized personnel to prevent potential construction hazards and damage to equipment or theft Strict security and safety protocols Provide adequate water and sanitation facilities to the project site Conduct of safety inductions for Project visitors and for the newly hired personnel			
Construction Phase	End of bridge construction	Loss of employment	People	Payment of social benefits subject to DOLE rules. Skills training/livelihood training for construction workers/employees who will be losing employment and residing in Pasay City prior to decommissioning. Endorsement of the displaced construction employees to the contractors of vertical	Project Developer/ Contractor	Project Construction Cost	Project Developer Contract / Agreement with the Contractor/s

Phase	Activities	Potential Impacts	Affected Environment	Options For Prevention/ Mitigation/ Enhancement	Responsible Entity	Cost	Guarantee/ Financial Arrangements
				development			
Construction Phase	Decommissioning of temporary facilities (worker's barracks, and construction signboards, among others)	Disposal of waste including hazardous waste generated during the bridge construction activities	Water and Land	Proper management and disposal of waste using DENR accredited 3rd party hauler and TSD facility Air and water sampling and monitoring to ensure that there is no adverse impact to the environment. Implement Turbidity Management Plan	Project Developer/ Contractor	Project Construction Cost	Project Developer Contract / Agreement with the Contractor/s
Operation Phase							
Operation Phase	Operation of bridges (Bridge and Pedestrian)	Traffic density increase and Traffic-related Accidents	Land People	Implementation of Traffic Management Plan which include proper lane designation, speed limit, trucks deployment schedule, traffic signs, CCTV, and traffic marshals among others.	Project Proponent Project Developer	Project Operation Cost	Project Proponent/ Project Developer
Operation Phase	Maintenance activities of bridges (Bridge and Pedestrian)	Solid waste and road debris	Land Use	Implementation of Solid Waste Management Plan (SWMP) Hauling of debris to a designated spoils disposal area Implement clean-up activities at the roads and pedestrian bridge	Project Proponent Project Developer	Project Operation Cost	Project Proponent/ Project Developer
Operation Phase	Operation of bridges (Bridge and Pedestrian)	Degradation of air quality Emissions due to the consumption of fuel from vehicles	Air quality People	Support to reforestation and greening program activities	Project Proponent Project Developer	Project Operation Cost	Project Proponent/ Project Developer
Operation Phase	Operation of bridges (Bridge and Pedestrian)	Increase in noise	Noise	Installation of appropriate noise barriers.	Project Proponent Project Developer	Project Operation Cost	Project Proponent/ Project Developer

Phase	Activities	Potential Impacts	Affected Environment	Options For Prevention/ Mitigation/ Enhancement	Responsible Entity	Cost	Guarantee/ Financial Arrangements
Operation Phase	Operation of bridges (Bridge and Pedestrian)	Change in drainage morphology/ change in stream water depth	Hydrology/ Hydrogeology People	Maintenance/ clean-up of bridge that are distributed in the alignment to allow free flowing of rain or running waters and avoid clogging. Support LGU programs to Manila Bay clean-up projects. Preparation and Implementation of Barge Access Plan and Safety.	Project Proponent Project Developer	Project Operation Cost	Project Proponent/ Project Developer
Abandonment (Plans for rehabilitation, abandonment and decommissioning will be communicated with the DENR/EMB for the latter's requirements and approval) • The proposed Pasay 360 bridges are intended to be a permanent part of Pasay City land area.							

4. ENVIRONMENTAL RISK ASSESSMENT & EMERGENCY RESPONSE POLICY

4.1. ENVIRONMENTAL RISK ASSESSMENT (ERA)

4.1.1. DESCRIPTIVE / QUATLITATIVE RISK ASSESSMENT

Risk Screening Level

A risk screening level exercise refers to specific facilities or the use of certain processes that has the potential to pose significant risks to people and its surrounding environment. Based on the Risk Screening Matrix provided under Annex 7-2e of DAO 2003-30 or the Revised Procedural Manual, the Project (Table 4.1) amendment to include the **Inter-Island and Mainland-Connecting Bridge Structures** does not fall within all identified activities requiring risk screening exercise, and thus, does not require to prepare an ERA.

Table 4.1: Risk Screening Matrix

Activities Requiring Risk Screening Exercise				ERA applicability to the Project
1. Facilities for the production or processing of organic/inorganic chemicals using:				
Alkylation	Esterification	Polymerization	Distillation	Not applicable
Amination	Halogenation	Sulphonation	Extraction	
Carbonylation	Hydrogenation	Desulphurization	Solvation	
Condenstation	Hydrolysis	Nitration	Pesticides &	
Dehydrogenation	Oxidation	Phosphorus prod.	pharmaceutical prod.	
2) Installations for distillation, refining, and other processing of petroleum products				Not applicable
3) Installations for total or partial disposal of solid or liquid substances by incineration or chemical decomposition				Not applicable
4) Installations for the production or processing of energy gases (e.g., LPG, LNG, SNG.)				Not applicable
5) Installations for the dry distillation of coal or lignite				Not applicable
6) Installations for the production of metals and non-metals by wet process or electrical energy				Not applicable
7) Installations for the loading and unloading of hazardous materials as defined by RA 6969 (or DAO 29)				Not applicable
Conclusion				Not applicable

4.1.2. SAFETY RISKS

The first step to any response procedure is to evaluate the danger to human health. Health, Safety and Environment (HSE) Team with the assistance of the Site Manager/Responding Personnel will evaluate the situation to identify if the incident area is safe for addressing environmental issues. If there is no immediate danger, the Environmental Unit (EU) and the Site Manager/Responding Personnel will address the identified environmental emergency.

However, if imminent danger is detected, the personnel will act to protect human life. Boats are also equipped with Safety and evacuation plan and placed in its strategic places. Table 4.2 shows the summary matrix of safety risks for this Project:

Table 4.2 Summary Matrix of Safety Risks

Activities	Safety Risks	Probability of Incident	Prevention/Control Measures
Bridge Construction **Dredging**	Fire	Nil to Minimal	Safety procedures at the dredging vessel/ bridge construction vessels Diesel Oil used has high Flash Point
	Explosion	Nil	Diesel Oil not explosive
	Release of toxic substances	Nil	No HAPs (Hazardous Air Pollutants) from exhaust of engines
Filling	Fire	Nil to Minimal	Safety procedures at the dredging vessel Diesel Oil used has high Flash Point
	Explosion	Nil	Diesel Oil not explosive
	Release of toxic substances	Nil	No HAPs (Hazardous Air Pollutants) from exhaust of engines
Operation of Heavy Equipment	Fire	From fossil fuels	Safe worthiness of equipment Firefighting equipment on board equipment
	Explosion	Not applicable, fuel with high flash point	Not applicable
	Release of toxic substances	Oil sludge generation	Not discharged to bay, instead to onshore

Based from the above table, there is no significant safety risks involved in the Project as long as the prevented control measures are at placed. The activities involved are confined to the reclamation area and away from population centers; thus, there are no societal risks associated.

4.1.3. PHYSICAL RISKS

The worst-case anticipated accident scenarios or potential accidents could occur during the construction phase involving the use of heavy machineries such as dredging equipment, and others.

The criteria for the choice of the construction contractor(s) will include among others the safety policies and protocol that will be observed.

The summary of the physical risks is presented in Table 4.3.

Table 4.3 Summary Matrix of Physical Risks

Activities	Physical Risks	Probability of Incident	Prevention/Control Measures
Bridge Construction **Dredging**	Accidents to Construction Personnel	Nil to insignificant	Safety Training of Construction Crews Safety worthy equipment

Activities	Physical Risks	Probability of Incident	Prevention/Control Measures
Filling	Accidents to Construction Personnel	Nil to insignificant	Safety Training of Construction Crews Safety worthy equipment
Operation of Heavy Equipment	Accidents to Construction Personnel	Nil to insignificant	Safety Training of Construction Crews Safety worthy equipment

It is thus concluded that there exist no significant physical risks as long as preventive measures are at placed.

4.2. EMERGENCY RESPONSE PLAN

The Project has an Environmental Emergency Response Plan prepared by CHEC for both onshore and offshore emergencies as well as an Oil Spill Contingency Plan prepared by RMS Petroleum Technology within the reclamation area and will also be used as reference during the Bridge Construction.

4.2.1. OFFSHORE – EMERGENCY

Vessel Preparedness

All Project vessels will comply with the applicable maritime conventions and Flag State requirements (e.g. Safety of Life at Sea (SOLAS), International Safety Management (ISM)). The safety management system implemented on board Contractor and Subcontractor vessels incorporates predefined emergency situations.

Emergency Contacts

Offshore emergency situations which require assistance may be supported by contacting the following:

- Coast Guard which is available via VHF channel 16
- Man Overboard, VHF channel 16
- Injury at Sea, VHF channel 16
- General Emergency telephone number: 9-1-1
- Unexploded Ordinance (UXO) discovery PNP EOD Head Office Col-Omengan: +63 908 866 1996

Emergency Alarm

Two main emergency signals on board the vessels are:

- General alarm – 7 short ringing of the bell followed by a long ring (on alarm bell or vessel horn); and
- Fire alarm – continuous ringing of the alarm bell or blasting vessels horn.

4.2.1.1. OFFSHORE EMERGENCY SCENARIO – PERSONAL INJURIES

Each working location will have trained first aider and first aid facilities. A minimum of one qualified First Aider will be on board during operations. Personnel on board will be informed of the first aid arrangements during induction training.

A map and directions to the local hospitals will be compiled and distributed to all vessels.

First aid boxes will be provided and maintained and will be checked on a monthly basis.

4.2.1.2. OFFSHORE EMERGENCY SCENARIO - FIRE

In the majority of cases, the first to identify the fire must activate the general alarm and inform the Master, Superintendent or Construction Site Manager of the emergency. Unless the fire is of very minor nature and has been put out by the personnel working in the vicinity, the Fire Fighting Team (vessel) or construction Site Emergency Response Team (ERT) will be mobilized immediately.

For the purpose of these guidelines, major fires shall be defined as fires, which cannot be handled by the personnel and resources available at the facility and outside assistance is required. In the event of a major fire, the Master / Construction Site Manager / Environmental Response Committee (ERC) will have to decide on the possibility of partial or total evacuation. In almost all major fires, partial evacuation shall be required, i.e. evacuation of non-essential personnel, and this should be initiated immediately.

The Master / Construction Site Manager / ERC shall:

- Make a vessel wide announcement clearly stating who are to be evacuated and by which method i.e. crew boat, supply vessel or tugs; and
- To inform the Project Director / Project Manager (and Fleet Manager for vessel related emergencies) requesting assistance if required.

4.2.1.3. OFFSHORE EMERGENCY SCENARIO – VESSEL COLLISION

In the event that the vessel loses its positioning control and collides with a facility, vessel or other offshore facilities, the Master must then act as follows:

- Inform the Project Manager / Construction Manager and request assistance, if required;
- Extent of the damage caused – to both the facilities;
- Likelihood of progressive failure of both facilities as a result of damage induced by the collision;
- Necessity to shut down the operations; and
- Necessity for total/partial evacuation of the facilities, if manned.

On assessment that a total evacuation is required, the Master shall:

- Activate the onboard ‘Prepare-to-Abandon Vessel procedure; and
- Shutdown the operations.

Action to be carried out on board (or as per vessels own ERP):

- Sound the general alarm;
- Inform engine room and all personnel below the waterline;
- Maneuver the ship so as to minimize effects of collision;
- Establish contact with another vessel;
- Close watertight doors and automatic fire doors;
- Muster all personnel and execute headcount;
- Switch on deck lights at night;
- Make ship's position available to GMDSS equipment;
- Sound bilges, tanks and void spaces after collision;
- Check for fire/ damages;
- Offer/ ask assistance to/from the other ship;
- Broadcast a distress message if the ships are in grave and imminent danger and immediate; and
- Assistance is required, otherwise inform ships or coast guard in the vicinity.

When reporting such incident, as much information as possible should be provided on the following:

- General dimensions of the colliding vessel;
- Name and port of registration of vessel;
- Locations;
- Environmental conditions;
- Whether it is completely/partially disabled;
- Weather forecast; and
- Other vessels available in the area.

In a collision situation, it is important to record all times and actions, including radar data, as accurately as possible. It should also be remembered that any other vessel involved may have severe damage and require assistance. This information will be required when existing by, Employer and assisting local area authorities.

4.2.1.4. OFFSHORE EMERGENCY SCENARIO – OIL SPILL

The basic procedure outlined below shall serve as an emergency response guide only and is not intended to replace the vessel's Shipboard Oil Pollution Emergency Plan (SOPEP) or Project specific plans (e.g. Environmental Management Plan). Should an incident occur that may cause an accidental release to the environment such as oil, chemicals etc. the following actions shall be taken:

- Regardless of the quantity released / spilled the Master shall immediately notify the Project Manager and the Fleet Manager (as indicated in the Corporate Crisis Management Plan);
- Inform bridge / engine room;
- Assemble oil spill team;
- Check if it is safe to approach the spill;
- Try to stop the outflow and reduce spreading of the spill by using absorbent materials;
- Clean up; and

- Report to Port Authorities, Engineer and Employer if applicable.

Action relating to the size of the spill:

- If the spill is of a small quantity, but a clean-up operation is not possible (e.g. due to unfavorable weather or sea conditions), the Master shall initiate the ERP notification;
- If the clean-up operation lies within the vessel's own capabilities, the Master shall evaluate how best to respond, taking into consideration the weather forecast, sea condition and maintaining personnel safety as top priority;
- If the conditions do not permit clean-up or recovery, the need for application of dispersant shall be considered by the Project Manager and/or Fleet Manager in close consultation with the Master, taking into consideration actual / expected sea state and any approval possibly required for the use on Project location; and
- If the spill exceeds the vessel's capability initiate the ERP notification process as indicated in the Corporate Crisis Management Plan.

4.2.2. ONSHORE – CONSTRUCTION SITE EMERGENCY

Onshore Emergency Equipment

The following onshore emergency equipment will the available:

- Portable fire extinguisher shall be made available at worksite/office and maintain in working condition;
- Automated External Defibrillators (AED) to be available on the construction site;
- A first aid room/ center shall be available in the Site office/camp area and equipped with first aid facilities and supplies;
- A first aid kit shall be available on the construction site;
- An air horn will be used to sound the emergency alarm; and
- Muster Stations/Escape Routes.

The Security personnel will inform all personnel of the muster station/assembly point prior to the commencement of work activities. The briefing shall include the type of emergency alarm, escape routes and lifesaving equipment.

A plan showing Escape Routes is posted at locations where personnel normally congregate. Escape routes are marked and sign-posted. They must be kept clear of trip hazards and adequately lit at all times.

Emergency Contacts

Onshore Emergency situations which require assistance will be coordinated and supported by:

- General Emergency telephone number (Injury/Security/Environmental /Fire) 9-1-1
- Philippine National Police Patrol 1-1-7

4.2.2.1. ONSHORE EMERGENCY SCENARIO – FIRE/ EXPLOSION – GAS RELEASE

All personnel are informed on the actions to be taken during a fire emergency through their Induction.

Following are the actions to be undertaken:

Fire/ Explosion

- Sound the airhorn alarm;
- Secure the location;
- Muster all personnel away (upwind) from the location;
- Establish cause and stop the source when possible;
- Inform internal Firefighting team /external assistance;
- Inform Construction Manager / HSE coordinator; and
- Treat any casualties as per “Medical Emergencies”.

Gas leak

- Sound the airhorn alarm;
- Stop gas flow;
- Muster personnel outside gas area (upwind) and avoid flames and sparks;
- Inform Construction Manager / HSE coordinator; and
- If required call Fire brigade via 911.

Specific responsibilities in case of a fire or gas leak are listed below. These responsibilities maybe transferred to local fire services arrive.

Fire wardens (in buildings)

- Turn off the power supply;
- Guide staff out of the floors to emergency staircase;
- Give the first response by using the existing fire-fighting equipment; and
- Fire wardens are the last persons to leave the building and they check the building to confirm everybody has evacuated.

First Aider

- Approach and give necessary help to the personnel who need first aid;
- Rescue and Search for any unaccounted-for personnel; and
- Provide help to the activities for the search and rescue of personnel and material.

Site Emergency Response Team

- Coordinate the actions to be taken by the building owner such as turning off the gas supply to the building.

4.2.2.2. ONSHORE EMERGENCY SCENARIO – MEDICAL EMERGENCY

Each working location will have trained first aider and first aid facilities. A minimum of one qualified First Aider will be on site during site working hours. Personnel on site will be informed of the first aid arrangements during induction training.

A map and directions to the local hospital will be compiled and displayed on the site noticeboard along with the completed Telephone list. These documents will also be placed in the project cars where applicable.

First aid boxes will be provided and maintained and will be checked on a monthly basis.

4.2.2.3. ONSHORE EMERGENCY SCENARIO – ENVIRONMENTAL SPILL

Personnel will be trained in the environmental and waste management arrangements during induction, drills and toolbox talks.

The storage of hazardous materials such as diesel, hydraulic oil, paint and other chemicals that poses potential environmental hazards are to be stored in bunded chemical storage areas. Capacity of the bunds should be at least 110% of the net capacity of the largest container. Drip trays shall be provided for chemicals used outside the chemical storage area. The amount of hazardous materials on site will be kept to a practicable minimum. The chemical storage area shall be kept clean, temperature maintained and Safety Data Sheets (SDS) available and followed. Chemical spill materials, including PPE, will be available at the chemical storage areas.

Filling and fueling valves / taps will be kept locked with access only to authorized personnel. Drip trays will be made available for all refueling activities. Fuel storage tanks and drums are provided with appropriately sized secondary containment (i.e. ≥ 110% of container volume).

For onsite refueling, oil spill response and firefighting equipment will be stationed near mobile bowsers. Only generators and mobile plant that are too far away to drive up to the fuel storage will be refueled on site. Preventive oil spill materials including PPE are to be available.

Regular inspections shall be conducted to ensure well maintained area against possible spill incidents.

Action to be carried out in case of spill:

1. Inform Construction Manager /HSE Coordinator;
2. Assemble oil spill team;
3. Check if it is safe to approach the spill (check your surroundings);
4. Try to stop the outflow
5. Reduce spreading of the spill by using bunding of absorbent materials;
6. Inform Engineer; and
7. Clean up of spill and disposing of waste materials in line with the Contractor's Waste Management Plan.

4.3. OIL SPILL CONTINGENCY PLAN

The Proponent has secured approval of its project Oil Spill Contingency Plan (OSCP) from the Philippine Coast Guard (PCG) on 19 October 2023. The content of the approved OSCP is presented below.

4.3.1. SPILL KITS

Spill kits and PPE would be placed at locations where the potential for a spill exists, such as areas with storage tanks or hazardous materials. For temporary operations or repairs that may result in a contamination event, a Spill kits will be provided on site.

4.3.1.1. TYPE OF SPILL KITS

a. General Spill Kits: are also known as universal spill kits or all-liquid spill kits. They are used to soak up coolant, degreaser, paint, blood, bodily fluids, oils and fuels as well as mild acids, bases and water-based chemicals.

b. Oil Spill Kit: are one of the most common workplace chemical spills. Even though oil has a relatively low toxicity level, it still poses a serious threat to the safety of your employees and workspace. Taking a proactive approach to oil containment will prevent possible spills as well as equip you with an effective means of containing the oil in the event of a spill.

c. Chemical Spill Kit: are a complete solution for emergency spills. These kits can be used for a wide variety of spill applications, from a small leak or drip from a transport trailer, to a large spill at a shipping and receiving facility, to a large-scale oil spill on water.

Prior to performing any containment or clean-up measures, the health and safety of personnel and the general public will be considered. All responding personnel will wear appropriate Personal Protective Equipment (PPE) at all times, when required.

Examples of PPE include:

- Eye protection: safety glasses, chemical splash goggles
- Skin protection: resistant gloves, nitrile rubber, clothing

Below shows the type of spill kits and its content that will be used in the project:

Table 4.4 Types of Oil Spill Kits

No	Item	Types of Spill Kits		
		General	Oil	Chemical
1.	Absorbent booms			
2.	Mats			
3.	Pads			
4.	Socks/rolls			
5.	Oil Only Socks			
6.	Oil Only Pads			
7.	Caution Tape			
8.	Nitrile Gloves			
9.	Safety Goggles			
10.	Protective Coveralls			
11.	Disposal Bags			
12.	Instruction Book/MSDS/SDS			
13.	Haz-Mat Socks			
14.	Haz-Mat Pads			
15	Haz-Mat Pillows			

Source: China Harbour Engineering Company Ltd. (CHEC). Pasay Reclamation Development Project Environmental Emergency Response Plan (EERP), October 2021

4.3.2. RESPONSE

In the event of an environmental emergency, on-site personnel will need to determine the level of response required. If the Site/Construction Manager is present, they will assume the roles and responsibilities during an emergency.

Measures will be taken to notify members of the public who may be adversely affected by any harm or danger.

4.3.2.1. NOTIFICATIONS AND CONTACTS

For all Environmental Emergencies, the following are contacts would be notified:

- HSE Director
- Environmental Manager
- Environmental Engineer/PCO
- HSE Manager
- Site/Construction Manager

If the environmental emergency causes an immediate threat to the health and safety of personnel or the public, or presents a risk of fire, **DIAL 911** for assistance.

Site manager would ensure that all personnel who are listed in the Contacts (Table 4.5) are informed and made aware of their responsibility in case of an environmental emergency. This can be checked as part of the annual review.

Table 4.5 External Contact List

Name	Who Would Contact	When to Call	Contact Number
Bureau of Fire Protection – Pasay City			
• Central Fire Station	Duty Officer	Emergency Assistance only	+632844-2120 +632843-6523
• Pasay Volunteer Fire Brigade	Duty Officer	Emergency Assistance only	+632-8831-3801
• Malibay Fire Sub-Station	Duty Officer	Emergency Assistance only	+632 851 0869
• Villamor Airbase Fire-Substation	Duty Officer	Emergency Assistance only	+632853-5031 +632 854-6722
• Senate Fire-Substation	Duty Officer	Emergency Assistance only	+632552-6601 local 1999
DENR-EMB (NCR)	Duty Officer	When spill occurs/or discovered	+63289206214
Manila Bay Coast Guard	Site Head/OIC	Reporting of spills in watercourses; clean-up assistance	+632527-8482 to 89 / +632527-3880 to 85
Manila Bay Maritime Office-Main	Manager/OIC	Reporting of spills in sealine are; clean-up assistance	+63916 315 4812
Barangay 76, Pasay City	Brgy Captain/OIC	Public alert and notification of Environmental emergency	+6328340812

4.3.3. RESPONSE PROCEDURE

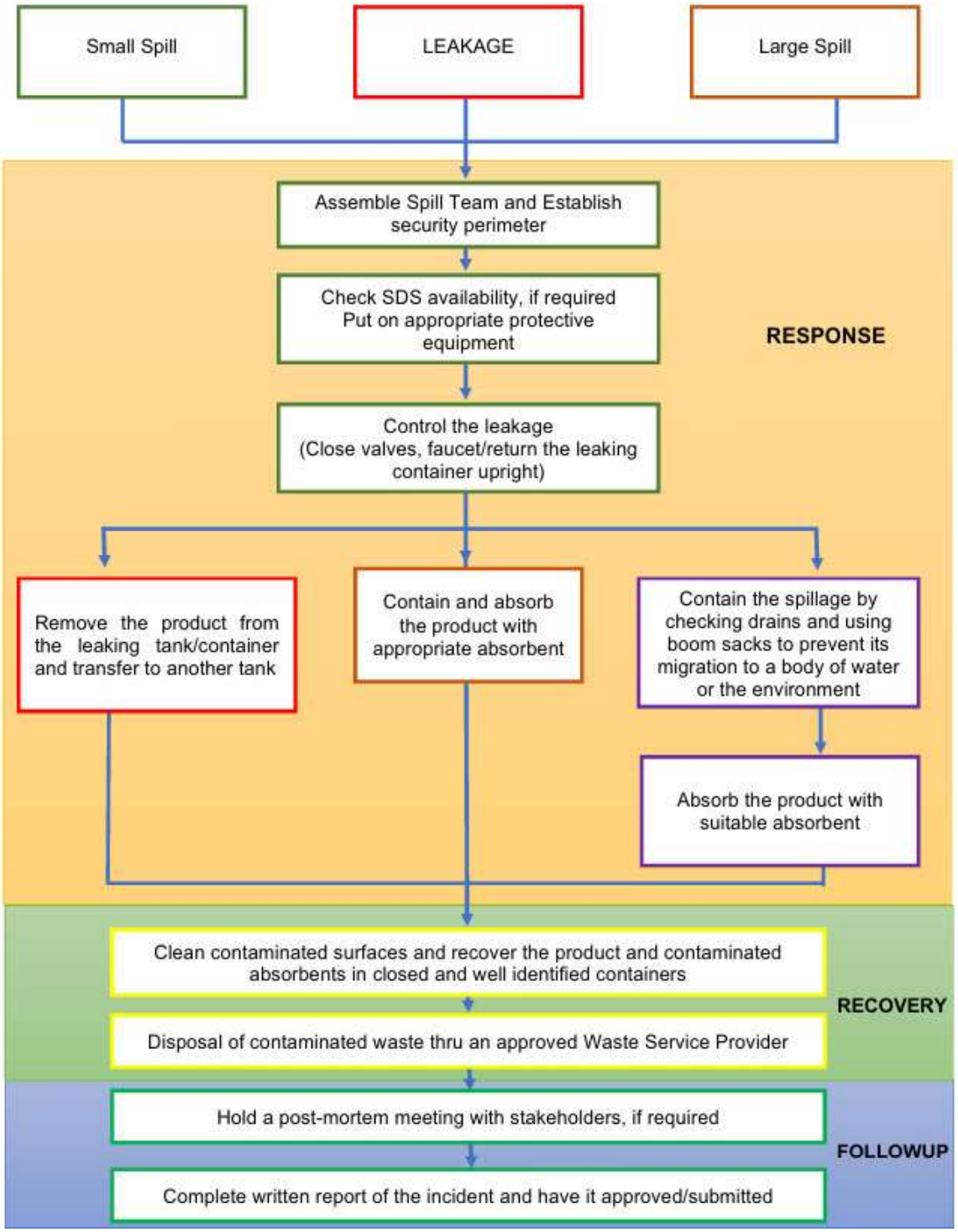
Figure 4.1 shows the summary of response guide for oil spill scenario. This guide will be posted in high-risk areas for guidance.

Quick Reference Initial Response Guidance Document	
Typical response steps in the event of a release of hazardous materials:	
STEP	**NOTES**
ASSESS THE SITUATION & DEFINE A SAFETY PERIMETER	• Identify the product (look at labels, placards or other markings). • Refer to the product's SDS. • Keeping a safe perimeter, carefully locate the source of the release. • Assess the source of the release (such as drum, storage tank or other container) to assist with the approximation of the quantity spilled. • If the spill has reached a drain or watercourse, it can no longer be contained and external parties will have to be immediately notified.
DETERMINE RESPONSE LEVEL	• What's the response level required? LEVEL 1: You are trained and capable to handle response LEVEL 2: Require additional assistance from Environmental Unit and the Engineer LEVEL 3: External third-party assistance required
CAREFULLY STOP OR CONTROL THE RELEASE	• Approach the spill site with the wind at your back. • Only if the situation is deemed safe to do so (For example: eliminate source of leak/spill by turning off valves, taps, faucets or other controls). • Cover grates/drains/sewers.
CONFINE THE SPILL OR CONTAIN THE PRODUCT	• Contain the spilled product in the smallest possible space close to the source. • Avoid directing the product toward the sewer system or body of water.
NOTIFY AUTHORITIES AND THE PUBLIC (AS APPROPRIATE)	• If the spill is no longer under your control, notify the concerned agencies/authorities, and/or fire/police (emergency response agencies). • Notify the public (if necessary).
RECOVER SPILLED MATERIALS	• The product will be recovered quickly to limit its migration or spread, taking into consideration the properties of the product and weather conditions.
SAFELY DISPOSE OF CONTAMINATED MATERIALS AND WASTE	• Store wastes separately from in-use products. • Use an accredited contractor. Obtain a correctly completed Waste Forms (i.e., hazardous waste transportation manifest).
PREPARE AN INCIDENT REPORT & REPORT TO THE AUTHORITIES	• Use Environmental Emergency (Spill Response) Incident Form. • Forward a copy to Engineer. • The EM/EPO will assume responsibility for informing and reporting to other authorities (with the Engineer's approval) as a result of the environmental incident, as needed.
REPLENISH RESPONSE SUPPLIES	• Conduct a spill kit inventory check, document. • Restore spill kit equipment, ensure used PPE is clean or replaced.

Figure 4.1 Summary of Response Guide for Oil Spill Scenario
Source: China Harbour Engineering Company Ltd. (CHEC). Pasay Reclamation Development Project Environmental Emergency Response Plan (EERP), October 2021

Figure 4.2 and Figure 4.3 section provides specific procedures during leakage and land spill of petroleum products and other hazardous materials that could potentially occur at the

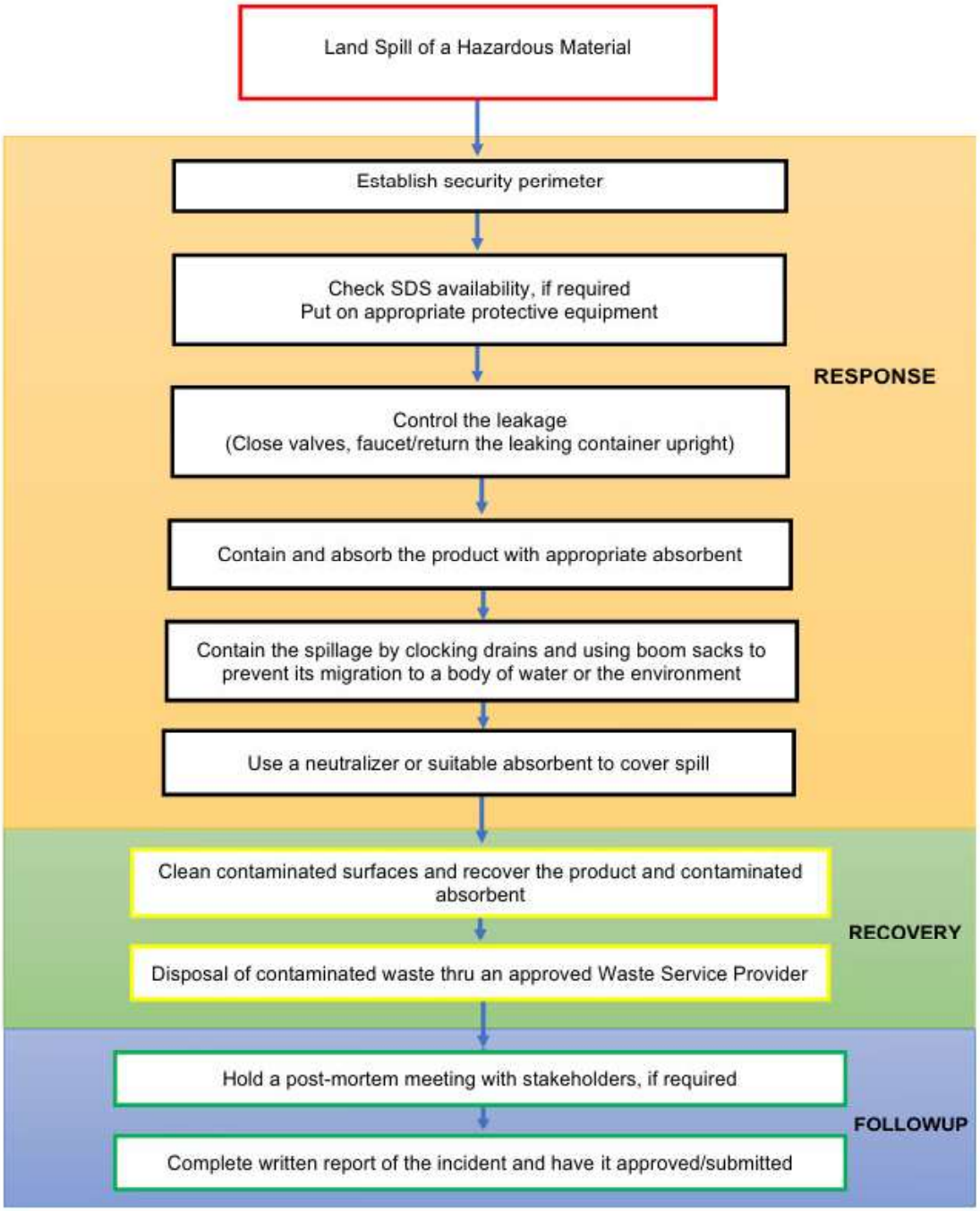
Project. These procedures will be posted beside fuel storage tanks or other areas where they can be easily accessible.



Note: The location of the leakage varies in every accident/incident. The flowchart is a representation of how to address incidents in different locations

Figure 4.2 Environmental Emergency Procedures during Leakage

Source: China Harbour Engineering Company Ltd. (CHEC). Pasay Reclamation Development Project Environmental Emergency Response Plan (EERP), October 2021



Note: Huge construction vessels (e.g., THSD) have their own set of mature and effective on spot oil spill contingency plans.

Figure 4.3 Environmental Emergency Procedures during Land Spill of any Hazardous Material
Source: China Harbour Engineering Company Ltd. (CHEC). Pasay Reclamation Development Project Environmental Emergency Response Plan (EERP), October 2021

4.4. SAFETY STATISTICS

As of January 13, 2026, a total of 10 million safe man-hours worked without Lost Time Injury (LTI) implemented onsite. No changes in Emergency Plan from EPRMP 2024.

5. ENVIRONMENTAL COMPLIANCE MONITORING

The summary of the compliance of the Project to SDP, IEC, IMP/EMP and EMoP is presented in Table 5.1. The Social Development Program (SDP) and Information, Education and Communication (IEC) Program presented in the approved EPRMP (2024) remains applicable since the inclusion of the bridge structures does not introduce additional project areas or communities beyond those previously covered.

For the approved EPRMP 2024 Impact Management Plan/ Environmental Management Plan and Environmental Monitoring Plan (EMoP), the conditions and commitments are continuously being complied and reported in the following:

- Compliance Monitoring Report (CMR)
- Self-Monitoring Report (SMR)
- Semi-annual Compliance Monitoring Validation Report (CMVR).

Table 5.1: Summary of Compliance

ECC Compliance	Complied?	SA2 2025 (Jul to Dec 2025)	SA1 2025 (Jan to Jun 2025)
Social Development Plan	**Yes**	- On 30 September 2025, both JV Partners for Pasay 360 and Pasay 265 met with Pasay City LGU to discuss potential project collaborations in line with the approved SDP. The proposed projects are currently undergoing review by Pasay City LGU. 2nd Semester SDP Activities: - Pasay City commenced the implementation of the SDP through different programs, projects and activities for the Pasayeños. Currently, the City has 25 on-going and 10 implemented projects covering the different sectors like business, health, education and welfare being implemented from July to December 2025. - One of the identified stakeholders in the approved SDP that needs assistance from the JV partner is the Pasay Libertad Anglers Association (PLAA). They were counted as the fishermen of Pasay and for the 2nd Semester of 2025, SM SCIDC was able to provide financial assistance and fuel subsidy to the 64 members of PLAA a total amount of Php 1,511,162.00. - While waiting for the specific SDP project that will be assigned as SM SCIDC share, the JV partner implements supplemental social development activities. One of which is	On 03 January 2025, JV partner sent a letter to the Proponent requesting for the allocation of PPAs under the submitted SDP to the JV Partner. First Semester SDP Activities: Pasay City commenced the implementation of the SDP through different programs, projects and activities for the Pasayeños. Currently, the City has 21 on-going projects covering the different sectors like business, health, education and welfare being implemented from January to June 2025. One of the identified stakeholders in the approved SDP that needs assistance from the JV partner is the Pasay Libertad Anglers Association (PLAA). They were counted as the fishermen of Pasay and for the 1st semester of 2025, SM SCIDC was able to provide financial assistance and fuel subsidy to the 64 members of PLAA a total amount of Php 806,400.00. While waiting for the specific SDP project that will be assigned as SM SCIDC share, the JV partner implements supplemental social development activities. One of which is the continuation of the UP Los Baños Sustainability Scholarship for the 10 Students under College of Human Ecology and College of Forestry and Natural Resources.

ECC Compliance	Complied?	SA2 2025 (Jul to Dec 2025)	SA1 2025 (Jan to Jun 2025)
		the continuation of the UP Los Baños Sustainability Scholarship for the 10 students under College of Human Ecology and College of Forestry and Natural Resources. - The project contractor hired local residents as project cleaners as part of its alternative livelihood program. Annex 5 (CMR): SDP Documentation Annex 6: (CMR)1st Sem 2025 Hiring of Cleaners	The project contractor hired local residents as project cleaners as part of its alternative livelihood program. Annex 5 (CMR): SDP Documentation Annex 6 (CMR): 1st Sem 2025 Hiring of Cleaners
IEC Plan	**Yes**	For the 2nd Semester of 2025, the Proponent (through City Chief of Staff Peter Pardo and City Administrator Peter Manzano, and ALPAS conducted IECs focusing on the Eco City vision, project benefits, environmental safeguards, water and air monitoring activities, future plans/projects, and updates on on-going coastal development projects. Continuous conduct of IEC activities: a. 18 September 2025 : Philippine Chamber of Industry Pasay and Las Piñas City Chapters b. 19 December 2025 : Pasay Libertad Anglers Association (PLAA) Maintain open communication channels with neighboring hinterland locators (i.e. Sofitel, Seascape, Lime Hotel, Solaire and ASEANA Annex 4: IEC Documentation	For the 1st Semester of 2025, the Proponent (through Mayor Emi Calixto- Rubiano), the Environmental Unit of its Private Joint Venture and ALPAS conducted IECs focusing on the Eco City vision, project benefits, environment al safeguards, water and air monitoring activities, future plans/project s, and updates on on-going coastal development projects. Continuous conduct of IEC activities: a.12 February 2025 : Business Sector – Pasay Rotary Club b.April to May 2025 : Districts 1 and 2 c. 05 June 2025 : Pasay Libertad Anglers Association (PLAA) d. 05 June 2025 : Pasay Tricycle Operators and Drivers Associations (TODA) e. 11 June 2025 : Parish Priests of Pasay Maintain open communication channels with neighboring hinterland locators (i.e. Sofitel, Seascape, Lime Hotel) Annex 4: IEC Documentation
IMP/EMP	**Yes**	The approved EPRMP 2024 Impact Management Plan/ Environmental Management Plan is continuously being complied.	The approved EPRMP 2024 Impact Management Plan/ Environmental Management Plan is continuously being complied.
EMoP	**Yes**	The approved EPRMP 2024 Environmental Monitoring Plan is continuously being complied. Trend analysis for water and air monitoring are provided in Chapter 5.2.	The approved EPRMP 2024 Environmental Monitoring Plan is continuously being complied. Trend analysis for water and air monitoring are provided in Chapter 5.2.

5.1. COMPLIANCE TO ECC CONDITIONS

The historical compliances of the Proponent with the ECC conditions which is reported in a semi-annual (SA) basis through CMR by the proponent and CMVR report by MMT are presented in Table 5.2. The annexes mentioned in this table are the proof of compliances which were included as attachment on that monitoring period.

All ECC conditions shall be complied with throughout the duration of the project, as reflected in Table 5.1. However, Condition No. 10.3 specifically states that a decommissioning plan must be submitted one (1) year prior to the completion of the reclamation activity. Accordingly, the Project shall submit the decommissioning plan one year before the scheduled completion date.

Table 5.2: Compliance to ECC Conditions (2025)

ECC Condition	Complied?	SA2 2025 (Jul to Dec 2025)	SA1 2025 (Jan to Jun 2025)
1. Submission of a Coastal Ecosystem Management Plan/ Program and Environmental Management Plan (EMP) consistent with; (a) DENR Manila Bay Coastal Strategy and its Operational Plan, (b) Continuing Supreme Court Mandamus on Manila Bay, (c) PRA laws and policies, (d) PRA Boulevard 2000 Integrated Framework Plan, and (e) the City of Manila and Pasay related rules and regulations one hundred twenty (120) days prior to project implementation	**Yes**	Coastal Ecosystem Management Plan as required under the ECC, was submitted on 07 May 2021. The EMB-CO acknowledged and noted compliance of Condition No. 1 on 17 May 2021. Environmental Management Plan (EMP), as embodied in the EIS Report, also submitted to EMB, and adopted by dredging contractor for the Project. Implementation of the CEMP/EMP are for continuing compliance. The updated EMP submitted on 07 May 2024 was superseded by the submission of EPRMP dated 22 November 2024 since the Environmental Management Plan is already an integral part of the latter. The Proponent complies with the updated Environmental Management Plan (EMP) as incorporated in the EPRMP, approved under the Amended ECC issued on March 13, 2025. The CEMP identified four (4) zones within and surrounding the Project namely built-up zones, marine ecotourism zone, marine restricted zone, and shipping and navigation zone which take into consideration economic development, coastal development, rational use of natural resources, landscape and seascape protection and rehabilitation, and protection of national heritage founded on scientific basis for the zoning. For built up zones, 2,095 square meters of off-site mangrove plantations located in neighboring provinces such Macabebe, Pampanga have already	Coastal Ecosystem Management Plan as required under the ECC, was submitted on 07 May 2021. The EMB-CO acknowledged and noted compliance of Condition No. 1 on 17 May 2021. Environmental Management Plan (EMP), as embodied in the EIS Report, also submitted to EMB, and adopted by dredging contractor for the Project. Implementation of the CEMP/EMP are for continuing compliance. The updated EMP submitted on 07 May 2024 was superseded by the submission of EPRMP dated 22 November 2024 since the Environmental Management Plan is already an integral part of the latter. The Proponent complies with the updated Environmental Management Plan (EMP) as incorporated in the EPRMP, approved under the Amended ECC issued on March 13, 2025. Annex 1: DENR letter to Pasay Acknowledgement of 360 ECC Compliance 17 May 2021 Annex 2: Coastal Ecosystem Management Plan Annex 3: Updated EMP 2025

ECC Condition	Complied?	SA2 2025 (Jul to Dec 2025)	SA1 2025 (Jan to Jun 2025)
		been commenced. These mangroves are intended to form part of the larger marine ecosystem in Manila Bay which are intended to improve and restore the marine life in the area. Scientific studies and surveys for onsite mangrove plantations have also been commenced and will be implemented at the adjacent Pasay 265 reclamation project upon the completion of the reclamation works For marine ecotourism zone, studies regarding the viability of aquaculture and artificial reefs to increase fishery resources within Manila Bay have been commenced and are ongoing. For marine restricted zone, zone coordinates have already been identified which aim to minimize the disturbance of marine resources and in turn increase the productivity of fishery resources in Manila Bay. For shipping and navigation zone, a new navigational sealane had already been established and announced by the Philippine Ports Authority through its Port Operations Bulletin on 19 June 2023. Lastly, Pasay City LGU and its JV Partners have also provided assistance to directly affected constituents such as the Pasay-Libertad Anglers Association through provision of alternative livelihood opportunities and financial assistance programs. To date, the Project has provided Php 1,511,162.00 in financial assistance to the fisherfolks. Annex 1: DENR letter to Pasay Acknowledgement of 360 ECC Compliance 17 May 2021 Annex 2: Coastal Ecosystem Management Plan Annex 3: Updated EMP 2025	
2. Undertake an effective and continuing Information, Education and Communication (IEC) Program to inform and educate all stakeholders, especially its local residents, employees of	**Yes**	For the 2nd Semester of 2025, the Proponent (through City Chief of Staff Peter Pardo and City Administrator Peter Manzano, and ALPAS conducted IECs focusing on the Eco City vision, project benefits, environmental safeguards, water and air monitoring activities, future plans/projects, and	For the 1st Semester of 2025, the Proponent (through Mayor Emi Calixto- Rubiano), the Environmental Unit of its Private Joint Venture and ALPAS conducted IECs focusing on the Eco City vision, project benefits, environment al safeguards, water and air monitoring activities, future

ECC Condition	Complied?	SA2 2025 (Jul to Dec 2025)	SA1 2025 (Jan to Jun 2025)
commercial and government establishments within the site and vicinity, on the Project's mitigating measures embodied in its EIS and the conditions stipulated in this Certificate		updates on on-going coastal development projects. Continuous conduct of IEC activities: a. 18 September 2025 : Philippine Chamber of Industry Pasay and Las Piñas City Chapters b. 19 December 2025 : Pasay Libertad Anglers Association (PLAA) Maintain open communication channels with neighboring hinterland locators (i.e. Sofitel, Seascape, Lime Hotel, Solaire and ASEANA Annex 4: IEC Documentation	plans/project s, and updates on on-going coastal development projects. Continuous conduct of IEC activities: a.12 February 2025 : Business Sector – Pasay Rotary Club b.April to May 2025 : Districts 1 and 2 c. 05 June 2025 : Pasay Libertad Anglers Association (PLAA) d. 05 June 2025 : Pasay Tricycle Operators and Drivers Associations (TODA) e. 11 June 2025 : Parish Priests of Pasay Maintain open communication channels with neighboring hinterland locators (i.e. Sofitel, Seascape, Lime Hotel) Annex 4: IEC Documentation
3. Provide detailed Social Development Plan (SDP) based on the framework submitted in the EIS and shall be submitted sixty days (60) from the receipt of this Certificate	**Yes**	- SDP Framework submitted through the EIS on 30 October 2017. - Detailed SDP based on the EIS Framework submitted by Pasay City LGU to EMB Central Office on 04 May 2021.This was acknowledged by EMB on 17 May 2021. - Updated SDP was submitted by Pasay City LGU to EMB Central Office on 7 September 2022 and was acknowledged by EMB Central Office on 7 November 2022. - Updated SDP was submitted to EMB CO on 01 June 2023. - On 03 January 2025, JV partner sent a letter to the Proponent requesting the allocation of PPAs under the submitted SDP to the JV Partner. - On 30 September 2025, both JV Partners for Pasay 360 and Pasay 265 met with Pasay City LGU to discuss potential project collaborations in line with the approved SDP. The proposed projects are currently undergoing review by Pasay City LGU. 2nd Semester SDP Activities: -Pasay City commenced the implementation of the SDP through different programs, projects and activities for the Pasayeños. Currently, the City has 25 on-going and 10 implemented projects covering the	SDP Framework submitted through the EIS on 30 October 2017. Detailed SDP based on the EIS Framework submitted by Pasay City LGU to EMB Central Office on 04 May 2021. This was acknowledged by EMB on 17 May 2021. Updated SDP was submitted by Pasay City LGU to EMB Central Office on 7 September 2022 and was acknowledged by EMB Central Office on 7 November 2022. Updated SDP was submitted to EMB CO on 2 June 2023. On 03 January 2025, JV partner sent a letter to the Proponent requesting for the allocation of PPAs under the submitted SDP to the JV Partner. First Semester SDP Activities: Pasay City commenced the implementation of the SDP through different programs, projects and activities for the Pasayeños. Currently, the City has 21 on-going projects covering the different sectors like business, health, education and welfare being implemented from January to June 2025. One of the identified stakeholders in the approved SDP that needs assistance from the JV partner is the Pasay Libertad Anglers Association (PLAA). They were counted as the

ECC Condition	Complied?	SA2 2025 (Jul to Dec 2025)	SA1 2025 (Jan to Jun 2025)
		different sectors like business, health, education and welfare being implemented from July to December 2025. - One of the identified stakeholders in the approved SDP that needs assistance from the JV partner is the Pasay Libertad Anglers Association (PLAA). They were counted as the fishermen of Pasay and for the 2nd Semester of 2025, SM SCIDC was able to provide financial assistance and fuel subsidy to the 64 members of PLAA a total amount of Php 1,511,162.00. - While waiting for the specific SDP project that will be assigned as SM SCIDC share, the JV partner implements supplemental social development activities. One of which is the continuation of the UP Los Baños Sustainability Scholarship for the 10 students under College of Human Ecology and College of Forestry and Natural Resources. - The project contractor hired local residents as project cleaners as part of its alternative livelihood program. Annex 5: SDP Documentation Annex 6: 1st Sem 2025 Hiring of Cleaners	fishermen of Pasay and for the 1st semester of 2025, SM SCIDC was able to provide financial assistance and fuel subsidy to the 64 members of PLAA a total amount of Php 806,400.00. While waiting for the specific SDP project that will be assigned as SM SCIDC share, the JV partner implements supplemental social development activities. One of which is the continuation of the UP Los Baños Sustainability Scholarship for the 10 Students under College of Human Ecology and College of Forestry and Natural Resources. The project contractor hired local residents as project cleaners as part of its alternative livelihood program. Annex 5: SDP Documentation Annex 6: 1st Sem 2025 Hiring of Cleaners
4. Conduct a more detailed geotechnical marine soil investigation and seismic risk analysis to be considered in the final engineering design for submission to EMB Central Office before any horizontal development activity	**Yes**	Geotechnical Interpretation Report (GIR) was submitted to EMB Central Office on 24 May 2023. GIR includes the more detailed geotechnical marine soil investigation and seismic risk analysis which were the basis for the detailed engineering design of the Contractor. Updated GIR to be used for Final Engineering Design shall be submitted to DENR Central Office prior to horizontal development construction. Currently, soil boring works for bridges are ongoing and then final report will be shared once available. Annex 7: Geotechnical Interpretation Report	Geotechnical Interpretation Report was submitted to EMB Central Office on 24 May 2023. Geotechnical Interpretation Report includes the more detailed soil investigation and seismic risk analysis which were the basis for the detailed engineering design of the Contractor. Updated GIR to be used for Final Engineering Design shall be submitted to DENR Central Office prior to horizontal development construction. Annex 7: Geotechnical Interpretation Report
5. Proper storm drainage system, concrete culverts, and other flood and erosion control measures shall	**Yes**	Storm drainage system, concrete culverts, and other erosion control measures were incorporated in the Detailed Engineering Design (DED) of the Project, and will be included in the	Storm drainage system, concrete culverts, and other erosion control Measures were incorporated in the Detailed Engineering Design (DED) of

ECC Condition	Complied?	SA2 2025 (Jul to Dec 2025)	SA1 2025 (Jan to Jun 2025)
be provided during the construction phase to adequately protect the receiving water body from siltation, physico-chemical/marine pollution and further protect the surrounding communities from environmental degradation		Project's final Master Development Plan. Storm drainage system and concrete culverts shall be installed during horizontal development as determined during the Technical Conference for the Summons with EMB CO. Sand key dredging as part of erosion control measures is a soil replacement method which replace the soft soil by sand and that makes the toe stable. The soft soil is dredged from the underwater center, making space for construction activities as well as water way for vessels. This process involves replacing soil up to about 30 to 40 meters deep, creating a foundation for landform. This method is especially useful in reclamation projects where the goal is to transform underwater areas into solid ground for future development. The Contractor also has a construction methodology to ensure slope stability. Moreover, to ensure that the sand sources do not pose environmental risks to marine ecosystems, TCLP (Toxicity Characteristic Leaching Procedure) analysis was conducted for all sand sources on the following dates: 1. On 12 Sep 2023, TCLP analysis was conducted on the sand sources from PRA 2000, Bucao and Maloma. Results show that all of the tested parameters from these sand source samples passed the DAO 2013-22 standard. 2. On 05 July 2024, TCLP Analysis was carried out on the sand source from Amnay river. All tested parameters passed the DAO 2013-22 standard. 3. On 05 July 2024, Additional sand source from Abra River was analyzed for TCLP analysis and passed the DAO 2013-22 standard. Results show that all of the tested parameters from these sand source samples passed the DAO 2013-22 standard. These will be strictly complied with starting at the horizontal development phase.	the Project, and will be included in the Project's final Master Development Plan. Storm drainage system and concrete culverts shall be installed during horizontal development as determined during the Technical Conference for the Summons with EMB CO. Sand key dredging as part of erosion control measures is a soil replacement method which replaces the soft soil by sand and that makes the toe stable. The soft soil is dredged from the underwater center, making space for construction activities as well as water way for vessels. This process involves replacing soil up to about 30 to 40 meters deep creating a foundation for landform. This method is especially useful in reclamation projects where the goal is to transform underwater areas into solid ground for future development The Contractor also has a construction methodology to ensure slope stability. Moreover, to ensure that the sand sources do not pose environmental risks to marine ecosystems, TCLP (Toxicity Characteristic Leaching Procedure) analysis was conducted for all sand sources on the following dates: 1. On 12 Sep 2023, TCLP analysis was conducted on the sand sources from PRA 2000, Bucao and Maloma. Results show that all of the tested parameters from these sand source samples passed the DAO 2013-22 standard. 2. On 05 July 2024, TCLP Analysis was carried out on the sand source from Amnay river. All tested parameters passed the DAO 2013-22 standard. 3. On 05 July 2024, Additional sand source from Abra River was analyzed for TCLP analysis and passed the DAO 2013-22 standard. Results show that all of the tested

ECC Condition	Complied?	SA2 2025 (Jul to Dec 2025)	SA1 2025 (Jan to Jun 2025)
		Moreover, revetment works are currently ongoing as part of the erosion control measures. Annex 8: TCLP Results for Bucao and Maloma in Zambales and PRA 2000 in Cavite Annex 9: Abra and Amnay River TCLP analysis Annex 10: Slope Stability	parameters from these sand source samples passed the DAO 2013-22 standard. These will be strictly complied with starting at the horizontal development phase. Annex 8: TCLP Results for Bucao and Maloma in Zambales and PRA 2000 in Cavite Annex 9: Abra and Amnay River TCLP analysis Annex 10: Slope Stability
6. Adequate land area shall be allotted for the construction of a centralized sewage treatment facility to be able to treat all the wastewater that will be generated by the locators prior to discharge	**Yes**	The area shall be identified in the final Master Development Plan.	The area shall be identified in the final Master Development Plan.
7. Submit a reforestation and carbon sink program using endemic/indigenous species to mitigate greenhouse gas (GHG) emissions in line with the DENR's thrust on GHG emission reduction programs. The program's status of implementation shall be submitted to EMB Central Office every six (6) months as part of its compliance monitoring report	**Yes**	Submitted updated reforestation and carbon sink program on August 22, 2023 to DENR EMB CO. PRA A.O. 2019-05 requires 5% of the Project Area to be dedicated for Green spaces to supplement the Carbon Sink Program. Status of implementation of reforestation activity as follows: a. August 31, 2025- SM SCIDC conducted mangrove monitoring to Macabebe, Pampanga. b. November 28, 2025- SM SCIDC conducted mangrove monitoring to Macabebe Pampanga with 1,534 mangroves survived (51% survival rate). Mangroves (4ft to 5ft tall) were submerged in water whole day for more than 3 months. Additional 100 mixed propagules and seedlings were also planted. Annex 1: DENR letter to Pasay Acknowledgement of 360 ECC Compliance 17 May 2021 Annex 11: Reforestation Documentation	Submitted updated reforestation and carbon sink program on August 22, 2023 to DENR EMB CO. PRA A.O. 2019-05 requires 5% of the Project Area to be dedicated for Green spaces to supplement the Carbon Sink Program. Status of implementation of reforestation activity as follows: a. March 31, 2025 – Maintenance of Mangroves in Macabebe, Pampanga and Calatagan, Batangas (both 84% survival rate). b. February 28, 2025 -SM SCIDC reached out through letter to Pasay LGU – CENRO regarding the donation of seedlings to the Pasay Communities. c. May 27, 2025- SM SCIDC conducted mangrove monitoring to Macabebe, Pampanga (82% survival rate). As of the 1st Semester of 2025, a total of 4,162 mangroves have survived. Annex 1: DENR letter to Pasay Acknowledgement of 360 ECC Compliance 17 May 2021

ECC Condition	Complied?	SA2 2025 (Jul to Dec 2025)	SA1 2025 (Jan to Jun 2025)
		Annex 16: Pasay Letter on Updated Compliance for Reforestation 22 Aug 2023	Annex 11: Reforestation Documentation Annex 16: Pasay Letter on Updated Compliance for Reforestation 22 Aug 2023
8. Submit a detailed Master Plan to cover the entire reclamation Projects one (1) year prior to Project construction	**Yes**	Conceptual Master Plan was included in the EIS submitted on 30 October 2017. Master Plan shall be submitted one (1) year prior to horizontal development construction. March 18, 2025: Master Plan of the reconfigured island submitted to PRA for approval. May 2, 2025: Official Development Master Plan was submitted to Pasay City – CPDO for the appropriate approval by the Sangguniang Panlungsod November 10, 2025: Issuance of CTC of PRA Board Resolution No. 6312 for the Approval of Pasay 360 Master Development Plan Annex 12: Initial Master Development Plan for Pasay 360 Annex 102: Letter dated March 17, 2025 received by PRA on March 18, 2025 regarding submission of Updated DED and Master Plan of Pasay 360 reconfigured islands. Annex 104: No. 6312 Approval of the Pasay 360 Master Development Plan	Conceptual Master Plan was included in the EIS submitted on 30 October 2017. Master Plan shall be submitted one (1) year prior to horizontal development construction. March 18, 2025: Master Plan of the reconfigured island submitted to PRA for approval. Annex 12: Initial Master Development Plan for Pasay 360
The proponent shall set-up the following: 9.1 Environmental Guarantee Fund (EGF) which can be replenished anytime to cover the following: a) Expenses for further environmental assessments; b) Compensation, indemnification for whatever damages to life and property that may be caused by the Project; and c) Rehabilitation and/or restoration of areas affected by the Project's implementation	**Yes**	EGF Cash Fund Account was established on 17 February 2022. EGF Performance Bond covered period (2025-2026). Annex 13: EGF Bank Certification Annex 103: EGF Performance Bond covered period (2025 2026)	EGF Cash Fund Account was established on 17 February 2022. EGF Performance Bond was established on 31 December 2022. Annex 13: EGF Bank Certification

ECC Condition	Complied?	SA2 2025 (Jul to Dec 2025)	SA1 2025 (Jan to Jun 2025)
9.2 A Multi-partite Monitoring Team (MMT) composed of representative(s) from the proponent, local environmental Non-Government Organization (NGO) concerned, the Manila Bay Coordinating Office, PAGASA, DPWH and other concerned government agencies shall be organized consistent with DAO 2003-30. The MMT shall primarily oversee and report to EMB Central Office full compliance of proponent with the EMP/ EMoP, other commitments, as well as mitigation measures that are contained in the EIS documents and conditions herein enumerated	**Yes**	MMT established and activated with the following members as determined by the Chairman (MOA signed on May 2021[EMB and Project Proponent] and on September 2021 [MMT Members]). MMT Manual of Operations (MOO) was submitted to EMB Central Office on 14 March 2023. It was resubmitted on 21 June 2024 and was approved on 04 July 2024. Final AWFP for the year 2025 submitted to EMB-CO on February 5, 2025. Annex 14: Submitted MOO to EMB CO Annex 15: Approval of MMT MOO	MMT established and activated with the Following members as determined by the Chairman (MOA signed on May 2021[EMB and Project Proponent] and on September 2021 [MMT Members]). MMT Manual of Operations (MOO) was submitted to EMB Central Office on 14 March 2023. It was resubmitted on 21 June 2024 and was approved on 04 July 2024. Final AWFP for the year 2025 submitted to EMB-CO on February 5, 2025. Annex 14: Submitted MOO to EMB CO Annex 15: Approval of MMT MOO
9.3 A replenishable Environmental Monitoring Fund (EMF) to cover all costs attendant to the operation and monitoring activities of the MMT including but not limited to capability building, training, actual sampling and laboratory analysis. Said provisions must be consistent with DAO 2003-30. The amount and mechanics of the EGF, EMF, and the establishment of MMT shall be determined by EMB Central Office and the proponent in consultation with EMB Regional Office, through an integrated Memorandum of Agreement (MOA) which shall be submitted to the EMB Central Office for approval within ninety	**Yes**	EMF has been established and currently being used to cover costs of MMT monitoring activities. EMF Bank Account opened on 17 February 2022. MMT Memorandum of Agreement (MOA) signed on 02 September 2021. Annex 17: Signed MMT MOA Annex 13: Proof of EMF Establishment	EMF has been established and currently being used to cover costs of MMT monitoring activities. EMF Bank Account opened on 17 February 2022. MMT Memorandum of Agreement (MOA) signed on 02 September 2021. Annex 17: Signed MMT MOA Annex 13: Proof of EMF Establishment

ECC Condition	Complied?	SA2 2025 (Jul to Dec 2025)	SA1 2025 (Jan to Jun 2025)
(90) days upon receipt hereof.			
10. An Environmental Unit (EU) shall be established to completely handle the environment related aspects of the Project in addition to the Monitoring requirements as specified in the Environmental Management Plan (EMP)/Environmental Monitoring Plan (EMoP). The EU shall: 10.1 Monitor actual Project impacts vis-à vis the predicted impacts management measures in the EIS	**Yes**	Original EU established by JV Partner on 11 January 2022. New EU was established on 28 July 2023 and received by DENR EMB on 01 August 2023, respectively. Continuous monitoring of the EMP/EMoP requirements through updating as deem necessary. JV Partner has been delegated by the Proponent for the Project EU. PCO for the Project was appointed on 2 September 2023 (COA No. 2023-NCR-10199). In addition to this, on 20 Jan 2025, Pasay LGU issued designation to Ozzy Boy S. Nicopior as PCO for Pasay 360. Nonetheless, Pasay LGU maintains that the JV PCO can be the Project PCO through a Position Paper dated 14 February 2025. In response, on 12 September 2025: DENR EMB replied through a letter to Pasay LGU regarding the PCO requirement of its similar project, Pasay 265. In this letter, EMB explicitly recognized that the requirement for a Project PCO has been "substantially complied" with by the assignment of the JV Partner PCO as Project PCO. Annex 18: Pasay Letter Delegating SM EU dated 11 January 2022 Annex 19: PCO Accreditation – Raymond Cabanilla Annex 20: Managing Head Certificate of Atty. Leah M. Quiambao	Original EU established by JV Partner on 11 January 2022. New EU was established on 28 July 2023 and received by DENR EMB on 01 August 2023, respectively. Continuous monitoring of the EMP/EMoP requirements through updating as deem necessary. PCO for the Project was appointed on 2 September 2023 (COA No. 2023 NCR-10199). 2nd PCO for the Project obtained her accreditation on 15 September 2024 (COA No. COA No. 2024-NCR-25277). 20 Jan 2025: Pasay LGU issued two letters of designation to: Ozzy Boy S. Nicopior as PCO for Pasay 360. Atty. Peter M. Manzano as Managing Head for both Pasay 360 and 265 Projects. Annex 18: Pasay Letter Delegating SM EU dated 11 January 2022 Annex 19: PCO Accreditation – Raymond Cabanilla Annex 20: Managing Head Certificate of Atty. Leah M. Quiambao
10.2 Ensure that monitoring and submission of reports to EMB (Central Office and NCR) are carried out as required	**Yes**	Quarterly Self-Monitoring Report (SMR) and Semi-annual Compliance Monitoring Report (CMR) are promptly submitted to the EMB Central Office and EMB NCR. Q3 and Q4 2025 SMR submitted on dates October 15, 2025 and January 15, 2026, respectively. 2nd Sem 2025 CMR submitted on 15 January 2026. Annex 21: Q3 2025 SMR	Quarterly Self-Monitoring Report (SMR) and Semi-annual Compliance Monitoring Report (CMR) are promptly submitted to the EMB Central Office and EMB NCR. Q1 and Q2 2025 SMR submitted on dates April 15, 2025 (Reference no. 282501) and July 15, 2025 (Reference no. 398206), respectively. 1st Sem 2025 CMR to be submitted on 15 July 2025.

ECC Condition	Complied?	SA2 2025 (Jul to Dec 2025)	SA1 2025 (Jan to Jun 2025)
		Annex 22: Q4 2025 SMR Annex 106: S2 Proof of Submission	Annex 21: Q1 2025 SMR Annex 22: Q2 2025 SMR
10.3 Submit Decommissioning Plan one (1) year prior to completion of reclamation activity. It shall include rehabilitation and clean-up measures	**Yes**	The Project's estimated date of completion is July 2028. A Decommissioning Plan shall be submitted one (1) year prior to date of completion, in accordance with Condition 10.3 of the ECC.	The Project's estimated date of completion is July 2028. A Decommissioning Plan shall be submitted one (1) year prior to date of completion, in accordance with Condition 10.3 of the ECC.
10.4 Submit the geographical coordinates of actual area approved by PRA to be reclaimed prior to Project construction; and	**Yes**	EIS configuration of the island is based on the 2017 PRA-approved configuration. However, on November 2023, the PRA approved a Revised Landform Plan for the Project, which was also allowed by the EMB to proceed in its letter dated 24 January 2024. Proponent sent a letter to the DENR on the proposed Revised Landform Plan for the Project on 31 October 2023. • The revised Landform Plan was approved by the PRA Board and endorsed to the DENR in a letter dated 28 November 2023. • On 24 January 2024, the EMB recognized the PRA-approved land reconfiguration and allowed Proponent to proceed with the reclamation activities. • JV Partner sent a letter dated 15 March 2024 to Proponent regarding the Revised Pasay 360 Landform, which Proponent endorsed to the Philippine Reclamation Authority (PRA) on 26 April 2024. • On 04 September 2024, PRA issued a new Board Resolution No. 6065 approving the Proposed Revised Landform Configuration and Technical Description of the Project featuring 476-m wider channel. • 22 November 2024: Upon endorsement by the JV Partner, the Proponent submitted the Final EPRMP for the revised landform of Pasay 360-ha Reclamation Project which contains the comments and suggestions made by the Review Committee (RevCom) members during the three RevCom meetings dated 30 August 2024, 17 September 2024 and 25 September	EIS configuration of the island is based on the 2017 PRA-approved configuration. However, on November 2023, the PRA approved a Revised Landform Plan for the Project, which was also allowed by the EMB to proceed in its letter dated 24 January 2024. Proponent sent a letter to the DENR on the proposed Revised Landform Plan for the Project on 31 October 2023. The revised Landform Plan was approved by the PRA Board and endorsed to the DENR in a letter dated 28 November 2023. On 24 January 2024, the EMB recognized the PRA-approved land reconfiguration and allowed Proponent to proceed with the reclamation activities. JV Partner sent a letter dated 15 March 2024 to Proponent regarding the Revised Pasay 360 Landform, which Proponent endorsed to the Philippine Reclamation Authority (PRA) on 26 April 2024. On 04 September 2024, PRA issued a new Board Resolution No. 6065 approving the Proposed Revised Landform Configuration and Technical Description of the Project featuring 476- m wider channel. 22 November 2024: Upon endorsement by the JV Partner, the Proponent submitted the Final EPRMP for the revised landform of Pasay 360-ha Reclamation Project which contains the comments and suggestions made by the Review Committee (RevCom) members during the three RevCom meetings

ECC Condition	Complied?	SA2 2025 (Jul to Dec 2025)	SA1 2025 (Jan to Jun 2025)
		2024. The Proponent also submitted the JV Partner endorsed Supplemental Information requested by the EMB-CO on the same date. Annex 23: Actual area approved through PRA Board Resolution to be reclaimed Annex 24: Geographical coordinates from EIS Annex 25: DENR EMB's Permission to Proceed with Land Reconfiguration Annex 26: PRA Board Resolution 6065 featuring 476-m channel Annex 27: [DENR Received] EPRMP dated 22 November 2024	dated 30 August 2024, 17 September 2024 and 25 September 2024. The Proponent also submitted the JV Partner endorsed Supplemental Information requested by the EMB-CO on the same date. Annex 23: Actual area approved through PRA Board Resolution to be reclaimed Annex 24: Geographical coordinates from EIS Annex 25: DENR EMB's Permission to Proceed with Land Reconfiguration Annex 26: PRA Board Resolution 6065 featuring 476-m channel Annex 27: [DENR Received] EPRMP dated 22 November 2024
10.5 Conduct continuing consultation with the stakeholders in updating EMP and EMoP that shall include necessary baseline data, geohazard and disaster risk reduction and management and ground settlement monitoring of the reclaimed area.	**Yes**	Pasay LGU, through its Private Joint Venture Partners, engaged environmental and urban planning experts Planades and Primex to conduct environmental studies and come up with environmental programs in compliance with the ECC for the Project. Their work includes the formulation, based on technical studies, of the enhanced and updated EMP and EMoP for the Project. Consultations were done with officials and residents of the cities of Manila on 31 August 2022 and (b) City of Parañaque on 16 September 2022, respectively. Pasay City, together with its JV Partners, also regularly update Planades and Primex (consultants for the Pasay Reclamation Projects) with the comments and suggestions of the Projects Multipartite Monitoring Team (which members include Pasay City CENRO and PCHO, Barangay 76, sectoral representatives from Urban Poor Sector/ Council of Leaders and Yahad Consumer Cooperative, PRA, BFAR, PCG, DENR-NCR and EMB) on matters regarding environment management and mitigating measures. PLANADES conducted consultations through social baseline surveys (such as perception survey) for ECC Amendment covering the land	Pasay LGU, through its Private Joint Venture Partners, engaged environmental and urban planning experts Planades and Primex to conduct environmental studies and come up with environmental programs in compliance with the ECC for the Project. Their work includes the formulation, based on technical studies, of the enhanced and updated EMP and EMoP for the Project. Consultations were done with officials and residents of the cities of Manila on 31 August 2022 and (b) City of Parañaque on 16 September 2022, respectively. Pasay City, together with its JV Partners, also regularly update Planades and Primex (consultants for the Pasay Reclamation Projects) with the comments and suggestions of the Projects Multipartite Monitoring Team (which members include Pasay City CENRO and PCHO, Barangay 76, sectoral representatives from Urban Poor Sector, Council of Leaders and Yahad Consumer Cooperative, PRA, BFAR, PCG, DENR-NCR and EMB) on matters regarding environment management and mitigating measures. PLANADES conducted consultations

ECC Condition	Complied?	SA2 2025 (Jul to Dec 2025)	SA1 2025 (Jan to Jun 2025)
		reconfiguration to the concerned Barangay Stakeholders and LGU Officials. The Final EPRMP submitted to the EMB on 22 November 2024 reflects the updated baseline conditions (i.e., Perception Survey) and the updated EMP and EMoP. Continuing consultation with the affected fisherfolks, PLAA regarding the monitoring activities, safety route and project changes. Furthermore, ground settlement monitoring analysis shows that uneven settlement occurred across all areas; however, no abnormal data trends were observed. The installation of PVD had a significant effect on the settlement plate readings, indicating that the ground improvement was effective and compliant with the design and specifications. The conclusion should be based on the Soft Foundation Treatment Unloading Report, while this report is intended to serve only as a process-course analysis. Annex 27: [DENR Received] EPRMP dated 22 November 2024 Annex 28: Minutes of the Consultations Annex 29: Perception Survey Annex 106: Ground settlement monitoring Analysis	through social baseline surveys (such as perception survey) for ECC Amendment covering the land reconfiguration to the concerned Barangay Stakeholders and LGU Officials. The Final EPRMP submitted to the EMB on 22 November 2024 reflects the updated baseline conditions and the updated EMP and EMoP. Continuing consultation with the affected fisherfolks, PLAA regarding the monitoring activities, safety route and project changes. Annex 27: [DENR Received] EPRMP dated 22 November 2024 Annex 28: Minutes of the Consultations Annex 29: Perception Survey
11. Ensure that its contractors and subcontractors properly comply with the relevant conditions of this Certificate including those regulations covering the entire activity of the Project;	**Yes**	Proponent / JV Partner is monitoring the compliance of the contractor through continuous coordination. The contractor is also required to submit its report to EMB. The Contractor is also required to submit periodic reports i.e., quarterly SMRs and other relevant permitting requirement applications such as Hazardous Waste Generator ID, PTO and PCO Accreditation to EMB. Regular bi-weekly coordination and monitoring between Proponent/JV Partner and Project Contractor. Annex 30: Contractor Permits	Proponent / JV Partner is monitoring the compliance of the contractor through continuous coordination. The contractor is also required to submit its report to EMB. The Contractor is also required to submit periodic reports i.e., quarterly SMRs and other relevant permitting requirement applications such as Hazardous Waste Generator ID, PTO and PCO Accreditation to EMB. Regular bi-weekly coordination and monitoring between Proponent/JV Partner and Project Contractor. Annex 30: Contractor Permits
12. The proponent shall notify the EMB Central	**Yes**	Notification of original sand source submitted to EMB Central Office on 04 May 2021.	Notification of original sand source submitted to EMB Central Office on 04

ECC Condition	Complied?	SA2 2025 (Jul to Dec 2025)	SA1 2025 (Jan to Jun 2025)
Office the location of filling materials		On 22 August 2023, the Proponent issued a written notification to the DENR-EMB (that the filling materials for the Project are sourced from the following locations: 1. Philippine Reclamation Authority (PRA) borrow area in San Nicholas Shoal (SNS) covered by Government Seabed Quarry Permit (GSQP) No. OMRooi-2008-firA-amended. Currently, there is no dredging since March 2023 because of insufficient sand volume due to the red zone/no-dredge zone imposed by the DENR-Mines Geosciences Bureau. 2. Western River Basins of Mt. Pinatubo -Downstream Portion of Bucao River, Botolan, Zambales, Philippines, covered by ECC Reference Code No. R03-02182020-4836; and 3. Western River Basins of Mt. Pinatubo Downstream Portion of Maloma River, San Felipe, Zambales covered by ECC Reference Code No. R03-02182020-4835-m011. On 16 May 2024, EMB was notified of the additional sand source material from Amnay River in Mindoro covered by ECC Reference Code No. ECC-R4B-2306-0002. On 13 March 2025, EMB was notified of the additional sand source from Pagbahan River, Province of Occidental Mindoro. All the relevant consents for the above-mentioned sand sources have been secured. Annex 31: Letter to EMB regarding sources of fill materials dated 17 August 2023 Annex 32: Letter of Notification for Additional Sand Source (Amnay) Annex 33: Letter of Notification for Abra River Sand Source Annex 34: Letter of Notification for Pagbahan River Sand Source	May 2021. On 22 August 2023, the Proponent issued a written notification to the DENR-EMB (that the filling materials for the Project are sourced from the following locations: 1. Philippine Reclamation Authority (PRA) borrow area in San Nicholas Shoal (SNS) covered by Government Seabed Quarry Permit (GSQP) No. OMRooi-2008-firA-amended. Currently, there is no dredging since March 2023 because of insufficient sand volume due to the red zone/no-dredge zone imposed by the DENR-Mines Geosciences Bureau. 2. Western River Basins of Mt. Pinatubo - Downstream Portion of Bucao River, Botolan, Zambales, Philippines, covered by ECC Reference Code No. R03-02182020-4836; and 3. Western River Basins of Mt. Pinatubo Downstream Portion of Maloma River, San Felipe, Zambales covered by ECC Reference Code No. R03-02182020-4835-m011. On 16 May 2024, EMB was notified of the additional sand source material from Amnay River in Mindoro covered by ECC Reference Code No. ECC-R4B-2306-0002. On 13 March 2025, EMB was notified of the additional sand source from Pagbahan River, Province of Occidental Mindoro. All the relevant consents for the above-mentioned sand sources have been secured. Annex 31: Letter to EMB regarding sources of fill materials dated 17 August 2023 Annex 32: Letter of Notification for Additional Sand Source (Amnay) Annex 33: Letter of Notification for Abra River Sand Source Annex 34: Letter of Notification for

ECC Condition	Complied?	SA2 2025 (Jul to Dec 2025)	SA1 2025 (Jan to Jun 2025)
			Pagbahan River Sand Source
13. The proponent shall use filling materials from legal suppliers/suppliers that secure necessary government permits	**Yes**	All sand sources are covered by relevant consents. Proponent/JV Partner is monitoring compliance of sand suppliers with necessary government permits. Annex 35: GSQP PRA SNS Annex 36: ECC PRA SNS Annex 37: ECC Botolan Annex 38: ECC Amnay Annex 39: ECC for Abra River Ilocos Sur sand source Annex 40: ECC for Pagbahan River sand source	All sand sources are covered by relevant consents. Proponent/JV Partner is monitoring compliance of sand suppliers with necessary government permits. Annex 35: GSQP PRA SNS Annex 36: ECC PRA SNS Annex 37: ECC Botolan Annex 38: ECC Amnay Annex 39: ECC for Abra River Ilocos Sur sand source Annex 40: ECC for Pagbahan River sand source
14. No activity shall be undertaken unless the following documents are submitted to this Office within one hundred twenty (120) days prior to Project implementation: a. Clearance/notice to proceed (NTP) duly issued by the Philippine Reclamation Authority (PRA); b. Area Clearance issued by the DENR; and c. Approval from the National Economic and Development Authority in accordance with Executive Order No. 146 and the Implementing Rules and Regulation thereof;	**Yes**	Proponent received a Notice to Proceed issued by the PRA on 04 December 2019, and Area Clearance by the DENR on 15 August 2019. The Project does not need NEDA approval based on EO 74 Series of 2019, delegating to the PRA Governing Board the power of the President to approve reclamation projects. Annex 41: PRA Notice to Proceed Annex 42: PRA Letter to Pasay LGU certifying compliance with the NTP and NTM/NTCARW conditions dated 01 December 2021 Annex 43: Area Clearance for Pasay 360 DENR EMB CO	Proponent received a Notice to Proceed issued by the PRA on 04 December 2019, and Area Clearance by the DENR on 15 August 2019. The Project does not need NEDA approval based on EO 74 Series of 2019, delegating to the PRA Governing Board the power of the President to approve reclamation projects. Annex 41: PRA Notice to Proceed Annex 42: PRA Letter to Pasay LGU certifying compliance with the NTP and NTM/NTCARW conditions dated 01 December 2021 Annex 43: Area Clearance for Pasay 360 DENR EMB CO
15. No other activities shall be undertaken other than what was stipulated in the EIS document. Expansion of the project/construction of other structures or any change in the activity beyond those stated in the EIS shall be subject to a new Environmental Impact Assessment	**Yes**	All activities are within those stated in the EIS. 22 November 2024: Upon endorsement by the JV Partner, the Proponent submitted the Final EPRMP for the revised landform of Pasay 360-ha Reclamation Project which contains the comments and suggestions made by the Review Committee (RevCom) members during the three RevCom meetings dated 30 August 2024, 17 September 2024 and 25 September 2024.	All activities are within those stated in the EIS. 22 November 2024: Upon endorsement by the JV Partner, the Proponent submitted the Final EPRMP for the revised landform of Pasay 360-ha Reclamation Project which contains the comments and suggestions made by the Review Committee (RevCom) members during the three RevCom meetings dated 30 August 2024, 17 September 2024 and 25 September 2024.

ECC Condition	Complied?	SA2 2025 (Jul to Dec 2025)	SA1 2025 (Jan to Jun 2025)
		The Proponent also submitted the JV Partner endorsed Supplemental Information requested by the EMB-CO on the same date. Annex 27: [DENR Received] EPRMP dated 22 November 2024 Annex 25: DENR EMB's Permission to Proceed with Land Reconfiguration dated 24 Jan 2024	The Proponent also submitted the JV Partner endorsed Supplemental\ Information requested by the EMB-CO on the same date. Annex 27: [DENR Received] EPRMP dated 22 November 2024 Annex 25: DENR EMB's Permission to Proceed with Land Reconfiguration dated 24 Jan 2024
16. Transfer of Ownership of this Project carries these same conditions and restrictions for which written notification must be made herein grantee to EMB within fifteen (15) days from such transfer.	**Yes**	No transfer of ownership.	No transfer of ownership.
1. All commitments, mitigating measures and monitoring requirements, especially those contained in the EMB-approved Environmental Performance Report & Management Plan (EPRMP), particularly the Environmental Management Plan and Environmental Monitoring Plan, shall be instituted to minimize any adverse impact to the environment throughout the project implementation.	**Yes**	Implementation of the updated EMP and EMoP derived from EPRMP shall be maintained. Annex 3: Updated EMP 2025. Annex 44: Updated EMoP 2025	Implementation of the updated EMP and EMoP derived from EPRMP shall be maintained. Annex 3: Updated EMP 2025 Annex 44: Updated EMoP 2025
2. The proponent shall conduct daily visual inspection of the areas affected by the reclamation project relative to the sediment plume dispersion modeling results. The maintenance of the sand bunds must be part of the daily visual inspection.	**Yes**	Compliance starting in May 2025. Daily visual inspection activities may include: - Drone Survey - Physical monitoring - CCTV monitoring (implemented especially during unfavorable conditions e.g., Typhoon and windy) Based on the daily visual inspection logs for July to December 2025, the majority of the observations indicated no presence of sediment plume at the sampling stations, while turbidity controls were found to be effective.	Compliance starting in May 2025. Daily visual inspection activities may include: - Drone Survey - Physical monitoring - CCTV monitoring (implemented especially during unfavorable conditions e.g., Typhoon and windy) Annex 45: Daily Visual Inspection Log sheet for May and June 2025

ECC Condition	Complied?	SA2 2025 (Jul to Dec 2025)	SA1 2025 (Jan to Jun 2025)
		Annex 45: Daily Visual Inspection Log Q4 2025	
3. The proponent shall conduct a comparative hydrodynamic analysis of the existing water circulation patterns before and after the Reclamation project. The result of which shall be submitted to EMB Central Office for review and assessment sixty (60) days from the completion of said activity.	**Yes**	The original hydrodynamic modelling study based on the original landform was submitted on 18 January 2019. 22 November 2024: Hydrodynamic analysis for the Project reconfiguration ('Before') was duly complied with and submitted along with EPRMP. The ('After') Comparative hydrodynamic analysis is not yet applicable at this time and will be submitted within 60 days after completion of reclamation project.	22 November 2024: Hydrodynamic analysis for the Project reconfiguration ('Before') was submitted along with EPRMP. Comparative hydrodynamic analysis will be submitted within required period after completion of reclamation project.
4. Temporary sand stockpile pits outside the proposed land reconfiguration area during reclamation is strictly prohibited.	**Yes**	No sand stockpile pits outside the Project Site.	No sand stockpile pits outside the Project Site.
5.Proper management of portalets shall be strictly implemented. Overflows from portalets are strictly prohibited.	**Yes**	Nineteen (19) portalets are covered with relevant permits. • Regular cleaning and siphoning of Portalets are maintained. Annex 46: Sewage Disposal Management	Eighteen (18) portalets are covered with relevant permits. Regular cleaning and siphoning of Portalets are maintained. Annex 46: Sewage Disposal Management
6. Fuel storage tanks shall be installed in a concrete pavement or similar impermeable surface with secondary containment capable of holding 110% of the total volume stored. Inspection/monitoring of fuel storage tanks should be conducted on a daily basis.	**Yes**	Fuel Storage with containment provision of 110% capacity as per requirement. PTO-OL-NCR-2025-08705-R issued last 19 December 2025 effective until 10 August 2029 for Six (6) Fuel Storage Tanks used for the Project. Annex 47: Photo-documentation of Fuel Storage Facility	Fuel Storage with containment provision of 110% capacity as per requirement. Ongoing Permit to Operate (PTO) application in DENR-EMB NCR with Application No. 398685. Annex 47 : Photo-documentation of Fuel Storage Facility
7. All temporary facilities shall be dismantled or pulled out after the completion of the reclamation. The proponent shall inform this Office of the completion of the reclamation activities.	**Yes**	To be implemented during decommissioning phase.	To be implemented during decommissioning phase.
8. The proponent shall ensure compliance with the Project Turbidity Management Plan to	**Yes**	Turbidity Management Plan is in place and being implemented. Annex 48: Turbidity Management Plan	Turbidity Management Plan is in place and being implemented.

ECC Condition	Complied?	SA2 2025 (Jul to Dec 2025)	SA1 2025 (Jan to Jun 2025)
avoid adverse impacts of the project on the Las Piñas – Parañaque Wetland Parks.			Annex 48: Turbidity Management Plan
9. Ensure that the reclamation and Development activities do not negatively impact the clam/shellfish and other aquatic Resources industries by implementing the mitigating measures provided in the Environmental Management Plan (EMP), specifically, those addressing wastewater, solid waste, and air emissions.	**Yes**	EMP mitigating measures on wastewater, solid waste, and air emissions are in place and being implemented.	EMP mitigating measures on wastewater, solid waste, and air emissions are in place and being implemented.
10. Adhere to full compliance with the Sanitation Code of the Philippines to uphold public health and environmental standards.	**Yes**	Full compliance with the Sanitation Code is maintained. Annex 46: Documentary evidence on compliance to Sanitation Code of the Philippines	Full compliance with the Sanitation Code is maintained. Annex 46: Documentary evidence on compliance to Sanitation Code of the Philippines
11. Maintain unobstructed water circulation to ensure that the reclamation activity does not exacerbate flooding in the area. The proponent must fully comply with the results and recommendations derived from hydrodynamic modeling to safeguard the surrounding environment and mitigate any adverse effects.	**Yes**	Based on the hydrodynamic modelling, the new landform do not and will not obstruct water circulation.	Based on the hydrodynamic modelling, the new landform do not and will not obstruct water circulation.
12. Full and fair compensation will be provided by the proponent to all affected fishermen and other stakeholders who depend on Manila Bay for their livelihood.	**Yes**	The identified affected fisherfolk (i.e., PLAA) are now engaged as part of the alternative livelihood program and subsidies related to their fishing activities. Currently consulting with Pasay CENRO and CPDO on other possible stakeholders affected by the Project. Annex 108: Compensation to the Affected Fishermen	Compensation provided to the identified affected fisherfolk of Pasay which is PLAA. Currently consulting with Pasay CENRO on other beneficiary stakeholders.
13. The proponent shall submit to this Office the	**Yes**	March 18, 2025: Detailed Engineering Design (DED), Development	Detailed Engineering Design (DED),

ECC Condition	Complied?	SA2 2025 (Jul to Dec 2025)	SA1 2025 (Jan to Jun 2025)
PRA-approved Detailed Engineering Design (DED), Development Masterplan and Dredging and Reclamation Methodology prior to the project implementation. If there are major changes in the project description and implementation activities that will cause significant environmental impacts, the proponent shall apply for further amendment of the ECC.		Masterplan and Dredging and Reclamation Methodology is submitted to PRA. November 10, 2025: Certified True Copies of the following PRA Board Resolutions were issued: • Annex 104: No. 6312 - Approval of Pasay 360 Master Development Plan • Annex 107: No. 6313 - Approval of Pasay 360 Updated Detailed Engineering Design	Development Masterplan and Dredging And Reclamation Methodology is submitted to PRA on March 18, 2025. Awaiting PRA Approval.
14. The connecting bridges between the reclamation project and the mainland, i.e. Bridge Nos. 1,2,3 and 4, shall be subjected to a separate ECC amendment application. The technical details of the said bridges shall be based on the Detailed Engineering Design and Development Masterplan approved by the PRA Governing Board.	**Yes**	For application of ECC Amendment for Bridges December 10, 2025: Pasay City submitted the EPRMP for ECC Amendment for Bridge Development to EMB CO.	For application of ECC Amendment for Bridges
15. No other activities shall be undertaken other than what was stipulated in the EPRMP. Expansion of the project/construction, construction of other structures, or any change in activity beyond those stated in the EPRMP shall be subjected to a new Environmental Impact Assessment.	**Yes**	All activities are within the scope of EPRMP	All activities are within the scope of EPRMP
1. All commitments, mitigating measures and monitoring requirements, especially those contained in the EMB-approved Environmental	**Yes**		Implementation of the updated EMP and EMoP derived from EPRMP shall be maintained. Annex 3: Updated EMP 2025 Annex 44: Updated EMoP 2025

ECC Condition	Complied?	SA2 2025 (Jul to Dec 2025)	SA1 2025 (Jan to Jun 2025)
Performance Report & Management Plan (EPRMP), particularly the Environmental Management Plan and Environmental Monitoring Plan, shall be instituted to minimize any adverse impact to the environment throughout the project implementation.			
2. The proponent shall conduct daily visual inspection of the areas affected by the reclamation project relative to the sediment plume dispersion modeling results. The maintenance of the sand bunds must be part of the daily visual inspection.	**Yes**		Compliance starting in May 2025. Daily visual inspection activities may include: - Drone Survey - Physical monitoring - CCTV monitoring (implemented especially during unfavorable conditions e.g., Typhoon and windy) Annex 45: Daily Visual Inspection Log sheet for May and June 2025
1. Proponent needs to comply with: 1.a. Sanitation Code of the Philippines: Compliance with the Sanitation Code of the Philippines	**Yes**	Annex 46: Documentary evidence on compliance to Sanitation Code of the Philippines	Annex 46: Documentary evidence on compliance to Sanitation Code of the Philippines
1.b. Labor Code of the Philippines: Compliance with the Labor Code of the Philippines including occupational health and safety standards	**Yes**	Annex 49: Work Permits	Annex 49: Work Permits
1.c. Building Structures, Drainage and Flood Control System, Reclamation practices in accordance with the Building Code of the Philippines occupational health and safety standards: Compliance with Building Code of the Philippines (LGU-CPDO). Implementation of Comprehensive Safety and Health Plan.	**Yes**	Annex 50: Comprehensive Safety and Health Plan Annex 51: DOLE OSHC	Annex 50: Comprehensive Safety and Health Plan Annex 51: DOLE OSHC
1.d Coastal/Marine community development program: Compliance with BFAR conditions or requirements	**Yes**	Annex 52: Ordinance Approving CSUP and received by BFAR on 06 January 2020 Annex 53: Submission of Enhanced CSUP dated 10 October 2022	Annex 52: Ordinance Approving CSUP and received by BFAR on 06 January 2020 Annex 53: Submission of Enhanced CSUP dated 10 October 2022

ECC Condition	Complied?	SA2 2025 (Jul to Dec 2025)	SA1 2025 (Jan to Jun 2025)
		Annex 54: BFAR Acknowledgement Letter dtd 19 December 2022	Annex 54: BFAR Acknowledgement Letter dtd 19 December 2022
2. Solid Waste Management System need to be in placed in coordination with LGU. / Compliance with RA 9003 in coordination with LGU-CENRO	**Yes**	Annex 55: Contract Agreement between CHEC and Vertex Annex 56: Provision of Material Recovery Facility Onsite Annex 57: Subcontractor Certifications Annex 58: Transport Management Plan & Route of Transport Annex 59: Certificates of Final Disposal Annex 60: Solid Waste Management	Adhere to the requirements with the following proof compliance documents: Annex 55: Contract Agreement between CHEC and Vertex Annex 56: Provision of Material Recovery Facility Onsite Annex 57: Subcontractor Certifications Annex 58: Transport Management Plan &Route of Transport Annex 59: Certificates of Final Disposal Annex 60: Solid Waste Management
3. The proponent shall coordinate prior to the initial stage of project implementation on the assessment of the presence of artifacts following the rules and protocols of the concerned agencies, i.e. National Museum Cultural Properties Division, National Historical Commission of the Philippines (NHCP) – Historic Preservation Division and Philippine Navy for artifacts and bombs. / Compliance with NHCP and National Museum requirements	**Yes**	All relevant documents are readily available: Annex 61: NHCP letter to Pasay dated 20 February 2020 Annex 62: Pasay LGU Letter to National Museum 27 April 2023 Annex 63: NHCP Endorsement to NCCA	All relevant documents are readily available: Annex 61: NHCP letter to Pasay dated 20 February 2020 Annex 62: Pasay LGU Letter to National Museum 27 April 2023 Annex 63: NHCP Endorsement to NCCA
4. The Proponent shall secure approval of its project Oil Spill Contingency Plan (OSCP) from the Philippine Coast Guard (PCG) before project implementation and shall ensure that all vessels the project will	**Yes**	The Oil Spill Contingency Plan (OSCP) of the Contractor contains their Emergency Response Plan which is valid until 19 October 2026 Annex 64: Approved OSCP of CHEC	The Oil Spill Contingency Plan (OSCP) of the Contractor contains their Emergency Response Plan which is valid until 19 October 2026. Annex 64: Approved OSCP of CHEC

ECC Condition	Complied?	SA2 2025 (Jul to Dec 2025)	SA1 2025 (Jan to Jun 2025)
use will secure government permits. / Compliance with PCG requirement on the approval of OSCP.			
5. Submission of Engineering Geological and Geohazard Assessment Report: Submission of EGGAR to DENR EMB CO as part of EIS.	**Yes**	Submitted EGGAR as part of the EIS on 30 October 2017. EGGAR was resubmitted on 24 May 2023 for the application of ECC Amendment which was also submitted to MGB. Annex 65: EGGAR for Pasay 360	Submitted EGGAR as part of the EIS on 30 October 2017. EGGAR resubmitted on 24 May 2023 for the application of ECC Amendment which was also submitted to MGB. Annex 65: EGGAR for Pasay 360
6. Proponent needs to give priority employment to qualified residents of the affected communities. Adequate public information for jobs available to local residents in the affected areas need to be provided. / Adhere to the local employment requirement	**Yes**	• Local employment data shows priority of employment to qualified residents of the affected communities. • Alternative livelihood also focuses on Pasay residents. • Moreover, Locally Hired Cleaners of the Project Contractor were resident from Pasay. In the fourth quarter of 2025, 71 locals participated in Contractor's clean-up program, collected approx. 1080cu.m of wastes from sea. Annex 66: Local Employment Data Annex 6: 2nd Sem 2025 Hiring of Cleaners	Local employment data shows priority of employment to qualified residents of the affected communities. PLAA alternative livelihood also focuses on Pasay residents. Moreover, Locally Hired Cleaners of the Project Contractor were resident from Pasay. Annex 66: Local Employment Data Annex 6: 1st Sem 2025 Hiring of Cleaners
7. Proponent needs to design and construct access roads and bridges of the project site with minimal land and ecological disturbance and with adequate drainage. Proponent needs to implement a Roadway Maintenance and Transport Management Plan which will include maintenance of public and private roads within the project site. / Adhere to the LGU-CPDO requirement on the TMP	**Yes**	To date, interconnectivity of the reclamation projects by concerned agencies together with the Reclamation Proponent was discussed and shall be implemented during horizontal development phase. December 10, 2025: Pasay City submitted the EPRMP for the ECC amendment application for Bridge Development to EMB CO.	To date, interconnectivity of the reclamation projects by concerned agencies together with the Reclamation Proponent was discussed and shall be implemented during horizontal development phase.
8. The Proponent needs to address environmental risks, and come up with contingency measures in case of accidents, equipment	**Yes**	Emergency Preparedness and Response Plan is available, which includes the Oil Spill Contingency Plan within the reclamation area.	Emergency Preparedness and Response Plan is available, which includes the Oil Spill Contingency Plan within the reclamation area. Annex 67: Environmental Emergency

ECC Condition	Complied?	SA2 2025 (Jul to Dec 2025)	SA1 2025 (Jan to Jun 2025)
malfunctions, machine failures, oil spills, and other emergencies including security risks: / Adhere to conduct an environmental risk assessment to identify all project related risks and hazards in order to address them properly through provision of corrective actions and contingency measures		Annex 67: Environmental Emergency Response Plan which includes the Oil Spill Contingency Plan within the reclamation area.	Response Plan which includes the Oil Spill Contingency Plan within the reclamation area.
The proponent shall strictly comply with the directives, regulatory issuances, and resolutions of the PRA in relation to the reclamation project implementation.	**Yes**	In close coordination with PRA on the compliance to the directives and regulatory documents. Strict compliance with the directives, regulatory issuances, and resolutions of the PRA.	In close coordination with PRA on the compliance to the directives and regulatory documents. Strict compliance with the directives, regulatory issuances, and resolutions of the PRA.
The proponent shall comply with the Philippine Coast Guard policies and guidelines with regards to the following: a. Offshore disposal of unsuitable dredged materials. b. Sea traffic/navigation during the project implementation. c. Project's Oil Spill Contingency Plan prior to project implementation. d. Marine vessel pollution protocols during the project implementation.	**Yes**	• Map of Disposal approved by PCG. • Vessel Traffic Management Plan is in place. • OSCP approved by PCG is in place. • PCG permits on marine vessel pollution protocols (e.g., Oil Waste Collector) including offshore and Onshore Construction Emergency Plan are in place	Map of Disposal approved by PCG. Vessel Traffic Management Plan is in place. OSCP approved by PCG is in place. PCG permits on marine vessel pollution protocols (e.g., Oil Waste Collector) including offshore and Onshore Construction Emergency Plan are in place
The proponent shall align and integrate its programs with the Local Government Unit's (LGU) plans on flooding, solid waste management, traffic control, emergency response, as well as water and power infrastructure, ensuring sustainable development efforts.	**Yes**	Full coordination with LGU. • Currently conducting a Flooding Study involving Pasay LGU.	Full coordination with LGU. Currently conducting a Flooding Study involving Pasay LGU.

5.2. COMPLIANCE TO AMBIENT AIR AND WATER MONITORING

5.2.1. COMPLIANCE TO AMBIENT AIR AND NOISE MONITORING

Ambient Air Monitoring

The Ambient Air and Noise Environmental Monitoring Plan (EMoP) in the updated and approved EMOP-based on the submitted EPRMP on 2024 is presented in Table 5.3 while the approved sampling stations are shown in Figure 5.1. Note that the second quarter (Q2) marks the first monitoring period conducted under the amended EMoP/EPRMP. Furthermore, all stations passed the DENR NAAQ standards for TSP, PM10 and daytime noise for all monitoring periods.

The monitoring stations used in the current EPRMP were updated relative to those established during the EIS stage (2013) to reflect the reconfiguration of the reclamation island layout and associated project components. During the detailed engineering and project refinement stage, the shape and configuration of the reclamation areas were modified, which consequently affected the spatial distribution of construction activities and potential environmental impact zones.

As such, the locations of the environmental monitoring stations were adjusted to ensure that they remain representative of the current project footprint. The updated monitoring stations were selected to better capture environmental conditions in relation to the revised reclamation boundaries including the bridges, support facilities and the approximate locations of active construction works.

Table 5.3: Compliance with the Approved Air Quality EmoP and Trend Analysis

Key Environmental Aspects per Project Phase Activities	Potential Impacts per Environmental Sector	Parameter to be Monitored	Sampling and Measurement Plan			Reference	Trend Analysis
			Method	Frequency	Location		
Air	Ambient Air Quality – Degradation of Air Quality (Dust)	24-hr TSP 24-hr PM10	High Volume – Gravimetric Method	Quarterly	S-1, A1, A-3, S-4, S-5, S-6	Table 5.5 Table 5.4	The ambient air quality monitoring results indicate that the measured concentrations of Total Suspended Particulates (TSP) and PM_{10} across all monitoring stations remained within the applicable DENR National Ambient Air Quality Guideline Values (NAAQGV) during the monitoring period. The recorded levels show generally stable conditions with only minor fluctuations between monitoring quarters, which are typical of normal variations in local atmospheric conditions and site activities. No persistent or significant increase in particulate concentrations attributable to project activities was observed. It should also be noted that the monitoring approach for TSP transitioned from 1-hour sampling in previous monitoring periods (2021–2024) to 24-hour sampling in 2025, in accordance with the updated and approved EMoP in EPRMP 2024. Despite the change in sampling duration, the results continue to indicate that ambient particulate concentrations remain well within the prescribed standards. Overall, the monitoring data demonstrate that air quality conditions in and around the project area remain acceptable and compliant with the relevant regulatory guidelines. While baseline ambient air data are available from the EIS study (sampling date:2013), direct comparison with the current monitoring results is not appropriate since the baseline sampling stations used in the EIS were located in different areas from the current CMR monitoring stations. Nevertheless, the monitoring results consistently indicate that ambient air quality conditions in the vicinity of the project remain within the prescribed regulatory standards and that no significant adverse impacts attributable to project activities have been observed.
	Noise – Increase in Noise Level	Daytime Noise	Meter	Quarterly Weekly (Internal)	S-1, A1, A-3, S-4, AS-5, S-6	Table 5.6	The results of the ambient noise monitoring conducted during the reporting period indicate that the measured noise levels across all monitoring stations generally remained within the applicable DENR noise standards for the project area. The recorded values showed minor variations across monitoring periods, which may be attributed to normal fluctuations in background noise from nearby urban activities,

Key Environmental Aspects per Project Phase Activities	Potential Impacts per Environmental Sector	Parameter to be Monitored	Sampling and Measurement Plan			Reference	Trend Analysis
			Method	Frequency	Location		
							vehicular movement, and other existing sources in the surrounding environment. No persistent or significant increase in noise levels attributable to project-related activities was observed. Overall, the monitoring results indicate that noise conditions in the vicinity of the project site remain within acceptable limits, demonstrating that the implemented mitigation and management measures are effective and that the project continues to comply with the applicable regulatory noise standards. While baseline noise data are available from the EIS study EIS study (sampling date: 2013 and 2014), direct comparison with the current monitoring results should be interpreted with caution since the baseline monitoring stations used in the EIS are located in different sampling locations from the present CMR and CMVR monitoring stations. Nevertheless, the current monitoring results indicate that ambient noise levels in the vicinity of the project remain within the applicable regulatory standards and that project activities have not resulted in significant adverse noise impacts.

Table 5.4: Ambient Air EIS Baseline Data (2013) and CMR Monitoring Data (2021 to 2024)

EIS 2017 Ambient Air and Noise (Sampling on 2013)

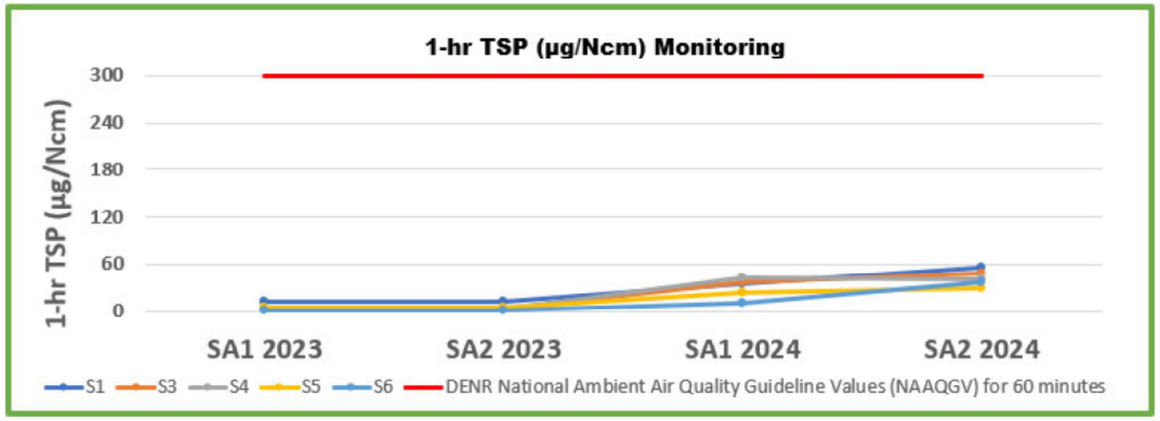
Station	Location	Date	PM_{10} (µg/Ncm)	SO_2 (µg/Ncm)	NO_2 (µg/Ncm)	CO (mg/Ncm)
1	Near Yacht Club	January 28-29, 2013	68	3.4	3.4	0.1
2	Near PICC Area		42	2.4	4.8	0.1
3	Near Sofitel Basketball Court		28	9.9	7.2	0.7
4	Near Coastal Mall Area		52	10.0	36.6	0.3
5	Near D. Macapagal Road		44	10.2	47.3	0.2
DENR National Ambient Air Quality Standards (NAAQS) for Source Specific Air Pollutants based on 60 minutes averaging time			**200**	**340**	**260**	**-**
DENR National Ambient Air Quality Guideline Values (NAAQGV)			**-**	**-**	**-**	**35**

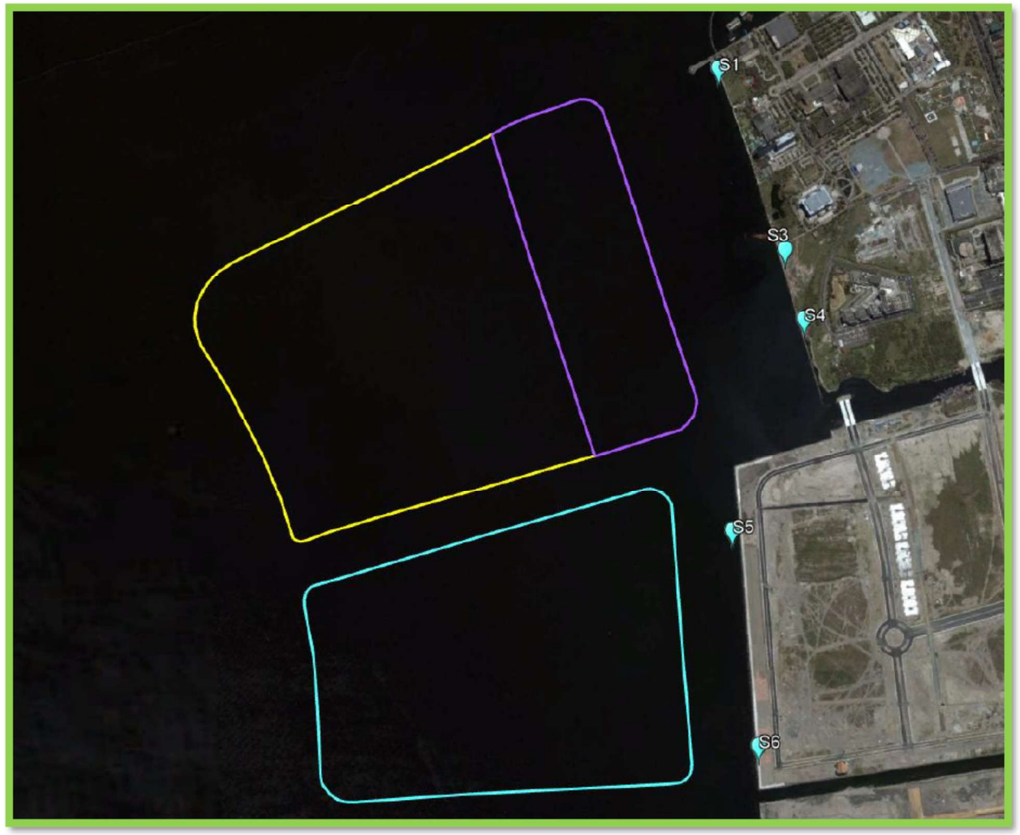
Source/Reference: Pasay City Government and Technotrix Consultancy Services, Inc. EIS Final Report for the Proposed 360 hectares Reclamation Project (October 2017)



EIS 2017 Ambient Air and Noise Monitoring Stations (2013) – **Sampling Station Map**

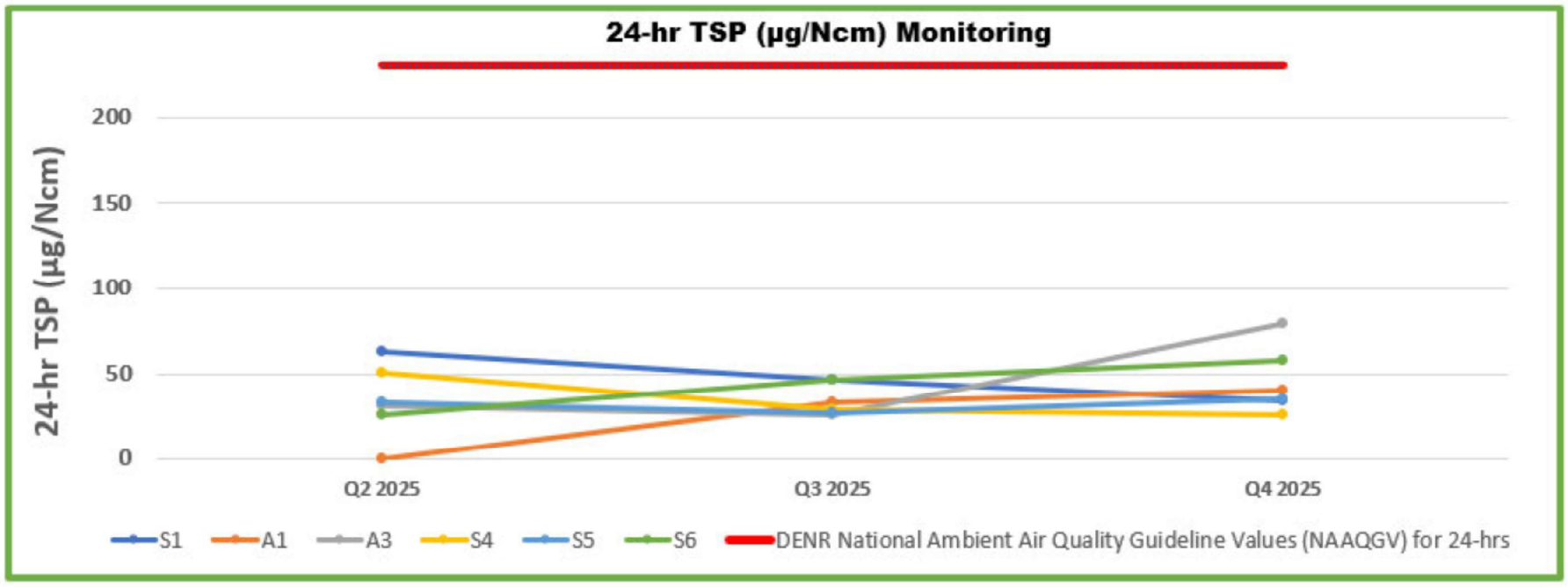
1-hr TSP CMR and CMVR Ambient Air Data (2021 to 2024)

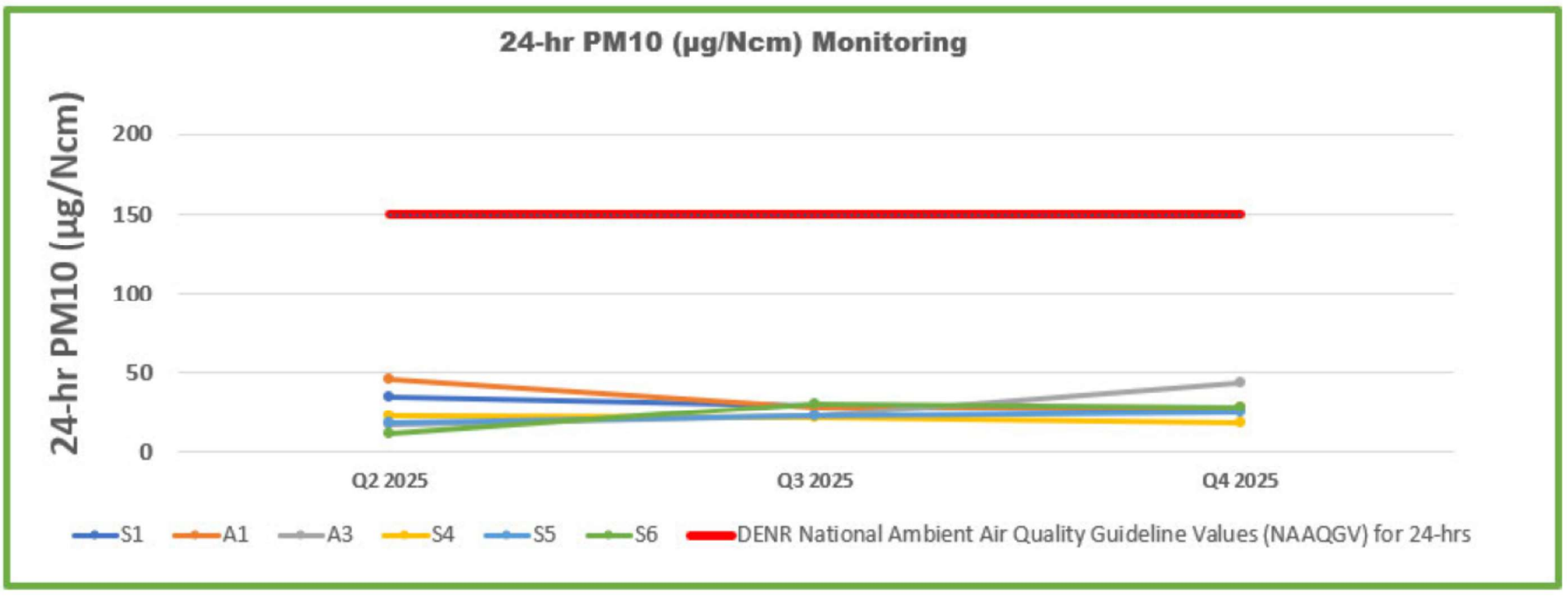




CMR and CMVR Ambient Air Data (2021 to 2024) – Monitoring Station Map

Table 5.5: 24-hr TSP and PM10 CMR and CMVR Ambient Air Data (2025)





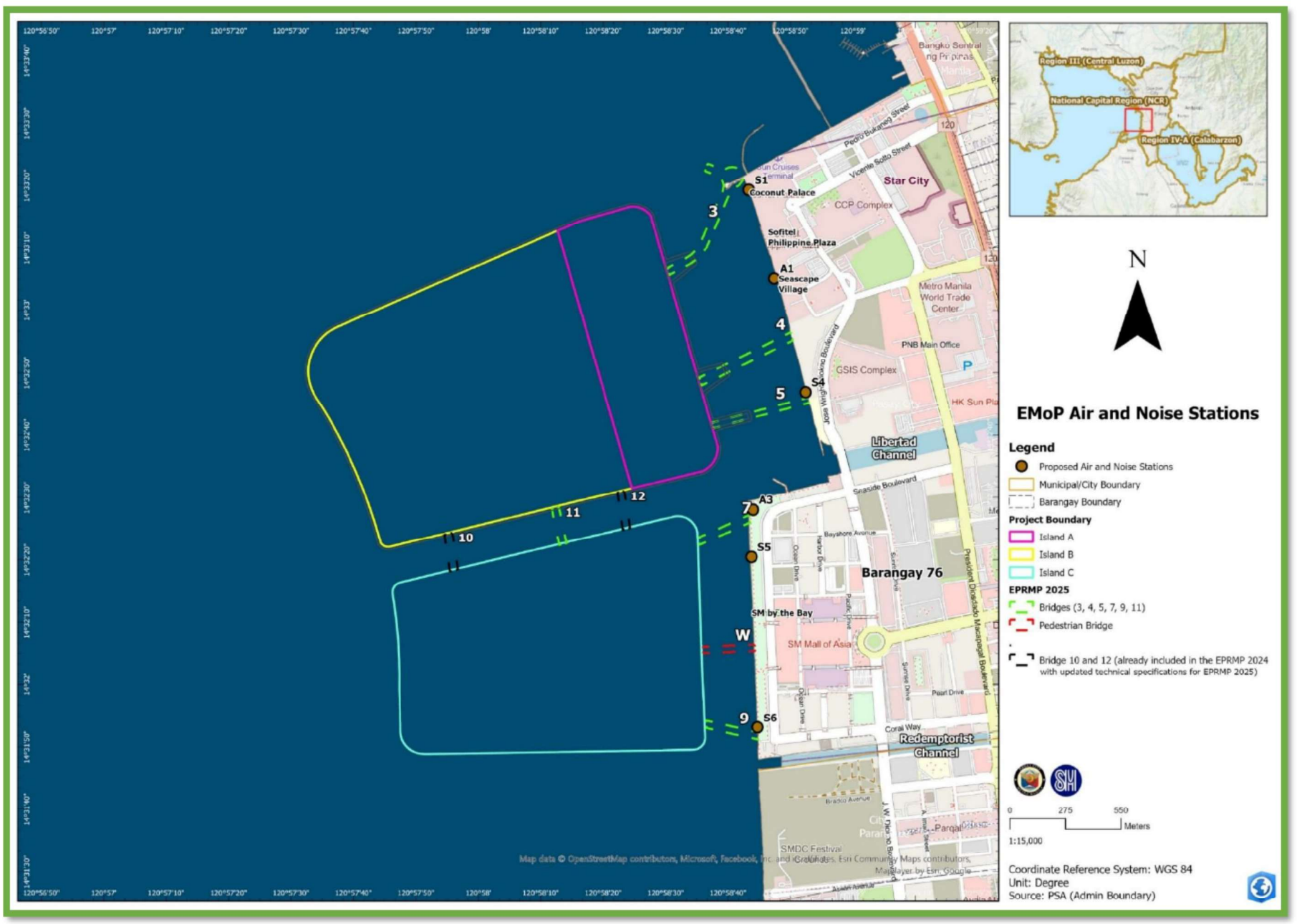


Figure 5.1 24-hr TSP and PM10 Approved Monitoring Stations based on EPRMP 2024

Table 5.6: Noise EIS Baseline Data (2013) and CMR Monitoring Data (2021 to 2024)

EIS 2017 Daytime Noise (Sampling on 2013 and 2014)

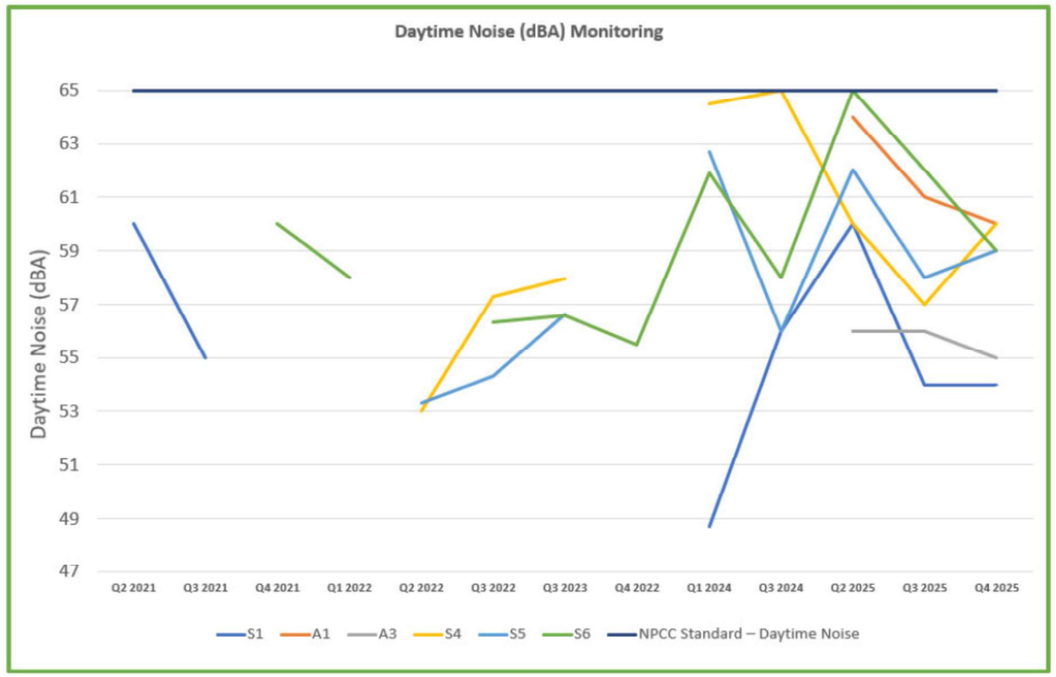
Station	Location	Date/Time of Sampling	MIN (dBA)	MAX (dBA)	MEAN (dBA)	MEDIAN (dBA)	NPCC standard for Class B
1	NE part of the proposed Pasay Reclamation and Extension Project, in front of Coconut Palace	January 28-29, 2013 (Daytime)	63.8	76.7	69.1	69.0	**65**
2	In front of SM – Mall of Asia (MOA), Pasay City		53.1	66.7	57.0	56.4	**65**
3	Near the mouth of Parañaque River, Parañaque City		51.6	60.8	54.5	54.2	**65**
1	NE part of the proposed Pasay Reclamation and Extension Project, in front of Coconut Palace		58.4	68.7	64.1	64.2	**65**
2	In front of SM – Mall of Asia (MOA), Pasay City		60.3	80.5	70.1	70.2	**65**
1	NE part of the proposed Pasay Reclamation and Extension Project, in front of Coconut Palace	August 2014 (Daytime)	53.3	80.9	69.9	69.8	**65**
2	In front of SM – Mall of Asia (MOA), Pasay City		67.0	81.5	75.3	75.6	**65**
3	Near the mouth of Parañaque River, Parañaque City		69.1	83.7	74.5	74.3	**65**

Source/Reference: Pasay City Government and Technotrix Consultancy Services, Inc. EIS Final Report for the Proposed 360 hectares Reclamation Project (October 2017)



EIS 2017 Noise Monitoring Stations (2013 and 2014)

Daytime Noise CMR and CMVR Air Data (2021 to 2025)



Source/Reference: CMR and CMVR Ambient Air Data (2021 to 2025)



5.2.2. COMPLIANCE TO WATER QUALITY MONITORING

The Water Quality Environmental Monitoring Plan (EMoP) indicated and approved in the EPRMP 2024 and its corresponding compliance is presented in Table 5.7. The compliance monitoring sampling stations is also presented in Figure 5.2.

Overall, the results of the environmental monitoring conducted during the reporting period indicate that the Proponent has complied with the requirements of the approved Environmental Monitoring Program (EMP). Monitoring of the identified environmental parameters showed that the measured conditions remained generally within the prescribed Environmental Quality Performance Levels (EQPL) and applicable regulatory standards. The trend analysis of the monitoring data indicates stable environmental conditions in the project area, with no significant or sustained adverse impacts attributable to project activities. The results further demonstrate that the implemented environmental management and mitigation measures are effective in preventing or minimizing potential impacts, thereby ensuring continued compliance with the commitments stipulated in the ECC and the approved EMP.

The monitoring stations used in the current EPRMP were updated relative to those established during the EIS stage (2012 and 2016) to reflect the reconfiguration of the reclamation island layout and associated project components. During the detailed engineering and project refinement stage, the shape and configuration of the reclamation areas were modified, which consequently affected the spatial distribution of construction activities and potential environmental impact zones.

As such, the locations of the environmental monitoring stations were adjusted to ensure that they remain representative of the current project footprint. The updated monitoring stations were selected to better capture environmental conditions in relation to the revised reclamation boundaries including the bridges, support facilities and the approximate locations of active construction works.

On the other hand, the baseline data from the EIS 2017 prepared by Technotrix Consultancy Services, Inc. which was conducted in 2012 and 2016 are presented in Table 5.10. The water sampling locations of the baseline data in 2012 and 2016 is presented in Figure 5.11 which were based on the original configuration of Pasay 360. It has to be noted that the sampling stations were updated based on the project reconfiguration and existing condition of the project site. While baseline environmental data (2012 and 2016) are available, direct comparison with the current monitoring results should be interpreted with caution since the baseline monitoring stations used in the EIS are located in different sampling locations from the present CMR and CMVR monitoring stations. As such, the EIS baseline data are presented primarily for general reference to the historical environmental conditions of the area. Nevertheless, the current monitoring results for water quality parameters indicate that conditions in the vicinity of the project remain within the applicable regulatory standards, and no significant adverse impacts attributable to project activities have been observed during the monitoring period.

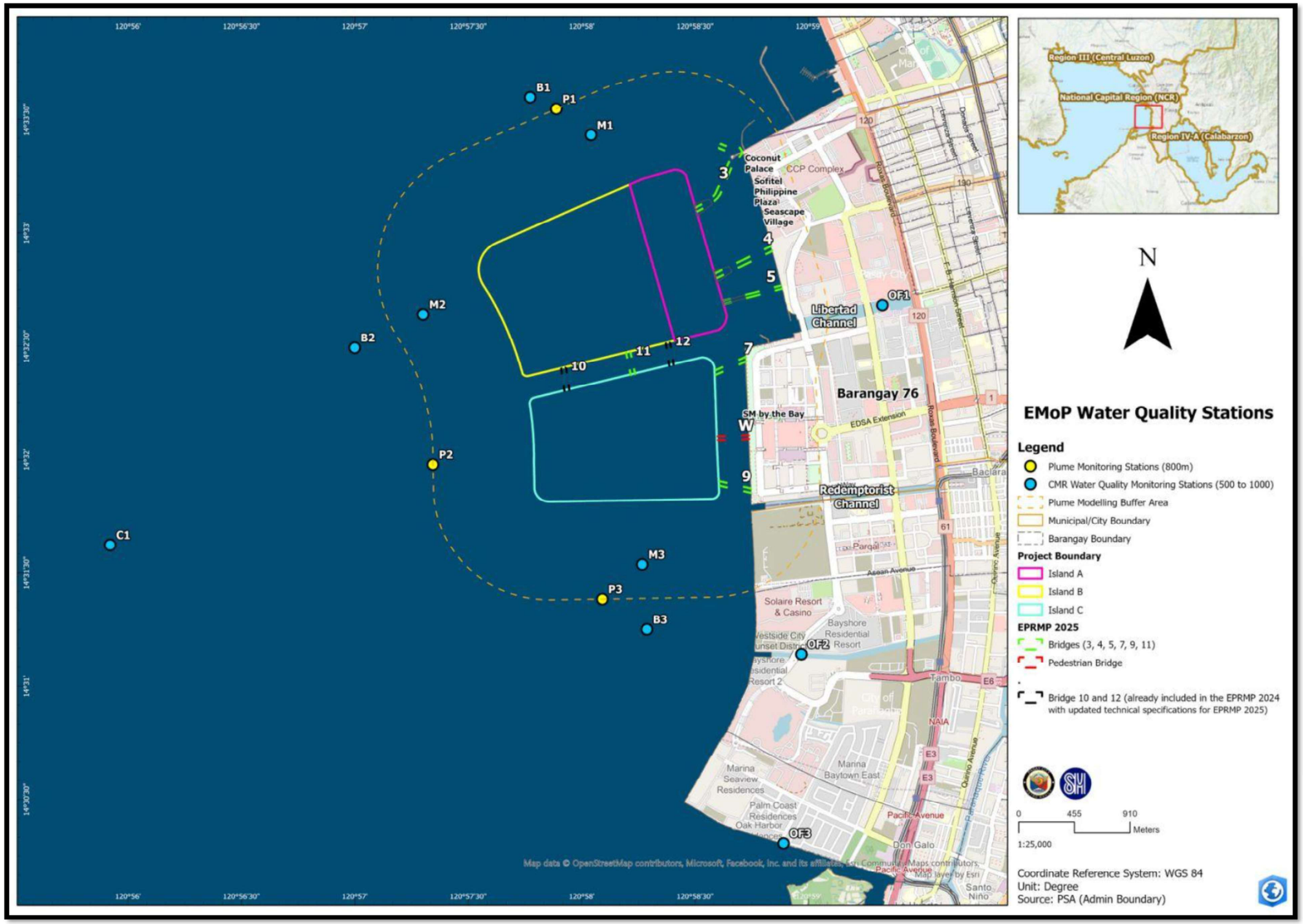


Figure 5.2 Water Quality Monitoring Stations

Table 5.7: Compliance with the Approved Water Quality EmoP and Trend Analysis

Key Environmental Aspects per Project Phase Activities	Potential Impacts per Environmental Sector	Parameter to be Monitored	Sampling and Measurement Plan			Reference	Trend Analysis
			Method	Frequency	Location		
Water	Degradation of Water Quality	Sediment Plume	Visual monitoring/ Drone survey	Daily	3 Monitoring Stations (800 meters from the Project Boundary) which is based on the sediment plume modeling (See Appendix S of EPRMP 2024)	Gdrive link	At most of the time, observations showed no extensive or persistent sediment plumes beyond the immediate work zones, and any localized turbidity appeared temporary and consistent with normal construction-related disturbances. The surveys confirmed that sediment dispersion remained confined within the expected influence area and did not result in observable adverse impacts at most on the surrounding marine waters. Gdrive: https://docs.google.com/spreadsheets/d/162RnpUmnRRMSI8V0oF-QFUO39Sr2eb4M/edit?gid=1321835436#gid=1321835436
	Degradation of Water Quality	TSS	Gravimetric (Dried at 103-105^{O}C) Water Sampling/ Collection for Laboratory Analysis	Monthly and as needed based on the daily visual monitoring of Plume		Figure 5.3 Figure 5.4	The Total Suspended Solids (TSS) and turbidity monitoring results from both the coastal water quality stations (C1, B1, B2, B3, M1, M2, M3) and the plume monitoring stations (P1, P2, P3) indicate generally low concentrations and stable water quality conditions in the marine area surrounding the reclamation site. Higher TSS values were occasionally observed at OF1, OF2, and OF3, with exceedances recorded at OF2 (Q4 2022) and OF3 (Q2 2023). However, these stations correspond to existing drainage outfalls located upstream on the mainland, as shown in the monitoring station map, and receive runoff from urbanized catchments along the Manila Bay coastal area. Elevated concentrations at these locations are therefore associated with land-based discharges such as stormwater runoff and drainage channel sediment resuspension, and are not attributable to reclamation activities. Overall, the monitoring results demonstrate that marine water quality within and around the project area remains compliant with applicable DENR standards and environmental performance limits, and no sustained increasing trend in TSS or turbidity attributable to the reclamation works is evident based on the monitoring data.
	Degradation of Water Quality	Turbidity	Nephelometric/ Handheld Turbidity Meter	Monthly and as needed based on the daily visual monitoring of Plume		Figure 5.5	
	Degradation of Water Quality	Transparency	Manual -Secchi disc	Monthly and as needed based on the daily visual monitoring of Plume		Table 5.8	The results of the Secchi disk transparency monitoring for the reporting period indicate that water clarity at all monitoring stations remained within the prescribed Environmental Quality Performance Level (EQPL). The observed transparency levels demonstrate that the water body maintained acceptable conditions throughout the monitoring period, with no indication of excessive turbidity. Overall, the monitoring results confirm that the project activities did not result in significant deterioration of water transparency and that the EQPL requirement was consistently complied with during the monitoring period.
	Degradation of Water Quality	Oil and Grease	Liquid-Liquid, Partition - Gravimetric In case of Incident	Quarterly As needed	At identified monitoring points based on quarterly sampling activities Mid Depth 3 Depths (Surface, Middle, Bottom)	Figure 5.6	The oil and grease monitoring results from Q3 2022 to Q4 2025 show that concentrations across most monitoring stations remained generally low and within the DENR DAO 2016-08 Class SB guideline value of 2 mg/L. Stations located within the marine area surrounding the project, including C1, B1, B2, B3, M1, M2, M3, and OF3, exhibited stable levels with only minor fluctuations throughout the monitoring period, reflecting typical coastal conditions influenced by normal marine activities, vessel movement, and occasional coastal runoff. An isolated exceedance was observed at OF2 during one monitoring period; however, OF1, OF2, and OF3 are existing drainage outfalls located upstream on the mainland that receive runoff from urbanized catchments along the Manila Bay coastal area, indicating that the elevated concentration is likely associated with land-based discharges rather than reclamation activities. Overall, the results indicate that oil and grease levels in the marine waters surrounding the project remain compliant with the DENR DAO 2016-08 guideline value of 2 mg/L, with no observable increasing trend attributable to project activities.

Key Environmental Aspects per Project Phase Activities	Potential Impacts per Environmental Sector	Parameter to be Monitored	Sampling and Measurement Plan			Reference	Trend Analysis
			Method	Frequency	Location		
	Degradation of Water Quality	Arsenic	ICP-OES	Quarterly	At identified monitoring points based on quarterly sampling activities	Table 5.9	The monitoring results for arsenic, hexavalent chromium (Cr^{6+}), lead, and mercury from Q3 2022 to Q4 2025 indicate that concentrations across all monitoring stations (C1, B1, B2, B3, M1, M2, M3, OF1, OF2, and OF3) were consistently below the laboratory detection limits throughout the monitoring period except for arsenic Q3 2022 readings on which a very small to nil amount is detected. The absence of detectable concentrations for these heavy metals suggests that no measurable accumulation or discharge of these contaminants occurred in the marine waters surrounding the project area. This consistent trend across all stations and monitoring periods indicates stable baseline water quality conditions and the absence of contamination from project-related activities or other significant sources. Overall, the results demonstrate that the monitored heavy metals remain well within the applicable DENR DAO 2016-08 water quality guideline values for Class SB waters, confirming continued compliance with the prescribed environmental standards
	Degradation of Water Quality	Chromium	Colorimetric				
	Degradation of Water Quality	Lead	ICP-OES				
	Degradation of Water Quality	Mercury	Cold Vapor AAS				
	Degradation of Water Quality	BOD5	5-day BOD Test			Figure 5.7	The Biochemical Oxygen Demand (BOD_5) monitoring results from Q3 2022 to Q4 2025 show generally low concentrations at the marine monitoring stations (C1, B1, B2, B3, M1, M2, and M3) surrounding the project area. Most recorded values remained low with only minor fluctuations throughout the monitoring period, indicating relatively good organic water quality conditions in the coastal waters. Occasional increases observed at some stations during certain quarters were intermittent and not sustained, and are likely influenced by natural coastal processes such as tidal mixing, seasonal runoff, and the transport of organic matter in Manila Bay, rather than project-related activities. Higher and more variable BOD_5 concentrations were observed at the mainland outfall stations (OF1, OF2, and OF3), which are existing drainage outfalls located upstream on the mainland that receive discharges from urbanized catchments and drainage systems along the Manila Bay coastal area. Elevated values at these locations are therefore likely associated with land-based inputs such as urban runoff and domestic wastewater contributions rather than reclamation activities. It should also be noted that DENR DAO 2016-08 does not prescribe a BOD_5 water quality guideline value for Class SB marine waters, as BOD is typically applied to freshwater classifications where oxygen depletion from organic loading is more directly assessed. For coastal and marine waters, other parameters such as dissolved oxygen are considered more appropriate indicators of organic pollution and ecosystem health. Overall, the monitoring results indicate no consistent increasing trend in BOD_5 levels within the marine stations attributable to the project activities.
	Degradation of Water Quality	pH	Electrometric			Figure 5.8	The pH monitoring results from Q3 2022 to Q4 2025 indicate that values across all monitoring stations (C1, B1, B2, B3, M1, M2, M3, OF1, OF2, and OF3) generally remained within the DENR DAO 2016-08 Class SB guideline range of pH 7.0 to 8.5. Minor fluctuations were observed during certain monitoring periods, with occasional slightly higher values; however, these variations were isolated and not sustained, and are typical of coastal waters influenced by tidal mixing, biological activity, temperature variation, and natural seawater buffering capacity. Overall, the pH levels remained relatively stable across both marine monitoring stations and mainland outfall stations, indicating normal marine water conditions with no significant changes attributable to project activities.
	Degradation of Water Quality	Temp	Laboratory and field (in-situ)			Figure 5.9	The temperature monitoring results show that recorded values across all stations generally fell within the DENR DAO 2016-08 Class SB guideline range of 26°C to 30°C, with some instances slightly above the upper range during certain quarters. Such variations are common in tropical coastal environments like Manila Bay, where water temperature is influenced by seasonal changes, solar radiation, tidal circulation, and shallow coastal water conditions. The observed fluctuations were temporary and did not exhibit a consistent increasing trend across the monitoring period. Overall, the results indicate that the temperature conditions in the monitoring area remain relatively stable and reflective of natural coastal variability, with no evident impacts attributable to the reclamation activities.
	Degradation of Water Quality	Color, True	Visual comparison			Figure 5.10	The color monitoring results from Q3 2022 to Q4 2025 show that values across most marine monitoring stations (C1, B1, B2, B3, M1, M2, and M3) generally remained low

Key Environmental Aspects per Project Phase Activities	Potential Impacts per Environmental Sector	Parameter to be Monitored	Sampling and Measurement Plan			Reference	Trend Analysis
			Method	Frequency	Location		
							and within the DENR DAO 2016-08 Class SB guideline value of 50 TCU. Minor fluctuations were observed across the monitoring period, which are typical in coastal environments and may be influenced by natural sediment movement, tidal mixing, organic matter, and seasonal runoff in Manila Bay. These variations were intermittent and did not show any consistent increasing trend, indicating stable water quality conditions in the marine area surrounding the project. A higher value was recorded at OF2 during Q4 2022, which reached the guideline value of 50 TCU. However, OF1, OF2, and OF3 are existing drainage outfalls located upstream on the mainland, receiving runoff from urbanized drainage systems along the Manila Bay coastal area. Variations observed at these stations are therefore likely associated with land-based inputs such as urban runoff, suspended sediments, and organic materials transported through drainage channels, rather than reclamation activities. Overall, the monitoring results indicate that color levels in the marine monitoring stations remain compliant with the DENR DAO 2016-08 guideline value of 50 TCU, with no observable trend attributable to project activities.

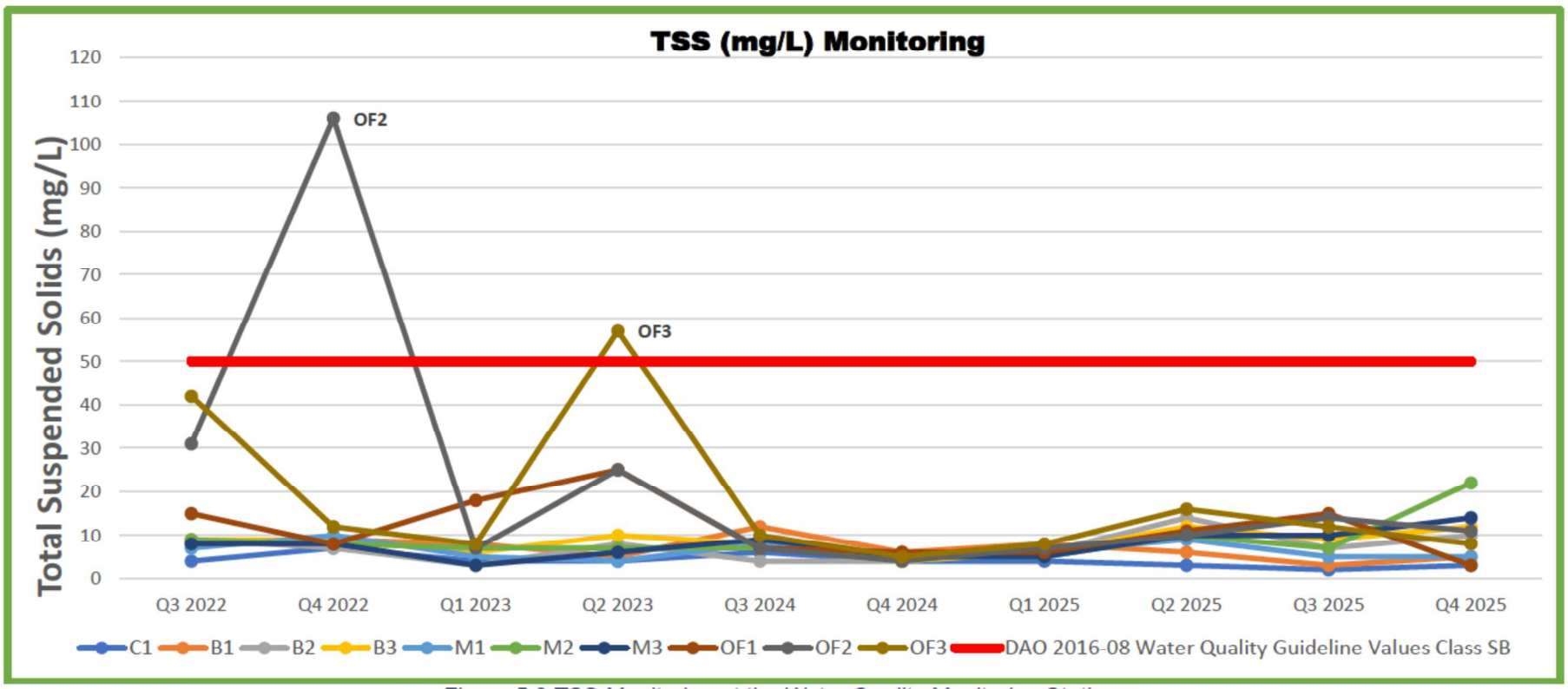


Figure 5.3 TSS Monitoring at the Water Quality Monitoring Stations

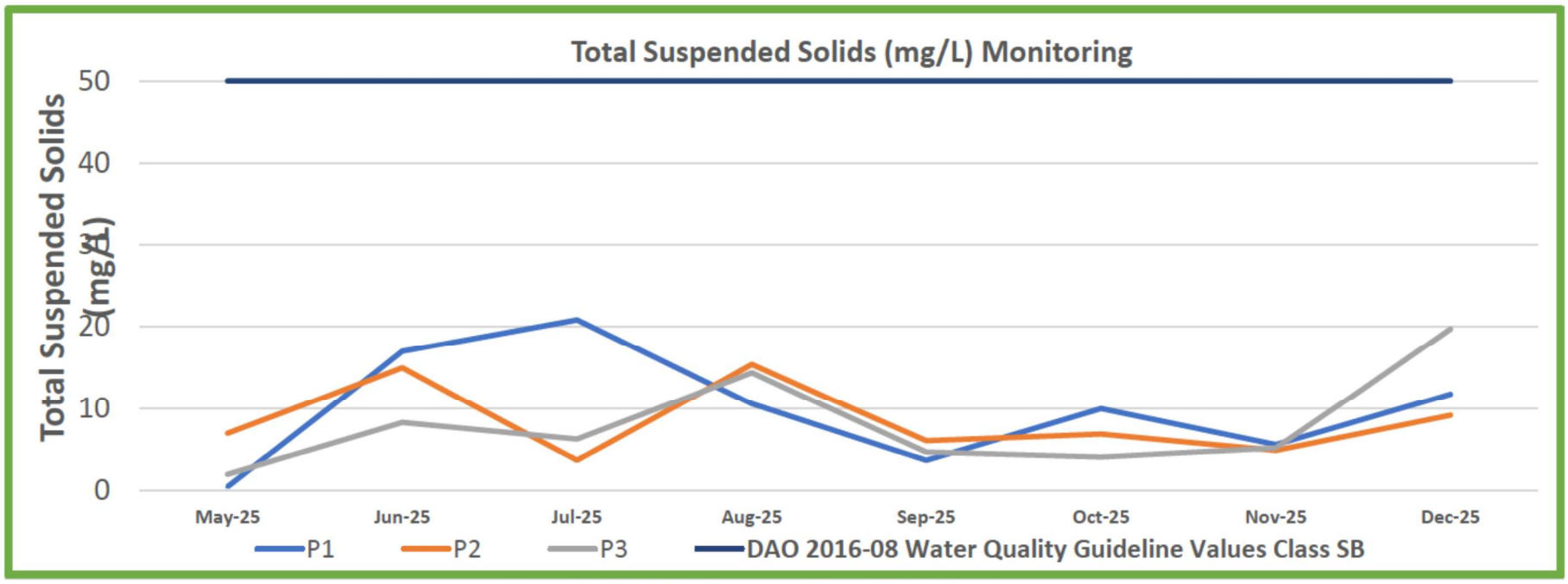


Figure 5.4 TSS Monitoring at Plume Monitoring Stations

Table 5.8: Transparency Monitoring

Quarter	P1	P2	P3
Units	m	m	m
Jul 2025	1.18	1.82	1.28
Aug 2025	1.82	1.43	1.18
Sep 2025	3.08	1.00	1.23
Oct 2025	1.92	2.22	1.38
Nov 2025	1.52	1.10	0.66
Dec 2025	0.78	0.52	0.52
EQPL Limit	Disk not visible at 20cm (0.020 m) depth		

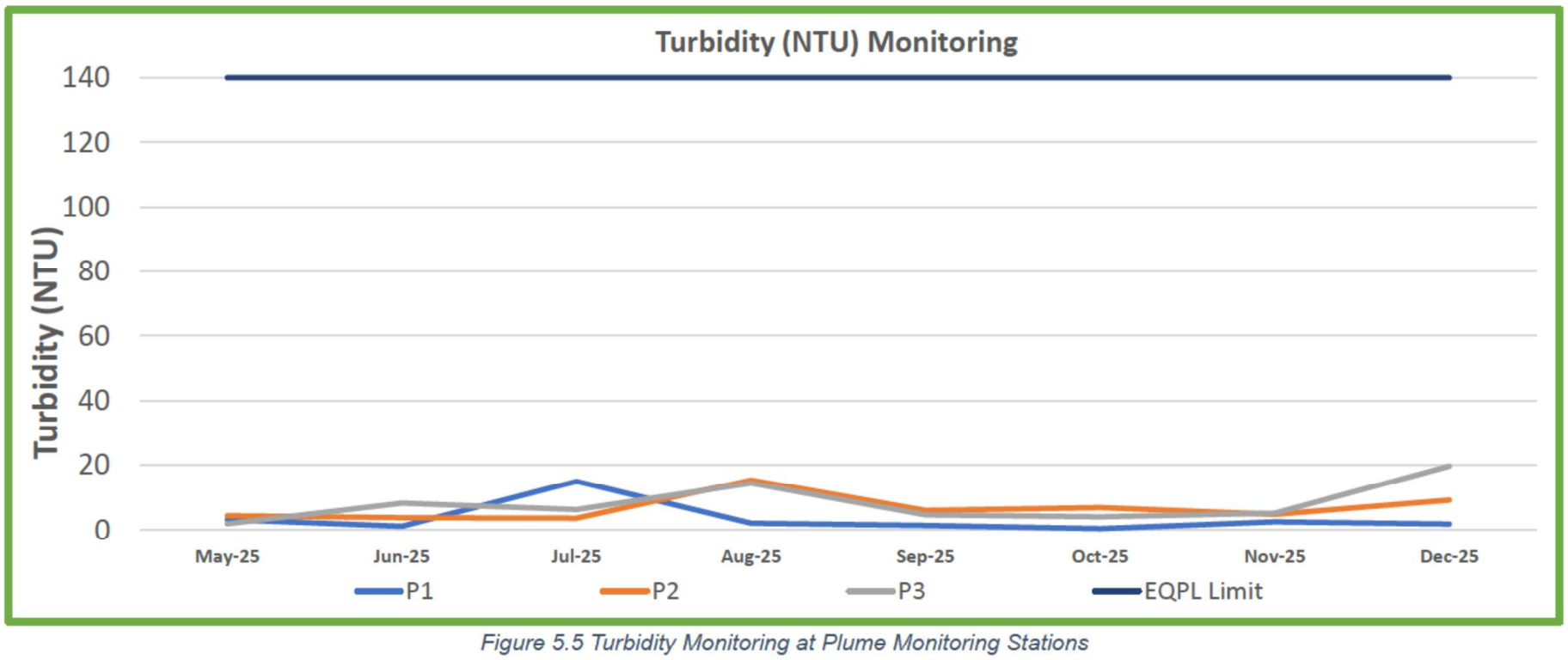


Figure 5.5 Turbidity Monitoring at Plume Monitoring Stations

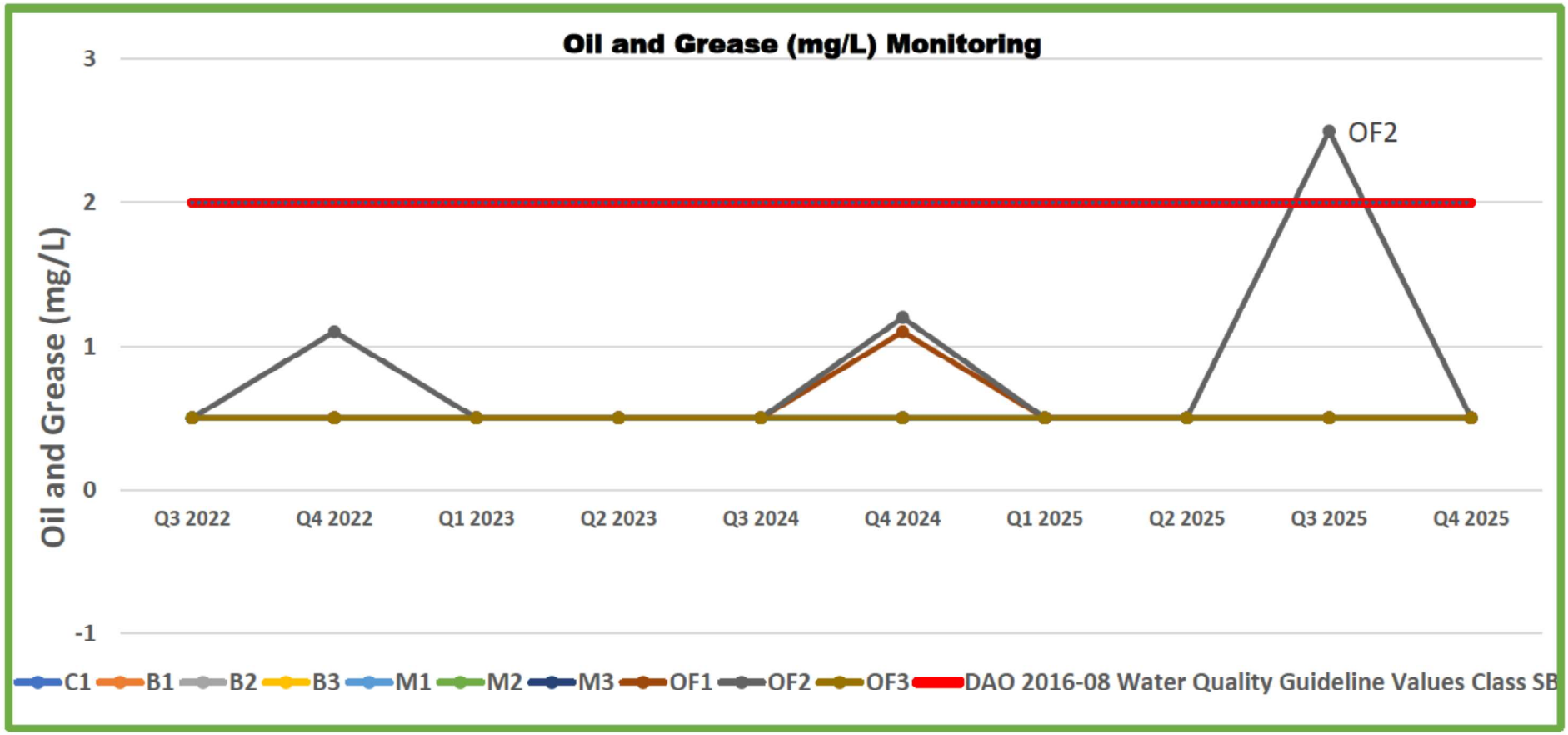


Figure 5.6 Oil and Grease Monitoring at the Water Quality Monitoring Stations

Table 5.9: Heavy Metals Monitoring

Quarter	C1	B1	B2	B3	M1	M2	M3	OF1	OF2	OF3
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Arsenic (As)										
Q3 2022	0.0014	0.001	0.0011	0.0011	0.0099	0.0008	0.0012	0.0015	0.0015	0.0014
Q4 2022	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007
Q1 2023	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007
Q2 2023	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Q3 2024	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Q4 2024	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Q1 2025	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Q2 2025	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Q3 2025	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Q4 2025	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
DAO 2016-08 Water Quality Guideline Values Class SB	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**
Chromium Hexavalent (Cr^{+6})										
Q3 2022	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Q4 2022	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Q1 2023	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Q2 2023	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Q3 2024	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Q4 2024	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01
Q1 2025	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Q2 2025	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Q3 2025	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01
Q4 2025	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01
DAO 2016-08 Water Quality Guideline Values Class SB	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**
Lead (Pb)										
Q3 2022	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Q4 2022	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Q1 2023	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Q2 2023	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.007	<0.0007	<0.0007	<0.0007
Q3 2024	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
Q4 2024	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
Q1 2025	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
Q2 2025	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
Q3 2025	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
Q4 2025	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
DAO 2016-08 Water Quality Guideline Values Class SB	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**
Mercury (Hg)										
Q3 2022	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Q4 2022	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Q1 2023	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Q2 2023	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Q3 2024	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Q4 2024	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Q1 2025	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Q2 2025	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Q3 2025	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Q4 2025	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.004
DAO 2016-08 Water Quality Guideline Values Class SB	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**

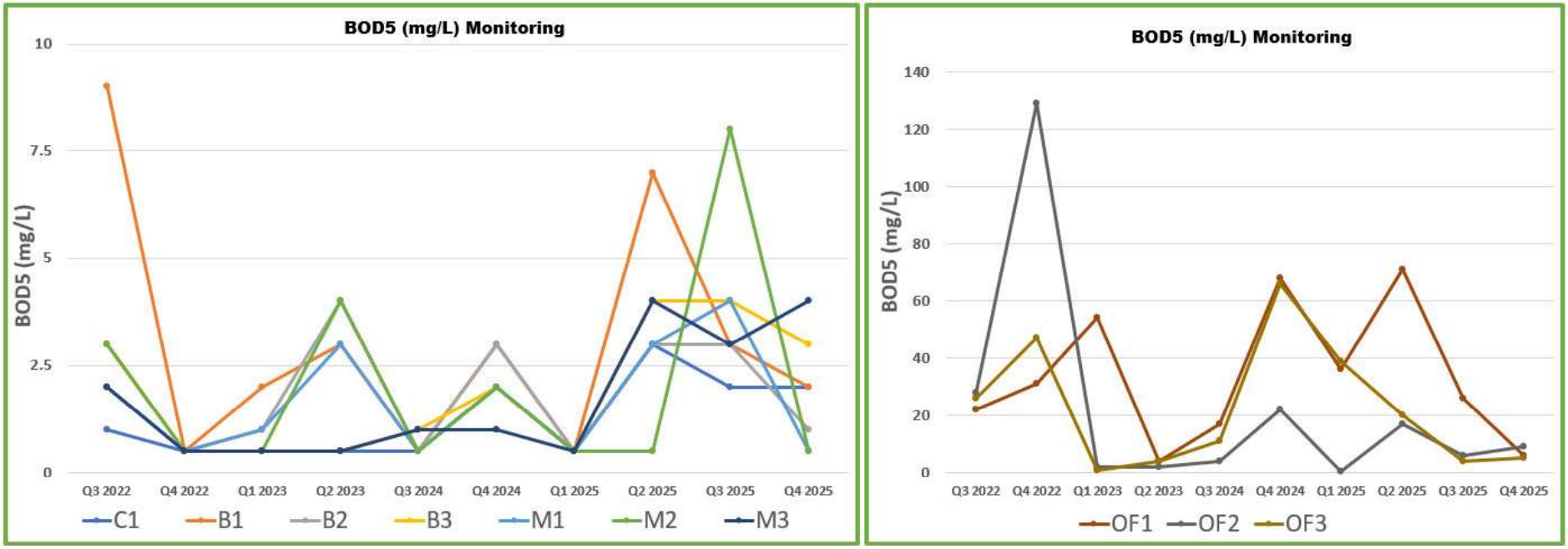


Figure 5.7 BOD Monitoring

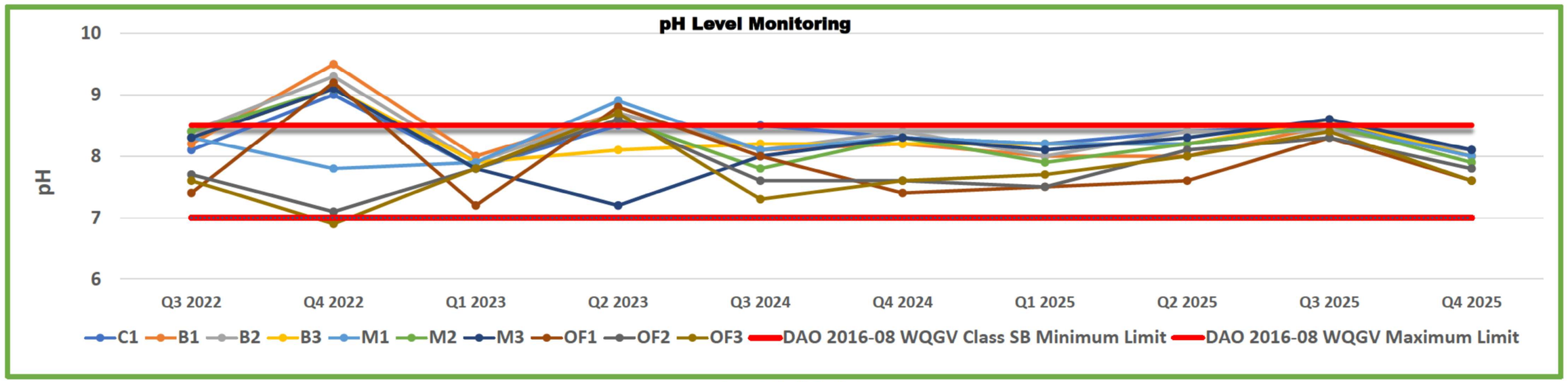


Figure 5.8 pH Monitoring

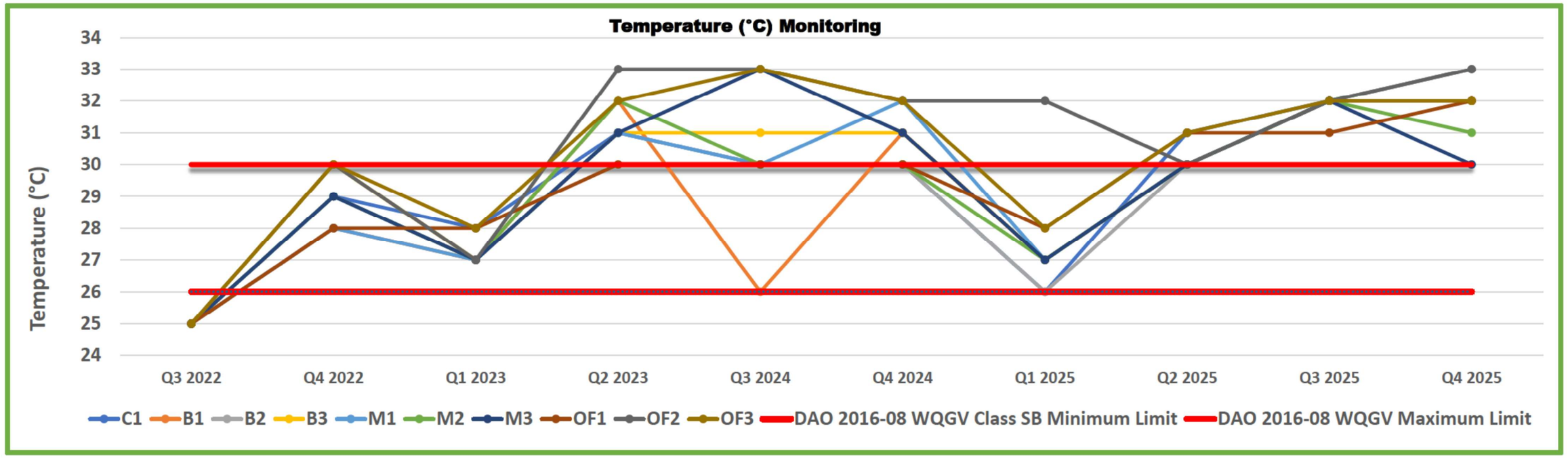


Figure 5.9 Temperature Monitoring

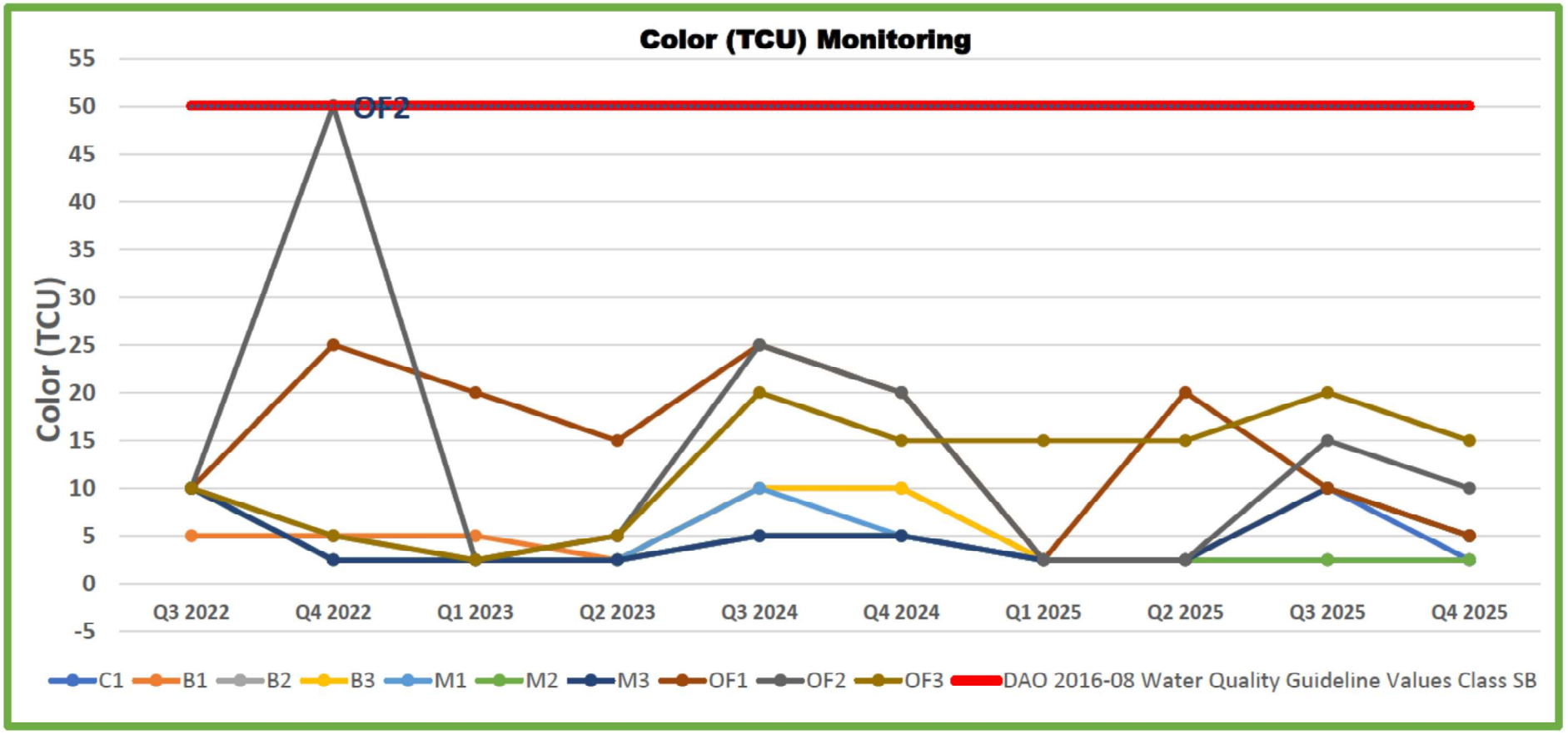


Figure 5.10 Color Monitoring



Figure 5.11 Water Quality EIS and CMR Monitoring Stations
Source/Reference: EIS 2017 and CMR Monitoring Stations (2022 to 2024)

Table 5.10: EIS Water Quality Baseline Data (2012 and 2016)

Code	Sampling Date	pH	Color	TDS	Oil and Grease	Ammonia-N	Cyanide, Free	Nitrate, -N	Phosphate	Salinity as NaCl	Fecal Coliform	Arsenic	Chromium	Lead	Mercury	TSS	Total Coliform	BOD5	COD	Chloride	DO	Cadmium
	Units	-	PCU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	MPN/100mL	mg/L	mg/L	mg/L	°C	mg/L	MPN/100mL	mg/L	mg/L	mg/L	mg/L	mg/L
1	11 Nov 2012	9.05	75	18,900	0.40	0.12	0.15	0.11	0.04	17,900	17	0	0	0	0	-	-	-	-	-	-	-
2	11 Nov 2012	8.9	25	21,000	0.41	0.05	0.15	0.09	0.04	19,600	4.0	0	0	0	0	-	-	-	-	-	-	-
3	11 Nov 2012	8.80	25	21,000	0.36	0.04	0.14	0.03	0.04	21,000	2.0	0	0	0	0	10	-	-	-	-	-	-
4	11 Nov 2012	8.16	25	19,500	0.42	2.7	0.13	0.17	0.28	17,000	170	0	0	0	0	12	-	-	-	-	-	-
5	11 Nov 2012	7.3	-	29,600	0.52	0.08	0.30	0	0.04	25,800	350	0	0	0	0	0	-	-	-	-	-	-
6	11 Nov 2012	9.6	-	-	0.9	-	-	0.08	0.02	-	<1.8	<0.01	<0.003	-	<0.0001	29	<1.8	8	797	10,000	9.5	<0.006
7	11 Nov 2012	7.94	-	28,600	0.54	3.4	0.24	0	0.23	26,600	14,000	0	0	0	0	-	-	-	-	-	-	-
8	11 Nov 2012	9.4	-	-	0.8	-	-	0.2	0.04	-	<1.8	<0.01	<0.003	-	<0.0001	27	<1.8	7	797	9,570	9.3	<0.006
9	11 Nov 2012	9.2	-	-	0.8	-	-	0.3	0.02	-	<1.8	<1.8	<0.003		<1.8	26	<1.8	7	998	9,970	9.7	<1.8
10	7 January 2016	-	-	-	-	-	-	-	-	-	28,000	-	<0.003	<0.05	-	-	160,000	33	-	-	-	-
11	7 January 2016	-	-	-	-	-	-	-	-	-	170	-	<0.003	<0.05	-	-	170	5	-	-	-	-
12	7 January 2016	-	-	-	-	-	-	-	-	-	<1.8	-	<0.003	<0.05	-	-	<1.8	16	-	-	-	-
13	7 January 2016	-	-	-	-	-	-	-	-	-	350	-	<0.003	<0.05	-	-	350	5	-	-	-	-
14	7 January 2016	-	-	-	-	-	-	-	-	-	240	-	<0.003	<0.05	-	-	240	5	-	-	-	-
DAO 2016-08 and DAO 2021-19[b] WQG Values, Class – SB		**7.0-8.5**	**-**	**-**	**2**	**0.06[b]**	**0.02**	**10**	**0.2[b]**	**-**	**100[b]**	**0.01**	**0.05**	**0.01**	**0.001**	**50**	-	Not applicable	-	Not applicable	Min. 6	0.003
DAO 2016-08 and DAO 2021-19[b] QG Values, Class – SC		**6.5-8.5**	**-**	**-**	**3**	**0.06[b]**	**0.1**	**10**	**0.2[b]**	**-**	**200[b]**	**0.02**	**0.05**	**0.05**	**0.002**	**80**	-	Not applicable	-	Not applicable	Min 5	0.005

Source/Reference: Pasay City Government and Technotrix Consultancy Services, inc. EIS Final Report for the Proposed 360 hectares Reclamation Project (October 2017)

5.3. SELF-MONITORING PLAN

Table 5.11 presents the approved Environmental Monitoring Plan with Environmental Quality Performance Levels (EQPL) for the Project using the template prescribed in Annex 2-21 of DAO 03-30 while Figure 5.12 and Figure 5.13 shows the location of the proposed air and noise, and water quality monitoring stations. quality performance level (EQPL) management scheme.

For the construction of Inter-Island and Mainland-Connecting Bridge Structures for the EPRMP 2025, the approved EMOP in 2024 will be used as the construction of these bridges have already been considered in 2024. The only updated section for the EPRMP 2025 is the – Management Measures Alert, Action, and Limit portions which is now more on “action-based” instead of anchored on sampling.

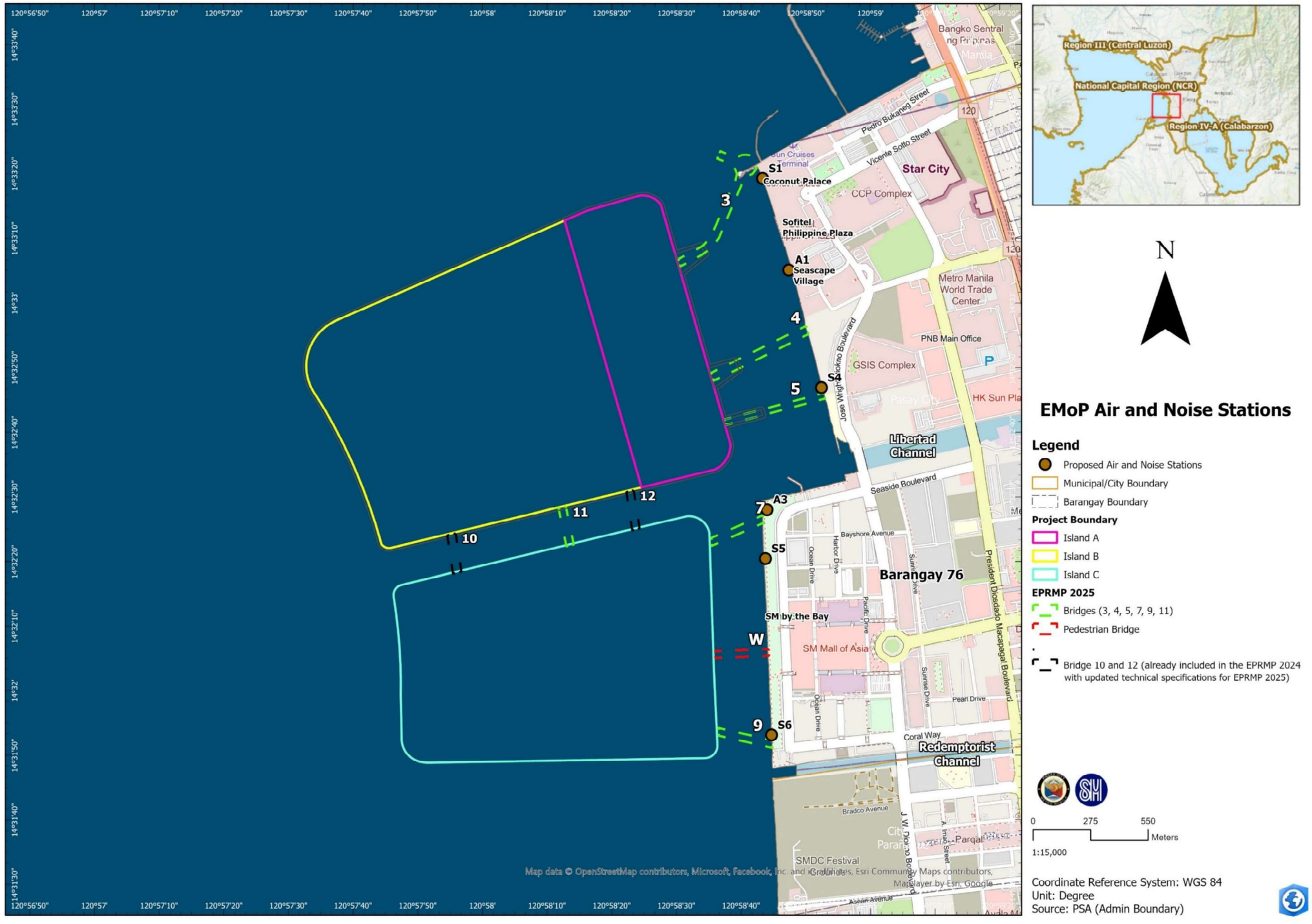
Table 5.11: Environmental Monitoring Program (Updated for EPRMP)

Key Environmental Aspects per Project Phase Activities	Potential Impacts per Environmental Sector	Parameter to be Monitored	Sampling and Measurement Plan			Lead Person	Annual Estimated Cost	Environmental Quality Performance Levels (EQPL) Management Scheme					
								EQPL Range			Management Measures		
			Method	Frequency	Location			Alert	Action	Limit	Alert	Action	Limit
PRE-CONSTRUCTION PHASE													
Based on the actual geo-technical investigation of the seabed in the project site, the area is totally devoid (zero) of corals and the silt and mud were measured at an average depth of 4 meters. It was deemed that no disturbance of corals and marine ecology during the geotechnical survey of the seabed. Deemed not applicable in as much as the pre-construction phase activities were essentially all completed.													
SITE PREPARATION PHASE													
Removal of scraps, debris at sea bed. Recovery of artifacts	Historic Relics - Impacts on Physical Cultural Resources	Artifacts	Visual	During entire activity	At specific sites recovery	Environmental Unit	Part of construction cost	Follow approved Unexploded Ordinance (UXO) procedure. Contact relevant authorities for accidental finds.					
CONSTRUCTION PHASE (Dredging, Construction of Containment Walls and Temporary Support Facilities, Filling Operation, Related construction activities at temporary working areas, Stabilization and other Horizontal Development Structures)													
Air	Ambient Air Quality – Degradation of Air Quality (Dust)	24-hr TSP	High Volume – Gravimetric Method	Quarterly	S-1, A1, A-3, S-4, S-5, S-6	Environmental Unit	PhP 720,000	170 micrograms per normal cubic meter (ug/NCM)	190 ug/NCM	215 ug/NCM	Increase water spraying frequency on construction areas, and haul roads. Cover stockpiles and transport trucks carrying fine materials. Implement speed limits for construction vehicles within the work area.	Intensify dust suppression measures including continuous water spraying. Temporarily reduce earthmoving, excavation, or hauling activities generating dust. Install temporary wind barriers or additional covering of materials.	Immediately stop dust-generating activities causing excessive emissions. Deploy additional dust control measures (water trucks, covering, barriers). Resume work only after dust emissions are effectively controlled.
		24-hr PM10						105 ug/NCM	125 ug/NCM	140 ug/NCM			
	Noise –Increase in Noise Level	Daytime Noise	Meter	Quarterly Weekly (Internal)	S-1, A1, A-3, S-4, AS-5, S-6	Environmental Unit (EU)	PhP 20,000 Part of the internal monitoring cost of the contractor	59 dBA and/or 1 to 2 noise complaints lodged by the affected community.	61 dBA and/or 3 to 4 noise complaints lodged by the affected community.	63 dBA and/ or 5 or more noise complaints lodged by the affected community.	Ensure proper maintenance of construction equipment to minimize noise. Schedule noisy activities during allowable daytime hours. Install temporary noise barriers where necessary.	Limit simultaneous operation of noisy equipment within the same area. Deploy portable noise barriers or acoustic enclosures. Relocate or reposition equipment away from sensitive receptors when feasible.	Temporarily suspend high-noise construction activities causing excessive noise. Implement additional noise control measures before resuming
Land	Generation of Solid Waste ted	Solid Waste	Visual	Daily or as needed	Project construction activity areas	Environmental Unit (EU)	Part of the internal monitoring cost of the contractor	Solid waste accumulation in storage areas reaches 75% of capacity	Solid waste accumulation in storage areas reaches 85% of capacity	Solid waste accumulation in storage areas reaches 95% of capacity	Ensure proper segregation and temporary storage of solid waste in designated containers.	Immediately collect and transfer accumulated waste to the designated temporary storage area.	Suspend construction activities in affected areas until accumulated waste is

Key Environmental Aspects per Project Phase Activities	Potential Impacts per Environmental Sector	Parameter to be Monitored	Sampling and Measurement Plan			Lead Person	Annual Estimated Cost	Environmental Quality Performance Levels (EQPL) Management Scheme					
								EQPL Range			Management Measures		
			Method	Frequency	Location			Alert	Action	Limit	Alert	Action	Limit
											Maintain regular collection schedule within construction areas.	Arrange immediate hauling and disposal through an accredited waste service provider.	properly collected, segregated, and disposed of in an approved disposal facility.
Water	Degradation of Water Quality	Sediment Plume	Visual monitoring/ Drone survey	Daily	3 Monitoring Stations (800 meters from the Project Boundary) which is based on the sediment plume modeling (See Appendix S of EPRMP 2024)	Environmental Unit	Arrangement with contractor	Plume reaches 200m from the nearest project boundary	Plume reaches 500m from the nearest project boundary	Plume reaches 800m from the nearest project boundary	Inspect dredging, bridge construction and reclamation filling activities and ensure controlled placement of fill materials and proper operation of dredging equipment. Adjust construction activities to minimize disturbance of seabed sediments. See Appendix S of EPRMP 2024 – Turbidity Management Plan	Reduce dredging or filling rate and modify equipment operation and bridge construction to minimize sediment disturbance. Ensure proper handling and controlled discharge of dredged or fill materials within the designated work area. See Appendix S of EPRMP 2024 – Turbidity Management Plan	Immediately suspend construction activities generating excessive sediment dispersion. Implement corrective measures such as adjusting construction methods, limiting active work areas, or improving material handling procedures before resuming operations. See Appendix S of EPRMP 2024 – Turbidity Management Plan
	Degradation of Water Quality	TSS	Gravimetric (Dried at 103- 105^{O}C) Water Sampling/ Collection for Laboratory Analysis	Monthly and as needed based on the daily visual monitoring of Plume		Environmental Unit	PhP 150,000	27 mg/L	36 mg/ L	45 mg/L			
	Degradation of Water Quality	Transparency	Manual -Secchi disc	Monthly and as needed based on the daily visual monitoring of Plume		Environmental Unit	PhP 5,000 per monitoring	disk not visible at 100cm depth	disk not visible at 50cm depth	disk not visible at 20cm depth			
	Degradation of Water Quality	Turbidity	Nephelometric/ Handheld Turbidity Meter	Monthly and as needed based on the daily visual monitoring of Plume		Environmental Unit	PhP 44,000	90 NTU	120 NTU	140 NTU			
	Degradation of Water Quality	Oil and Grease	Liquid-Liquid, Partition - Gravimetric	Quarterly	At identified monitoring points based on quarterly sampling activities	Environmental Unit	PhP 29,000	1.5 mg/L	1.7 mg/L	1.8 mg/L	Inspect construction equipment, barges, and fuel storage areas to ensure no visible oil leaks or spills. Ensure proper handling and storage of fuel, lubricants, and oils in designated areas with containment measures.	Immediately contain and clean up oil or grease spills using absorbent materials or spill containment equipment. Conduct maintenance or repair of leaking equipment and ensure proper handling of fuel and lubricants during refueling activities.	Immediately stop equipment operation or refueling activities causing oil or grease leakage. Implement spill response procedures and remove contaminated materials for proper disposal through an accredited waste handler

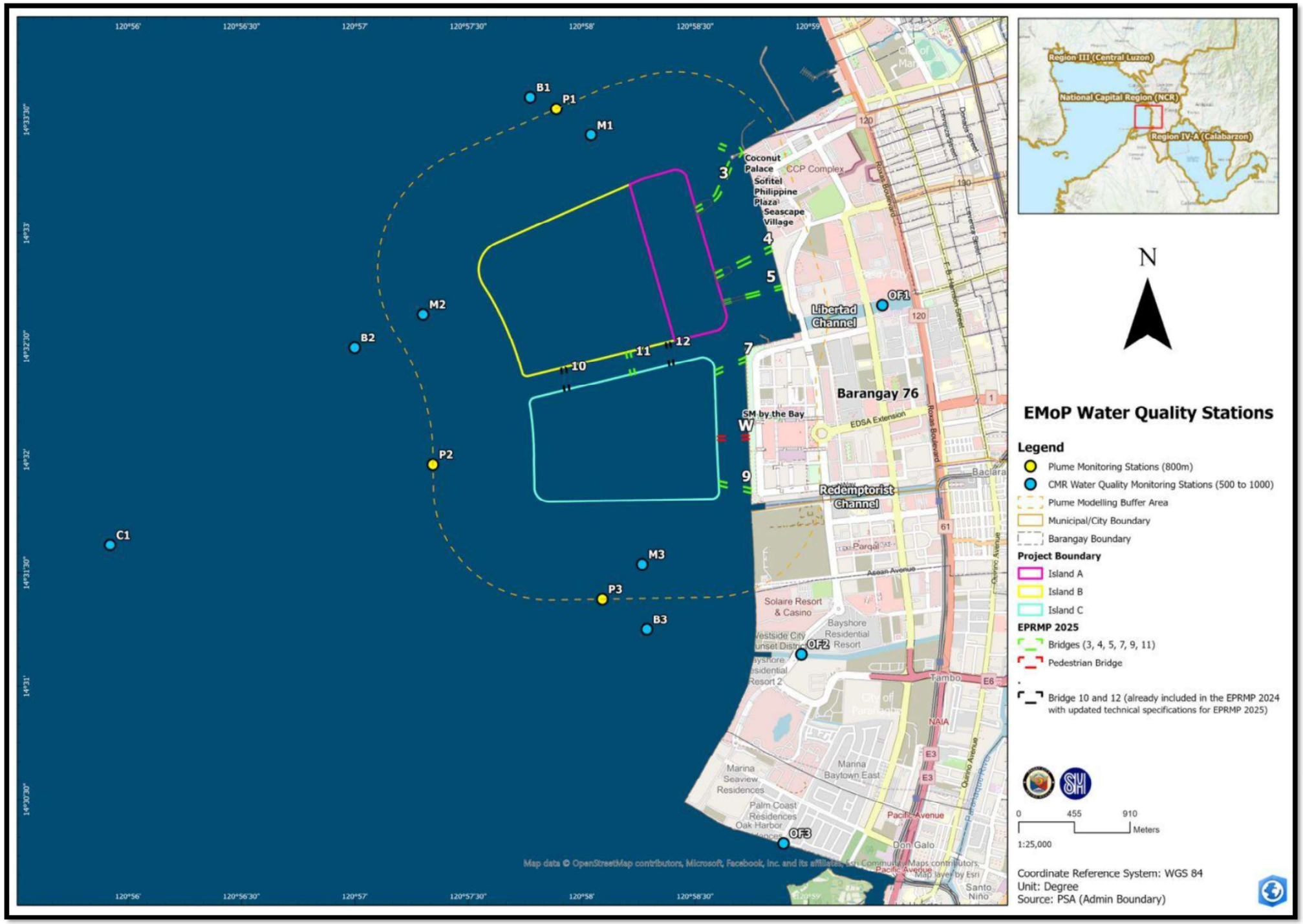
Key Environmental Aspects per Project Phase Activities	Potential Impacts per Environmental Sector	Parameter to be Monitored	Sampling and Measurement Plan			Lead Person	Annual Estimated Cost	Environmental Quality Performance Levels (EQPL) Management Scheme					
								EQPL Range			Management Measures		
			Method	Frequency	Location			Alert	Action	Limit	Alert	Action	Limit
													before resuming operations.
	Degradation of Water Quality – In case of Incident			As needed	3 Depths (Surface, Middle, Bottom) within and/or near the incident location.		Php 1,000 per sample	1.5 mg/L	1.7 mg/L	1.8 mg/L	Implementation of Environmental Emergency Response Plan (EERP) and Oil Spill Contingency Plan (OSCP, Appendix O.3 of EPRMP 2024)		
	Degradation of Water Quality	Arsenic	ICP-OES			Environmental Unit		0.01 Note: Arsenic is constrained by detection limit			Inspect dredging, excavation, bridge construction, and material handling activities to ensure proper handling and controlled placement of dredged or fill materials within the designated work area. Ensure construction equipment is well maintained to prevent leakage of fuel, lubricants, or other contaminants.	Reduce construction activities in the affected area and ensure proper handling and containment of dredged materials. Conduct maintenance or repair of equipment showing signs of leakage and implement improved material handling procedures.	Immediately suspend dredging, excavation, bridge construction, or filling activities that may introduce contaminated sediments or materials into the water. Remove or properly manage the suspected source of contamination and implement corrective construction practices before resuming operations.
	Degradation of Water Quality	Chromium	Colorimetric			Environmental Unit		0.02 mg/L	0.03 mg/L	0.04 mg/L			
	Degradation of Water Quality	Lead	ICP-OES			Environmental Unit		0.007 mg/L	0.008 mg/L	0.009 mg/L			
	Degradation of Water Quality	Mercury	Cold Vapor AAS	Quarterly	At identified monitoring points based on quarterly sampling activities	Environmental Unit	PhP 195,000	0.0006 mg/L	0.0008 mg/L	0.0009 mg/L			
	Degradation of Water Quality	BOD5	5-day BOD Test			Environmental Unit	PhP 7,000	Not considered relevant because domestic wastes are from construction crews only who are based on barges or sea going vessels					
	Degradation of Water Quality	pH	Electrometric			Environmental Unit	PhP 6,000	At least 75% of the DAO 2016-08 Water Quality Guidelines	At least 85% of the DAO 2016-08 Water Quality Guidelines	At least 95% of the DAO 2016-08 Quality Guidelines	Investigate if changes in water quality may be possibly attributed with the construction activities.	Identify the sources of the changes in the water quality and if there are any activities associated with these changes. If yes, strict implementation of buffer areas	Temporarily halt construction activities to identify and resolve sources of any drastic changes in water quality.
	Degradation of Water Quality	Temp	Laboratory and field (in-situ)			Environmental Unit	PhP 6,000						
	Degradation of Water Quality	Color, True	Visual comparison			Environmental Unit	PhP 8,500	35 TCU	40 TCU	45 TCU			
	Marine Ecology – Threat to Marine Species	Marine species	Ocular Survey; Interview Survey with Fisherfolks	During Reclamation works	Near the site where construction activities, e.g. dredging or filling are conducted	Environmental Unit	PhP 250,000	Zero incident of fish kill caused by the Project.			Conduct Incident investigation and report to EMB in accordance to prescribed EMB incident report form. Action to be discussed with MMT and stakeholders		

Key Environmental Aspects per Project Phase Activities	Potential Impacts per Environmental Sector	Parameter to be Monitored	Sampling and Measurement Plan			Lead Person	Annual Estimated Cost	Environmental Quality Performance Levels (EQPL) Management Scheme					
								EQPL Range			Management Measures		
			Method	Frequency	Location			Alert	Action	Limit	Alert	Action	Limit
People	Possible accidents, incidence and near misses	Occupational safety incidents	Recording of safety incidents	Daily	Reclamation /Construction site	HSE Officer	Part of Project contractor cost	Zero accident	One First Aid Incident Case	One Medical Aid Incident Case	Conduct incident investigation and reporting of near miss incidents and safety observations	Conduct incident investigation. Provide remedial measures for the root causes of the incident. Apply First Aid Treatment.	Recording of incidents
	Degradation of water quality, threat to marine ecology, and threat to safety of People	Oil Spill incidents	Recording of Oil Spill Incidents	Daily	Reclamation /Construction site	HSE Officer	Part of Project contractor cost	Zero Oil Spill Incident			Continuous monitoring and ensure implementation of PCG approved Oil Spill Contingency Plan (Appendix O.3 of EPRMP 2024)		
	Generation of Livelihood/ Jobs	Employment of local qualified residents	Record of contractors	Entire reclamation period	NA	Project Manager	Part of the operation cost	Negative feedback to the proponent	Formal complaint by the hired workers		Proponent to investigate	Review the operation protocol & reconsider the complaint, if applicable	Bring notice to DOLE



Source/ Reference: Admin Boundary – NAMRIA/PSA, 2020 | Open Street Map 2024

Figure 5.12 Proposed EMoP Stations (Air&Noise)



Source/ Reference: Admin Boundary – NAMRIA/PSA, 2020 | Open Street Map 2024

Figure 5.13 Proposed EMoP Stations – Water Quality Stations

5.4. MULTI-SECTORAL MONITORING FRAMEWORK

The composition of Multi-Partite Monitoring Team (MMT) is guided by DAO 2017-15, Section 16 Rationalization of the MMT Existence, Composition and Leadership, Section IV. A. I of DAO 2018-18: and with the ECC condition No. 9.2. Table 5.12 shows the MMT composition for this project that meets the criteria of the said reference. The representative from the Philippine Reclamation Authority (PM) is the current MMT chair for this project.

Table 5.12: MMT Composition

MMT Member	MMT Members (based on the MMT MOA dated 02 September 2021)
The LGU representatives: o A representative from the Provincial Environment and Natural Resources Office (PENRO) o The Rural Health Unit (RHU) Chief and o Concerned Barangay Captain(s)	• Pasay City Environmental and Natural Resources Officer (Pasay CENRO) • Pasay City Health Officer • Punong Barangay of Barangay 76 Zone 10, City of Pasay
One (1) representative from the LGU-accredited local NGO(s) with mission/s specifically related to environmental management and/or to the type and impacts of the proposed undertaking/project may be designated as representative to the MMT. In cases, where there is no such NGOs, it shall be open to other NGOs.	• YAHAD Consumer and Credit Cooperative
Maximum of two (2) representatives from locally recognized community leaders who can represent vulnerable sectors including women and senior citizens and representatives from academe may be included as member of the MMT in addition to the LGU-accredited NGO.	• Representative from locally recognized community leader – Urban Poor Council
Maximum of three (3) representatives from government agencies with related mandate on the type of project and its impacts during project implementation shall be included in the MMT membership, it not yet included.	• Philippine Reclamation Authority (PRA) • Philippine Coast Guard (PCC) • Bureau of Fisheries and Aquatic Resources (BFAR) • Department of Environment and Natural Resources – National Capital Region

The general roles and responsibilities of the MMT are indicated in DAO 2017-15 and in the Memorandum of Agreement (MMT MOA) on the creation of the MMT for this project as stated below:

1. Monitor project compliance with the conditions stipulated in the ECC and the EMP;
2. Validate proponent's conduct of self-monitoring;

3. Receive complaints, gather relevant information to facilitate determination of validity of complaints or concerns about the project and timely transmit to the proponent and EMB recommended measures to address the complaint;

4. Prepare, integrate & disseminate simplified monitoring reports to community stakeholders; and

5. Make regular and timely submission of MMT Report based on the EMB-prescribed format which is the Compliance Monitoring Validation Report.

The summary of compliance to MMT Condition of the ECC which is found in the CMVR report prepared by the MMT members is shown in Table 5.13 and in ECC Condition No. 9.2: Multi-partite Monitoring Team (MMT) composed of representative(s) from the proponent, local environmental Non- Government Organization (NGO) concerned, the Manila Bay Coordinating Office, PAGASA, DPWH and other concerned government agencies shall be organized consistent with DAO 2003-30. The MMT shall primarily oversee and report to EMB Central Office full compliance of proponent with the EMP/ EMoP, other commitments, as well as mitigation measures that are contained in the EIS documents and conditions herein enumerated as included in Table 4.1.

Table 5.13: Compliance to MMT (2022 to 2024)

Monitoring Period	Evidence	Remarks
SA1 2024 CMVR (January to June 2024)	MMT has been established and conducted regular monitoring. Annex 22: Signed MMT MOA Annex 21: Submitted MOO to EMB CO Annex 104: Acknowledgement Letter of 2024 AWFP submission dated 4 July 2024 Annex 105: 2024 AWFP and MMT Resolution	MMT MOA signed on 02 September 2021. MOO submitted on 13 March 2023. MOO was resubmitted to the EMB on 21 June 2024 based on EMB's comments on February 2024. The MMT passed a resolution removing Alouette Foundation as MMT Member (MMT Resolution No. 2023-002). The 2024 AWFP was submitted to the EMB on 4 July 2024.
SA2 2023 CMVR (July to December 2023)	MMT has been established and conducted regular monitoring. Annex 9: Signed MMT MOA Annex 10: Submitted MOO to EMB CO	MMT MOA signed on 02 September 2021 MOO pending approval officially submitted to EMB CO on 13 March 2023
SA1 2023 CMVR (January to June 2023)	MMT has been established and conducted regular monitoring Annex 8: MOA of Multi-partite Monitoring Team Annex 9: Submitted MOO to EMB CO	MMT MOA signed on 02 September 2021 MOO pending approval. Officially submitted and received by EMB CO on 13 March 2023.
SA2 2022 CMVR (July to December 2022)	Annex 10: Memorandum of Agreement of Multi-Partite Monitoring Team	Formed on 3rd Quarter Meeting: September 20, 2022

Source/Reference: Compliance Monitoring Validation Report for Pasay 360-hectare Reclamation Project of Pasay City LGU and SM SCIDC (SA2 2022 CMVR, SA1 2023 CMVR, SA2 2023 CMVR and SA1 CMVR)

5.5. ENVIRONMENTAL MONITORING AND GUARANTEE FUND

Establishment of the Environmental Monitoring Fund (EMF)

The EMF is a fund that the proponent shall commit to establish to support the activities of the MMT.

The Proponent (City of Pasay) through its JV partner, SM Smart City Infrastructure and Development Corp. had already open an account in a reputable bank in the country for the EMF, as committed in the MMT MOA. The EMF amounting into at least ONE MILLION PESOS (Php 1,000,000) will be used to finance the initial organizational activities of the MMT for the Project based on the Work and Financial Plan.

The mode of fund administration is through the appointment of Fund Administrator, that was decided upon by the project proponent in consultation with the MMT and considering the MMT's independence. The Fund Administrator accepted the fund administration and management responsibilities as reflected in the MOO and became liable for any misapplication or inappropriate disbursements allowed to be charged against the EMF.

Environmental Guarantee Fund (EGF)

The EGF shall be established and used exclusively for the following purposes:
1. The immediate rehabilitation of areas affected by proven damages to the environment and the resulting deterioration of environmental quality as a direct consequence of project construction, operation and abandonment;
2. The just compensation of parties and communities affected by the proven negative impacts of the Project;
3. The conduct of scientific or research studies related to the PROJECT that will aid in the prevention or rehabilitation of accidents and/or environmental damages; and
4. For contingency clean-up activities, environmental enhancement measures, damage prevention programs and social equity measures (e. g. livelihood, social development programs) including the necessary IEC and capability building activities related to the Project.

There shall be two (2) components of the EGF as follows:

EGF Trust Fund

The Pasay City Government, through its Private Sector Partner or Project Developer, shall open an account for the EGF Trust Fund in the amount of TEN MILLION PESOS (Php. 10,000,000.00) in the form of performance bond the earnings / interests of which shall accrue to the same Fund. The Trust Fund will be used to compensate aggrieved parties for any proven damages to life or property, undertake community-based environmental programs, conduct environmental research aimed at strengthening measures to prevent environmental damage and to finance restoration and rehabilitation of environmental quality of the project-affected area.

The Trust Fund shall also be renewed upon every expiration. The proponent shall immediately inform EMB Central and RO should it fail to renew the Trust Fund (e. g. insurance policy) on its stated expiration date or should the Trust Fund be cancelled or voided by the Insurer because of non-payment of the required premiums or any other cause allowed by the Insurance Code of pertinent issuances of the insurance Commission.

EGF Cash Fund

The PASAY CITY GOVERNMENT, through its Private Sector Partner or Project Developer, shall open an account for the EGF Cash Fund at a reputable bank in the area in the amount of TEN MILLION PESOS (PhP. 10,000,000.00) which shall be earmarked for immediate rehabilitation and compensation of affected communities in case of proven damage or project-related accidents. it shall also be used to cover the operational costs of the EOF Committee. This Cash fund shall be placed in an interest-bearing account and such interest shall accrue to the same Cash Fund. The Fund shall be replenished to its original amount annually or whenever the amount goes below 50% of the amount.

Provided further that in the event of insufficiency of both the EOF Trust Fund and the EGF Cash Fund to answer for expenses, the Proponent shall shoulder the amount of any such insufficiency.

6. ABANDONMENT/ DECOMMISSIONING/ REHABILITATION POLICY

Decommissioning of Temporary Facilities

Temporary facilities during the bridge construction which include: Site Offices; Clinic/Medical Facility; General Material Laydown Area (on-site); Precast Yard; Materials and Machineries/ Tools Storage and Maintenance Yard; Equipment Yard; Movable / Transferable Jetty (Passenger Jetty); Temporary Berthing Area w/ Rock Revetment (For Logistic); Fuel Storage Facility; Water Supply; Power Supply (Temporary Facilities); Washing Bay; Temporary Site Access; Bentonite/Polymer Storage Facility; Material Testing Facility; Sanitation Facilities; and Materials Recovery Facility & Hazardous Waste Facilityshall be properly removed to give way of the project operations. During the abandonment phase of the temporary facilities, the Project Proponent as well as their contractor shall:

- Properly manage and dismantled all temporary facilities;
- Develop waste management procedures and sort materials according to types;
- Reusable materials may be sold to junk shop or donated to the community;
- All other waste shall be segregated and dispose properly;
- Solid and Hazardous waste shall be properly hauled by a DENR accredited waste haulers;
- Portalets shall be properly siphoned and collected by the siphoning contractor;
- The inventory of waste produced as well as the certificate of treatment, hauling records, manifest form, etc. shall be reported in SMR and CMR;
- Conduct land and water restoration and rehabilitation activities, if applicable.

Decommissioning of the Bridges

The lifespan of the proposed bridges is around 50 years. Should there be a need to abandon, change ownership or to rehabilitate the project, or change in LGU land use plan, necessary permits and approval will be secured to the DENR EMB, concerned LGUs and government offices. The project will be properly rehabilitated following the guidelines by DENR EMB which is the revised procedural manual of DAO 2003-30 or whatever that is available at the time of decommissioning. A letter of request to relief the ECC, including the decommissioning/ abandonment/ rehabilitation plan will be prepared and submitted to DENR EMB for at least six months prior to its abandonment.

The abandonment plan will be composed of the following activities:
a) Assessment & Preparation: Secure permits, assess structure, and set up safety measures.
b) Superstructure Removal: Dismantle deck, girders, and transport materials via barges.
c) Substructure Removal: Extract piers, abutments, and piles using controlled methods.
d) Site Restoration: Dispose of waste, recycle materials, and restore the area.

7. INSTITUTIONAL PLAN FOR EMP IMPLEMENTATION

The Pasay City together with its joint venture partner, the SM Smart City Infrastructure and Development Corporation (SM SCIDC) has established an Environmental Unit (EU) for purposes of monitoring the Project and submitting reports to the Environmental Management Bureau (EMB) on environmental compliances of the Project. The original EU was established by JV Partner on 11 January 2022 and a new EU was established on 28 July 2023, Endorsement letter from Pasay was received by DENR EMB on 01 August 2023.

The established EU continues to ensure effective performance of the Project including its reconfiguration activities to its Environmental Management Plan (EMP), Environmental Monitoring Plan (EMoP) and to the conditions of Environmental Compliance Certificate (ECC). The EU coordinates to the management of its contractor, China Harbour Engineering Company (CHEC), for the environmental compliances and mitigating measures. The management framework for the implementation of the ECC, EMP and EMoP is shown Figure 7.1.

There are several parties responsible for the implementation of the EMP. The main responsibility and accountability in the successful implementation of the EMP lies on the Project Proponent, the City of Pasay, as indicated in the ECC of the reclamation project.

The City of Pasay will liaise with SM Smart City Infrastructure and Development Corporation (SM SCIDC), its Joint Venture Partner (JVP)/ Project Developer, in the compliance of environmental requirements including the implementation of the ECC conditions, Environmental Monitoring Plan (EMoP) and submission Monitoring Reports (SMR and CMR) to the DENR-EMB and related regulatory bodies.

SM SCIDC through its Environmental Unit is responsible in ensuring the compliance with the ECC conditions and EMoP implementation before, during, and after project completion.

The established EU will continue to address relevant environmental and social issues that may possibly arise during the project implementation. The EU shall report directly to the general manager on the status of the monitoring and compliance activities and recommends mitigating measures when necessary.

In compliance to the requirements of the DENR and with the ECC condition No. 10: An Environmental Unit (EU) shall be established to completely handle the environment related aspects of the Project in addition to the Monitoring requirements as specified in the Environmental Management Plan (EMP)/Environmental Monitoring Plan (EMoP). The EU shall:

- Monitor actual Project impacts vis-à vis the predicted impacts management measures in the EIS;
- Ensure that monitoring and submission of reports to EMB (Central Office and NCR) are carried out as required;
- Submit Decommissioning Plan one (1) year prior to completion of reclamation activity. It shall include rehabilitation and clean-up measures;
- Submit the geographical coordinates of actual area approved by PRA to be reclaimed prior to Project construction; and

- Conduct continuing consultation with the stakeholders in updating EMP and EMoP that shall include necessary baseline data, geohazard and disaster risk reduction and management and ground settlement monitoring of the reclaimed area.

Both the Proponent and Project Developer will be responsible for ensuring that all employees, officers, contractors and subcontractors associated with the project are familiar with the EMP, ECC and relevant permits. Both of which will have its own Managing Head and PCO.

The City Government of Pasay will be responsible for securing EMB-permits under its name and submission of the required compliance reports to EMB with the assistance of SM SCIDC and its Contractor. They should also ensure that requirements of environmental legislation committed to ensuring environmentally sound practices are implemented in all activities.

Specific management responsibilities are summarized in Table 7.1.

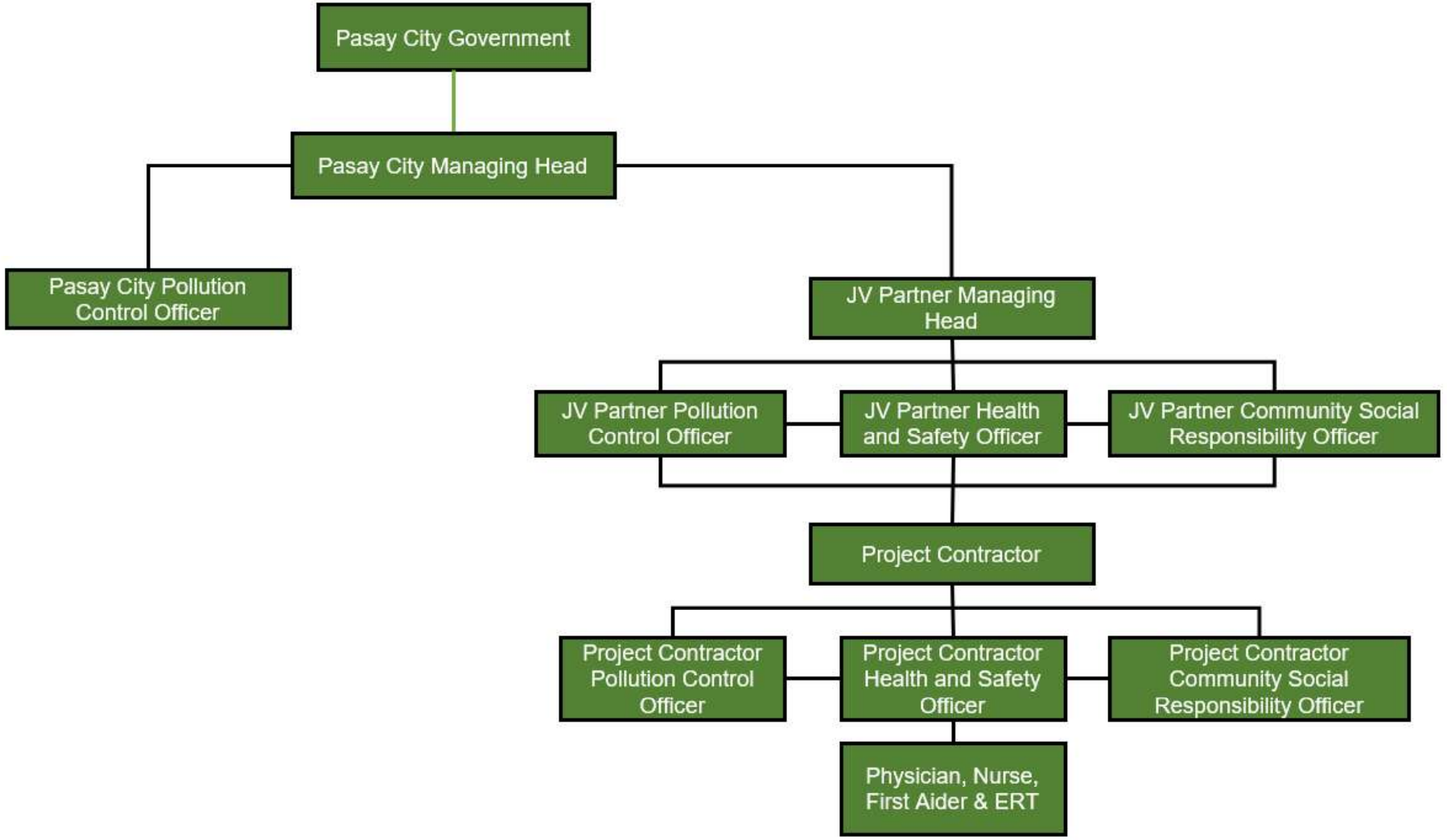


Figure 7.1 Environmental Unit / Organizational Chart for the Project Implementation

Table 7.1 EMP Management Roles and Responsibilities

Role	Responsibilities
Pasay City Proponent/ Permit Holder/ Project Owner	• Ensure that the Project Developer implements and monitors the EMP, ECC conditions and other environmental regulations and requirements. • Ensure that appropriate and adequate resources are allocated for the effective implementation and maintenance of the EMP. • Ensure that periodic reviews of environmental performance are conducted by the Project Developer. • Ensure that the Project Developer reports to DENR-EMB and other relevant regulators, any major environmental incidents that may have a significant impact on the surrounding environment.
SM SCIDC Project Developer	• Ensure that the Project Consultant implements and monitors the EMP, ECC conditions and other environmental regulations and requirements. • Ensure that all supervisory and management staff involved in the project are aware and understand their responsibilities under this EMP. • Allocate appropriate and adequate resources for the effective implementation and maintenance of the EMP. • Ensure that periodic reviews of environmental performance are conducted by the Project Consultant. • Report any major environmental incidents to DENR-EMB and other relevant regulators, any major environmental incidents that may have a significant impact on the surrounding environment. • Ensure that their employees and contractors receive the relevant environmental instruction in relation to the EMP and understand their obligations and duties. • Provide necessary directives to Project Contractor, directly and indirectly.
Contractor – During Reclamation Phase and Horizontal Development (China Harbour Engineering Construction) **Contractor – During Construction of Inter-Island Connecting Bridges to the Mainland**	• Responsible for the adequacy, stability and safety of all the Contractor's operations and activities • Submit to the Employer all the necessary approvals, licenses and permits for the commencement of the works • Ensure that all personnel including subcontractors adhere to these requirements. • Ensure that the appropriate requirements are incorporated into the reclamation plans and bridge construction activities. • Ensure that personnel involved in the project, including subcontractors and visitors, have received necessary environmental training/ induction so that they understand their roles under the EMP. • Carry out all work in accordance with the procedures outlined in the EMP. • Make sure adherence to all environmental safeguards and precautions are in place, at a minimum, in accordance with the monitoring requirements outlined in the EMP. • Ensure proper maintenance, inspection and monitoring of equipment • Report all environmental incidents directly to the Project Consultant, in accordance to the severity of the incident. Preliminary reporting to be submitted within 24 hours

Below are the key roles of the Managing Head, Pollution Control Officer, Health, Safety and Environment (HSE) and CSR personnel in accordance with the applicable rules and regulations that is being practiced for this project:

Managing Head (DAO 2014-02)

- Appoint and request for the accreditation of a PCO;
- In case of resignation/termination of the PCO, the Managing Head shall appoint/designate a new PCO and inform in writing the concerned EMB Regional Office within 15 calendar days and seek accreditation for the new PCO within 30 calendar days from the date of resignation/termination. The Managing Head shall immediately assume the responsibilities as interim PCO until such time that a new PCO shall have been accredited; and
- Sign the reports prepared by the PCO.

Pollution Control Officer (Section 10 of DAO 2014-02)

1) Together with the Managing Head, ensure compliance with the requirements of PD 1586, RA 6969, RA 8749, RA 9003, RA 9275, their respective implementing rules and regulations (IRRs), and other pertinent rules and regulations;
2) Identify significant environmental aspects and impacts of the establishment's operational activities and recommend possible mitigating measures in the formulation/preparation and/or review of the Environmental Management Plan and Contingency Plan:
3) Attend to all permitting and registration requirements of the establishment prior to the construction, installation, or operation of pollutant sources and control facilities;
4) Ensure the proper performance, operation, and maintenance of environmental management facilities or systems of the establishment such as the following:
   - Wastewater treatment facilities;
   - Air pollution control devices referred to in DAO 2000-03;
   - Hazardous waste management storage areas (permanent or temporary);
   - Solid waste segregation/management facilities (i.e. MRFs, sanitary landfills, composting facilities, etc,); and
   - Environmental monitoring devices such as the Continuous Emission Monitoring Systems, Air Monitoring Stations, effluent flow metering/measuring devices, groundwater monitoring wells, and other environmental monitoring devices.
5) Ensure that the hazardous waste disposed offsite are covered by a Permit to Transport; each transport is covered by a hazardous waste manifest duly signed by the transporter and TSD facility; and with corresponding Certificate of Treatment (COT) duly signed by the TSD facility. Copies of the signed hazardous waste manifest and COT shall be submitted to the concerned EMB Regional Office in accordance with DENR Adm. Or. No. 2004-36;
6) Ensure that transport vehicles are properly operated and maintained (applicable only for hazardous wastes transporter);
7) Ensure that hazardous wastes Treatment Storage and Disposal (TSD) facilities are properly operated and maintained (applicable only for hazardous wastes TSD facility);
8) Monitor compliance to the requirements specified in the Environmental Compliance Certificate and the commitments stipulated in the Environmental Management and Monitoring Plans or Environmental Performance Report and Management Plans, and report the same in the Compliance Monitoring Report (CMR);
9) Monitor activities pertaining to the installation or construction of pollution source and control facilities to ensure compliance with the National Emission Standards for Source

Specific Air Pollutants and National Ambient Air Quality Standards and report monitoring results to DENR as part of the Self-Monitoring Report (SMR);

10) Monitor activities pertaining to the operation and maintenance of pollution control facilities to ensure compliance with the Effluent Standards and report monitoring results to DENR as part of the SMR;
11) Monitor the use of chemicals, especially those listed under the Priority Chemical List (PCL) and those with Chemical Control Orders (CCO) and the generation of solid and hazardous wastes. Monitoring data shall be submitted as part of the SMR and the PCL Compliance Certificate;
12) Monitor the importation or distribution of chemicals, especially those listed under the PCL and those with CCO and the generation of solid and hazardous wastes. Monitoring data shall be submitted as part of the SMR and the PCL Compliance Certificate (applicable only for importers or distributors of chemicals);
13) Promptly submit CMRs and SMRs, duly accomplished and signed by the PCOs, approved and certified correct by the Managing Head, and notarized;
14) Report in writing within twenty-four (24) hours from the occurrence of any of the following environmental incident to the concerned EMB Regional Office, as the case may be:
    - Breakdown of any pollution source and/or control facility or monitoring instruments; or
    - Releases (e.g. leaks, spills, etc.) of chemicals or hazardous wastes (listed in Annex 1 of this Order as well as the Priority List of Hazardous Substances as published by the Agency for Toxic Substances and Disease Registry of the Department of Health & Human Services of the Unites States of America) to environmental media.
15) Report in writing within twenty-four (24) hours from securing of the results of laboratory analysis or from online monitoring instruments any exceedance to effluent and/or emission standards;

- The report covering Items 14 and 15 above shall include the following:
    - Date/time of the incident;
    - Cause(s) of the incident; and
    - Description of the incident detailing the following:
        - Estimated amount of chemicals or hazardous wastes, emissions, and/or effluents released to the receiving environment; and
        - Interim/contingency measures to mitigate any potential negative impacts.
    - The managing Head Shall sign the Report prepared by the PCO. Annex 4 shows the Environmental Incident Report format.

16) Submit to the Pollution Adjudication Board a copy of the SMR duly received by the respective EMB Regional Office (applicable only for establishments with pending case);
17) Attend, as duly authorized representatives of the establishment, technical conferences, hearings, and meetings especially on matters pertaining to pollution cases of the establishment where he/she is employed;
18) As a liaison officer to EMB, keep himself/herself abreast with the requirements of the Department;
19) Coordinate regulatory programs and activities with the city/provincial/municipal governments (if applicable);
20) Initiate and intensify environmental management activities including awareness campaign within their organization; and
21) Participate in multi-partite monitoring (MMT) team activities and meetings, where applicable.

Health and Safety Committee (Rule 1040 of DOLE OSHS)

- Plans and develops accident prevention programs for the establishment;
- Directs the accident prevention efforts of the establishment in accordance with the safety programs safety performance and government regulations in order to prevent accidents from occurring in the workplace.
- Conducts safety meetings at least once a month;
- Reviews reports of inspection, accident investigations and implementation of program;
- Submits reports to the manager on its meetings and activities;
- Provides necessary assistance to government inspecting authorities in the proper conduct of their activities such as the enforcement of the provisions of this Standards;
- Initiates and supervises safety training for employees; and
- Develops and maintains a disaster contingency plan and organizes such emergency service units as may be necessary to handle disaster situations pursuant to the emergency preparedness manual for establishments of the Office of Civil Defense.

Community Relations Officer / Corporate Social Responsibility (CSR) Manager

- Lead in the implementation the IEC and SDP;
- Coordination with B/CLGUs with the proposed plans for IEC and SDP;
- Ensure that financial resources required by the IEC and SDP are available and on-time;
- Ensure that HSE personnel are updated on SDP and IEC programs;
- Ensure that the upper management is briefed / updated on SDP and IEC programs; and
- Ensure that any feedback (positive / negative) on the company from the community is disseminated to the company.

Complaints Management / Grievance Redress Mechanism

The proponent and the contractor have already established a Grievance Redress Mechanism (GRM) to address grievances received towards the project. The complaints management include:

- The complaint receiving setup;
- Case investigation;
- Implementation of corrective measures; communication with the complainant/ public; and
- Complaint documentation.

8. REFERENCES

AECOM. The SM Reclamation Master Development Plan Report for the Pasay-Paranaque reclamations (2016)

Azanza, R. V. and Miranda, L. N. 2001.Phytoplankton composition and Pyrodinium bahamense toxic blooms in Manila, Bay Philippines. J. Shellfish Res. 20: 1251–1255.

Barangay 76, Pasay City Profile.

Bautista Bartolome, Bautista Leyo, Punongbayan Jane, Rasdas Ariel, Nillos Jun-Jun, Punongbayan Raymundo, Thenhaus Paul, Hanson Stanley, Algermissen, Estimates of the Regional Ground-Motion Hazard in the Philippines

Besana, G.M., Daligdig, J.A., Panol, D.A., Balbuena, E.S., Sikat, B., and Punongbayan, R.S., Active Faults in the Philippines, October 2000

Besana, G.M., Daligdig, J.A., Hydrological and Meteorological Hazards in Metro Manila, 1993

Besana, G.M., Daligdig, J.A., Seismological Hazards in Metro Manila, 1993

Besana, G.M., Daligdig, J.A., Torres, R. C., Volcanic Hazards in Metro Manila, 1993

Carpenter, K and V. Niem, eds (1998). FAO Species Identification Guide, Vol. 1: Seaweeds, corals, bivalves and gastropods.

China Harbour Engineering Company Ltd. (CHEC). Pasay Reclamation Development Project Environmental Emergency Response Plan (EERP), October 2021

China Harbour Engineering Company Ltd. (CHEC). Pasay-SM Reclamation Development Project Emergency Response Plan, January 2021

China Harbour Engineering Company Ltd. (CHEC). Self-Monitoring Report (Q2 2021 to Q4 2023)

Commission on Higher Education. List of Higher Education Institutions AY 2023-2024 as of 15 January 2024. Accessed on 18 May 2024. https://ched.gov.ph/list-of-higher-education-institutions-2/

Delchem Environmental Services. Ambient Air and Noise Monitoring Reports

Department of Education. Schools Division Office – Pasay City.

Department of Health. DOH Manual of Standards for Primary Care Facilities Philippines (13 April 2020).

Department of Education. Masterlist of Schools. Retrieved 16 May 2024. https://www.deped.gov.ph/wp-content/uploads/2021/06/SY-2020-2021-Masterlist-of-Schools-Address-only-1-1.pdf

Department of Finance – Bureau of Local Government Finance. LGU Income Classification per DOF Order No. 23-08, dated 29 July 2008.

Department of Environment and Natural Resources (2017). Operational Plan for the Manila Bay Coastal Strategy 2017-2022.

Del Hoyo, J., Andrew, E., & Sargatal, J. (1992). Handbook of the Birds of the World. Barcelona: Lynx Edicions.

Engineering, Geological and Geohazard Assessment Report. Proposed 360-Hectare Reclamation Project Along Coast of Manila Bay, Pasay City, 2017

Elmer, A. D. E. (2009). Leaflets of Philippine botany. General Books LLC.

English, S. C., Wilkinson and V. Baker, Editors (1997). Survey manual for tropical marine resources. 2nd ed. Australian Institute of Marine Sciences, Queensland, 390 p.

Farnsworth, M. (2024, February 27). Whiskered tern: Unveiling the secrets of this fascinating bird. The World's Rarest Birds. https://theworldsrarestbirds.com/whiskered-tern/#:~:text=Behavior%20and%20Diet%20of%20the%20Whiskered%20Tern%201,3%20Dietary%20Composition%20...%204%20Nesting%20Behavior%20

Ferrer, A. J., Francisco, H., Carmelita, B., Hopanda, J., & Predo, C. (2017). Gender Differences in Participation, Roles, and Attitude towards Mariculture Operation: A Case Study in the Philippines. Asian Fisheries Science. 30S. 83-102. 10.33997/j.afs.2017.30.S1.004.

Fisherfolks and farmers remain to have the highest poverty incidences among the basic sectors in 2021. (2023). Philippine Statistics Authority. https://www.psa.gov.ph/content/fisherfolks-and-farmers-remain-have-highest-poverty-incidences-among-basic-sectors-2021

Francisco, B.S. Reports on marine ecology baseline assessments for various reclamation projects in nearshore Manila Bay prepared by (2020 to 2024)

Hazard Hunter PH. Hazard Assessment. hazardhunter.georisk.gov.ph

Household Characteristics (2020 Census of Population and Housing). (2023). *Philippine Statistics Authority.* https://psa.gov.ph/content/household-characteristics-2020-census-population-and-housing

Kizamaya. (n.d.). Little Egret - facts, diet, habitat & pictures on Animalia.bio. https://animalia.bio/little-egret

M. Radermacher et.al. The Art of Screening Effectiveness of Silt Screens. https://www.iadc-dredging.com/wp-content/uploads/2017/02/article-the-art-of-screening-effectiveness-of-silt-screens-terra-et-aqua-132-1.pdf

Magurran, A.E. (Ed.) (2011). *Biological Diversity: Frontiers in Measurement and Assessment.* Oxford University Press.

Merrill, E. D. (2015). A Flora of Manila. Fb&c Limited.

Merrill, E. D. (1922). An enumeration of Philippine flowering plants. Bureau of printing.

Mines and Geosciences Bureau, Geology and Mineral Resources of the Philippines, Volume One, 1982

Mines and Geosciences Bureau, 1:50,000 Geological Map of Manila

MMT members for the Pasay 360 project. Compliance Monitoring Validation Report (CMVR) for Pasay 360-hectare Reclamation Project of Pasay City LGU and SM SCIDC (SA2 2022 CMVR, SA1 2023 CMVR and SA2 2023 CMVR)

Modified from Metro Manila Authority. (1985), PHIVOLCS Hydrological and Meteorological Hazards in Metro Manila

National Economic and Development Authority (2020). *Manila Bay Sustainable Development Master Plan*.

National Mapping & Resource Information Authority, 1:50,000 Topographic Map of Manila

IUCN 2024. The IUCN Red List of Threatened Species. Version 2023-1. https://www.iucnredlist.org

Ostrea Mineral Laboratories, Inc (OMLI). Baseline Ambient Air & Noise Level Monitoring Report for Manila Bay Reclamation Project (2024)

Ostrea Mineral Laboratories, Inc (OMLI). Certificate of Analysis (2024)

Pasay City Comprehensive Land Use Plan 2014-2022

Pasay City Comprehensive Land Use Plan 2023-2034

Pasay City Draft Comprehensive Land Use Plan 2023-2034 – Volume 1: Land Use Plan and Volume 3: Sectoral Studies.

Pasay City Ecological Profile – Updating of Mandated Plans Project.

Pasay City Government and SM SCIDC. Compliance Monitoring Report (SA2 2021, SA1 2022, SA2 2022, SA1 2023 and SA2 2023)

Pasay City Government and Technotrix Consultancy Services, inc. EIS Final Report for the Proposed 360 hectares Reclamation Project (October 2017)

Pascual, Alfred. City Planning and Development Office - City Government of Las Piñas. Las Piñas City. (29 June 2018)

Pelser, P.B., Barcelona, J.F. and Nickrent, D.L. (2011) Co's Digital Flora of the Philippines. http://www.philippineplants.org

PLANADES and PRIMEX. Coastal Habitat and Fisheries Final Report. 2022.

Primavera, J. H. (2009). Field guide to Philippine mangroves. Zoological Society of London-Philippines.

Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA), Climatological Data

Philippine Institute of Volcanology and Seismology, Disaster Prevention and Mitigation in Metropolitan Manila, 1993

Philippine Institute of Volcanology and Seismology, Department of Science and Technology, Disaster Prevention and Mitigation in Metropolitan Manila, UNCHS (Habitat) Project INT/90/701, March 1993

Philippine Institute of Volcanology and Seismology, Several Geohazard and Hydrological Hazard Maps

Philippine Seismic Zone Map in accordance to the Seismic Studies of Torregoza, Sugito and Nojima of the Gifu University in Japan and PHIVOLCS

Philippine Statistics Authority. 2020 Census of Population and Housing Report No. 4 – Urban Population. Published in June 2022. Accessed on 27 May 2024. https://library.psa.gov.ph/cgi-bin/koha/opac-detail.pl?biblionumber=15806.

Philippine Statistics Authority. 2020 Census of Population and Housing. Accessed on 29 May 2024. https://psada.psa.gov.ph/catalog/Household-based_Censuses/about

Philippine Statistics Authority. Census of Population 2015. Accessed on 15 May 2024. https://psada.psa.gov.ph/catalog/168/get-microdata

Philippines. "Administrative Order No. 16, s. 2019." *Official Gazette of the Republic of the Philippines*. Last modified February 19, 2019. Accessed June 17, 2024. https://www.officialgazette.gov.ph/2019/02/19/administrative-order-no-16-s-2019/.

PHIVOLCS. The Philippine Earthquake Model (2017)

PLANADES. Pasay 360: Environmental Performance Report and Management Plan (Nov 2024)

Planning and Development Research Foundation, Inc., and Pacific Rim Innovation and Management Exponents, Inc. Environmental and Coastal Studies for Pasay Reclamation Projects: Social Development Plan (August 2022)

Project NOAH, Compilation of Storm Surge Occurrences in the Philippines, February 4, 2014

Ramsar Sites Information Service. https://rsis.ramsar.org/ris/2124

Republic of the Philippines Department of Environment and Natural Resources. (n.d.). https://bmb.gov.ph/downloads/WRD/WC/WC2020/stat_and_lists_of_wildlife/fauna/dao-2019-09.pdf

Republic of the Philippines Department of Environment and Natural Resources. (n.d.). https://www.philippineplants.org/Resources/dao-2017-11.pdf

RMS Petroleum Technology & Waste Management Corporation. Oil Spill Contingency Plan, August 2021

Rojo, J. P. (1999). Revised Lexicon of Philippine Trees. Forest Products Research and Development Institute, Department of Science and Technology.

Royal HaskoningDHV, Detailed Engineering Design Report - Reclamation & Coastal Works (2019)

Royal HaskoningDHV, Geotechnical Interpretation Report: Detailed Engineering Design Pasay and Parañaque Reclamation Development, 2017

Royal HaskoningDHV, Hydrodynamic and Morphologic Modeling Study for Pasay and Parañaque Reclamation Development, February, 2017

Royal HaskoningDHV, Hydrodynamic modelling studies (May 2024)

Royal HaskoningDHV, PRDP and PQRD Hinterland Flood Risk Study (May 2024)

Royal HaskoningDHV, Sediment Plume Modelling (September 2024)

Sangguniang Panlunsod ng Pasay, Resolution No. 3764, S2016, 2014 – 2022 Comprehensive Land Use Plan of Pasay City, 2016

Sitoy, H. S., Young, A. L., & Tabbu, M. Y. (1983). Raft culture of mussels.

Tigbauan, Iloilo, Philippines: Aquaculture Department, Southeast Asian Fisheries Development Center.

Solidum, R. Jr. Earthquake Hazards and Risk Scenario form Metro Manila and Vicinity: The Need for Whole of Society Preparedness (May 20, 2015)

Supreme Court of the Philippines. "G.R. No. 221697: People of the Philippines vs. Benjamin Mañalac y Jomalesa and Noel Fernandez y Gamboa." Supreme Court E-Library. Accessed May 15, 2024. https://elibrary.judiciary.gov.ph/thebookshelf/showdocs/1/48335.

Surbana International Consultants Pte Ltd. Pre-feasibility Studies for Navotas Coastal Bay (November 2013)

The Philippine Registry of Cultural Property (PRECUP). https://ncca.gov.ph/philippine-registry-cultural-property-precup (2024)

Thenhaus, P.C., Hanson. S.L., Algermissen, S.T., Bautista, B.C., Bautista, M.L.P., Punongbayan, B., Rasdas, A.R., Nillos, T.E. and Punongbayan, R.S., *Estimates of the Regional Ground-Motion Hazard in the Philippines, Natural Disaster Mitigation in the Philippines* – Proceedings, Department of Science and Technology – Philippine Institute of Volcanology and Seismology, October 19 -20, 1994

Thomson, L. & Evans, B. 2019. *Terminalia catappa*. The IUCN Red List of Threatened Species 2019: e.T61989853A61989855. https://dx.doi.org/10.2305/IUCN.UK.2019-3.RLTS.T61989853A61989855.en. Accessed on 06 May 2024.

Torell, E., Castro, J., Lazarte, A., & Bilecki, D. (2020). Analysis of Gender Roles in Philippine Fishing Communities. Journal of International Development, 33(1). 10.1002/jid.3520

Universal Testing Laboratory and Inspection, Inc. Soil investigation of Proposed Four E-com Building at the Mall of Asia

Velasco, M. T. (2019). Pasay City: Rise of the Travel City (June 2019).

Wang, Z., Li, N., Gao, S. & An, S. (2020). Response of wintering waterbird diversity to reclamation history and post-reclamation habitat along Yellow Sea coast. https://doi.org/10.1111/1749-4877.12464

Volume 1, 7th Edition of National Structural Code of the Philippines (NSCP), 2015

Youth. (2024). UNESCO. https://www.unesco.org/en/youth

Sources of Maps and Data:

Bureau of Soils and Water Management

Mines and Geosciences Bureau (MGB)

National Mapping and Resource Information Authority (NAMRIA)

Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)

Philippine Institute of Volcanology and Seismology (PHIVOLCS)