

PROJECT SHEET

HARBOR CITY RECLAMATION PROJECT LAND RECLAMATION

BOSKALIS

Boskalis is a leading global marine contractor and services provider. With safety as our core value, we offer a wide variety of specialist activities to the oil & gas and renewables sectors. These activities include marine installation and decommissioning, seabed intervention, marine transport and services, subsea services and marine survey. In addition, Boskalis is a global dredging contractor, provides towage and terminal services across the globe and delivers marine salvage solutions.

By understanding what drives our Clients we are able to provide the solutions that enable them to meet their specific business goals. For this reason we are constantly looking for new ways to broaden and optimize our offering and are committed to expanding our proposition, supported by our financial strength. With our committed professionals in engineering, project management and operations, 500 specialized vessels and an unprecedented breadth of activities in 90 countries across six continents we help our Clients push boundaries and create new horizons.

INTRODUCTION

The Harbor City Reclamation Project was commissioned by Pasay Harbor City Corporation to create approximately 265 hectares of new urban land along the western coastline of Manila Bay in Pasay City, Philippines. The project provides the foundation for a next-generation smart city development, combining residential, commercial, and public infrastructure within a sustainable and resilient urban environment.

As one of the most complex reclamation projects undertaken in the Philippines, the works addressed significant challenges, including deep marine soft clay deposits, wartime unexploded ordnance (UXO), and stakeholder engagement with local fishing communities. The reclamation platform was engineered to withstand major seismic events and accommodate future sea level rise.



FEATURES

Client	Pasay Harbor City Corporation
Location	Pasay, Metro Manila, Philippines
Period	2021 – 2025, with final works completed on 02 May 2025
Contractor	Boskalis Philippines, Inc.
Engineer	Haskoning Philippines
Project Size	Approximately 265 hectares of land reclamation comprising two reclamation platforms: Island A of approximately 210 hectares and Island B of approximately 55 hectares.



A Vibro Compaction works in tandem rig configuration.
B TSHD Prins der Nederlanden discharging sand at the Project Site.

The project was delivered in accordance with the Boskalis Way of Working, applying innovative engineering solutions, rigorous risk management, and proactive stakeholder engagement to create a resilient foundation for future urban growth.

SCOPE OF WORK / PROJECT EXECUTION

The project comprised the design and construction of approximately 265 hectares of new land in Pasay, Metro Manila, including Island A and Island B, together with reclamation edge structures, navigation channels, ground improvement works, and a mangrove buffer zone.

The project commenced with the construction of an access channel to support marine operations and site development. As reclamation activities progressed, Boskalis subsequently delivered the PPA Alternative Navigation Channel, providing a dedicated route for commercial marine traffic and maintaining safe navigation around the active construction area.

A comprehensive marine geotechnical investigation program was undertaken to characterize the subsurface conditions and support the engineering design. The site was characterized by deep deposits of soft marine clay overlying the Guadalupe Tuff Formation (GTF), requiring detailed soil investigations, careful engineering assessment, and continuous survey and geotechnical verification

throughout execution. The soil investigation, verification, and geotechnical monitoring programs were largely executed in-house, enabling rapid interpretation of ground conditions and timely adaptation of construction methods. Accurately identifying the transition between the marine clay and the underlying GTF during dredging operations was one of the project's principal technical challenges.

The marine works included sand key dredging and hydraulic reclamation to create the development platform. Soft marine clay excavated during the sand key works was transported and placed at a regulator-approved offshore disposal site. At peak production, the reclamation works were supported by a large marine spread comprising up to seven medium and jumbo Trailing Suction Hopper Dredgers (TSHDs), three spreader pontoons, and various auxiliary vessels. The integrated marine operation achieved fill placement rates of up to 2.4 million m³ per week, highlighting the scale, complexity, and efficiency of project execution.

Ground improvement was carried out through the installation of Prefabricated Vertical Drains (PVDs) and surcharge loading to accelerate consolidation of the underlying soft soils and achieve the required settlement criteria, while Vibro Compaction (VC) was applied to densify the reclamation fill and achieve the required bearing capacity, and seismic performance criteria. Extensive monitoring, field testing, and survey verification were undertaken throughout the project to confirm compliance with the design requirements. Post-compaction performance was verified using a seismic CPT-based testing program, providing assurance that the reclaimed land met the stringent design criteria for long-term stability and seismic resilience.

The project was executed under challenging conditions, including work suspensions, a government reclamation moratorium, and multiple contract amendments. Through close collaboration with the Client, regulators, and stakeholders, Boskalis successfully delivered the reclamation platform that will form the foundation of a future smart city development in Manila Bay.

NINA

The project was delivered under Boskalis' NINA (No Injuries, No Accidents) program, supported by a dedicated HSES organization and a strong safety culture across all marine and land-based



operations. Through the Navigate to Zero Incidents (NZI) approach, safety leadership, workforce engagement, and proactive risk management were embedded throughout the project lifecycle.

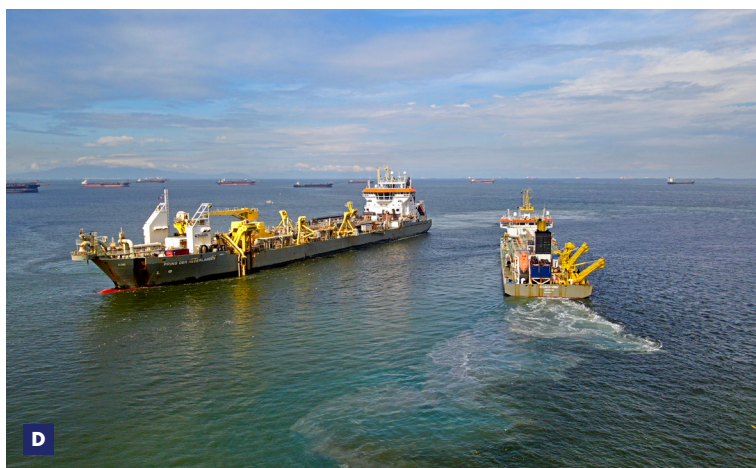
Key risks included large-scale dredging and reclamation activities, simultaneous operations, marine traffic, typhoon exposure, unexploded ordnance (UXO), and H₂S-contaminated seabed sediments. A particular challenge was the presence of UXO within the borrow and reclamation areas. Through specialist procedures, workforce training, and close coordination with Philippine authorities, more than 1,200 UXO items were safely recovered and managed without injuries and with minimal disruption to project operations.

Safety was further strengthened through a Safety by Design approach, integrating geotechnical engineering, ground improvement, monitoring, and constructability considerations into project execution. This enabled the safe and efficient delivery of the reclamation, channel dredging, and ground improvement works in a complex marine environment.

ENVIRONMENTAL AND SOCIAL

Environmental and social management was integrated into all project activities, with dedicated oversight for regulatory compliance, environmental monitoring, and stakeholder engagement.

The project maintained comprehensive environmental controls covering water quality, waste management, marine activities, and dust mitigation. Boskalis also supported community and environmental initiatives, including coastal clean-ups, fisherfolk safety programs, and marine conservation activities.



- C** MSP 2 carrying out spraying activities.
- D** TSHD Prins der Nederlanden and TSHD Beachway performing dredging activities.



A structured grievance mechanism provided local fishing communities with a transparent process for raising concerns, with verified cases investigated and addressed through engagement and appropriate resolution measures.

QUALITY

Quality was embedded in every phase of the project through the Boskalis Way of Working. Inspection and Test Plans, audits, non-conformance management, and comprehensive quality assurance processes ensured compliance with project requirements.

Extensive in-house survey, geotechnical investigation, testing, and monitoring programs verified dredging, reclamation, and ground improvement works throughout execution, providing confidence in the quality, performance, and long-term resilience of the completed development platform.

Relatics was used to manage requirements, verification and quality assurance processes, while Asite served as the project's document control platform, providing structured workflows and full traceability of inspections, test records, approvals, and project documentation. Together, these systems enabled transparent quality management and effective collaboration between Boskalis, the Engineer and the Client.

DESIGN AND ENGINEERING

Design and engineering were at the core of the Harbor City Reclamation Project, requiring the integration of geotechnical engineering, seismic design, coastal engineering, ground improvement, and construction planning to deliver a resilient foundation for a future smart city development.

The project was executed over deep deposits of marine soft clay underlain by the Guadalupe Tuff Formation (GTF), demanding extensive site investigations, in-house geotechnical verification,

and continuous assessment of subsurface conditions throughout construction. The engineering solution combined sand key construction, Prefabricated Vertical Drains (PVDs) with surcharge loading and Vibro Compaction (VC) to achieve the required settlement, bearing capacity, and liquefaction performance criteria.

Advanced seismic studies, including Probabilistic Seismic Hazard Assessment (PSHA) and Seismic Ground Response Analysis (SGRA), informed the design of a reclamation platform capable of withstanding major earthquake events and accommodating future sea level rise. Boskalis' in-house expertise was complemented by internationally recognized geotechnical experts and specialist laboratories, providing independent input and validation of key design assumptions and engineering solutions.

An observational design approach, supported by extensive instrumentation, monitoring, geotechnical testing, and back-analysis, enabled engineering decisions to be continuously validated and refined during execution. The project team also successfully challenged and refined elements of the Engineer's wave studies, resulting in optimized reclamation edge structures that maintained performance requirements while improving constructability and overall project value. In addition, multiple reclamation and development scenarios were evaluated in close cooperation with the Client to support the efficient acquisition of land titles and maximize the value of the reclaimed development.

The project demonstrates Boskalis' ability to combine engineering innovation, geotechnical expertise, and construction excellence to deliver complex reclamation projects under challenging ground conditions while creating tangible value for the Client.

FINANCING AND DELIVERY STRUCTURE

A key enabler of the Harbor City Reclamation Project was an innovative financing and delivery structure developed in close cooperation between Boskalis, the Client and its financial partners. The structure allowed reclamation works to commence under a funded Limited Notice to Proceed while the Client finalized the long-term project financing. As construction progressed, the newly created land contributed to the asset and collateral base supporting subsequent funding phases, establishing a direct link between project execution, value creation and capital availability. Supported by advance funding and bank-backed payment security arrangements, the structure provided the certainty required for Boskalis to mobilize substantial resources at an early stage. By combining commercial flexibility, secure funding arrangements and phased project delivery, Boskalis helped transform the Client's development vision into a bankable and executable reclamation program.

OUTCOME

The Harbor City Reclamation Project successfully delivered the agreed Amended Priority Works up to 02 May 2025, after which the Contract Closure Agreement was executed between the Parties.

The project was delivered under exceptionally challenging conditions, including highly variable ground conditions, stringent seismic performance requirements, regulatory uncertainty, work suspensions, stakeholder sensitivities, and the management of significant UXO risks. Throughout the project, changing development priorities and funding-driven adjustments to the program required continuous adaptation of execution strategies, work sequencing, and project objectives. Through these challenges, the project organization demonstrated resilience, flexibility, and a strong commitment to maintaining a collaborative relationship with the Client.

E Manta CPT on board BKM 102 en route to an offshore testing location.



A defining characteristic of the project was the ability of the Boskalis team to develop practical and innovative solutions, whether through optimized engineering designs, alternative execution strategies, stakeholder engagement initiatives, or tailored contractual and operational approaches. This adaptability, combined with a strong partnership with the Client, enabled the project to preserve value, maintain momentum, and successfully deliver the agreed priority works.

Beyond the physical works, the project generated valuable technical, operational, and organizational knowledge in the fields of reclamation, geotechnics, seismic design, environmental management, stakeholder engagement, and project delivery. Harbor City stands as a strong reference project for Boskalis, demonstrating how engineering excellence, creativity, and organizational resilience can successfully deliver complex urban marine infrastructure in a challenging and evolving environment.