

PROJECT SHEET

LOTTE - LINE PROJECT, INDONESIA
LAND RECLAMATION FOR A NEW PETROCHEMICAL COMPLEX

BOSKALIS

Royal Boskalis Westminster is a leading global services provider operating in the dredging, maritime infrastructure and maritime services sectors. The company provides creative and innovative all-round solutions to infrastructural challenges in the maritime, coastal and delta regions of the world. With core activities such as coastal defense, riverbank protection and land reclamation Boskalis is able to provide adaptive and mitigating solutions to combat the effects of climate change, such as extreme weather conditions and rising sea levels, as well as delivering solutions for the increasing need for space in coastal and delta regions across the world. The company facilitates the development of offshore energy infrastructure, including renewable wind energy. Boskalis is furthermore active in the construction and maintenance of ports, waterways, access channels and civil infrastructure, thus helping to facilitate trade flows and regional socio-economic development. In addition, Boskalis is a global marine salvage expert and has a number of strategic partnerships in harbor towage and terminal services (Keppel Smit Towage and Smit Lamnalco). With a versatile fleet of more than 700 vessels and floating equipment and 10,000 employees, including associates, Boskalis is creating new horizons around the world.

INTRODUCTION

The LOTTE Chemical Indonesia New Ethylene (LINE) project consists of building a large-scale petrochemical complex, including a naphtha-fed steam cracker, for the manufacturing of downstream polyethylene products. Once completed, the site will turn into an integrated complex with HDPE and LLDPE plants.

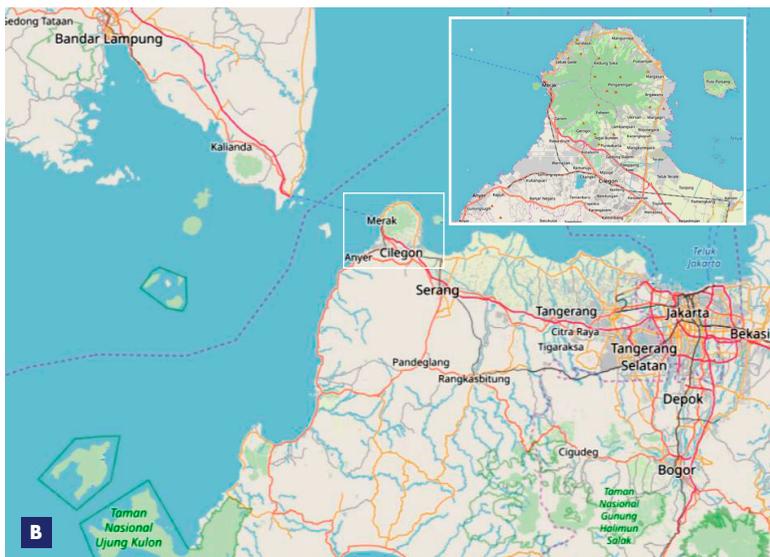
The LINE project complements LOTTE's three existing polyethylene plants to form an integrated petrochemical facility. The successful implementation of the LINE project will be a significant milestone for the LOTTE Group as it plans to become a top tier petrochemical company in South East Asia.



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FEATURES

Client	LOTTE E&C – HANS ENGG JO
Location	Cilegon, Banten Province, West Java, Indonesia
Period	2019 - 2020
Contractor	PT Boskalis International Indonesia



- A** TSHD Oranje discharging
- B** Location map
- C** PVD installation works

PROJECT SPECIFICATION

The land preparation works for the project, executed by PT Boskalis International Indonesia consisted of dredging and reclamation of some 3.3 million cubic meters of sand derived from an offshore borrow area, supply and installation of approximately 3 million linear meters of pre-fabricated vertical drains and pre-boring of close to 145,000 meters to facilitate the vertical drain installation. A volume of around 150,000 cubic meters of sand was relocated within the site boundaries by means of dry earth moving.

Boskalis was awarded the contract in April 2019 and all works were completed by January 2020.



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SAFETY, HEALTH AND THE ENVIRONMENT

Boskalis' No Injuries, No Accidents (NINA) behavioral based safety program was adopted for the whole project. Challenges were presented in the form of a local workforce not used to wearing personal protective equipment (PPE), let alone thinking safety and a site frequently visited by various species of exotic animals. Extensive project inductions, continuous follow-up through toolboxes, on-the-job trainings and a relentless attention for SHE-related matters made it possible to execute the project in nearly 400,000 safe working hours without LTI (Lost Time Injury).



DREDGING AND RECLAMATION

The sand required for the 96 hectares of land preparation was dredged by the large trailing suction hopper dredger Oranje from a marine borrow area near the site location. The shallow waters in the marine borrow area meant that the Oranje was able to dredge from specific parts of the borrow area only, whilst simultaneously navigating tides, current and around local marine traffic. Sand dredged by the Oranje was pumped to the disposal area by means of a combination of floating and land based pipelines. The sand was partially installed on top of a layer of pre-installed geotextile and a thin layer of soil, which meant that the drainage of the process water had to be carefully planned. As the existing soil was not suitable for the construction of bund walls around the reclamation area to contain the sand and to protect the surrounding industrial plants and villages, these were erected using reclaimed sand. To prevent the outflow of sediment into open water, a settlement pond and two silt screens were installed. Installation of pre-fabricated vertical drains was planned to be carried out prior to filling the reclamation area to the final levels. Consequently, sophisticated planning and phasing of the works were made to ensure the continuity of both the dredging and reclamation works, as well as the pre-boring and vertical drain installation.

By means of dry earth moving, trucks transferred a total volume of 150,000 cubic meters of sand from purpose built stockpiles at the reclamation area to a separate area north of the existing plant.

PRE-BORING AND VERTICAL DRAIN INSTALLATION

Prefabricated vertical drains were applied to expedite the consolidation process of the reclamation areas. Boskalis called in its subsidiary Cofra, which specializes in soil improvement solutions, to supply and install the vertical drains. A total length of close to 3,000 kilometers of vertical drains was installed, of which some to a depth of 13 meters below the surface. Completing this scope in time and in conjunction with the ongoing reclamation activities required a total of five installation rigs, in weight ranging between 40 and 60 tons. In order to install the vertical drains in areas with a hard surface layer, a total of some 145,000 meters of pre-boring was required. Before, during and after the land preparation works, settlement was measured using settlement beacons.



- D** Reclamation in progress
- E** Reclamation in progress
- F** Topview of the reclamation

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