

# PROJECT SHEET

**FECAMP OWF**  
SEABED PREPARATION FOR GBS FOUNDATIONS

## BOSKALIS

Royal Boskalis Westminster is a leading global marine contractor and services provider. We offer our clients a wide variety of specialized 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, it also provides towage and terminal services across the globe and delivers marine salvage solutions.

With our committed professionals in engineering, project management and operations, 650 specialized vessels and an unprecedented range of activities in 90 countries across six continents we help our clients in the offshore industry to push boundaries and create new horizons.

## INTRODUCTION

The Fecamp offshore wind farm (OWF) is a 500 MW wind farm located in the English Channel, 13 km off the coast of Normandy, France, which generates sufficient electricity to cover the power consumption of more than 770,000 people.

The wind farm consists of 71 offshore wind turbines with a capacity of 7 MW each, connected to the gravity-based structures (GBS) installed on the seabed at depths between 25 and 32 meters.

## SCOPE OF WORKS

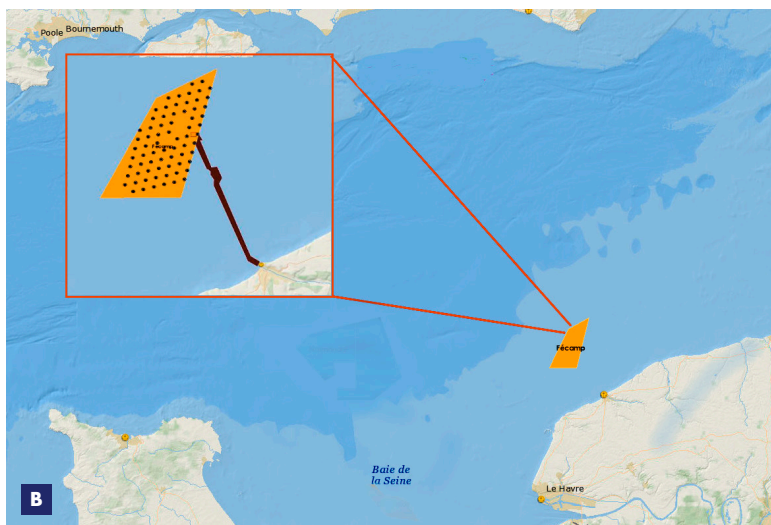
Boskalis, in consortium with Bouygues Travaux Publics (Bouygues) and Saipem has been awarded a EUR 552 million EPCI contract for the design, construction and installation of 71 concrete Gravity-Based Structures (GBS) designed and produced as Wind Turbine Generator foundations to be installed on the Fécamp OWF site.



**A** GBS Transportation to the project site

## FEATURES

Client	Eoliennes Offshore des Hautes Falaises
Location	France, Fecamp
Period	2 March 2022 - 6 December 2022
Contractor	Boskalis Offshore Subsea Contracting BV
Main activities	SRI, Seabed preparation, Ballasting, Scour protection, Survey

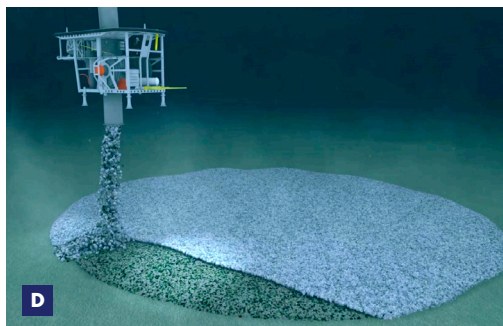


Boskalis' scope of works includes the installation of rock bedding layers as seabed preparation prior to the GBS installation, post-installation ballasting as well as scour protection of GBS. Boskalis also provided the tugs for GBS transportation to site.



**B** Project location map

**C** Installation of scour protection around foundations



D

### KEY PROJECT FIGURES

- 71 GBS's produced, transported, and installed on site
- Weight of each GBS is  $\approx 4,800$  Te
- OWF location in the English Channel about 16 km from the French coastal line
- Water depths from 25 m to 32 m

### SUBSEA ROCK INSTALLATION (SRI) FIGURES

- 164,000 te of rocks installed as bedding layer
- 148,000 te of rocks installed for scour protection
- 230,000 m<sup>3</sup> marine gravel used for ballasting.

### PROJECT EQUIPMENT

- SRI vessel Rockpiper
- TSHD Willem van Oranje
- Auxiliary assisting tug Kamara
- Survey Vessel Terra Plana
- 3 x DP2 Anchor handling tug
- 2 SRI vessels with Inclined Fallpipe

### PROJECT EXECUTION

The scope included design, preparation of seabed, transportation by means of tugs and barges, subsea rock installation for multiple purposes and ballasting of GBS.

### PRIOR TO GBS INSTALLATION

Boskalis project team executed the subsea rock installation of 71 gravel pads with an approximate diameter of 34 m each as bedding layers for the GBS foundations. Rocks of 1-4" size were installed with high accuracy ( $\pm 10$  cm) by means of SRI Vessel equipped with ROV mounted on the fall pipe. Each GBS was installed on top of the accurate bedding layer.

### AFTER THE GBS INSTALLATION

After the GBS's were installed, SRI vessels executed subsea rock installation around structures by means of inclined fall pipe for the purpose of stabilization and scour protection of GBS.

Parallel to scour protection all the GBS structures were ballasted by TSHD Willem van Oranje supported by CSV Kamara with marine gravel to ensure their stability on the sea floor against the environmental loads.

### PROJECT CHALLENGES

Boskalis team performed subsea rock installation for both seabed preparation and post-installation scour protection close to offshore structures with high installation precision (only 10 cm tolerance for the bedding layer) in difficult environmental conditions, such as high tides (up to 8 m) with a strong tidal current above 3 knots and westerly waves from the Atlantic Ocean.

The requirement for a short offshore execution period raised the necessity for thorough work preparation. Therefore, various 3D visualization and simulation techniques, as well as extensive model and commissioning tests, were performed throughout the project preparation phase to ensure the requested accuracy and speed of project execution with the highest safety standards.

The project team demonstrated an outstanding performance in managing this multi-vessel project with wide range of simultaneous operations (simops) on site executed up to the client's satisfaction.



E

- D GBS Bedding layer installation.
- E GBS Ballasting by means of TSHD Willem van Oranje supported by CSV Kamara