

**GEOBAG COASTAL PROTECTION PROJECT - GANPATIPULE,
RATNAGIRI, MAHARASHTRA**
RATNAGIRI, MAHARASHTRA, INDIA

Coastal Protection

Client:	Products used:
GOVT OF MAHARASHTRA	• TECHFAB GEOBAGS
Contractor:	
BLUE BERRY INFRA PVT LTD W/O. RR EDIFICE	
Manufacturer & Supplier:	Year of Construction:
TECHFAB (INDIA) INDUSTRIES LTD.	2026

Project Introduction:

The project site is located near Ganapatipule near Ratnagiri on the coastal stretch of the Arabian Sea coast of Maharashtra, India which is a well-known tourism destination in Maharashtra and attracts large numbers of visitors for beach recreation, pilgrimage, and marine tourism activities including scuba diving and coastal sightseeing. The Google coordinates of the project location are 17.14° N latitude and 73.27° E longitude. The shoreline in this region is characterized by a pocket beach morphology controlled by lateritic headlands and hillock-type formations projecting into the sea. One such prominent geomorphic feature near the project site resembles a “dolphin nose” type promontory, which significantly influences local wave transformation and sediment movement along the beach.

The coastal environment in this region also supports sensitive ecological systems including coastal vegetation and mangrove habitats in nearby creeks and estuaries. Protection of the shoreline is therefore important not only to safeguard the hinterland and infrastructure but also to preserve the natural beach environment and tourism.

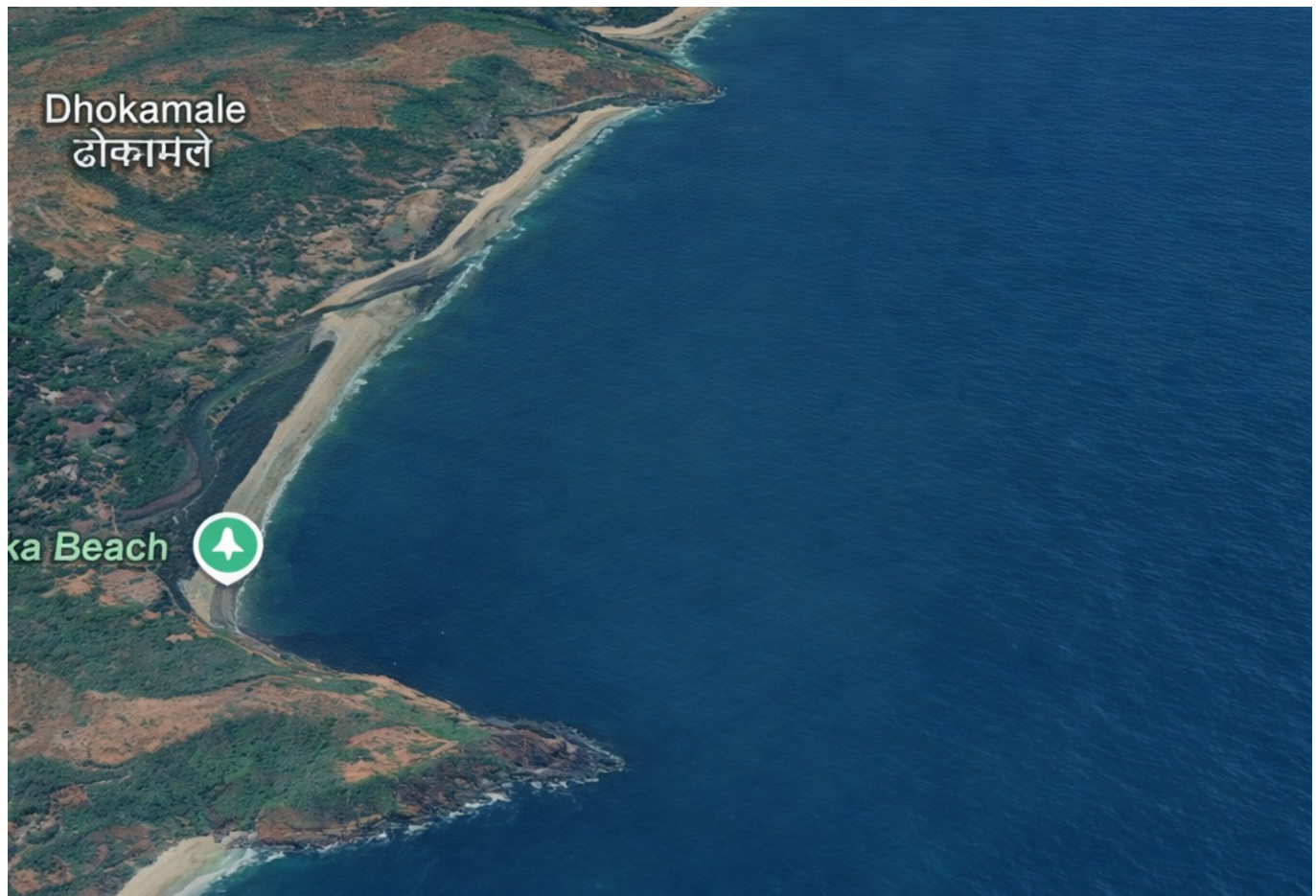


Photo 1 : Shore line Protection Site at Neware, Ganpatipule

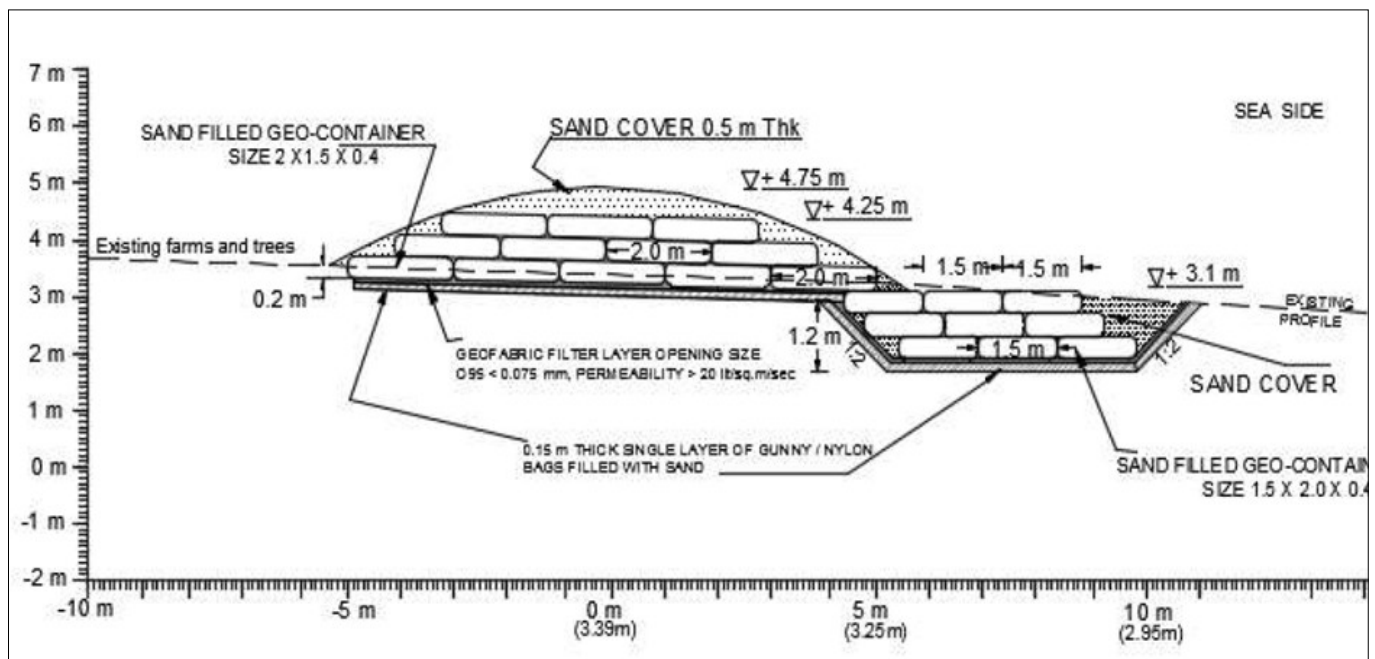
Wave Climate

The Ratnagiri coastline is exposed to the Arabian Sea wave climate, which is strongly seasonal and dominated by the southwest monsoon. During the fair-weather period (October to May), wave conditions are relatively moderate and beaches generally undergo natural recovery. During the southwest monsoon season (June to September), wave heights increase significantly and the coastline experiences high-energy wave conditions, which can induce erosion of the beach and backshore areas. Oceanographic studies along the coastal zones near Ganpatipule indicate that non-monsoon breaker wave heights generally range between 0.2 and 1.1 m, while during the southwest monsoon the breaker heights increase to approximately 0.5 to 2.3 m. This seasonal variation in wave climate results in foreshore widening and beach recovery during fair-weather months, whereas significant beach erosion and sediment redistribution occur during the monsoon period.

Engineered & Sustainable Solution

The coastal protection solution adopted at the site consists of a geobag dyke system constructed parallel to the shoreline, combined with geotextile tube groynes placed perpendicular to the coast.

The geobag dyke is constructed using Engineered Geobags made of High Tenacity Polypropylene fabric made to a size of 2.0m x 1.5m x 0.4m designed to hold a weight of 2MT to resist the destabilizing wave forces and brace up the dyke with stable units of Geobags forming a trapezoidal geometry. The Geobag units fabricated using engineered fabrics which are designed to resist high hydrodynamic stresses and offer endurance for design life by resisting abrasion & UV degradation.



Typical Cross Section Drawing

The Geobag units are filled with dredged sand locally from the sea and filled in to the bags to make the project sustainable. The Geobag units are engineered and pattern placed in a way to build a dyke from 3.1m CD to 4.25m CD. The dyke acts as a flexible coastal defensive revetment structure that dissipates incoming wave energy and protects the backshore from erosion. The geotube groynes interrupt longshore sediment transport and promote localized sand accumulation, encouraging the formation of wider beach sections between structures.

The combined system provides both immediate shoreline protection and long-term beach stabilization by working in harmony with the natural sediment transport processes of the coastline.



Photo 2 : Installation of Geobags



Photo 5 : Completed Geobag Works for Shore Protection

Conclusion:

The integrated use of geobag dyke with engineered Geobag units designed for its stability and endurance provides an effective and adaptable coastal protection strategy for the Ganpatipule–Ratnagiri shoreline. The system helps reduce erosion during high-energy monsoon conditions while allowing natural beach recovery during calmer seasons. By stabilizing the shoreline and encouraging sand deposition, the project contributes to the long-term sustainability of tourism, coastal infrastructure, and ecological resources in the region.

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