

Secugrid® Bentofix® X - Sarbagita Landfill - Indonesia

Rehabilitation of a landfill

- **Project Name**
Sarbagita Landfill, Bali, Indonesia
- **Product**
Bentofix® X2 NSP 3300
Secugrid® 80/20 R6





Challenge

The Indonesian island of Bali is one of the world's most well-known tourist destinations. It provides critical economic vitality to the province, with tourism accounting for more than 70% of its economy.

However, just 9km from the Ngurah Rai International Airport is the Sarbagita Regional Landfill.

The landfill is the largest one in Bali. Its traditional waste disposal practices – accepting upwards of 1.400 tons per day – had led to the development of overloaded mounds of waste that had begun to dominate the landscape. The 30-ha site was estimated to have less than two years of space left.

Health officials worried about the stability of the waste slopes and the impact the exposed waste might have on local water. Tourism officials worried that the large footprint of the landfill, visible from the air by arriving visitors, would impact Bali's reputation as a place of beauty.

Solution

To resolve these concerns, the Ministry of Public Works and Public Housing set forth on an ambitious plan to fully revitalise Sarbagita. Their vision was to create a modern waste-to-energy facility and, through the installation of a geosynthetic capping system, transform the large landfill space into green slopes.

The revitalisation design used Secugrid® 80/20 R6 geogrids for slope reinforcement and a Bentofix® X2 NSP 3300 geo synthetic clay liner (GCL) for the cap. The slopes greatly needed reinforcement to protect the waste from potential land-slide. The high-strength Secugrid® geogrid panels were extended back into the waste at key benches on the slope and in the middle slope zone. A mesh facing was installed on the face of the 10m high prepared slopes and a tier of gabion baskets was installed at the slope toe to create the composite reinforcement system.

Geomembranes and GCLs are typically used for landfill caps to prevent fluid migration into the landfill, thereby reducing or eliminating post-closure generation of leachate and the associated treatment costs. The cap is also designed to trap and properly vent the gases generated during decomposition of organic wastes. Similarly, the closure system can prevent the seep of any fluids from the refuse body to the landfill surface. Often GCLs are added beneath the geomembrane to form a composite lining system.

In this case the Ministry of Public Works and the designer decided to use a multi -component GCL and selected for the cap the polyethylene extruded coated Bentofix® X GCL, which directly suited the project's performance goals. This composite variety of GCL features an extruded polyethylene coating on one of the highly durable outer geotextiles. The coating ensures a very high fibre pull-out resistance and increases the long-term internal shear strength of the GCL, which was a major benefit for the cap design on the slopes. Additionally, the coating increases the gas barrier performance of the GCL and further protects the bentonite core from desiccation or critical substances.

By fully encapsulating the landfill, the completed cap enables the safe and efficient restoration, revegetation, and possible reuse of the land. The total area of this first major phase of capping work was 5ha.

With this multi-geosynthetic design, Bali is restoring some of the hillside traditional beauty through a landfill modernisation programme. The work exemplifies the province's green engineering infrastructure goals.