

GEOWEB®

DIKE EMBANKMENT STABILIZATION



LNG ENERGY PROVIDER
Northeast US

Degraded Original Asphalt Cover



GEOWEB® Confinement System



3D Soil Confinement System Repairs Eroded Dikes Protecting LNG Storage Tanks

Project Challenge:

To repair 100,000 sf (9,300 sm) of eroding primary and secondary dikes around a Liquid Natural Gas (LNG) storage tank. The original asphalt cover had deteriorated along the face of the dike largely due to expansion and contraction issues. A slope adjacent to an access roadway showed significant degradation caused by pavement cracks in the road that allowed water to penetrate the soil below the asphalt and create large holes in the slope.

The tank holds LNG that expands to one billion cubic feet of gas. Steep embankments on the primary dike consisted of 1.2H:1V slopes 26 ft (8 m) high and 2H:1V slopes 5 ft (1.5 m) high on the secondary embankments.

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Primary Dike Repair

To begin the slope rehabilitation of the primary dike, the existing asphalt cover was removed and the surface graded to remove any rills and depressions. Additional fill was added where necessary to level out the slope surface. A non-woven geotextile, followed by Presto's GEOWEB® 3D Soil Confinement System (GW30V6 mid-size cell, 6 in (150 mm)) depth was installed over the slope.

Due to a desire to keep the slope relatively impermeable—as well as the combination of slope length and slope angle—staking the GEOWEB material on the slope was not practical. A system of tendons and tie-offs secured the material without using penetrating anchors.

Eight polyester tendons were required per panel, with an ATRA® Tendon Clip load transfer device placed in every 6th cell of the GEOWEB sections downslope. The load transfer device placement assures that the stress on the GEOWEB cells does not exceed their design loading. Generally, tendons are tied to a buried PVC deadman pipe at the crest, but due to lack of room at the top for such placement, earth anchors with a minimum pullout of 1,250 lbs each were driven at the crest with the tendons secured to them. Crushed rock infill completed the surface.

Secondary Dike Repair

Rehabilitation continued on the secondary dike by grading the slopes in preparation for the GEOWEB cover. Shorter, flatter slopes compared to the primary dike allowed a 100 mm (4 in) GEOWEB material to be used—as well as stake anchors.

The client wanted to avoid using metal rebar stakes, therefore the 20 in (50 cm) Presto ATRA® Speed Stakes were used. The speed stakes are made of an HDPE based polymer alloy that will not rust or degrade over time. The stakes were placed in a 3 cell x 3 cell anchoring pattern (approximately one stake per square yard of GEOWEB material).

Dike Rehabilitation Results

Completed in Spring of 2017, both the primary and secondary dikes are stable, and performing extremely well.

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