



Propex[®]

RESILIENT FLOOD MITIGATION

Supporting state/local governments and tribes/territories in building resilient infrastructure and communities through nature-based flood mitigation solutions.

Propex® is a global leader in developing and manufacturing innovative flood mitigation & erosion protection systems. Our low carbon solutions stabilize the earth and improve the performance of levees, dams, channels and other key infrastructure.



Nature-Based Solutions



- **Half the installed cost of rock and concrete**
- **Tested & approved by the U.S. Army Corps of Engineers**
- **Made in the U.S.A.**

Technical Support

Propex's team of professional engineers offer full service support throughout the design process including site analysis, product selection, design support, construction details, and installation assistance.

Resilient solutions that meet FEMA's nature-based criterion:

- Promotes vegetation and help restore rivers, floodplains, wetlands, living shorelines and soil stabilization.
- First and only manufacturer of High Performance Turf Reinforcement Mat (HPTRM) to have our **carbon footprint verified** by an independent, third-party organization.
- The carbon footprint of our HPTRM is **up to thirty times smaller** than traditional solutions such as rock riprap and concrete.
- HPTRMs have been **recognized by the Environmental Protection Agency as a Best Management Practice (BMP)** to improve water quality.
- Reinforced vegetative solutions support living shorelines, whereas rock riprap and concrete can decrease streamside vegetation and adversely impact fish populations.





CASE STUDY

Oyster Lake Outfall Improvement

Location: Santa Rosa, FL | **FEMA Region:** IV | **Primary Lifeline:** Transportation
Hazards: Coastal Flooding, Hurricanes | **Solutions:** ARMORMAX®

Oyster Lake is a coastal dune lake that creates a unique interchange between a natural storm water lake and the Gulf of Mexico. When a coastal dune lake reaches a high water level, flow breaks through the dune system forming a channel between the lake and the Gulf. The outfall is critical for regulating water levels and mitigating flooding. Oyster Lake’s outfall had become severely degraded and the overall health was strained from major storms and urban growth.

Walton County and other state agencies wanted to reinforce the outfall while preserving the natural vegetation.

More than 2,000 square yards of ARMORMAX, consisting of High Performance Turf Reinforcement Mat (HPTRM) and Engineered Earth Anchors (EEA), was installed along the channel. This system was selected because it provides slope stabilization and erosion control while promoting vegetation. During installation, 2,000 sea oats were planted within the HPTRM, which is designed to promote vegetation.

After installation, Hurricane Michael [category 4] made landfall 60 miles east of Oyster Lake causing winds up to 80 mph, storm surge, and significant rainfall and flooding at the project location. The vegetated slopes of the outfall withstood the extreme conditions, protecting beachfront homes, nearby businesses, underground utilities, a section of Highway 30A, and a bridge that crosses the channel.



CASE STUDY

Murrieta Creek Stabilization

Location: Temecula, CA | **FEMA Region:** IX | **Primary Lifeline:** Transportation
Hazards: Inland Flooding | **Solutions:** ARMORMAX®

Murrieta Creek has a history of devastating flooding. Notably, the flood of 1993 that claimed the lives of five people and damaged 70 aircrafts and two bridges at Pendleton Marine Corps Base. The flood also inundated pumps at the Eastern Municipal Water District, causing 5 million gallons of raw sewage to flow into the creek. Multiple major flood events have occurred since the 1993 flood. Today, more than 600 homes and commercial structures are vulnerable to flooding.

In 2000, the U.S. Army Corps of Engineers initiated the Murrieta Creek Flood Control, Environmental Restoration and Recreation Project to mitigate flooding. In phase two of the project, ARMORMAX was selected to provide erosion and scour protection on the creek banks. The system consists of High Performance Turf Reinforcement Mat (HPTRM) and earth anchors that provide resilient flood control for up to 75 years.

Maintaining water quality was a main concern because Murrieta Creek is recognized as one of the last high-quality, minimally disturbed riverine environments in Southern California. ARMORMAX helps to decrease sedimentation and encourages infiltration of water back into the ground water table. The system also promotes rapid root development for long-term vegetation, whereas rock riprap, can decrease streamside vegetation and adversely impact fish populations.

Vegetation was quickly established, and ARMORMAX has effectively protected the channel from erosion and flooding.





CASE STUDY

Harvey Ditch Stabilization

Location: Waller County, TX | **FEMA Region:** VI | **Primary Lifeline:** Transportation
Hazards: Inland Flooding | **Solutions:** SCOURLOK® & ARMORMAX®

Brookshire-Katy Drainage District (BKDD) maintains a drainage channel that runs along Stalknecht Road in Waller County, Texas. Extreme storm water flows caused by Hurricane Harvey caused the roadside drainage ditch to experience erosion and slope instability, reducing the channel’s capacity.

The severe erosion and reduction in channel capacity prompted BKDD to pursue permanent erosion protection. An early phase in the design process used rock filled gabion baskets to armor the channel, however, the design engineer wanted a more economical and environmentally-friendly solution. Gabion baskets require the removal and transportation of excavated material from the site, but SCOURLOK allows the reuse of on-site soil to fill the units.

Stakeholders selected SCOURLOK for the remaining phases of the project because it was a more cost-effective solution. SCOURLOK is a stabilization system that features rigid and interlocking cells armored with erosion protection from a highly UV stabilized High Performance Turf Reinforcement Mat (HPTRM). The system is engineered to provide a vegetated, gravity wall system that resists sliding and overturning for up to 75 years.

The design included an eight-foot wall, comprised of two tiers of SCOURLOK that spans 500 feet along the eastern side of the channel. The design also included 300 square yards of ARMORMAX along the top of the channel.



CASE STUDY

Kaneohe Stream Bank Restoration

Location: Oahu, HI | **FEMA Region:** IX | **Primary Lifeline:** Safety & Security
Hazards: Inland Flooding & Coastal Flooding | **Solutions:** PYRAWALL®

As part of Hawaii’s National Pollutant Discharge Elimination System (NPDES) and Erosion Prone Area Improvements Program, a streambank stabilization project was completed along Kaneohe Stream in Kaneohe, Oahu.

Over the past 30 years, high-flow events eroded higher portions of the channel, causing encroachment of several private properties. To prevent additional property loss and mitigate future flooding, the City and County of Honolulu wanted to find a solution that would provide long-term channel stabilization. Historically, a concrete solution has been used, but the City and County wanted a more natural system that encouraged growth of native vegetation.

PYRAWALL engineered wrap-faced vegetated solution, was selected to reinforce 330 feet of Kaneohe Stream. The installation ranged from six to eight feet high and was designed based on geotechnical information available at the site. This included steep 1H:4V slope segments with a mid-slope planting bench.

PYRAWALL combines High Performance Turf Reinforcement Mat (HPTRM) with internal braces to reinforce soil mass and resist lateral earth pressures. It is also designed to encourage vegetation and is a vegetated Best Management Practice Solution for NPDES Storm Water Compliance. This wall system is comprised entirely of three engineered geosynthetic components with no metal, concrete or short-lived biodegradable materials.

The vegetated wrap-face wall system provided resilient bank reconstruction and stabilization along a residential section of the Kaneohe Stream that will provide flood mitigation for up to 75 years.





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