

PROJECT PROFILE



Project Basics

Project Name: N Schultz Pass Road Development

Installation Date: Summer 2019

Product Type: Western Excelsior Xtreme Armor System™ (XAS)
utilizing PP5-Xtreme with Percussion Driven
Anchors (PDAs)

Project Location: Flagstaff, Arizona

Project Overview

North Schultz Pass in Coconino County, like much of Arizona, is hot, dry, and with generally sparse vegetation growth. But after fire destroyed the wooded area on the east side of the San Francisco peaks near Flagstaff, the east side of the mountain saddle was left more vulnerable to erosion from heavy rains. In July of 2018, a rain event dumped nearly 6 inches of rainfall on the area within just 2 hours. The extent of this rainfall event was determined to be approximately a 1,000-yr hydraulic event for the area. To make matters worse, this event was preceded by another large rainfall event that produced 2 to 4 inches of rain in the same area, just four days earlier. With little vegetation left due to fire, and significant mountain debris mobilized in the event tumbling downstream, erosion damage was massive. Existing assets including mitigation areas, ditches, emergency spillways, and retention basins were severely compromised. In the flooding aftermath, the Coconino County floodplain management team was tasked with evaluating the affected area to address the need for increased soil stabilization to help mitigate future erosion issues in large floods.

Project Solution

The Xtreme Armor system (XAS) was selected as the appropriate erosion control system for the job. The XAS is an adaptable Anchor Reinforced Vegetated System (ARVS) that includes an integrated design combining high-performance turf reinforcement mat (HPTRM), percussion driven anchors, pins, and vegetation to create an erosion control system that can handle the high stress and strain from large hydraulic loading events. The particular configuration designed for North Schultz was specifically adapted for channel installations that are of greater than typical flows and hydraulic stress conditions. To build the site-specific XAS system, the PP5-Xtreme High-Performance Turf Reinforcement Mat (HPTRM) was selected. PP5-Xtreme is a woven HPTRM that creates a high-tensile strength, low-profile matting. This means it can handle more loading



Fire-stricken ground and an 1000-yr storm event resulted in massive channel erosion (top). Remediation started by cleaning and regrading the channel (middle), and the installation of the Xtreme Armor System (bottom).

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Western Green

4609 E. Boonville-New Harmony Rd., Evansville, IN 47725

(866) 540-9810 | www.westernexcelsior.com



PROJECT PROFILE cont.

with less strain. These HPTRM attributes also make it suitable to handle wheel load and large animal traffic through the area, both which were benefits to the use and maintenance of the project location.

Erosion Solution Installation

Installation began on the project site in July of 2019. Originally, the system was scheduled to be installed during the spring of 2019, but due to multiple delays, work didn't begin until late summer. Because of the delays, the crew was forced to hasten the installation pace in hopes of finishing the site protection before the monsoon season in August. Luckily, the XAS system selected can be installed more quickly than many hard armor alternatives.

Due to the shape and size of the flood structures, the HPTRM was installed perpendicular to the channel flow. This direction of matting installation is a bit unconventional, as most installers choose to install parallel to water flow, but for this project the direction was decided upon as it would result in ZERO material waste. The HPTRM could be cut to fit the channel dimensions specifically. The XAS system can be installed in either direction as long as proper shingle-style overlaps occur in the direction of water flow. Once the erosion control matting was placed, the percussion driven anchors were installed along seams and every 4 ft across the matting. The PDAs created a working check slot to slow soil movement along the bed, while resisting pull-out up to 1000 lbs./ft. Additionally, 8-inch twist pins were installed as added fastening support. The twist pins are an inexpensive fastener that help add HPTRM-to-soil conformance using a screw-like install resulting in nearly 150 lbs. of pull-out resistance in loam to clay soil types. Finally, 12-inch-long straight wire pins were installed between the rows of PDAs and twist pins, as a final stop-check for system strength.



Percussion driven anchors were installed at 4 ft intervals across the HPTRM, with twist pins installed intermittently (left). The finished install of the ARVS design resulted in a low-impact design in the drainage channel (right).

Performance

Beyond holding up to the hexpected hydraulic forces, there were additional considerations for the selection of an erosion control system. Local soils and the lack of long-term vegetation were significant concerns. The Flagstaff area typically consists of nutrient-poor, alkaline soils that are heavy in clay. This soil type results in minimal vegetation growth, and what does grow tends to be slow growing natives. The optimized configuration of the PP5-Xtremem is ideal for the establishment and support of vegetation, an extra benefit with slow-establishing plants. Additionally, since the long-term vegetation will be sparse, the erosion control solution needed to hold up under added UV exposure. Luckily, the Xtreme Armor System is suitable for both of these issues. Together, the PP5-Xtreme matting and the permanent percussion driven anchors have been tested for long-term system longevity of 25-50 years and is one of the strongest UV-stabilized systems available in the market.

