



Carus Well Pad Slope Stabilization

Near Killdeer, North Dakota

The Geopier X1® system saved time and helped preserve natural beauty on a steep, sliding slope adjacent to an oil pad.

Description: The Carus Well Pad for XTO Energy experienced a rotational landslide along the northeast slope pad boundary following excavation of the existing slope for the well pad footprint. The overall project consisted of stabilizing the landslide mass area and regrading the area north of the pad (along the existing slope). Site access at the site would prove to be challenging due to the hilly terrain surrounding the well pad. The State of North Dakota requested that the slide be stabilized to increase the factor of safety against global instability and meet the requirements for critical failure surfaces to prevent future landslides from occurring to reach the well pad footprint. Additionally, the State of North Dakota required a natural-looking solution that blended in with the native surroundings and did not want exposed structural fixes (i.e. concrete or steel) to be visible. The X1® system was chosen as the most economical and best technical solution for landslide stabilization as well as its low-impact installation result and expedient installation process.

Subsurface Conditions: Soil conditions were variable throughout the project site footprint. Borings generally showed about 7 feet of landslide mass overlying interbedded layers of soft to stiff silt and clay (colluvium) with lignite layers overlying claystone bedrock.

Geopier Solution: The Geopier designer worked with the geotechnical engineer to develop a Geopier solution that reinforced to soft landslide mass and extended through



the soft layers to tag the claystone bedrock. A series of benches were created to allow for the installation equipment. In addition to hilly conditions and aesthetic requirements, the Geopier crew had to work within a specific time window before freezing temperatures and winter weather would make pier installations difficult. The end result, a total of 830 X1 elements with shaft lengths of 25 to 35 feet, were installed over a period of 13 days by crews working around the clock. The X1 technology improved the stability at the base of the slope, as part of an overall reconstruction of the slope. The area of X1 elements was covered by a rip rap buttress with an erosion protection blanket being implemented upslope.

PROJECT TEAM

Owner:

XTO Energy

Geotechnical Engineer:

Braun Intertec (Fargo)

Earthwork Contractor:

Trotter Construction

Geopier Installer:

Peterson Contractors, Inc.

Geopier Designer:

Ground Improvement Engineering.