

## UNITED STATES

## MDT - Two Mile Drive Vibro Stone Columns



### Owner

Montana Department of  
Transportation

### Engineer

NTL Engineering and Geoscience

### General contractor

LHC Inc.

### Dates of work

February 2016 May 2016

## Description

The Montana Department of Transportation (MDT) wanted to construct a byway around the city center of Kalispell, MT. The planned location of the new by-way intersected with several existing roads which would need to be relocated above the new highway. The planned overpass for Two Mile Drive roadway required ground improvement to strengthen the soils beneath the two new bridge embankments, and to mitigate the risk of liquefaction-induced settlement during a potential seismic event.

MDT and their geotechnical consultant developed a stone column ground improvement design at a high replacement ratio. Menard was awarded the project to install stone columns to support the new bridge embankments.

## Main figures

Stone columns

572 EA.

## Ground conditions

The subsurface strata are characterized by alternating layers of saturated lean clay and silty sand to sandy silts in varying thicknesses.

## Solution

The mountainous terrain of Montana makes it an uncommon location for ground improvement. In this region it is more common to require earth retention or slope reinforcement, rather than improvement of soft/loose soils. MDT Two Mile Drive is only the second publicly funded VSC project in Montana history.

This project was unique and challenging in several ways. The geotechnical consultant's stone column design called for a large volume of stone to meet a high replacement ratio requirement. This is a challenge when installing stone columns because the columns serve to densify the ground, and the installation of each additional column becomes more difficult in the increasingly stiffer/dense soils.

Additionally, due to the near-surface soil's high water content, the site became wet and muddy after construction started. This resulted in the site needing remediation and reconstruction of the working pad every few weeks. At project completion, MDT estimated up to 40,000 cars will travel on the by-way every day.

Menard installed a total of 572 stone columns to maximum depths of 50 ft.