

CASE STUDY



Lavaltrie

Construction of a Residential Building on Liquefiable Soil Using Geogrids

PROJECT

This project involves the construction of a four-story multi-unit residential building on a site with challenging ground conditions, including soil susceptible to liquefaction. A geosynthetic-reinforced foundation system was selected as an alternative to traditional pile foundations.

This approach represents a first in Quebec for this type of application.

CHALLENGE

Soil liquefaction can weaken the ground and cause significant settlement. Under these conditions, constructing a 37 m by 20 m building with underground parking requires special attention to ensure foundation stability. Furthermore, in the event of an earthquake, the loss of soil strength associated with liquefaction can increase ground displacement and settlement, posing greater risks to infrastructure.

Conventional solutions typically rely on pile foundations. However, these approaches involve high costs and lengthy construction timelines. The challenge was therefore to limit post-liquefaction settlement while ensuring sufficient bearing capacity comparable to that of deep foundations.

SELECTED SOLUTION

The selected solution consists of a gravel raft foundation reinforced with geogrids. The system includes three layers of geogrids installed over an area of approximately 1,500 m², representing a total of approximately 4,500 m² of geogrid material. These layers were incorporated into the granular structure at 300 mm intervals to create a high-performance foundation. This system ensures effective load distribution and improves soil behavior.

The foundation was designed using the Tensar+ design software. The project incorporates NXST geogrids, which feature a polymeric structure with a network of rigid ribs that allow aggregates to interlock within the apertures. This mechanism provides aggregate confinement and limits lateral movement.

Specifically developed for foundation applications, NXST geogrids make it possible to replace pile foundations with a reinforced shallow foundation system adapted to the site's ground conditions.



Installation of NXST Geogrids



Placement of Fill Material Over the NXST Geogrid



Building Under Construction

BENEFITS

The use of geogrids in this project made it possible to:

- Eliminate the need for pile foundations, significantly reducing costs by eliminating deep foundation installation, specialized equipment, and associated labor.
- Accelerate construction timelines through a simpler installation process, reduced excavation requirements, and streamlined site logistics.
- Reduce the project's environmental footprint, particularly by decreasing material quantities and transportation requirements.

PROJECT SUMMARY	
Products	NXST Geogrids
Quantity	4500 m ²
Application	Foundation Reinforcement on Liquefiable Soil
Year of completion	2026

NEED TO KNOW MORE?

Get in touch with one of our representatives to discuss your project.
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