

Nunavut Permafrost Vulnerability Maps

The Permafrost Vulnerability Maps display the suitability of land for future development in seven Nunavut communities. They are created by gathering and analysing four years' worth of satellite imagery, along with analysing the physical features of the land (e.g., water bodies, slopes) and doing site inspections. The overall goal of this project is to inform communities about climate change impacts (specifically permafrost thaw) and to develop adaptation measures for community planning and infrastructure that deal with these impacts.

Map Locations: Arviat, Baker Lake, Cape Dorset, Gjoa Haven, Kimmirut, Kugluktuk, and Pangnirtung (Kugaaruk and Pond Inlet in 2013)

The Government of Nunavut is the owner of the property rights to these maps. By using these maps you agree that the Government of Nunavut will not be held responsible for any losses, damages, or injuries to persons or property resulting from the use of or reliance of these maps. It is strongly recommended that you consult a professional engineer if you suspect that there are permafrost-related problems with your home.

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Description of the Map Legend

The legend below gives information around the different categories of the Permafrost Vulnerability Maps and what this means for development.

Four key guidelines have come out of this work:

1. Build on solid ground, ideally bedrock, where ground shifting is minimized.
2. Avoid permafrost that is ice-rich and more capable of melting and becoming unstable.
3. Avoid slopes where erosion could be a problem.

Sometimes it is not possible to avoid building on less suitable areas. For example, some communities have many water bodies or very steep slopes within the municipal boundaries. When these areas cannot be avoided, it is important to address these concerns and adapt building practices. This helps ensure that infrastructure can withstand the potential damage due to these impacts.

Other factors to consider during the community planning and land development process include:

- Surveying and selecting lots based on ground stability
- Preparing the lot for development (e.g., leveling, filling)
- Choosing the appropriate building type for the land
- Choosing the appropriate foundation type for the land

Permafrost Vulnerability Map- legend

Building siting, lot preparation, foundation type, and building type. Category	Description
No data	An area where, due to technical errors from the satellite, there are gaps in the data.
Suitable for development	<p>An area that is stable with little or no evidence of ice-rich and changing permafrost conditions.</p> <ul style="list-style-type: none"> • Exposed Rock, bare soil, low vegetation • Slope less than 4%: a slight slope
Possibly suitable for development	<p>An area that is possibly stable for development with limited evidence of changing permafrost conditions. In some cases, due to the lack of quality remote sensing data, the presence of ice-rich permafrost cannot be ruled out.</p> <ul style="list-style-type: none"> • Exposed Rock, bare soil, low vegetation • Slope less than 4%: a slight slope • Potential of ice rich permafrost
Marginally suitable for development	<p>An area where some ice-rich permafrost is present and the area is therefore only marginally suitable for future development.</p> <ul style="list-style-type: none"> • Low vegetation • Slope 4 - 10 degrees: a medium steep slope • Some ice-rich permafrost
Unsuitable for development	<p>An area of rugged terrain, evidence of ground ice or movement, and surface water identified in the area.</p> <ul style="list-style-type: none"> • Wet areas • Within 25 m of ground shifting • Within 30 m of water body • Slopes greater than 10%: a steep slope • More ice-rich permafrost