

Evidence essay · Land and freshwater

A permafrost map cannot inspect a building plot

Amina Okafor · 4 September 2026

Fictional author and institute · Editorial demonstration, not peer reviewed

ABSTRACT

Regional permafrost maps provide context, not inspections of individual building plots. This essay reads the Circum-Arctic Map of Permafrost and Ground-Ice Conditions to separate mapped extent classes from parcel-level probabilities and ground-ice abundance from the thermal definition of permafrost. It explains why zooming, resampling, or displaying sharper boundaries cannot add evidence absent from the original map. Production scale, historical observations, release dates, and the meanings of blank areas all constrain interpretation. Local snow, surface conditions, and materials further limit direct transfer from a regional class to a particular site. The practical outcome is a concise reporting approach that names dataset, version, property, scale, methods, and limits. Actual foundation decisions remain dependent on competent site-specific investigation, not a colour selected on screen.

Keywords: permafrost mapping · ground ice · spatial scale · map interpretation · site investigation

Adapted from the Still North field journal. Original article. A source-based editorial text, not a report of original Still North research. Examples and imagery are illustrative.

Zooming into a regional permafrost map makes its coloured boundaries larger, not more locally certain. A building footprint may look comfortably inside one colour, but the source information may describe conditions across many square kilometres. The map can provide valuable context without establishing what lies beneath the proposed foundations. Those are different jobs at different scales.

The first reading task is therefore not to find the most detailed-looking view. It is to find the legend, production method, date, and intended use. A crisp line on a screen can represent a broad transition assembled from sparse observations, expert interpretation, or modelling. Display precision should not be confused with measurement precision.

Percent of area is not a site probability

The Circum-Arctic Map of Permafrost and Ground-Ice Conditions, archived by the National Snow and Ice Data Center, describes permafrost extent in classes such as 90–100%, 50–90%, and 10–50% of area. These classes summarise how widespread permafrost is within mapped units. They do not locate every frozen and unfrozen patch inside those units.

A 50–90% extent class is not automatically a calibrated probability that a particular house stands on permafrost. A local slope, water body, snowdrift, sediment type, or disturbance can make a site unlike the unit's average conditions. Treating the class as a parcel-level forecast replaces those local controls with information the map did not provide.

Ground ice is another attribute. The same dataset separately estimates the relative abundance of ground ice in the upper 20 metres by volume. Permafrost extent and ground-ice abundance answer different questions. One

concerns where ground meets a thermal definition; the other helps describe a material whose loss can influence settlement. Neither is a direct foundation-design specification.

A smaller grid does not create a new survey

The archive states that its shapefiles derive from an original paper map at 1:10,000,000 scale, with gridded products at resolutions including 12.5 km and 25 km. At the original scale, 1 mm on paper represents 10 km on the ground. That simple conversion helps explain why moving the same information into a modern interactive map cannot make it resolve an individual driveway.

Resampling can produce more pixels or smoother boundaries without adding new ground evidence. A map exported at high resolution may simply give a cleaner picture of the same broad classification. Conversely, a scientifically useful regional product is not defective because it cannot answer an engineering question. Its value depends on using it for a question it was designed to address.

The publication date also needs interpretation. A dataset release or website update is not necessarily the date when every underlying observation was collected. The Circum-Arctic product is a historical synthesis, not a live inspection of current conditions at every location. A comparison with a newer product needs method and class definitions as well as the two dates.

Boundaries and blank space need reading too

A mapped boundary is a representation of a transition. Its apparent sharpness may come from how a polygon was drawn, not a sudden wall between two ground states. The NSIDC ground overview explains that local ground

conditions do not follow air temperature alone. Snow and surface conditions help complicate apparently simple geographical divisions.

Blank space can mean several things: outside coverage, missing information, excluded terrain, or an actual mapped absence of permafrost. The legend must distinguish them. Turning all blanks into a reassuring absence can erase the places where evidence is weakest. A map with explicit no-data areas is often more honest and more useful than one that colours everything.

Use the map to choose the next evidence

For regional learning, broad extent classes can show why permafrost belongs in a discussion of water, ecosystems, or infrastructure. For a real building decision, site-specific investigation by competent professionals is needed, including relevant ground materials, temperatures, ice, drainage, and design requirements. This article offers no judgement about whether any particular plot is safe to develop.

Before using a permafrost map in a report or meeting, give the reader these details:

- The named dataset and version, not just a screenshot of its colours.
- The mapped property: permafrost extent, ground-ice abundance, temperature, or another quantity.
- The original scale or grid size, plus the dates and methods behind the information.
- The meaning of blanks, boundaries, and any uncertainty classes.
- The question the map can inform, and the additional investigation needed for a local decision.

[Sources and methods](#) explains how to keep scope beside a claim. The [Permafrost and freshwater overview](#) follows the processes that no single colour can fully describe.

References

1. Circum-Arctic Map of Permafrost and Ground-Ice Conditions (nsidc.org)
2. NSIDC ground overview (nsidc.org)