

## T5-PhD1

Title: Risk management of linear infrastructure in remote permafrost terrain: Churchill Railway

Anticipated start: September 2020 (flexible)

Supervisory team: Dr. Shawn Kenny, Dr. Ryley Beddoe, Dr. Pascale Roy-Léveillé, Dr. Merritt Turetsky and Dr. Fabrice Calmels

The performance and integrity of northern linear infrastructure, such as railway lines and road networks, may be affected by ground deformation geohazards (e.g. subsidence, slope instability, permafrost degradation), which may be influenced by hydrology and climate change effects.

The Churchill Railway, which has experienced damage and failures due to flooding and permafrost thaw events, will provide the basis for a strategic case study. The PhD candidate will collect, synthesize and integrate a range of datasets (e.g. topographic, meteorological, hydrological, geotechnical, geophysical), which may be acquired through desktop studies, field investigations (e.g. electrical resistivity tomography field survey, boreholes) and remote sensing (e.g. satellite, drone) observations. Empirical and screening level computational tools will be advanced to generate risk estimates along the Infrastructure right of way. This improved knowledge base and tools will help to identify regions of interest where more detailed and localized investigations or assessments are required to refine the risk estimate. This will support owners in more effective decision making under uncertainty, within an evidence based risk framework, for the asset management of linear infrastructure in permafrost environments.

We are seeking a highly motivated and engaged PhD candidate, to be enrolled in either a civil engineering or physical geography graduate studies program, with academic interests in the fields of remote sensing, geotechnical and permafrost sciences, site or field investigations and risk analysis. The PhD candidate will be an integral team member of a multi-disciplinary supervisory committee and collaborate with other team members within the PermafrostNet network. All applications will be reviewed by the selection committee with respect to academic qualifications and integration within the network through the PermafrostNet lens on equity, diversity and inclusion. For more information on this project, please contact [shawn.kenny@carleton.ca](mailto:shawn.kenny@carleton.ca).