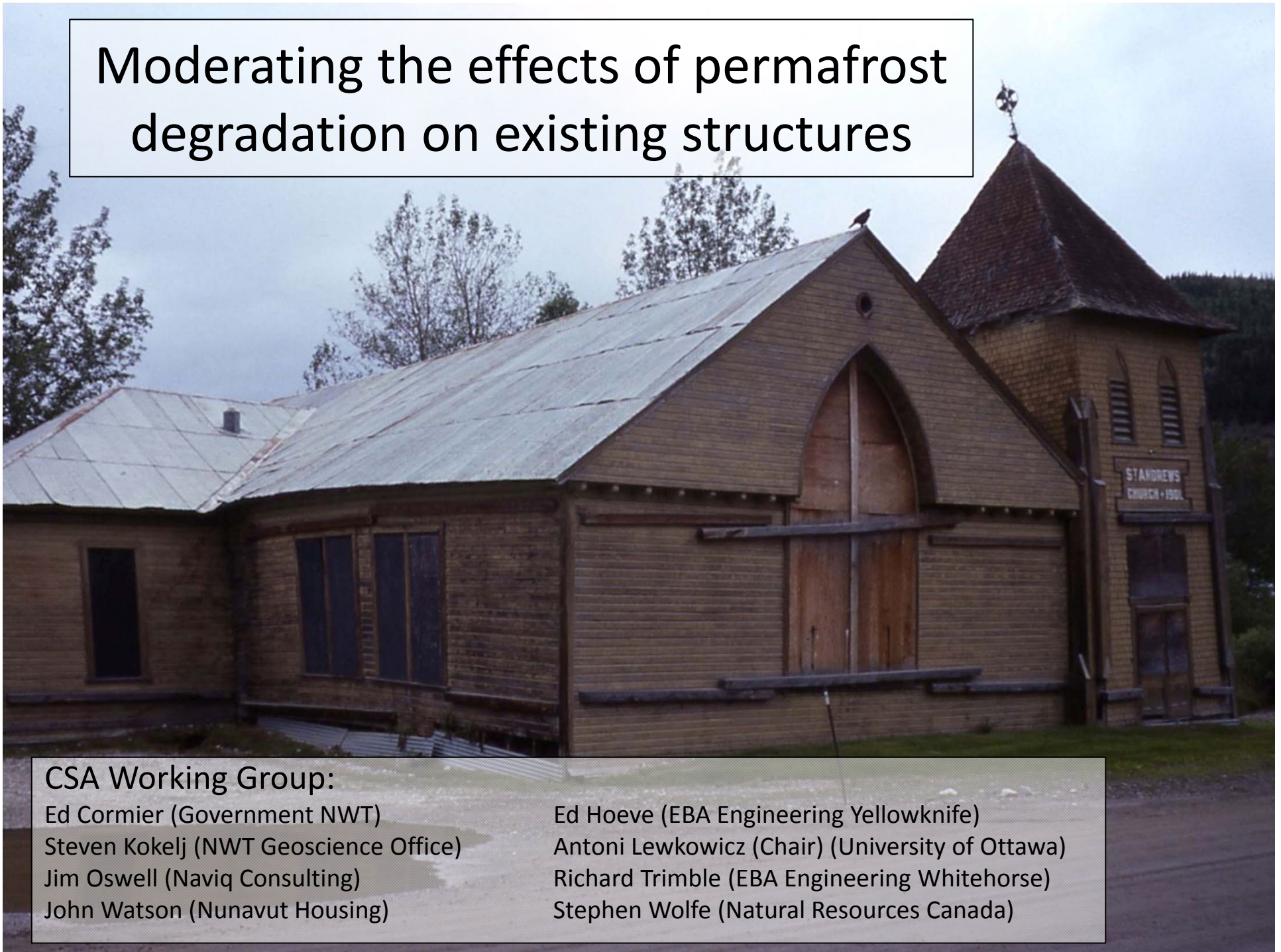


Moderating the effects of permafrost degradation on existing structures



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Objective

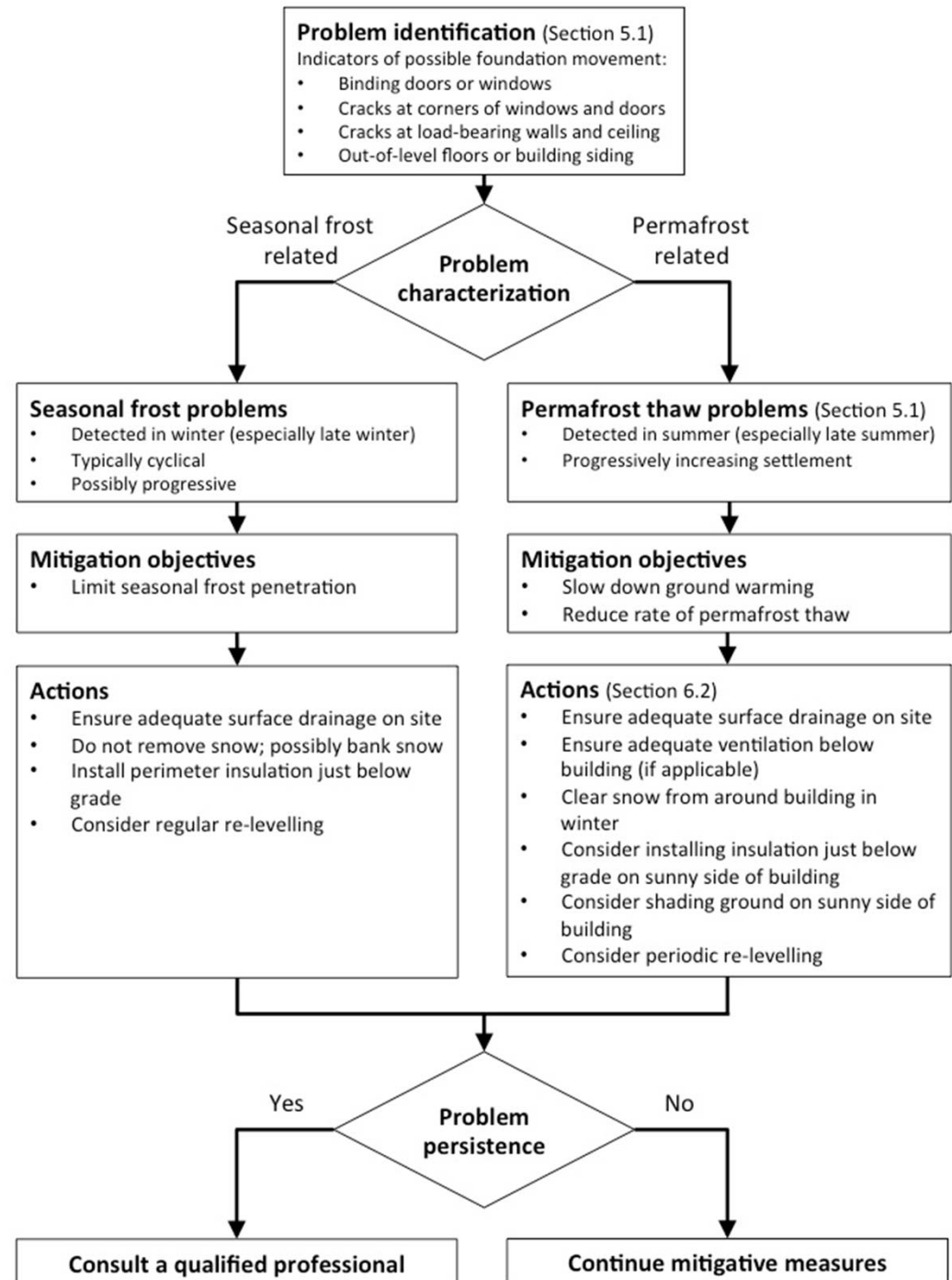
- Develop a Canadian Standard for moderating the effects of permafrost degradation on **existing** structures.
- The standard will apply to:
 - Shallow foundations
 - Footings with or without a ventilated air space
 - Slab-on-grade with no air space.
 - Deep foundations
 - Adfreeze piles with a ventilated air space
 - Rock socket or end-bearing piles with or without a ventilated air space
- The Standard is currently in draft form. Further amendments are expected.

Audience for the Standard

- The Standard is destined for use by:
 - Owners and operators of buildings
 - Owners and operators of other community infrastructure
 - Building contractors
 - Design professionals and reviewers
 - Educators
 - Regulators

Identification of the problem

Seasonal frost heave and settlement or permafrost thaw?



Measures covered in the Standard and their potential application

Technique	Shallow Foundations			Deep Foundations	
	Surface Footings	Buried Footings	Slab-on-Grade	Adfreeze Piles	Grouted/End-bearing Piles
Shading	Yes	Yes	Yes	Yes	Yes
Drainage	Yes	Yes	Yes	Yes	Yes
Snow management	Yes	Yes	Yes	Yes	Yes
Ventilation	Yes	Yes	No	Yes	No ⁵
Ground Insulation	Yes	Yes	No ¹	Yes	Maybe ²
Foundation adjustment/leveling	Yes	Yes	Maybe ³	Yes	Yes
Mechanized refrigeration	Yes	Yes	Yes	Yes	Yes
Thermosyphons	Yes	Yes	Yes	Yes	Yes
Foundation replacement	Yes	Yes	No ⁵	Maybe ⁴	Maybe ⁴
Site abandonment	Yes	Yes	Yes	Yes	Yes

1. *Perimeter insulation may be effective. Insulation under slab likely not feasible, except as per Note 3.*
2. *Perimeter insulation will be feasible in any case. Feasibility of insulation under building will depend on access*
3. *Relevelling by grout or foam injection may be feasible.*
4. *Replacing piles with adjustable footings could be considered. It may be feasible to replace piles under building with beams and outrigger piles. Less likely would be underpinning with micropiles.*
5. *Under rare circumstances, may be possible.*



Challenges of developing this Standard

- Balance between the individual nature of structure response to permafrost thaw and the need for prescriptive language in a Standard.
- Balance between use of appropriate technical language and needs of some audiences.
- Views of the Technical Committee and consultations with the external community will indicate whether the WG has achieved the right balance.



Thanks to all the WG members who have
volunteered their time, energy and
experience to help develop this Standard.

Meeting on Thursday!