

SMART SURFACES



**Front Street Paving in Dawson City
September 21, 2009
Globe & Mail**



Why not pave the streets with gold? Oh, right

The Project



Pave Front Street in Dawson City from Ferry Landing to Crocus Bluff

Community Concerns

- Chamber of Commerce
 - Not happy with dust and potholes.
 - Excessive maintenance of business premises
 - Wanted a proper asphalt pavement
- Planning Board / Historical Society
 - Maintain historic appearance of Front Street i.e. gravel surface
 - Very opposed to asphalt pavement



Engineering Concerns

Permafrost- warm ice-rich permafrost underlying Front Street



Drainage – very flat, drainage impeded by flood protection dyke



Condition of existing UG utilities and maintenance of an asphalt pavement in a remote community

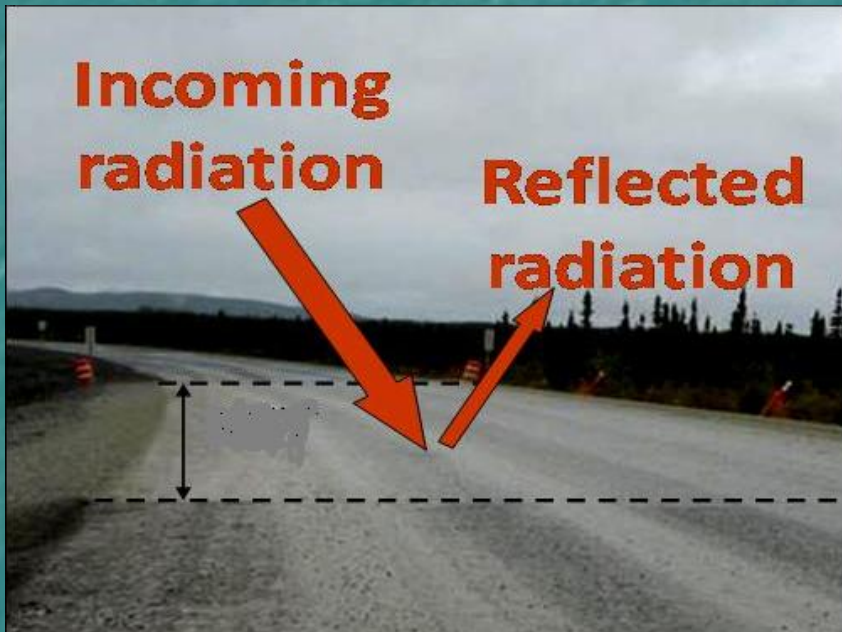


Pavements and Permafrost



Dark coloured pavements absorb solar heat which in turn can cause underlying permafrost to melt.

Effect of Light Coloured Pavement



Thermal modelling for Front Street conditions indicated that a light coloured pavement would have a similar impact on permafrost to that of a gravel surface.

Predicted ground temperature increase and related settlements would be better than for a standard black asphalt pavement

Pavement Options Considered



Light coloured chips rolled into asphalt concrete (Sprinkle Coat)



Chipseal using local aggregate



Pigmented Asphalt (Bituclair, Mexphalte, Nevchem)

Based on the Department's risk analysis, pigmented asphalt was felt to have the best chance of success.

Design was for 75 mm of standard asphalt concrete base layer and a 25 mm top mat of light coloured pavement.

Construction



Old BST surface ripped up and granular base-course completed between summer solstice and music festival. A lot of attention was paid to ensuring that there was reasonable drainage to existing catch-basins and also some new ones added

Construction



Base layer of conventional pavement commenced in last week of August

Construction



Tack coat between base conventional pavement layer and top layer of light coloured pavement

Construction



Once the base layer of pavement was complete extensive cleaning of the plant commenced

Construction



A new asphalt pump was installed and other plumbing done to feed the bituclair and the pigmentation agent (Titanium Dioxide) to the drum as recommended by Colas

Construction



Procedures as recommended by Colas were carefully followed during placement of the light coloured top layer

Construction



The objective of the light coloured pavement was primarily to reduce solar heat absorption but there was a secondary goal of matching the colour of Dawson's historic gravel streets

Finished Product



Monitoring

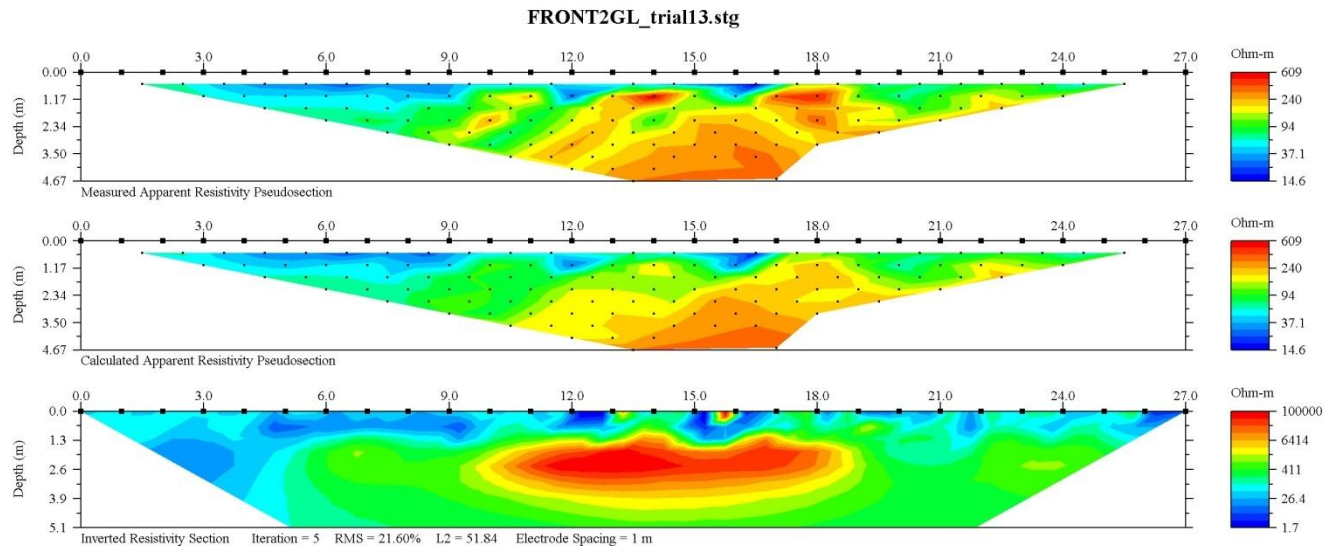
The Yukon Cold Climate Innovation Centre (YCCIC) is coordinating a research project to measure the behaviour of the permafrost over time



Installing DC Resistivity Array

Installing Thermistor

Monitoring



Transect across Front Street near Grey Line storefront

- Boundary between red and green area represent the permafrost profile
- Permafrost depth 2 to 2.5 m

Questions?



Front Street c. 1898



Front Street 2009