

seecon



The Social Context of Infrastructure on Remote Communities

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Challenges facing remote communities

Food insecurity affected 46 per cent of Nunavut households by 2016, study says

May 21, 2019

On Sept. 27, 2016, a two-litre carton of orange juice was priced at \$12.99. That doesn't count the \$1 federal subsidy provided through the Nutrition North program. Food insecurity in Nunavut has gotten worse since the introduction of the Nutrition North program in 2011. The study, published by researchers from the University of Toronto, determined 46 per cent of households in Nunavut were experiencing food insecurity in 2016, up from 33.1 per cent in 2011, when Nutrition North was introduced.



Challenges facing remote communities

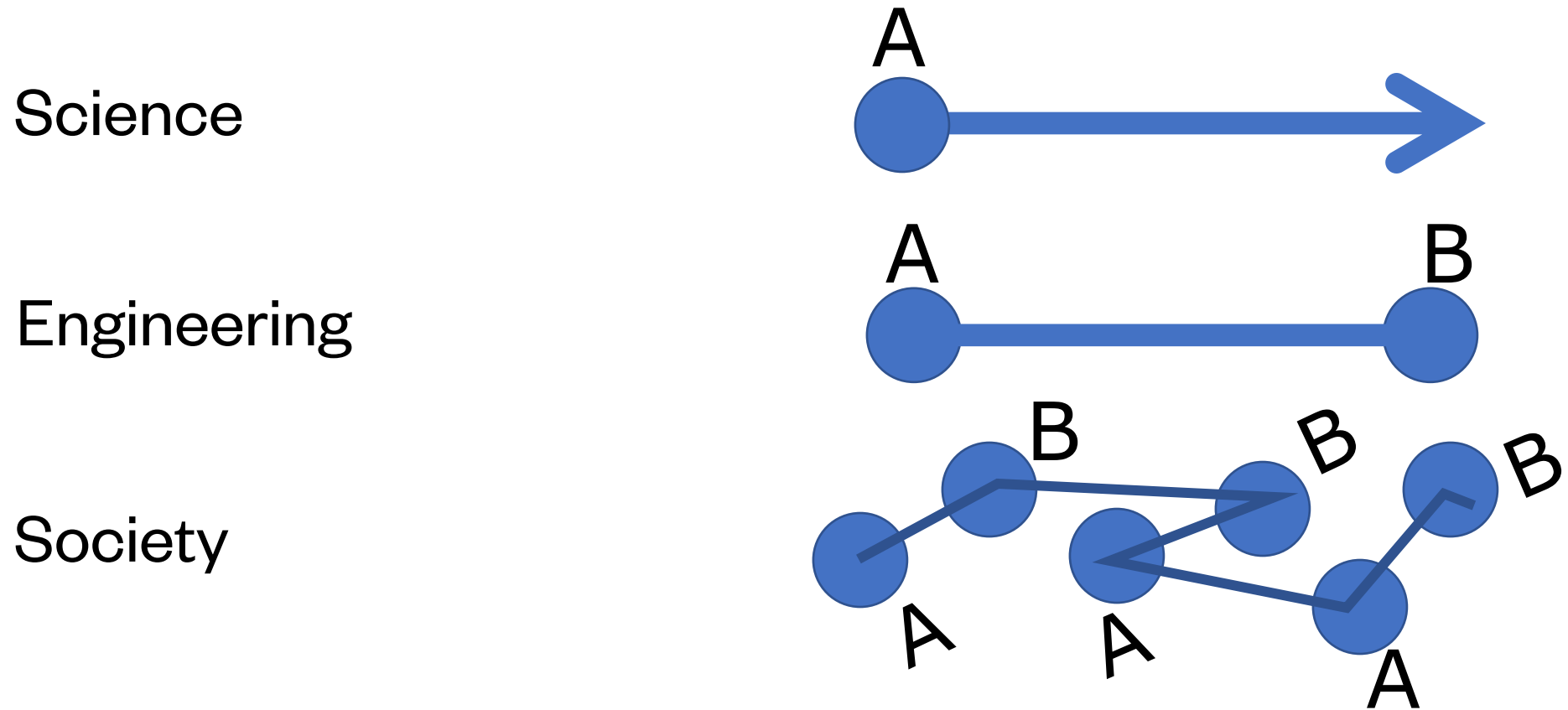
'Inadequate and unsafe' Inuit housing needs national fix,
say senators



March 1, 2017

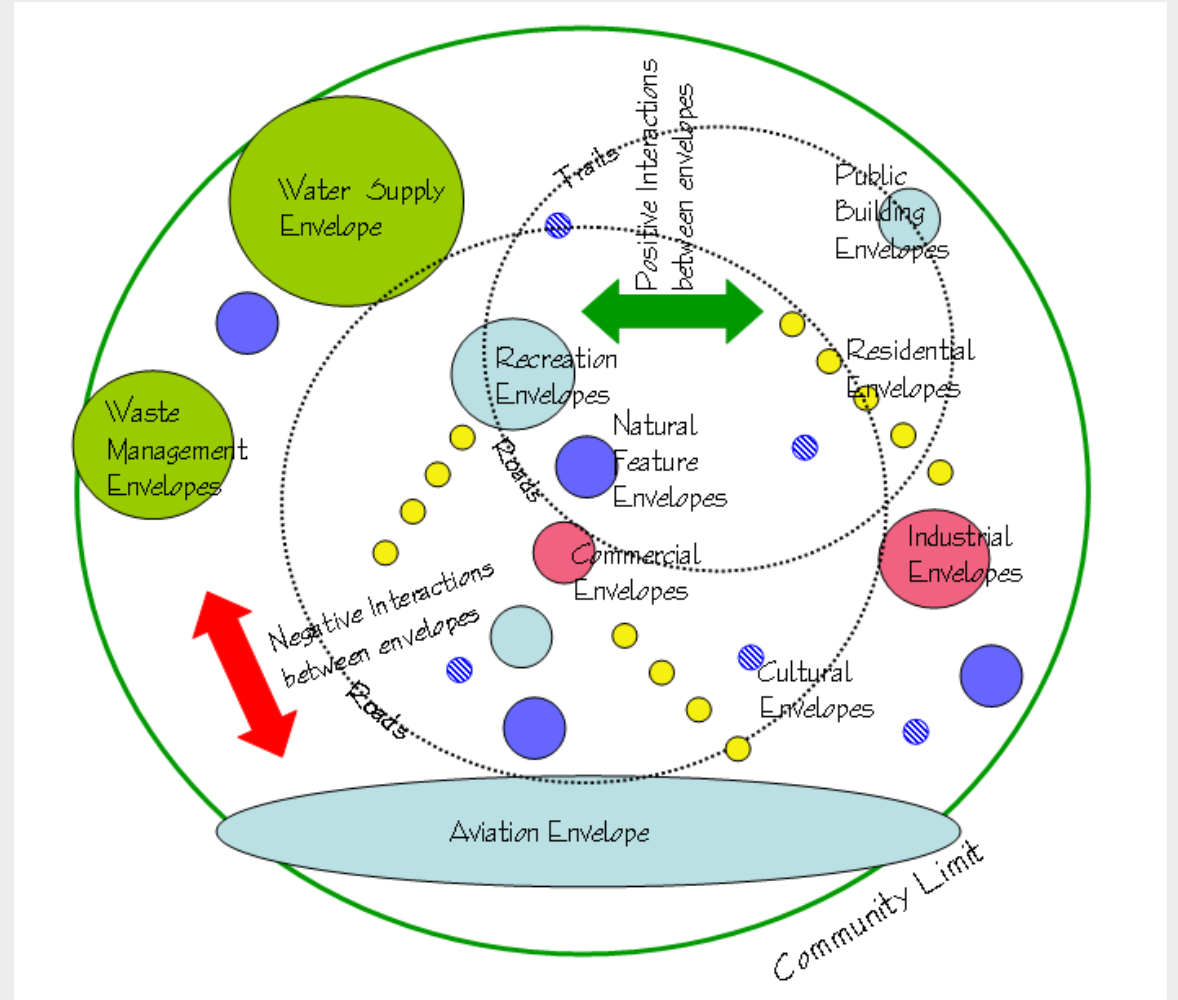
In a report issued Wednesday, the senators agree that Inuit "face an acute housing crisis which threatens their health and safety." They characterize the crisis as a source of "despair" with far-reaching effects on health, family violence, and children's ability to learn. The co-chair and chair of the Senate Committee on Aboriginal Peoples, were told there was a family living in a shack. "[We] were invited into this dark, plywood shack, where a young couple with a young child had spent what is a very cruel winter in the High Arctic. "

Fundamental execution of science, engineering and social science



Spatial elements of a remote community

The spatial elements of infrastructure have many positive and negative interactions in remote community development.





Overall remote development context

- ▲ Distant communities....
- ▲ Phenomenal growth....
- ▲ Unbelievable costs....
- ▲ Limited budgets....
- ▲ Limited accessibility....
- ▲ Changing climate....
- ▲ Demanding regulators....
- ▲ Competing needs.....
- ▲ Deteriorating infrastructure....

Infrastructure needs in remote regions



Piped water & sewer
at Iqaluit, Nunavut



Water supply
at Carcross, Yukon



Trucked sewage discharge
at Tuktoyaktuk, NWT



Remote engineering

Key principles to engineering in remote communities

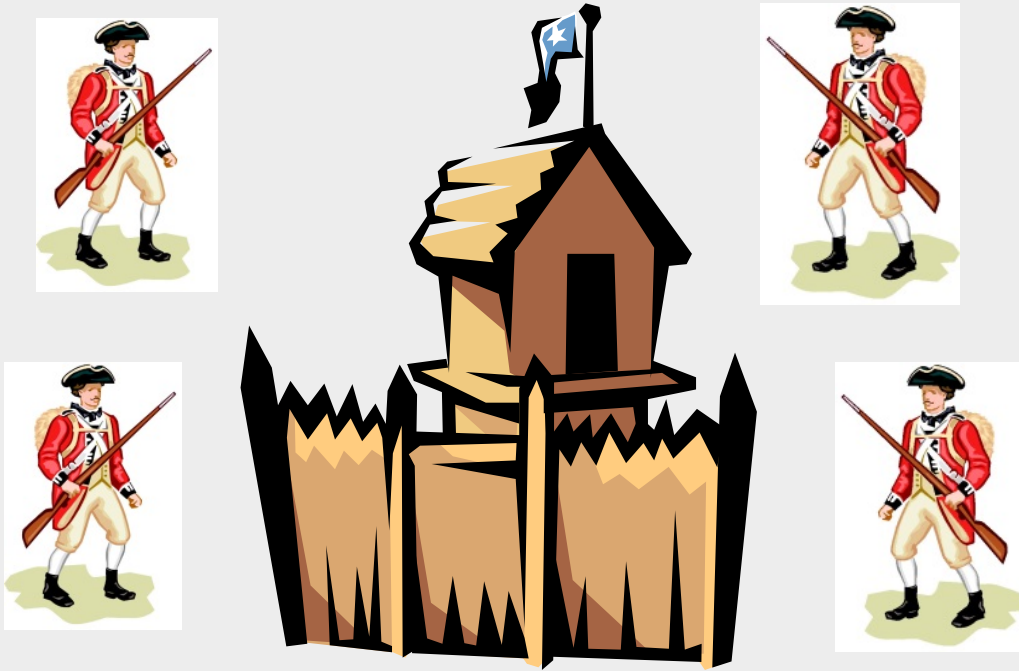
 Appropriate technology

 Remote context

 Incremental improvement



Practices of Senior Governments



Many remote communities are finding the demands of the senior governments to be well beyond their financial and administrative resources.

Science of Wastewater Treatment

The practice of wastewater sampling has inherent problems in remote communities from the seemingly simple process of getting a water sample to “the lab”, to the representation of the source environment in a laboratory conditions.



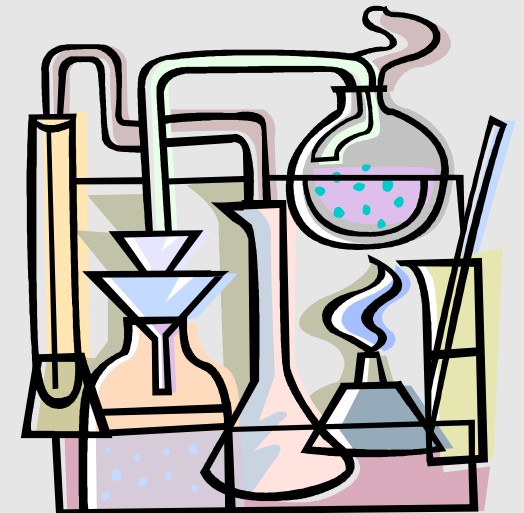
The source



The sample



The science

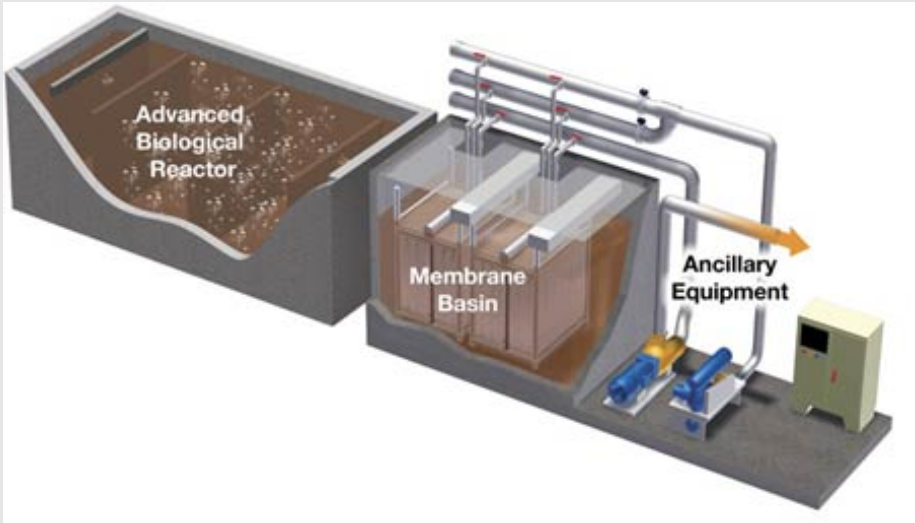


Applied Science of Wastewater Treatment

Principles

▲ Membrane bioreactor
treatment process

▲ Sequencing batch reactor
treatment process

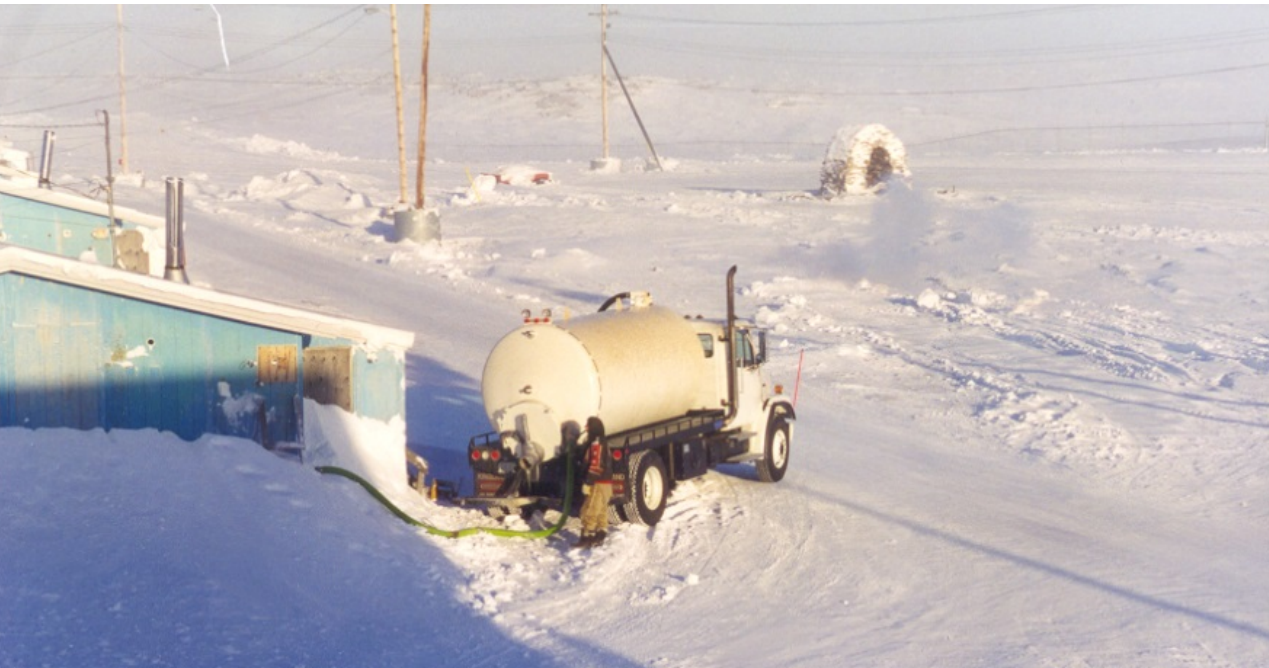


Applied Science of Wastewater Treatment

Practices



Trucked sewage collection
in Repulse Bay provides service
to all residents



Trucked discharge to
a “natural” sewage lagoon
in Tuktoyaktuk.



Science of Wastewater Treatment

Practices

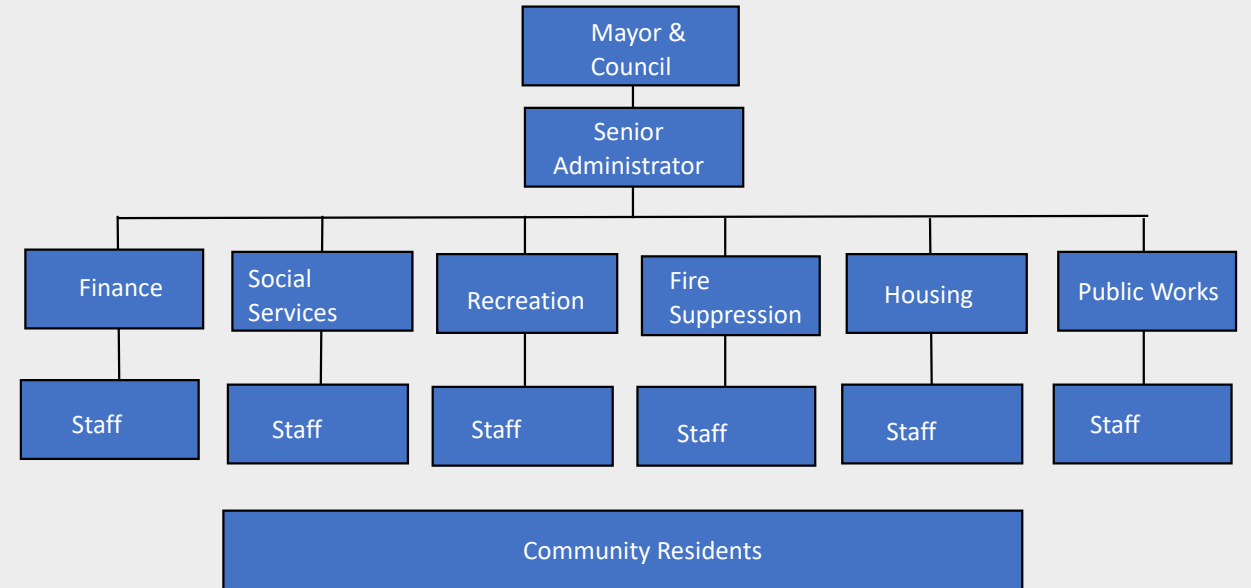
Sewage retention lagoon in Grise Fiord, Nunavut –
the most northerly community wastewater system in Canada.



Social Science of Wastewater

Principles

Any remote community, regardless of size, has the need for a fully funded, fully staffed and fully trained community administration – this is seldom the case.



Social Science of Wastewater



Grise Fiord, Nunavut - Operation and Maintenance

Year	Water \$	Sewer \$	Total \$
2001	234,391	100,200	334,591
2002	255,959	109,696	365,655

\$2240 per capita per year in 2002 or 6.4 cents per litre

Water use - 5,678,500 litres per year or 95 litres per capita per day

Whati, NWT - Operation and Maintenance

Year	Water \$	Sewer \$	Total \$
2001	167,800	71,900	239,700
2002	184,600	79,100	263,700

\$580 per capita per year in 2002 or 2.3 cents per litre

Water use: 11.5 million litres per year or 70 litres per capita per day

0.12 cents per litre in Edmonton

Practices

Not only are remote communities suffering from a lack of financial and human resources, the residents must cope with extremely high infrastructure costs.



“The ecosystems of the remote regions of Canada are unique and fragile, and must be protected. However, to date, the protective measures for these ecosystems have not been developed or implemented based upon the necessary science, applied science, and social science information.”