

The Challenge of Wastewater Treatment in Dawson City

TERRAIN

- The City of Dawson is located in the Klondike River Valley and available space is limited by the topography and geography of the region.
- Flood Plain: The valley bottom at the confluence of the Klondike and Yukon Rivers is subject to serious flooding caused by spring melt and ice jam events.
- Lagoon locations are also challenged by the permafrost and dredge tailings.

LAND OWNERSHIP

- All of the proposed lagoon locations have neighbours. Some are adjacent to First Nations land and others have various mining claims on them. Securing these sites for development may be a challenge because of the conflicting land uses .

PERMAFROST

- Lagoons require permafrost-free and stable ground. If engineers find permafrost at any of the sites construction would be delayed until the permafrost soil had been thawed, removed and replaced with non-frost susceptible soil. Alternatively, the permafrost can be removed while frozen, but this is more time consuming and therefore more expensive.

COLD TEMPERATURES

Very cold temperatures pose a risk to water and wastewater mains in Dawson. Freeze protection measures like bleeders, insulation, recirculation pumps, and/or heat traces are needed to avoid costly damage to the system and service interruption to the users.

- As a comparison only, it can be said that bleeders in Dawson increase the water use of the municipality to that of a southern city of 6000 in winter.
- Some Dawson buildings have a gap between the floor and the ground, to keep cold air circulating over the ground to prevent permafrost thaw which could result in damage to the buildings. Pipes have to cross this gap and can freeze in the winter air.
- The average sewage flow increases from 2000 m³ in the summer (480 litres per person per day) to 2500 m³ (1600 litres per person per day) in the winter when bleeders are in use. A reduction in the bleeder flow would improve the operating conditions for either a lagoon or a mechanical sewage treatment system.
- Operation and maintenance costs for the lagoons will be higher than southern regions and highest for those locations furthest from town as they will require the most pumping and freeze protection.

ACCESS AND COST OF CONSTRUCTION AND MAINTENANCE

- Access to Dawson can be challenging at times due to its distance from and major centre and extreme winter temperatures. These factors impact the cost of construction and cost of operation and maintenance.