DILLON CONSULTING

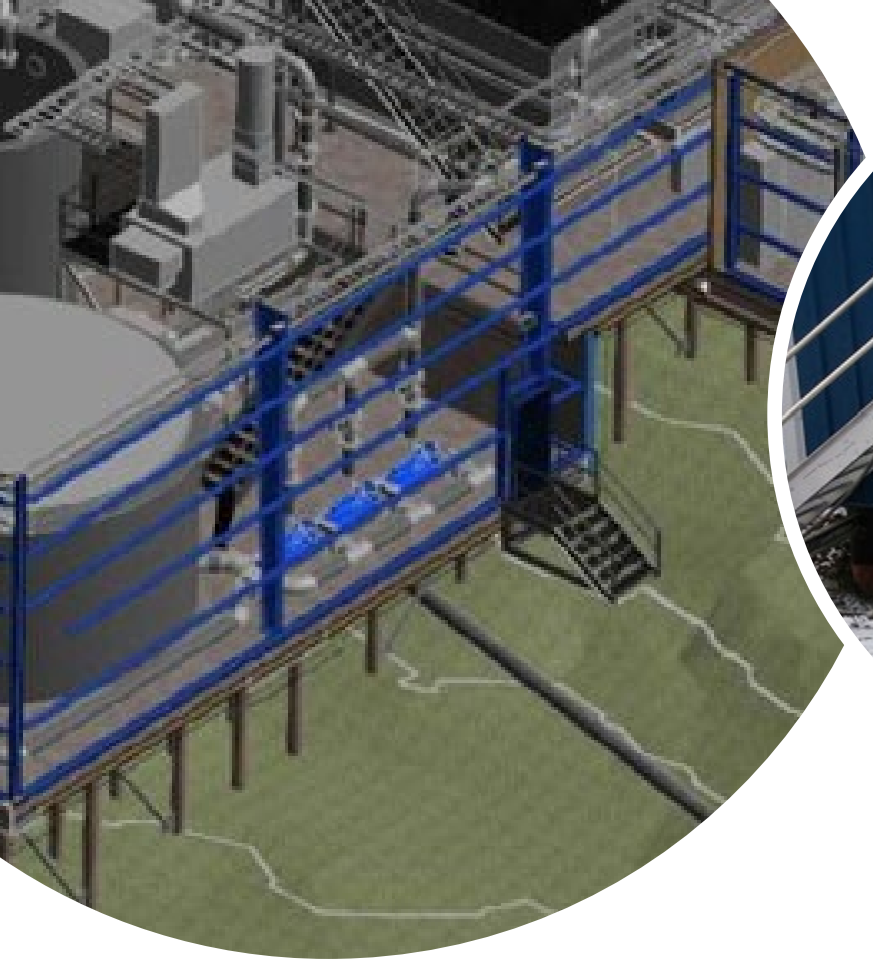
East Channel Water Treatment Plant - Northwest Territories

CATEGORY: WATER RESOURCES

ASSOCIATION OF CONSULTING ENGINEERING COMPANIES | CANADA

ASSOCIATION DES FIRMES D'INGÉNIEURS-CONSEILS | CANADA

CANADIAN CONSULTING ENGINEERING AWARDS | 2018



PROJECT HIGHLIGHTS

- ***Collaborators:*** Town of Inuvik, MACA, GNWT
- ***Consultants:*** Dillon Consulting Limited, AMEC Foster Wheeler
- ***Contractors:*** Nappaq Design and Construction Ltd.

PROJECT SUMMARY

Located 200kms north of the Arctic Circle, Inuvik faces many challenges with its water system. In 2017, the Town opened a $19M water treatment plant (WTP). Previously, Inuvik operated and maintained two water supplies. Depending on the time of year, the Town would switch between sources at significant costs to the Utility. The new WTP eliminated the need for separate water sources and allowed the community to provide safe, clean drinking water year-round.

INNOVATION

The Town of Inuvik owned and operated two water supply and associated treatment facilities to provide potable water for the community on a year-round basis. The pre-existing water treatment plants were reaching intended lifespans and needed to be upgraded or replaced.

The Town worked with Dillon to design a new water treatment solution that would draw water from a single source instead of the two water supplies situated on the East Channel of the MacKenzie River. In 2017, a new water treatment plant was put into operation allowing Inuvik to have a single source of water year round as opposed to relying on water from Hidden Lake in the summer and the Mackenzie River in the winter.

Additional upgrades to the plant included:

- Upgrade and repurposing of the existing treatment facility
- New packaged water treatment plant including filtration, disinfection and storage
- Year-round river intake and raw water pump station.

Dillon provided the assessment of source waters, water quality testing, bench-scale testing, schematic design, detailed design, assistance with public consultation, and construction administration.

A significant challenge of this project was constructing a large enough facility to handle current and future requirements, in challenging permafrost conditions. To accomplish this, Dillon and the Town incorporated several innovative approaches to the final design such as:

- installing over 200 10metre adfreeze pilings to allow for ventilation under the concrete foundation
- utilising rectangular chlorine contact tanks versus circular to save on floor space
- incorporating UV disinfection to reduce the size of the chlorine contact tanks
- utilising modular rectangular wastewater storage tanks – a first in northern Canada.

The modular storage simplified the building footprint significant reduces transportation costs which is a main concern in the Canadian north

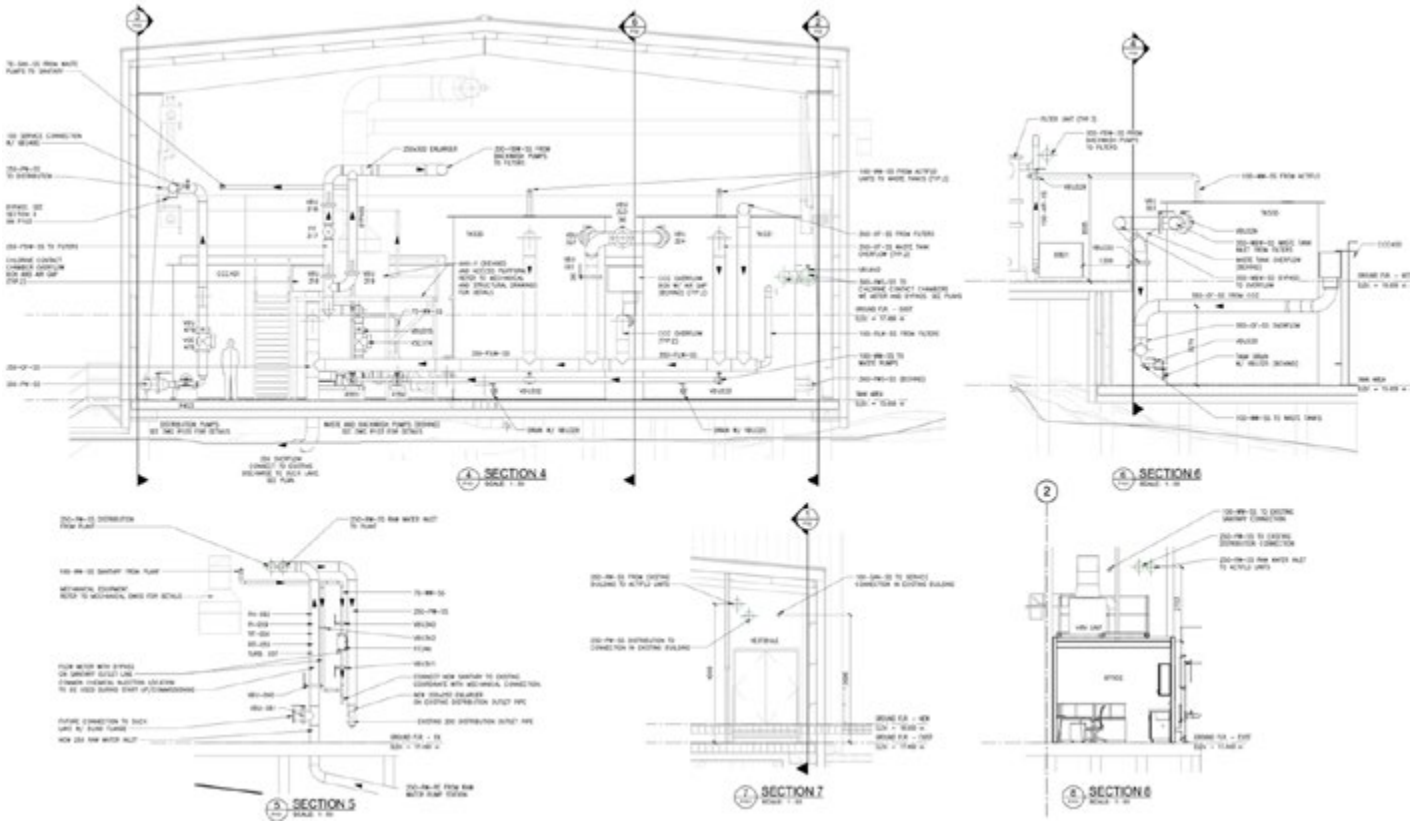
A new raw water pump station was constructed to allow year-round withdrawal of water from the river. The station is located on the bank of the river and was designed to ensure all equipment could continue to operate during historical flood levels for the river.

COMPLEXITY

Working in the north always has complexity regarding permafrost, weather, light, transportation and building conditions to name a few. The seasonal flood levels and ice thicknesses in the river pose challenges for any permanent infrastructure as they need to be able to operate and withstand widely varying conditions.

The water quality in the river has significant quality changes throughout the year which requires specialised treatment techniques to be able to handle the varying turbidity loadings.

Dillon's vast experience in the North allows us to understand and work with locals to develop solutions that are designed specifically to that area.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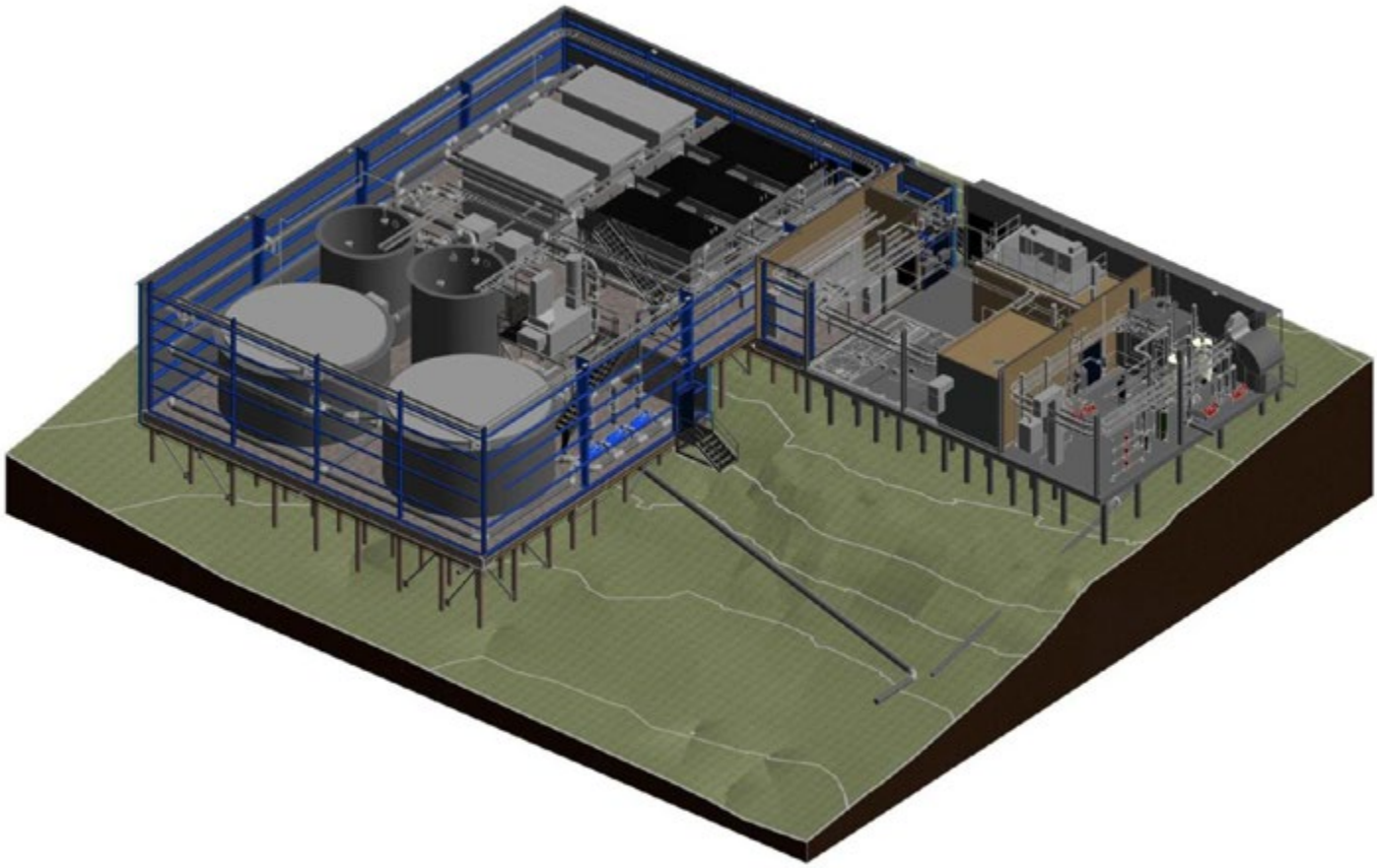
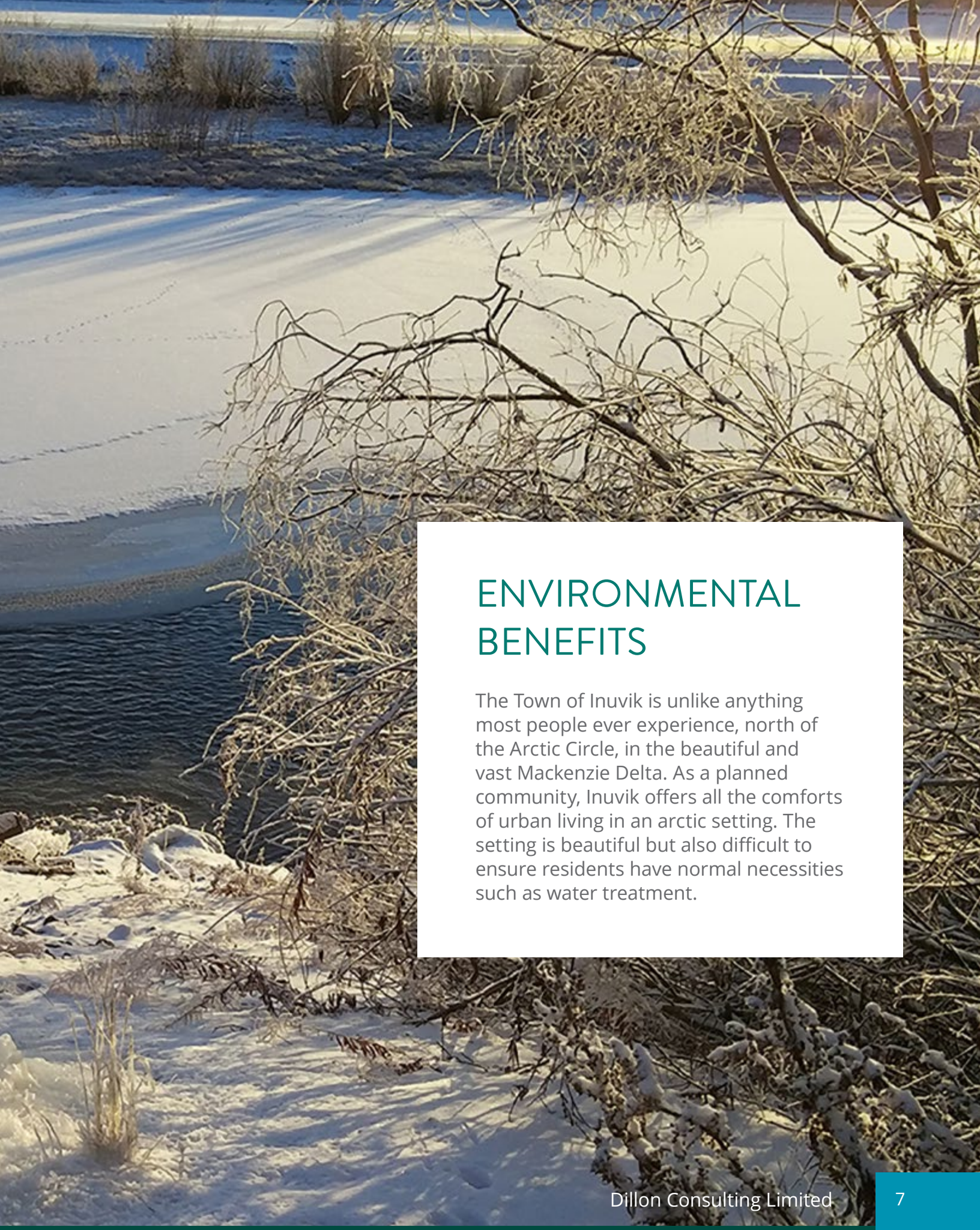


SOCIAL & ECONOMIC BENEFITS

Northern tourism continues to be a growth market for the Town. Inuvik prides itself on being authentic, accessible and amazing. With a variety of restaurants, hotels and tour operators, the Town continues to grow. The development of the new WTP was necessary to ensure these businesses continue to flourish as tourists flock to the area.

The Town launched its “Embracing Our Future” strategic plan that builds upon the Integrated Community Sustainability Plan and runs through 2021. Dillon worked within the guidelines of the previous and current plans to ensure capacity would adequately meet the needs of today and tomorrow. The WTP has a 40 year construction lifespan.



ENVIRONMENTAL BENEFITS

The Town of Inuvik is unlike anything most people ever experience, north of the Arctic Circle, in the beautiful and vast Mackenzie Delta. As a planned community, Inuvik offers all the comforts of urban living in an arctic setting. The setting is beautiful but also difficult to ensure residents have normal necessities such as water treatment.

MEETING CLIENT NEEDS

The new WTP will greatly improve water availability and quality to the community. Inuvik will no longer need to switch between water sources throughout the year which will amount to a significant operational savings.

The singular source of water will help ensure the community is able to meet its long term growth and tourism goals while not sacrificing or harming the native area.

All systems in the new facility have redundant back-ups to allow the Town to address maintenance needs with no impact to delivery of safe water. Northern Canada is a unique and beautiful land that with this project we were able to not only meet the needs of the town but ensure the flavour of the area remains unmarred.