

Inuvik to Tuktoyaktuk All Season Access Highway Challenges & Lessons Learned

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April 6, 2016



Safety Moment



Agenda

- 1** Introduction
- 2** Project Overview
- 3** Project Challenges
- 4** Lessons Learned

Introduction of Presenter

Warren McLeod

- Team Lead for Civil Engineering Group in Yellowknife: Transportation, Municipal Engineering
- Stantec Project Manager for the ITH project



2 Project Overview



Project & Team Location



Generally

- 140 km all season access road
- Provides access for community members, industry, tourists.
- Primarily winter construction



Project History

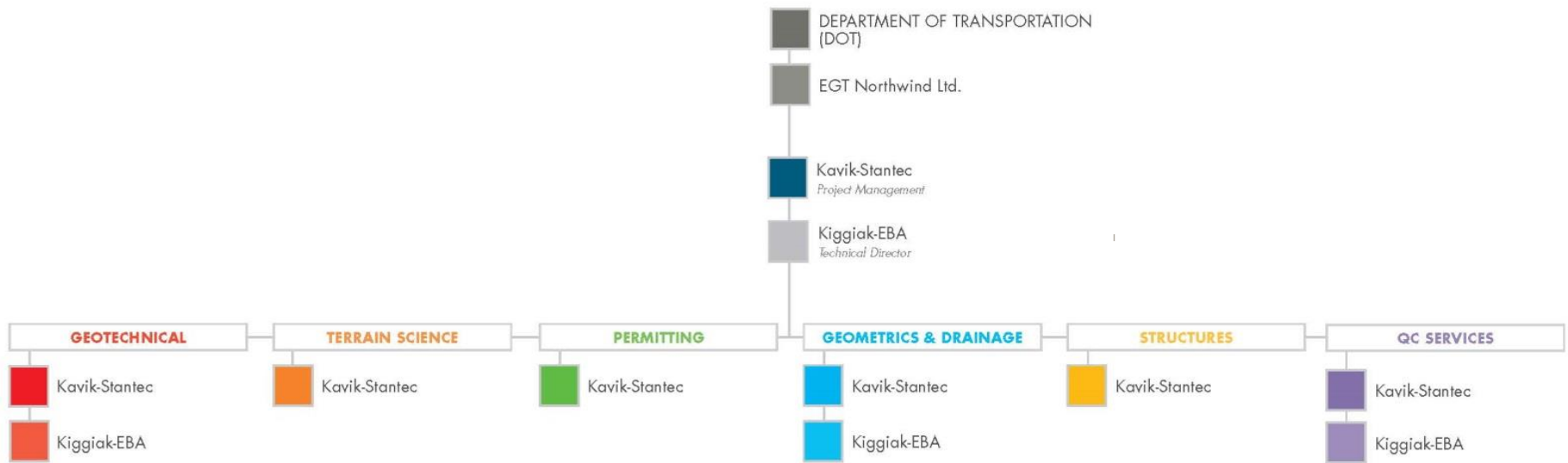
- 1960s – the Territorial and Federal Governments discuss
- 1970s – preliminary investigations and designs for the access road
- 2009 - ITH Project Description Report was completed
- 2010 - upgrading of borrow source 177 (extending south from Tuktoyaktuk)
- 2013 - upgrading of Navy Road (extending north from Inuvik)

Stantec's Role

- Environmental
- Geotechnical
- Hydrotechnical
- Geometric Design
- Structural



Project Team



Engineering Timeline

- 85% design complete early 2013
- 100% design complete September 2013
- December 2013 construction contract signed
- January 26, 2014 broke ground



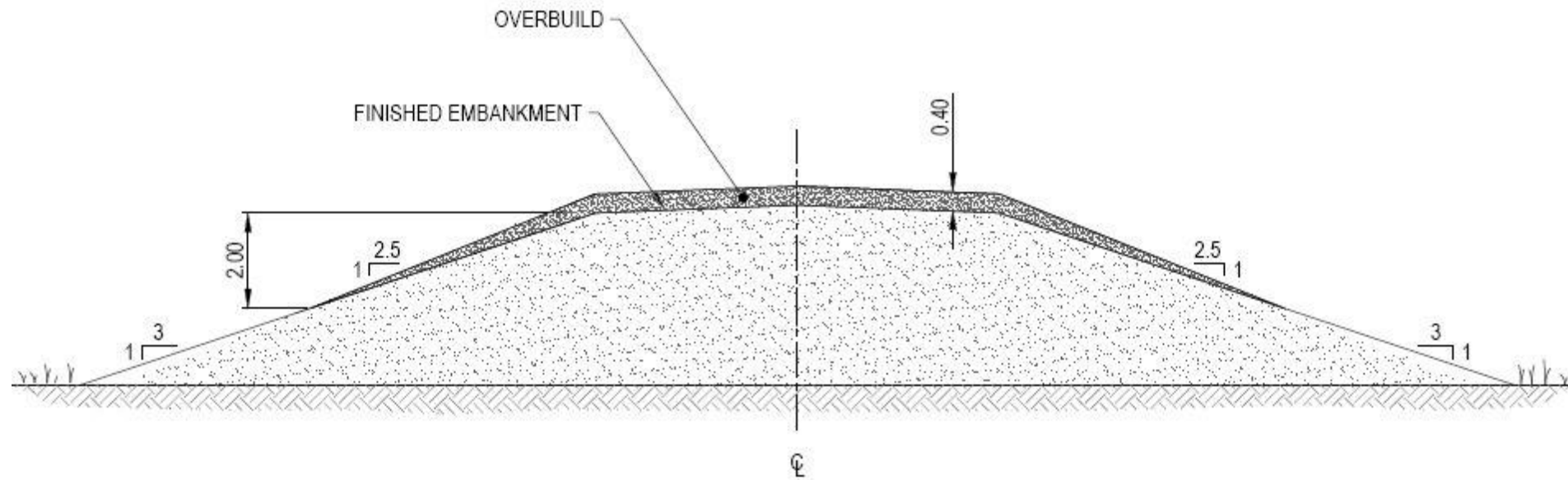
Some Key Statistics

Key Numbers

- 140 kms in length over sensitive terrain
- 5.2 million cubic meters of embankment
- 24 borrow sources (699 boreholes in 78 days)
- 8 Bridges
- 19 Large diameter culverts
- 40 Stream size culverts
- 9 kilometers of 800Ø culverts
- 3 winter seasons of construction

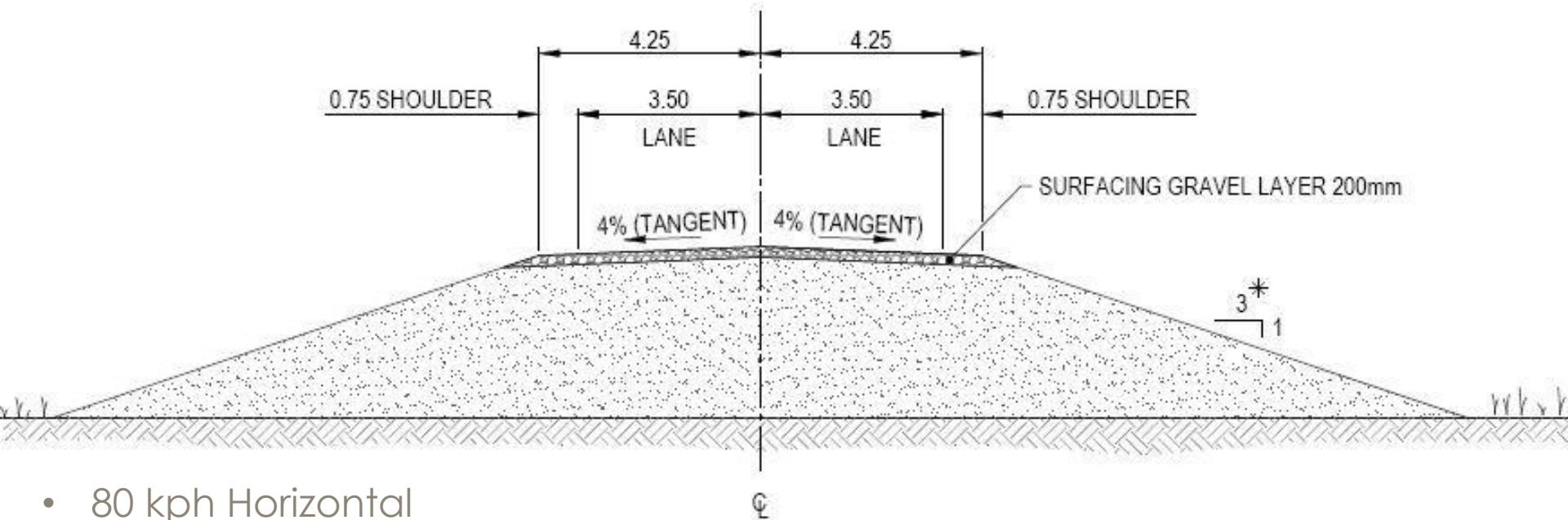
Road & Bridges





INTERIM CONSTRUCTION EMBANKMENT OVERBUILD (ALLOWING FOR SETTLEMENT)

Typical Interim Road Section
Inuvik Tuk Highway



TYPICAL ROAD SECTION

- 80 kph Horizontal
- 70 kph Vertical
- 9% Max Gradient
- Min Embankment Height: 1.70 m

Typical Finished Road Section
Inuvik Tuk Highway

Granular Source Development



Permitting Overview

Over its lifespan, the Project has triggered a number of different regulatory requirements due to:

- Use of land and water needed to construct the highway
- Construction of watercourse crossings
- Development of borrow sources
- Construction of all-season access road into a borrow source
- Commitment to conduct pre-construction surveys

3 Project Challenges



Challenges & Triumphs

Challenge	Mitigative Measure	Triumph
Health & Safety	<ul style="list-style-type: none">• Custom HSA plan & support	No injury incidents
Remote Location	<ul style="list-style-type: none">• Designed structures to limit on-site fabrication	It worked (so far!)
Data Limitations	<ul style="list-style-type: none">• Adding more data collection during construction• Warmer than expected ground conditions• Able to transition on the fly	Schedule is maintained (for now!)
Stop & Go Funding	<ul style="list-style-type: none">• Maintained schedule by adding resources• Collaboration in person, regularly	Schedule was maintained
Climate Change	<ul style="list-style-type: none">• Ad-freeze piles deeper (active layer changes)• Drainage structures larger (increased rain/snow)• Embankment thickness deeper (warming)	Too early to tell
Sensitive Terrain	<ul style="list-style-type: none">• To minimize thawing construction had to be completed during the coldest winter temperatures.	Too early to tell

Challenges & Triumphs

Challenge	Mitigative Measure	Triumph
Working with different groups	<ul style="list-style-type: none">• Various consultants working on different stages and components of the project• Working with multiple clients on the project – DOT was our main client but prime contractor also a client (a collaboration between two parties)• Territorial and Inuvialuit regulators needed to collaborate	Regulatory applications were completed on-time
Change in regulations	<ul style="list-style-type: none">• Devolution• Changes in federal requirements part way through the project (i.e. Fisheries Act, Navigable Waters Act)	Regulatory applications were completed on-time

4 Lessons Learned



Lessons Learned

- Winter embankment construction works
- Borrow sites developed with drill/blast operations were efficient
- Fill only design to minimize disturbance of terrain
- Overbuild is necessary
- Importance of collaboration with regulatory agencies early and often
- Allocating adequate time for multiple levels of review from client/owner/regulator

Acknowledgements

- Government of the Northwest Territories
Department of Transportation
- E.Gruben's Transport Ltd.
- Northwind Industries Ltd.
- Stantec
- KAVIK-STANTEC
- Tetra-Tech EBA
- Kiggiak-EBA

Questions?

Qujannamiik!
Merci!
Thank you!

