Mistissini bridge over Uupaachikus Pass

Mr. Emmett Macleod
Director of Municipal Services
Cree Nation of Mistissini
Introduction and requested bridge characteristics

Design criteria

Environmental and social impact assessment

Final Design

Current Status

Residential Development requirements

Gravel Studies

Schedule
Introduction and requested bridge characteristics

Mistissini Bridge over the Uupaatchikus Pass

- The Cree Nation of Mistissini has mandated Dessau to design and prepare Construction drawings for a bridge over the Uupaatchikus Pass, in Mistissini.

- The new bridge will be used to access the existing West side forestry road and to allow access to a new pit.

- The bridge should have:
  - 2 lanes with shoulders on each side
  - 1 sidewalk
  - 2 fences and barriers
  - Lighting
  - Concrete abutments and piers

- The bridge should support future infrastructure needed for residential development (sanitary pipe and water pipe).
Introduction and requested bridge characteristics

Location

Cree Nation of Mistissini
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Design criteria

Original Bridge Layout study (Qualitas, Sept. 2010)

Soil investigation: 7 boreholes
Design criteria

Hydraulic study (Stavibel/AECOM, Sept. 2011)

+ Design high water level (return period of 50 years): 375.72 m
+ Minimum soffit height: 6 m (passage of Twin Otter floatplanes)
+ Water design velocity: 0.32 m/s (slow)
+ Design ice thickness: 0.87 m (level of point of application: 374.85 m)
+ Pier protection: 600 mm thick gravel (100-200 mm Ø)
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**Environmental and social impact assessment**

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Schedule
Environmental and social impact assessment (ESIA) (Stantec, June 2011)

+ ESIA was established based on:
  • Existing environmental conditions
  • Guidelines issued by the authorities
  • Concerns during public consultations

+ Selected valued environmental components:
  • Fish and fish habitats
  • Wetlands
  • Terrestrial fauna
  • Avifauna
  • Land use
  • Archeological and heritage resources
Environmental and social impact assessment (ESIA) (Stantec, June 2011)

Mitigation and preventive measures:

- Dust emission
- Construction wastes
- Noise sources
- Water discharges
- Management of excavated soils
- Accidental spill response
- Sanitary installation
- Archaeological resources
- Fish habitat
- Public safety
- Workplace Health and Safety Management Plan
- Injuries and Accidents Management Plan

Conclusion: It is not anticipated that the project will cause significant adverse environmental effects considering mitigation and preventive measures.
Wood deck on wood girders

- Bridge length: 160 m
- Bridge width: 9.25 m
  - Curb: 0.45 m
  - Shoulders: 0.5 m
  - Lane width: 3.0 m (one lane in each direction)
  - Sidewalk: 1.8 m
- Fences (2.9 m) and side barriers
- 2 abutments and 3 piers
- Shallow foundations (no piles required)
1. Wood deck on wood girders

Elevation view
1. Wood deck on wood girders

Cross-sectional view
1. Wood deck on wood girders

Isometric view
1. Wood deck on wood girders

Isometric view from below
2. Concrete deck on Wood girders (composite design)

Revised cost estimate

<table>
<thead>
<tr>
<th>Mistissini Bridge Proposed solutions</th>
<th>Initial</th>
<th>Now</th>
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<tbody>
<tr>
<td>Structure</td>
<td>6 000 000 $</td>
<td>6 359 905 $</td>
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<tr>
<td>Traffic control</td>
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<td>30 000 $</td>
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<td>Lighting</td>
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<tr>
<td>Installation of pipes (abutments)</td>
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<td>Field organisation</td>
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<td>Contingencies</td>
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<td><strong>Total Structure</strong></td>
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<td>Access roads</td>
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<tr>
<td>Acces road (East and West side)</td>
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<td>1 126 902 $</td>
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<td>New Main Street</td>
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<tr>
<td>Contingencies</td>
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<tr>
<td><strong>Total Access roads</strong></td>
<td><strong>3 800 000 $</strong></td>
<td><strong>1 239 592 $</strong></td>
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<td>**Total *</td>
<td><strong>12 710 000 $</strong></td>
<td><strong>9 483 414 $</strong></td>
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</table>

* Not included : Office and site supervision and Environment
Current Status

+ Responded to Environnemental Questions
+ performed additional surveying
+ Performed additional boreholes on east side
+ Reduced the number of piers in water from 5 to 3
+ With wood design the new soffit height is 9 meters
+ Bridge, foundations, civil and electrical design is completed
+ CNM has mandated Dessau to produce tender documents
+ CNM have met with Chantier chibougamau to review project and estimate fabrication budget
+ Chantier Chibougamau have confirmed fabrication costs
+ 16 weeks fabrication time required for wood beams
+ Final Plans can be viewed on Dessau FTP site
+ Dessau has submitted proposed fees to CNM for site supervision and quality control during construction during 2012-13 phase of the project
+ Works must begin in September 2012 at latest for 2013 completion
Residential Developments

Zone D – Residential lots will be used up with in 5-7 years

Note: Cree Nation of Mistissini currently has approximately 50 lots available.
Future lot development requirements

+ CHB will be finalising their capital agreement with the Quebec Government by this fall 2012.
+ Within the capital agreement, the Cree Nation of Mistissini will be required to provide 50 residential lots.
## Residential Development Requirements

### Residential lots - Requirements

<table>
<thead>
<tr>
<th>Entity</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
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Introduction and requested bridge characteristics
Design criteria
Environmental and social impact assessment
Proposed solutions
Current Status
Residential Development requirements
Gravel Studies
Schedule
Comparatif Cost

+ Quarry Production

<table>
<thead>
<tr>
<th>QUARRY PRODUCTION / UNIT COST</th>
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</thead>
<tbody>
<tr>
<td>PRODUCT</td>
</tr>
<tr>
<td>Crushing</td>
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<td>TOTAL</td>
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<table>
<thead>
<tr>
<th>QUARRY PRODUCTION</th>
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<tr>
<td>3.0 OPERATION.</td>
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<td>3.1 Crushing MG-80</td>
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<td>3.2 Crushing MG-20</td>
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<td>3.3 Crushing BC 5 - 20</td>
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<tr>
<td>3.4 Crush.100 - 200 mm.</td>
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<td>3.5 TOTAL</td>
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</table>
Introduction and requested bridge characteristics

Comparatif Cost

+ Gravel Pit exploitation

Cree Nation of Mistissini
**Comparatif Cost - Conclusion**

- Quarry Production = $331,266.00
- Versus
- Gravel Pit exploitation = $710,310.00

It is much more cost effective and feasible to exploit a gravel pit.
Gravel availability

- **August 1995**: Study by Monterval concludes that gravel pits within 1A land were depleted. Other sources were much further out.

- **December 2003**: Study by Monterval illustrated that the gravel pit at km 12 was nearing depletion. 25 000 m$^3$ of MG-112 was remaining. In 2003 alone, some 60 000 m$^3$ of run-pit sand and gravel were hauled from Pit km 12.

- **March 2007**: Study by Monterval concludes that pit at km 12 is nearly depleted and that what is remaining is of poor quality due to high silt content. This report concludes and recommends the purchasing of sand from Chibougamau or to exploit a new sand and gravel source on the other side of the bay. (40 km along winter access road.)
Gravel Studies

June 2012: Qualitas report concludes that km 12 and all gravel pits within the Mistissini area are depleted.

- Gravel Pit km 12: presently depleted and furthermore the exploitation of the water well is less 1 km away from this pit.
- Rock Quarry km 8: the crushed stone from this quarry is amended with sand from Pit km 12. The sand is no longer available therefore a new sand source is required.
- Pits km 8 to 12: very marginal quantities available (less than 500 m³).
- Pit km 307 on Route 167: quantities for 1 year only.
Cree Nation of Mistissini

Various locations tested by laboratory

Gravel Studies
Gravel Situation - 2012

+ In previous years, the CNM had produced granular material by blasting and crushing rock and adding sand, which is made granular. Since CNM has no sand (none acceptable for development purposes, such as foundations and granular pads).
+ Construction season 2012, the CNM is so limited on existing requirements, we are having to prioritizing all local projects and also limitations on the local operations and maintenance on GOF, such as winter road maintenance to emergency service connection or waterline leaks, etc…
+ Also, the sand is a main component to installation of infrastructure piping
+ The CNM is in a critical situation, without this project, we can not continue our 5 year capital plan, within both NRA eligible or non-eligible projects
+ This situation is also having a negative impact with the delivery of our private housing program
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Schedule 2012 - 2013

Start: September 3rd

2012

<table>
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<tr>
<th>June</th>
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2013

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</table>

- Tender
- Preparatory work
- Abutments
- Talus protection
- Wood fabrication
- Cofferdams, Piers
- Girders and wood deck installation
- Curbs and sidewalks
- Pavement
- Barriers and accessories
- Clean up
Thank you for your attention