

# Manitoba Hydro Bipole III Project Update

EPRI HVDC and FACT Conference  
Palo Alto, CA

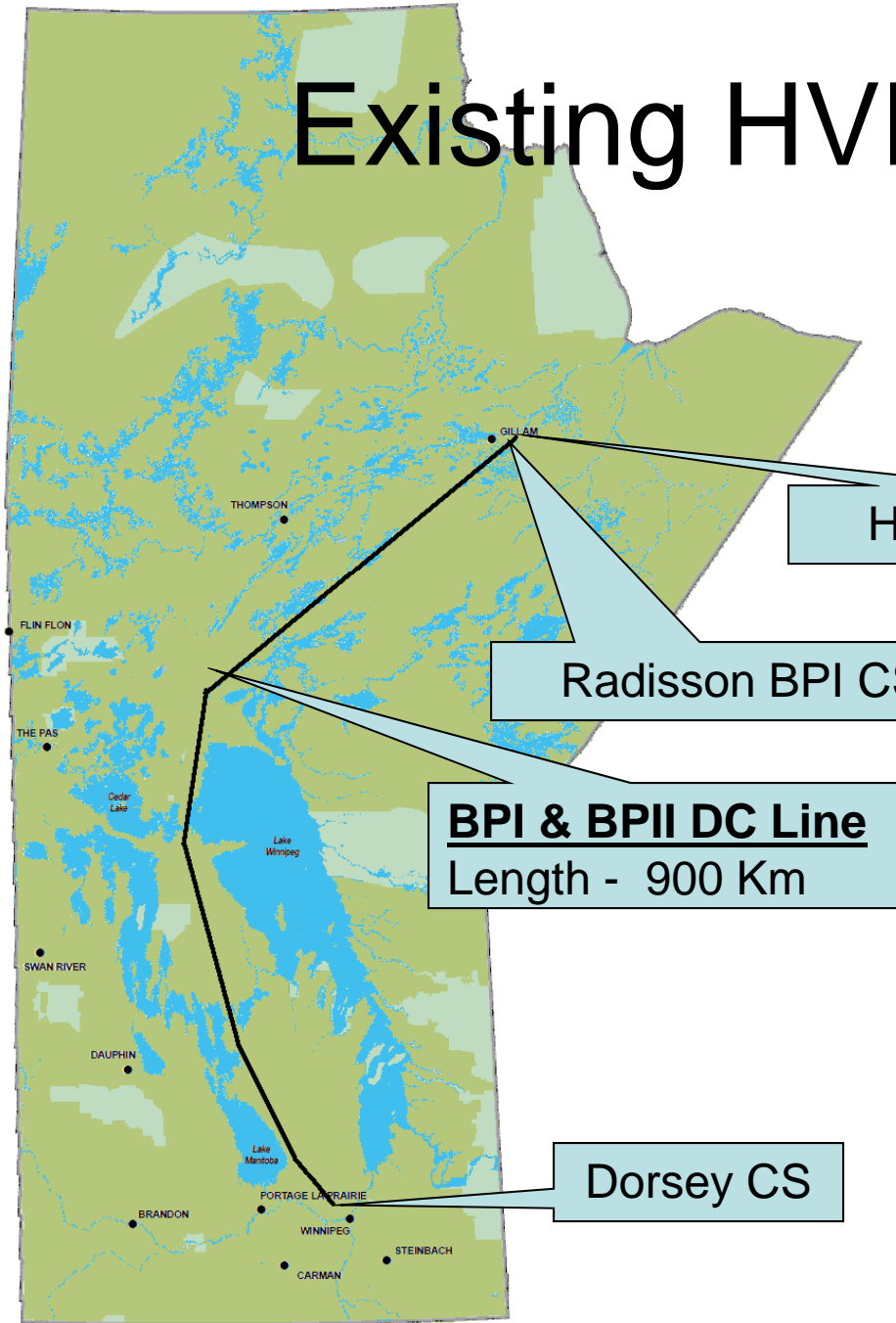
Rick Valiquette  
Manitoba Hydro  
August 31st, 2011

# Agenda

- Existing Manitoba Hydro HVDC System
- Bipole III Project Justification
- Project Scope
- Project Progress
- Project Schedule
- Q & A



# Existing HVDC System



Henday BPII CS

Radisson BPI CS

**BPI & BPII DC Line**  
Length - 900 Km

Dorsey CS

## **BPI Converter Stations Rating**

Voltage	+/- 463.5kV DC
Power	1854MW
Synch. Cond.	6 x 160MVAR

## **BPII Converter Stations Rating**

Voltage	+/- 500kV DC
Power	2000MW
Synch. Cond.	3 x 360MVAR

# Bipole III Justification - Reliability

- Low probability, catastrophic events
  - Extreme weather
  - Fire
  - Other





# Bipole III Justification - Reliability

- Common Transmission Corridor
- Southern Converter Station
- 500 kV Switchyard and Transmission



# Bipole III Justification - Reliability

- 1996 line outage
- 2011 flooding



# Bipole III Project Scope

- 2300 MW, +/- 500 kV Bipole
- 500 kV DC Transmission line
- AC system upgrades North/South (2000 MW)
- Northern Converter Station (Keewatinoow)
  - 230 kV AC Switchyard
  - Earth electrode and electrode line
  - DC converter equipment, 2 Valve Groups per pole
  - Green field development

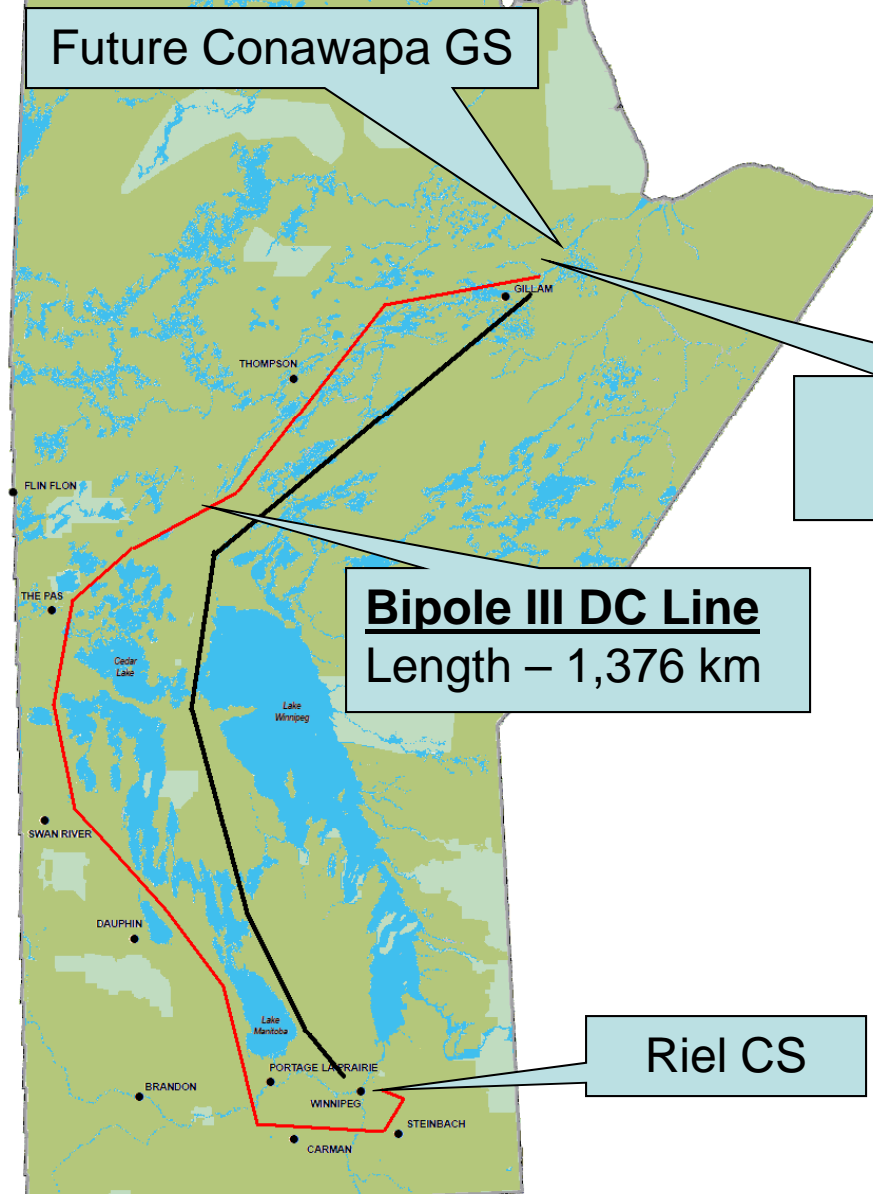
# Bipole III Project Scope

- Southern Converter Station
  - Earth electrode and electrode line
  - DC converter equipment
  - Phase 2 of 500 kV/230 kV AC Station development
  - Four 250 MVAR Synchronous Condensers





# Bipole III Progress: Transmission Line



- Preliminary engineering completed
- Preferred route selected

Northern CS  
Keewatinooow

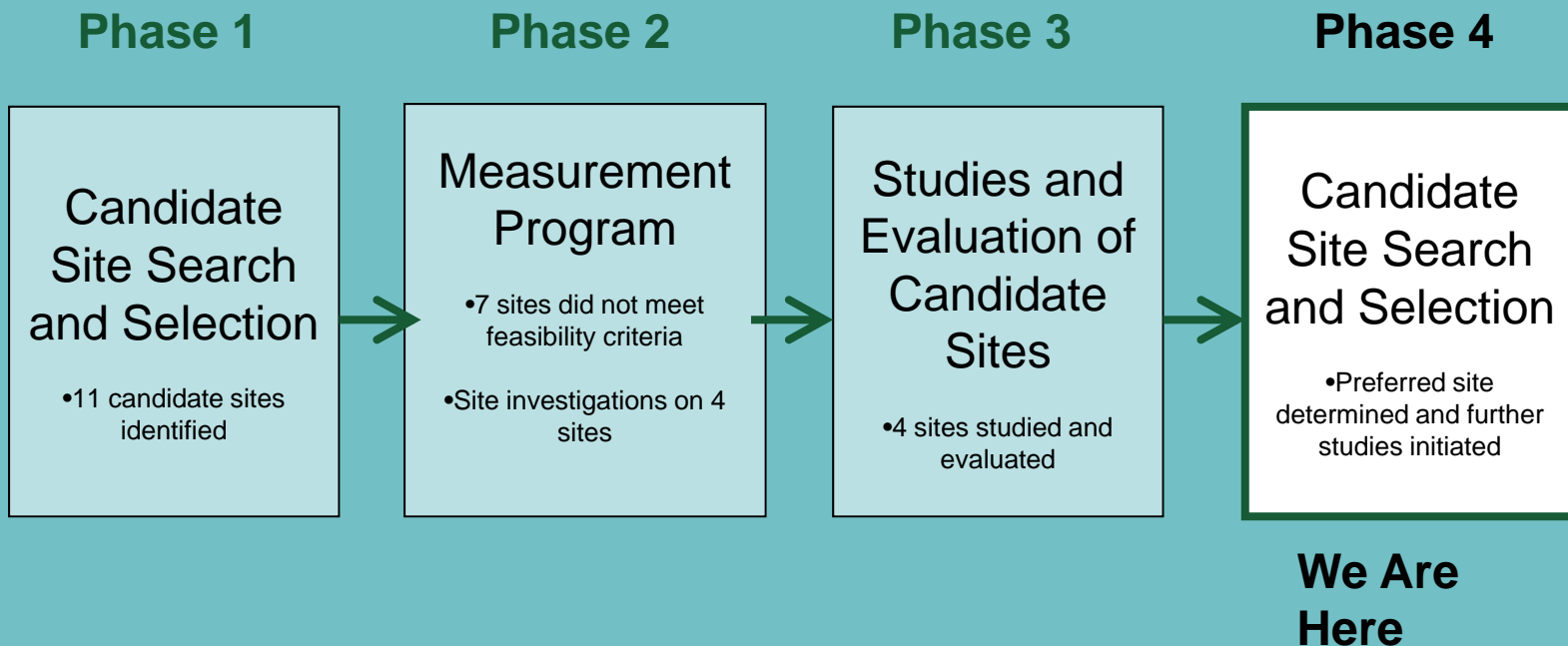
# Bipole III Progress

- Riel 230 kV/500 kV Switchyard
  - Site is located on the East side of Winnipeg
  - Switchyard construction underway (separate project)
  - In-service 2014



# Bipole III Progress

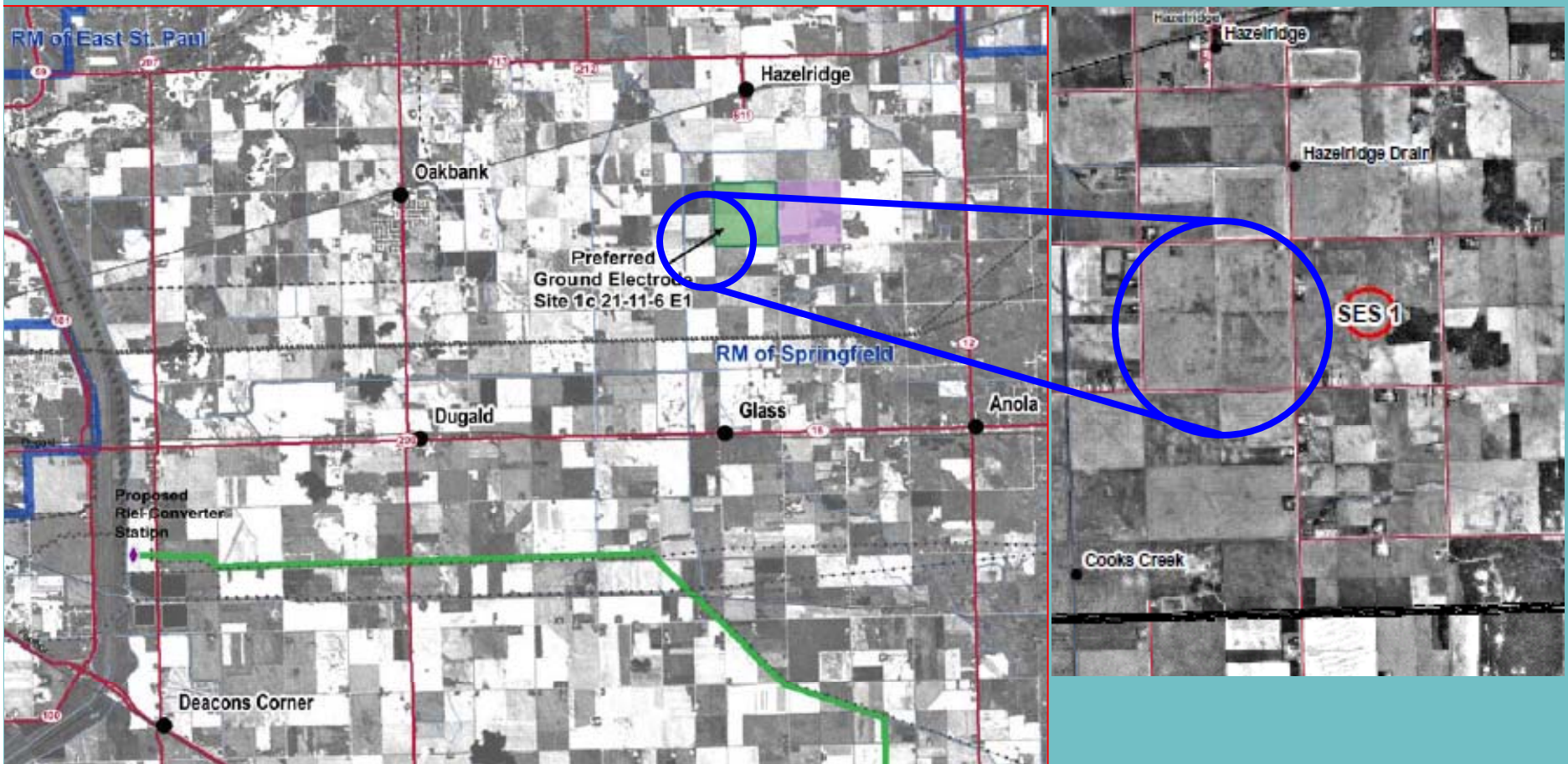
- Riel Electrode Site
  - Preliminary site selection completed
  - Drill programs underway





# Bipole III Progress

- Southern Electrode Site Selection





An aerial photograph of a wide, flat landscape. The foreground and middle ground are covered with sparse, low-lying vegetation, including small trees and shrubs. A dirt road or path runs diagonally across the scene. In the far distance, a large body of water is visible under a clear sky. The entire image is framed by a teal border.

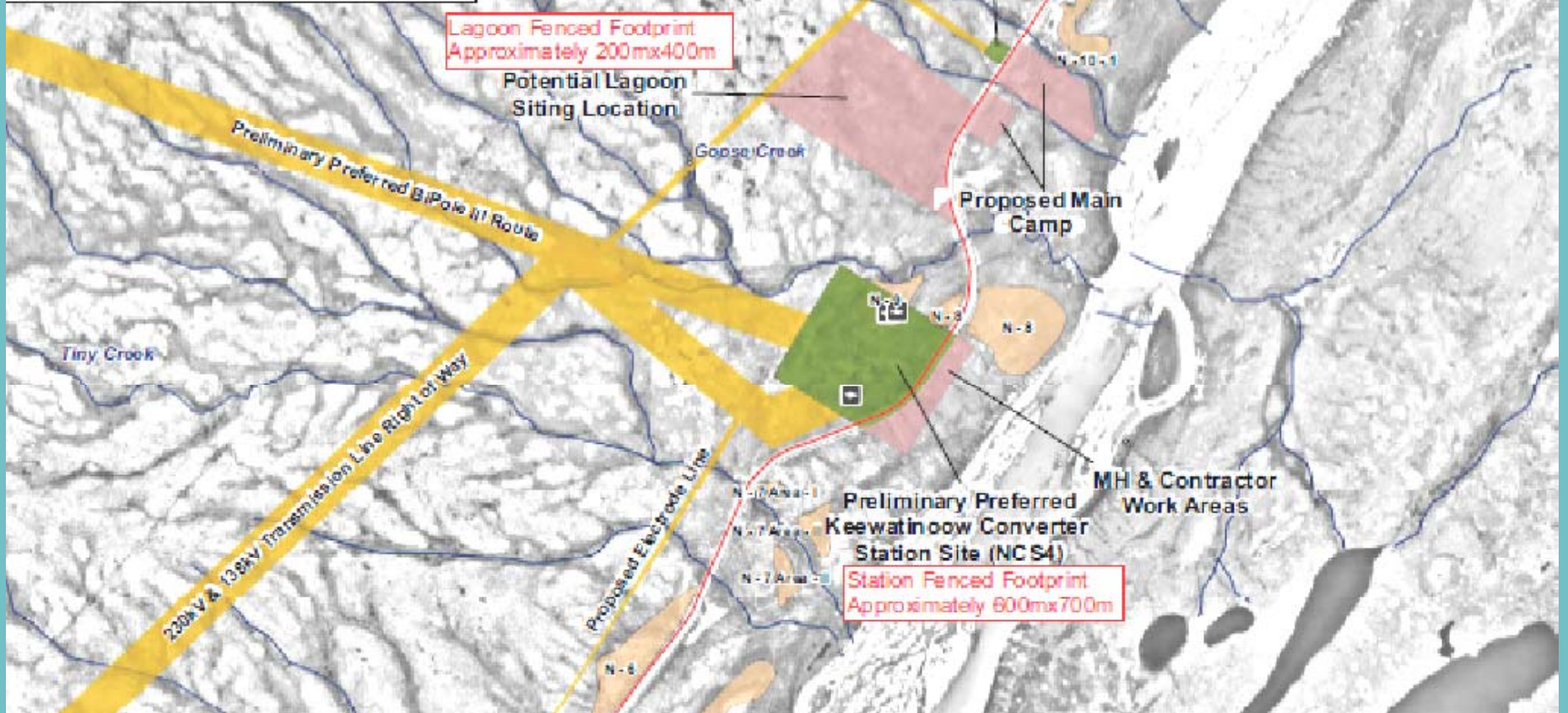
# Bipole III Progress

- Northern CS & Electrode Site Selection
  - Preliminary site selection completed
  - Drill programs underway



# Bipole III Progress

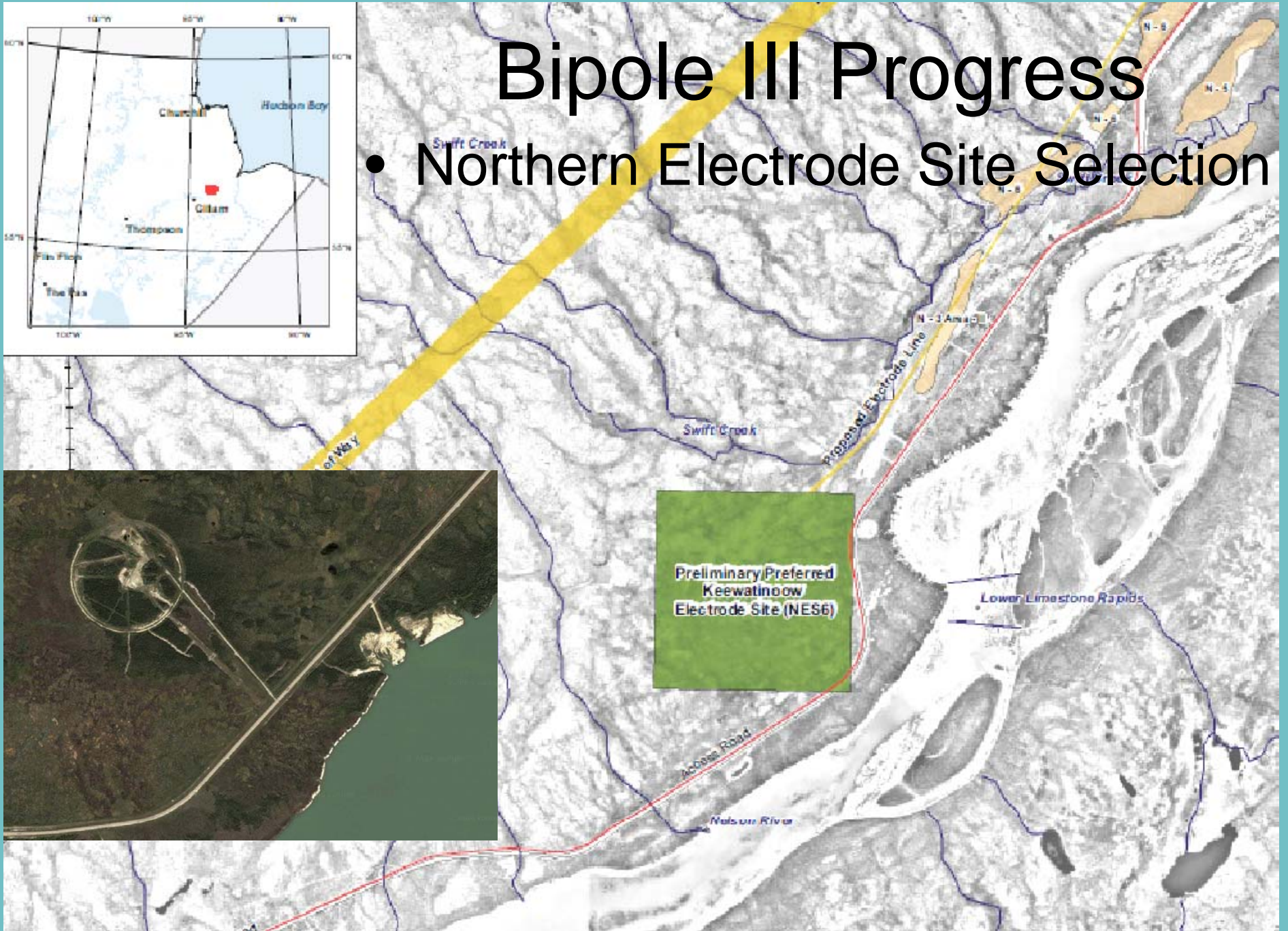
- Northern CS Site Selection





# Bipole III Progress

- Northern Electrode Site Selection



# Bipole III Progress

- Environmental Licensing
  - Four rounds of consultations have been held with Aboriginals communities and organizations, interested stakeholders, RM's, towns and planning districts along the route.
  - Submission of Environmental Impact Statement in Oct 2011
  - License approval anticipated Sept 2012



# Bipole III Progress

- Voltage Source Converters
  - Working group evaluating the technology
  - Expression of interest responses received from suppliers
  - System studies in progress
  - Issues: maturity of technology, DC line faults, commercial issues
  - Benefits: elimination of synchronous condensers (?), operation with low SCR, black start capability, other



# Project Schedule

- Synchronous Condenser Milestone Dates
  - Issue for Tender Jan 2012
  - Award Dec 2012
  - ISD 2017
- Transmission Line
  - Detailed tower design and testing 2012
  - Right-of-way clearing start winter 2012/13
  - Line construction 2013 – April 2017

Questions?