



GTEN 2019 Symposium

October 21-23, 2019 | Banff, Alberta

The Coastal GasLink Pipeline

A Seven Year Journey to the Starting Line

**Rick Gateman, Vice President Business Development
Canada Gas, TC Energy**

Presented at the Gas Turbines Energy Network (GTEN) 2019 Symposium
Banff, Alberta, Canada - October 2019

The GTEN Committee shall not be responsible for statements or opinions advanced in technical papers or in symposium or meeting discussions.

A Natural Gas Pipeline to serve the LNG Canada project

A company of significance to all of Canada

When LNG Canada's Joint Venture Participants – Shell, Petronas, Petro China, Mitsubishi and Kogas – made a final investment decision on October 1, 2018, it signified the culmination of seven years of community engagement and consultation with First Nations, local communities, all levels of government, the business community, regulators and countless others. It showed that British Columbia and Canada are open for business for a major energy project – a project that today represents the largest private sector investment in Canadian history.

From the LNG Canada Website

Today's Presentation:

- Why LNG?
- Why Now?
- Advantages and Disadvantages of Canadian LNG
- Why did LNG Canada Succeed?
- Coastal GasLink's Pre-development Stage
- One Continuing Challenge
- A Pipeline under Construction

Why LNG?

- Supply and Demand 101
- Growing natural gas production in many regions of the world
 - Access to shale gas through technological advances
 - Abundance of supply expected to keep cost low
- Growing economies in Asian countries need increasing energy supplies
 - Asian demand currently takes over 70% of world LNG supply
 - Industrialization and modernization drives future demand growth
 - In China, replacing coal is a priority

Why LNG?

- Natural Gas is the fuel of choice:
 - Liquefied Natural Gas utilizes decades of proven technology
 - Once in liquid form, natural gas can be transported globally
 - at – 260F and at atmospheric pressure, natural gas remains a liquid
 - safe, non-explosive in liquid state
 - Flexible and versatile for base load power and for heating applications
 - Cleanest burning hydrocarbon (50 – 60% less CO₂ than coal; less particulates)

Why Now?

Early April in Shanghai, China...



What causes China's air pollution?

Coal. The increasing number of **air pollutants** can **cause** incidences of low visibility for days and acid rain. ... Long-term exposure to **pollutants** can **cause** health risks such as respiratory diseases, cancer, cardiovascular and cerebrovascular diseases. Coal is a huge issue because of the SO₂ emissions from coal factories. [Google Search]

Why Now?

China's State Council has issued plans to reduce air pollution:

- Air Pollution Prevention and Control Action Plan (2013)
- Three-Year Action Plan for Winning the Blue Sky War (2018)



Timing is Key

- There are fairly well defined windows of opportunity for entering LNG markets
 - Extensive forecasting of future demand for energy in worldwide markets
 - Including energy switching from coal
 - Extensive monitoring of worldwide LNG production capability and proposed projects
 - Final Investment Decision (FID) dates are closely watched
 - Country-specific conditions which enable or impede the progress of projects
- Canadian West Coast projects were first targeted to meet a 2020 LNG market window
 - Initial planning for some projects started around 2005-2009
 - Up to 20 projects were proposed for BC – they all missed the window and most were terminated
- Next window is targeted for 2023, followed by a post-2025 window

Advantages to Canadian LNG

- The BC Advantage
 - Shipping Times to Asian markets are about 50% less than from US Gulf Coast
 - 8 days to Tokyo; 10 days to Seoul
 - No Panama Canal tolls/uncertainties
 - Energy advantage to LNG operations due to lower ambient temperatures
 - Average northern BC port temperature is 7 degrees C vs 27 degrees C for Australia
 - Extensive, long-life natural gas reserves at low cost
 - BC claims over 3,300 Trillion Cubic Feet of gas (2016 estimate)
 - Availability of NIT liquidity/AECO hub

VS...

Disadvantages to Canadian LNG

- The Canadian Disadvantage
 - A growing belief that nothing can be built in Canada
 - Regulatory uncertainty
 - Government uncertainty
 - First Nations uncertainty
 - Environmental activism
 - Gas reserves are 670 - 900 kilometers from the coast
 - Lengthy and costly new pipelines are required over mountainous terrain
 - Construction costs for plant are generally higher than competitor countries
 - Uncertainty as to Federal government tariffs on steel and fabricated vessels
 - Electrification policy of current BC government
 - Brown-field US Gulf Coast cost seen as a direct competitor, further advantaged by established pipeline service

Why Did LNG Canada Succeed?

- A world-class assembly of Joint Venture participants:
 - Shell 40%
 - PETRONAS 25%
 - Mitsubishi 15%
 - PetroChina 15%
 - KOGAS 5%
- All participants bring:
 - BC/Alberta natural gas reserves
 - LNG plant experience/deep industry knowledge
 - Asian markets for LNG
 - Financial strength
- TC Energy is a world-class Pipeline Partner
 - Proven experience with First Nations and stakeholders
 - Skilled in construction
 - Responsible operator

Why Did LNG Canada Succeed?

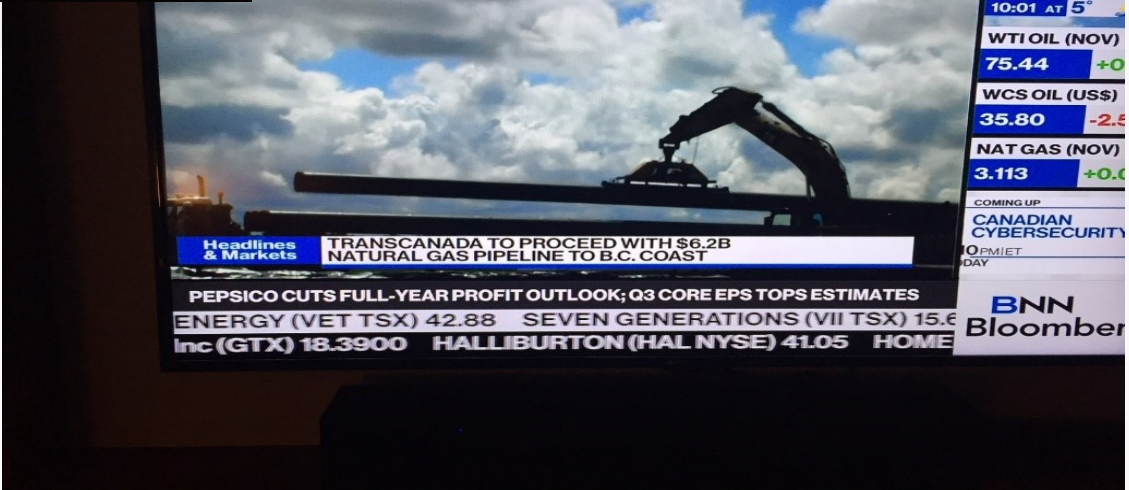
- A long and arduous pre-FID journey served to de-risk the disadvantages
 - Pipeline and plant permits were received (and renewed)
 - Governments were supportive (BC/Federal)
 - Fiscal arrangements were concluded; tariff impacts minimized
 - First Nations Agreements were obtained for both the plant and along the pipeline route
 - Environmental activism was and continues to be managed
 - “Greenest” LNG plant in the world
 - Pipeline construction best practices (river crossings)
- This all took a long time...
 - 2020 market window was missed – refocused on 2023-24
 - Staying power of the JV participants was key
 - FID decision was indefinitely postponed in July, 2016 due to global market conditions
 - All-out drive to reduce/optimize capital costs of plant and pipeline construction
 - Goal of beating US Gulf Coast delivered cost to Asian markets

LNG Canada Final Investment Decision October 1, 2018...



Formal FID Announcement – October 2, 2018



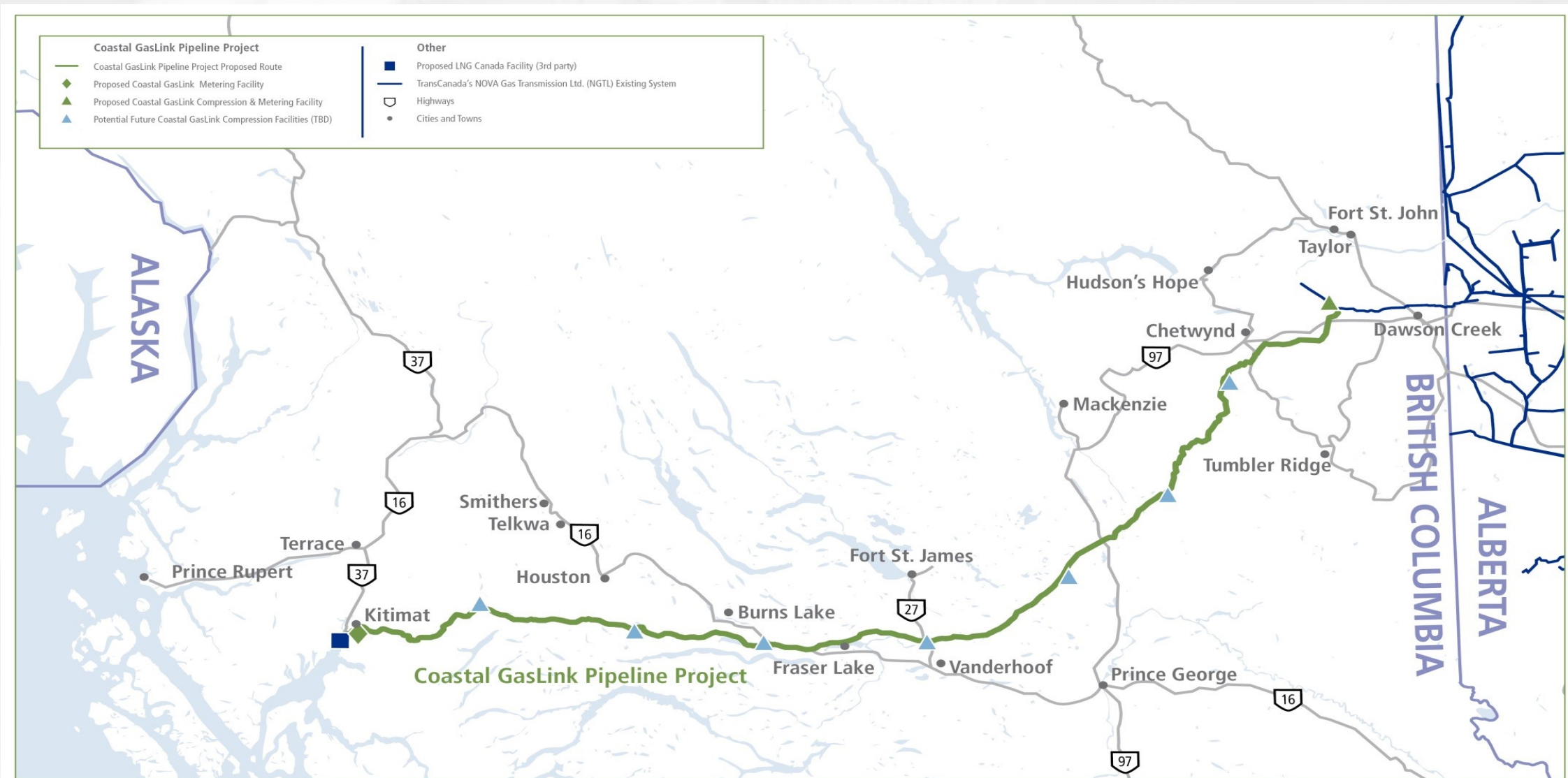


What is TC Energy Building?

- A 48" diameter natural gas pipeline running approximately 670 kilometers from the Groundbirch region in northeast British Columbia to Kitimat, BC. to provide natural gas feedstock to the LNG Canada plant
- Initial capacity of 2.1 bcf/day, with potential to expand to about 5 bcf/ day with the addition of up to 7 compressor stations
- Construction cost of \$6.2 billion - \$470 million spent to FID on pre-development costs
- 2,000 to 2,500 jobs during the four year construction period and 16 to 35 jobs during ongoing operations



Coastal GasLink Pipeline Project



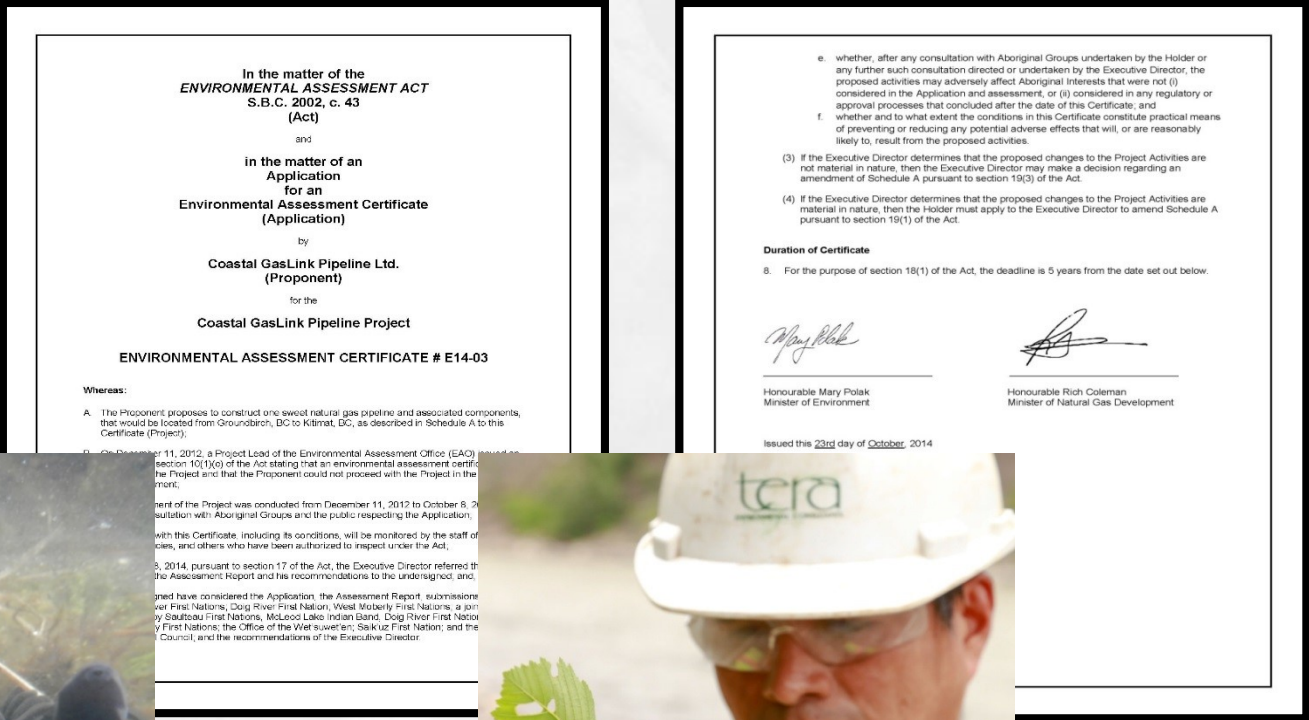
Coastal GasLink Pre-Development Timeline

2010	First Meeting with Shell in December
2011	Internal discussions/marketing/validation with Shell; December 9 Request for Proposals (RFP)
2012	RFP success in April; Interim Agreement; Announcement in June, 2012; Immediate engagement with First Nations and stakeholders
2013	Consultation with approximately 25 First Nations and 10 Northern BC communities; Field Work for Environmental Certificate and BC Oil & Gas Commission (OGC) permit applications
2014	EAO Certificate application submitted in January, 2014

Environmental Certificate Application submitted – January 29, 2014



BC Environmental Assessment Certificate issued October 24, 2014 (5 year term)



Coastal GasLink Timeline

- 2014 BC Oil & Gas Commission permit applications submitted in March; Formal Project Development Agreement signed with LNG Canada and JV participants in April; 4 Project Agreements signed with First Nation bands
- 2015 Most OGC permits received; 7 Project Agreements signed with First Nation bands; continuing engagement with Northern BC municipalities
- 2016 Final OGC permits received; 6 Project Agreements signed with First Nation bands
- July - LNG Canada final investment decision (FID) deferred indefinitely, project teams reduced to maintenance mode

Maintaining Momentum - Investing in Communities



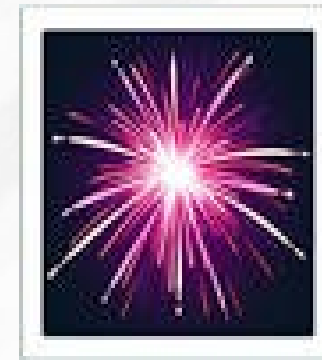
Achieving and Maintaining First Nations and Stakeholder Support in BC



Coastal GasLink Timeline

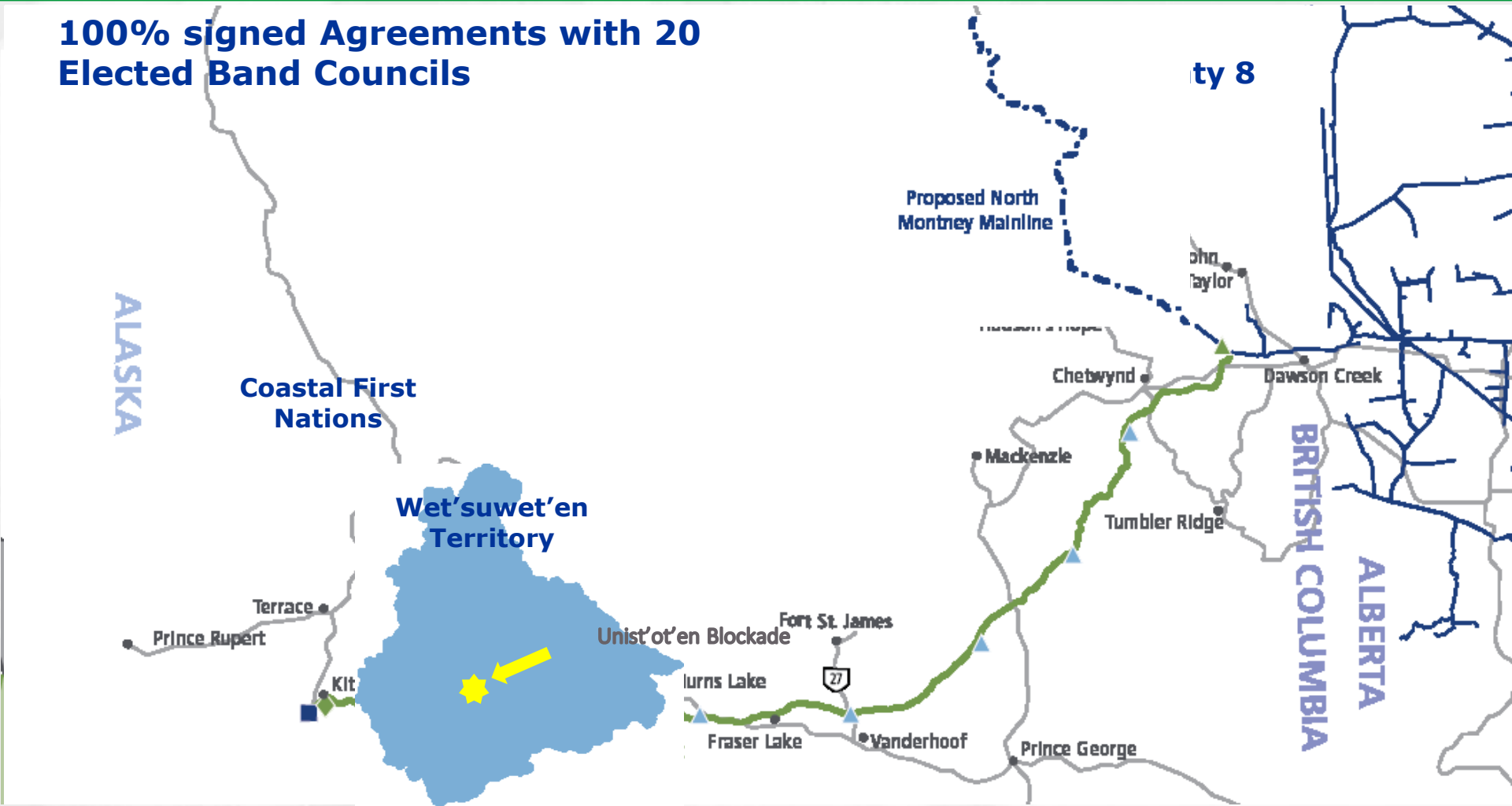
- 2017 Maintenance mode – community and First Nation investments; maintain momentum and engagement
- 2018 3 Project Agreements signed... and... after numerous extensions to the Final Investment Decision (FID) over seven years

LNG CANADA FID WAS ANNOUNCED ON OCTOBER 1, 2018



Achieving First Nations Support

100% signed Agreements with 20 Elected Band Councils



Coastal GasLink's Approach to Partnering with First Nations

- Over 15,000 engagements have been undertaken and over \$13 million in capacity funding has been advanced to Indigenous groups since the project was announced in June, 2012
- Coastal GasLink has sought from the outset to include First Nations along the pipeline route as partners – to allow shared success in the project. Project Agreements offered to First Nation communities include:
 - Preferential access to contracting opportunities for Band-owned and joint venture businesses
 - Preferential access to skills training and employment opportunities for Band members
 - 3-stage project payments
 - Annual payments throughout the operating life of the pipeline
 - Covenants to not convert the use of the pipeline

Coastal GasLink's Approach to Partnering with First Nations

- Financial contributions toward socio-economic, environmental and cultural initiatives
- Ongoing liaison committee involvement through construction and beyond
- In signing a Project Agreement, the First Nation agrees to support the project and *consents* to the pipeline crossing their traditional territory
- Importantly, TC Energy has achieved:
 - the BC government's "First Nations' partnership" condition to LNG development; and
 - the spirit and intent of "free prior and informed consent" of the United Nations Declaration on the Rights of Indigenous Peoples

Project Agreements with First Nations

Signed 20 of 20 Project Agreements with Elected Band Councils along the Pipeline route



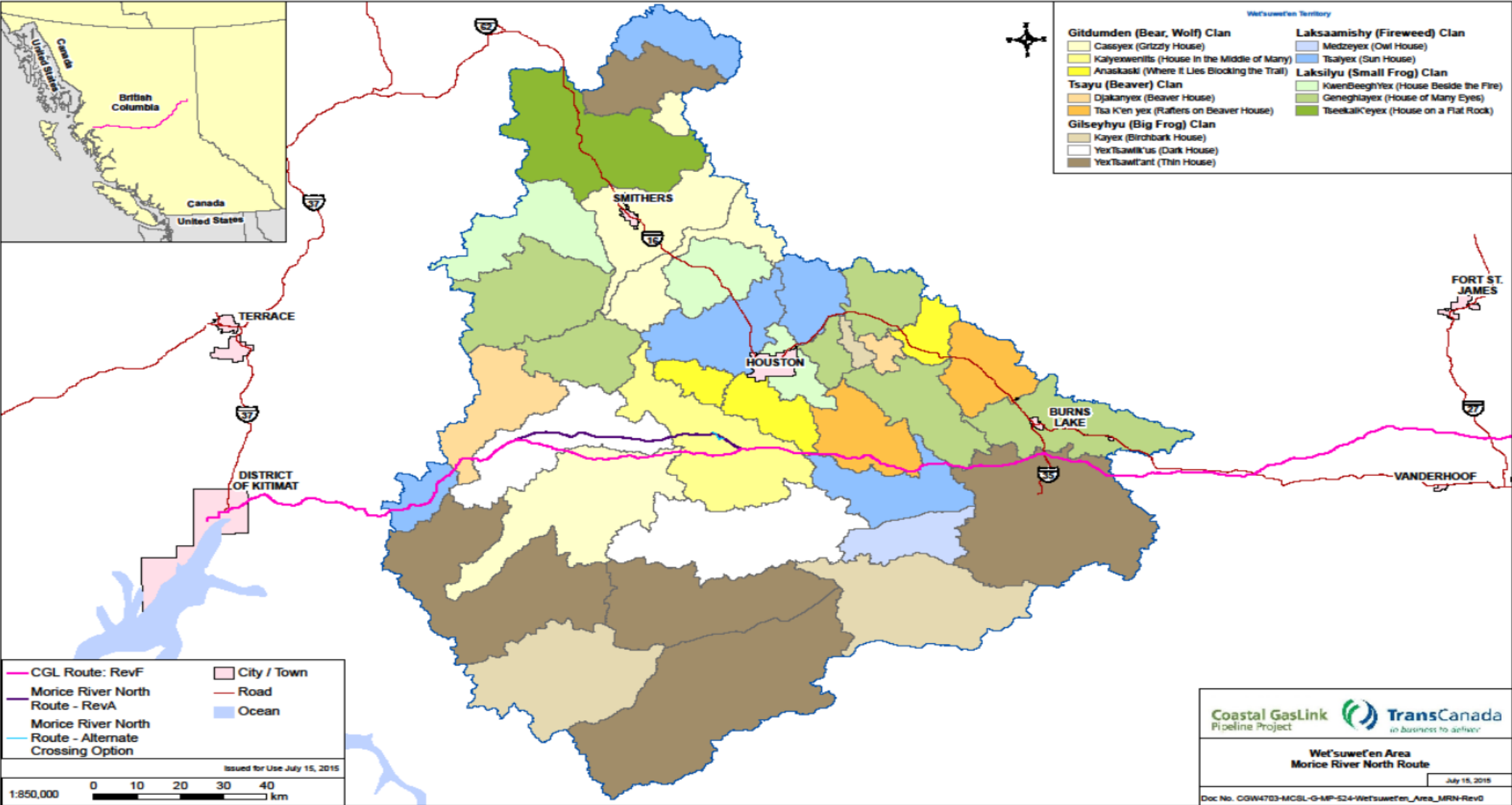
One Continuing First Nation Challenge...



Unist'ot'en Blockade on the Morice River bridge – circa 2012

- Originally tied to proposed Northern Gateway routing
- Environmental activist funding (US protestors)
- Aligned (for different reasons) with a minority of Wet'suwet'en Hereditary Chiefs

Wet'suwet'en Hereditary Houses



Wet'suwet'en Hereditary Chiefs

- In all other regions along the pipeline right-of-way, community members, elders and Hereditary Chiefs were informed and consulted by elected Chiefs and Council members. Many Nations held community votes to approve Project Agreements
- Wet'suwet'en Hereditary Chiefs have largely separated from Wet'suwet'en region elected Chiefs and Councils, refusing co-operative overtures and asserting that elected Councils only have jurisdiction on reserves
- A small faction of Chiefs are opposed to the pipeline, largely as a means to assert larger land right and title claims tied to historical legal cases involving the provincial government
- Environmental activist groups have aligned with these Chiefs, providing funding, protest participants and social media presence
- BC government has announced they are resuming discussions with the Chiefs

Unist'ot'en Camp

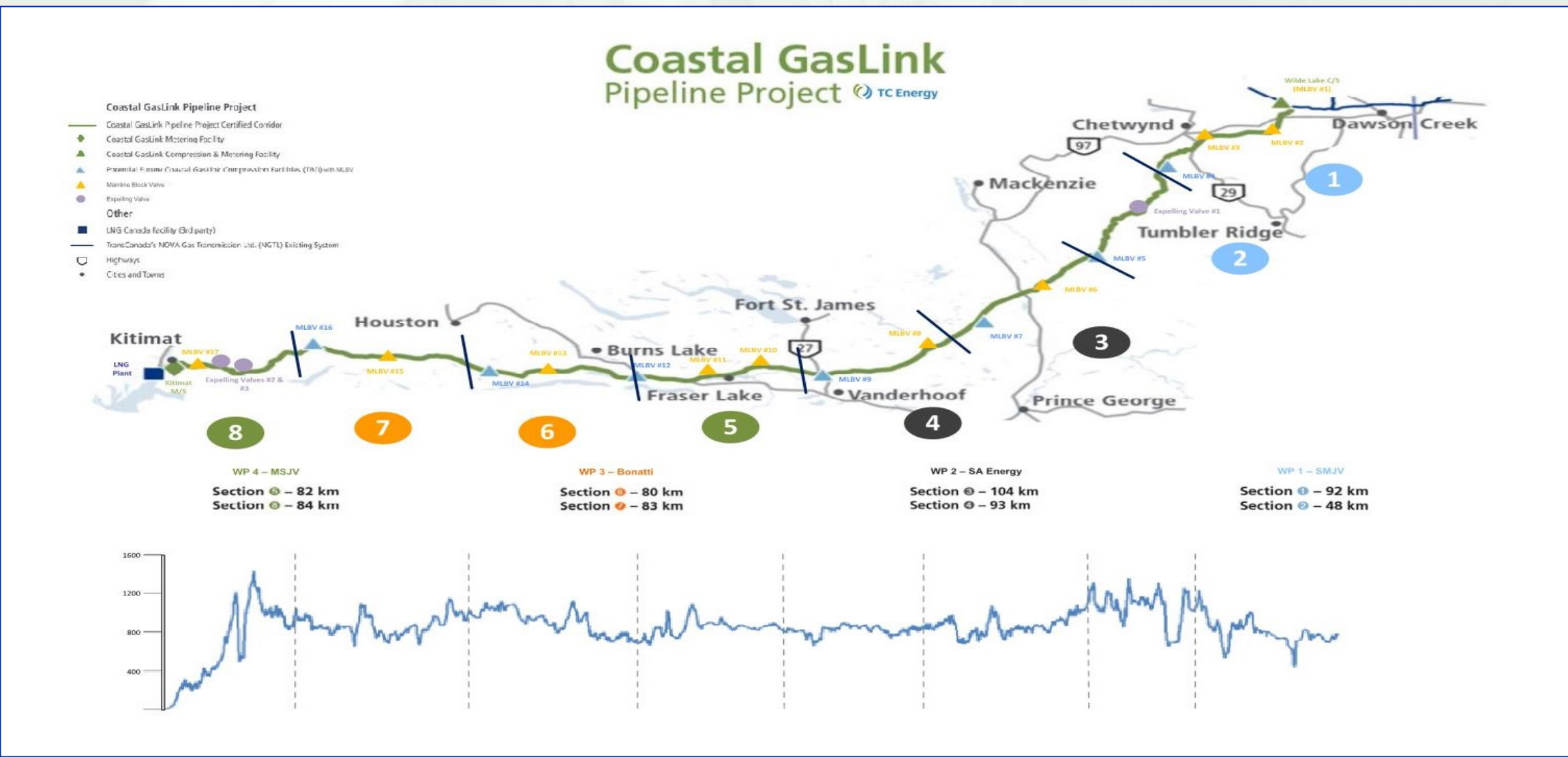


Morice River Bridge – circa 2017

Obtaining Land Access

- Extensive attempts to reach an Agreement with Wet'suwet'en Hereditary Chiefs and Unist'ot'en representatives were ultimately unsuccessful
- An injunction was granted on December 14, 2018 by the BC Supreme Court
- Access to the Morice River bridge and the dismantling of an ancillary blockade was enforced by the RCMP on January 7, 2019
- Substantial social media and mainstream media attention ensued and to a limited degree continues today
- Continuing presence of protestors in the vicinity of pipeline worksites near the Morice river bridge

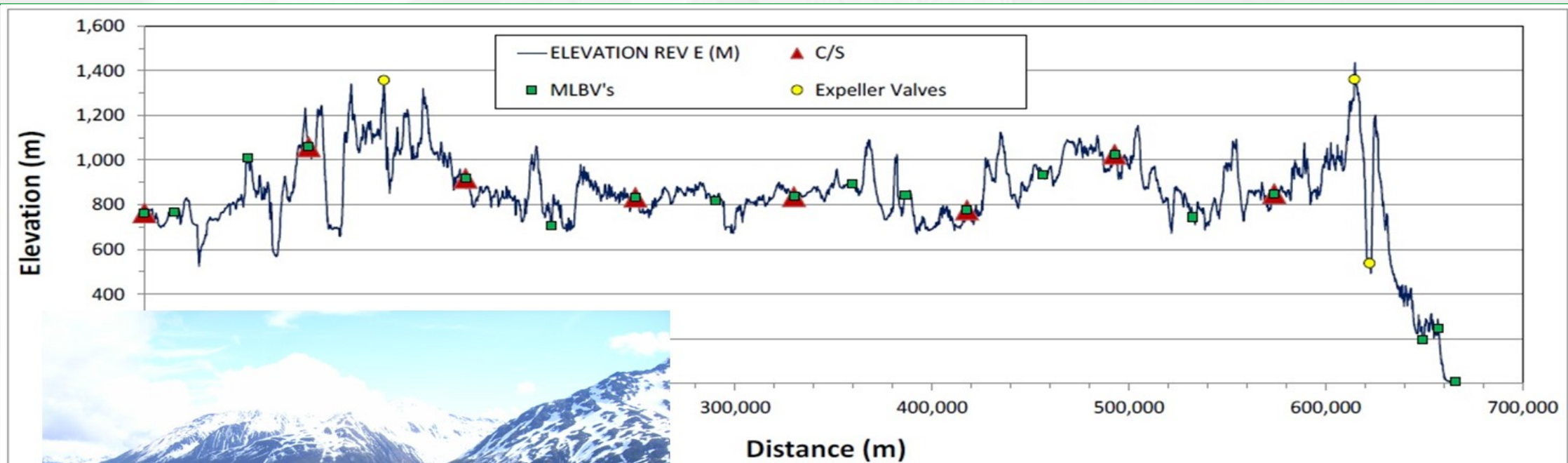
Construction Overview: Spread Summary & Terrain Profile



Types of Terrain



Pipeline Construction – Challenging Terrain



Construction Activity and Timeline – East (Spreads 1-4)

- Access road construction and upgrading largely completed
- Most workforce camp locations are prepared with camp installation underway
- Clearing has started for all Spreads in preparation for 2020 mechanical construction
- Grading and rock work also commencing

Clearing and
mulching on
Sukunka multi-
use site
(Spread 3)



Cleared multi-use site
near Chetwynd (Spread 1)

Construction – West (Spreads 5-8)



Spread 8 Camp



Spread 8 right of way clearing
near Kitimat.



Grubbing and mulching
at KP 650.

Construction – West Spreads 5-8



Clearing Laydown 31/32, Shea Road



RoW Clearing – North Kitimat

Construction – Spread 8 Cable Crane Slope

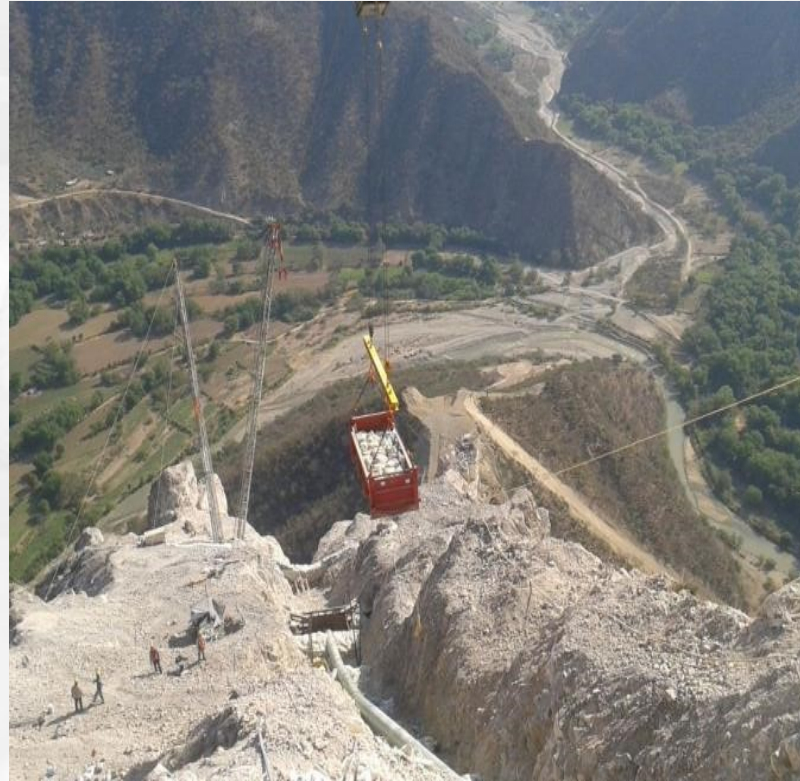


Clearing of cable crane slope
(1.8km length, 26 degrees (49%).

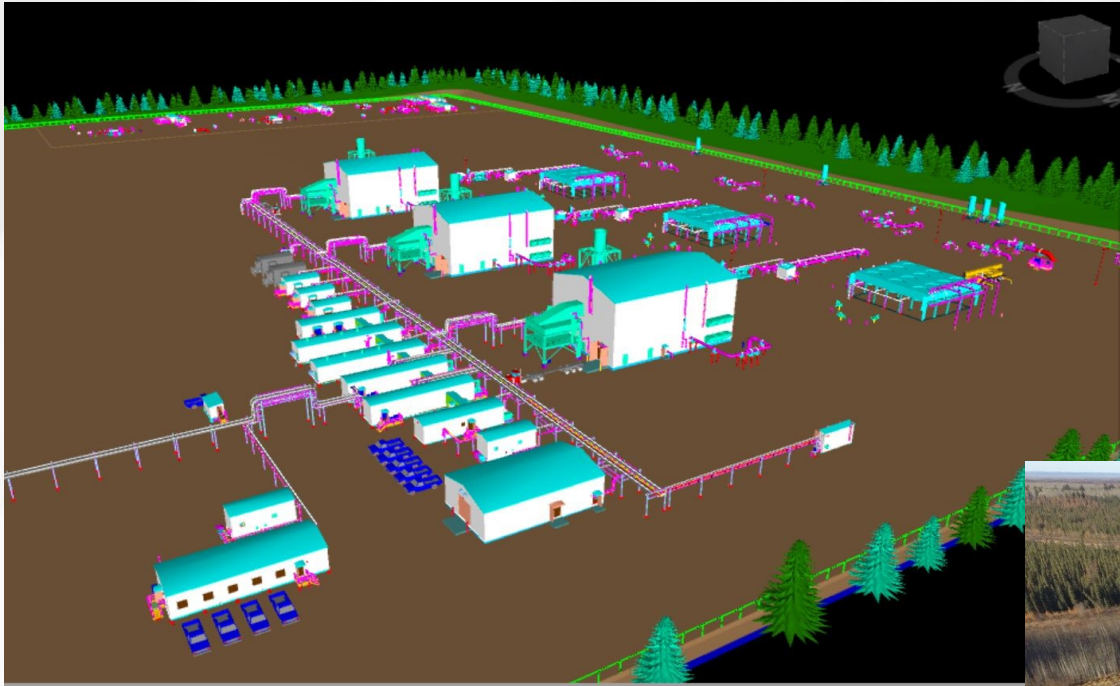


Working Cable-crane Arrangement
(Albanian project, courtesy of Spiecapag)

Steep Slope Construction Experience (Mexico)



One Compressor Station in Phase One

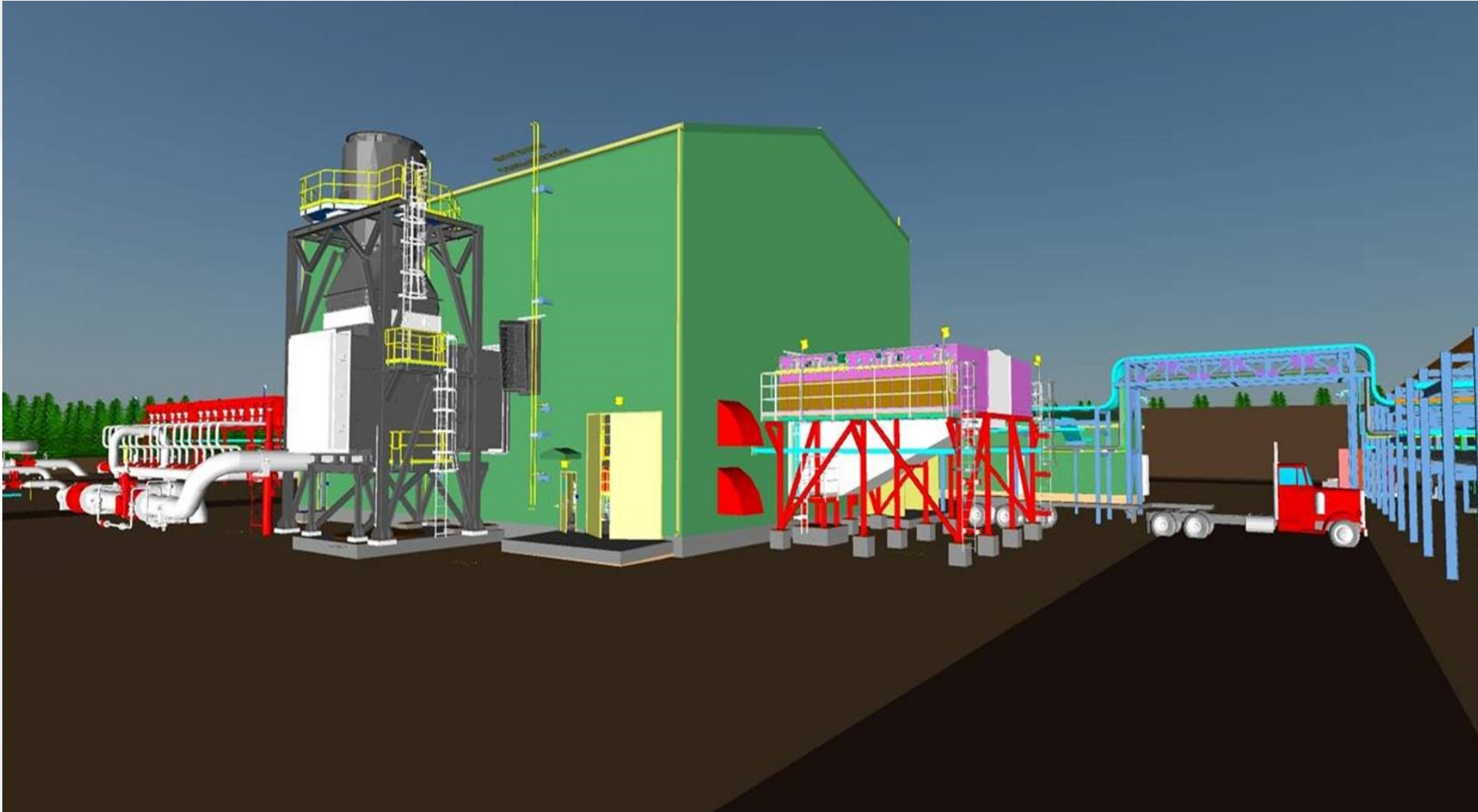


Schematic of Wilde Lake Compressor site

Similar to Goodfish Compressor Site – North Montney Mainline (NE BC)



Wilde Lake Compressor Site Rendering



Thank you

