Final Report – Draft V1

Northern BC Rail Analysis

Resource Municipalities Coalition

Northern BC

April 25, 2022

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Report Revision

Title:	Final Report – Draft		
Revision:	Draft V1	**Date:**	April 25, 2022
HDR Corporation			
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ES1 Executive Summary

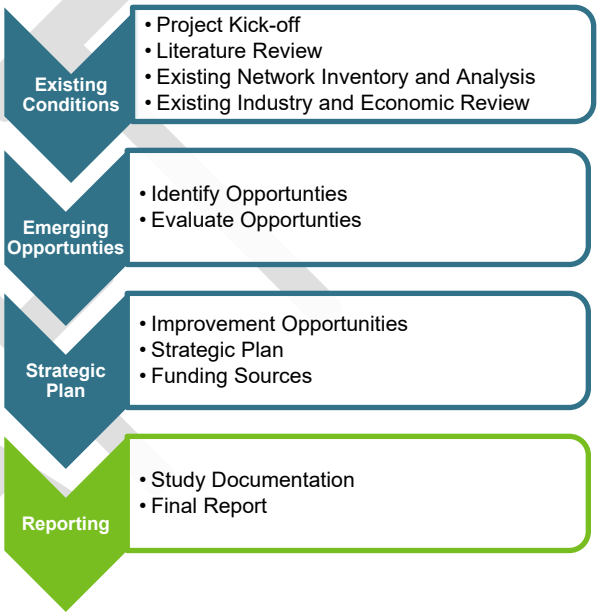
The Resource Municipalities Coalition (RMC) retained HDR to complete an analysis and study of the rail network and service in Northern British Columbia. The rail network is an economic enabler for resource development and is a key component of the Provincial and National transportation networks. It provides a vital link between industry in the region and markets located in North America and around the globe, with BC serving as an important gateway for trade with Asia.

Existing Conditions

Goods-producing industries in Northern BC are a significant economic driver, and they include the agriculture, forestry, mining, and oil and gas sectors, and supporting transportation services. It is estimated that these rail-served sectors generate $15.8 billion worth of economic activity annually and support 43,430 jobs across British Columbia, and $19.5 billion and 56,531 jobs in Canada.

The Northern BC rail network includes two primary corridors, CN's east-west mainline from the AB/BC border to Prince Rupert, and their secondary corridor that travels southwest to northeast from Squamish to Fort Nelson. Together these corridors serve hundreds of different businesses and shippers, and pass through numerous communities.

Figure 1: Study Outline



Stakeholder engagement was conducted with Municipalities, Shippers, First Nations, and other interested parties in the study area. The engagement was conducted through an online survey and Microsoft Teams-based video calls. Input from stakeholders was fundamental to the study, and they provided their knowledge of rail network conditions and operations, potential areas for improvement, and economic growth opportunities. As the primary service provider in the study area, Canadian National Railway (CN) was a critical stakeholder, and will be an important partner in improving rail service in Northern BC.

A wide range of areas for improvement were identified through the stakeholder engagement and network analysis. These included identification of subdivisions / network segments where increases in track speed and/or gross weight capacities would be beneficial, and a wide range of areas / ideas for rail service improvements throughout the region.

Emerging Opportunities & Ideas

Potential economic development opportunities and improvement ideas were identified in the agriculture, forestry, mining and oil and gas sectors through stakeholder engagement, research, and a literature review. It was estimated that the opportunities that were identified could

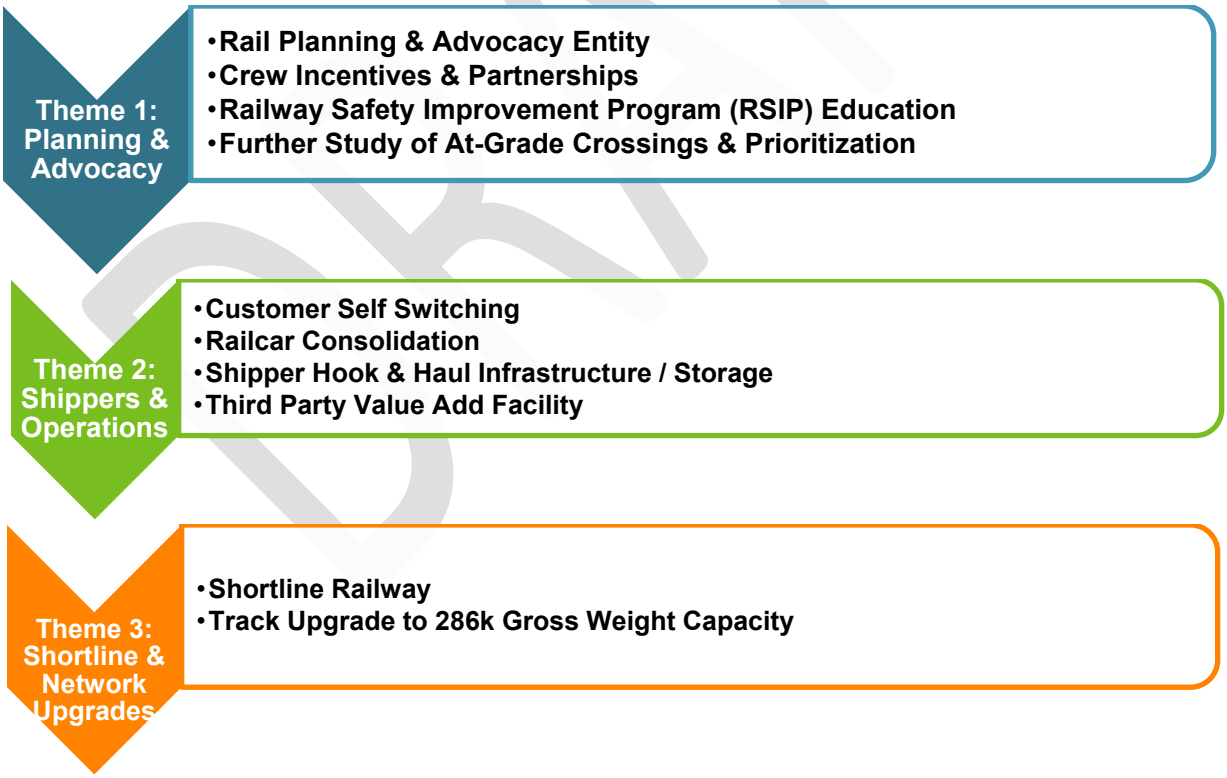
generate up to 26,000 annual railcars worth of demand, and this is believed to be only a fraction of the total growth potential in Northern BC.

Stakeholders provided clear feedback on the types of rail network and service improvements that would help to realize these opportunities. Many noted that basic changes in rail service frequency and flexibility could help their existing operations run more smoothly, and ultimately increase the viability and economic potential of their businesses. Stakeholders reported that improvements were needed beyond the former provincially owned BC Rail network, including on the primary east-west mainline corridor from Alberta to Prince Rupert and near major rail terminals like Prince George and Prince Rupert.

Strategic Plan

A long list of improvement ideas were developed, and the ideas were evaluated to determine if they would provide sufficient value to RMC and Northern BC. A total of 10 improvements ideas are recommended. These improvements have been grouped into “themes” based on how they relate to one another, and they are shown in the figure below. The study includes descriptions of how each theme could be implemented, and details into each specific recommended improvement idea.

Strategic Plan Visual



Potential funding sources that could help support the recommended improvements were identified. Funding sources include the National Trade Corridors Fund, Canada Infrastructure Bank, Shipper Funding, and Private Equity Funding.

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1 Introduction

The Resource Municipalities Coalition (RMC) is a partnership of municipalities, chambers of commerce, and other organizations in Northern BC. Their mission is:

"To be a constructive part of creating a more equitable and inclusive society protecting and enhancing sustainable development of resource communities and provide a high quality of life to citizens through the provision of services that ensure safety, education, health, economic vitality and a healthy natural environment and mutually respectful relationships with First Nations."

RMC retained HDR to complete an analysis and study of the rail network and service in Northern British Columbia.

The rail network in Northern BC is an economic enabler for resource development and serves as a key component of the Provincial and National transportation networks. The rail network creates a vital link between industry in the region and markets located across North America and around the globe, with BC serving as an important gateway for trade with Asia.

Figure 2 shows the study area. It includes the existing rail network and significant roadway and port facilities in the region. Canadian National Railway (CN) is the only current rail operator / service provider in the study area, although CN connects with and exchanges rail traffic with a number of other railways in the Lower Mainland and elsewhere in Western Canada which allows rail traffic moving to/from Northern BC to access all parts of the North American rail network.

In Canada and the United States, the units most commonly used for operating and analyzing the rail network are imperial (miles and feet), and those units have been primarily used in this document to align with industry standards.

Figure 2: Study Area

1.1 Literature Review

To inform the study we conducted a literature review of the available reports and previous studies that were relevant to the rail network and economy in Northern BC. This included reports produced by the RMC and by other industry and government parties. The most applicable reports are summarized below, and a list of all reports, and documents reviewed for relevant information is included in Appendix A.

1.1.1 BC Rail Agreements (2003, 2004)

There are a number of documents that specify the agreements that were made when CN purchase the former BC Rail corridor in 2004. These include the BC Rail and BC Rail Partnership Revitalization Agreement, and the BC Rail Transaction Agreement between BC Rail, BC Rail Properties, and CN. These documents detail the requirements as they pertain to the purchase, maintenance, and operation of the corridor.

1.1.2 British Columbia Transportation Trade Network Analysis Study Summary (2019)

The Transportation Trade Network (TTN) Study was a province-wide study of the key road and rail trade corridors in the province. The goal of the study was to support efficient and effective transportation trade in the province, and the study supported this through the identification of issues and by providing a recommended set of improvements to address exiting road and rail conflicts through grade separation and other measures. The study also included detailed trade and rail forecasts.

1.1.3 Terrace Transloading Facility Feasibility Study (2019)

The City of Terrace commissioned a study to investigate the feasibility of a new transload facility in or near Terrace. The study found that current short-term traffic volumes could be accommodated by existing infrastructure in the area, and did not require a new facility. For the medium and long term, stakeholders noted that the limited availability of land in Prince Rupert could become a constraint on the Port's expansion and capacity, and that this could increase the potential need for a transload facility elsewhere, which could include Terrace. Terrace is located approximately 85 miles (1.5-2 hours) from the Port of Prince Rupert on the Skeena subdivision. The report stated that:

"It is plausible though not likely that a facility as shown would develop in Terrace in the next 10 years. On one hand, the relatively short distance between Prince Rupert and Terrace makes it difficult for intermodal rail to be cost competitive with trucking on this corridor. On the other, developments at the Skeena Industrial Development Park (SIDP), such as micro-LNG could provide stable traffic to anchor a facility, and there are concerns about future trucking capacity in the area, particularly as the Port of Prince Rupert and SIDP grows, which could lead to trucking rate increases."

The report recommended that the City of Terrace take steps to enable future development of a logistics yard. Through the stakeholder engagement portion of this project HDR learned that there is a proponent that is interested in developing a transload facility in Terrace, and it is our understanding that the proponent is advancing the concept through the permitting phase at this time.

1.1.4 Port of Prince Rupert Master Plan (2020)

The Land Use Plan for the Port of Prince Rupert lays out how the Port will grow over the next 20 years, including the primary goals of the port, challenges to meeting those goals, growth forecasts, and projects that have been identified and/or are currently being undertaken. Key improvements that are being made include the addition of a new double-track bridge adjacent to the existing single track Zanardi Bridge, and the creation of the Ridley Island Connector Corridor, which will remove port truck traffic from the public road system and greatly reduce mileage for drayage routes between port terminals and related facilities.

1.1.5 Northeast BC Exports and Provincial Revenue (2021)

This RMC study is an update of the 2014 Northeast and Peace Region Exports Analysis study. The study estimates the contributions that Northeast BC makes to the provincial economy within a number of accounts. It found that the Northeast produces $141,000 in regional exports for each resident, nearly six times the provincial average. Energy is the dominant export commodity, representing over 80% of total exports in value, with forestry, services and mining being the next highest three for a combined total of 16%. Similarly, Northeast BC contributes a higher amount of taxes per capita, contributing 2.7% of the provincial total, while its population accounts for only 1.5% of the total provincial population. The study also found that jobs in the Northeast spur more additional jobs than in other regions of the province, with the average job having a spinoff impact of 0.93 additional jobs, compared to the provincial average of 0.66 additional jobs. Ultimately the report demonstrates the contribution and value that Northeast BC provides to the province.

1.1.6 West Cost Supply Chain Visibility Program (On-going)

The program is a collaboration between the Vancouver Fraser Port Authority, Transport Canada, the Prince Rupert Port Authority, and other Pacific Gateway partners. The program is being supported by funding from Transport Canada's National Trade Corridors Fund (NTCF), and the goal of the program is to increase the visibility of the Pacific Gateway supply chain to *"provide insights to maximize the performance of existing infrastructure, as well as the extensive investments made, being made or planned by governments and industry".* The Pacific Gateway includes the Port of Vancouver, the Port of Prince Rupert, and the infrastructure leading to them in Canada. Together the two ports handle $290 billion in cargo annually, and trade with over 170 world economies. More information can be found at: portvancouver.com/port-dashboard/supply-chain-performance.

1.2 Importance of Freight Rail in Northern BC

1.2.1 Overview

The economic activity in Northern British Columbia is driven by the goods-production industry. This is reflective of the larger share of employment in the goods industry in Northern BC relative to the provincial split, based on 2020 labour market statistics from BC Stats. Some of the key goods-producing industries in Northern BC include:

- Forestry[2]
- Agriculture
- Mining, Oil and Gas Extraction

Not only are these industries key economic employment drivers within the region, but they also contribute to the Canadian export economy. Thus, these industries are reliant on transportation services, including rail, to transport raw, intermediary, or finished products to other operations or ports for export. This section reviews the economic impact of the rail served industries mentioned above, and the transportation services involved in the movement of the goods.

The section also includes quantitative economic modeling, which has been informed by the research and stakeholder engagement, and which identifies potential economic impacts on the communities.

1.2.1.1 FORESTRY

The forestry industry in BC is comprised of wood products (e.g., logs, lumbers, and structural panels), pulp and paper, and wood pellet sectors. According to the Government of BC, approximately 90 percent of the forest products produced in BC are exported.[3] Though a large proportion of the forest products are exported, there are some variations in how the commodities are transported. For instance, a large percentage of wood pellets are shipped by rail for export at the Port of Prince Rupert. Meanwhile, since 2016, over 50 percent of BC's lumber exports were transported by rail, with much of it going to the US, and an additional 30% – 35% was exported by water, with much of this likely being transported by rail to the port of entry. In Northern BC, the forestry sector is a significant economic and employment driver in the Cariboo region, as well as the North Coast & Nechako regions.[4,5]

1.2.1.2 AGRICULTURE

Based on the 2016 census of farms in Canada, just over 20 percent of BC farms are located in Northern BC. Additionally, while there are not a significant number of farms in BC producing oilseeds and grain products, almost 70% of these types of farms are located in Northern BC, with most of them located in the Peace River region.[6] Like the rest of BC, nearly half the farms

[2] Forestry industry not only reflects the raw harvested logs but it also the various wood products produced such as wood pellets, lumber, wood chips, as well as pulp and paper products.
[3] Government of BC. Forestry. https://www.britishcolumbia.ca/buy/goods-and-services/forestry/
[4] Work BC. Regional Profile: Cariboo. https://www.workbc.ca/Labour-Market-Information/Regional-Profiles/Cariboo#this-region-industries-sectors
[5] Work BC. Regional Profile: North Coast & Nechako. https://www.workbc.ca/Labour-Market-Information/Regional-Profiles/North-Coast-Nechako#this-region-industries-sectors
[6] Statistics Canada. Table 32-10-0403-01 Farms classified by farm type. Accessed July 29, 2021.

in Northern BC are animal farms, while the rest are a mainly crop farms. Grain shipments make up the bulk of agricultural products that are shipped by rail, as many of the other agricultural products are time and climate sensitive.

1.2.1.3 MINING, OIL AND GAS EXTRACTION

The mining, oil and gas extraction industry in BC has been very sensitive to commodity prices and the global economy as the products produced or extracted within the industry are mainly exported.[7]

In 2018, 3 of the 8 active coal mines in BC were located in Northern BC, and 7 of the 9 active metal mines in BC were located in Northern BC.[8] More recently, 1 metal mine has come online with production starting in 2021, while 1 coal mine project may look to add an additional 6 million tonnes of coal production capacity per year. Additionally, 2 metal mines ceased production from 2019 and 2020. Beyond the mines, other developments in the industry include the LNG Canada project, a large liquid natural gas (LNG) export facility in Northern BC, and 3 other proposed LNG projects.[9] However, LNG products, similar to most petrochemical products are transported to their various export facilities via pipeline, unlike exported mine products, which are generally transported by rail or trucks.

1.2.2 Economic Benefits

1.2.2.1 METHODOLOGY

The economic impacts were assessed using a traditional economic impact analysis methodology that identifies and quantifies the economic activity that is generated or can be linked to an industry and its socio-economic activity. The methodology uses information about industry activity (e.g., employment or output) to estimate how those activities affect the overall economic activity in the regional and national economy.

The economic impacts were based on the annual industry operations in 2019. These impacts were estimated at the provincial level for British Columbia, and at the national level for all of Canada using economic input-output multipliers derived from Statistics Canada's input-output Interprovincial Model.

The scope of the economic impact analysis captures what are called direct, indirect, and induced impacts of rail services in Northern BC.

- **Direct impacts** are simply the economic activity directly associated with the various rail served industries and operations in Northern British Columbia. For instance, an operation with 10 permanent employees and $2 million in annual revenues would be considered to create 10 direct jobs and enable $2 million in direct economic output.

[7] WorkBC. Mining and Oil and Gas Extraction. https://www.workbc.ca/Labour-Market-Information/Industry-Information/Industry-Profiles/Mining-and-Oil-and-Gas-Extraction
[8] BC Ministry of Energy, Mines and Low Carbon Innovation. Chief Inspector of Mines 2019 Annual Report. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/mineral-exploration-mining/documents/health-and-safety/ci-annual-reports/112869_2019_ci_annual_rpt.pdf
[9] Government of BC. Liquified Natural Gas Projects. https://www2.gov.bc.ca/gov/content/industry/natural-gas-oil/lng/lng-projects. Accessed July 29, 2021

- **Indirect impacts** capture the economic activity associated with suppliers of goods and services to the rail served industries and operations in Northern BC. For instance, purchasing goods from a supplier in Vancouver creates revenue for that supplier which enables them to pay employees, hire new staff, and purchase additional goods and services. As a result, industry and operational activities in Northern BC would impact other areas in BC as well as other parts of Canada.
- **Induced impacts** capture the economic activity associated with the spending of personal income by employees of all the rail served industries in Northern BC and their suppliers.

Each of these impacts is estimated in terms of several common measures of economic activity including economic output, gross domestic product (GDP), jobs, and employment income as described in Table 1.

Table 1: Measures of Economic Activity

Economic Output	Gross Domestic Product (GDP)	Jobs	Employment Income
Economic output is the total gross output value of all business activity. It represents the total sum of all economic activity that has taken place in connection with Northern BC industries that are serviced by rail and is the broadest measure of economic activity.	GDP is the net value added to the economy, or the value of output minus the value of purchased goods and services used in the production process. It represents the unduplicated measure of the total value of economic activity and is the standard metric for quantifying the size of the economy.	Jobs are employment created as a result of the activity of rail served industries in Northern BC. These jobs include seasonal, contract, and part time work.	Employment income is the sum of wages and salaries paid to employees as a result of business operations and capital expenditures.

1.2.2.2 ECONOMIC IMPACT RESULTS

The economic impact analysis results are shown in Table 2, and they illustrate the importance of rail service in Northern BC as a source of activity in British Columbia and across Canada. The analysis captures all economic activity associated with the various rail served industries and operations in BC including the purchases of goods and services from elsewhere in the province or Canada by organizations as well as their employees. As a result, activity from rail served industries in Northern BC impacts other industries and operations in other parts of Canada.[10]

Provincial Impacts

Rail served industries in Northern BC generated $15.8 billion worth of economic activity across British Columbia, which translates to a net value added of $8.3 billion in GDP to the provincial economy. These organizations supported a total 43,430 jobs and $3.5 billion in employee wages and benefits.

[10] Results by region are cumulative, as in the results for Canada incorporates results from British Columbia.

National Impacts

More broadly, the rail served industries in Northern BC generated $19.5 billion worth of economic activity across all of Canada, which translated to a net value added of $10.1 billion in GDP to the national economy. The rail served industries in Northern BC also supported a total of 56,531 jobs across Canada and $4.4 billion in employee wages and benefits.

Table 2: Economic Impacts from All Rail Served Industries in Northern BC

	Economic Output	GDP	Employment Income	Jobs
British Columbia				
Direct	$9,359 M	$4,578 M	$1,611 M	15,457
Indirect	$4,619 M	$2,341 M	$1,356 M	18,211
Induced	$1,878 M	$1,370 M	$490 M	9,762
Total	**$15,856 M**	**$8,288 M**	**$3,457 M**	**43,430**
All of Canada				
Direct	$9,359 M	$4,578 M	$1,611 M	15,457
Indirect	$7,188 M	$3,558 M	$1,977 M	26,443
Induced	$2,947 M	$1,986 M	$769 M	14,630
Total	**$19,494 M**	**$10,123 M**	**$4,358 M**	**56,531**

Table 3 breaks down the direct impact by the various sectors in Northern BC that are rail dependent and the employment levels of these industries relative to employment in the corresponding sectors. It shows how many jobs in Northern BC are dependent on rail service out of the total jobs in each industry.

Table 3: Direct Impact of Rail Served Industries in Northern BC by Sector

Sector	GDP ($ Million)	Employment Income ($ Million)	Rail Dependent Employment	% of Northern BC Employment	% of BC Employment
Forestry	$1,198 M	$744 M	8,108	49.7%	45.3%
Agriculture	$7 M	$3 M	109	5.8%	0.2%
Mining and Oil and Gas Extraction	$2,173 M	$449 M	3,148	67.0%	11.0%
Transportation	$1,201 M	$415 M	4,093	38.3%	3.0%
Total	**$4,578 M**	**$1,611 M**	**15,457**	**-**	**-**

2 Existing Network

2.1 Introduction

The rail network in the study area is again shown in Figure 3. It consists of two primary corridors, CN's east-west mainline and a north-south secondary corridor with several branch lines. These lines represent a total of 2,113 track miles, and include a number of prominent terminals, yards and connections, including the Port of Prince Rupert and the Prince George Intermodal Terminal.

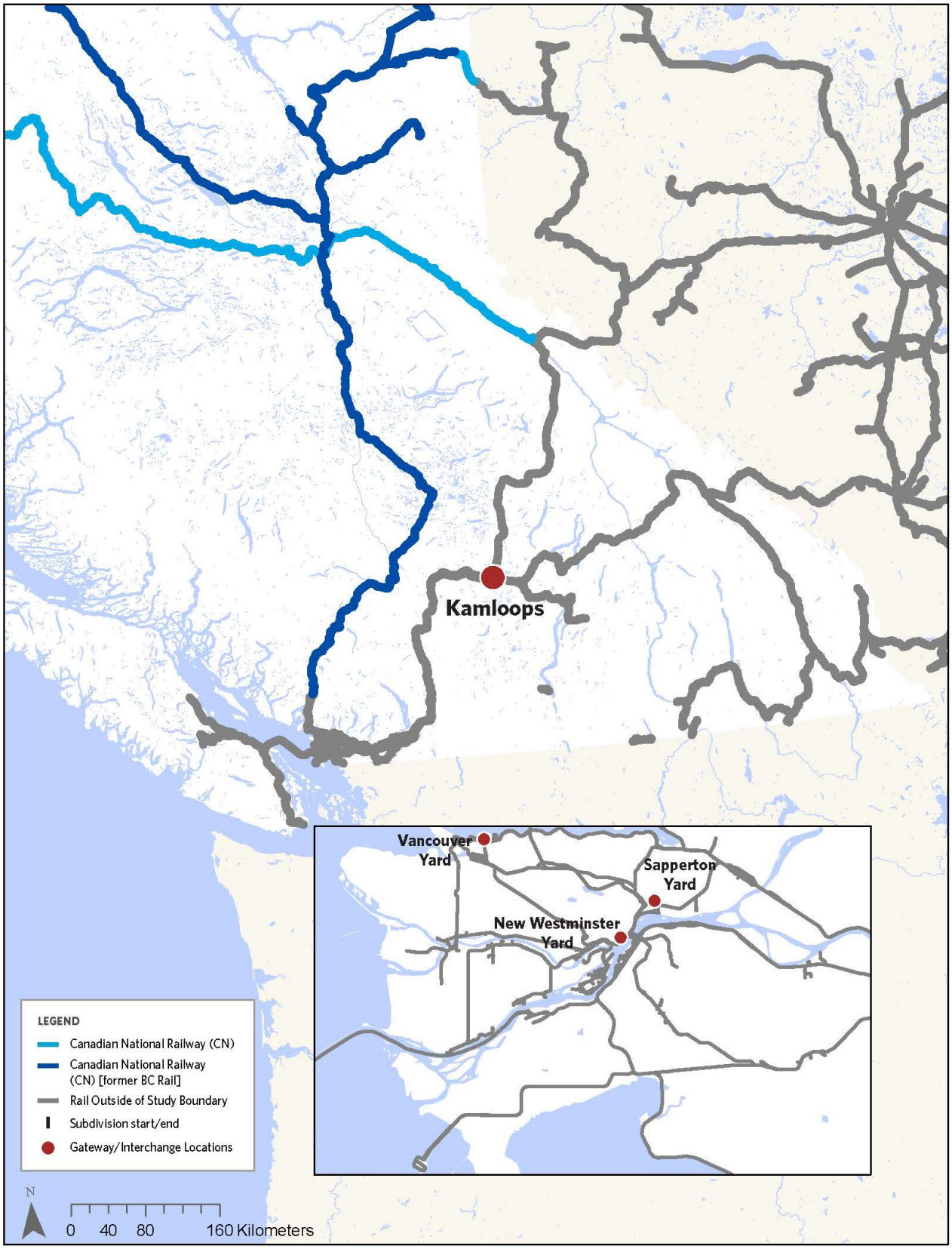
Figure 3: Network

All rail lines in the study area are now owned and operated by CN. Historically, CN has operated their mainline east-west across the province, stretching from the connection with their primary CN Edmonton to Vancouver mainline at Tête Jaune Cache, westward through Prince George and terminating at the Port of Prince Rupert on the pacific coast. The provincially owned British Columbia Railway (BC Rail or BCOL) operated the north-south rail corridor in the province, stretching from Fort Nelson in the far north to the Port of Vancouver and Squamish in the south. In addition, BC Rail operated several key branch lines north of Prince George including feeder lines serving Tumbler Ridge, Dawson Creek, Mackenzie, and Fort St. James.

In 2004, the Province sold the operations and infrastructure of BC Rail to CN for $1 billion, although the Province retained ownership of the rail right-of-way and leased it to CN as part of a long-term deal. As such, the entire northern region of British Columbia is now served by CN, although provisions have been made to interchange former BCOL traffic to other Class I rail carriers in the province including Canadian Pacific Railway (CP), BNSF Railway (BNSF), and the Union Pacific Railroad (UP) through a haulage agreement where CN acts as the local service provider on the former BC Rail network and traffic is handed off to CP, BNSF, and UP at interchange gateways such as Vancouver and Kamloops. CN is required to facilitate these transfers, and to adhere to other service level requirements, as outlined in the BC Railway Act and the BC Railway Revitalization Agreement[11]. Primary interchange locations for rail traffic moving to/from Northern BC to other railways in BC are shown in Figure 4, with most of these being Canadian Transportation Agency (CTA) interchanges open to interswitching[12] of local rail traffic within the Lower Mainland and Port of Vancouver.

[11] British Columbia Railway Company, www2.gov.bc.ca/gov/content/transportation/transportation-reports-and-reference/ministry-reporting/bctfa/british-columbia-railway-company
[12] Canadian Transportation Agency, https://otc-cta.gc.ca/eng/interswitching

Figure 4: Primary Interchange Locations



2.2 Rail Network

The rail network in the study area is made up of 18 separate subdivisions, and two primary corridors, including the CN northern mainline corridor travelling east-west through Prince George and Prince Rupert, and their secondary former BC Rail corridor that travels southwest to northeast from the Squamish to Fort Nelson. The secondary corridor is not currently operated as a through route between Prince George and Vancouver, with local rail service provided to shippers from either end of the CN network. Limited rail service is currently provided between Squamish and Williams Lake (as required). Any rail traffic travelling between Northern BC and the Lower Mainland is handled via Tête Jaune Cache where the CN northern mainline corridor connects to CN's mainline between Alberta and Vancouver.

The CN northern mainline from Tête Jaune Cache to Prince Rupert is a key transportation corridor in Western Canada, acting as one of the primary gateways for Asia-Pacific trade along with the CP and CN mainlines that extend into the Lower Mainland and Port of Vancouver (both of which are outside the limits of this study). Combined, these rail networks support all types of businesses and producers in BC, including key industries such as forestry, mining, construction, agriculture and energy.

Passenger rail service is provided over a few routes in the study area. Via Rail Canada provides inter-city passenger rail service from Jasper Alberta through Prince George to Prince Rupert, and from Edmonton to Vancouver. Pre pandemic Via Rail operated three days a week (each direction) over both routes, but now are only providing one service per week in each direction. It is expected to resume more frequent service as pandemic restrictions are eased. Rocky Mountaineer provides a tourist train service from North Vancouver to Jasper via Prince George, and it operates on a seasonal basis. The Kaoham shuttle is another community passenger rail service that is operated via a partnership between CN and the Seton Lake Indian Band, and it operates daily between Lillooet and Seton Portage[13].

Figure 5: Kaoham Shuttle - Source: lillooet.ca

[13] http://lillooet.ca/PDF/Kaoham-Shuttle-Schedule.aspx

Figure 6 shows the subdivisions in the study area. There are six subdivisions on CN's east-west mainline, and one branch line to Kitimat. There are also six subdivisions on CN's north-south secondary line, and five branch lines that break off and serve other municipalities and industries in Northeastern BC.

Figure 6: Study Area Subdivisions

Figure 7 shows the gross weight capacity on all subdivision segments. Many sections in the study area network do not meet the railcar weight industry standard of 286,000 pounds (286k). As such, some shippers have to “light load” railcars (for others volume capacity is reached before weight capacity), and this can cause inefficiencies and increased costs for both shippers and CN alike.

Figure 7: Weight Limit by Subdivision Segment

Figure 8 shows the typical track speeds for each subdivision segment. Many of the subdivision segments on the secondary network have track speeds that are significantly less than those found on mainline corridors. This may be acceptable for lower volume routes, where constraints including track curvature, mountain grades, and capital improvement costs to improve speeds are not justifiable based on the benefits. Slower track speeds result in longer transit times for rail shipments, increased operating costs, and can also impact the overall corridor capacity due to longer travel times between sidings and yards where trains can meet and pass.

Table 4 on the following page summarizes the subdivisions in more detail, and includes gross weight capacity, average track speeds, and other details, such as major centres and yards along each subdivision.

Figure 8: Typical Network Track Speeds

Table 4: Rail Network Inventory by Subdivision

Corridor	Subdivision	Trackage Properties	Mileage Range		Subdivision Length (miles)	Class-ification	Gross Weight Capacity (000 lbs)	Average Track Speed (mph)[1]	Major Centres	Major Yards	Notes
East-West Mainline	Tete Jaune	Signaled Single Track, 12500' Max Siding	0	43	43	Main Corridor	286	41	-	McBride	Taverna to McBride,
	Fraser	Signaled Single Track, 13205' Max Siding	0	146	146	Main Corridor	286	43	Prince George	Prince George	Connects to Tete Jaune Sub
	Nechako	Signaled, Mostly Single Track, 16573' Max Siding	0	112	112	Main Corridor	286	44	Prince George	Prince George Endako	Connecting to Telkwa Sub and access west to Prince Rupert
	Telkwa	Signaled Single Track, 13610' Max Siding,	0	125	125	Main Corridor	286	49	-	Endako	Telkwa
	Bulkley	Signaled Single Track, 12449' Max Siding	0	132	132	Main Corridor	286	43	-	Smithers Terrace	Smithers to Terrace, Connects with Skeena, Telkwa and Kitimat Subs
	Skeena	Signaled Single Track, 12449' Max Siding	0	94	94	Main Corridor	286	49	Prince Rupert	Terrace Prince Rupert	Access to the port of Prince Rupert
North-South Secondary Corridor	Squamish	Single Track, 7400' Max Siding Some Mountain Grade	2	157	155	Secondary Corridor	286	22	North Van., Squamish, Whistler	North Vancouver Squamish, Lillooet	Access to the port of Squamish and connections to Vancouver north shore
	Lillooet	Single Track, 8900' Max Siding, Mountain Grade	157	312	155	Secondary Corridor	286	29	-	Williams Lake Lillooet	Connects to Squamish Sub and access west to Squamish and North Vancouver
	Prince George	Single Track, 11365' Max Siding, Some Mountain Grade	313	462	149	Secondary Corridor	286	30	Prince George, Quesnel	Williams Lake Prince George	Connects south to Lillooet Sub and access to Squamish and North Vancouver
	Chetwynd	Single Track,11287' Max Siding, Some Mountain Grade	463	658	195	Secondary Corridor	272	32	Prince George	Prince George Chetwynd	Prince George to Chetwynd, Connects with Fort St John, Dawson Creek, Tumbler, Stuart, Mackenzie, Fraser, and Prince George Subs
	Fort St John	Single Track, 6000' Max Siding, Mountain Grade	662	728	66	Secondary Corridor	268	23	Fort St John	Chetwynd Fort St John	Fort St John to Chetwynd, Connects with Fort Nelson, Chetwynd and Dawson Creek Subs
	Fort Nelson	Single Track, Few Sidings, 6100' Max Siding, Mountain Grade	730	978	248	Secondary Corridor	268	24	Fort Nelson	Fort St John Fort Nelson	Fort St John to Fort Nelson
East-West Branch Line	Kitimat	Single Track, 1260' siding, Mountain Grade	0	40	40	Branch Line	286	21	Kitimat	Kitimat Terrace	Access to the port of Kitimat
North-South Branch Lines	Dawson Creek	Single Track, No Sidings, Mountain Grade (2% or greater)	0	62	62	Branch Line	263	41	Dawson Creek	Chetwynd Dawson Creek	Chetwynd to Dawson Creek, Connects with Fort St John and Chetwynd Subs. Most 6-axle locomotives prohibited, Short cars (<41.5') prohibited on bridge MP45.99, Winter (below -20C) operations restricted
	Mackenzie	Single Track	0	24	24	Branch Line	268	32	Mackenzie	Mackenzie	Branch line to the town of Mackenzie
	Stuart	Single Track, 4600' Max Siding, Mountain Grade	0	73	73	Branch Line	263	34	-	Fort St James	Branch line connecting to the out-of-service Takla Sub
	Takla[2]	Single Track, 5400' Max Siding, Some Mountain Grade	73	274	201	Branch Line	230	21	-	Fort St James Lovell	Presently not in service
	Tumbler	Single Track, 10348' Max Siding, Some Mountain Grade	0	80	80	Branch Line	286	30	Tumbler Ridge	Wolverine	Branch line to Tumbler Ridge

1- Calculation based on maximum CN timetable track speed.

2- Out of Service

2.3 Rail Network Connections and Potential Additions

There have been many proposed additions and new connections to the Northern BC rail network, and several deserve particular attention. This sub-section provides a summary of those specific connections and an overview of the major proposals for additions to the Northern BC rail network. These lines includes both existing lines that are out of service or underutilized, as well as proposed lines in various states of speculation, planning and completion. The high-level location of each line is shown in Figure 9 for context.

If and when each line is built and/or brought back into service, they could potentially facilitate new economic opportunities for Northern BC. Specific corridors could help better connect the region and the business and communities within it. We will explore the need and feasibility of these connections and others during the next phase of the project.

2.3.1 Dease Lake Extension

The Dease Lake Extension was a planned 663-kilometer railway extension northwest of BC Rail's Chetwynd subdivision. It was initiated by the BC government in the late 1960's and was only partially completed. The rail network and service in the area is now only provided between the Chetwynd subdivision and Fort St. James on the Stuart Subdivision. The Takla Subdivision, extending west from Fort St. James to Minaret is currently out of service. The majority of the Takla Subdivision is advertised for discontinuance in CN's Three Year Plan[14].

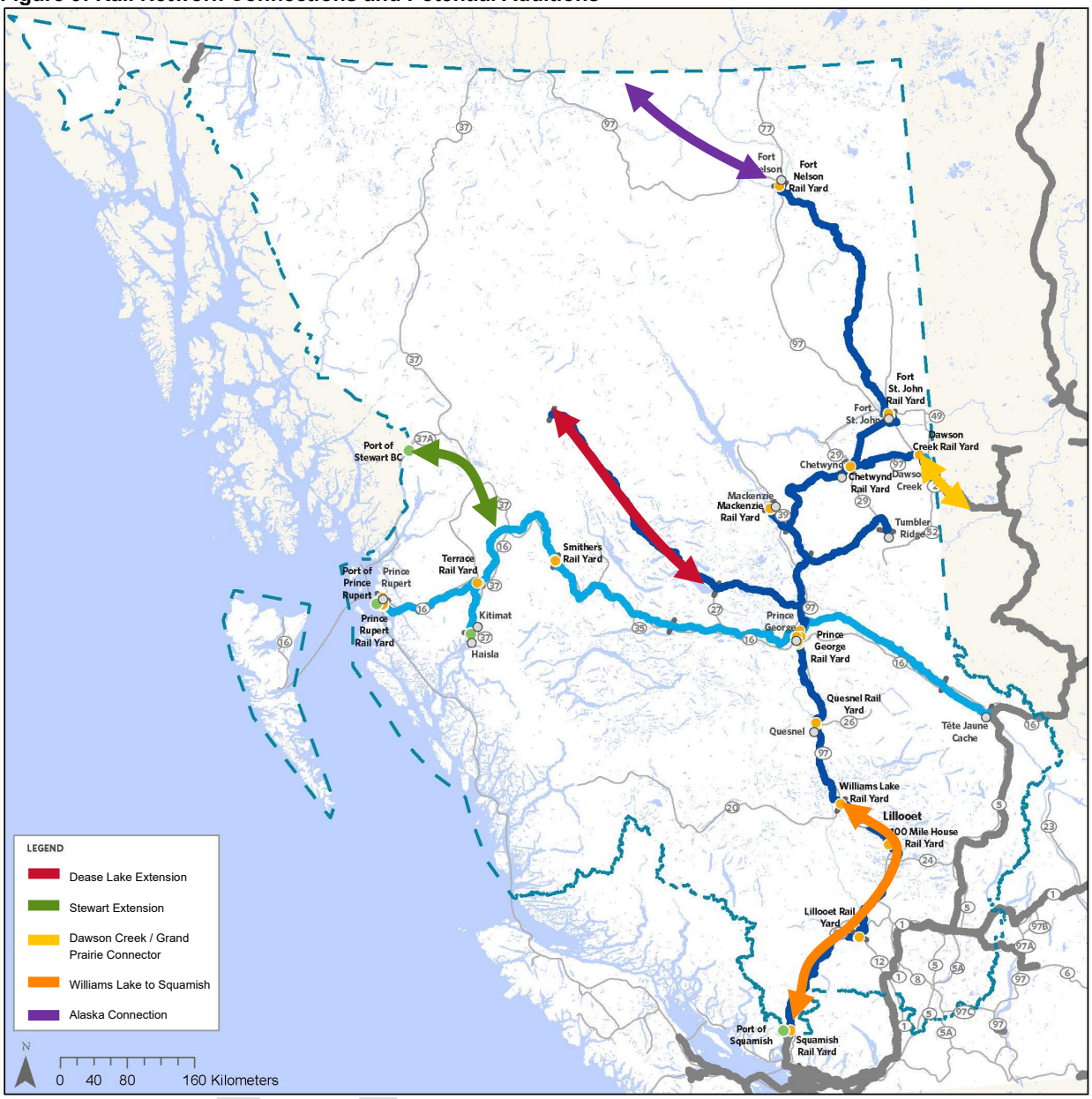
The Dease Lake Extension was intended to open up resource development in the area but was ultimately cancelled due to cost overruns and concerns about the environmental impact of the project[15]. Portions of the rail corridor were never completed and are in various states of completion (including right of way grading and partial track construction).

2.3.2 Stewart Extension

Stewart World Port is located near the community of Stewart in Northwestern BC. The Port has expressed interest in a rail connection between CN's mainline and the port, and is currently studying the feasibility of an extension with Canada Potash. The line would be approximately 220 kilometers long, and could be constructed at 2% grades or less according to the initial mapping and analysis that has been completed[16].

[14] https://www.cn.ca/en/about-cn/network-efficiencies/
[15] That Other Time the NDP Failed to Stop and Over-Budget Megaproejct, The Tyee, https://thetyee.ca/News/2021/03/03/Other-Time-NDP-Failed-To-Stop-Over-Budget-Megaproject/
[16] Canada Stewart Port Railway, https://stewartworldport.com/?page_id=474

Figure 9: Rail Network Connections and Potential Additions



2.3.3 Dawson Creek / Grande Prairie Connector

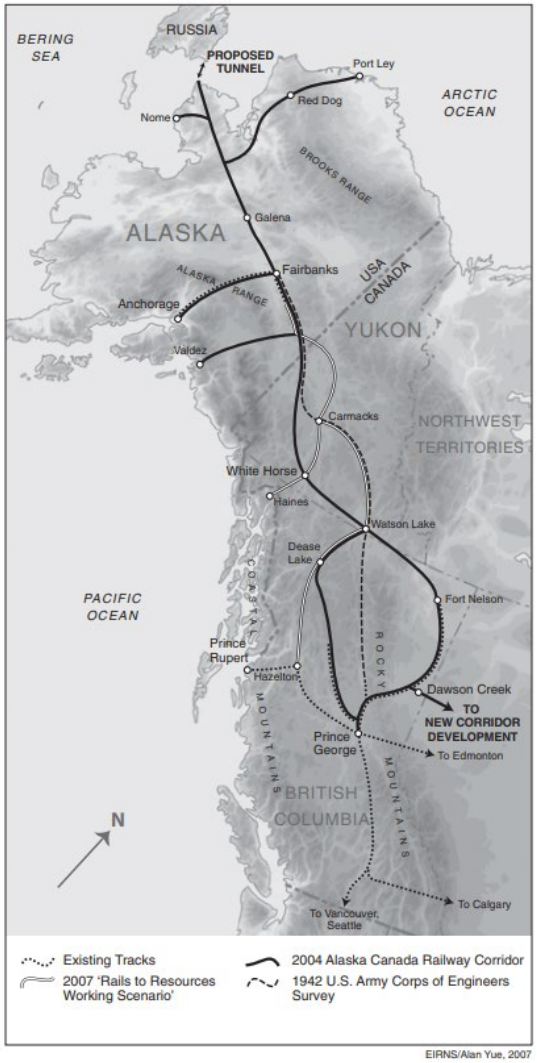
CN's active rail network currently extends to Dawson Creek BC from the west, and from Grande Prairie to Beaverlodge AB in the east. The CN Grande Prairie Subdivision is currently out of service between Beaverlodge and Dawson Creek and has been advertised for discontinuance under CN's Three Year Plan. As part of the CN acquisition of BC Rail in 2004, CN committed to reinstating this segment of the rail network. However, they were under no obligation to upgrade the infrastructure until such time that rail traffic levels supported the investment of the infrastructure and connection. HDR's understanding is that the former line is in disrepair and currently out of service. Many at-grade road/rail crossings on this segment have been closed and/or paved over to enable un-interrupted vehicle travel. Several major rail bridges on this

segment will make it costly to re-open as an active rail route between Alberta and British Columbia.

2.3.4 Williams Lake to Squamish

In April 2020, CN suspended through freight service on the former BC Rail mainline between Williams Lake and Squamish, requiring traffic in the central part of the province to detour via Prince George, Tête Jaune Cache, and Kamloops while travelling to/from the Port of Vancouver and key Class I rail connections with CP, BNSF, and UP at the Lower Mainland gateway. Although not advertised as permanent in nature by CN, this strategic north-south corridor is a key area of interest to shippers in Northern BC, serving as the shortest rail route between Prince George and the major port facilities and rail connections in Vancouver. In order to accommodate the longer route miles and minimize potential impacts to shipment transit times, CN has established consistent daily freight service between Prince George and Vancouver via Tête Jaune Cache over their higher density mainline corridors. Local rail service between Squamish and Williams Lake is provided to customers on an "as required" basis (when needed) as there are very few active customers left on this segment.

Figure 10: Alaska Railway Route Options from the Alaska-Canada Railway Corridor Project | EIR Economics 2007



2.3.5 Alaska Connection

A railway connecting North America's rail network with the state-owned Alaska Railroad was conceived decades ago and the concept has underwent numerous iterations. The Alaska-Canada Railway Corridor Project[17] proposed a connection between Prince George (via the Dease Lake

[17] Building the Missing Link: Alaska-North America Rail, EIR Economics, https://larouchepub.com/eiw/public/2007/eirv34n29-20070727/26-33_729.pdf

Extension and/or Fort Nelson) and Alaska in the 2000's, and more recently the Alaska to Alberta Railway (A2A), proposed a similar connection to Alaska from Alberta. The proposed A2A route would extend from a location north of Fort McMurray in Northeastern Alberta, through the Northwest Territories and onto the Yukon and Alaska[18].

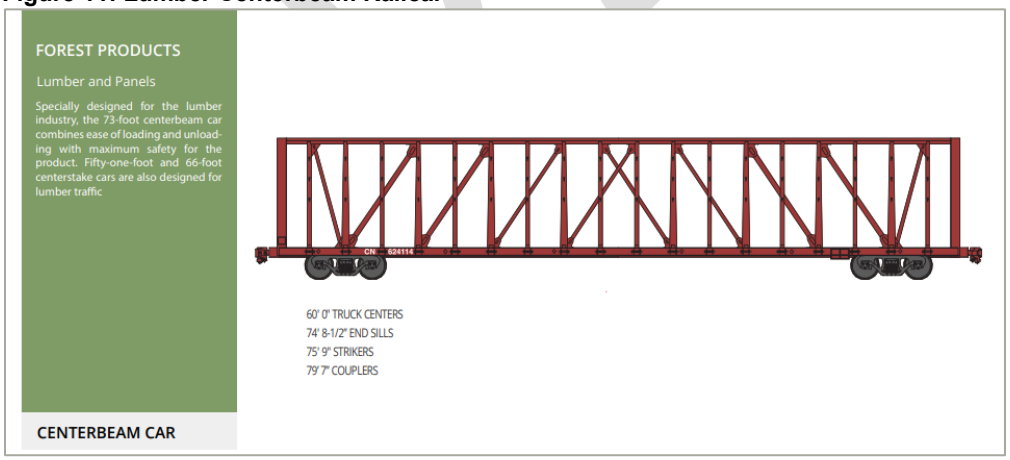
The current A2A proposal is still in the planning stages, and there has yet to be a confirmation on if / when the project would be completed.

2.4 Rail Equipment Inventory

In addition to the rail lines that make up the rail transportation network, another crucial component of rail transportation is the railcar and engine fleet (rolling stock). This section provides a general overview of CN's equipment that is available for use in Northern BC.

CN typically provides shippers with the engines, cars and crew required to transport their products, although shippers may provide their own private railcars as well. CN has the largest inventory of rail equipment in Canada, however this equipment is dispersed and continually moves through the study area, province and continent as it transports products across the rail network. Information on the exact quantity, specification and condition of equipment is not publicly available. However, CN does provide a list of all available railcars for use by shippers in their Equipment Specifications guide[19]. Figure 11 shows an example of a Centerbeam railcar that is used to transport lumber. The guide contains specifications, including the lengths and weight capacities for cars by commodity.

Figure 11: Lumber Centerbeam Railcar



The availability of train crews, railcars, and power (locomotives) were some of the most common responses from stakeholders when explaining potential reasons for missed freight rail shipments or lower than anticipated rail volumes. In many cases, fewer rail cars were delivered to site for loading than desired by shippers, sometimes resulting in product being diverted to truck or production volumes being curtailed.

[18] Alaska to Alberta Railway, https://a2arail.com/about-a2a/
[19] CN Equipment Specifications, https://www.cn.ca/en/customer-centre/safety-guidelines-and-regulations/equipment-specifications/

2.5 Rail Volumes

Train volumes (in trains per day) on the study area network were compiled from a variety of sources, including the BC Transportation Trade Network Study (2017) and Transport Canada's (TC) Grade Crossing Inventory (accessed 2021). Current (2021) volumes were estimated by using either the higher of either the TTN volumes (grown at 2.4%[20] from 2015 to 2021), or TC's volumes, which were not grown. Some adjustments were made to average train volumes on the feeder network based on our understanding of current rail service in the region.

Estimated 2021 volumes are shown in Figure 12. It is noted that these volumes are a business-as-usual estimate, meaning that they are intended to represent the typical normal average volumes (loaded and empty) on the network, and do not incorporate changes due to recent disruptions such as the COVID-19 pandemic and the Lytton fire, which have shifted freight patterns on the rail network.

Commodities that are transported include mining products (ore, metallurgical and thermal coal), forestry products including fibre, lumber and pellets, agricultural products including grains and pulses, oil and gas products including petroleum coke and propane, and consumer and industrial goods coming from Asia and other overseas origins.

[20] BC Export Growth Rate from 2015 to 2020, from the Canadian International Merchandise Trade Database, StatsCan.

Figure 12: Existing Train Volumes (2021 Business as Usual HDR Estimate)

2.6 Rail Operations

As CN owns and operates all rail lines and trains within the study area, only some data regarding operations is publicly accessible. This section presents HDR's understanding of rail operations in the study area based on available data.

2.6.1 Operation Summary

Railway operations in the study area consist of several different train types. Intermodal container trains between the Port of Prince Rupert and points inland generally have the highest time sensitivity from a schedule perspective (similar to passenger trains), with most of these travelling along CN's east/west mainline from Prince Rupert to the AB / BC border and beyond. Mixed manifest trains (trains that can contain multiple different types of commodities and cars) generally have lower time sensitivity, but must still adhere to a schedule to meet customer commitments and trip plans. Finally, trains handling bulk traffic, which is usually hauled as a single commodity (unit train) and includes coal, grain, potash, sulphur and oil and gas products may have the most flexibility from a schedule perspective, but also need to be coordinated as part of the overall supply chain from origin to port.

Other types of trains include "local jobs" or "wayfreights", which originate and terminate at specific locations within the network. These trips service local industries by distributing empty railcars and collecting rail traffic before returning to their origin yard where cars are blocked and/or built into mixed manifest trains to travel to a different destination.

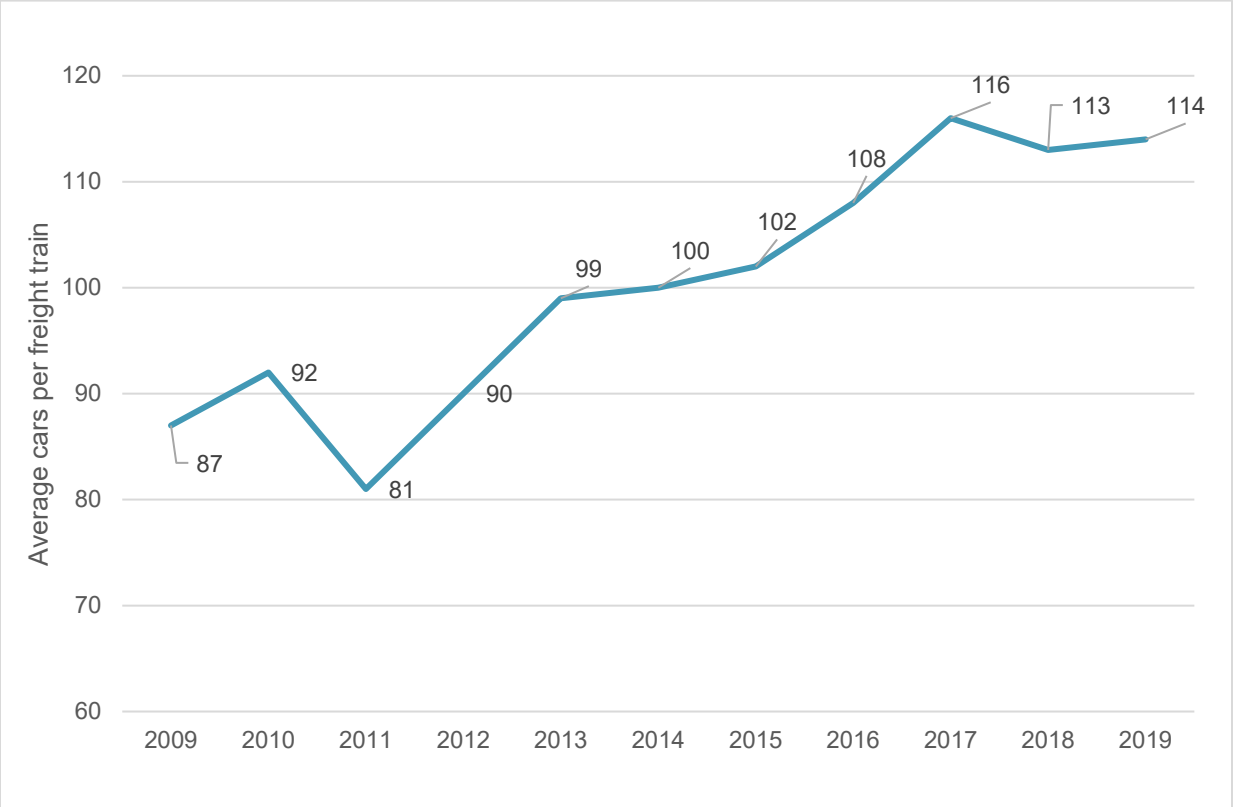
The primary flow of commodities on the rail network in Northern BC is east-west, with commodities sourced from east of the study area and throughout the study area, and then typically shipped westward to either the Port of Prince Rupert, or southward to the Lower Mainland and/or the US. The returning trains (except primarily container trains) and cars are then often hauled back eastward empty, or are loaded with intermodal and container traffic to ship inbound goods from the major ports to the commercial markets in Northern BC and beyond in Canada and the US.

There are other opposing rail shipments along all of the routes that carry different types of commodities and deliver different products to urban centres and businesses, but these make up a smaller portion of the overall freight traffic compared to the bulk exports and container imports.

2.6.2 Train Lengths & Siding Inventory

The length of freight trains in Canada has continued to grow over the past decade, with the average number of cars per freight train increasing 30% between 2009 and 2018, as shown in Figure 13.

Figure 13: Average Cars per Freight Train



Source: Rail Trends 2020, RAC

All subdivisions in the study area are typically single track mainline, expect for select sections in and near rail yards (such as in Prince George) where multiple mainline tracks are present. Sidings, which are essentially sections of double tracked rail line, provide spaces for opposing trains to meet and pass one another, and the length of sidings and space between them are important because they effectively define the capacity of a single-track corridor. The increasing lengths of trains can complicate corridor operations, as many shorter sidings are no long enough to accommodate meets between bi-directional long trains. This can limit the locations where opposing trains can meet and pass one another, and can lead to increased network delays, as larger opposing trains have to stop sooner and wait longer to let on-coming long trains pass. It also reduces the total amount of trains that can operate on the network in a fluid and sustainable manner. CN continuously reviews its operating plan to find the right mix of train lengths and train counts for each corridor based on the available corridor capacity and siding lengths available. Where volumes warrant, CN has made targeted investments in new or extended sidings, especially along the east west corridor from Tête Jaune Cache to Prince Rupert through Prince George.

Despite the increase in freight train lengths, siding lengths on the network are quite variable. Table 5 shows the number of sidings on the East-West mainline by subdivision, and groups them into two categories, longer or shorter than 12,000 feet in length. All subdivisions except for Tete Jaune have sidings that are less than 12,000 feet. It is noted that there are often yards

between subdivisions where trains can pass each other, and these are not captured in the sidings inventory.

Table 5: Sidings per Subdivision: East-West Mainline

Subdivision	Length (miles)	<12,000 ft Sidings	>= 12,000 ft Sidings
Skeena	94	2	3
Bulkley	132	1	4
Telkwa	125	5	5
Nechako	112	2	4
Fraser	146	4	9
Tete Jaune	43	0	3
Total	**652**	**14**	**28**

Table 6 shows the number of sidings on the North-South secondary corridor by subdivision. No sidings longer than 12,000 feet are provided on the route, with most sidings being around 6,000 – 8,000 feet. This limits the length of trains that are feasible on this route (although train volumes are considerably lower on this route and the requirement for longer sidings is not required with the current operating plan). It is also noted that trains can be split up to make meets when the available siding is less than the length of the train, but this is an inefficient, time-consuming process, and is not preferable for regular operations.

Table 6: Sidings per Subdivision: North-South Secondary Corridor

Subdivision	Length (miles)	<12,000 ft Sidings	>= 12,000 ft Sidings
Squamish	155	12	0
Lillooet	155	8	0
Prince George	149	7	0
Chetwynd	195	11	0
Fort St John	66	2	0
Fort Nelson	248	2	0
Total	**968**	**42**	**0**

CN is responsible for and continually improves their network as needed, and this includes the addition and extension of sidings. CN recently constructed three new 12,000-foot sidings between Prince George and Prince Rupert to improve the capacity of the route.[21] The single track Zanardi bridge is located on the only rail route to Prince Rupert. A new double track bridge will be built immediately adjacent to the existing bridge, and the existing bridge and approaches will also be upgraded, creating three tracks of capacity over the connection. These upgrades will improve the capacity and fluidity of the rail connection between the Port of Prince Rupert an CN's network.[22]

[21] 2020-2021 CN Grain Plan, https://www.railwayage.com/wp-content/uploads/2020/07/2020-21-Grain-Plan-EN-1.pdf
[22] Federal Government to Invest $150 Million in Infrastructure, https://www.rupertport.com/federal-government-to-invest-150-million-in-infrastructure/

2.6.3 Travel Speeds and Transit Times

Transit times within the study area and across CN's primary east-west corridor can vary depending upon several factors, including siding availability. Intermodal trains typically maintain a higher average speed than manifest or bulk trains because they typically have a higher horsepower to ton ratio, are prioritized on meets/passes due to tighter schedule requirements, and travel closer to posted track speed limits. Similarly, empty bulk commodity trains can also maintain a higher average speed that loaded bulk trains due to their higher horsepower to ton ratio. In single-track sections, which is the bulk of the study area, dispatch priority is generally given to traffic that the railway deems more important, requiring lower-priority trains to occasionally wait in sidings, increasing their overall transit time. High grades, especially those at or exceeding 2% are considered "mountain grades" and result in significantly lower travel speeds due to the special handling requirements both ascending and descending the steeper gradients.

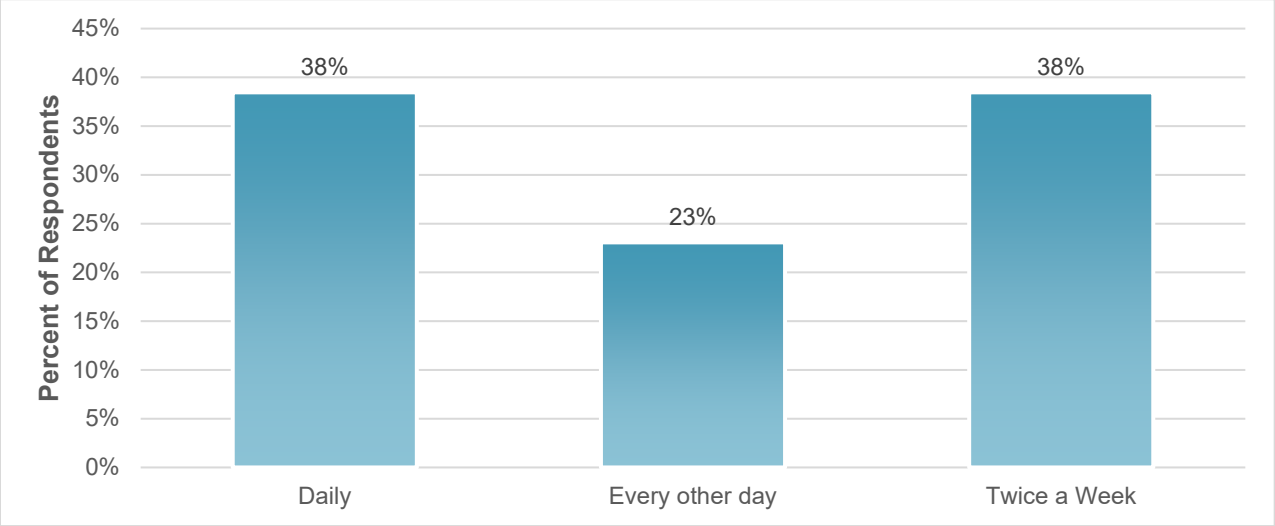
In the study area, it likely takes a typical manifest train approximately 30 hours to travel CN's east-west corridor from the Alberta border to the Port of Prince Rupert, and vice versa. The trip would take longer if the train was required to stop and add or remove railcars along the way, such as at Prince George. Similarly, the Prince George to Squamish route via the Quesnel and Lillooet subdivisions would typically take approximately 20 hours. These times only represent travelling transit times, and similar magnitudes of times are need at yards to switch and block railcars into groups by destination / commodity, and at origin and destination locations, where it can take multiple hours and up to a day to load and unload a train.

2.6.4 Shipper Service Frequency

In addition to capacity and physical constraints on the primary study area corridors, service availability and frequency is an equally important constraint for shippers and rail customers. Service availability on these lines directly impacts the time it takes to ship products to market, and extended shipping times, or irregular service can hamper a businesses' prospect or discourage new businesses from starting.

Service frequency to rail served industries is generally confidential, and not publicly available. However, service frequencies were voluntarily provided by some of the shippers who responded to the customer survey, and these are shown in Figure 14 below. 38% of respondents said that they receive service either daily or twice a week, and 23% of respondents said that they receive service approximately every other day.

Figure 14: Rail Service Frequency



During the interviews, many respondents noted that it was a common occurrence for a delivery or pick up of railcars to be missed once a week (if the schedule service was three times a week). Respondents also noted that it was common for a shortage of cars to be delivered on a regular basis (such as 10 cars being delivered when 15 were ordered). Both of these events impact the ability for customers to ship their products, and can in turn impact the production of the business if there is not sufficient on-site storage for the product. The results from the online survey and interviews are fully discussed in Section 4.

2.7 Terminals and Ports

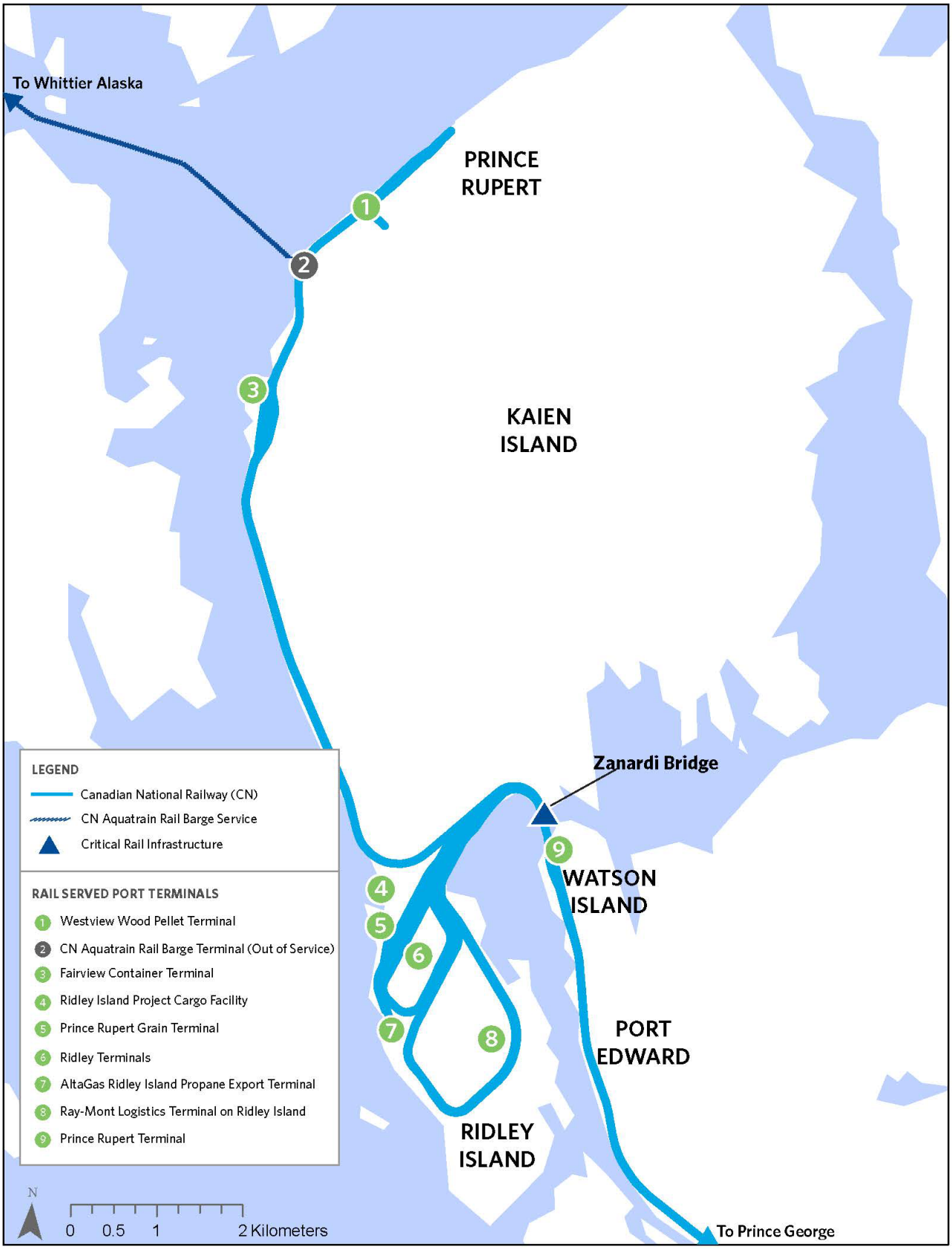
Ports are the primary goods terminals in Northern BC, and many are located within the study area. Beyond the study area, other gateways, including the Port of Vancouver and land border crossing between Canada and the US are also important trade routes. This section provides a summary of the primary ports and terminals in the study area.

2.7.1 Port of Prince Rupert

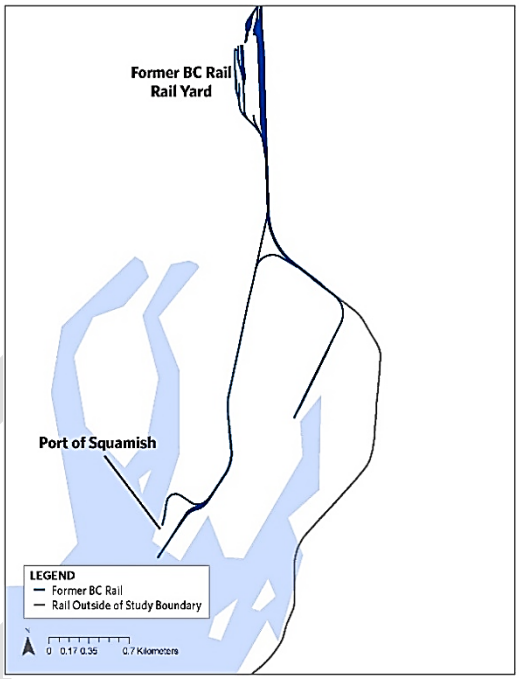
The Port of Prince Rupert is the third busiest port in Canada by cargo and container volumes and is one of the fastest growing ports in North America. It is the closest major deep-water port in North America to Asia, and major commodities shipped through the port include grain, coal, wood pellets, LPG, and containers. CN's continental railway terminates at the Port of Prince Rupert, and CN's mainline travels adjacent to the Port. Figure 15 shows the majors terminals at the Port. The Fairview Terminal is one of the major terminals at the port, and is a dedicated intermodal container terminal, with direct ship to rail transloading.

It is noted that CN recently discontinued their Aquatrain service to Whittier Alaska, which used to provide a connection from CN's network to the Alaska Railroad via a rail barge.

Figure 15: Port of Prince Rupert



2.7.2 Port of Squamish

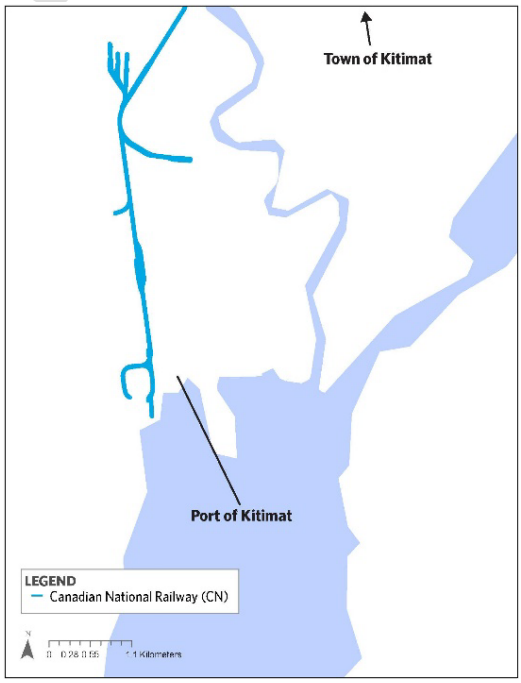


The Port of Squamish is located in Squamish BC, at the southwestern extent of the study area, approximately 30 miles north of the Lower Mainland. It is a private port, and is owned by Western Stevedoring[23]. It is primarily a break bulk port that handles forest products such as wood pulp, lumber, steel and other project cargo. The Port receives daily service from CN and the Lower Mainland via the Squamish subdivision. The Port is on the former BC Rail corridor that connects Vancouver with Prince George via the Squamish, Lillooet and Prince George subdivisions. Although this route is not typically in regular service, service on the route was recently re-instated due to the Lytton fires and associated disruption to CN's mainline near Ashcroft / Lytton.

2.7.3 Stewart World Port

Stewart World Port recently opened in 2015 and is privately owned by the Stewart World Port company. The Port serves the mining, forestry, and agricultural industries, and is Canada's most northern ice-free port. It recently received $13 million in NTCF funding to increase capacity and improve the fluidity of export commodities through the port. The port is not currently connected to the rail network, although concepts, such as the Canada Stewart Port Railway, have been proposed.

2.7.4 Port of Kitimat



The Port of Kitimat is located in the Kitimat Valley, and is a private port owned by Royal Dutch Shell[24]. The Port caters to energy exports and projects. Rio Tinto operates an aluminum smelter in the area, and LNG Canada is building an LNG export terminal and the Costal GasLink pipeline. These facilities are under construction, and when complete, they will transport LNG from the Montney Shale Formation near Dawson Creek to the Port of Kitimat for export to Asian markets.

2.7.5 Other Significant Gateways

Other important trade gateways for the study area including the Port of Vancouver, CN and CP's rail networks to the east through Canada and US, UP's Eastport/Kingsgate connection via CP, BNSF through New Westminster and Sumas (and UP through a line

[23] https://www.westeve.com/services/terminal-operations/squamish-terminal
[24] https://www.shell.com/about-us/major-projects/lng-canada.html

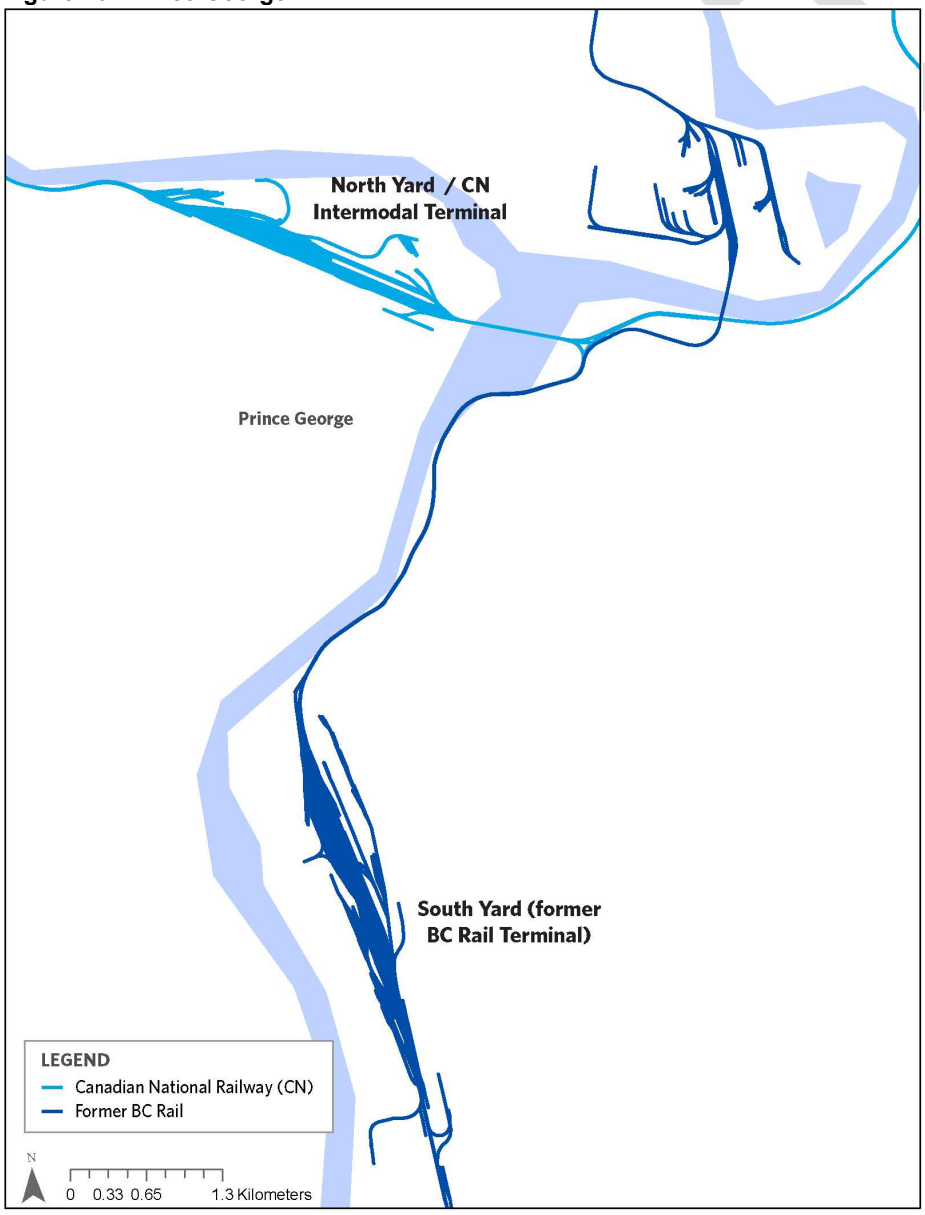
haul agreement with BNSF), and the CN-CP interchange at Kamloops where former BCOL traffic is exchanged to CP.

While these connections are not all directly accessible from CN's network in the study area, they can be accessed via existing commercial, tariff, and interline agreements.

2.7.6 Prince George

Prince George is the only major rail yard in the study area that is not at a port, and it is an essential connection point between CN's east-west mainline and their north-south secondary corridor. CN's primary yard is their North Yard, which also includes an inland intermodal container facility and can accommodate transloading (rail/container to truck). CN also operates the former BC Rail yard as their South Yard.

Figure 16: Prince George



2.7.7 Shipper Facilities

Rail shippers typically own the spur lines, trackage or yards that are on their properties, and are responsible for loading and unloading materials to/from railcars at their facilities. Shipper rail yards are typically small in size, yet they play an important role in the supply chain, as on-site product transfer and railcar storage capacity is directly related to how much product a shipper can load / unload and ship, and in-turn how frequently a shipper needs to be serviced by the rail carrier.

A full-scale inventory of all shipper facilities (yards, spur lines, etc.) was beyond the scope of this study. However, feedback from shippers during the stakeholder engagement did provide information on the state of shipper's internal facilities, and how these enabled and/or limited rail shipping in some locations. A primary comment received through engagement was that disruptions can create variability in rail service, or insufficient rail car deliveries could impact production by shippers, as there was often insufficient storage for commodities on-site. It is noted that shippers are responsible for providing their own on-site storage and many shippers choose to provide additional product or railcar storage to help mitigate disruptions and supply chain variability.

Additional on-site railcar storage, or perhaps targeted railcar fleet increases (in select circumstances), could help alleviate this issue for some shippers. These strategies have been used to improve supply chain fluidity for shippers in other locations in North America[25]. However, it is noted that this approach may not be optimal depending on the location / situation, as it can be more efficient to expand commonly accessible rail yard space instead, as these facilities can act as surge capacity for a number of shippers and the railway, instead of being useful for only a single shipper / producer.

[25] https://mghrailcar.com/Blog%20Article/On-Railcar-Storage-PT.1-Industry-Overview

3 Stakeholder Engagement

3.1 Introduction

Stakeholder engagement is an important tool to understand how the rail network is currently serving and impacting the businesses, residents and First Nations communities in Northern BC. Engagement was completed using two primary techniques, with the first being online surveys, and the other being virtual interviews with survey respondents. The online surveys were administered through Lime Survey, while the virtual interviews were conducted using the Microsoft Teams platform. All survey responses are considered confidential, and only aggregated responses and un-referenced quotes have been shared from the survey process.

The primary purposes of the stakeholder engagement were to:

- Better understand the perceptions and attitudes held by Municipalities, First Nations and rail customers in Northern BC about the benefits and impacts of freight and passenger rail,
- Learn how improvements or changes in rail service and the rail network might benefit economic development and quality of life for communities and businesses across Northern BC in general, and
- Identify areas for improvement and issues regarding the rail network and rail service in Northern BC.

The First Nation and Municipal surveys included 13 questions, with the questions focused on the contributions and impacts of freight rail to their community, and their satisfaction with and/or desire for passenger rail service. The Customer survey was more focused on understanding the operations and feedback of existing shippers, with questions about customers' current rail operations and service, and their satisfaction with existing service and desire for service improvements. The survey included 32 questions.

3.2 Online Survey

3.2.1 Rail Customers (Shippers / Receivers)

This section summarizes the survey responses from businesses that use or are located along the rail network in the study area. The customers, who may be shippers, receivers, or both, were identified using a number of methods, including a review of aerial photography, comparison with available databases, and from stakeholder feedback.

A total of 119 existing customer locations were identified in the study area, and an additional 105 business/locations were identified as potential existing / future customers. Businesses with multiple locations were included in the inventory multiple times, in order to capture the geographic distribution of customers (and rail demand) on the network. The existing customers by industry are shown in Figure 17 and listed in Appendix C. It is noted that this inventory is not an exhaustive list of all businesses that use or rely on the rail network, and that some of the businesses listed may no longer use rail service. However, this inventory of customers is considered to be a substantial and representative portion of all rail shippers and receivers in the study area.

Invitations to participate in the survey were shared with all of existing customers if contact information was available. Survey invitations were sent to 51 different customers, and we received a total of 17 complete online survey responses for a response rate of 33%. Table 7 show the response breakdown by location and industry type.

Table 7: Customer Online Survey Responses by Primary Business Location (left) and Industry (right) (n=17)

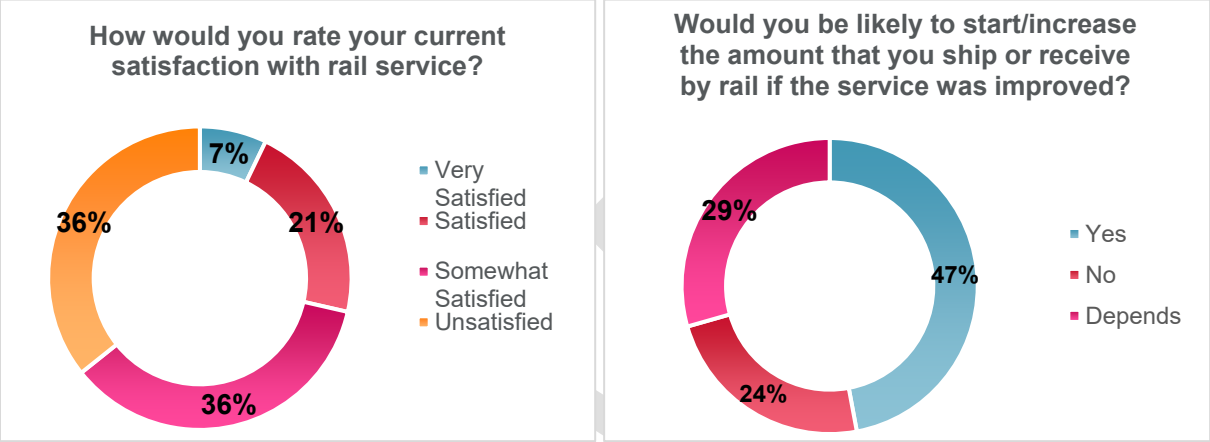
Location	Customers
Fort Nelson	1
Fort St John	2
Mackenzie	4
Prince George	3
Prince Rupert	1
Quesnel	1
Skeena	1
Taylor	2
Terrace	1
Tumbler Ridge	1

Industry	Customers
Building Materials	1
Energy	6
Forestry	4
Mining	2
Other (Intermodal, scrap metal, etc.)	4

Figure 17: Existing Rail Customers Map by Industry

The responses made up a reasonable distribution of industries and locations within the study area. Responses from two of the questions that provided good insight into the current opinions and expectations of shippers are shown in Figure 15. The left chart shows how satisfied customers currently are with rail service, and the chart on the right shows how likely customers would be to start or increase rail shipments if rail service were improved. These results indicate that approximately 1/3 of respondents were very satisfied or satisfied, 1/3 were somewhat satisfied and 1/3 were unsatisfied with current rail service. Nearly half (47%) of respondents also said that they would increase rail shipments if service were improved.

Figure 18: Rail Service Satisfaction | Likeliness to Increase Rail Use



3.2.2 Municipalities

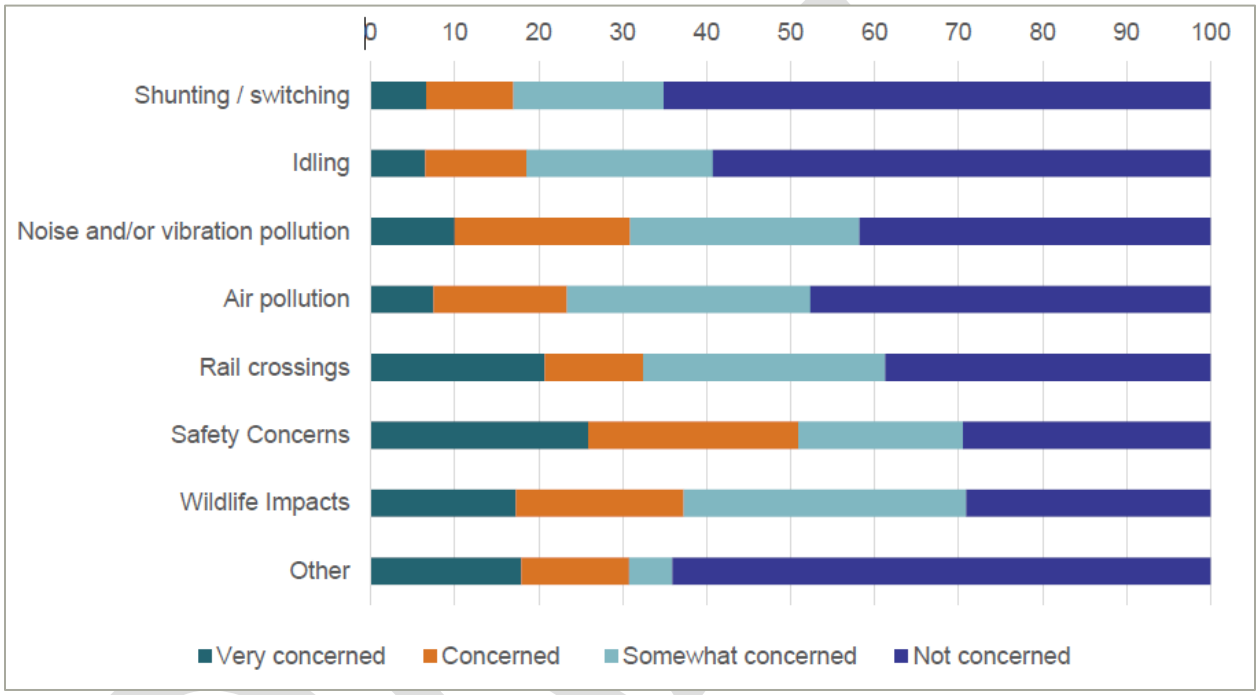
Municipalities within a 50-kilometer buffer of the rail network in the study area were identified as potential contacts for the study. We reached out to a total of 38 Municipalities and 285 separate contacts with invitations to participate in the online survey, and 121 survey responses were received, including responses from Mayor, Councilors, Economic Development leads, and other municipal staff, with a response rate of 42%. The responses by community are shown in Table 8.

Table 8: Municipal Responses by Community (n=121)

Community	No. of resp.	Community	No. of resp.	Community	No. of resp.
Aschroft	1	Hudson's Hope	1	Prince George	2
Burns Lake	6	Kitimat	1	Prince Rupert	4
Cecil Lake	1	Lillooet	4	Quesnel	2
Chetwynd	3	Mackenzie	11	Smithers	4
Clinton	1	McBride	2	Taylor	5
Dawson Creek	3	North East BC	1	Telkwa	1
Fort Nelson	10	New Hazelton	2	Terrace	4
Fort St James	1	Northern Rockies Regional Municipality	1	Tumbler Ridge	3
Fort St John	31			Valemount	1
Fraser Lake	2			Vanderhoof	1
Granisle	2	Peace River Regional District	1	Whistler	1
Houston	4			Williams Lake	3
		Pemberton	1		

Respondents were asked about their level of concern on several potential impacts or issues related to freight rail, and their responses are shown in Figure 19. Of those impacts or issues that were pre-identified for respondents to consider, safety concerns (e.g., spills, Transportation of Dangerous Goods (TDG), derailment) were the issues of greatest concern with over 51% of respondents being concerned or very concerned, and another 20% being somewhat concerned. Wildlife impacts (e.g., on moose, bear, caribou), were the second issue of greatest concern with over 70% of respondents expressing some degree of concern.

Figure 19: Level of Concern by potential issues (n=121)



Several improvements or changes in the rail service and rail network were suggested by respondents. They emphasized four areas of improvement for freight rail service: i) safety; ii) improvements to rail properties, beds and rolling stock; iii) increasing the contributions of rail service to local economic development; and, iv) better community engagement and customer service by rail providers.

From an economic development perspective, respondents suggested that rail providers should more actively participate in economic development opportunities and cooperate and collaborate with businesses who would like to develop transloading and/or spur operations. The presence of stable and reliable rail service is seen as fundamental to attracting investment and supporting local economies across the north, and while it appears that many local businesses would prefer to use rail, they opt for transporting goods by truck as often becomes easier and more convenient than shipping by rail. Several respondents also mentioned that if the rail lines were not going to be used by the railways, the rail lines could be given “back” to the communities for use.

Passenger rail is non-existent in many of the respondents' communities, and respondents were generally in support of improved passenger rail service, with over 80% stating that passenger rail service was either somewhat important, important or very important.

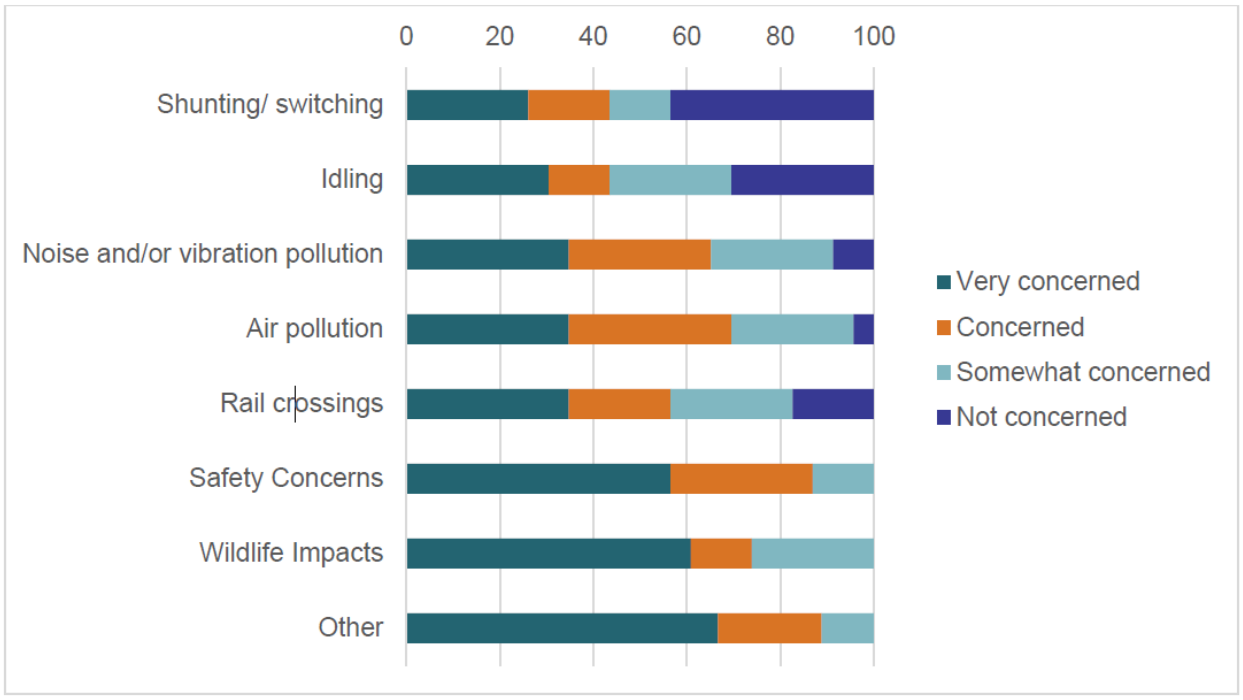
3.2.3 First Nations

First Nations within a 50-kilometer buffer of the rail network within the study area were identified to be contacted. We reached out to a total of 52 First Nations. A total of 26 respondents from at least 21 different First Nations responded to the survey, representing a response rate of >40%.

Due to the nature of the remote locations of many First Nations communities in BC, some respondents listed the name of the closest municipality, while others opted to give the name of their Band/Nation/community for their location. For those respondents who chose to identify by municipality, it was difficult to determine which of the 52 First Nations they represented as several Bands/Nations may have mailing addresses in the same municipality (e.g., 3-4 First Nations have mailing addresses located in Burns Lake). 85% (22) of respondents have lived in their communities for at least 6 years, and 85% (22) have lived in Northern BC for 15 years or more.

Respondents were asked about their level of concern regarding several potential impacts or issues, and the responses are shown in Figure 20. Top concerns were those regarding safety, wildlife impacts, and other concerns, with over 50% of respondents said that they were very concerned about these issues.

Figure 20: Level of Concern by potential issues (n=23)



3.3 Stakeholder Interviews

The online surveys asked respondents if they would be interested in being interviewed to further discuss their experience with rail operations and service. A number of shippers, municipalities and First Nations indicated their interest in being interviewed and provided their contact information.

HDR organized and coordinated 30-minute online interviews with a total of nine rail customers, ten municipalities, four Chambers of Commerce, and six other individuals who had interest in rail service (community members, business owners, etc.). Two First Nations were also interviewed to discuss the benefits, impacts and opportunities of freight and potential passenger rail service to their communities.

All feedback from the stakeholder interviews was reviewed, categorized, and consolidated. This section provides a summary of the feedback. Each section includes a description and indirect quotes that have been adjusted for readability and anonymity.

3.3.1 Rail Service

Municipalities and customers located throughout the study area described frustrations with rail service. Missed shipments, insufficient delivery of railcars, and challenges with adjusting service levels or addressing other issues were some of the most common issues mentioned by interviewees. Reasons given for the service interruptions varied, but many noted a lack of railcars and crews as a common response, with many crews being based hours away from the areas that they served.

Many organizations have made significant changes to their operations to mitigate against what they see as inadequate rail service. These include building out their facilities to increase the number of railcars or raw product that they can store on site, and trucking their goods for longer distances to improve reliability, despite trucking often being more costly than rail. Indirect quotes include:

- *We have been turning away product because we can't reliably ship it by rail.*
- *Rail shipping rates in Northern BC are higher than in other similar locations in BC and Canada.*
- *There is a need for service improvements on CN's east-west mainline as well, not just the branchlines, as shippers on the mainline also experience frequent service failures.*
- *It can be difficult to get in contact with the right person at CN, and time consuming to negotiate service improvements or achieve confidence that service can be provided for a new business or location.*

3.3.2 Safety

The communities of Northern BC are resource dependent, and many of the interviewees were fully aware of the pros and cons of rail service in their community, and the potential risks that exist. Some interviewees provided detailed accounts of safety concerns and first hand experiences, and these included concerns regarding the transportation of dangerous goods, grade crossing safety, train / pedestrian crossings, train crossing events impacting emergency response time, a lack of training for local first responders, and poor communication with CN when events did occur. Indirect quotes include:

- *Our community straddles the rail line, and our fire station is located on the west side of the tracks. We worry that a rail crossing could limit our ability to respond to an emergency event on the other side of the tracks.*
- *Dangerous goods are transported through our community, and I would like to see gas sensors installed along the railway.*

3.3.3 Economic Challenges

The economy in many parts of Northern BC has faced significant challenges over the recent past. Events such as changing commodity prices, the mountain pine beetle infestation, and a downturn in the oil and gas industry has resulted in the closure of mines, mills, and reduced exploration for oil and gas. Wood fibre supplies, allocated through the Allowable Annual Cut mechanism are anticipated to decrease in the near future, and this will limit the amount of fibre that is available for processing and industries. Indirect quotes include:

- *A lack of reliable rail service is the single biggest stumbling block that our community faces.*
- *There used to be three sawmills in our community, and now there is only one. This reduced the profitability of providing rail service to our community, and in-turn rail service has been reduced.*
- *Growth is not realistic for the lumber industry. Major companies hold significant portions of the Allowable Annual Cut, and the high cost of transportation limits the potential of new operations or businesses.*

3.3.4 Economic Opportunities

Despite the recent economic challenges that many communities in Northern BC have faced, many of the interviewees were optimistic about the future and economic prospects of their businesses and the region. The rapid growth of the Port of Prince Rupert, plus the potential for growth in industries such as wood pellets, mining, and logistics shows that there remains significant economic potential in Northern BC. Many companies were interested in investing in their current facilities, and others were planning to open up new facilities. New and growing businesses in Northern BC have the potential to generate new trade and jobs. New trade facilities are also being explored, including logistics parks, transload facilities, distribution centres and an inland port in Terrace. This growth has even created a glut of un-filled jobs in some locations, such as in and around Terrace. Indirect quotes include:

- *BC, and in particular the Golden Triangle, have an opportunity to capitalize on the new and rapidly growing area of critical metals.*
- *Growth and resource exploration will be driven and supported by First Nations communities.*
- *Supporting industries such as pellet manufactures and smelters enable us to process our own goods and create jobs, benefiting our communities and the province.*

3.3.5 Improvement Ideas

Interviewees provided a wide range of ideas to improve the rail network and service. These included the need to improve rail infrastructure, capacity and travel speeds in many locations. Practically all of the respondents desired improved communication with CN, as they found it difficult to change their service, find out why a service failure had occurred (such as cars not being delivered on time), or find out about emergency events. They recommended incentives for CN to hire more crews, recommended that local crews be used to reduce transportation time between the crews' home base and the facilities that they service, and the creation of shortlines, passenger rail, or similar third-party groups to improve service and transportation. Indirect quotes include:

- *CN needs to hire more crews. Lack of crews, equipment and locomotives are the top 3 reasons for service issues.*
- *The provincial government has a role to play in rail transportation, whether that is advocating on behalf of rural communities, keeping CN accountable, or investing in infrastructure to support growth. While some companies have used the BC Rail agreement to negotiate with CN, others have not been able to hold CN accountable, and we do not have the resources to escalate our issues to the Canadian Transportation Agency.*
- *We would be interested in alternative rail service models, including third party switching, new transloading facilities, team tracks, or shortline operation.*
- *Passenger rail service would be a safer and green alternative to driving, and would provide tourism and equity benefits.*

4 Areas for Improvement

Based on the network review, supporting studies, and comments provided through the stakeholder engagement, the section below provides a summary of the primary improvement areas that have been identified. They have been categorized into three topics, **Infrastructure, Service,** and **Community** for readability, although many of the areas may fall within multiple sections.

4.1 Infrastructure

- **Gross Weight Capacity** – Many of the subdivisions, including the Chetwynd, Fort Nelson, and Fort St. John subdivisions have gross weight capacities that are below the 286,000 lb industry standard. This restricts the amount of product that can be hauled per car, and increases costs for both CN and customers[26].
- **Track Speeds** – Average speeds for many of the subdivisions, including the Squamish, Chetwynd and Fort Nelson subdivisions are significantly lower than typical maximum speeds of 50-60 mph. This increases the time that it takes for trains to traverse a subdivision, and in turn impacts the transit time of loaded and empty railcars.
- **At-grade Crossings** – At grade road / rail crossing are found in many of the study area communities. While it can often be cost prohibitive to remove the crossings, through grade separation or other means, these crossings can be the source of potential collisions, and impact travel within communities and for emergency services.
- **Terminal Capacity** – Terminals such as CN's North and South terminals in Prince George are necessary facilities for receiving, switching, blocking and shipping trains, but they also slow down traffic on the rail network, and can act as bottlenecks in the system.
- **Railcar Storage** – The amount of railcar storage spaces at a customer's site can limit the number of railcars that can be received / shipped, and this effectively limits the amount of product that can be exported based on a regular service schedule. In the event of a rail service interruption, a lack of on-site storage can directly impact facility production. Many customers in the study area have limited on-site railcar storage, and access to third party railcar storage providers in the study area is limited.
- **Local Issues** – Infrastructure issues and improvement ideas at specific locations have been identified through past studies, including the TTN that identified nearly 20 improvement ideas in the study area. These include grade separation and new road connections to remove road/rail conflict points and facilitate capacity expansions on the rail corridor.

[26] It is noted that mountain conditions, including speed grades, sharp curvature, and low traffic volumes may not warrant speed improvements in some locations.

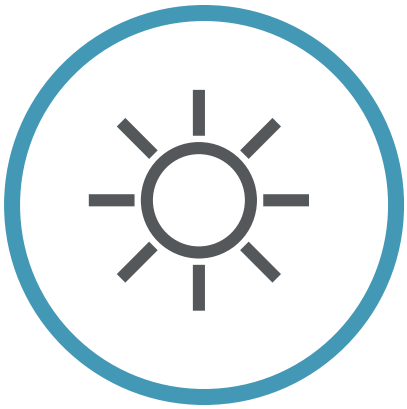
4.2 Service

- **Missed Shipments / Deficient Railcar Deliveries** – Missed railcar deliveries and insufficient car deliveries (where fewer cars are received than ordered), can negatively affect the operation and profitability of a customers' business, and were common concerns from customers. The most commonly cited reason for either missed shipments or not enough railcars were crew shortages, but other network incidents can also affect railcar service.
- **Rail Access** – Some existing and potential customers do not have access to a rail yard, an existing service relationship with CN, or a convenient place to load and ship their products. There are also a limited number of team tracks in the study area.
- **Communication** – Many customers noted that it was difficult to change their service schedule, or contact the correct person within CN to discuss their operations and concerns. Others indicated that it was difficult to get confirmation of future service for land parcels that were adjacent to rail yards/corridors but not currently serviced by CN.
- **Rail Service Costs** – Some respondents stated that the cost of rail service was a concern, and that per mile costs were significantly more expensive than other locations in BC and Canada.
- **Fulfilling Service Obligations** – A couple respondents made comments in regard to CN fulfilling their service obligations or providing a reasonable level of service as a common carrier railway.
- **Passenger Service** – There was general support and desire for expanded passenger service in Northern BC, for use by both tourists and locals. Benefits that were quoted included ease of travel, reduced impacts on the environment, safer travel in winter conditions, opportunities for tourism, and travel equity for low-income groups.

4.3 Community

- **Noise** – Noise pollution such as engine noise, track noise and whistling can have impacts on the adjacent wildlife and residential communities. There are specific whistle requirements at most road / rail crossings, and some respondents noted that whistles are an issue for some residents and community members.
- **Development** – It was noted by some respondents that guidelines and best practices regarding setbacks between the rail lines and residential development should be more closely adhered to, as deviances can result in on-going issues and complaints by residents regarding noise, etc.
- **Safety** – Rail safety was mentioned by a number of stakeholders, including the risks of collisions and derailments, as well as the transportation of dangerous goods. Some respondents suggested that more safety measures were required, such as gas sensors to detect dangerous goods if spilled.
- **Traffic Disruptions** – At-grade rail crossing can disrupt traffic operations and separate communities, and concerns regarding grade crossings were mentioned by a number of communities.
- **Wildlife** – Rail operations can impact wildlife through both direct collisions, and general disturbance due to noise and sight, etc. Some respondents were concerned about the impacts of rail on wildlife.
- **Emergency Preparedness** – The railway passes through the centre of many communities, and there is a concern in some communities that a train crossing could block emergency vehicles, and result in significant delays to emergency response times. There were also some concerns about a lack of communication and coordination between CN and the local emergency crews, who would likely be first responders.
- **Communication** – Some respondents indicated that they didn't believe that they had enough communication with CN, and that this resulted in their concerns not being heard or addressed. This included a lack of communication on topics such as safety concerns, whistle durations and care of the rail corridor.
- **Collaboration -** Many of the First Nations and Municipalities contacted in the study area were interested in rail operations, and how to better leverage the rail service to improve their communities. There is an opportunity to make these communities active members in pursuing new solutions to improve the rail network and rail service, whether that through cooperation on economic development, passenger rail, or infrastructure funding.

5 Emerging Opportunities Review



This section provides an overview of the economic outlook for Northern BC, and includes an economic sector-based analysis. The analysis of each sector includes a summary of the economic landscape, major projects that have been identified by the province, what we heard through the stakeholder engagement regarding opportunities for economic development, and an overview of potential rail network and/or service improvements that could help support the identified opportunities.

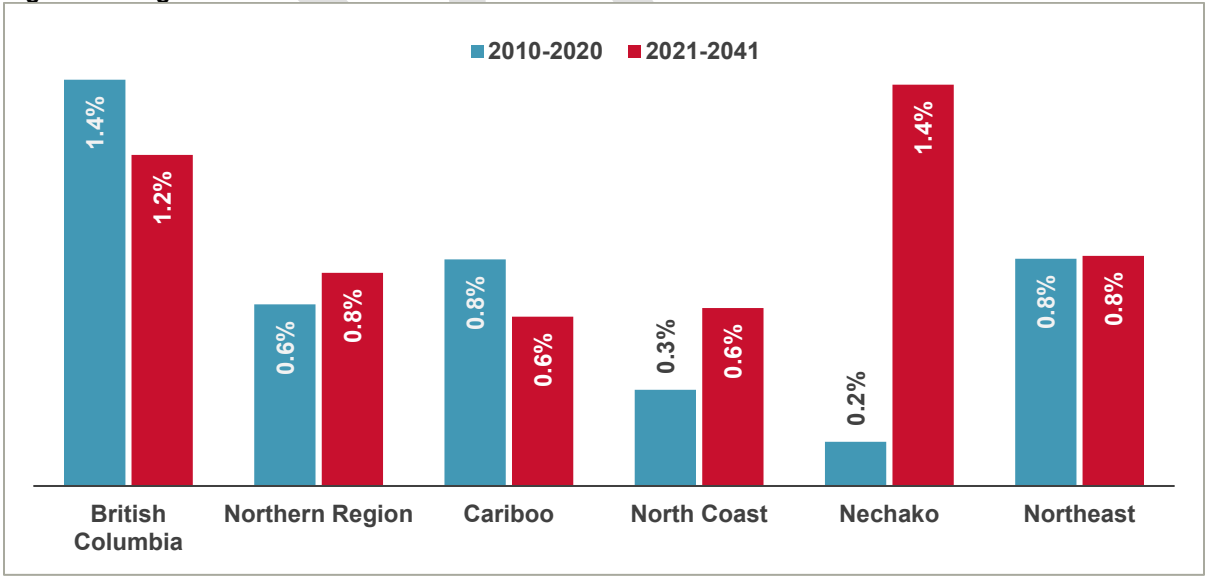
5.1 Economic Overview

5.1.1 Population

A key indicator of the economic potential for Northern BC is population growth. The long-term population growth signifies how the region is growing as well as the growing potential labour force in the region.

Historically, from 2010 to 2020, BC's population grew by an average of 1.4% per year.[27] The Government of BC also projects that the province will experience an average annual growth of 1.1% from 2020 to 2041.[28] The regions that were reviewed were shown in Figure 2, and the population growth for these regions are shown in Figure 21[29].

Figure 21: Regional Growth & Growth Forecasts



[27] Calculated based on data from Statistics Canada *Table 17-10-0137-01 Population Estimates, July 1, by Economic Region, 2016 Boundaries*.
[28] Government of BC. BC Stats. *PEOPLE 2020: BC Sub-Provincial Population Projections*. October 2019.
[29] Government of BC. BC Stats. https://bcstats.shinyapps.io/popApp/

In Northern BC, the historical annual average population growth has ranged between 0.2% and 0.8% annually over the past decade. In particular, the Nechako region experienced limited growth between 2010 and 2020, while both the Cariboo and Northeast region saw the largest increase, with growth rates around 0.8% annually.[30] Looking forward, the Government of BC projects that the Nechako region is expected to grow faster than all other Northern BC regions at an average of 1.4% annually from 2021 to 2041. The next fastest growing region is forecasted to be the Northeast region at 0.8% annually, followed by the North Coast and the Cariboo regions, each with 0.6% annual projected growth rates.[31]

5.1.2 Labour Force

The labour force is a direct indicator of how the workforce in the region is growing. From 2010 to 2020, total employment in BC has grown by an average of 1.2% per year.[32] In Northern BC, the Cariboo and Northeast regions saw total employment grow an average of 0.4% and 0.3% per year from 2010 to 2020 respectively. Meanwhile, in the North Coast and Nechako regions, total employment saw a slight decline from 2010 to 2020 of -0.1% per year. Despite the slight decline in the North Coast and Nechako regions, the construction sector saw significant employment growth at 6.5% per year on average. Meanwhile, the fastest growing industry in the Cariboo is the manufacturing industry, growing at 1.6%, and the fastest growing industry in the Northeast region is the transportation and warehousing industry, growing at 3.0% annually.[33] Growth across these industries is a positive indicator for rail activity in Northern BC, as they more heavily rely on rail service compared to other industries such as service and retail.

The Business Council of British Columbia (BCBC) indicated that 2020 employment fell by 6.2% from the 2019 employment level.[34] However, the short-term outlook for employment growth in BC is positive, and the report projected that in 2021 employment is expected to grow by 7.2%, driven by pandemic recovery efforts, and is expected to further grow by 3.2% in 2022.[35]

The long-term projected growth by the PBO indicates growth for employment, growing at an average of 0.7% annually until 2025, and at an average of 0.5% annually from 2025 to 2050.[36] Additionally, PBO's projections also indicate that labour productivity is expected to increase over time. In particular, the report forecasts that labour productivity will grow at 0.4% annually until 2025 and then grow at an average of 0.7% annually from 2025 to 2050. However, the PBO does indicate that the growth in labour productivity is lower than the national average.[37,38]

[30] Calculated based on data from Government of BC. BC Stats. *People Projections Application*. October 2021. Accessed: October 28, 2021.
[31] Ibid.
[32] Calculated based on data from Statistics Canada *Table 14-10-0392-01 Employment by Industry, Annual (x1,000)*.
[33] Ibid.
[34] Business Council of British Columbia. *Stronger Today, Momentum for Tomorrow*. August 2021.
[35] Ibid.
[36] Office of the Parliamentary Budget Officer. *Fiscal Sustainability Report 2021 – British Columbia*.
[37] Ibid.
[38] PBO indicates that their labour productivity growth was based on historical trends from 1982 to 2019.

5.1.3 Gross Domestic Product

Gross domestic product (GDP) is a common and frequently used macroeconomic indicator of economic activity. In particular, it represents the unduplicated measure of the total value of economic activity and is often the standard metric for quantifying the size of the economy.

Recently, the COVID-19 pandemic significantly impacted BC's GDP, where the BCBC reported a 3.8% decline in real GDP in 2020. However, the report also indicates an optimistic short-term outlook with real GDP projected to grow by 5.8% in 2021 and 4.5% in 2022.[39]

Meanwhile, the PBO's long-term outlook projects BC's real GDP to grow at an average of 1.0% per year until 2025, and from 2025 to 2050, it is expected to grow at an average of 1.2% annually.[40] The PBO indicated that BC's real GDP is expected to grow slower that the national average due to their projected low labour productivity growth.

5.1.4 Major Projects

The BC Major Project Inventory[41] (MPI) is a list that the province assembles of the major public and private sector projects with a capital cost over $15 million in BC. The list includes information about the project type, proponent, industry, and status (Proposed, Under Construction, Completed, or On Hold). The province notes that "projects must be known to be included, and some project information is not published for reasons of confidentiality."

Although it's possible that some of these projects may never be built, the inventory provides a representative sample of the economic development opportunities by industry in the different regions of Northern BC, and this provides valuable insight to economic development in the region as supporting context for this study. The latest data available at the time of writing was for Quarter 2, 2021, and it is the basis of analysis for this project.

Figure 22 shows the major projects that are proposed within the study area. Table 9 shows the number of projects by region and type, and Table 10 shows the value of proposed projects. Only the project types that are considered likely to generate material rail demands have been included in the analysis. The excluded project types included Accommodation, Health, Primarily Residential – Single Use, and Recreation.

A total of 61 major projects were identified, with a combined total project value of $101.6 billion (2021 Can. $). While it is possible that some of these projects will not proceed, this volume of projects and estimated project value are indicative of the economic opportunities in Northern BC. It identifies that proponents in many different sectors are exploring investment opportunities within Northern BC, many of which will generate rail traffic either during construction or on an ongoing basis once completed. A list of all projects is included in **Appendix A**.

[39] Business Council of British Columbia. *Stronger Today, Momentum for Tomorrow*. August 2021
[40] Office of the Parliamentary Budget Officer. *Fiscal Sustainability Report 2021 – British Columbia*.
[41] https://www2.gov.bc.ca/gov/content/employment-business/economic-development/industry/bc-major-projects-inventory

Figure 22: Major Projects with Regional Districts

Table 9: Number of Major Projects in Study Area

Region	Mainland / Southwest	Thompson-Okanagan	Cariboo	North Coast	Nechako	Northeast	Total
Commercial/ Industrial			2	1		1	**4**
Liquefied Natural Gas				6			**6**
Manufacturing			1	1			**2**
Mining		2	5	6	6	9	**28**
Oil and Gas Extraction						1	**1**
Petrochemical Manufacturing				2		2	**4**
Port and Harbour Facilities				1			**1**
Utilities	2		3	4	2	4	**15**
Total	**2**	**2**	**11**	**21**	**8**	**17**	**61**

Source: BC MPI Q2, 2021 https://www2.gov.bc.ca/gov/content/employment-business/economic-development/industry/bc-major-projects-inventory

Table 10: Value of Major Projects in Study Area ($ millions)

Region	Mainland / Southwest	Thompson-Okanagan	Cariboo	North Coast	Nechako	Northeast	Total
Commercial/ Industrial			$382	$15		$40	**$437**
Liquefied Natural Gas				$41,950			**$41,950**
Manufacturing			$15				**$15**
Mining		$200	$2,646	$8,501	$3,466	$3,184	**$17,997**
Oil and Gas Extraction						$760	**760**
Petrochemical Manufacturing				$32,000		$4,000	**$36,000**
Port and Harbour Facilities				$250			**$250**
Utilities	$411		$740	$756	$321	$1,920	**$4,148**
Total	**$411**	**$200**	**$3,783**	**$83,472**	**$3,787**	**$9,904**	**$101,557**

Source: BC MPI Q2, 2021 https://www2.gov.bc.ca/gov/content/employment-business/economic-development/industry/bc-major-projects-inventory

Access to cost effective and reliable rail transportation is a primary consideration in the feasibility of many of these projects. The existing rail network in Northern BC provides a good starting point for enabling economic development within the region, especially in close proximity to existing rail lines. However, attractive shipping rates and reliable rail service are also key considerations for prospective shipper's business cases to be feasible.

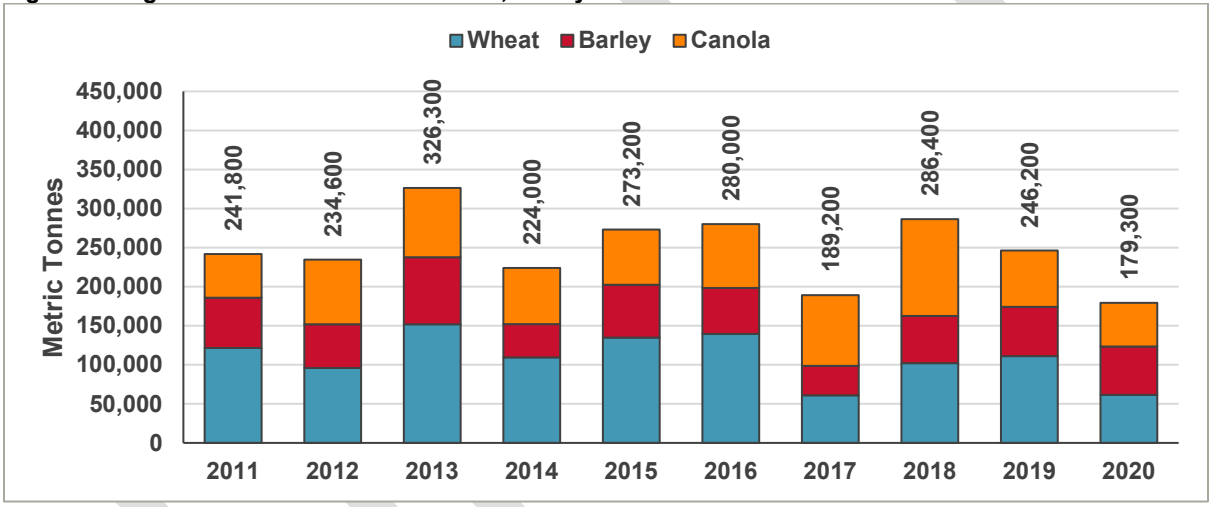
There is also potential growth and need for rail service in other projects areas that were not singled out in the following sections. These include wind projects, manufacturing facilities, and refineries. While these projects might not generate significant rail demands once operational, major projects such as these do require considerable volumes of building materials during the construction phases, and the rail network can help facilitate the construction of these projects and limit transportation costs compared to shipping the same materials on the road network.

5.2 Agriculture

Based on the 2016 census of farms in Canada, Northern BC farms account for just over 20 percent of BC farms, and most of the farms producing oilseeds and grain products in BC are located in Northern BC. Much of the production of these crops are located around Fort St. John and Dawson Creek. These products rely on the rail network for transportation to consumption markets, both inland and for export.

Production of these crops fluctuated between 2011 and 2020, as shown in Figure 23 below, with typical annual production of 250,000 metric tonnes, lows around 200,000 metric tonnes and highs near 300,000 metric tonnes. Year 2013 was an exception, where the production reached 326,300 metric tonnes, and years 2017 and 2020 were also outliers, with production dropping below 200,000 metrics tonnes each year. More specifically, 2020 production was the lowest within the time frame with only 179,300 metric tonnes.[42]

Figure 23: Agricultural Production of Wheat, Barley and Canola in BC



It should be noted that while there is a sizeable volume of agricultural products produced in Northern BC, many of these farms are small in scale and thus employ a limited number of people. This is reflective of the BC employment data, which censors regional employment counts for any industry reporting less 1,500 employees. For Northern BC, between 2011 to 2020, employment in the agricultural industry was only reported in 2016, meaning that employment was less than 1,500 for the other years.

The production of grains and oil seeds has been relatively stable over the past 10 years. The potential for agricultural production in Northern BC could change due to climate change, with risks in some areas due to longer, hotter and dryer summers, and potential benefits in others with agricultural potential extending northward and to higher elevations due to the warming climate.[43]

[42] Data from Statistics Canada, Table 32-10-0359-01 Estimated areas, yield, production, average farm price and total farm value of principal field crops, in metric and imperial units. Data extracted for British Columbia focusing on wheat, barley, canola.
[43] https://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/agricultural-land-and-environment/climate-action/adapting-to-climate-change

5.2.1 Major Projects

No major agricultural projects are included on the MPI within the study area. This is likely because very few new large agricultural projects, such as high-efficiency grain terminals, are built, and other large agricultural projects often cost less than the minimum value of $15 million. Many of these projects would also be solely privately funded and operated, and many not be identified on the inventory. It is also noted that there are significant agricultural projects underway in northwestern Alberta, near to the study area, and some of these projects are described in the following section.

5.2.2 What We Heard

Agriculture is an important component of the economy for certain areas in Northern BC, specifically around Fort St. John. Stakeholders noted that farmers would like to set up producer loading sites to export their grain in larger quantities from the Fort St. John area, but have been unable to secure a suitable site on the rail network thus far.

James and Margaret Little are members of the North Pine Farmers Institute (NPFI)[44], which currently operates a grain elevator in Fort St. John. The group is interested in expanding their current facility from a 24-car spot to a 32-car spot. They have also been exploring opportunities to bring in other agriculture related products such as fertilizer.

Local area farmers and the NPFI have been unable to acquire a producer loading site and expand the rail car storage capacity of the existing grain elevator due to a combination of the capital costs of track construction and difficulties receiving additional rail service from the rail carrier.

Figure 24: NPFI Elevator in Fort St. John

Source: https://www.google.com/maps/place/Viterra/@56.2372453, 120.7856161,3a,75y,90t /data=!3m8!1e2!3m6!1sAF1QipOsvi1rl10zl4JBEOfSo0Wkqmjnp1HPBL_1cCy!2e10!3e12!6sht tps:%2F%2Flh5.googleusercontent.com %2Fp%2FAF1QipOsvi1r 10zl4JBEOfSo0Wkqm-jnp1HPBL_1cCy%3Dw86-h114-k no!7i1536!8i2048!4m13!1m7!3m6!1s0x53912ba8e9431 255:0xc7789b d603faa629!2sRycroft,+AB T0H+3A0,+Canada!3b1!8m2!3d55.7559644!4d-118.7114513!3m4!1s0x5392369f6fef5dd3:0x4cccdd8a12095ca3!8m2!3d56.2369643!4d-120.7859361

As a result, a significant amount of grain produced in Northeastern BC is currently trucked from the Fort St. John area into Alberta to existing grain elevators in the Grande Prairie and Rycroft areas. This adds considerable trucking costs to the grain, reducing profits for the farmers, and also adds addition rail route miles, as the bulk of grain produced in Western Canada is ultimately destinated to the West Coast ports at either Prince Rupert or Vancouver. This phenomenon also adds additional wear and tear on the road and highway networks in BC and Alberta, compared to if the grain was shipped from a nearby grain terminal.

[44] https://bcfarmersinstitutes.ca/groups/north-pine-farmers-institute/

"In Fort St. John a lot of products are getting transported by truck to Dawson Creek and further from there. Our goal is to keep things local and get it back on the rail system and off the roads." – Larry Houley, President of the North Pine Farmers Institute[45]

Supporting this claim, a number of new high-capacity elevators have recently been built in this area of Northwestern Alberta. For example, the company G3 recently announced the construction of a new high-efficiency elevator in the village of Rycroft, which is 100 km east of Dawson Creek. The new elevator will have a capacity of 42,000 tonnes, be unit train compatible, and will be served by CN[46].

There are opportunities for more grain production and export out of Northeastern BC, but the lack of grain terminal capacity and the current level of rail service could be hampering growth in this sector. Additionally, the current weight limit of the Mackenzie and Fort St. John subdivisions (272,000 and 268,000 pounds accordingly) is less than the east-west mainline weight limit of 286,000 pounds. This may be a deterrent for new grain terminal development in the Fort St. John area, as grain typically ships in unit train quantities (100-150 cars per train) because the rail carriers offer freight discounts to shippers for unit train volumes. Full weight (286,000) rail lines are typically required to accommodate unit trains.

5.2.3 Rail Improvement Areas

Farmers in Canada have the legal right to be able to load their grain at designated producer car loading sites, and this protection is enforced and used in many places across Western Canada, including British Columbia, Alberta, Saskatchewan, and Manitoba. Several designated producer car loading sites are advertised by CN in Dawson Creek (2 car spots) and Fort St. John (2 separate sites with a combined 6 car spots)[47]. Educating local farmers and producers of the location and ability to utilize these designated producer car sites could help smaller farming communities load and ship more of their grain locally versus trucking to far away sites. It should be noted that farmers typically need to provide their own loading equipment at these producer sites as well as have experience dealing with the logistics of shipping their own railcars to port. Third party companies are available to support farmers wishing to load producer cars, assisting in administration, grain procurement, and rail logistics management.

The other issues identified in Northeastern BC include what is viewed as insufficient service to the existing grain terminals, and prohibitive costs to expand existing facilities to meet the desired demand (rail car capacity increases), as the terminal operators were told that they would need to bear the entire rail capacity expansion cost, with the rail carrier not covering any portion of the cost. Although this is typical of most industrial rail expansions, sometimes opportunities exist for shippers and railways to share in capital expansion costs if the anticipated benefits are realized by both parties from the expansion. Either way, the capital costs for rail

[45] https://www.northerndevelopment.bc.ca/explore-our-region/success-stories/north-pine-farmers-institute-aquires-rail-head-and-elevator-in-fort-st-john/
[46] https://www.railwayage.com/freight/class-i/cn-to-serve-two-new-g3-grain-elevators/
[47] https://www.cn.ca/-/media/Files/Your-Industry/Documents-Grain/producer-list-gtr-en.pdf

facility expansion was noted as a barrier for increased shipping of agriculture products in this segment of the Province.

Potential options to address these issues include upgrading portions of the rail network to full 286,000 pound gross weight capacity, exploring alternative rail service options (like a shortline and/or 3rd party switching company), or attracting investment for high-throughput grain terminals like those being constructed in Alberta. Depending on the commodities handled, a multi-purpose transload and railcar storage facility located in the region could also be beneficial for the existing producers, as it could provide a space to stage and block grain cars, fertilizer cars, and other commodities requiring transloading locally. The development of this type of facility could provide a “shared use” site where multiple commodities could be loaded or unloaded depending on the needs of the region and producers, while also ensuring suitable railcar storage space outside of the serving yards of CN in the region, keeping those yards clear and fluid for processing and blocking rail traffic (versus storing railcars). Several successful producer-led organizations across Western Canada have developed independent grain terminals and/or transloads and private rail yards to facilitate the economies of unit train volumes where large grain companies were unwilling to invest locally. The ability to move railcars in large blocks and/or unit trains typically can result in reduced shipping rates and more consistent service due to the reduced frequency of train service required at each facility.

5.3 Forestry

While recent softwood production in BC has declined from the peak in 2016, the share of production in BC's Northern Interior has remained around 48% of the provincial total from 2015 to 2020. Figure 25 shows historical forestry production by region in BC. At its peak, production in the BC Northern Interior reached 14.7 million cubic metres in 2017, however, production volumes in the region dropped drastically in 2019 and 2020 (similar to the rest of BC). In 2019 there was only 10.8 million cubic metres of softwood produced, and in 2020 there was only 10.1 million cubic metres of softwood produced.[48] In terms of employment, the forestry and logging industry supported at least 5,700 jobs from 2017 – 2019, though in 2020 that number dropped to a minimum of 2,900 jobs.[49]

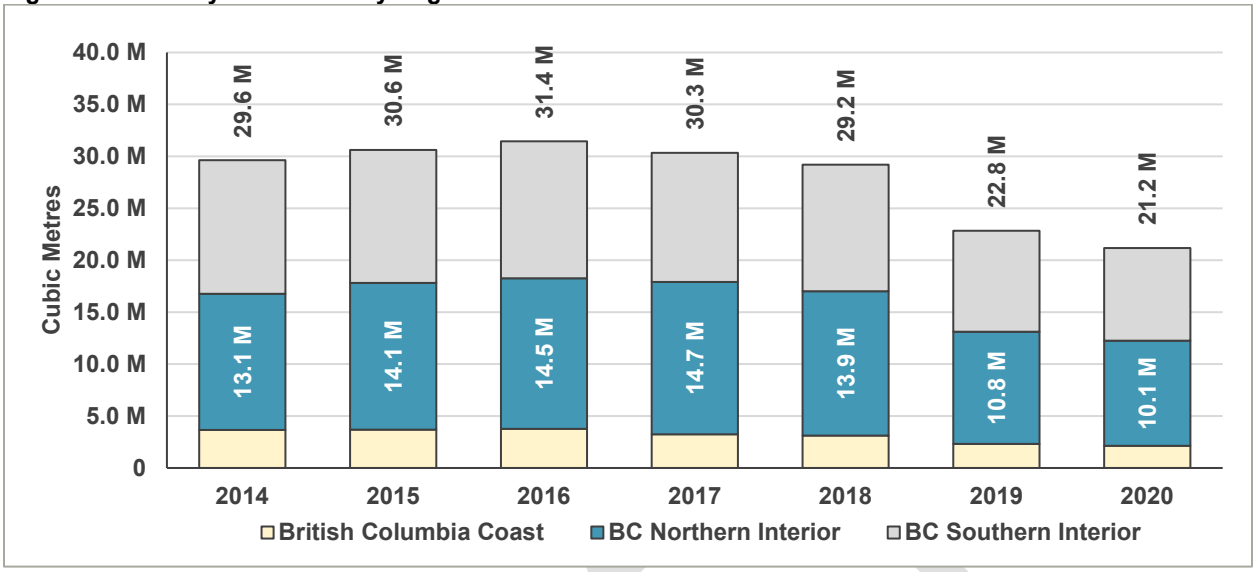
Overall, the forestry sector in BC has been negatively impacted by a slew of impacts including natural disasters, reduced demand from some notable countries, labour disputes, fluctuating prices, and COVID-19.[50] Additionally, historical softwood production from 2014 to 2018 estimates were revisited due to new estimation methodology, resulting in slightly higher production volumes.[51]

In terms of the reduced demand, the United States in 2019 imported less forest products from BC. This could be attributed to a combination of excess demand in the US, driven by the reduction in exports as a result of the trade war, and the additional production capabilities during the high lumber prices in 2018.[52] Moreover, the industry is still facing the negative impacts of the tariffs on BC softwood lumber, especially with recent announcements of further increase tariffs on BC softwood lumber.[53]

Meanwhile, the province also faced a constant battle with forest fires and the infestation of mountain pine beetles. In particular, the infestation was cited as one of the primary reasons of the downturn in the forestry sector in 2019 as the mountain pine beetles have been damaging the forests and their impacts expecting to last into the future.[54]

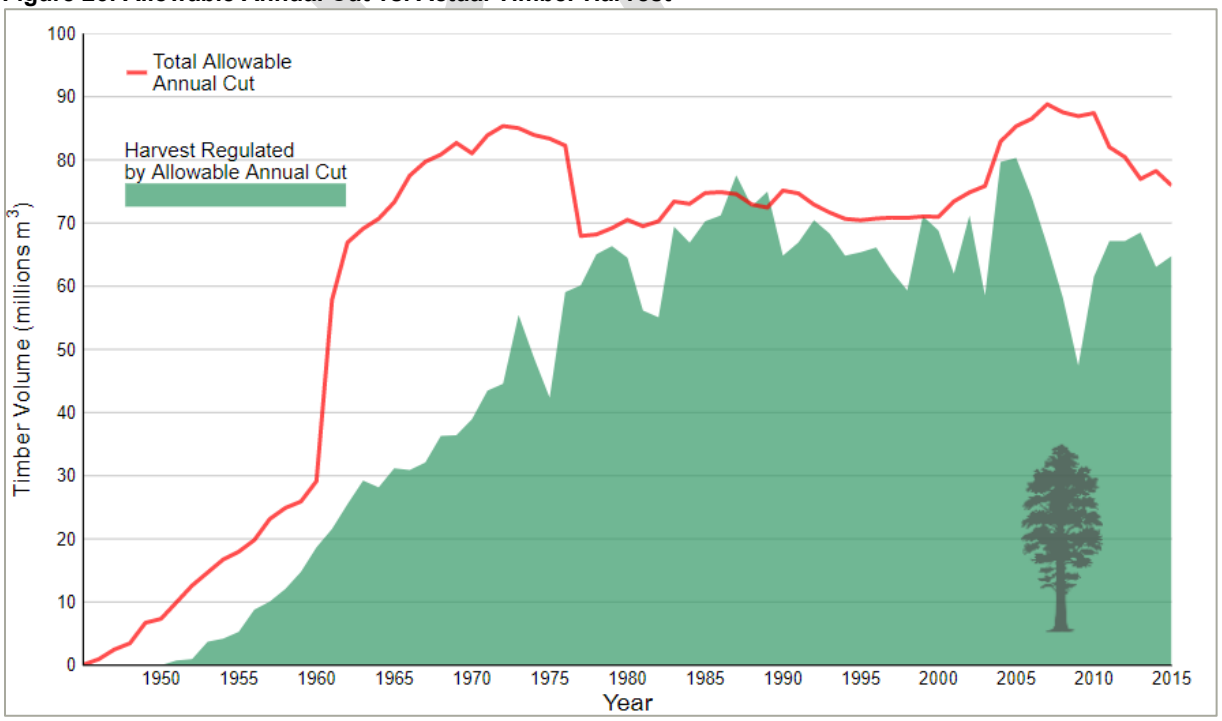
[48] Data obtained from Statistics Canada. Table 16-10-0017-01 Lumber production, shipments, and stocks by species, monthly (x 1,000).
[49] Based on employment data for Forestry and Logging with support activities obtained from Government of BC and Work BC. Referenced minimum as the employment count under 1,500 is censored and some regions may have censored employment for Forestry and Logging with support activities.
[50] Laura Bautista. Government of BC. Ministry of Forests, Lands, Natural Resource Operations and Rural Development. 2019 Economic State of British Columbia's Forestry Sector. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/forest-industry-economics/economic-state/2019_economic_state_of_the_bc_forest_sector.pdf
[51] Ibid.
[52] Ibid.
[53] Government of BC. Minister's Statement on Softwood Lumber Final Ruling. November 24, 2021.
[54] Derrick Penner. Vancouver Sun. Forestry Crisis Shows Up with Deepening Decline in B.C.'s Trade Figures. October 27, 2019.

Figure 25: Forestry Production by Region



Demand for BC's forestry products is driven by two major factors, available fibre supply, and prices for lumber and other forest products. The available fibre supply is initially set by the province each year through the Allowable Annual Cut (AAC) mechanism, which defines the overall amount of timber that can be harvested and allocates it between different parties through an auction system. Figure 26 shows the AAC since the 1950's. The mountain pine beetle infestation enabled a significant increase in harvesting in the 2000s and 2010s, and stakeholders have surmised that the AAC for future years is likely to be below what have been historically high levels.

Figure 26: Allowable Annual Cut vs. Actual Timber Harvest

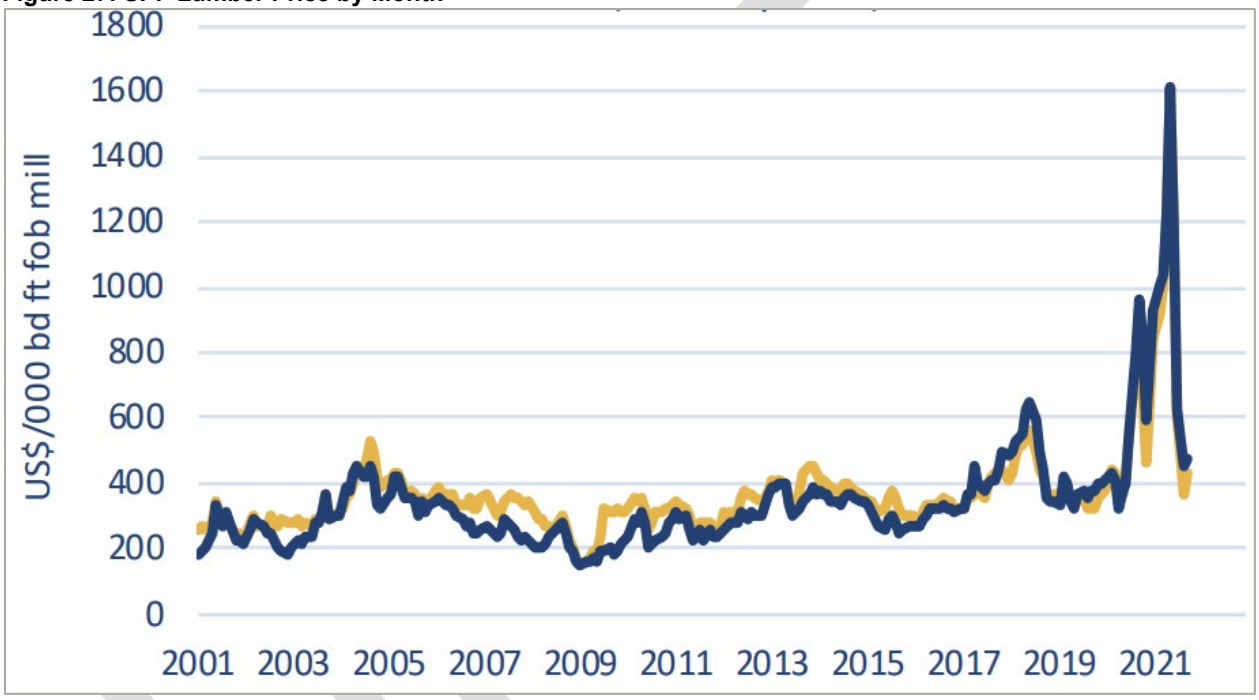


Source: https://www.env.gov.bc.ca/soe/indicators/land/timber-harvest.html

The second factor that greatly influences forestry activity is the price of lumber and other forestry products. The COVID-19 pandemic, and the associated temporary closure of sawmills and increases in home renovations and construction caused wild fluctuations in lumber prices over the past two years, as shown in Figure 27. Lumber peaked at over $1,600 US per 1000 board feet at the start of 2021, nearly 400% higher than the ~$400 at the start of 2020, and at this time of writing, the price is back down to the $400 - $500 range, similar to the start of 2020.

Production and activity in the forestry sector reflects the underlying price of the products and the available AAC, and in turn, the need for rail transportation is also largely driven by production, the overall AAC, and lumber prices.

Figure 27: SPF Lumber Price by Month



Source: https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/forest-industry-economics/weekly-prices/forest_product_prices_-_2021-10-01.pdf

5.3.1 Major Projects

No major forestry projects are included on the MPI inventory. Like the agricultural sector, this may be because the capital-intensive components of the supply chain (saw and pulp mills) have already been built, and these are sufficient to process the available fibre supply. Many forestry projects may also cost less than $15 million, and therefore also not be captured in the inventory.

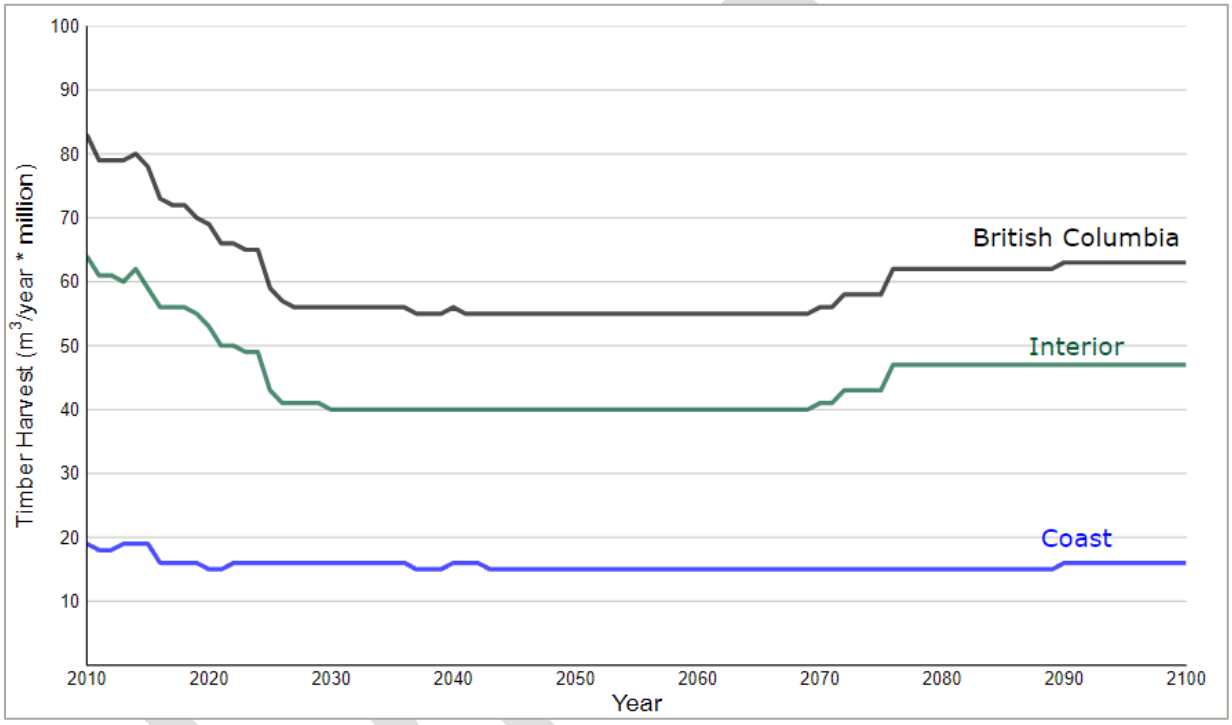
5.3.2 What We Heard

Given the AAC provisions over the past decade, many stakeholders surmised that the AAC was likely to decrease in the future, resulting in less overall fibre supply for the industry. This assertion is support by the provincial forecast, which is shown in Figure 28. It shows the AAC in the Interior decreasing from 2020 to 2030 before flatlining. While the available fibre supply effectively limits the growth potential of this industry, stakeholders noted that in some regions, such as the Northern Rockies, not all of the available fibre supply is currently being harvested.

They also noted that efficient, reliable, and cost-effective rail service is important to facilitating current production in the region and enabling growth opportunities when they do arise.

Reliable rail service and regular maintenance of the rail line into and within the Northern Rockies Regional Municipality is essential to the economic well-being of local businesses and is a significant consideration for investors contemplating the start-up of new businesses within the NRRM. – Mayor Gary Foster, Mayor of Northern Rockies Regional Municipality

Figure 28: Provincial Timber Supply Forecast



Source: https://www.env.gov.bc.ca/soe/indicators/land/timber-harvest.html

Despite the AAC cap, growth is possible in some locations and sectors of the forestry industry. There is an opportunity for production to increase in BC's north where limited transportation corridors exists, or for new rail volumes where much of the existing lumber is currently shipped by truck and could move to rail.

Other examples include companies that convert what was formerly waste, such as trim ends and sawdust, to dimensional manufactured lumber and wood pellets. BC's wood pellet industry has grown significantly in recent years[55], with new single purpose export facilities now located in both Prince Rupert and Vancouver. These facilities export the pellets to be used a fuel, primarily in Asian markets. Pinnacle is one of the primary producers and exports of wood pellets in BC.

[55] Pinnacle is one of the primary producers and exports of wood pellets in BC. https://pinnaclepellet.com/wp-content/uploads/2019/04/Pinnacle_2018_Annual_Report_WEB-002.pdf

There are also localized opportunities for growth. We spoke with Ken Shields, the CEO of Conifex Timber Inc., who operates a sawmill complex in Mackenzie. He said that the current annual capacity of their facility is 240 million board feet, and they are considering modernizing the mill and boosting capacity up to 300 million board feet. Another business, Peak Renewables, said that they were interested in setting up a new pellet mill in Fort Nelson, which has the potential to create up to 400 new jobs in total. The new pellet mill could generate up to 8,000 carloads of pellets and 4,000 carloads of raw logs per year. Both companies noted that adequate rail service would be a requirement of further advancing their business plans.

5.3.3 Rail Improvement Areas

Through the stakeholder engagement process, several companies in the forestry sector noted that current rail infrastructure and/or rail service had the potential to be limiting factors in their business development plans. This included limited existing service levels north of Prince George, irregular service, slow travel speeds (which equates to longer times to market for products and longer rail car cycle times), limited capacity on the line between Fort St. John and Fort Nelson, and difficulties in achieving changes to service frequencies and/or receiving new service within the region.

There are many potential improvement ideas that could help the forestry industry in Northern BC, and they range based on the type of issue that they will address and how much they will cost.

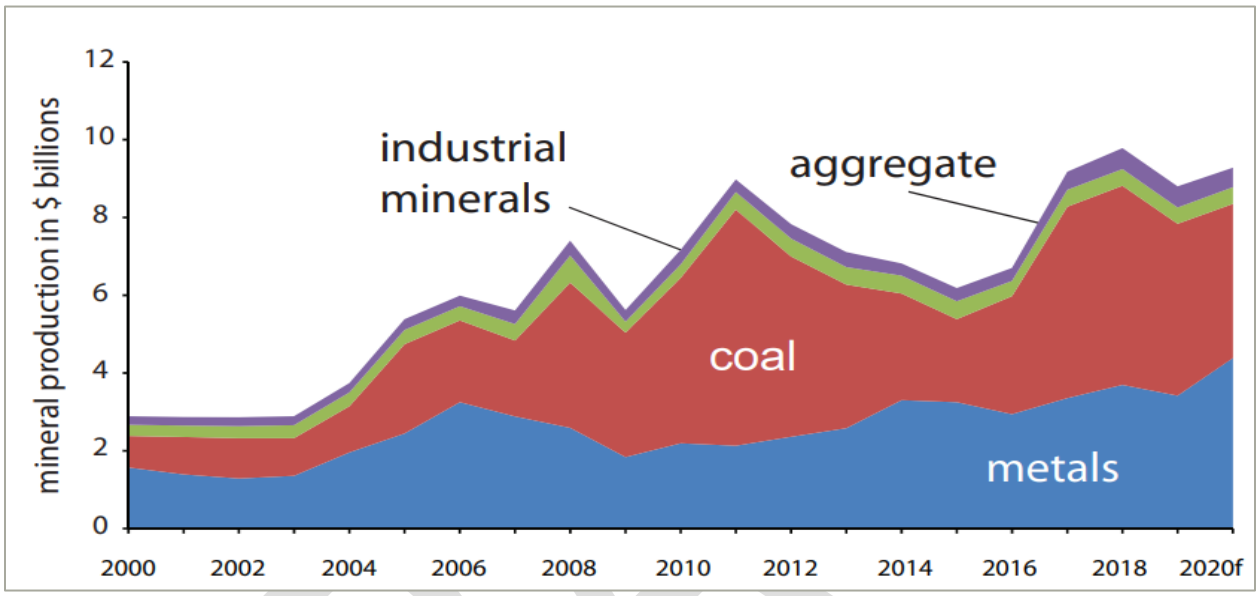
Improving service frequency and reliability involves little to no capital costs but does require consistent staffing and performance from the rail carrier, which can require increased operating expense and/or resources. Two methods of achieving this could be through setting up an arrangement where producers are switched by a local company to/from the producers' sites and a main railcar serving/storage yard. A centrally located rail yard could serve multiple customers and be accessed via a third-party company for switching purposes. It could help mitigate or reduce the supply chain shocks that producers experience when switches or deliveries are provided on a less frequent basis and would help provide a buffer in the supply chain by allowing for more frequent switching of local industries. Alternatively, the implementation of a shortline within the region may also provide improvements in service frequency and reliability depending on structure.

The proponent for building a new wood pellet plant in Fort Nelson stated that capital improvements to improve the speed and gross weight capacity of the line between Fort St. John and Fort Nelson were a necessary enabling condition for their new facility. Estimated costs of the improvements to the rail line were in the $50 million dollar range, and funding for these improvements has not yet been secured.

5.4 Mining

The value of mining in BC as a whole has grown steadily over the past 20 years. Figure 29 shows the historical value of mineral production in all of BC between 2000 and 2020. Overall value has increased from around $3 billion in 2020 to $9 billion in 2020, a threefold increase[56].

Figure 29: Value of British Columbia Mineral Production by Year



In 2019, of the 17 active mines in British Columbia, 10 were in the Northern BC region with an additional 9 mines in exploration or development phase. As of this time of writing, 8 of the 10 mines are currently active, and 2 have went into care and maintenance. 3 of the 8 mines produce coal with a combined production capacity of 4.7 million tonnes per year. The remaining 5 mines produce a mix of gold, silver, copper, and some molybdenum. Combined the 8 active support a total of over 4,200 jobs.

According to the Government of British Columbia, the majority of the coal produced in BC is exported internationally through either the coal terminal at Port of Prince Rupert or the coal terminals at Port of Vancouver. It is important to note that the vast majority (95%) of coal produced in BC is metallurgical coal [57]. Metallurgical coal is used in the production of steel from iron ore, as opposed to thermal coal, which can be used for heating and power generation production. The growth prospects of metallurgical coal are generally considered to be better than thermal coal, as energy markets continue to transition towards lower carbon alternatives.

Figure 30 and Figure 31 show the production tonnage and value of coal and other materials over the past number of years.

[56] http://cmscontent.nrs.gov.bc.ca/geoscience/PublicationCatalogue/InformationCircular/BCGS_IC2021-01-01.pdf
[57] Government of BC. Overview of Coal in BC. Accessed October 15, 2021. https://www2.gov.bc.ca/gov/content/industry/mineral-exploration-mining/british-columbia-geological-survey/geology/coal-overview

Figure 30: Coal Production (Tonnes | Value)

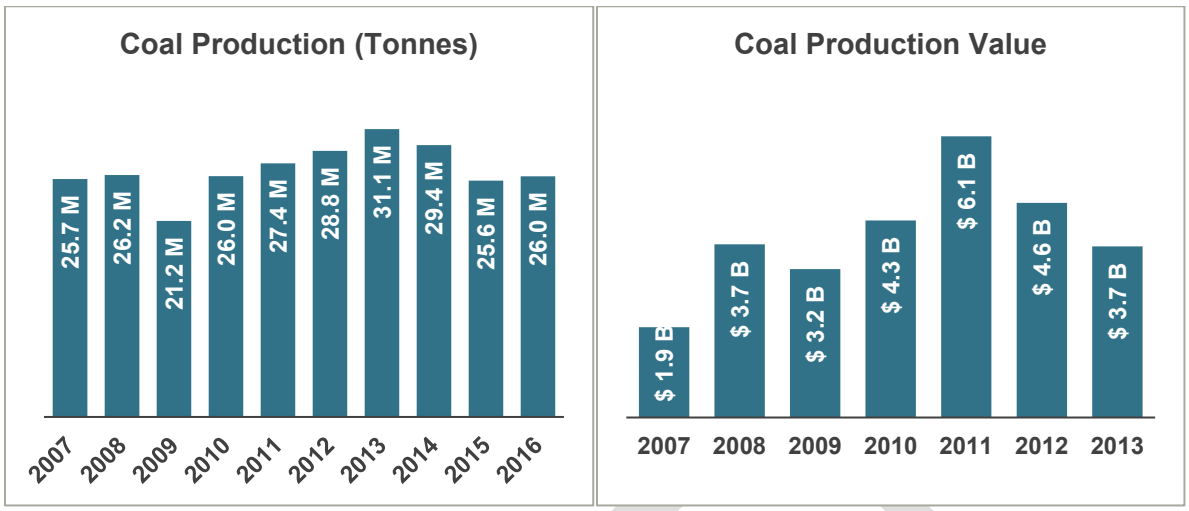
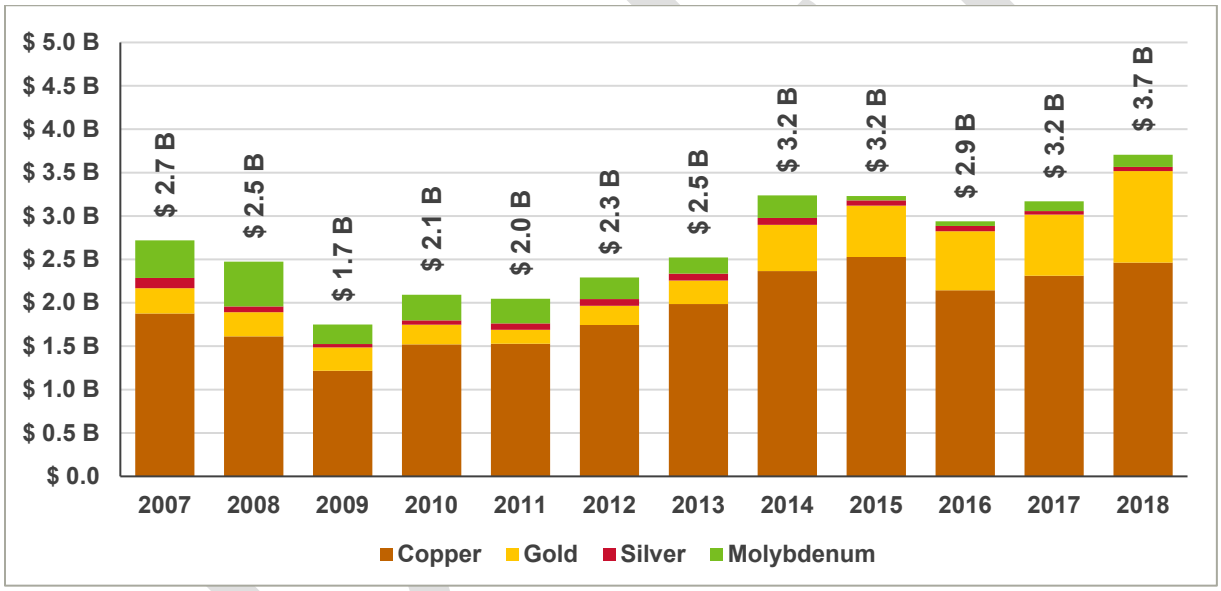


Figure 31: Production Value of Other Metals and Minerals



The production of coal stayed relatively constant between 2007 and 2013, whereas the production value of the other materials has increased between 2007 and 2018.

5.4.1 Major Projects

Mining is the sector with the most projects on the MPI list for Northern BC, with 28 projects currently identified, and a combined total value of nearly $18 billion in estimated construction costs. The projects are fairly evenly distributed throughout the Cariboo, North Coast, Nechako and Northeast regions.

The necessity of rail service to support these mining projects largely depends on the commodity being exported. Mines that produce, process, and ship higher value commodities, such as gold and silver, often end up shipping a much lower total tonnage of product overall, making rail

service less of a necessity, and trucking a more cost competitive alternative for higher value materials / lower volumes. The converse is also true, with mines that export larger volumes of lower cost materials, such as coal or ores, being very dependent on efficient, rail service (typically unit train service) to achieve the cost efficiencies that support the bottom-line business case of the mine.

5.4.2 What We Heard

We spoke with both current mine operators and stakeholders in Northern BC who were highly knowledgeable about the potential for future mining projects and economic development in the mining space.

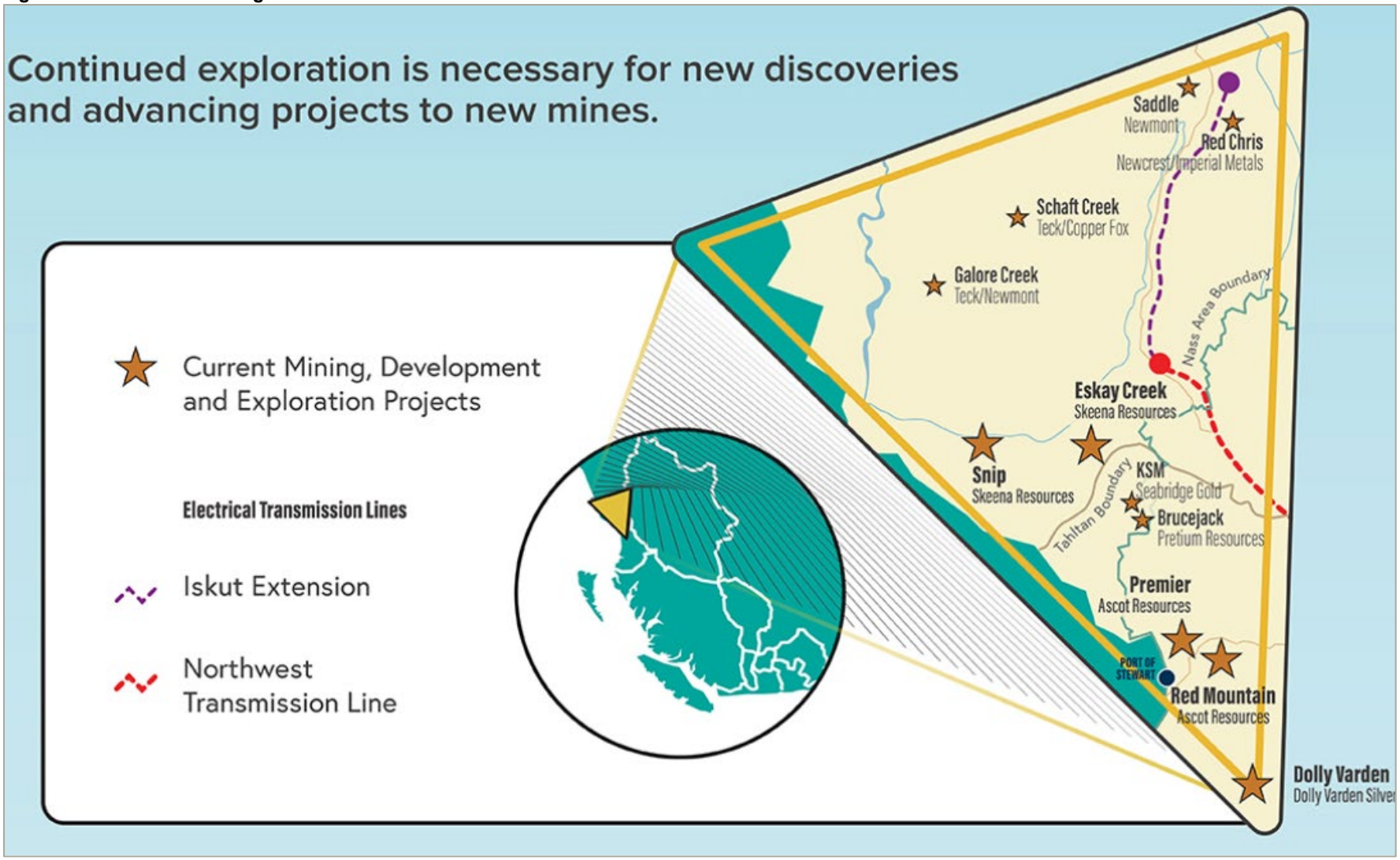
Tony Fogarassy, an expert in the mining industry in BC, noted that there are opportunities for rare and critical metal mining in Northern BC, especially northwest of Takla Landing in the area known as the Golden Triangle. This area, located primarily within the Kitimat Stikine, is shown in Figure 32. The British Columba Regional Mining Alliance (BCRMA) is an advocacy group for exploration in the Golden Triangle. The area is said to account for 44% of total exploration expenditures in BC in 2020, and they estimate that there were 26 exploration projects in the area in 2020, representing a total expenditure of $184 million[58].

The metals being explored for in the area are primarily gold and copper, but it is noted that other commodities that are needed to build a low-carbon economy are also being explored for, including silver, nickel and zinc. Stakeholders noted that there have been previous concepts in the past to build a smelter in the area, which could help encourage other mining projects to develop and would likely require rail service.

Another stakeholder noted that there was the potential for new mining export volumes in Northeastern BC, and that if improvements to the Fort Nelson subdivision were made, it could result in an additional 1,500 annual rail cars per year on the segment hauling mining concentrate southward. The stakeholder noted that improvements to the Fort Nelson subdivision, and improved service, would be required for this opportunity to be realized.

[58] https://www.mining.com/web/visualizing-the-economic-impact-of-british-columbias-golden-triangle/

Figure 32: The Golden Triangle



Source: https://www.mining.com/web/visualizing-the-economic-impact-of-british-columbias-golden-triangle/

5.4.3 Rail Improvement Areas

The mining industry is an important sector in BC, and many mines in the industry are very dependent on rail service for their operations. As mines often generate large volumes of product to be shipped (typically unit trains on a weekly or more frequent basis), these large mines are able to work directly with rail carriers to develop custom rail service (rates and schedules) to suite their unique needs and the location of the mine. Mines that produce lower quantities of materials can have a harder time of negotiating adequate rail service and rates as their rail traffic may operate in more typical manifest rail service.

The improvements required for both types of mines are different. Larger exporting mines have a higher chance of being able to come up with the capital improvements required to build their own facilities, and in turn the rail carriers are more incentivized to invest / maintain / repair their facilities and service the mines if there is an anticipated high volume of traffic, i.e., no direct intervention is needed to support these facilities.

However, smaller mines on the other hand, are often not able to negotiate rates and service that are feasible for their operations. They may not be able to build the necessary rail facilities for unit trains on their own site, and may be asked by the rail carrier to pay directly for capital upgrades on the rail line if they want improved service. All of these can be cost prohibitive and discourage new mine opportunities from progressing.

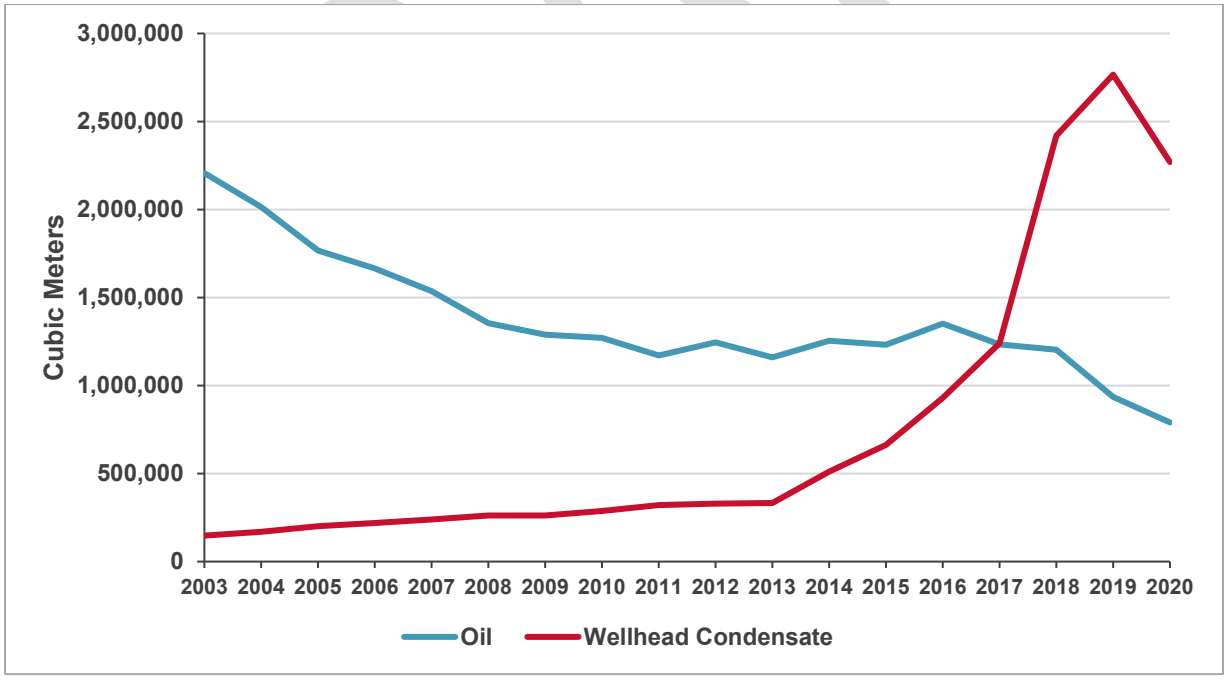
The potential solutions to support new mines include shared rail storage yards near mines for staging and blocking of railcars to provide a place to build unit trains, line upgrades so that mines can load railcars to maximum gross weights, and potentially a shortline railway option which could potentially provide more regular service and reduce the need for costly on-site railcar storage at the mine sites depending on service options provided by the carrier among numerous customers.

5.5 Oil & Gas

Based on 2018 production, British Columbia's crude oil production represented approximately 2% of the total Canadian production.[59] All production in the province is light oil, condensate and pentanes. A large portion of the volumes are produced in Northeastern B.C. In comparison, the average production of natural gas was about 5.1 billion cubic feet per day, which is approximately 32% of the total Canadian production. Most of the natural gas production is in Northeastern BC in the Montney Formation. Other significant sources include the Horn River Basin and the Liard Basin.[60]

There are 2 refineries in BC. The smaller is located in Prince George and is owned by Tidewater Mainstream and Infrastructure Ltd., with a capacity of 12 Mb/day. The larger one is in Burnaby and is owned by Parkland Corporation, with a capacity of 55 Mb/day. The refinery located in Burnaby generally receives crude oil through the Trans Mountain Pipeline, which is currently being expanded.[61] Figure 33 shows historical oil and wellhead condensate production for BC, with all of the commercial oil and gas production coming from the Northeast region. While oil production has been decreasing for the past two decades years, wellhead condensate production has significantly increased since 2003[62]. Wellhead condensate includes Natural Gas and Natural Gas Liquids (NGLs).

Figure 33: BC Oil Production



[59] Canada Energy Regulator. Provincial and Territorial Energy Profiles – British Columbia. March 17th, 2021.
[60] Ibid.
[61] Ibid.
[62] BC Government Statistics. https://www2.gov.bc.ca/gov/content/industry/natural-gas-oil/statistics

5.5.1 Major Projects

One oil and gas extraction project, six LNG projects, and four petrochemical manufacturing projects are included in the MPI, with a combined project value of over $78.7 billion. Most of the projects are located on the North Coast, with some in the Northeast. Like with the other commodities, smaller initiatives, such as localize oil and gas exploration and production do not register on the MPI list due to their smaller project value.

5.5.2 What We Heard

The Montney shale region in Northeastern BC was identified by stakeholders as a potential area for considerable growth, and it is shown in Figure 34.

"The largest and most productive play, the Montney, stretches from the BC/Alberta border near Dawson Creek 200 kilometres northwest to the BC Rocky Mountain foothills" – Natural Resources Canada[63]

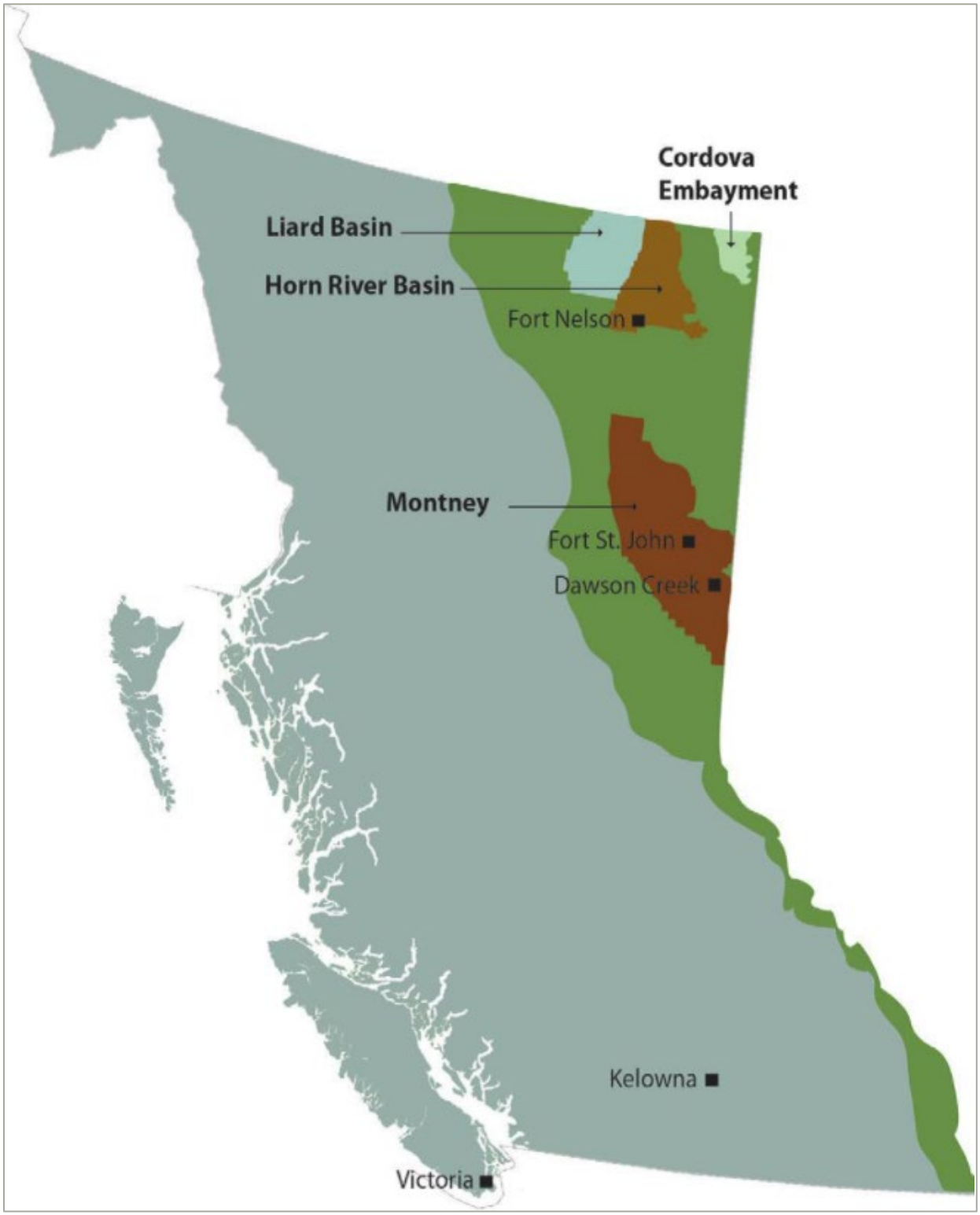
We spoke with a number of stakeholders in the oil and gas industry in Northeastern BC, and they expressed opportunities for growth and also noted that rail service and the reliability of rail service are key supply chain factors that could influence the amount of oil and gas exploration, production, and export that occurs within the region.

LNG Canada is one of the significant Liquified Natural Gas (LNG) export facilities that is currently being built in Kitimat. The facility will receive its supply of LNG from the Montney formation via Costal GasLink, a pipeline that is currently under construction and is shown in Figure 35. Once completed, the project will be able to export up to 2.1 billion cubic feet of LNG per day[64]. This significant project will facilitate continued Natural Gas exploration in Northeastern BC and drive continued demand for rail service to export product and import materials to support exploration and extraction.

While Natural Gas is typically exported via pipeline, the production of Natural Gas creates Natural Gas Liquids (NGLs) byproducts, including Propane, Butane, Iso-Butane, Condensates, and Ethane. Propane and Ethane are primary feedstocks for plastics production (polyethylene and polypropylene). AltaGas is one of the current producers in the region, and they operate a facility north of Fort. St. John. Much of the production from this facility is transported by rail to AltaGas' Ridley Island Propane Export Terminal (RIPET) in Prince Rupert.

[63] https://www.nrcan.gc.ca/our-natural-resources/energy-sources-distribution/clean-fossil-fuels/natural-gas/shale-and-tight-resources-canada/british-columbias-shale-and-tight-resources/17692
[64] https://www.coastalgaslink.com/about/

Figure 34: BC Oil & Gas Resources



Source: https://www.nrcan.gc.ca/our-natural-resources/energy-sources-distribution/clean-fossil-fuels/natural-gas/shale-and-tight-resources-canada/british-columbias-shale-and-tight-resources/17692

Figure 35: LNG Canada / Costal GasLink Pipeline

Source: https://www.coastalgaslink.com/siteassets/about/approved-route/coastal-gaslink-route-map-may-2020.jp

West Coast Olefins is proposing to build a large liquids extraction facility near Prince George[65] that would extract NGLs from Natural Gas. While the dry Natural Gas would be sent to LNG markets via pipeline, the byproduct NGLs would be manufactured into plastic pellets, glycol, and other petrochemicals that would be shipped from the facility by rail. Figure 36 shows the production process of both LNG and NGLs, and the transportation method used for each.

This project will create additional rail volumes in Prince George. It will reduce the need to transport NGLs from Northern BC to Alberta for processing, and for the Natural Gas to then be sent back to the West Coast ports for export, which is what happens for much of the product today.

Significant volumes of inputs are also required for oil and gas exploration, including frac sand, which is used in the process of hydraulic fracturing, and construction components including drill pipes, drilling fluids, and other chemicals used in the production of natural gas and oil.

We spoke with Steve Smith, Chief Operating Officer of Torq Energy Logistics, who supports oil and gas exploration in Northeastern BC by providing frac sand offloading and outbound petrochemical transloading at their rail terminals. He said that Torq is on track to significantly increase the amount of frac sand that their customers import to the region, potentially increasing their current import volume by 3 to 4 times in the next few years. Torq is considering building a new facility in Taylor to support this growth and their operations in the region. Torq also mentioned that one of the midstream companies in the area is only able to export 30% of their product via their rail network due to existing rail service levels. This leaves them to either truck the product or sell it to local markets at a greatly reduced price.

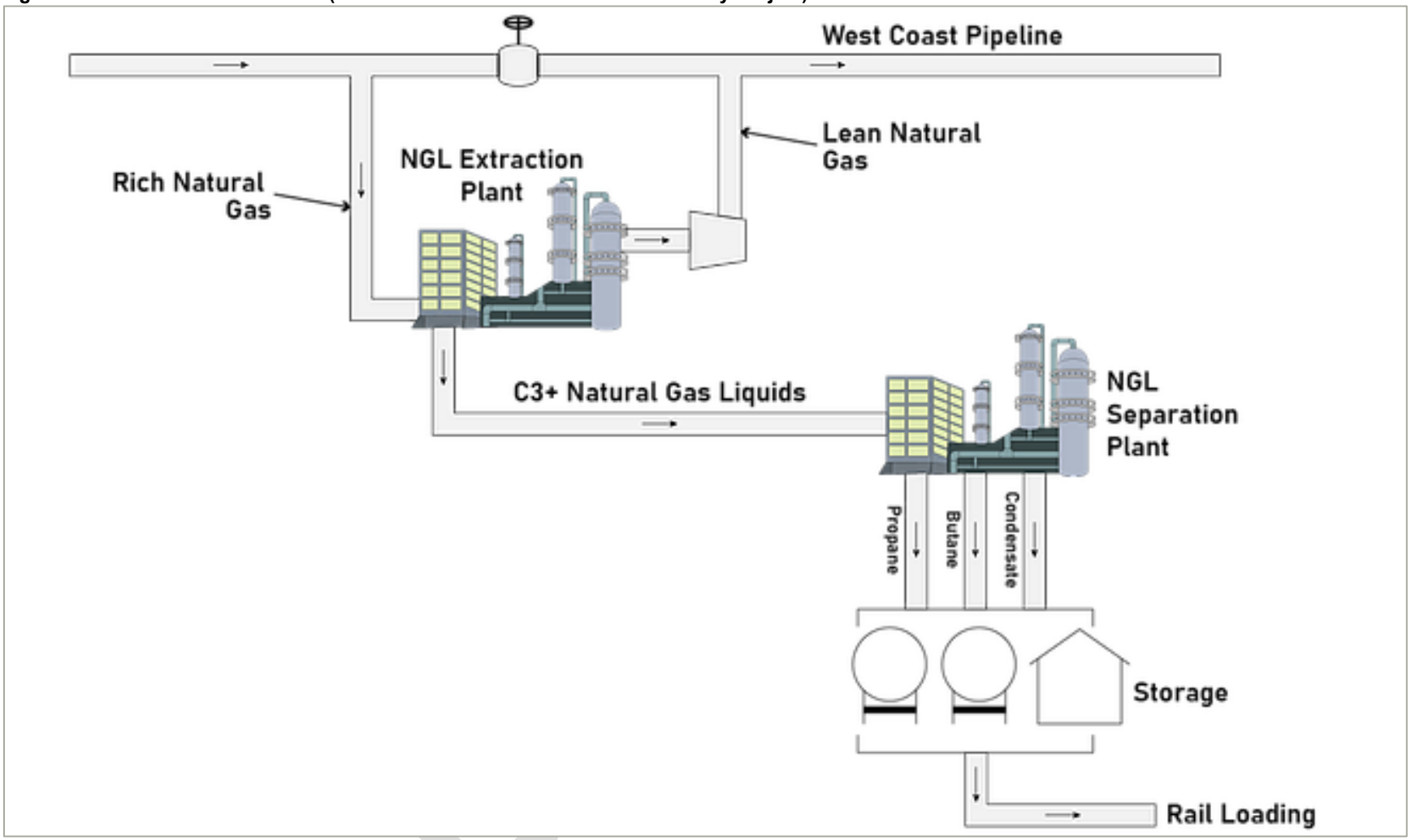
5.5.3 Rail Improvement Areas

Opportunities for oil and gas are focused in Northeastern BC, and the opportunities for rail improvements noted by stakeholders were primarily oriented around more frequent rail service and consistent reliability. Many producers noted that they could export more products if they received more regular and reliable rail service.

To help improve rail service for the oil and gas sector in Northeastern BC, improvement options include a shortline, and third-party switching and storage services to reduce the impact of service irregularities to business operations by providing more railcar storage and/or product storage as a buffer.

[65] https://www.westcoastolefins.com/pg-ngl-recovery-plant

Figure 36: NGL Extraction Process (Source: West Coast Olefins NGL Recovery Project)



5.6 Emerging Opportunity Summary

A review of the economic landscape, major projects, and major sectors in Northern BC indicate the potential for continued economic growth. Stakeholders also shared information about the growth prospects for their businesses, and perspectives on growth for their industries. As those working in industry often know their industries best, these first-hand descriptions of potential opportunities add significant validity to the emerging opportunities analysis and insight that is often not publicly available or published.

Table 11 shows the potential increase in railcar demand that stakeholders told us was possible if the rail network and service frequencies were improved to help facilitate their business opportunities. The total additional demand is 26,200 railcars annually, with the majority of opportunity originating on the former BC Rail network north of Prince George.

Table 11: Potential Demand

Industry	Location	Annual Railcar Estimate
Mining	Fort Liard NWT	1,200
Forestry	Mackenzie	500
Oil & Gas	Fort St. John	10,000
Forestry	Fort Nelson	12,000
Mixed Freight	Fort Nelson	1,000
Mixed Freight	Fort Nelson	500
Intermodal	Terrace	500
Intermodal	Prince George	500
Total	**-**	**26,200**

We believe that this value is only a portion of the total growth potential in Northern BC, as many stakeholders were unable to quantify the potential benefit to their business if rail service was improved or additional rail services were offered. It should also be noted that we spoke to only a fraction of the hundreds of businesses in Northern BC that currently ship / rely on rail service, and that the total potential growth for rail traffic may be multiple times what is show above.

6 Improvement Ideas & Evaluation

This section summarizes the improvement ideas that have been identified throughout the study. It includes an evaluation of each idea, and HDR's recommendation of whether or not RMC should further pursue each concept. If an idea is recommended in this section, the following sections provide a further description of each idea, and details on how the idea could be pursued.

For most of these ideas, it is envisioned that RMC would not be the primary party funding the project, but would instead be the party that advocates for the improvement and assists from an organizational capacity; identifying and connecting potential partners who could complete and pay for the improvements.

6.1 Evaluation

Each idea has been evaluated through a Multiple Account Evaluation (MAE) process, and the evaluation is summarized in Table 12. Several different accounts have been used, and definitions of each are provided below. A recommendation and rationale for the recommendation are provided in the final .

The recommendations provided are in regard to whether or not RMC should pursue the idea. This is not an evaluation of whether or not the recommendations are warranted, but instead a recommendation of whether or not HDR believes that the idea could realistically provide benefits to shippers and the Northern BC community with a proportional level of effort by RMC (or other parties involved) compared to the level of benefit.

6.1.1 Account Description

6.1.1.1 COST

Cost estimates were not completed for the project ideas, but initial level of magnitude costs are provided for each. This is provided to show the cost magnitude of each idea, and whether the idea is capital or operating cost intensive compared to the other options. The respective cost ranges used for evaluation are:

Capital Cost		**Annual Operating Cost**	
$:	$0 – $1 million	**$**:	$0 – $100,000
$$:	$1 – $10 million	**$$**:	$100,000 - $1 million
$$$:	>$10 million	**$$$**:	> $1 million

Identifying which specific entity that would be responsible for these costs has not been identified in this section. There are potentially multiple ways that each idea could be funded, and different funding sources for consideration are described in Section 9.

6.1.1.2 INCREASE RAIL TRAFFIC AND IMPROVE RAIL SERVICE

This criterion shows the anticipated increase in rail demand as a result of the improvement option, and/or the improvement in rail service (delivering and receiving cars from shippers in a timely manner) that is expected to be provided by each option.

6.1.1.3 POTENTIAL BENEFIT MAGNITUDE BY STAKEHOLDER

This criterion shows the potential level of benefit that each improvement idea is expected to provide to each stakeholder group (Shippers, Community, and CN).

6.1.1.4 IMPLEMENTATION DIFFICULTY

The level of implementation difficulty criteria represents the level of inherent difficulty that each option possesses when it comes to implementation. Ideas with low levels of difficulty can likely be implemented in a short period of time with few hurdles, whereas high level of difficulty projects are anticipated to have more significant barriers or complexity, including anticipated regulatory or stakeholder barriers that would need to be overcome and dealt with to progress the opportunity.

6.1.1.5 EVALUATION SUMMARY

The evaluation summary provides HDR's recommendation on whether or not the option should be further pursued, and our rationale for the decision.

6.1.1.6 EVALUATION SCALE

A five-level evaluation scale has been used for many of the accounts, with the values being Negative, None, Low, Medium and High. The evaluations were completed using the information received throughout the project, including stakeholder engagement, analysis, and from HDR's experience on other projects.

Table 12: Idea Evaluation

Idea Type	Idea	Description	Capital Cost	Operating Cost	Increase Rail Traffic	Improve Rail Service	Potential Benefit Magnitude by Stakeholder			Implementation Difficulty	Evaluation Summary
							Shippers	Community	Railway		
Operating	**Shortline Railway**	A shortline railway company/entity would take over rail operations for a defined segment of the rail network, and would be able to provide more tailored levels of service and support to shippers, and would relieve CN from onerous tasks such as switching.	$$	$$	High	High	High	Medium	Medium	Medium CN expressed interest in working with potential shortline partners for the Fort Nelson subdivision, and there may be opportunities to expand the boundaries in the future, or for multiple shortlines to operate portions of the network.	✓ Has the potential to provide significant benefits to shippers, communities and CN.
	Customer Self Switching	Shippers would be able to access training for their employees so that they could switch their own railcars. This would potentially reduce the frequency that CN has to service certain shippers and/or enable shippers to improve their own on-site operations and cycle through railcars faster.	$	$	Low	Medium	Medium	Low	Medium	Low CN was in support of this idea, and with training being voluntary, shippers could sign up if interested. Funding support may be needed to help shippers pay for trackmobiles, locomotives, or other railcar moving devices.	✓ A potential win-win solution that will benefit the rail network and shippers.
	Railcar Consolidation	Adjacent shippers could consolidate their own railcars in a centralized location for CN to pick up / drop off, potentially enabling service frequency improvements and improvements in shippers' onsite operations.	$	$$	Low	Medium	Medium	Low	Medium	Low There may already be underutilized rail yards throughout the study area that could be repurposed as central hubs for this concept	✓ A potential win-win solution that will benefit the rail network and shippers.
	Subsidize Crew Costs	Additional CN crews for Northern BC would be subsidized with the goal of improving crew availability, service frequency and reliability.	$	$$	Low	High	Medium	Low	Medium	Medium While CN may be receptive to receiving funding for crews, ensuring that these resources provide value to shippers may be challenging and difficult to manage.	✗ Crew partnerships are anticipated to provide similar value at a lower cost.
	Crew Incentives / Partnerships	RMC would help coordinate between CN and local organizations such as First Nations, Community Colleges, etc. to train and hire new crews.	$	$$	Low	Medium	Medium	High	Medium	Medium May require significant coordination effort by RMC and other interested parties to organize and maintain.	✓ A low cost, high reward idea that has been successful in other locations.
Infrastruc-ture	**Shipper Hook & Haul Infrastructure / Storage Capacity**	Trackage at shipper facilities would be added to enable hook and haul type service (CN would no longer do on-site switching and spotting). Funding support for the additional trackage could be provided for both new and existing shippers.	$$	$	Low	Medium	High	Low	Medium	Low As long as shipper have enough room for additional trackage, the design and construction of new yard tracks should be feasible.	✓ Will provide benefits for both the shippers and the railways at a moderate cost.
	East-West Mainline Improvements	Improvements on CN's east-west mainline between Tete Jaune and Prince Rupert will be required to accommodate projected volume growth and maintain fluidity. Potential projects could include double tracking CN's mainline on either side of Prince George or other major terminals, which could require either grade separation and/or removal of at-grade crossings along the corridor.	$$$	-	Low	Medium	Low	Low	High	Medium While the capacity improvements may be a straightforward improvement, removing / addressing the at-grade crossings could be challenging and require significant investment.	✗ CN is responsible for maintaining and improving their trackage, and RMC's effort and funds can be better spent elsewhere to benefit shippers / the community. This may be better pursued by other entities like BC MoTI, Transport Canada, and CN.
	Third Party Value Add Facility	A new third-party rail facility could be built to accommodate railcar storage, staging, maintenance, and/or transloading. It could be built in a central location (or in an existing rail yard), and would help act as buffer between shippers and the railway to accommodate variability, market cycles, and short-term economic development opportunities.	$$$	$$	Medium	Medium	High	Medium	Medium	Medium Identifying a partner who is interested in leading and funding this idea could be challenging.	✓ Would provide benefits to all stakeholders and could potentially be privately funded.
	Track Upgrade to 286k	This project would upgrade the gross weight capacity of the Fort Nelson, Fort St. John, Chetwynd, and/or Dawson Creek subdivisions so that they could accommodate railcars up to 286,000 pounds in weight. The Fort Nelson subdivision is anticipated to be the most expensive to upgrade based on existing condition and length.	$$$	$	Medium	Low	Medium	Low	Medium	Medium While initial cost estimates to upgrade the Fort Nelson subdivision have been conducted, there is the potential for actual improvement costs to exceed the estimate.	✓ This option will directly support new economic development opportunities in Fort Nelson, Fort St. John, and other areas in Northeastern BC.

Idea Type	Idea	Description	Capital Cost	Operating Cost	Increase Rail Traffic	Improve Rail Service	Potential Benefit Magnitude by Stakeholder			Implementation Difficulty	Evaluation Summary
							Shippers	Community	Railway		
	Mainline Maintenance Facility	A new maintenance facility would be built on the western side of CN's east-west mainline, potentially near Terrace or Smithers. It would include a drop- table and inspection facility to inspect and replace railcar wheelsets and perform mechanical inspections on trains and railcars.	$$	$	Low	Low	Low	Medium	Medium	Medium The existing locations that CN is considering for this facility would require at-grade crossing relocation / removal.	✗ Depending on mechanical needs for their overall rail network, CN may be best suited to champion this opportunity
	Just in Time Mixing – Blocking Facility	A new railcar mixing, blocking, storage and staging facility could be built on or near the CN mainline, ideally near Prince Rupert. It would enable CN to ship mixed manifest trains to this facility, where the railcars would then be stored and assembled into unit trains or large blocks before being shipped to Prince Rupert for direct hit unloading or loading at port facilities.	$$	$$	Low	Medium	Medium	Low	Medium	Medium Identifying a suitable location that is relatively close to the Port could be challenging given the geography along the CN mainline and Skeena River.	✗ The primary beneficiaries will be the Port of Prince Rupert and CN, both of whom are better positioned to champion this idea.
	RSIP Education	Transport Canada funds improvements to at-grade road-rail crossings through the Railway Safety Improvement Program (RSIP), and for this option RMC or another entity would provide education and support to municipalities who would like to improve the crossings and/or rail safety within their community.	$	$	Low	Low	Low	High	Low	Low The RSIP program is well defined, and the application process is straight forward.	✓ Would provide community benefits and increased safety with minimal effort and costs for RMC.
	Further Study of At-Grade Crossings & Prioritization	Related to the above option, for this option RMC or a similar party (such as a municipality or BC MOTI) would lead the study and prioritization of at-grade crossings in Northern BC and identify a group of crossings for improvement. It could also include applying for funding to improve / grade separate / remove these crossings.	$$	-	Low	Low	Low	High	Medium	Medium Would require a significant amount of funding and organizational effort from RMC or another party to complete, as opposed to the above option.	✓ A centralized effort to identify and improve multiple at-grade crossings may help achieve greater levels of improvement and reduce the burden on individual municipalities.
Other	**Rail Planning and Advocacy Entity**	This idea is to formalize the planning of rail in Northern BC through the creation of a new entity to advocate for improved rail service and planning, either as a standalone agency or as role within an existing body such as BC MoTI.	$	$$	Medium	Medium	Medium	Medium	Medium	Medium Identifying the lead party, funding sources, scope and jurisdiction may be challenging.	✓ Would be a long-term investment that would ultimately drive planning, economic development and rail advocacy in Northern BC (or perhaps the entire province).
	Work with Federal Government to Establish Minimum Service Levels	RMC would work on behalf of shippers with the Federal Government to define minimum service level standards in Northern BC. This could include things such as service frequency, pricing, and/or penalties for service failures.	$	-	Low	High	Medium	Low	Negative	High This process is likely to be time and cost intensive and may not result in meaningful service improvements. It also has the potential to alienate potential project partners.	✗ Not anticipated to be worth the potential risks and effort compared to other win-win options that will provide similar benefits.
	Passenger Rail Service	New passenger rail service would be added to select communities on the study area rail network. The service could be operated by a third party such as a shortline, municipality, or First Nation.	$$	$$$	Low	Low	Low	High	Low	Medium There are other small community passenger rail services currently in operation in BC, and a similar model could be followed to implement this service	✗ Demand for passenger rail service is not anticipated to be sufficient to cover the anticipated capital and operating costs of a new venture. This may be better suited to be explored by a Provincial entity and/or select municipalities and/or First Nations where a specific transportation need exists.

7 Recommended Improvement Descriptions

This section provides further information on each option that was recommended through the evaluation. It includes more detailed descriptions of each option, examples of where they have been implemented before if available, and one or more potential approaches that RMC or another party could use to pursue each option.

7.1 Operating

7.1.1 Shortline Railway

Primary Benefits	Improved service frequency and reliability for shippers
Anticipated Effort	Medium
Cost	$$
Potential Partners	CN, Third Party Shortline Rail Service Providers
Next Steps	Identify interested partners and develop and confirm approach

One of the most common comments from stakeholders was the desire for improved rail service (such as service frequency and reliability), and that both existing and new customers had difficulty receiving new rail service or changing their service frequency (such as from twice a week to three times a week).

CN is the rail carrier and service provider in the study area, and they operate a continental railway, with over 20,000 route-miles of track[66]. In BC, much attention is paid to optimizing the capacity and efficiency of their mainlines between Tete Juane and the Ports of Prince Rupert and Vancouver. Shippers in Northern BC only generate a small portion of the total rail volume moved within the province.

A shortline railway is a small or mid-sized rail company that operates over a relatively small section of track compared to the larger, national railway networks. In Canada there are dozens of shortline railways, with the Southern Railway of British Columbia (SRY) being the only one currently in operation in BC. Due to their focus on a specific region / route, shortlines can be more adaptive to regional and customer's needs, have more flexibility when it comes to crew and labour options, and can provide a more customized level of service than what Class I railways typically provide.

Shortline railways can operate with a cost recovery business model, or even at a loss if they deem that the railway provides valuable benefits to the local economy, shippers, etc. They are frequently owned by conglomerations of shippers, communities, or other parties who can be more oriented towards providing timely service, value add options, and opening up economic development opportunities for their owners and community stakeholders. As a result, shortlines often have the time, staff and equipment available to respond to shippers needs, and in some cases, can provide a higher level of service than what would be adequate from the perspective

[66] https://www.cn.ca/en/our-services/maps-and-network/

of a Class I railway due to their collaborative solutions with local stakeholders, ability to access government funds for capital and/or operation expenses, as well as lower financial return requirements. In general, shortlines operate on a different business model than large Class I railways, which can facilitate opportunities for increased rail service and more unique services for shippers, even on lower density branchlines and secondary lines where traffic volumes may be marginal.

The initial recommended extents for a shortline in Northern BC could include the Fort Nelson subdivision in its entirety, from Fort Nelson to Fort St. John. In order to generate additional revenue and synergies for CN mainline train operations, it is recommended that the shortline would also switch and service the shippers within Fort St. John and surrounding area (possibly including Taylor). Currently, there is minimal rail traffic that operates over the entire corridor to/from Fort Nelson, and the rail served businesses within surrounding Fort St. John could help make a shortline commercially viable, while also minimizing CN's requirement to maintain a local yard operation to switch railcars and service customers locally.

Identifying an interested party to operate the shortline and scoping the initiative with CN would likely be the first steps. CN has expressed some interest in the concept for the Fort Nelson subdivision during the stakeholder consultation for this study, but more work would need to be done to confirm their interest, develop required conditions and constraints, and continue the development of the shortline concept and feasibility.

Throughout this study, HDR spoke with many stakeholders who expressed support for a shortline in the region, including a few stakeholders who would be potentially interested in operating such a railway if a need exists. Throughout the project we engaged with CN, and they said that they would be interested in entertaining concepts for a shortline railway in Northern BC, specifically on the Fort Nelson subdivision from interested parties.

During the stakeholder consultation, some stakeholders noted that a shortline railway could potentially increase the overall transportation costs for some shippers. It is acknowledged that there could be a potential for this, as there would be two railways (the new shortline and CN) who would now be sharing the revenue for the same transportation services. However, from our past experience we expect that the benefits of improved service and a reduction in ancillary charges could help to alleviate any potential increases in shipping costs that might be experienced by certain shippers, which could still make the shortline concept attractive for most, if not all, shippers on specific corridors where a shortline might be viable within Northern BC.

In addition to providing benefits to shippers, a shortline railway could benefit CN by freeing up resources (crews, locomotives, and finances) for utilization on other routes and core parts of the CN network. As noted earlier, CN's primary focus is on hauling large quantities of goods along their mainlines and primary corridors, and a shortline would potentially enable CN to focus their efforts on the core mainline network in BC and Western Canada. A shortline railway would provide direct benefits to the communities along its route, enabling additional economic development opportunities and providing a new local source of employment (it should be noted that existing CN crews and maintenance staff in Northern BC do not necessarily reside in the communities that they work in).

The creation of and/or investment in shortline railways is a common approach used to stimulate and support economic development in both Canada and the United States.

In Canada, the Government of Saskatchewan provides support to the shortline railway industry through the Shortline Railway Improvement Program (SRIP). The government budget for 2021-2022 included $530,000 for shortline railway investment, and this fund assists with upgrades and expansion, crossing surface and sightline improvements, bridge maintenance, and track rehabilitations. In the past, the Saskatchewan government has also funded shortline railway feasibility studies and has provided technical expertise and shortline startup support through their Rail Services office. This success has helped in the creation and ongoing operations of 13 provincially-regulated shortline railways across the Province of Saskatchewan.

In the United States, the Ohio Rail Development Commission (ORDC) recently supported the newly founded Napoleon, Defiance & Western (NDW) shortline railway through a grant of over $600,000. The trackage that the shortline took over from the previous owner was in a state of disrepair, and the project involved improvements that would enable the shortline to haul larger and heavier trains. The Executive Director of the ORDC project said, “This project, as well as the recent federal grant award, will make this rail line an asset for the region’s economic development efforts for many years to come”.

Source: https://www.saskatchewan.ca/government/news-and-media/2021/june/03/short-line-railway-improvement-program-supports-vital-rail-service, https://www.trains.com/trn/news-reviews/news-wire/ohio-short-line-gets-funding-for-rail-project/

Stakeholder Coordination

It is fully acknowledged that RMC may not be in a position to organize and lead the development of a shortline railway in Northern BC. However, we believe that there are some basic steps that RMC can take to initiate the process and set the stage for a shortline to develop and be successful within the region.

The first step to further progress the concept would be to speak with the necessary parties and assess their interest / willingness to support the initiative. These include further engagement with CN to confirm their interest in transferring a portion of the network that they operate to a shortline railway, including outlining any specific terms or requests that CN may have in regard to setting up a shortline operation. During the stakeholder engagement CN said that they would consider this concept for the Fort Nelson subdivision, but confirmation of this and other conditions would be required.

The second party to be engaged would be the British Columbia Railway Company (BCRC) and the BC Ministry of Transportation and Infrastructure (MOTI). With BCRC being the owner of the former BC Rail corridor that CN leases, they will be a primary stakeholder in the process, and may be able to support the initiative from either a monetary and/or regulatory perspective.

The final initial step would include reaching out to prospective entities who may be interested in taking a leadership role in running the initiative. JBS Mining / Cariboo Rail expressed interest in

operating such a shortline during the stakeholder engagement, and there may be other companies who would also be interested.

Funding

The primary costs to implement a shortline railway could include the funding of a feasibility study, potential purchase and startup costs, including locomotives, railcars (if required), maintenance equipment, and staffing. It is assumed that some level of public funding will be required to kick-start the initiative, and there are a number of potential funding sources that could be considered, and these are further described in Section 9.

Governance and On-going Monitoring

While the governance of the shortline will need to be sorted out near the on-set of the process, regular monitoring, reporting and methods of accountability will need be set up and tracked to help ensure that the new railway is delivering on the mission to support businesses and economic development in Northern BC.

Many shortlines operate as independent companies that are wholly owned by a parent organization or are governed by a board of elected / appointed representatives. This provides the shortline with the autonomy that it needs to operate, while enabling the parent organization (province, local municipalities, shippers, etc.) to guide and monitor the railway to ensure that it is providing value to shippers and is oriented to achieve its economic development goals in addition to any financial goals that it may have (such as turning a profit and providing a return for investors).

7.1.2 Customer Self-Switching

Primary Benefits	Improved on-site operations for shippers by enabling them to move and reposition railcars without having to wait for service from CN
Anticipated Effort	Low
Cost	$
Potential Partners	CN, Shippers, Training Organizations
Next Steps	Define the program (training and subsidization of training and equipment purchases), and then confirm interest from shippers before proceeding

Many of the shippers in Northern BC ship and receive a variety of different types of goods and commodities via railcar, such as inputs for their processes, or different outputs, such as lumber, wood chips, and pellets. These different types of commodities require several types of railcars, and are often unloaded and loaded at different locations within a customer's industrial site. Traditional rail operations at terminals such as these rely on the mainline railway to switch / move the various different railcars on the shipper's site to different locations, depending on where the product can be loaded / unloaded, and how it fits into the shippers' operations and/or storage plans. This can be very time intensive, and can use up a significant amount of time for the locomotive and crew, reducing the efficiency of the serving railway and increasing the resource needs to service all customers in a respective area. In the event that there are unforeseen interruptions or delays, this can ripple down and effect the service of other customers served by the railway, as the train crew may no longer be able to provide the scheduled service within their maximum working hours allowed by regulation. This can often be

the case with local railway assignments service numerous industrial railway facilities where railcars need to be positioned, or re-positioned, to various locations within the plant or industrial site.

In Northern BC, CN continues to do in-plant switching for many existing shippers, but they are encouraging new shippers to do their own self-switching as new facilities come online, or existing facilities are expanded. While self-switching can be contracted to third party companies, a more cost-effective model may be for shippers to do the switching activities themselves, perhaps with existing employees if feasible. There are two primary components required for shippers be able to switch their own railcars, including procuring proper railcar moving equipment, and qualifying staff to perform industrial railway switching.

The railcar moving equipment could be a locomotive, trackmobile or railcar progressioner depending on individual site needs. Costs to acquire a single used unit could be $50,000 or more depending on the condition and what type of equipment is required. In support of this option, RMC could work with other stakeholders to help develop a joint funding program that could provide monetary support to shippers through the subsidization of both employee training and/or the purchase of the necessary railcar moving equipment. In some cases, track modifications may be required to facilitate self-switching at industrial sites, and this could increase the costs on a case-by-case basis. CN may partner with shippers to develop freight rate incentives and/or other monetary benefits to help absorb the costs and support the implementation of self-switching at specific sites. Customer self-switching typically facilitates “hook and haul” opportunities for CN (see “Hook & Haul Infrastructure” in Section 7.1.1), which is more efficient and reduces their resource use. This not only creates financial efficiencies for CN, but also allows resources to be stretched further, facilitating the option to service additional customers and/or increasing service frequency to existing customers, with the same locomotive and crew resources.

Having properly qualified staff to operate railcar moving equipment is another pre-requisite for customer self-switching to be safe, viable, and efficient. There are several training organizations that provide industrial switching and railcar mover operations and safety training including Canadian Heartland Training Railway Services Inc. (CHTRS)[67]. An organization such as CHTRS could be retained to provide education, training, support services, and/or help organize a new training program specifically for industrial rail customers in Northern BC.

Customer self-switching would provide benefits for both industrial rail customers and CN, and could be implemented on a case by case basis with any industrial rail customer who is interested in changing their operations and developing self-switch capability.

[67] https://chtr.ca/about/

Cargill operates a meat processing plant at High River Alberta (south of Calgary) that relies on rail service from Canadian Pacific Railway (CP). Their facility is located on an industrial spur that is located several miles away from the CP mainline. As such, the Cargill facility requires dedicated rail service from CP as it is not operationally feasible to utilize other mainline trains to service this customer site. Historically, CP provided all the intra-plant switching at the Cargill plant site, including sorting and spotting of numerous commodities and railcar types within the plant. With different grades of outbound product and numerous railcar types required, the intra-plant switching time could often take several hours for CP to complete. Due to the complex switching operations at the Cargill plant, plus the required time for the crew to service other customers in their train operating route between the local serving yard and the Cargill plant, the crew often expired on their maximum working hours requiring a re-crew (additional crew start) and/or the train to be "tied down" until another crew could be supplied.

CP worked with Cargill to see if there was an opportunity for Cargill to "self-switch" their plant with a trackmobile versus CP providing these services. In this way, CP could deliver mixed inbound cars to Cargill and pull all outbound railcars that Cargill had already combined for CP in a "hook & haul" fashion. Cargill leased a portion of the CP industrial spur, to facilitate an efficient location for exchanging railcars with CP, while also providing some additional trackage for railcar storage immediately adjacent to their facility. Cargill purchased a small trackmobile and had their existing product loading staff qualified to operate the trackmobile and provide internal plant industrial rail switching service. This was a "win-win" opportunity for Cargill as it allowed them to cycle through the loading of their cars in a continuous 24-7 production environment, without being at the mercy of being switched by CP only 3-5 times per week. It also minimized the CP crew time needed to service Cargill, drastically reducing the frequency of "re-crews" or failed service to the facility and other customer sites in the region. Taking on the self-switching activity and leasing some adjacent CP industrial trackage also created a small buffer of railcar storage at Cargill's site to deal with shipping and service variability, seasonality, and other supply chain impacts. Cargill's outbound rail volumes have increased considerably due to these changes and less product now needs to move by truck to distant markets.

7.1.3 Crew Incentives / Partnerships

Primary Benefits	Improved railway efficiency and service reliability Local employment
Anticipated Effort	Low
Cost	$
Potential Partners	Community organizations such as colleges and technical schools, First Nations, CN
Next Steps	Scope the requirements of training with CN, and identify partners who may be interested in leading the program

CN and other businesses in Northern BC often have a difficult time in finding, training, and retaining qualified staff. It can take over 6 months to train new employees to operate trains and/or maintain trackage for CN, and because of this it can be difficult to quickly replace field

staff when there is employee turnover. This can lead to staffing issues, which can interrupt rail service and reliability in the region.

One potential improvement idea to address this is to develop a crew training / incentive partnership between CN and interested local organizations in Northern BC. This would help CN find local staff that are interested in remaining in the community (reducing turnover), and could also benefit local communities by providing training and job opportunities. Potential partners for this program include First Nations, community colleges and technical schools, and existing job support organizations.

> AltaGas Ltd has developed a local training program in collaboration with Coast Tsimshian communities and Coast Mountain College in Prince Rupert and Terrace to provide both First Nations and local residents with the proper technical skills to apply for entry-level positions at the AltaGas Ridley Island Propane Export Terminal (RIPET). This is a collaborative program to bring industry training directly into the local community and provide long-term employment opportunities for local residents and the growing needs of industry within the region.

Source: https://www.altagas.ca/newsroom/news-releases/altagas-celebrates-graduation-local-students-altagas-operator-training

Through the stakeholder engagement survey, a number of First Nations members said that they were interested in working together with CN to identify employment opportunities for their community.

Once initial buy in to the concept is confirmed with CN, RMC can use the stakeholder feedback results to identify potential First Nations and communities who may be interested in being partners in the railway employment program.

7.1.4 Railcar Consolidation

Primary Benefits	Potential for increased rail service frequency and reliability if enough shippers buy into the concept
Anticipated Effort	Low
Cost	$
Potential Partners	Shippers, CN
Next Steps	Confirm interest in concept by shippers and CN, and then identify potential existing locations for consolidation

One of the factors that influences the frequency of service that shippers receive is the amount of demand that each shipper generates. More frequent service is warranted for shippers that generate large quantities of goods, compared to shippers that generate only a few railcars worth of demand every week.

One opportunity to potentially enable increased service frequency to low producing shippers is to consolidate railcars that have either similar commodities or are located in close proximity to a central location. This removes the railcars from the small shippers' sites, reducing the chance of these cars affecting their production, and makes it more convenient for CN to pick up and haul away the railcars, as they have all been consolidated to one location. If the railcars from enough

shippers are consolidated together, then CN may even be able to provide more frequent service to pick up these railcars (and drop off empties), as it will take less time to consolidate them into larger trains for furtherance from the region.

This improvement idea requires either the shippers or a third party to move the railcars from the shipper terminals to a central location, and requires a central location with enough space to store and consolidate the cars. There may be sidings / small terminals in many locations throughout Northern BC that could be re-purposed for this use, and the railcar switching and consolidation could potentially be done by an existing shipper or private company with a trackmobile or locomotive.

HDR has identified several locations that could potentially be considered for this concept, and they are show in Figure 37 below. There are likely many other locations on the CN network in Northern BC that could be considered and those would likely be best identified by CN along with their shippers.

Figure 37: Potential Rail Consolidation Locations

7.2 Infrastructure

7.2.1 Shipper Hook & Haul Infrastructure / Storage Capacity

Primary Benefits	Improved railway efficiency, service and reliability
Anticipated Effort	Medium
Cost	$$
Potential Partners	Shippers, CN
Next Steps	Confirm CN's interest in Hook & Haul and interest from shippers

Mainline operators such as CN have been evolving towards an operating model known as "Hook & Haul", where all of the internal railcar switching at industrial rail sites is done either by the shipper themselves or a potentially a third-party (refer to self-switching as described in Section 7.1.2). This leaves the mainline railway to simply drop off a single block (or unit train) of railcars and pick up a single block of railcars, a much more efficient process for the serving rail carrier.

CN has indicated that they are encouraging new shippers to build their own rail infrastructure on-site to enable hook and haul operations. Dedicated exchange tracks at shippers' sites are required for this model. They include one inbound track for CN to deliver a block of inbound railcars (or train), and typically a dedicated outbound track for CN to pick up a block of outbound railcars (or train). In some cases, it may be possible for one long track to serve the purpose of both inbound and outbound use (especially for unit train operations). These tracks are typically different than railcar storage tracks, which are used for staging and storing both empty and loaded railcars on site, and act as a buffer to help industries deal with shipping and service variability, seasonality, and other supply chain impacts to their fleet size and railcar cycle times.

The primary benefit of the hook and haul approach is that it would greatly reduce the amount of time that CN has to spend at each shipper's site, and will therefore enable the railway to service more shippers within a day, increasing the consistency and reliability of rail service in a particular rail segment or area overall. It is not uncommon for railways to spend multiple hours at an industrial rail site doing blocking and switching, and the hook and haul approach can reduce this time dramatically, sometimes only taking 30-60 minutes to both set off and lift rail traffic with this approach.

While some shippers may already have the necessary on-site trackage to enable the hook and haul model, many do not, and the costs to build this new trackage (or reconfigure existing trackage) are often significant.

An improvement idea would be to provide a subsidy or loan for new and existing shippers to build the exchange tracks needed for the hook and haul model. This could potentially be done by developing a centralized source of funds that shippers could access to subsidize their costs, or by securing provincial / federal funding that could be drawn upon to initially pay for these facilities before the shipper can fully repay for them (low interest loans for example). This idea would help remove a cost barrier that may currently be an impediment for new shippers who are considering building a new facility in the region, or for existing customers looking to retrofit their facilities.

Many industrial rail shippers are converting their facilities to "self-switch" capability across Western Canada, facilitating efficient "Hook & Haul" opportunities for the Class I railways that service them. Large ag companies including Cargill, Richardson Pioneer, Parish & Heimbecker, and Viterra have been taking over full responsibility for self-switching their facilities to enable hook and haul capabilities. In many cases this is combined with infrastructure investment to facilitate efficient exchange of large blocks of railcars (or entire unit trains) with the serving Class I railway. The grain companies then self-switch and sequence the railcars through their facility with their own locomotive and crew resources. In some cases, they may leverage locomotives left on-site by the Class I railway as well. Depending on the efficiencies gained by the Class I railway, certain financial incentives are provided to the industrial customer to take over these activities and/or build complementary infrastructure to support self-switching and hook and haul capability. This has included significant freight rate discounts for efficient unit train loading (within specified turnaround times), or perhaps capital contributions (either monetary, or in some cases by contributing track materials and/or installation labour) to facilitate larger blocks of railcars and more efficient mainline rail operations.

It is noted that existing shippers may not be interested in building the necessary trackage for hook and haul operations, especially if CN is already switching their facility within their current fees. There may be an opportunity for RMC or another party to negotiate a standard discount for rail service for shippers if they either self-switch their facilities and/or build hook and haul capable facilities, and this discount could help incentivize shippers to build the facilities and support this model. Although direct costs are variable depending on the number of locomotives and labour contracts, an hours' worth of time for a mainline train crew and typical two-unit locomotive consist could be valued at over $500 per hour, and there are significant savings that could be afforded the railway if switching time / effort are reduced by multiple hours a week for certain sites. The ripple effects of more productive train crews and reduced switching hours at each customer site is the real value, allowing MORE customer sites and/or more volume to be handled with the same resources used today.

7.2.2 Third-Party Value Add Facility

Primary Benefits	Mainline efficiency
Anticipated Effort	Low
Cost	$$
Potential Partners	Existing third-party operators (Cando, AMRT, Transmark, etc.), CN, Port of Prince Rupert
Next Steps	Organize discussion with potential providers, stakeholders and interested parties, including CN and the Port of Prince Rupert

The amount of railcar storage at a shippers' site can limit the number of railcars that can be received / shipped, and this effectively limits the amount of product that can be exported based on a regular service schedule. In the event of a rail service interruption, or other supply chain issue, a lack of on-site product storage (or railcar storage) can directly impact facility production. Many customers in the study area have limited on-site railcar and product storage, and there

are currently no major third-party railcar storage facilities in the study area. Although CN has some rail yards in the region, those are primarily utilized to process railcars (switch, combine, and segregate them as part of regular operations) and they are generally not supportive of storing, staging or maintaining private railcars in their own facilities, except for extreme circumstances. This is consistent with most Class I railways as they generally want to utilize their infrastructure for operating purposes, not storage purposes.

This opportunity would look at the feasibility to construct one or more third-party rail storage, staging and maintenance facilities in the study area. This could be of new construction and/or repurposing existing industrial or CN operated trackage to facilitate. Potential areas for a facility are shown in the figure below, and could include locations near Terrace, Smithers, Prince George, and Taylor / Fort St. John.

Third party value add facilities are becoming more common in Western Canada, and there are several examples in Alberta, including facilities provided by Cando Rail & Terminals and Alberta Midland Railway Terminal (AMRT) in Alberta's Industrial Heartland near Edmonton, as well as a facility owned by Transmark south of Lethbridge. These facilities provide railcar storage, staging, maintenance, and potential transloading services to private railcar owners, industries, and the railways (if needed). These types of facilities have become more popular as over time the Class I railways have sought to simplify their operations and focus more on mainline service and less on these auxiliary services, leaving a gap for these third-party providers to support. The overall growth of the industry has also forced the Class I railways to utilize rail yard space more effectively dedicating it to services (like switching and blocking) that "keep trains moving" versus them historically also serving as a place to store railcars when needed. These third-party facilities often have a revenue generating component that is cheaper than the alternatives for industrial rail shippers. Often shippers may have to consider constructing additional trackage at their facilities that is used infrequently, or perhaps paying significant demurrage or storage tariffs to the Class I railways when they have insufficient space at their facilities to accommodate all railcars directed to them at any particular time. For areas where there are many shippers, a third-party value add facility may be a better alternative than each shipper developing their own infrastructure at their respective facilities to accommodate variability and seasonal storage requirements.

RMC could advance this concept by identifying third parties that may be interested in developing such a facility in the region, and negotiating a set rate for shippers, or negotiating the lease of a set number of tracks. Coordination with CN would be critical to establish an efficient location, taking into consideration proximity to customer industrial sites, but also proximity to CN's local serving yards and a crew base.

Such a facility could even potentially be located at the same location as a Just-In-Time railyard that would serve the Port of Prince Rupert trade corridor. This would provide greater synergies between the activities at this location, and the existence of each would help drive demand for the other.

Potential locations for Third Party Value Add Facilities are shown in Figure 38.

Figure 38: Third Party Value Add Facility - Potential Locations

7.2.3 Track Upgrade to 286k Gross Weight Capacity

Primary Benefits	Improved economic development opportunities by enabling lower per ton shipping costs
Anticipated Effort	Medium
Cost	$$$
Potential Partners	Province, CN, Potential shortline railway partners, private shippers
Next Steps	Incorporate the upgrade of this trackage into the shortline railway option discussion

The gross weight capacity of the Fort Nelson Subdivision between Fort St. John and Fort Nelson is currently 268,000 lbs (286k) per railcar, and track speeds vary between 10 and 30 miles per hour. Many stakeholders noted that this subdivision was in need of repair / upgrading in order to facilitate the growth of rail traffic. Additionally, the Fort St. John and Chetwynd subdivisions also have weight capacities that are under 286,000 lbs. The same could be said for branchlines to Mackenzie and Dawson Creek.

CN continues to operate regularly on the corridor to Fort Nelson and has reduced operating speeds as the track condition has deteriorated over the years.

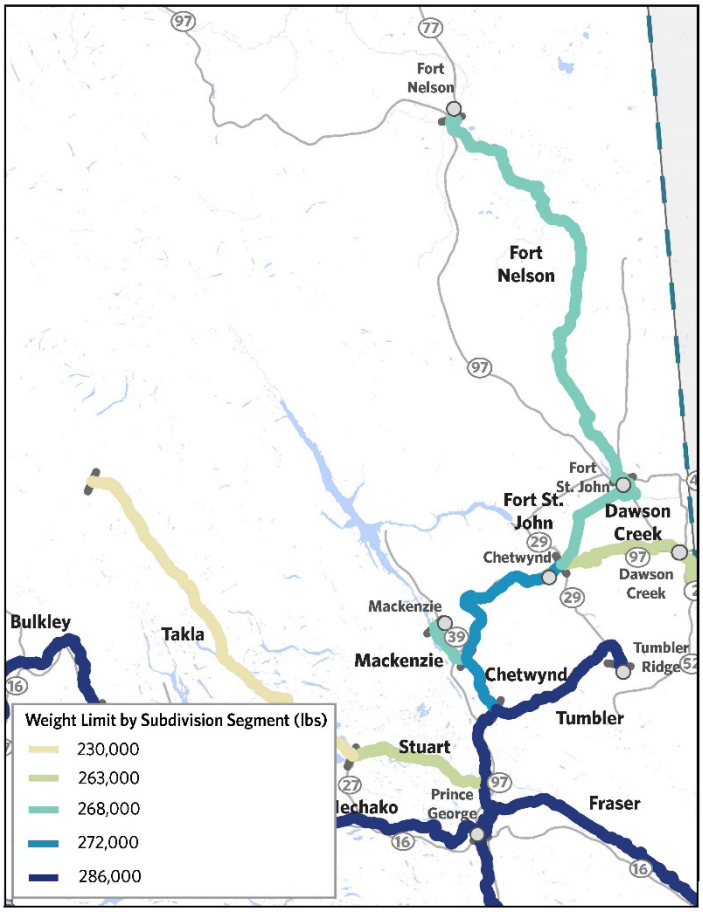
Existing traffic volumes to Fort Nelson, which are less than 1,000 railcars annually, do not warrant track improvements on their own. However, as presented in Section 5, there are economic development opportunities along the Fort Nelson subdivision and to the north, and these opportunities may not materialize if the line is not upgraded, as the current low weight capacity increases transportation costs on a per ton/volume basis for prospective shippers.

A number of stakeholders noted that this track is of strategic importance to their businesses and the economy around Fort Nelson, and that additional volumes could be generated if the track were in better condition (from either a speed or gross weight capacity perspective). One stakeholder, who expressed interest in owning, operating, and upgrading the line themselves, estimated that it would cost in the order of $50 million to upgrade the Fort Nelson subdivision to a better state of repair, and if it was upgraded, and service frequency was improved, demand on the line could potentially increase in the next few years from <1,000 railcars per year to over 10,000 railcars per year future state.

HDR believes that the Fort Nelson subdivision is in the highest need of repair, and that it will cost significantly less to upgrade the Fort St. John and Chetwynd subdivisions to 286,000 lbs. A detailed analysis of upgrade costs, either to facilitate increased track speeds and/or gross weight capabilities would need to be developed by CN's engineering department or a third party engineering analysis (including site visit).

With track upgrades and gross weight capacity increases being deemed uneconomical at the current rail traffic volumes, HDR recommends that RMC upgrades to facilitate increased trade flows, economic development, and more efficient rail operations over the longer term. Funding for track upgrades could potentially come from the provincial government, or through a joint application with CN, shippers, and other stakeholders to Transport Canada's National Trade Corridors Fund (NTCF).

This improvement option is likely to require government funding assistance to upgrade the rail lines, as there is currently insufficient revenue generated by existing rail shipments in the area to warrant upgrades directly by CN. The current sub-286k capacity of the rail lines, lower track speeds, and overall track condition cab sometimes act as a potential deterrent to new businesses and shippers considering investing in the area that require rail service. The reduced capacity of the current line, compared to 286k, can effectively increases the costs to ship goods in the area by an estimated 5-15% per ton, and for large volume shippers such as mines where transportation costs make up a large portion of total project costs, this value could be significant enough to sway an investment decision, and push investments to other locations where 286k rail is available, or more likely to be upgraded in the near future.



The recent development of high throughput grain terminals in Northwestern Alberta, directly across the border from the Fort St. John region, may be evidence that this has already occurred. According to CN gross weight capacity maps from 2016, the CN trackage in the Grande Prairie region is a mix of 286k and 263k capable, while as noted above the Fort St. John and Fort Nelson subdivisions are only 268k capable. There has been significant economic development in this region over the last 5-10 years and it may be more economically feasible for CN to upgrade the remaining rail lines in Northwestern Alberta to 286k capability, versus similar upgrades in Northern BC. Having longer term guidance from CN on their eventual capability to have full 286k capability on rail lines within the Alberta region may have been a contributing factor when the grain terminal companies were choosing where to construct new terminals. The entire Peace Region on both sides of the AB-BC border is a primary grain growing region, and much of the BC grain production is currently trucked across the AB-BC border to these new grain elevators. This results in additional wear and tear on regional roadways and highways (in both BC and Alberta), and also represents a lack of economic development and tax revenue for the BC Peace region and province.

It is noted that the focus of this option is on upgrading track weight capacity over speeds, as it is considered to have a higher impact on operating costs for the railways, and in turn shipper costs for producers. That said, increasing the weight capacity of the track is likely to also improve track speeds to a certain extent, and this will provide additional benefits to the railway and shippers by reducing transit time and improving resource utilization.

The US Department of Transportation's Federal Railroad Administration recently awarded over $16 million to the Springfield Terminal Railway Company in the Northeast US to increase the gross weight capacity of a section of their network in support of more efficient and safe operations. The project will replace a total of 75 miles of rail, 55,000 ties, 72 grade crossings and improve five bridges. This project will increase the gross weight capacity of the track to 286,000 lbs, and will enable speeds to increase from 10 to 25 miles per hour, enabling more efficient operations. The increase in efficiency is expected to improve safety, reliability and reduce operating costs, and could incentivize businesses to increase shipments along the railway.

Source: https://railsandports.com/2020/09/fra-awards-320-6-million-for-rail-infrastructure-and-safety-improvements/

7.3 Other

7.3.1 RSIP Education

Primary Benefits	Safety improvements along the rail network and at at-grade crossings
Anticipated Effort	Low
Cost	$
Potential Partners	Municipalities, First Nations, CN, other community organizations
Next Steps	Identify party to lead this idea

This improved idea is for RMC or another organization to educate municipalities and other community groups in Northern BC on the Railway Safety Improvement Program (RSIP)[68] program, and provide support with identifying projects and completing funding applications throughout the region.

In 2014 Transport Canada released new federal road/railway Grade Crossing Regulations, and grade crossings must meet certain requirements defined in the Regulations. Compliance is required for crossing deemed high-priority by November 28, 2022, and for all other grade crossing by November 28, 2024. This requires road authorities and railway companies to assess and upgrade their current crossings to meet the new standards, with an emphasis on signage, sightlines, warning devices, vehicle use and pedestrian access safety.

The Government of Canada established the RSIP to provide communities with support for upgrading their crossings to the current standards. The program provides funding to provinces, local governments and not-for-profit organizations to improve rail safety and reduce injuries and fatalities related to rail transportation.

Types of projects that can be implemented includes grade separation, the installation of lights and gates, train detection technologies, communication technologies, research, and the closure of at-grade crossings. Up to 80% of the total project costs are covered for municipalities, including up to $25,000 for improvements to a public crossing and/or crossing closure.

[68] https://tc.canada.ca/en/programs/funding-programs/rail-safety-improvement-program

7.3.2 Further Study of At-Grade Crossings & Prioritization

Primary Benefits	Safety benefits for communities and improved rail operations
Anticipated Effort	Medium
Cost	$
Potential Partners	Municipalities, community organizations, CN
Next Steps	Identify and prioritize crossing for improvement, and confirm interest in the process with municipalities.

There are hundreds of at-grade road / rail crossings in Northern BC, and each one has unique safety risks, with some have operational impacts to the rail network. Transport Canada maintains an inventory of all grade crossings in the country, and requires that all jurisdictions' review and ensure that their grade crossings comply with federal standards. Standards vary based on the crossing type, rail/vehicular volumes, and other factors.

The locations of all at-grade crossings in Northern BC can be found in both Transport Canada's Grade Crossing Inventory[69] and also on the Railway Association of Canada (RAC) online railway atlas[70] website. This improvement idea would be for RMC or another local entity to organize and conduct a study to rank and prioritize existing grade crossings for review (grade crossing safety assessments may be required) and potential improvement. Once a list of crossings have been identified for improvement, funding through the RISP program could be sought to help pay for the majority of the improvements.

BC MoTI completed the BC Transportation Trade Network (TTN) Study in 2016, and this project identified many road / rail conflicts and issue areas that could be improved on key trade corridors. The information in this study and the crossings that were identified would provide a good starting point for this work in Northern BC.

Source: https://www2.gov.bc.ca/assets/gov/driving-and-transportation/reports-and-reference/reports-and-studies/planning-strategy-economy/ttn-analysis-summary-report.pdf

The improvement, removal or grade separation of at-grade road rail crossings also provides significant benefits to the railways. Trains are not legally permitted to stop over an at-grade crossing for more than 5 minutes, and this negatively impacts rail operations, as trains cannot be staged or stopped in areas with at-grade crossings to facilitate railway operations. Similarly, the extension of sidings and/or double track is often curtailed by the existence of at-grade crossings, as the extended trackage cannot be effectively used to stop or stage a train if there is an at-grade crossing across it. CN could also be approached to partner on this study, and they would benefit from the removal of certain at-grade crossing depending on those that align with their longer term network capacity expansion plans and anticipated operating plans.

[69] https://tc.canada.ca/en/rail-transportation/rail-safety/grade-crossings-inventory
[70] https://rac.jmaponline.net/canadianrailatlas/

7.3.3 Rail Planning & Advocacy Entity

Primary Benefits	Improved long term economic develop prospects through better rail planning and advocacy
Anticipated Effort	High
Cost	$
Potential Partners	Province, Municipalities, CN
Next Steps	Lobby the province to develop a new organization to oversee the planning and advocacy of the rail network in Northern BC

The advancement of rail planning and advocacy work in support of economic development and community betterment for Northern BC has been championed through the RMC via this study, however it is our understanding that RMC would like to transfer these responsibilities and advocacy to a more appropriate entity. Provinces and states often take the lead in developing regional rail plans, and in the U.S. the government has mandated that states must complete a statewide rail plan every 4 years. There have been multimodal trade network studies completed in BC and Alberta in recent years (BC and AB Transportation Trade Network Studies), and the province of Saskatchewan has a small team dedicated to rail planning and supporting the needs of shippers and shortline operators.

This idea would be to start a new entity, either as a standalone party, or within a different level of government such as the MoTI. The scope of the organization would be to lead rail planning in Northern BC or perhaps all of BC, and champion the initiatives recommended in this report and others. They could also support economic development related to rail, providing guidance and advocacy on behalf of industry, and helping to act as a conduit / third party between shippers, railways, various levels of government, and other stakeholders to support and champion rail development and rail usage within BC.

Seven County Infrastructure Coalition
The Seven County Infrastructure Coalition was originally formed in 2014 to promote regional planning, collaboration between regions and the alignment of goals and planning strategies for member counties within the state of Utah. The coalition is made up of the counties of Carbon, Daggett, Duchesne, Emery, San Juan, Sevier, and Uintah. Economic development and rail planning are included within the coalition mandate, and on-going projects include the Southeast Utah Rail Line Study and Unita Basin Railway, which is a new self-sustaining railway project that will provide access to a large resource producing region in the Uinta Basin.

The Seven County Infrastructure Coalition and Uinta Basin Railway are model organizations that demonstrate how a new Rail Planning & Advocacy Entity and shortline railway could be formed and structured.

South Central Ontario Region Economic Development Corporation
In 2010 the counties of Brant, Elgin Middlesex, and Oxford in Southwestern Ontario formed the South Central Ontario Region Economic Development Corporation (SCOR EDC) as a regional partnership to provide a venue for planning, regional coordination and economic development. In 2020, CN provided notice of discontinuance of the Cayuga subdivision, which served a number of businesses in the region, and extended between St. Thomas and Tillsonburg. Current volumes on the route were between 400-800 railcar loads annually, and it had an estimated annual operating cost of $1- $1.5 million. The SCOR recognized the value that the route provided for local businesses, shippers and economic development as a whole.

To save the line, SCOR drafted a letter of intent to attract shortline service operators and investigated opportunities for funding. They worked with current shortline rail operators including GIO Rail to understand the importance of the route, and then developed a long-range plan that will look to leverage funding from all levels of government (including the National Trade Corridors Fund). The effort ultimately succeeded, and SCOR re-opened the route for local rail service in January 2022.

Source: https://scic-utah.org/, https://uintabasinrailway.com/, https://www.scorregion.com/, http://www.okthepk.ca/news/2022020307.htm

8 Strategic Plan

HDR recommends that the improvement options in the previous section be further explored, either by RMC or another designated entity. Some of the initiatives will be easier to accomplish than others, and there are interdependences between them, meaning that it will be easier to undertake some first, while others will have a higher chance of success if they are implemented later.

This section provides a summary of our recommended course of action for RMC / a new entity to implement the ideas and improve rail service in Northern BC. The improvement ideas have been split into the three different themes:

- **Theme 1: Planning & Advocacy**
- **Theme 2: Shippers & Operations**
- **Theme 3: Shortline & Network Upgrades**

Within each theme, the projects listed first are those that we recommended undertaking first, and the interdependencies and rationale for the order are described for each theme. Each theme can be implemented concurrently.

Theme 1: Planning & Advocacy

- **Rail Planning & Advocacy Entity**
- **Crew Incentives & Partnerships**
- **Railway Safety Improvement Program (RSIP) Education**
- **Further Study of At-Grade Crossings & Prioritization**

Beginning to set up a new entity to take over the rail planning and advocacy work from RMC is our recommended first step for this theme, and for the project overall. This process may take a number of years to complete, and so we recommend that RMC begins working on how this entity could be set up as soon as possible. This new entity may be able to lead the next steps of this theme and others.

The next two items in this theme will involve significant engagement with communities in Northern BC, and may be able to be initiated in tandem, providing efficiencies during the process. We believe that the RSIP Education should also be conducted before further study and prioritization of at-grade crossings, as the education and engagement process with municipalities and stakeholders will shed light on the need and direction of this subsequent work task. It may be found that there are only handful of crossings that communities would like to be improved, and no need for additional study and prioritization.

Theme 2: Shippers & Operations

- **Customer Self Switching**
- **Railcar Consolidation**
- **Shipper Hook & Haul Infrastructure / Storage**
- **Third Party Value Add Facility**

The railcar consolidation and Hook & Haul initiatives are predicated on shippers being able to switch their own railcars without CN, either by doing the work themselves, or by retaining a third-party to complete the work. We therefore recommend that the Customer Self Switching initiative is first initiated, and then the Railcar Consolidation initiative. Shipper engagement will be needed for both of these concepts, and it may be found that existing facilities (both at shippers' sites and other central locations) may be sufficient to accommodate shippers needs for switching, railcar storage and staging, and a Hook & Haul type model, without the need for additional Hook & Haul infrastructure.

After the first two ideas have been further explored, the need for individual shipper Hook & Haul facilities can be confirmed, and contrasted with the benefits that a Third Party Value Add Facility might provide, with potentially different findings possible for different areas within Northern BC. For example, customer self-switching and railcar consolidation to an existing central location may be found to be the most effective in some locations, while other locations may warrant dedicated Hook & Haul infrastructure and/or Third Party facilities.

Theme 3: Shortline & Network Upgrades

- **Shortline Railway**
- **Track Upgrade to 286k Gross Weight Capacity**

The increased usage of the Fort Nelson subdivision is predicated on the weight capacity of the line, but also on the level of service that the shippers in the area receive. If the line is upgraded without the shippers receiving improved service, the upgrade may not spur the desired economic development and investment.

JBS Mining / Cariboo Rail expressed interest in setting up a shortline railway on the Fort Nelson subdivision, and HDR recommends that RMC explore the opportunity of establishing a shortline railway with this party and others first. Through this work it will become more apparent what the specific infrastructure needs are, and what other aspects will be required for a shortline to succeed. For example, the extents of the shortline railway will depend on how much traffic is generated in the area, as the shortline will need to capture enough revenue to maintain operations and potentially upgrade the trackage depending on their funding model and assistance from various levels of government and/or shippers.

Once an approach to developing a shortline railway has been identified and agreed upon by CN and an interested shortline partner, then the shortline / RMC / the new planning and advocacy entity can pursue funding to upgrade the line. Having an agreement and business plan for the shortline railway in place will greatly increase the chance of receiving funding to upgrade the facility, and in turn the chance of the shortline railway succeeding. Funding may also be sought at the same time to subsidize the shortline railway and cover startup costs and/or capital.

9 Potential Funding Sources

The type of funding that is pursued for each improvement should be based on the implementation plan / primary proponents for each improvement, and some of the improvements could warrant multiple funding types.

9.1 Transport Canada National Trade Corridors Fund

Transport Canada (TC) created the National Trade Corridors Fund[71] (NTCF) in July 2017 as a mechanism to fund improvements to Canada's transportation trade network. Since then, TC has announced funding for over 96 projects and committed more than $2.1 billion to marine, air, rail and road projects across the country. Funding has been granted to a number of rail projects, including the Great Sandhills Railway Shortline in Saskatchewan, which received over $10 million for track upgrades and new infrastructure, and the Forty Mile Railroad shortline to develop a new transload facility and track rehabilitation in Southern Alberta. Based on HDR's experience, projects that provide benefits to multiple stakeholders and are joint ventures between private industry and public organizations often have the highest chance of receiving funding through the program.

The latest call for proposals, "Increasing the Fluidity of Canada's Supply Chains"[72], closed on March 31, 2022, but it is a multi-year program, and it is anticipated that there will be additional calls for proposals in the future, potentially annually. The two main investment themes of the latest call are:

- **Strengthening Canada's connections to global markets**: will support fluid and reliable trade flows between Canada and global markets, including the U.S. and Mexico; enable an increase in or generate new exports and improve the national transportation system's efficiency and reliability for Canadian supply chains.

- **Building internal trade corridors**: will support the fluidity of Canadian goods trade and supply chains by alleviating capacity constraints and bottlenecks along regional and inter-provincial trade corridors; strengthen modal interconnectivity and operability; and improve producers' access to markets, industrial centres and/or multimodal hubs and gateways.

If a project and proponent are eligible to apply for funding, there is a two staged funding application process. An Expression of Interest (EOI) is submitted first, and if approved, applicants are invited to submit a Comprehensive Project Proposal (CPP). NTCF funding can be provided for the planning, design and construction components of a project. Maximum funding

[71] https://tc.canada.ca/en/programs/funding-programs/national-trade-corridors-fund
[72] https://tc.canada.ca/en/programs/funding-programs/national-trade-corridors-fund/apply-under-national-trade-corridors-fund-call-proposals-increasing-fluidity-canada-s-supply-chains

for a project depends on the proponent, but the maximum amount of a project that can be covered ranges between 33% - 100% depending on the proponent type (private, public, etc.)

9.2 Canada Infrastructure Bank

The Canada Infrastructure Bank (CIB) was formed in 2017 and its purpose is to invest in revenue-generating infrastructure that benefits Canadians and attracts private capital[73]. The CIB has a mandate to invest $35 billion in projects. Sectors that the CIB provides funding for include Public Transit, Green Infrastructure, Broadband, Transportation & Trade, Clean Power, Project Acceleration, and Indigenous Infrastructure. As of October 2021, the CIB has invested $6.3 billion into projects with a total capital cost of $17.8 billion. Rail projects that are underway include the Tshiuetin Railway in Northeastern Quebec, and a study of the New Westminster Rail Bridge project in the Lower Mainland[74].

Private companies and institutional investors can submit Unsolicited proposals (USPs) to the CIB, while public sector applications can contact the CIB to explore potential funding at investments@cib-bic.ca.

9.3 Other Government Funding

The federal, provincial, and regional governments may also be potential sources of funding for certain improvements. While there are often not official funding programs and applications, once a confirmed course of action and project has been identified by RMC or another entity, government counterparts at all levels should be contacted to investigate the potential for funding for these projects, especially if part of the projects can be funded by private entities or the other programs listed above.

9.4 Shipper Funding

Some the improvements that have been identified may be able to be funded by single or multiple shippers in part or in full, depending on the project. The RMC, or some other organization could act as the administrator or governing party, and shippers could pay a fee for certain services, such as training for their employees to be able to switch their own railcars, or as rent to access shared railcar storage facilities.

The amount that shippers are willing to pay to support a project will depend on the benefit of the initiative to the shipper and how many shippers can share in the costs.

[73] https://cib-bic.ca/en/about-us/our-purpose/
[74] https://cib-bic.ca/en/partnerships/

9.5 Private Equity Funding

Private organizations, including private equity / investment groups, or third-party rail service operators may also be interested in funding some of the improvement ideas. Funding arrangement can include a private equity party as the main source of funding for a project, who then collects tolls or revenue to pay back the initial investment plus a return. Third party rail service provides may also be interested in developing some of these projects or operating them, such as a shortline or third-party rail services yard. These exist in many places throughout Western Canada, and we heard through our stakeholder engagement that there are private parties that are interested in pursuing these types of ideas in Northern BC. These types of facilities typically operate on a fee for service model, where they can provide storage, staging, transloading, maintenance or other services, with the costs based on the specific service.

HDR recommends that RMC pursue the strategic plan provided in this document, and then strategically reach out to potential private partners as required for each improvement idea.

Appendix A: Literature Review Summary

Document Name	Author	Date
1,200 jobs may be lost by sale of BC Rail to CN, report says	Brothers of Locomotive Engineers	2003
2019 CN Investor Fact Book	CN	2019
2021-2021 CN Grain Plan	CN	2020
A BC Rail Disaster Waiting to Happen? Audit Bolsters Warning the Risk	The Tyee	2020
BC Rail and BC Rail Partnership Revitalization Agreement	BC Government	2004
BC Rail Transaction Agreement with CN Rail	BC Government	2003
BC Transportation Trade Network Analysis	BC Ministry of Transportation	2019
British Columbia's Energy Roadmap	Resource Municipalities Coalition	2019
Canada Stewart Port Railway - stewartworldport.com	Stewart World Port	2021
Canadian International Merchandise Trade Database - Export Data	Statistics Canada	2020
CN 6544 Mileage Equalization and Distance Allowance in Canada	CN	2021
CN 9001-Cdn Optional Services - Switching in Canada	CN	2020
CN Quarterly Review	CN	2020
CN Tariff Tariff 628597 - AD	CN	2019
Contributing to a Better BC: 2019 Forest Industry Economic Impact	BC Council of Forest Industries	2019
CTA Interswitching Points - Canada (CN)	CN	NA
Deep Roots. Strong Communities: 2019 Regional Supply Chain Study	BC Council of Forest Industries	2019
General Rail Statistics	CARS / ACFCF	2021
Global Energy Review 2021	IEA	2021
Grain Monitoring Program Report	Quorum Corporation	2020
Greater Vancouver Gateway - Periodic Update Report	Greater Vancovuer Gateway 2030	2020
Greater Vancouver Gateway - Website	Gateway Transportation	2021
Guide to Effective Indigenous Involvement in Federal Impact	First Nations Major Projects	2020
Investment Ready - Community Profile	District of Kitimat	2021
LNG: Canada's Global Market Opportunity	Canada and the Natrual Gas	2019
Market Snapshot: New propane export terminal in British Columbia	Canadian Energy Regulator	2019
Monitoring the Canadian Grain Handling and Transportation System	Government of Canada	2019
Northeast & Peace River Regions: Exports Analysis	The North Peace Economic	2014
Northeast BC Share of BC Exports and Provincial Revenue	Resource Municipalities Coalition	2021
Pacific Access: PART III – ECONOMIC IMPACTS OF EXPORTING	Canadian Energy Research Institue	2012
Port of Prince Rupert Fact Sheet	Prince Rupert Port Authority	2021
Port of Prince Rupert Foreign Cargo Volumes by Terminal	Prince Rupert Port Authority	2021
Port of Prince Rupert Master Plan	Prince Rupert Port Authority	2020
Port of Prince Rupert Master Plan 2 pager	Prince Rupert Port Authority	2021
Port of Prince Rupert’s plans are staggering - Port of Prince Rupert	The Northern View	2019
Protecting the Investment in Our Future: MANAGING THE SOCIO-	Fort McMurrary Chamber of	2015
Provincial Trade Data	Statistics Canada	2021
Rail Publications Website	Transport Canada	2021
Renewables 2020: Analysis and forecast to 2025	IEA	2020
Report 1 - Follow-up Audit on the Transportation of Dangerous Goods	Office of the Auditor General of	2020
Report of the Process Monitor On the BC Rail/CN RFP Process	Passenger Tourist Train Service	2004
Reports and Reference Studies Online	BC Ministry of Transportation	2021
Securing Canadas Economic Future: Natural resources for real jobs	Task Force for Real Jobs, Real	2020
Stewards of a Valuable Resource	Squamish Terminals	2021
Terrace Transload Study	CPCS	2019
West Coast Supply Chain Visibility Program - Program Overview	Port of Vancovuer	2020

Appendix B: Customers Database

Name	Regional District	Type of Customer	Type (Simplified)
ABC Recycling	Peace River	Waste	Other
ABC Recycling	Fraser-Fort George	Waste	Other
ABC Recycling	Kitimat Stikine	Waste	Other
AJ Forsyth	Fraser-Fort George	Building Materials	Building Materials
Allen's Scrap & Salvage	Fraser-Fort George	Waste	Other
Apollo Forest Products	Buckley-Nechako	Forestry	Forestry
Armetc	Peace River	Building Materials	Building Materials
Babine Forest Products	Buckley-Nechako	Forestry	Forestry
BC Livestock Producers	Thompson-Nicola	Livestock	Agriculture
BCR	Fraser-Fort George	Chemical	Chemical
Bluewave Energy	Northern Rockies	Energy	Energy
Brenntag	Peace River	Chemical	Chemical
Brink Forest Products	Fraser-Fort George	Forestry	Forestry
Cameron River Logistics	Peace River	Forestry	Forestry
Canfor	Peace River	Forestry	Forestry
Canfor	Peace River	Forestry	Forestry
Canfor	Fraser-Fort George	Forestry	Forestry
Canfor	Fraser-Fort George	Forestry	Forestry
Canfor	Fraser-Fort George	Forestry	Forestry
Canfor	Fraser-Fort George	Forestry	Forestry
Canfor	Fraser-Fort George	Forestry	Forestry
Canfor	Buckley-Nechako	Forestry	Forestry
Canfor	Buckley-Nechako	Forestry	Forestry
CanGas Propane	Fraser-Fort George	Energy	Energy
Centerra Gold	Fraser-Fort George	Gold	Mining
Chasm Sawmill	Thompson-Nicola	Forestry	Forestry
Chemtrade	Fraser-Fort George	Chemical	Chemical
Chemtrade	Fraser-Fort George	Chemical	Chemical
Clusko Logging	Fraser-Fort George	Forestry	Forestry
Combustion Solutions	Squamish-Lillooet	Building Materials	Building Materials
Conifex Timber	Buckley-Nechako	Forestry	Forestry
Conuma Coal			Energy
Decker Lake Forest Products	Buckley-Nechako	Forestry	Forestry
DP World Prince Rupert	North Coast	Container	Other
Dunkley Lumber	Cariboo	Forestry	Forestry
Duz Cho Logging	Fraser-Fort George	Forestry	Forestry
East Fraser Fiber	Fraser-Fort George	Forestry	Forestry
Enbridge			Energy
ExxonMobil	Peace River	Energy	Energy
Fraserwood Industries	Squamish-Lillooet	Forestry	Forestry
Gibraltar Mine	Cariboo	Copper	Mining
Husky	Thompson-Nicola	Concrete	Building Materials
Jepson Petroleum	Cariboo	Energy	Energy
Jepson Petroleum	Cariboo	Energy	Energy
Kalum Quarry	Kitimat Stikine	Mining	Mining
Kitimat Iron & Metal Works	Kitimat Stikine	Building Materials	Building Materials
Kode Contracting	Fraser-Fort George	Sand	Building Materials
Lafarge	Peace River	Concrete	Building Materials
Lafarge	Kitimat Stikine	Concrete	Building Materials
Lakeland Mills	Fraser-Fort George	Forestry	Forestry
LaPrairie Group	Peace River	Sand	Building Materials
LNG	Kitimat Stikine	Energy	Energy
Louis Dreyfus Canada (P & H)	Peace River	Grain	Agriculture
Louisiana Pacific	Peace River	Forestry	Forestry
Mackenzie Pulp Mill Corporati	Fraser-Fort George	Forestry	Forestry
Mount Milligan Gold Mine	Buckley-Nechako	Gold	Mining
Nechako Lumber	Buckley-Nechako	Forestry	Forestry
Newpro	Buckley-Nechako	Building Materials	Building Materials
NorthRiver Midstream	Peace River		Energy
Northwest Wood Preservers	Fraser-Fort George	Forestry	Forestry
Ospika Lath & Pre-Cut	Fraser-Fort George		Forestry
Pacific Bioenergy	Fraser-Fort George	Building Materials	Building Materials

Pal Lumber	Cariboo	Forestry	Forestry
Peak Renewables	Northern Rockies Regional Mu	Bio fuels	Forestry
Pembina	Peace River	Energy	Energy
PeroxyChem	Fraser-Fort George	Chemical	Chemical
Petro-Canada	Peace River	Energy	Energy
Pickseed Canada	Peace River	Grain	Agriculture
Pinnacle Pellet	Buckley-Nechako	Building Materials	Building Materials
Pinnacle Pellet	Cariboo	Energy	Energy
Pleasant Valley Remanufactur	Buckley-Nechako	Forestry	Forestry
Prince George Refinery	Fraser-Fort George	Energy	Energy
Prince Rupert Port Authority			Other
Prine Rupert Grain	North Coast	Grain	Agriculture
Railview Terminal	North Coast	Container	Other
Rayonier Advanced Materials	Peace River	Forestry	Forestry
Richardson Pioneer	Peace River	Grain	Agriculture
Richmond Steel Recycling	Fraser-Fort George	Waste	Other
Ridley Terminals	North Coast	Grain	Agriculture
Rio Tinto Alcan	Kitimat Stikine	Metals	Mining
Rockwater Energy Solutions	Peace River	Energy	Energy
Sinclar Group Forest Products Ltd.			Forestry
Sigurdson Forest Products	Cariboo	Forestry	Forestry
Skeena Resources	Kitimat Stikine	gold	Mining
Skeena Sawmills	Kitimat Stikine	Forestry	Forestry
Spectra Energy	Cariboo	Energy	Energy
Squamish Terminals	Squamish-Lillooet	Container	Other
Stella-Jones	Fraser-Fort George	Building Materials	Building Materials
Suncor Energy	Thompson-Nicola	Energy	Energy
Superior Propane	Kitimat Stikine	Energy	Energy
Superior Propane	Squamish-Lillooet	Energy	Energy
Tasedko Mines	Fraser-Fort George	Mining	Mining
Thompson Creek Metals Com	Buckley-Nechako	Minerals	Mining
Tolko Industries	Cariboo	Forestry	Forestry
Torq Transloading			
Tolko Industries	Cariboo	Forestry	Forestry
TranSand	Peace River	Sand	Building Materials
Trico	Fraser-Fort George	Building Materials	Building Materials
Univar	Peace River	Chemical	Chemical
Unknown	Buckley-Nechako		Other
Unknown	Stikine		Other
Unknown	Buckley-Nechako		Other
Unknown	Kitimat Stikine		Other
Unknown	Cariboo		Other
Unknown	Squamish-Lillooet		Other
Unknown	Thompson-Nicola		Other
Viterra	Peace River	Grain	Agriculture
Wajax	Fraser-Fort George	Building Materials	Building Materials
West Fraser	Cariboo	Forestry	Forestry
West Fraser	Cariboo	Forestry	Forestry
West Fraser	Cariboo	Forestry	Forestry
West Fraser	Cariboo	Forestry	Forestry
West Fraser	Cariboo	Forestry	Forestry
West Fraser	Cariboo	Forestry	Forestry
West Fraser Resources	Buckley-Nechako	Forestry	Forestry
West Fraser Resources	Buckley-Nechako	Forestry	Forestry
Western Equipment	Kitimat Stikine	Building Materials	Building Materials
Winton Global	Fraser-Fort George	Forestry	Forestry
Mount Polley Mine		Copper	Mining

Appendix C: Engagement Details

Hatfield Ref #: HDR10443

August 11, 2021

Fred Kramer, Project Manager
HDR
Ste 1510 – 639 5th Ave., SW
Calgary, Alberta
T2P 0M9

Re: Updated Survey Results – First Nations freight and passenger rail survey

1.0 INTRODUCTION

In May 2021, the Resource Municipalities Coalition (RMC) undertook a survey of First Nations communities within a 50 km radius of the rail network in northern British Columbia (BC). The purposes of the survey were to:

1. Better understand the perceptions and attitudes held by First Nations communities in northern BC about the impacts of freight and passenger rail, and
2. Learn how improvements or changes in the rail service and rail network might benefit economic development and quality of life in communities across northern BC in general.

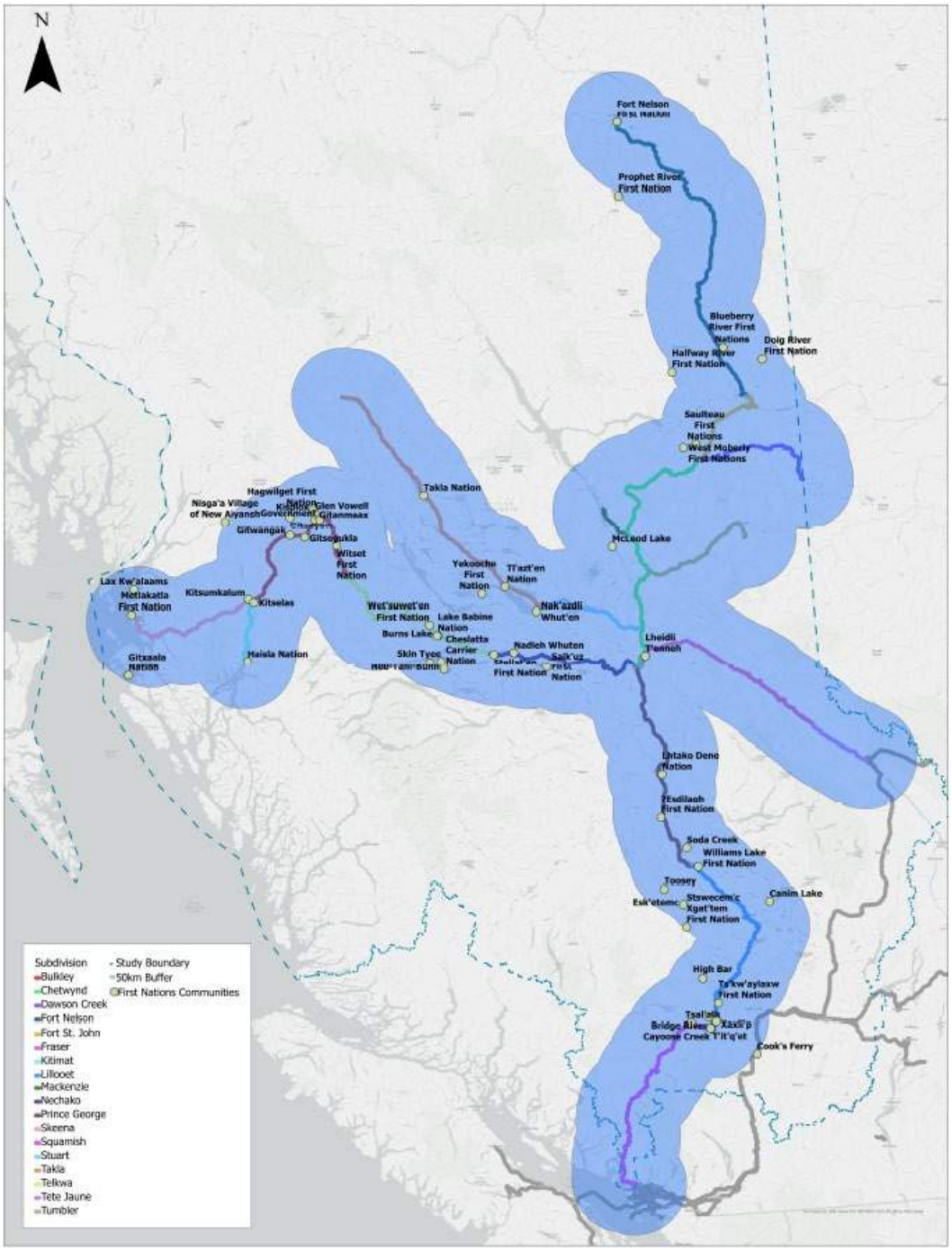
Information provided through the survey was intended to help the RMC to identify gaps and areas for improvement in rail service and the rail network in northern BC, with the goal of improving market access and economic vitality for northern industries and businesses.

Respondents were asked a range of questions pertaining to rail and rail services in the communities they work in, including:

- Positive contributions of, and drawbacks or frustrations with, freight rail;
- Changes to freight rail service that could help to improve life in their community;
- Concerns about impacts associated with rail (e.g., shunting, idling, safety, and speed at rail crossings, etc.); and
- Level of satisfaction with access to, and importance of, passenger rail service.

The questions were administered through Lime Survey, an online survey platform. Invitations to complete the online survey were sent in May 2021 to the email addresses of representatives from 52 First Nations within a 50 km radius of a northern BC rail network (see Figure 1), followed by a reminder email one week later. Due to a low response rate, invitations were sent to additional representatives within each Nation in July 2021, followed by a reminder email one week later. Respondents included elected officials, economic development staff, Band administrators, land managers, finance managers, and one hereditary Chief. A similar online survey was emailed to representatives from municipalities within the same regions; those results were summarized separately and provided under separate cover.

Figure 1 Geographic distribution of First Nations communities surveyed (n=52).



The survey consisted of both closed-ended, quantitative questions and open-ended, qualitative questions. In this report, the results for the former are displayed graphically using pie charts or histograms accompanied by a description of the results. The open-ended questions gave respondents the opportunity to provide feedback in their own words. These responses were analyzed using simple thematic coding to capture and report on the most frequently mentioned themes considered important by respondents.

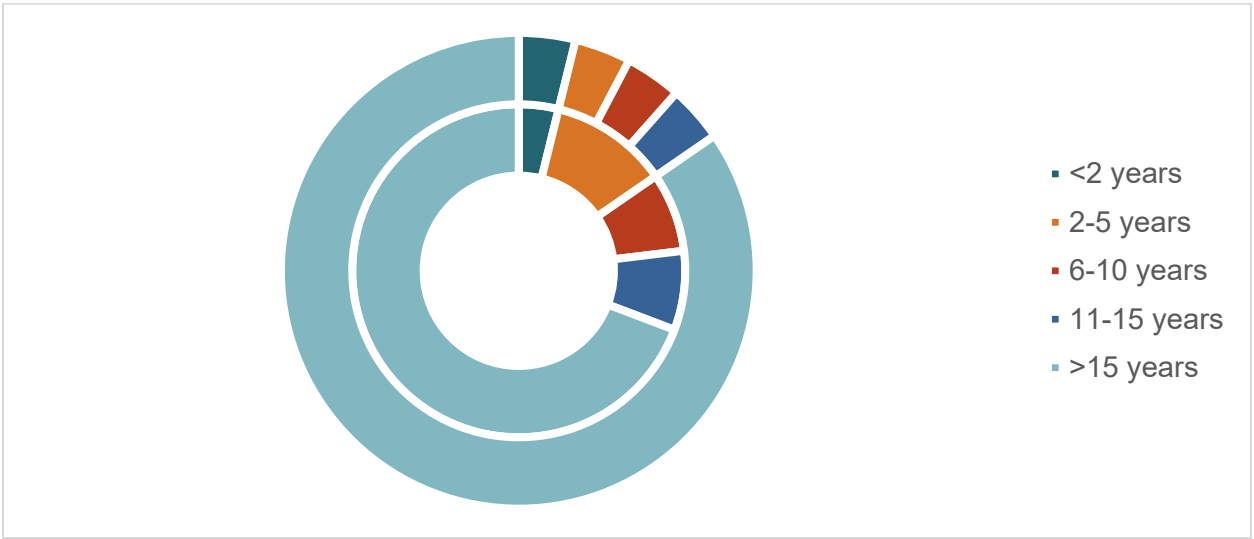
2.0 SURVEY RESULTS

The first four questions of the survey helped to characterize each respondent in terms of which community they work (and live) in, their current role in the community, and the length of time they have lived in there and in northern BC in general.

Respondents were asked to identify the community(ies) in which they currently live and work. A total of 26 respondents from at least 21 First Nations responded to the survey, representing >40% of the First Nations within a 50 km radius of a northern BC rail network. Due to the nature of the remote locations of many First Nations communities in BC, some respondents listed the name of the closest municipality, while others opted to give the name of their Band/Nation/community for their location. For those respondents who chose to identify by municipality, it was difficult to determine which of the 52 First Nations they represented as several Bands/Nations may have mailing addresses in the same municipality (e.g., 3-4 First Nations have mailing addresses located in Burns Lake). All but 11 of the First Nations in the study area belong to an organization such as a treaty society or a tribal council. There are 9 such organizations in the study area and, while not an explicit question in the survey, it appears that respondents to the survey came from 89% (8/9) of these organizations.

Eighty-five percent (22) of respondents have lived in their communities for at least 6 years and 69% (18) for >15 years (Figure 2). Eighty-five percent (22) of respondents have lived in northern BC for >15 years (Figure 2).

Figure 2 Length of time in community (inner ring; n=26) and length of time in northern BC (outer ring; n=26).



Thirty-two percent (8) of respondents were either Band managers or administrators, 24% (6) were elected officials, and 20% (5) were economic development staff (Figure 3). Other respondent roles included finance manager, lands manager, environmental officer, and CEO of a development corporation. 38% (10) reported having a very good understanding of rail and rail service in their community, while 31% (8) reported being somewhat familiar with rail in their community, and 31% (8) reported that they had very little understanding of rail and rail service (Figure 4). Respondents were also asked if their community was serviced directly by rail; 50% (13) respondents live in communities not serviced directly by rail, while 38% (10) live in communities serviced directly by rail (data not shown).

Figure 3 Current role of respondents in the community where they work (n=25).

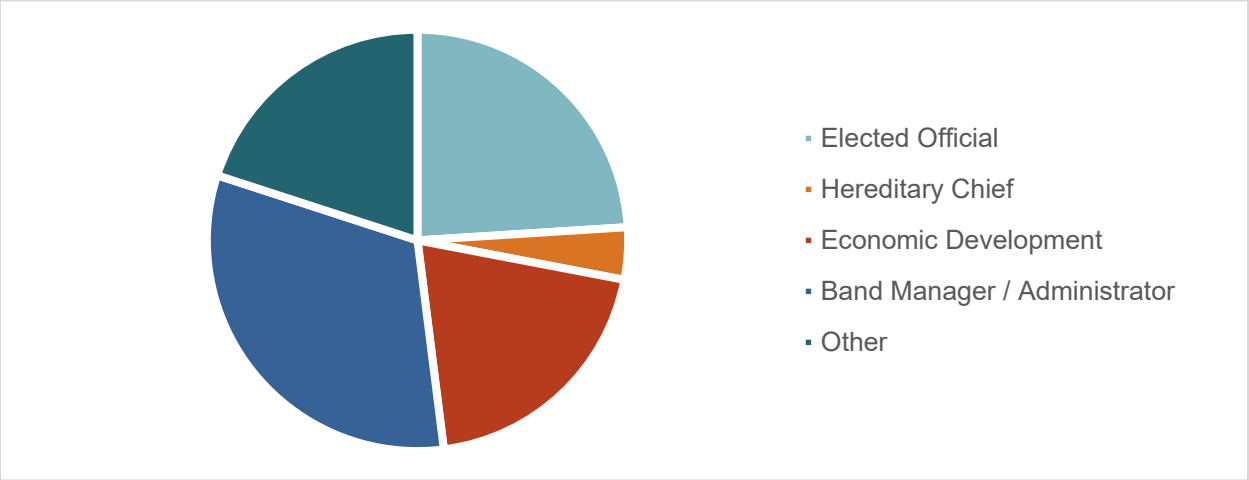
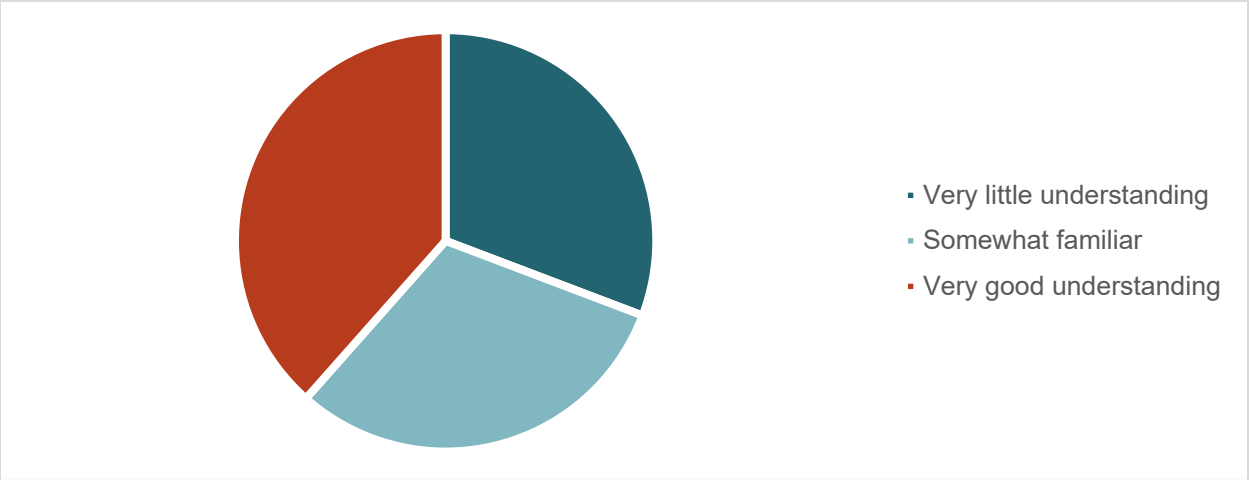


Figure 4 Awareness or familiarity of respondents with rail and rail service to their community (n=26).



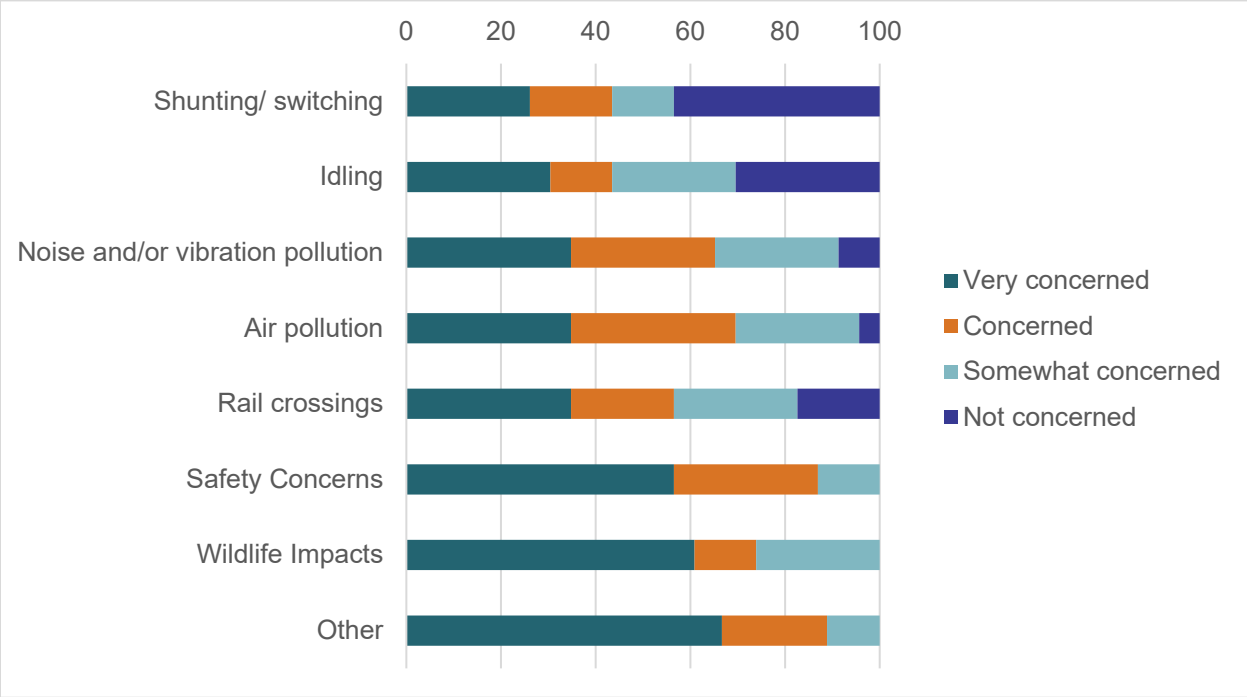
2.1 FREIGHT RAIL SERVICE

The survey questions focused mainly on freight rail to identify gaps and areas for improvement in rail service and the rail network in northern BC to support improvements to market access and economic vitality for northern industries and businesses. Respondents were asked about their level of concern regarding several potential impacts or issues related to freight rail (Figure 5). Safety issues such as spills, transportation of dangerous goods (TDG), and derailment were of greatest concern with 87% (20) of respondents concerned or very concerned followed by wildlife impacts (e.g., on moose, bear, caribou) with over 74% (17) of respondents being concerned or very concerned. In a related, open-ended question asking respondents about shortcomings of the rail network, one respondent emphasized concern about wildlife impacts claiming that 500 - 800 large animals per year are killed by trains running between Prince George and Prince Rupert.

Air pollution, noise and/or vibration pollution rail crossings (e.g., speed of trains at crossings, traffic disruptions) were the next highest issues of concern (Figure 5). Several respondents also noted “other” concerns, such as the barrier created by railway tracks which can isolate first responders from parts of the community making it difficult or impossible to respond to calls on the other side of the tracks, especially

when trains are being made up or broken apart for delivery or pick-up as this disrupts traffic; an overpass to ensure emergency services such as first responders can cross safely at all times was recommended by another respondent. Chemicals leaching from creosote-soaked “toxic rail ties” into waterways was another concern; this was also mentioned in the open-ended responses with one respondent expressing concern about chemicals leaching, “...into rivers, streams and lakes and affecting food fish and other aquatic life”.

Figure 5 Level of concern about potential impacts of issues (n=23).



Respondents were asked to describe in their own words the main drawbacks or frustrations they feel about how freight rail affects their communities. Responses were coded according to the general theme or perspective of the response. Five general themes were identified:

(i) issues related to rail service, especially the lack of passenger service (recently compounded by the impact of Greyhound’s withdrawal of bus service in the region), but also high freight costs and inadequate freight service which not only impacts the export of raw materials but also leads to increased heavy truck traffic and associated wear and tear on highways and road safety concerns;

(ii) negative environmental impacts associated with rail, including wildlife fatalities, the environmental health impacts of chemical spills leaching into local waterbodies (mentioned above), risks of derailments, and poor vegetation maintenance along the tracks (and its links to an increased risk of wildfire, as a food source for wildlife which then puts them at risk of being hit, the spraying of pesticides/herbicides along the tracks particularly in areas bordering streams and rivers, as well as the transmission of noxious weeds into communities);

(iii) negative human health impacts including safety around rail lines that bisect communities, noise and air pollution concerns, and a lack of disaster preparedness pertaining to the increased volume of hydrocarbons being transported by rail;

(iv) a perceived lack of local benefits such as stable employment or training within the rail network; and

(v) a lack of local public involvement in maintenance or planning, and the prevailing perception held by numerous respondents that CN has little to no respect for local communities evidenced by a lack of engagement with communities about their concerns.

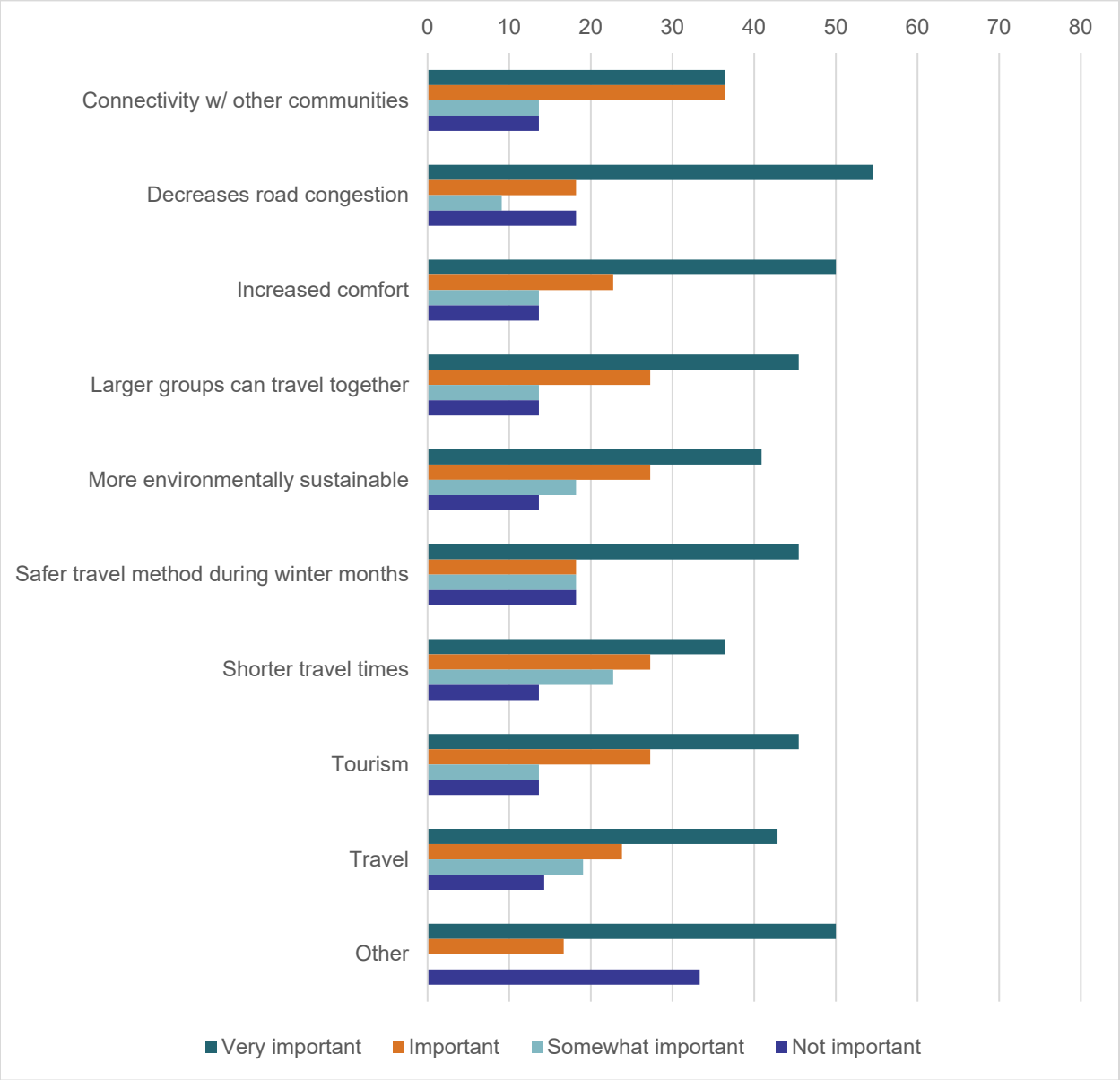
Respondents were also asked to describe how freight rail service could be changed to help improve life in their communities. Responses highlighted the lack of accessible, affordable and reliable freight rail service, the need for more frequent rail service (both freight and passenger), more railcar supply, and faster transit times. More frequent freight service reaching these remote communities was described by one respondent in Takla as a “lifeline” that supports manufacturing and the potential for communities to export goods they produce. Two respondents noted that Canadian National Railway (CN) has not pursued any form of reconciliation with First Nations nor worked to establish relationships with First Nations communities impacted by rail. It was suggested that the railway should offer special rates to those First Nations communities bisected by rail lines and make an effort to hire their community members. As one respondent noted, “rail companies do not have a relationship with [our community] despite operating in our traditional territory since colonization.”

2.2 PASSENGER RAIL SERVICE

Respondents were queried about their level of satisfaction with their community’s access to passenger rail service. 91% (20) of the respondents (n=22) clearly exhibited dissatisfaction with their lack of access to passenger rail, with many respondents noting they have no easy access to passenger service in their region (data not shown). One respondent noted that “service here is poor, irregular, and unpredictable” while another noted feeling “abandoned” by the rail company. In one community, high school students used to travel by train to the neighbouring community 42 miles away for school, but now those students travel by gravel road with elevation changes of 2,500 feet in often inclement weather.

Respondents were asked to indicate how important passenger rail was to their community according to a number of factors (e.g., for tourism, connectivity with other communities, increased comfort of travel, etc.) (Figure 6). Over 70% of respondents (n=22) believe that passenger rail service is important or very important for tourism, and as a way to decrease road congestion, connect communities, provide increased travel comfort, and enable larger groups to travel together. One respondent emphasized the importance of rail to smaller and remote towns in BC, especially those communities vulnerable to being cut off from other transport options by natural disasters such as fires, floods, and slides. Several respondents suggested the return of Budd cars would help to alleviate the absence of passenger service and would be a welcome contribution to their community.

Figure 6 The importance of passenger rail by factor (n=22).



3.0 CONCLUSION

If the results of this survey are representative of the First Nations communities living within 50 km of a northern BC rail network, it suggests that there are widespread concerns about the rail network pertaining to questionable safety precautions regarding spills, derailments and around TDGs, wildlife impacts, air pollution, and rail crossings (e.g., speed of trains at crossings, traffic disruptions). As RMC endeavours to understand what improvements or changes in the rail service and rail network might benefit the communities and the quality of life across northern BC, the key consideration appears to be the lack of passenger rail service which has been compounded by the impacts of the cancelled Greyhound bus service in the region. The return of Budd cars - self-propelled diesel rail cars generally used for passenger service in rural areas with low traffic density or in short-haul commuter service - should at least be considered.

RMC could engage with CN on these concerns as well as on other issues affecting economic development, including linkages between the high cost of freight, the impacts of minimal rail service on the ability to export raw materials, increased heavy truck traffic, wear and tear on highways, and the risks these pose to public safety. Likewise, gauging the extent of stable employment or training for local First Nations is important, especially given the perception that CN has not pursued any form of reconciliation or established relationships with the First Nations impacted by the northern rail network. Efforts to make amendments on these points could help to alleviate local sentiment that local Nations receive none of the benefits of the rail network while suffering from negative impacts associated with it.

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Re: Survey Results—Northern BC municipality freight and passenger rail survey

1.0 INTRODUCTION

The Resource Municipalities Coalition (RMC) surveyed municipalities within a 50 km radius of the rail network in northern British Columbia (BC). The purposes of the survey were to:

1. Better understand the perceptions and attitudes held by municipalities in northern BC about the impacts of freight and passenger rail, and
2. Learn how improvements or changes in the rail service and rail network might benefit economic development and quality of life in communities across northern BC in general.

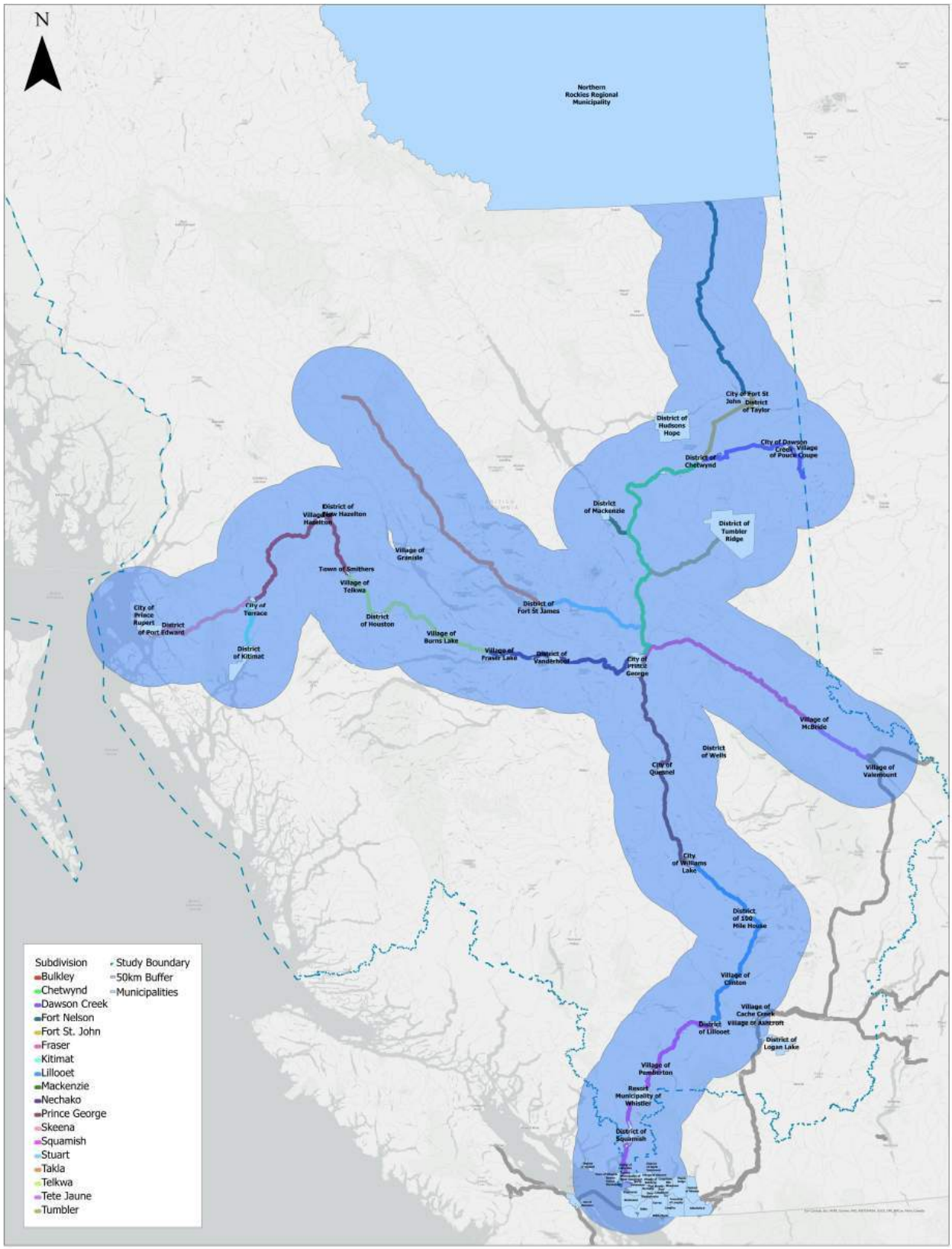
Respondents were informed that the information they provided through the surveys would help the RMC to identify gaps and areas for improvement in rail service and the rail network in northern BC, to improve market access and economic vitality for northern industries and businesses.

The brief survey consisted of thirteen (13) questions about rail and rail services in the communities in which respondents worked, and included:

- Positive contributions of, and drawbacks or frustrations with, freight rail;
- Changes to freight rail service that could help to improve life in their community;
- Concerns about impacts associated with rail (e.g., shunting, idling, safety, and speed at rail crossings, etc.); and
- Level of satisfaction with access to, and importance of, passenger rail service.

The questions were administered through Lime Survey, an online survey platform, and invitations to complete the online survey were sent in May 2021 to the email addresses of representatives from 39 municipalities within 50 km of a northern BC rail network (see Figure 1), with a reminder email sent one week later. 121 respondents from 34 different municipalities responded to the survey. While elected officials, municipal staff, and members of local Chambers of Commerce were sent the survey directly, recipients were asked to forward the survey link to their networks for completion as well. Thus, respondents also included local business owners and employees, NGO representatives, teachers, and retired professionals. (Note: a similar online survey was emailed to representatives from First Nations within the same regions; those results were summarized separately and provided under separate cover).

Figure 1 Geographic distribution of the communities in which survey respondents work (n=121).



The survey consisted of both closed-ended, quantitative questions and open-ended, qualitative questions. The former is displayed graphically and is accompanied by a description of the results. In comparison, the open-ended questions allowed respondents to provide feedback in their own words, and responses were analyzed using a type of thematic coding to capture and report on the most frequently mentioned themes considered important by respondents.

2.0 SURVEY RESULTS

The first four questions of the survey helped to characterize which community each respondent worked (and lived) in, the length of time lived in their community specifically and in northern BC generally, and their current role within their community. While 1-4 individuals completed the survey for most communities, Fort Nelson (n=10), MacKenzie (n=11), and Fort St. John (n=31) had the most respondents per community.[1] A complete list of the number of respondents per community surveyed is provided in Table 1.

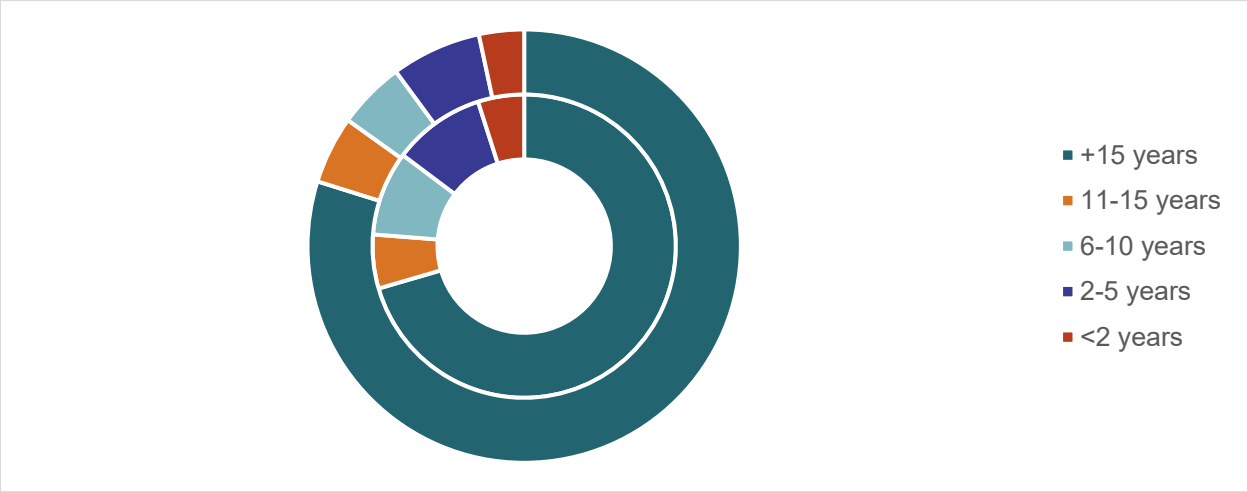
Table 1 Communities in which survey respondents work (n=121).

Community	No. of respondents	Community	No. of respondents
Ashcroft	1	New Hazelton	2
Burns Lake	6	Northern Rockies Regional Municipality (NRRM)	1
Cecil Lake	1		
Chetwynd	3	Peace River Regional District	1
Clinton (Village of)	1	Pemberton	1
Dawson Creek	3	Prince George	2
Fort Nelson	10	Prince Rupert	4
Fort St James	1	Quesnel	2
Fort St John	31	Smithers	4
Fraser Lake	2	Taylor	5
Granisle	2	Telkwa	1
Houston	4	Terrace	4
Hudson's Hope	1	Tumbler Ridge	3
Kitimat	1	Valemount	1
Lillooet	4	Vanderhoof	1
Mackenzie	11	Whistler	1
McBride	2	Williams Lake	3
North East BC	1		

Respondents were asked about the length of time they have lived in their community specifically, and in northern BC in general. Figure 2 displays the results from these two questions, with the inner ring depicting the length of time lived within the community and the outer ring depicting the length of time lived within northern BC. 85% of respondents have lived in their community for at least 6 years, with 70% of respondents having lived in their community for +15 years. 90% of respondents have lived in northern BC for at least 6 years, with over 80% having lived in northern BC for +15 years.

[1] "n" denotes the sample size or number of respondents.

Figure 2 Length of time in years that respondents have lived in their community and in northern BC.



Inner ring = length of time (years) respondents (n=122) have lived in their community.

Outer ring= length of time (years) respondents (n=119) have lived in northern BC.

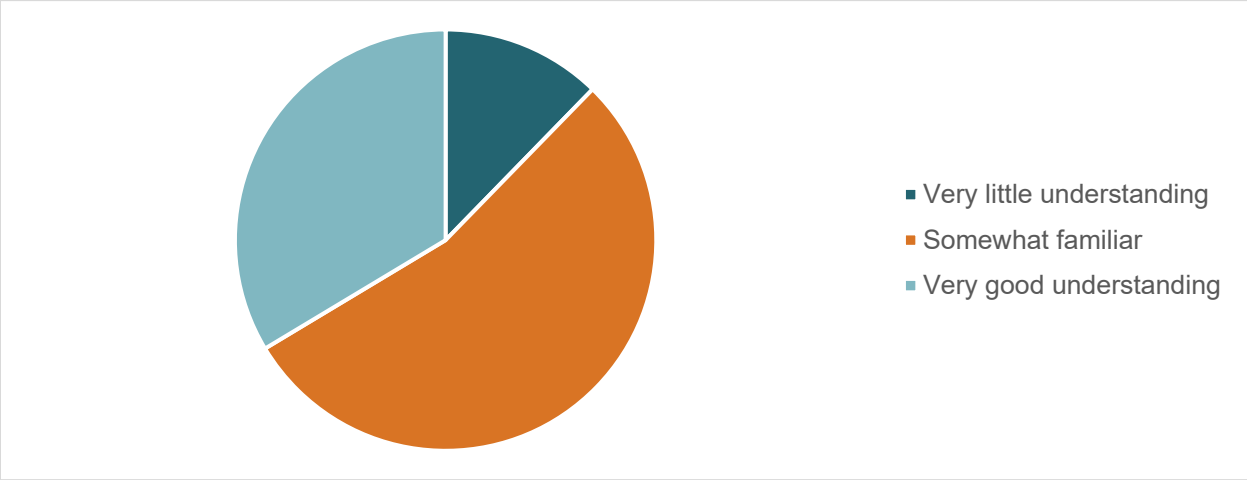
Respondents were asked to identify their current role within their community (Table 2). 70% of respondents were elected officials to local or regional governments, or staff of a government department. 30% of respondents were employed elsewhere, retired, or did not specify. However, these are not mutually exclusive roles as respondents (particularly in smaller towns) often play multiple roles. For example, several elected officials and those working with the Chambers of Commerce also specified having other occupations such as being business owner and corporate managers.

Table 2 Current role of respondents in the community where they work (n=122).

Current Role	No. of respondents
Elected Official (local/regional)	41
Other local employment	22
Economic Development	13
Chamber of Commerce	12
Other government staff (local/regional/ provincial)	10
Chief Administrative Officer (CAO)	7
Planning & Engineering	6
Public Works & Utilities	5
Not specified/retired/other	3
Public Safety	3

The level of understanding of rail and rail service in their communities reported by respondents was high, with 34% reporting a very good understanding of rail and rail service, 54% reporting being somewhat familiar. Only 12% of respondents reported that they had very little understanding of rail and rail service (Figure 3). Respondents were also asked if the community in which they worked was serviced directly by rail; 80% of respondents worked in communities serviced directly by rail, 13% of respondents were not serviced directly by rail, and 7% of respondent were unsure as to whether or not the community they worked in was serviced directly by rail (data not shown).

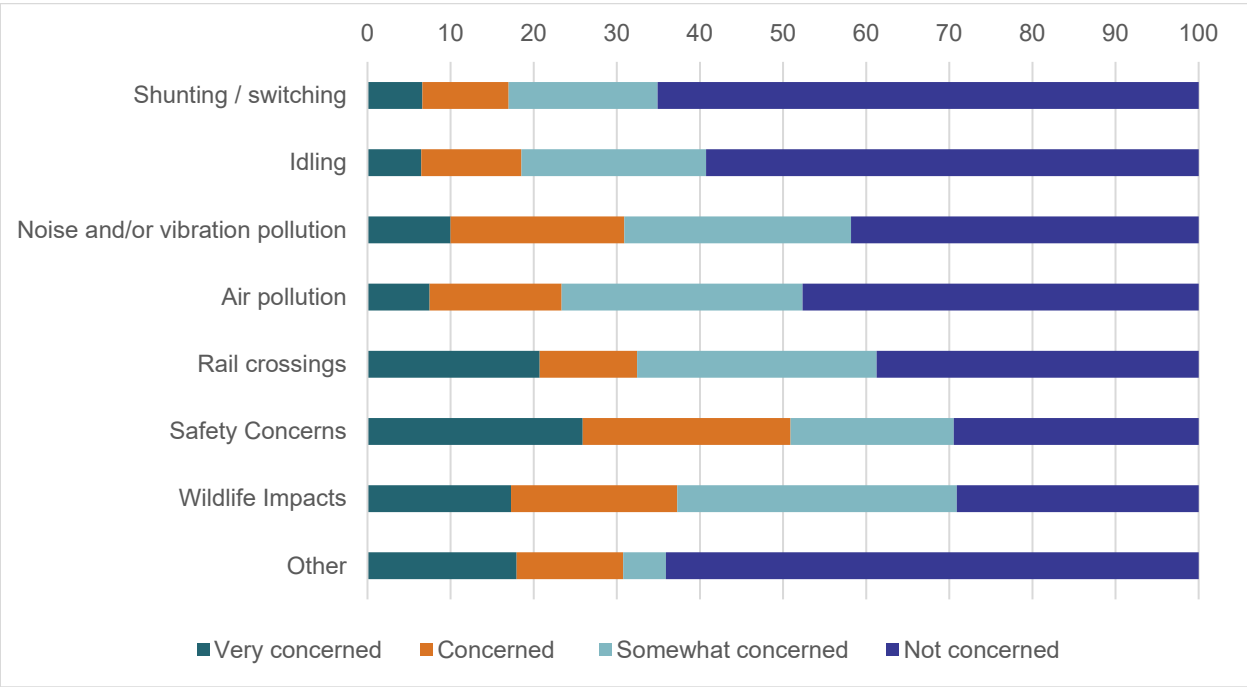
Figure 3 Awareness or familiarity of respondents with rail and rail service to their community (n=122).



2.1 FREIGHT RAIL SERVICE

The overarching goal for RMC with this survey was to identify gaps and areas for improvement in rail service and the rail network in northern BC, with the main goal of working to improve market access and economic vitality for northern industries and businesses. The survey therefore focused mainly on freight rail. Respondents were asked about their level of concern about several potential impacts or issues related to freight rail (Figure 4). Of those impacts or issues that were pre-identified for respondents to consider, safety concerns (e.g., spills, Transportation of Dangerous Goods (TDG), derailment) were the issues of greatest concern with over 51% of respondents being concerned or very concerned, and another 20% being somewhat concerned. Wildlife impacts (e.g., on moose, bear, caribou), were the second issue of greatest concern with over 70% of respondents expressing some degree of concern.

Figure 4 Level of concern about potential impacts of issues (n=112).



Respondents were also asked to describe in their own words the most important contributions that freight rail makes to their communities at present. Lumber, coal, and agriculture-dependent communities generally held a favourable view of rail service, although remained concerned that service is insufficient or could be more reliable. The presence of stable and reliable rail service is important to attract investment and support local economies. This is particularly so for those communities (e.g., Ft Nelson, MacKenzie) where many local businesses (especially in heavy extractive industries) struggle to remain viable without access to dependable freight rail transport. In communities with sidings (e.g., Smithers, Terrace), rail is seen not just in terms of transport but also as an important local employer. In comparison, it was apparent from the responses that communities without rail or where trains do not stop see little value or contribution from freight rail to their communities, but experience the drawbacks including noise pollution and reduced community safety. As one respondent put it, the presence of rail in the community is “all risk and no reward”.

Respondents were also asked how freight rail service could be changed to help improve life in their community. Comments were categorized into four broad themes: i) safety; ii) improvements to rail properties, beds, and rolling stock; iii) increasing the contributions of rail service to local economic development and iv) better community engagement and customer service by rail providers. These themes are not mutually exclusive categories, instead they illustrate a range the broad range of interconnected issues and the inherent tension between the perceived benefits and concerns people have about rail and rail service in their communities. For example, improvements to rail service and rolling stock is a key part of fostering rail-dependent business in the north, however, more rail service will mean more safety concerns in many communities and the need for more engagement with the rail provider on safety issues.

2.1.1 Safety

Respondents were clear that railway lines running through their communities raise concerns about safety. In addition to the nuisance that increased wait times at rail crossings caused for local traffic, there were very real safety concerns described. Several community respondents noted that First Responders are unable to access some neighborhoods on the other side of the tracks from their stations, thus “our emergency services are all located in such a way that an emergency could render them unable to respond” because “there is only one crossing and in the event of a breakdown or an emergency at the crossing there is no other option for access”. Several respondents from different communities suggested building overpasses (both vehicular and pedestrian) to remedy this problem. Recommended solutions include building a vehicular overpass to enable better transit times for First Responders, and for rail providers (in this case, Canadian National Railway (CN)) to also improve their dialogue and working relationship with community volunteer firefighters to ensure the safety of the community in the event of a disaster. One respondent also noted the importance of better safety messaging to students about the dangers of rail travel as “…too many of them are playing “chicken” with the trains”.

Several respondents also expressed concerns with the transportation of dangerous goods (TDGs), reflecting the findings presented in Figure 4. Several respondents mentioned leaching from creosote rail ties left along the tracks, and one noted that because propane is not perfumed or noticeable by smell, propane sensors may be needed and that a similar standard for enhanced emergency braking systems mandated in the US should apply for Canadian rail transport.

While this question in the survey was specifically related to freight service, numerous respondents mentioned the importance of passenger rail service to northern BC communities from a safety perspective. With the cancellation of the Greyhound bus services, and little to no passenger service throughout the northern region, there are very real concerns for the safety of northerners needing to travel. One respondent called the lack of passenger rail "insulting" while another accused CN of "strangling VIA rail". Still, another recommended twinning the rail lines and giving passenger rail absolute priority.

2.1.2 Improvements to rail properties, beds and rolling stock

Respondents strongly suggested that rail providers improve both their fixed properties (e.g., stations, rail beds) and their rolling stock. With regards to fixed properties, several respondents suggested improving the look of rail lands and assets by cleaning up siding and fencing, keeping the grass cut to eliminate fire hazards, continuing to spray to control noxious weeds, removing old assets like the former BC Rail Building in MacKenzie, and partnering on brownfield mitigation projects. Several respondents requested more frequent and more dependable rail service, faster transit times, more/stable railcar supply, better availability of different types of rail cars that meet the typical needs of producers to ship their products (e.g., for lumber), and improvements/upgrades to the existing rail bed to carry 100% loads rather than the restricted loading currently in place.

2.1.3 Increasing the contributions of rail service to local economic development

The changes mentioned above regarding improving transit times, rail beds and railcar supply are seen by many respondents as crucial to economic development opportunities across the north. Respondents clearly articulated these links in comments such as:

> *"Certainty regarding schedules, service and transport times that would provide certainty to industry contemplating starting a new business."*
>
> *"If we consistently need more cars that should provide a business case for providers to supply or purchase more to meet the steady demand."*
>
> *"Basically, CN isn't in the business to provide a service to grow industry, they want industry to start first and then decide if they will provide service."*
>
> *"Existing businesses have had to resort to the use of road transport to ensure minimum levels of goods are available because CN does not deliver with sufficient regularity or dependability to sustain business."*
>
> *"Lack of development of spur lines…impedes access to market and community economic development opportunities."*

Improvements to the physical assets of rail beds and rolling stock should be accompanied by other changes that would improve local economic development opportunities. In fact, respondents suggest rail providers more actively participate in economic development opportunities and cooperate and collaborate with businesses that would like to develop transloading and/or spur operations. Other improvements include twinning the lines, offering better rates to encourage (rather discourage) new business, developing a distribution center/freight forwarding service to allow for irregular shipments by smaller firms, and expanding/increasing opportunities to ship other products (other than coal) by rail in the future were seen

as important developments. These improvements were mentioned referencing a number of communities including Prince George, MacKenzie, Fort Nelson, Terrace, and Tumbler Ridge. Lastly, several respondents noted the importance of passenger service to tourism in the north in the form of “rail cruises”.

2.1.4 Better community engagement and customer service

Given the changes suggested, there is little surprise that respondents recommend rail providers (i.e., CN) improve their engagement with, and customer service to, northern communities. Criticisms of CN in respondent comments were noted and included: “billion-dollar company ignores hundreds of small communities is one view of CN Rail”, and “absolutely terrible customer service”. The company should be “good neighbours” and respond more responsibly to their customer’s needs.

Respondents believe that CN could implement several changes that would make a big difference for communities bisected by rail lines. These include whistle cessation/noise abatement, stopping night transport and only moving freight in daylight hours, and eliminating charges to communities for basic maintenance and upgrades. Several respondents drew a direct link between CN’s lack of participation in driving economic development and their demands for municipality contributions to maintenance costs and upgrades and called on the rail provider to more willingly participate in and promote economic development in northern communities. Without this, one respondent cautioned that CN is creating a self-fulfilling prophecy whereby:

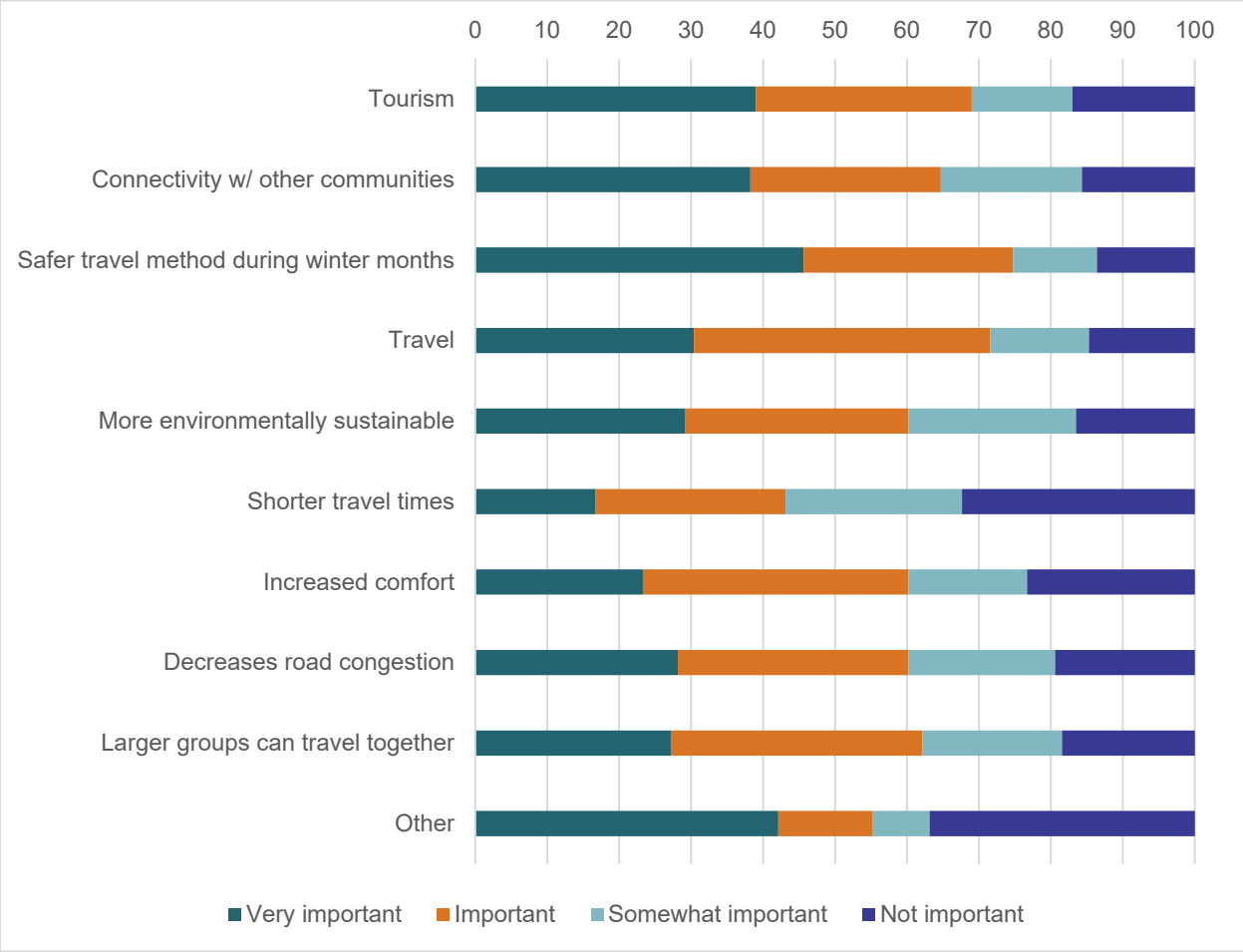
> *“CN has cut service resulting in companies having to find other means such as trucking to get their products here, companies require dependable on time deliveries and when they can't get that they have to find other means, this results in a further loss of activity with CN who in turn says demand isn't there and further cuts service. It isn't that the demand isn't there but that the service cannot be relied upon.”*

One respondent also noted that municipalities need to have “better access to CN decision-makers and influencers to improve responsiveness to the communities wishes, needs and strategies”, while another stressed that “CN should be required to live up to their agreement to retain rail services from Alberta to BC.” Ultimately, CN is perceived to hold a monopoly on freight rail service in northern BC, therefore having more than one choice of rail provider is considered preferable.

2.2 PASSENGER RAIL SERVICE

Respondents were asked to indicate how important passenger rail was to their community according to several factors (Figure 5). Over 80% of respondents considered passenger rail service to be somewhat important, important, or very important to the following factors (listed in decreasing order of importance): safer travel method during winter months, travel in general, connectivity with other communities, tourism, more environmentally sustainable modes of travel, larger groups travelling together, and as a means to decrease road congestion.

Figure 5 The importance of passenger rail by factor (n=103).



The priorities listed in Figure 5 were reflected in an open-ended question that asked respondents to describe in their own words how satisfied they are with their community's access to passenger rail service. 106 respondents answered this question; of this total, less than 5% of respondents were satisfied or somewhat satisfied; 55% were not satisfied with their community's access to passenger rail, and another 32% of respondents made comments that were interpreted as unsatisfied (e.g., responses such as "we don't have any!!", "non-existent" and "there is none"). The remaining 8% of respondents stated "not applicable" or an answer that was neither interpreted as satisfied or unsatisfied.

The comments provided from dissatisfied respondents were of two types. The first type of comment was from those respondents dissatisfied with either a complete lack of, or lack of reasonable access to, passenger service. Their dissatisfaction is reflected in comments such as:

> *"There is no passenger rail service that can be used by residents in Quesnel as a method of transportation."*
>
> *"There's nothing to be satisfied with as this isn't a service offered in Mackenzie".*
>
> *"We have NO access to passenger rail service. We would definitely welcome this if it was reinstated".*

The second type of comments were from those respondents who appear to have access to passenger service, but who are critical of its unreliability. This is reflected in comments such as:

> *“No station in which to wait, just on the side of the road. Trains are regularly significantly off schedule, this makes waiting a challenge in a northern climate.”*
>
> *"A train a few minutes late is one thing, trains consistently late by hours renders the service unusable.”*
>
> *“I'm glad we have it, but scheduling and speed of the trip needs to be improved.”*
>
> *“There is a VIA rail terminal in PG, however it is not well used and the destinations are limited.”*

The second type of comment concerned the perceived prioritization of freight rail service over passenger rail. This is reflected in comments such as:

> *“Via Rail takes second place to the freight trains and as such cannot keep to a schedule. This of course causes loss of ridership and so it goes...”*
>
> *“Passenger trains are lower priority to some or most freight movement.”*
>
> *“It is very clear that passenger rail service takes second place to freight service. “*
>
> *“Trips take longer than a regular train due to freight priority changing the schedule.”*

Though it was not asked directly in the survey, 25% (n=26) of the respondents indicated there would be support for passenger service in their community. Several respondents either mentioned the lack of Greyhound bus service by name, or alluded to the lack of options for affordable and reliable transportation options across the north, as one of the reasons for support. Such support for passenger service is reflected in the following types of comments:

> *“Would love to see passenger service for northern BC!”*
>
> *“I think having a rail service to the lower mainland would have a lot of support from the North, and would allow for much safer travel year round than travel by highway. I suspect this service would have much higher demand than the current route which is generally used for an experience than for practical transportation.”*
>
> *“Given the absence of other affordable options (particularly bus) it would be a boon to the community.”*
>
> *“This would be a welcome addition to the very few modes of passenger transportation currently available.”*
>
> *“Since Greyhound has shut down bus service as well, passenger rail service for elderly, low income, etc. would have a better opportunity to travel to southern BC where there is better medical service.”*

Passenger rail using VIA as well as the Rocky Mountaineer and the Skeena line were mentioned as important to building a tourism industry.

3.0 CONCLUSIONS

The RMC undertook this survey of municipalities within a 50 km radius of the rail network in northern BC to better understand the perceptions and attitudes held by municipalities in northern BC about the impacts of freight and passenger rail to learn how improvements or changes in the rail service and rail network might benefit northern communities and the quality of life across northern BC in general. There was a strong response to invitations to complete the survey (34 out of 39 municipalities responded) from a broad geographic distribution of respondents representing municipalities all along BC's northern rail network (see Figure 1). As such, the RMC should be confident that the results obtained and summarized within this report are a reliable and accurate representation of the municipalities' concerns.

Regarding freight trains, respondents are foremost concerned about the safety of the trains as it pertains to spills, TDG, and derailment. Wildlife impacts, concerns about rail crossings, noise and /or vibration pollution, and air pollution were also noteworthy. In comparison, passenger rail is clearly a priority to respondents, with over 80% of respondents indicating its importance as a safer travel method during winter months for general travel, connectivity with other communities, and tourism, among other factors. Most notably, more than 80% of respondents are dissatisfied with their community's access to passenger rail.

Several improvements or changes in the rail service and rail network were suggested that would benefit communities along the northern rail network. Respondents emphasized four areas of improvement for freight rail service: i) safety; ii) improvements to rail properties, beds and rolling stock; iii) increasing the contributions of rail service to local economic development; and, iv) better community engagement and customer service by rail providers. From an economic development perspective, respondents suggest rail providers more actively participate in economic development opportunities and cooperate and collaborate with businesses who would like to develop transloading and/or spur operations. Other improvements include twinning the lines and offering better rates to encourage new business (as opposed to reportedly high rates which are seen to discourage new business), among others. The presence of stable and reliable rail service is seen as fundamental to attracting investment and supporting local economies across the north, and while it appears that many local businesses would prefer to use rail, they opt for transporting goods by truck as, in the words of one respondent, "it is easier to do so than to deal with CN". Several respondents also mentioned that if the rail lines were not going to be used by CN, the rail lines should be given "back" to the communities for use.

Passenger rail is non-existent in many of the respondents' communities. Bringing passenger rail back or facilitating its development is a clear priority as its absence is amplified by the lack of other reliable and affordable transport options across the north and the relatively recent removal of Greyhound bus services. Engaging community members to better understand how the lack of transport options differentially impact the elderly, infirm, and impoverished members of society is recommended as several respondents falling into these categories alluded to such impacts. For those few communities with direct access to passenger (e.g., VIA) rail, improvements in reliability and providing shelter to waiting passengers (especially important during cold, winter months) are priorities. Finally, passenger rail is considered imperative for building a sustainable tourism industry across the north in the form of "rail cruises".

The rail network in northern BC does not appear to be meeting local expectations or business needs, yet presents numerous safety concerns that negatively effect quality of life for the communities and their residents. One respondent best summed up what may be the presiding sentiment around the northern BC rail network:

> *"Decreased service levels, lack of knowledge about the service, and a feeling of abandonment by the rail company have left the community wondering what the future holds. This uncertainty does not welcome new investment in the community and puts increasing pressure on industry which is struggling to maintain its failing momentum."*

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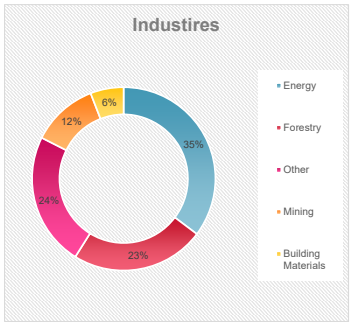
Shipper Detailed Response Summary



Commodities Shipped by Respondents

Logs	Caustic Soda
Lumber	Sodium Chlorate
Wood Pellets	Sulphuric acid
Pulp	silica sand
Propane	frac sand
Butane	metallurgical coal
Copper	magnetite
Gold	Scrap Metal
Silver	

Most Common Modes of Transportation for Commodity Shipping / Reciving

Mode Rank	Rail	Truck	Pipeline	Marine
First	80%	7%	7%	7%
Second	21%	71%	7%	0%
Third	0%	60%	0%	40%
Fourth	0%	0%	0%	100%

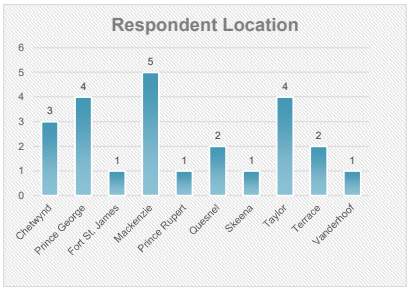
% of respondents that are forecasting increases in rail shipments	**71%**
% of respondents loading at shipper owned facilities (not team track or other)	**100%**
% of Respondents that said additional rail services would support their business	**71%**

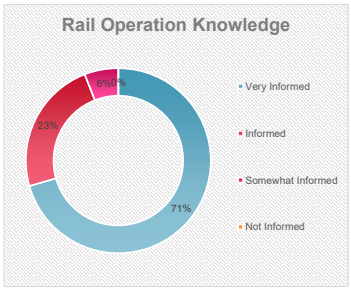
Top other services that would support their business

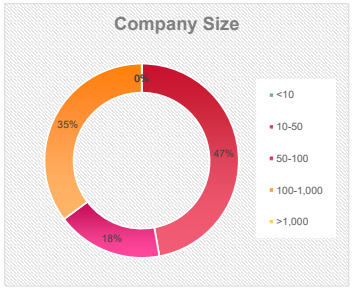
Storage	36%
Repair	36%
Track maintenance/insp	36%
Container terminal/hand	29%
Transloading services	7%
3rd party switching / rail	7%

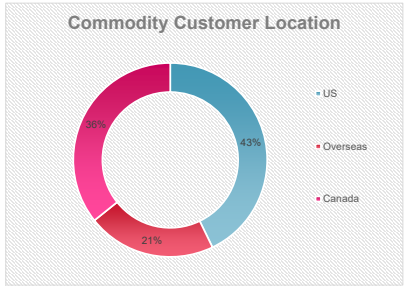
Factors that would be most likley influence shippers decision to ship more via rail (highest to least)

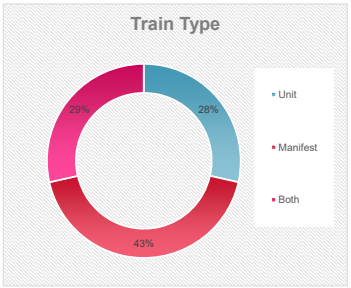
More frequent rail service	6
More reliable and consistent rail service	6
Changes to railway demurrage policies and other tariffs	3
Overall lower freight transportation costs	2
Heavier gross tonnage railcar limits (up to 286,000 pound gros	2
Faster transit times	1

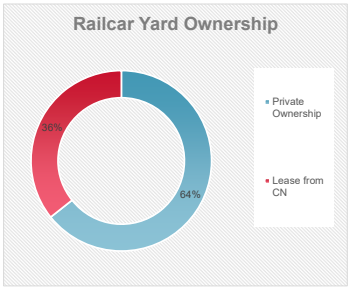


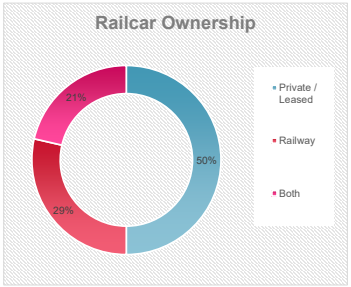


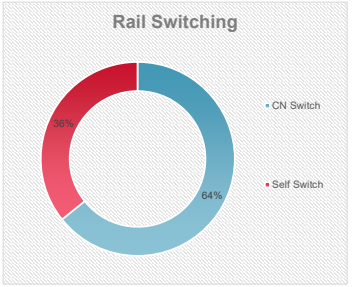


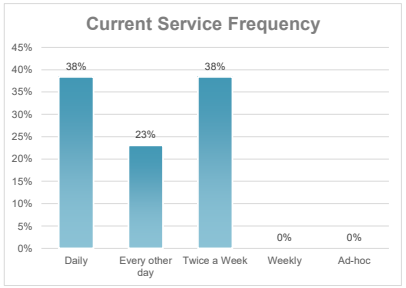


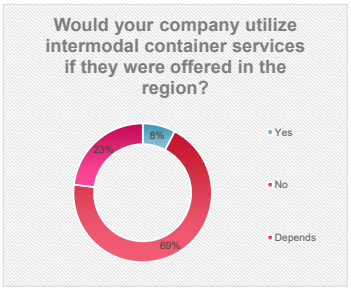


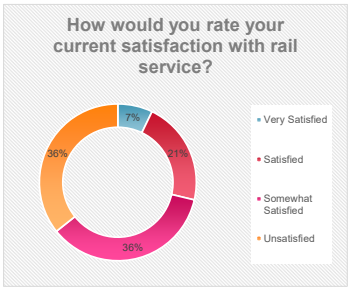


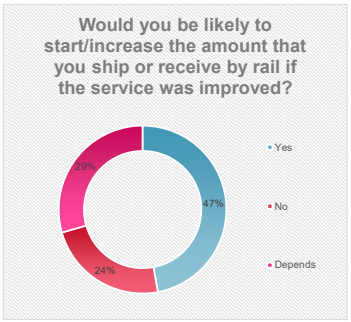


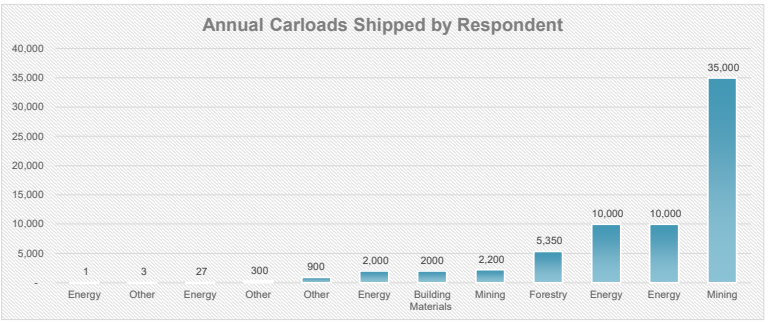












Appendix D: Major Project Inventory (Q2, 2021)

PROJECT_ID	PROJECT_NAME	ESTIMATED_COS	PROJECT_TYPE	REGION	MUNICIPALITY	DEVELOPER	PROJECT_STATUS
3048	Hart North Industrial Site	0	Commercial/Industrial	5. Cariboo	Prince George	Prince George Economic Development Corp./ Reg	Proposed
3045	Prince George Global Logistics Park	382	Commercial/Industrial	5. Cariboo	Prince George	Prince George Global Logistics Park	Proposed
2922	Queen Charlotte Industrial Park Development	15	Commercial/Industrial	6. North Coast	Queen Charlotte	Village of Queen Charlotte	Proposed
3144	Horn River Basin Light Industrial Park	40	Commercial/Industrial	8. Northeast	Fort Nelson	Northern Rockies Regional Municipality	Proposed
4020	Vopak Pacific Canada Storage and Export Facility	750	Liquefied Natural Gas	6. North Coast	Prince Rupert	Vopak Development Canada Inc.	Proposed
3409	Nisga'a LNG	0	Liquefied Natural Gas	6. North Coast	Nasoga Gulf	Nisga'a Nation	Proposed
3371	Cedar LNG	1400	Liquefied Natural Gas	6. North Coast	Kitimat	Cedar LNG Export Development Ltd.	Proposed
3213	Kitsault LNG Facility	34000	Liquefied Natural Gas	6. North Coast	Kitsault	Kitsault Energy Ltd. of Canada	Proposed
1114	Kitimat LNG Facility	4500	Liquefied Natural Gas	6. North Coast	Kitimat	Chevron Canada Ltd./Woodside Energy Ltd.	Proposed
1644	Pacific Northern Gas Pipeline Looping Project	1300	Liquefied Natural Gas	6. North Coast	Kitimat To Summit Lake	Pacific Northern Gas Ltd.	Proposed
3047	Alterna Biocarbon Manufacturing Facility	15	Manufacturing	5. Cariboo	Prince George	Alterna Biocarbon	Proposed
2932	Skeena Industrial Development Park	0	Manufacturing	6. North Coast	Terrace	City of Terrace	Proposed
2379	Ruddock Creek Zinc-Lead Mine Development Project	100	Mining	3. Thompson-Okanagan	Clearwater	Ruddock Creek Mining Corp.	Proposed
1124	Elk Gold Mine	100	Mining	3. Thompson-Okanagan	Merritt	Trek Mining	Proposed
2819	Aley Niobium Project	700	Mining	5. Cariboo	Mackenzie Region	Taseko Mines Ltd.	Proposed
1987	Giscome Quarry and Lime Project	130	Mining	5. Cariboo	Prince George	Graymont Western Canada Inc.	Proposed
1584	Spanish Mountain Copper-Gold Mines	756	Mining	5. Cariboo	Williams Lake	Spanish Mountain Gold Ltd.	Proposed
523	Bonanza Ledge Mine	60	Mining	5. Cariboo	Quesnel	Barkerville Gold Mines Ltd.	Proposed
302	New Prosperity Gold-Copper Project	1000	Mining	5. Cariboo	Williams Lake	Taseko Mines Ltd.	Proposed
3590	Red Mountain Underground Gold Project	76	Mining	6. North Coast	Stewart	Ascot Resources Ltd.	Proposed
2325	GJ Kinaskan Lake Copper-Gold Project	0	Mining	6. North Coast	Iskut	Teck Resources/NGEx Resources	Proposed
2245	Kerr - Sulphurets - Mitchell (KSM) Gold/Copper	5300	Mining	6. North Coast	Stewart	Seabridge Gold Inc.	Proposed
1501	Harmony Gold Mine	50	Mining	6. North Coast	Graham Island	Taseko Mines Ltd.	Proposed
1080	Schaft Creek Porphyry Copper-Gold Mine	2900	Mining	6. North Coast	Iskut	Copper Fox Metals/ Teck Resources	Proposed
322	Iskut (Bronson Slope) Copper/Gold/Silver/Molybdenum Mine	175	Mining	6. North Coast	Stewart region	Seabridge Gold Inc.	Proposed
3584	Groundhog Project Anthracite Coal Mine	600	Mining	7. Nechako	Smithers Area	Atrum Coal	Proposed
2993	Blackwater Gold Project	1416	Mining	7. Nechako	Vanderhoof	Artemis Gold Inc.	Proposed
2789	Berg Copper-Molybdenum-Silver Mine	0	Mining	7. Nechako	Houston	Thompson Creek Metals Company Inc.	Proposed
2164	Turnagain Nickel Project Expansion	1300	Mining	7. Nechako	Dease Lake Area	Gigametals Corp.	Proposed
1600	Lorraine-Jayjay Copper Mine	100	Mining	7. Nechako	Fort St James	Lorraine Copper Corp./Teck Cominco Ltd.	Proposed
1082	New Polaris Gold Mine	50	Mining	7. Nechako	Atlin	Canarc Resource Corp.	Proposed
3115	Sukunka Coal Mine Project	444	Mining	8. Northeast	Tumbler Ridge	Glencore	Proposed
3043	Kemess Underground Copper-Gold Mine	524	Mining	8. Northeast	Chetwynd	Northgate Minerals Corp.	Proposed
2956	Carbon Creek Mine	301	Mining	8. Northeast	Hudson Hope	Cardero Resource Corp.	Proposed
2778	Murray River Coal Project	400	Mining	8. Northeast	Tumbler Ridge	HD Mining International Ltd.	Proposed
2779	Bullmoose River Coal Project	0	Mining	8. Northeast	Tumbler Ridge	Canadian Dehua International Mines Group Inc.	Proposed
2782	Wapiti River Coal Project	0	Mining	8. Northeast	Tumbler Ridge	Canadian Dehua International Mines Group Inc.	Proposed
1932	Gething Coal Project	1360	Mining	8. Northeast	Hudson Hope	Canadian Kailuan Dehua Mines Co., Ltd./ Shandor	Proposed
1318	Hermann Coal Mine	55	Mining	8. Northeast	Tumbler Ridge area	Western Canadian Coal Corp	Proposed
1332	Belcourt/ Saxon Coal Mine	100	Mining	8. Northeast	Tumbler Ridge area	Belcourt-Saxon Coal LP	Proposed
2936	Fortune Creek Gas Plant	760	Oil and Gas Extraction	8. Northeast	Fort Nelson		Proposed
3306	Pacific Future Energy Refinery	10000	Petrochemical Manufacturing	6. North Coast	Kitimat	Pacific Future Energy Corp.	Proposed
3064	Kitimat Clean Oil Refinery	22000	Petrochemical Manufacturing	6. North Coast	Kitimat	Kitimat Clean Ltd.	Proposed
3383	Sundance Clean Methanol Refinery	1500	Petrochemical Manufacturing	8. Northeast	Chetwynd	Canadian Methanol Corp.	Proposed
2628	Sundance Low Carbon Gasoline Refinery	2500	Petrochemical Manufacturing	8. Northeast	Chetwynd	Blue Fuel Energy Corp.	Proposed
3280	Terminal A Extension Project	250	Port and Harbour Facilities	6. North Coast	Kitimat	Rio Tinto	Proposed
2520	Hurley River Watershed Hydropower Project	138	Utilities	2. Mainland/Southwest	Pemberton	Hurley River Hydro LP	Proposed
867	Ryan River Hydro Project	273	Utilities	2. Mainland/Southwest	Pemberton	Ryan River Joint Venture	Proposed
3376	Isle Pierre Wind Farm	400	Utilities	5. Cariboo	Prince George	Kruger Energy Inc.	Proposed
3044	Robson Valley Hydroelectric Project	200	Utilities	5. Cariboo	McBride	Holmes Hydro	Proposed
2745	Biomass Project - McBride	140	Utilities	5. Cariboo	McBride	ecoTECH Energy Group (Canada) Inc.	Proposed
3242	Lakelse Geothermal Power Plant	120	Utilities	6. North Coast	Terrace	Enbridge/ Borealis Geopower/ Kitselas First Nation	Proposed
3190	Quottoon Cluster of Hydroelectric Projects	120	Utilities	6. North Coast	Prince Rupert	Sequoia Energy Inc.	Proposed
2524	Bronson Slope Hydropower Projects	216	Utilities	6. North Coast	Stewart Region		Proposed
2338	Kinskuch Hydro Project	300	Utilities	6. North Coast	Iskut	Kinskuch Lake Hydro LP	Proposed
2142	Cheslatta Green Energy Project	46	Utilities	7. Nechako	Burns Lake	Pristine Power Inc./Cheslatta Forest Products	Proposed
315	Kenney Dam Cold Water Release Facility	275	Utilities	7. Nechako	Vanderhoof		Proposed
3375	Red Willow Wind Farm	480	Utilities	8. Northeast	Tumbler Ridge	Red Willow Wind LP	Proposed
3066	Taylor Wind Project	900	Utilities	8. Northeast	Taylor	Taylor Wind Project Ltd.	Proposed
2037	Hackney Hills Wind Park	400	Utilities	8. Northeast	Fort St. John	Aeolis Wind Power Corporation	Proposed
1390	Wartenbe Wind Energy Project	140	Utilities	8. Northeast	Chetwynd area	Dokie Wind Energy Inc.	Proposed