



# Mining Readiness Strategy

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A guiding framework for the City of Thunder Bay to support the growing Northwestern Ontario mining sector

*FINAL DRAFT*

Prepared by MNP LLP for The Corporation of the City of Thunder Bay and Thunder Bay Community Economic Development Commission (CEDC)

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## Executive Summary

Northwestern Ontario is positioned to capitalize on a significant regional economic development opportunity over the coming years due to the current 6 operating mines (gold and palladium) and 15 major exploration projects (gold, palladium, lithium, graphite and nickel-copper-PGE) in the region.

The City of Thunder Bay and the Community Economic Development Commission (CEDC) engaged MNP to develop a Mining Readiness Strategy focused on business development in mining supply and services, workforce training and development, transportation and electrical infrastructure, economic impacts, research and development, and gaps and barriers to mine development.

### What we heard from Stakeholders

MNP developed the strategy through mining industry stakeholder interviews with 18 exploration and mining companies and 25 associations (representing a 93 percent participation rate), and documentation review of public reports to compile valuable mining sector information and develop recommendations for the CEDC's strategic priorities.

Mining Supply and Service Businesses: The mining operations companies (representing the buyer) recommended a focus on quicker customer service times due to mine proximity, general mine support businesses, training centers, structural mining materials, delivery services and chemical processing.

Proximity to Mines	Workforce Training	Critical Minerals	Available Land
<ul style="list-style-type: none"> <li>Local distribution centers.               <ul style="list-style-type: none"> <li>Transportation and logistics services (e.g. trucking).</li> </ul> </li> <li>Equipment and parts service centers.</li> <li>General mine support services (e.g. security, transportation, cleaning, catering, health, etc.).</li> <li>Ground support materials (e.g. shotcrete).</li> </ul>	<ul style="list-style-type: none"> <li>Skilled trades training centers.</li> <li>Mining skills training centers.</li> <li>Life skills and career development services.</li> </ul>	<ul style="list-style-type: none"> <li>Chemical processing plants for critical mineral processing (e.g. lithium, graphene).</li> </ul>	<ul style="list-style-type: none"> <li>Promote available commercial and industrial land available in the city.</li> </ul>

Employment in the Mining Sector: Operations jobs estimated to peak around 2026 and construction jobs estimated to peak around 2023, if no interruptions occur to the major exploration projects.

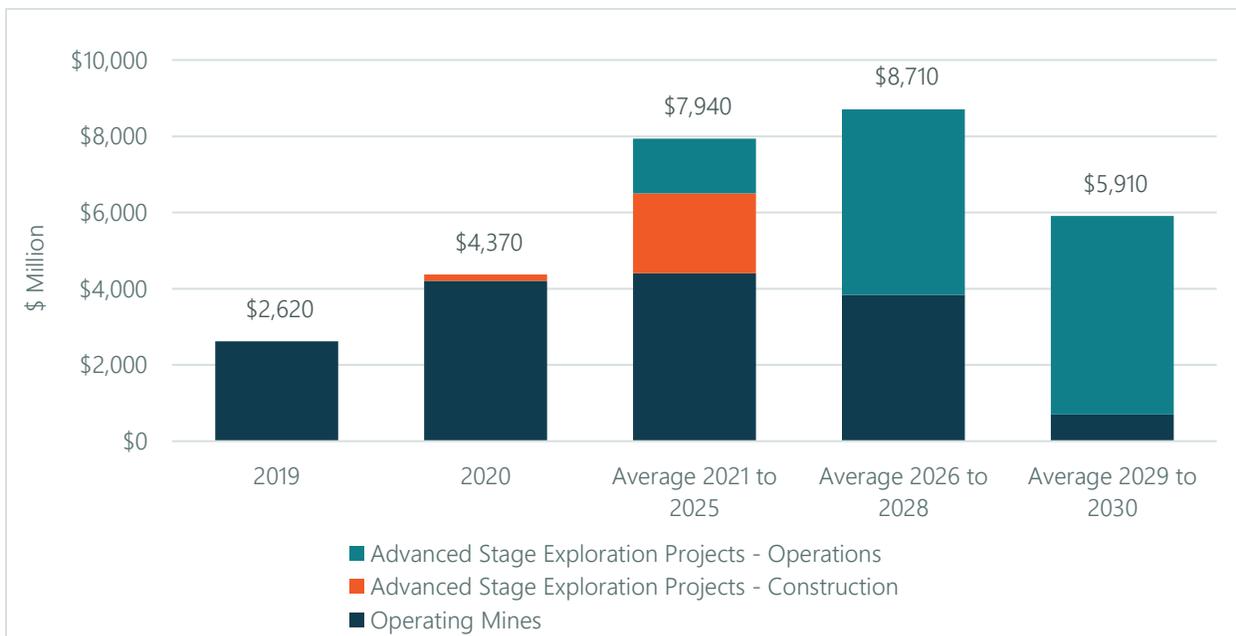
<p><b>3,600+</b></p> <p><b>Mine Operations Jobs in 2020</b></p> <p>Estimated for the 6 operating mines in Northwestern Ontario.</p>	<p><b>100%</b></p> <p><b>Increase in Mine Operations Jobs</b></p> <p>Estimated to peak at 7,400+ total positions.</p>	<p><b>2,000+</b></p> <p><b>Peak Construction Jobs in 2023</b></p> <p>Estimated for the 15 major exploration sites in Northwestern Ontario.</p>	<p><b>7,000+</b></p> <p><b>Peak Mining Jobs between 2023-2028</b></p> <p>Estimated jobs required for construction and operation of new and existing mines.</p>
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Transportation and Electrical Infrastructure: Construction requirements for exploration sites was found to be primarily minimal or moderate for both access road construction and electricity transmission connection due to advantageous locations close to highways and transmission lines.

Electricity Demand: Estimated to grow by 180 percent by 2026, from 195 MW to 550 MW. The regions experiencing the highest rate of growth include Marathon-Greenstone (116 MW) and Red Lake (84 MW).



Economic Impacts: During the peak period between 2026 to 2028, direct economic output is estimated to be \$5.22B and total economic output (direct, indirect and induced) to be \$8.71B.



## Strategic Readiness Actions Summary

MNP has developed seven primary strategic recommendations which are actionable and achievable for the CEDC to support the near term ramping up of mining activities:

1. The CEDC should act quickly to implement the strategic recommendations with completion targets by the end of 2021.
2. Leverage technology and digital media by enhancing the CEDC Mining website, allowing ease of access to contemporary information and facilitate the exchange of information and data.
3. Develop or expand on the CEDC mining readiness Marketing and Communications plan to ensure the Thunder Bay is widely known as the node for facilitation, collaboration, training and information of mining related services.
4. Advanced facilitation and knowledge transfer about the regional Mining Supply and Services offerings, making prospective clients and companies aware of who's in the region and able to support the growing mining industry.
5. Promote Thunder Bay as the Workforce Training and Development hub for mining sector and inform the education and training associations of what types of jobs are needed in the future.
6. Improve the regional mining industry stakeholders' awareness (e.g. electricity planning and infrastructure organizations, exploration and mining companies, and provincial and federal government) of the Transportation and Electrical Infrastructure needs and planned or in-progress projects.
7. Evaluate strategic incentives and municipal infrastructure priorities which incentivize Business and Economic Development for the Mining Sector.

# 1.0 Introduction

## 1.1 Background and Purpose

Northwestern Ontario (NWO), including the City of Thunder Bay, is positioned to capitalize on a major regional economic development opportunity over the next few years related to mineral exploration and mine production led primarily by gold and palladium, and supplementary metals nickel, copper, platinum, graphite, chromite, iron and lithium. Northwestern Ontario currently has 6 existing operating mines and 15 major exploration projects that are poised to become producing mines over the next decade, providing the foundation for a strong and emerging mineral sector.

As a result, industrial development opportunities are expected to grow and diversify the economy of the region and contribute to economic and social development in the local and Indigenous communities.

## 1.2 Scope

To build a strategic plan for the various mining activities in Northwestern Ontario, The City of Thunder Bay and the Community Economic Development Commission (CEDC) engaged MNP LLP (MNP), and their regional engineering and mining sector advisory partners TBT Engineering, to develop a Mining Readiness Strategy focused on regional developments over the next ten years (2020 to 2030). The report focuses primarily on:

- Business Development in Supply and Services: Maximizing exploration and mining service and supply opportunities for Thunder Bay, including connecting directly with the 6 mines and 15 exploration managers, identifying indirect and induced businesses and gaps in the supply chain.
- Workforce Training and Development: Develop an understanding of positions required by mines now and in the future, assess existing college, university and trade programs and how to address any gaps.
- Transportation and Electrical Infrastructure: Identify road, port and airport access and electricity requirements and constraints for the 15 exploration sites.
- Economic Impact of New and Existing Mine Developments for Thunder Bay: Estimate the contribution to Thunder Bay's economy by the 6 producing mines and 15 exploration projects.
- Research and Development: Identify potential technology advances and partnerships with local education and research centers.
- Identifying Gaps and Barriers to Exploration and Mine Development in Northwestern Ontario.

The report will conclude with strategic recommendations that the CEDC can implement to support the exploration and mining sector in the City of Thunder Bay and Northwestern Ontario.

## 1.3 Report Structure

The report is organized as follows:

- Section 2 - Describes the approach and methodology used to develop the mining readiness strategy.
- Section 3 – Describes the current state of the exploration and mining industry in Ontario and Northwestern Ontario.
- Section 4 – Summarizes the major themes and responses from stakeholder interviews.
- Section 5 – Describes the mining supply and service businesses that are best suited to be in Thunder Bay.
- Section 6 – Provides an analysis of current and future workforce requirements at the mine sites.
- Section 7 – Summarizes the transportation and electricity infrastructure requirements for the existing and future mining operations.
- Section 8 – Economic impact estimates of the 6 operating mines and 15 exploration projects.
- Section 9 – Provides the strategic recommendations to be implemented as part of the Mining Readiness Strategy.
- Appendices A through J – Provide supporting information referenced in the main body of the report.

## 1.4 Qualifications

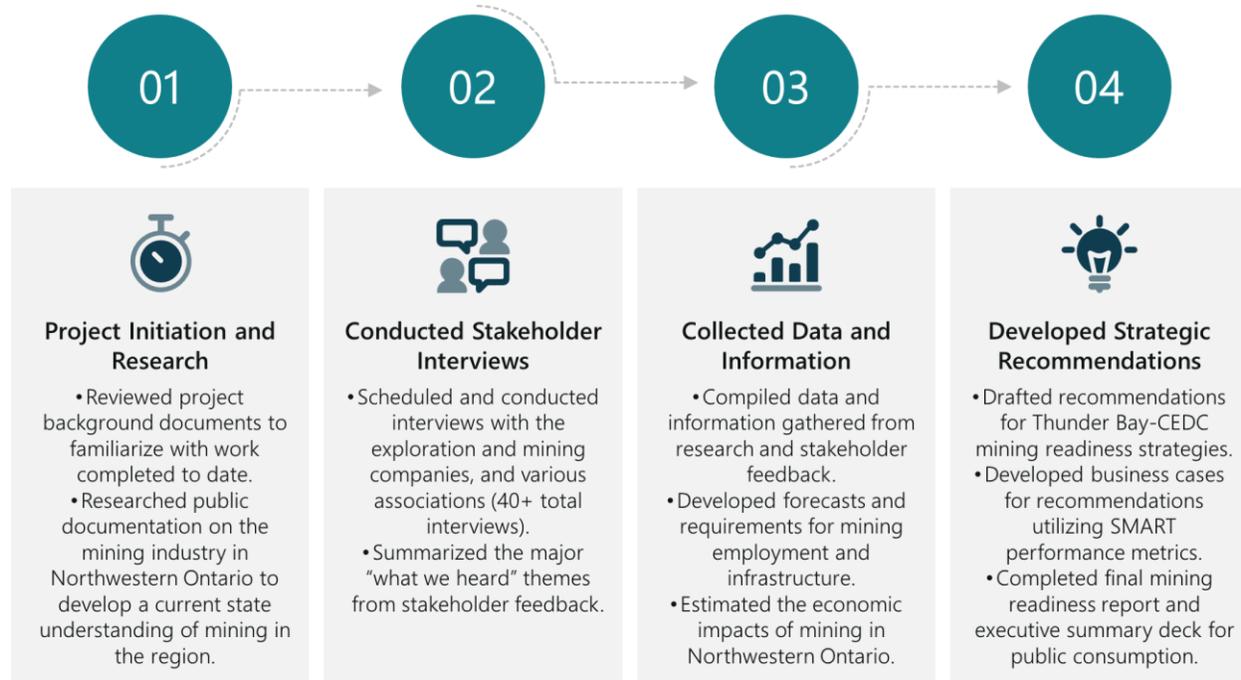
The findings presented in this study are subject to the following qualifications:

- Strategic recommendations are developed by MNP as a third-party independent consultant to align with the CEDC's mandate as understood by MNP.
- Recommendations are based on CEDC information submitted to MNP and stakeholder feedback received during the interview process.
- Majority of the exploration sites reviewed in the report are in advanced stages having completed technical and feasibility reports and have a high level of confidence in proceeding to an operating mine soon.
- Not all required data was available by the stakeholders or made public.
- MNP received feedback from 93 percent of the CEDC identified mining industry stakeholders.
- No in person or on-site consultation was complete due to COVID-19 restrictions.
- The economic impact estimates were developed using input-output models. Input-output models are static models based on the flow of goods and services at a point in time. Over time those relationships may change due to changes in technology and productivity.
- Projections are based on past events giving an expectation of certain future events. Future events are not guaranteed to follow past patterns and results may vary, even significantly. Accordingly, we express no assurance as to whether the projections underlying the economic impact analysis will be achieved.

## 2.0 Approach and Methodology

The mining readiness strategy was developed by MNP through the approach outlined in Figure 1.

Figure 1: Mining Readiness Strategy Approach



## 2.1 Data Sources

MNP utilized a combination of primary and secondary sources to gather data and information for the mining readiness strategy.

### Primary Research

MNP conducted interviews with Northwestern Ontario exploration and mining related stakeholders to gather information on the main topics of the study, including:

- Business development in the supply and services sector.
- Workforce training and development.
- Transportation and electrical infrastructure.
- Economic impact of new and existing mine development for Thunder Bay.
- Research and development.
- Gaps and barriers to exploration and mining in Northwestern Ontario.

MNP completed 43 total interviews, including:

- 12 interviews with exploration companies and 6 interviews with active mining companies.
- 25 interviews with various associations (educators, labour unions, employment services, mining and prospecting associations, infrastructure representatives, and indigenous communities).

## Secondary Research

MNP conducted a review of relevant publicly available documents including annual financial reports of public exploration and mining companies, data from government bodies (e.g. Natural Resources Canada, Ontario government documentation, Statistics Canada, etc.) and information from previously completed employment, economic development and electrical infrastructure publications provided by the CEDC.

### 3.0 Regional Mining Overview

Ontario is currently the largest producer in Canada of gold, platinum group metals (platinum, palladium, rhodium, ruthenium, osmium and iridium) and nickel, and the second largest producer of copper.<sup>1</sup> The value of mineral production in Ontario has consistently exceeded \$10 billion since 2014, and reached a value of \$10.7 billion in 2019.<sup>2</sup>

Ontario is often one of the leading jurisdictions for exploration expenditures, alongside Quebec and British Columbia, with spending in the province over the last three years between \$517 to \$585 million.<sup>3</sup>

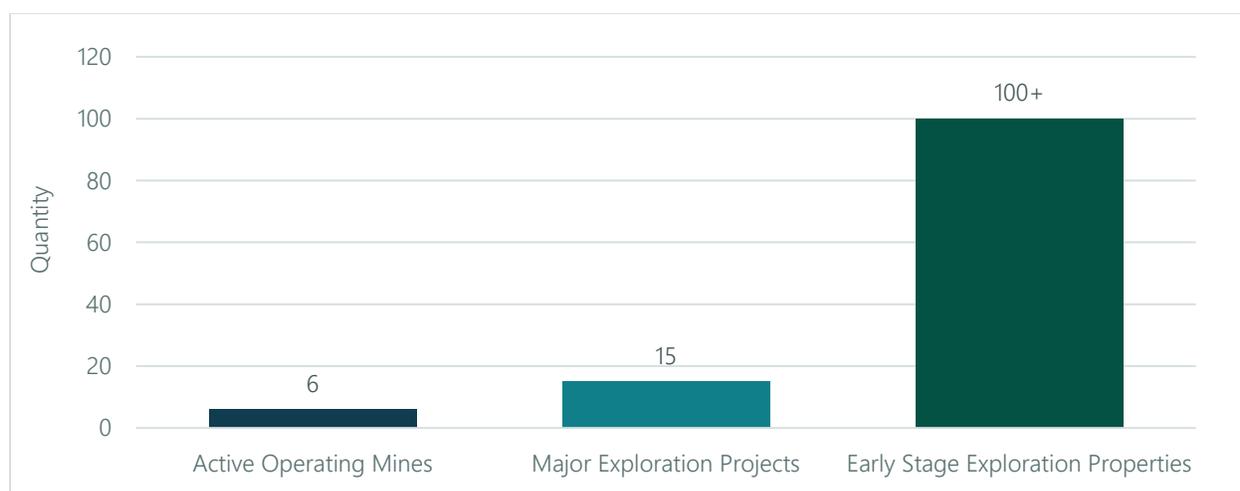
It is estimated that the mining industry creates 26,000 direct jobs and approximately 46,000 indirect jobs in mineral processing and mining supply and services in Ontario. The mining industry is also the largest private sector employer of Indigenous Canadians, accounting for 6 percent of the total mining labour force and 11 percent of direct mining jobs in Ontario.<sup>1</sup>

In 2020, Ontario had 40 operating mine sites, including 20 gold mines, 9 base metal mines (e.g. copper, zinc), an iron mine and a platinum group metal mine. The mines are primarily located in Timmins, Sudbury and Northwestern Ontario (Appendix A).

### 3.1 Exploration and Mining in Northwestern Ontario

Northwestern Ontario currently hosts 6 of the 40 operating mines in the province and is poised for growth with 15 major exploration sites in the region. In addition, there are over a hundred early stage exploration properties in Northwestern Ontario, actively being explored (not considered in this study), some of which in time may mature to major exploration or operating mine status (Figure 2).

Figure 2: Number of Operating Mines, Major Exploration and Early Stage Exploration Projects in Northwestern Ontario



<sup>1</sup> [https://www.oma.on.ca/en/ontariomining/facts\\_figures.asp](https://www.oma.on.ca/en/ontariomining/facts_figures.asp)

<sup>2</sup> <https://www.nrcan.gc.ca/our-natural-resources/minerals-mining/minerals-and-economy/20529>

<sup>3</sup> <https://www.nrcan.gc.ca/science-data/science-research/earth-sciences/earth-sciences-resources/earth-sciences-federal-programs/canadian-mineral-exploration-information-bulletin/17762>

The metals found in the region primarily include gold, palladium, lithium, graphite and nickel-copper-platinum group elements (PGE), with gold currently being the major focus for active mines and major exploration sites (Figure 3).

Figure 3: Distribution of metals by major exploration sites and active mines in Northwestern Ontario (2020)



The operating mines in the region include four mines that began operations over 20 years ago, and 2 relatively new gold mines, outlined in Table 1.

Table 1: Operating Mines in Northwestern Ontario

Company	Site Name	Start Year	Projected End Year	Metal Deposit
Evolution Mining	Red Lake Mine	1949	2033	Gold
Barrick	Hemlo Mine	1985	2028	Gold
Impala Canada	Lac des Iles (LDI) Mine	1993	2027	Palladium
Newmont	Musselwhite Mine	1997	2028	Gold
New Gold	Rainy River Mine	2017	2028	Gold
Harte Gold	Sugar Zone Mine	2019	2032	Gold

Production of the 20-year old mines has been steady over the past five years (excluding the Musselwhite mine that experienced a conveyor fire in 2019) and the newer mines have been steadily ramping up production (Figure 4).

Figure 4: Historic Northwestern Ontario Operating Mine Production (Gold and Palladium)



Source: [Ontario Mining & Exploration directory and resource guide 2020](#) and various company financial reports

The location of the major exploration and operating mine sites is provided in Figure 5.

Figure 5: Northwestern Ontario Major Exploration and Mining Sites



## 3.2 Regional Infrastructure Projects

Various transportation and electrical infrastructure projects are currently in planning or construction phase in Northwestern Ontario that are intended to support the local towns, remote and Indigenous communities and the mining industry.

### East-West Tie Electricity Transmission Project

The East-West Tie transmission project is a new 450 km long, double circuit, 230 kV line being installed between Wawa and Thunder Bay with a connection midway in Marathon (Figure 6). The project, valued at \$777 million, began in late 2019 and is expected to be complete by end of 2021. The new transmission line is intended to ensure long-term reliability of electricity in Northwestern Ontario, including the mining sector which is expected to drive electricity demand growth over the next decade.<sup>4</sup>

Figure 6: East-West Tie Transmission Line<sup>5</sup>



### Wataynikaneyap Electricity Transmission Project

There are currently 32 remote communities, of which 25 are recognized First Nations communities, in the northern area of Northwestern Ontario that are not connected to the provincial transmission grid. The communities are powered by diesel generation that feeds into local distribution grids. The costs to use diesel power can be over three times more than the provincial grid due to the cost of fuel and transportation costs, as often the fuel can only be shipped in via winter ice roads or flown in. The 25 First Nations communities currently has an approximate population of 15,000 people (and growing) and a peak electricity demand of 20 MW.<sup>6</sup>

<sup>4</sup> <https://www.nextbridge.ca/regulatory-approvals>

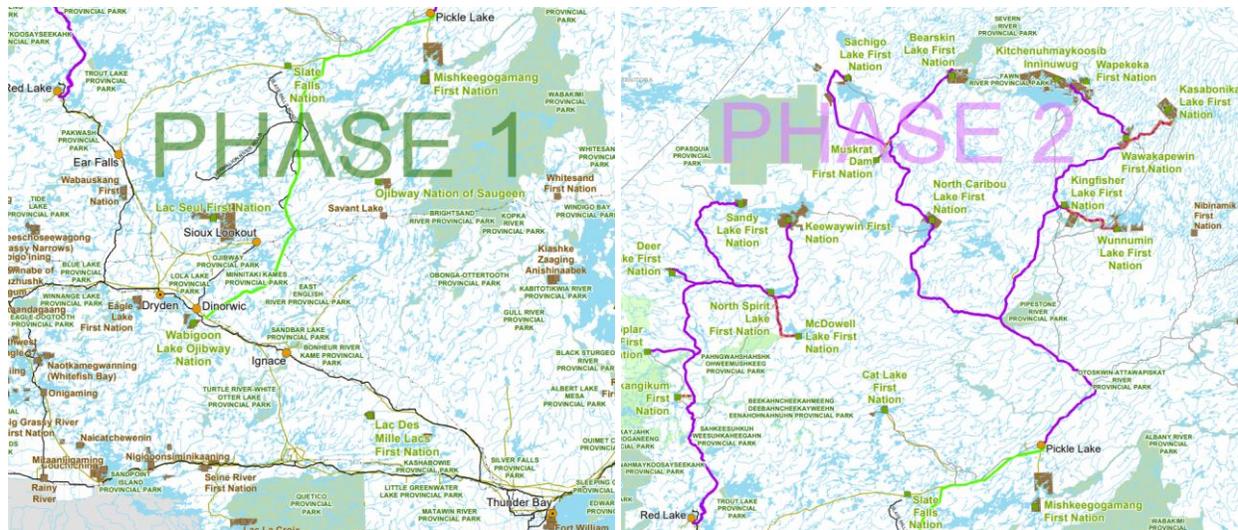
<sup>5</sup> <https://www.nextbridge.ca/home>

<sup>6</sup> <https://www.wataypower.ca/project/background>

The new 1,800 km long Wataynikaneyap transmission line will be bringing grid connection to 17 remote communities in Northwestern Ontario (Figure 7) and includes two major construction phases:

- Phase 1: A 300 m long 230 kV line replacing the existing 70-year-old 115 kV E1C line. Potential construction completion in late 2020.<sup>7</sup>
- Phase 2: A brand new 1,600 km transmission line with a mix of 115 kV, 44 kV and 25 kV service. To be completed by 2023, with remote community connections expected in 2021.<sup>8</sup>

Figure 7: Wataynikaneyap Transmission Line, Phase 1 and 2<sup>9</sup>



### Waasigan Transmission Line Project

The Waasigan Transmission Line is a proposed new double-circuit 230 kilovolt (kV) transmission line between Lakehead Transformer Station (TS) in the Municipality of Shuniah and Mackenzie TS in the Town of Atikokan, and a new single-circuit 230 kV transmission line between Mackenzie TS and Dryden TS in the City of Dryden (Figure 8).

The project is currently undergoing public and stakeholder consultation for the environmental assessment, which is slated to be complete by 2024 prior to any construction beginning.<sup>10</sup>

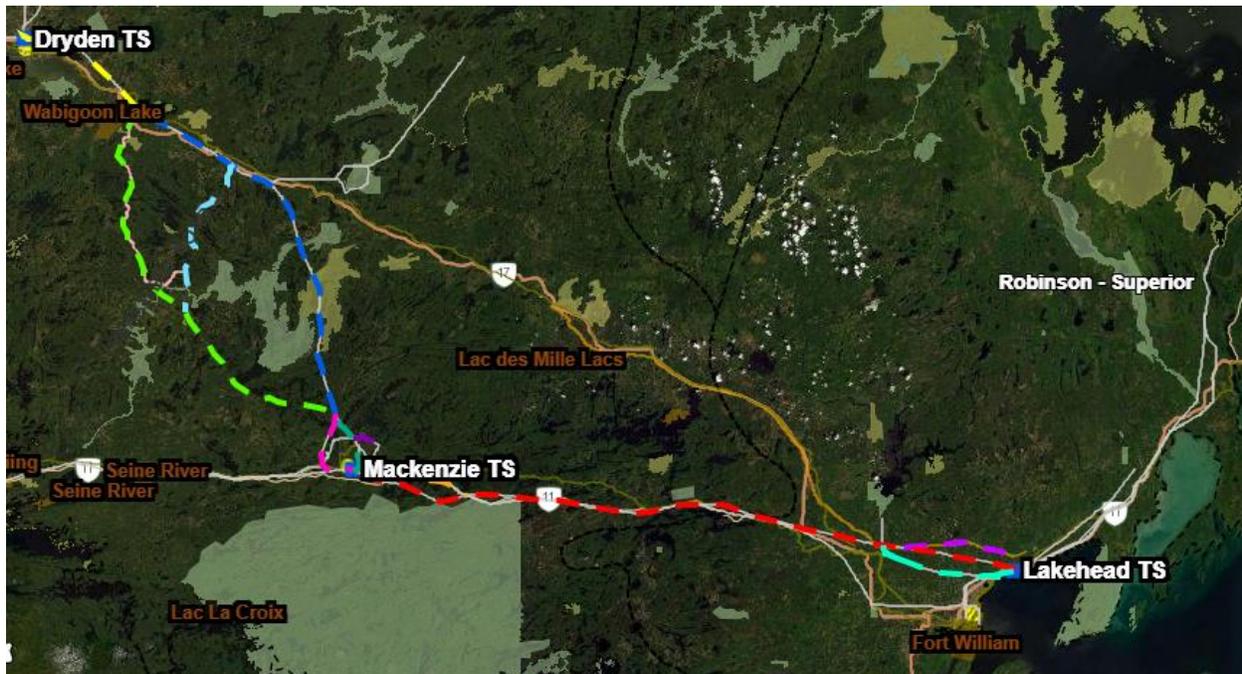
<sup>7</sup> <https://www.wataypower.ca/project/phase-1>

<sup>8</sup> <https://www.wataypower.ca/project/phase-2>

<sup>9</sup> <https://www.wataypower.ca/documents>

<sup>10</sup> <https://www.hydroone.com/about/corporate-information/major-projects/waasigan>

Figure 8: Waasigan Transmission Line Project



Source: <https://maps-dillon.maps.arcgis.com/apps/webappviewer/index.html?id=43ac330673e34705be1b8da570e4420e>

### Ring of Fire Road Construction

The Ring of Fire is known to be one of the most promising mineral deposits in Ontario, located approximately 500 km northeast of Thunder Bay and covering about 5,000 km<sup>2</sup> of area. Current estimates suggest a multi-generational potential of chromite production, along with significant production of nickel, copper and platinum.<sup>11</sup>

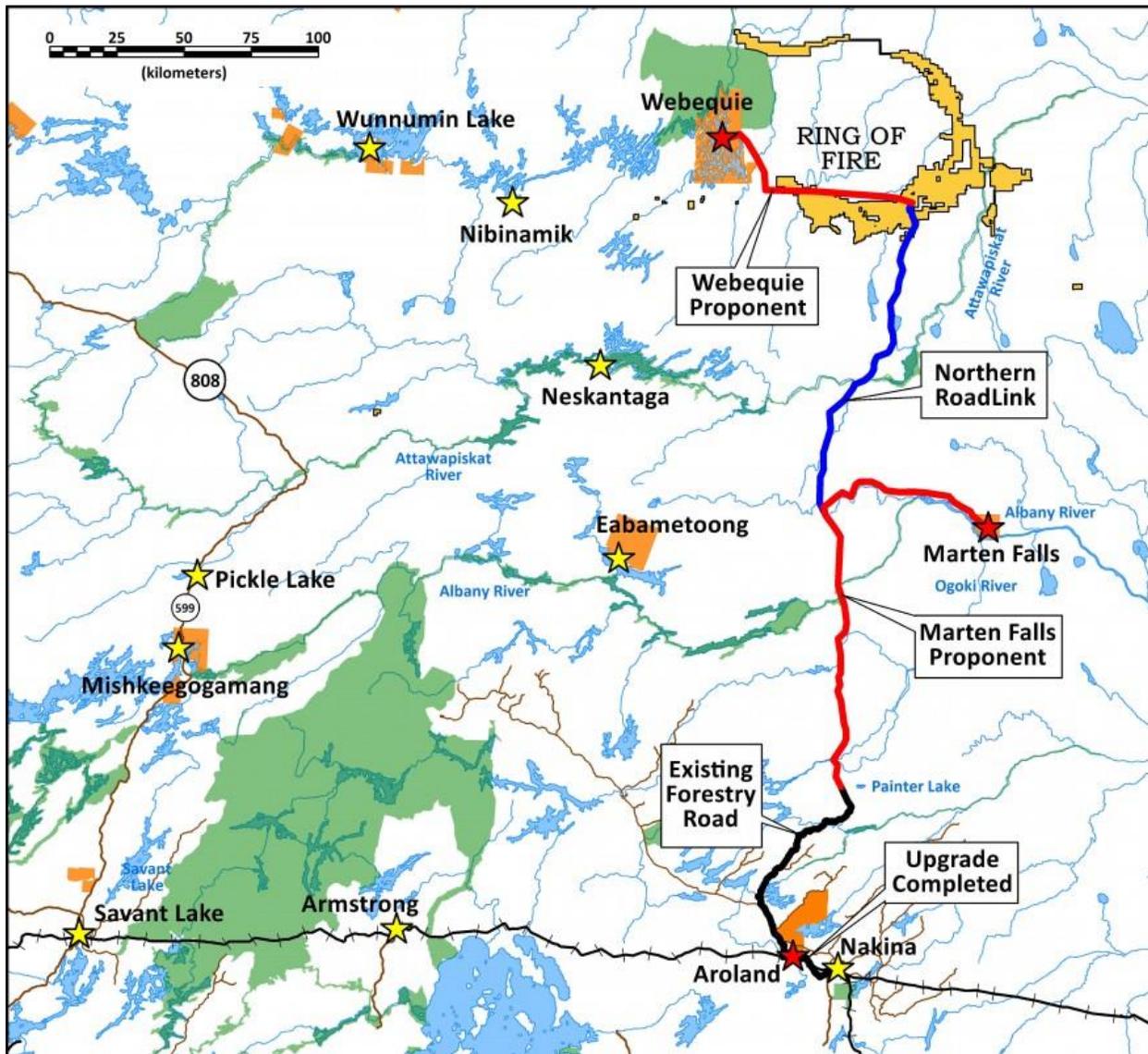
Due to the location of the Ring of Fire in the far north, availability of all-season roads present challenges in accessing the mineral deposit, adding costs to developing a mine in the region, or present a barrier to mining altogether. Road development conversations between government and Indigenous communities have been an ongoing initiative, and in March 2020, it was announced the government would be moving forward on advanced planning of an all-season north-south road to provide access to potential mine sites and connect First Nation communities to Ontario's highway network.<sup>12</sup>

More recently, Provincial Environmental Assessment, Federal Impact Assessment, and engineering design work is underway on three sections of the overall road right-of-way (North-Webequie Supply Road, South-Marten Falls First Nation Community Access Road, and Central-the Northern Road Link). The initiative is indigenous led, by Webequie and Marten Falls First Nations, and once constructed will provide a community access road system and access to the Ring of Fire from south to north (Figure 9).

<sup>11</sup> <https://www.mndm.gov.on.ca/en/ring-fire>

<sup>12</sup> <https://news.ontario.ca/en/release/56039/moving-forward-with-road-access-to-the-ring-of-fire>

Figure 9: Road to Ring of Fire<sup>13</sup>



## Port of Thunder Bay

The Port of Thunder Bay is the Western Canadian terminus of the St. Lawrence Seaway System, the largest inland waterway in the world. The Port was built to provide access to European markets for Western Canadian grain producers through the longest grain supply chain in the world.

An integral part of the Port of Thunder Bay's strategy is expanding upon the successful project cargo corridor, facilitating the movement of dimensional cargo to and from Western Canada and international markets. The Port coordinates the activities of stevedores, trucking companies, equipment operators,

<sup>13</sup> <https://norontresources.com/wp-content/uploads/2020/11/Q3-2020-Corporate-Presentation-FINAL.pdf>

railways and fabricators to ensure that project cargo is handled efficiently and that shippers derive value out of shipping cargo via Thunder Bay.

The Port strives to diversify cargoes to reduce dependency on select commodities. The Port has prepared a significant 5-Year Capital Plan in strategic investments, including the expansion and reconfiguration of the general cargo terminal to capitalize on future cargo growth opportunities.<sup>14</sup>

The Port's facilities, able to handle 9 million tonnes of cargo annually, include:

- 8 grain elevators
- 3 dry bulk terminals
- 2 liquid bulk terminals
- 1 general/project cargo terminal
- 1 shipyard with drydock

The port also has available waterfront land for property development, including:<sup>15</sup>

- Harbour Park – a 45-hectare industrial park.
- Intercity Site – a 12-hectare waterfront site with a 61-metre dock, rail access and operational grain elevator.

An aerial view of part of the port's facilities is presented in Figure 10.

Figure 10: Port of Thunder Bay<sup>16</sup>



<sup>14</sup> <https://www.portofthunderbay.ca/administration/>

<sup>15</sup> <https://www.portofthunderbay.ca/administration/property-development/>

<sup>16</sup> Photo by Ron Garnett / [www.AirScapes.ca](http://www.AirScapes.ca)

### 3.3 Developments in Critical Minerals

Critical minerals consist of the metals cobalt, copper, nickel, uranium, lithium, magnesium, platinum group metals, rare earth elements and others, and are vital in aerospace, telecommunications, computing, and an array of clean technology industries.<sup>17</sup>

Canada ranks among the top five exports of various critical minerals including platinum group metals, nickel, cobalt, and graphite, seen in Figure 11 and Figure 12.<sup>18</sup>

Northwestern Ontario currently has eight advanced critical mineral exploration sites, including lithium, graphite, copper and platinum group metals (palladium) providing an opportunity for the province to become a leading jurisdiction in critical mineral production.

Critical minerals like lithium and graphite also require processing of the raw mined material to create a useable product, presenting an opportunity for Northwestern Ontario to become a leader in the chemical processing and conversion of critical minerals to provide products for clean technologies such as batteries for electric vehicles and large scale electrical grid energy storage.

#### Government Initiatives

In 2020, multiple government funding initiatives were announced that support the development of critical minerals, including \$590 million from the Ontario and federal government to build electric vehicles at Ford’s Oakville plant, representing a commitment to clean technology, and a \$31 million investment by the Saskatchewan government to build Canada’s first rare earth processing facility.<sup>19, 20</sup>

Figure 11: Canada's Technology Mineral Production and Advanced Projects, 2017

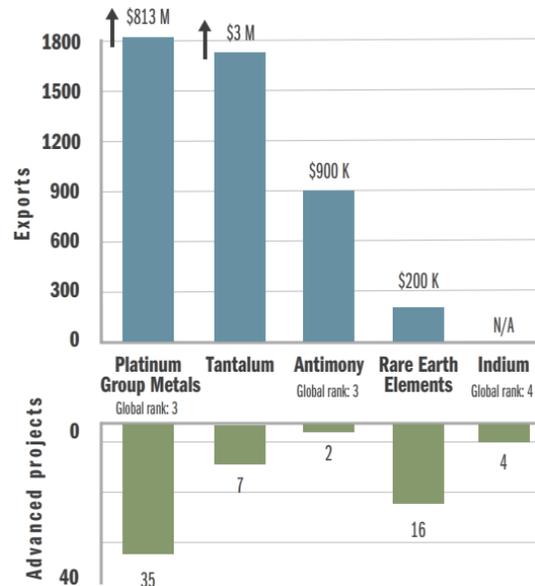
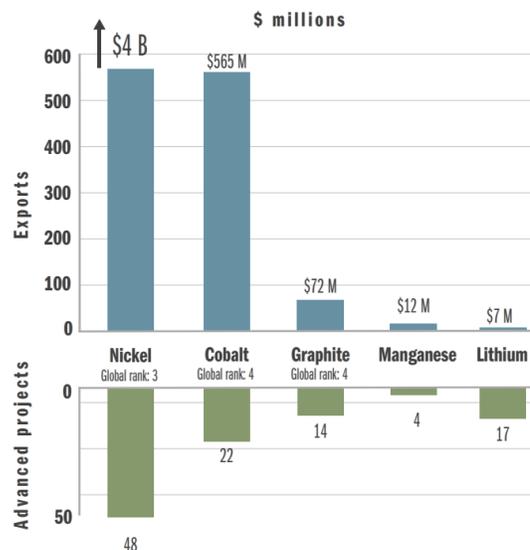


Figure 12: Canada's Battery Mineral Production and Advanced Projects, 2017



<sup>17</sup> <https://mining.ca/our-focus/critical-minerals/>

<sup>18</sup> [https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/Critical%20Minerals\\_EN\\_2020\\_accessible.pdf](https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/Critical%20Minerals_EN_2020_accessible.pdf)

<sup>19</sup> <https://news.ontario.ca/en/release/58736/historic-ford-canada-investment-transforming-ontario-into-global-electric-vehicle-manufacturing-hub>

<sup>20</sup> <https://www.saskatchewan.ca/government/news-and-media/2020/august/27/ree-facility>

### 3.4 City of Thunder Bay

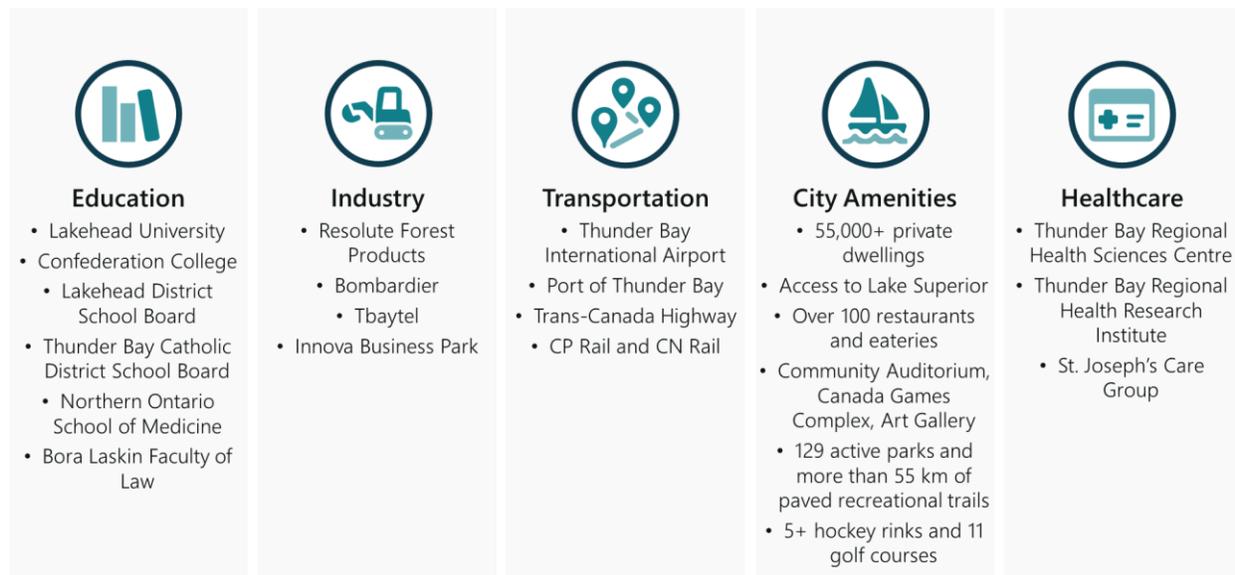
Thunder Bay is a central Canadian city on the north shore of Lake Superior, located 1,300 km northwest of Toronto, 700 km east of Winnipeg and 580 km northeast of Minneapolis. The city's location allows it to be the gateway to the northwest, providing access to eastern and western markets through the port, international airport, major highways and railways.

With a population of 121,621 (census 2016), Thunder Bay is the largest community on Lake Superior and the most populous municipality in Northwestern Ontario.<sup>21</sup> In 2016, 19 percent of the population was between 15 to 29 years of age, 17 percent was 30 to 44 and 23 percent was 45 to 59.<sup>22</sup>



The city is home to various major businesses and resident amenities, summarized in Figure 13.

Figure 13: City of Thunder Bay Major Businesses and Amenities Summary



<sup>21</sup> <https://www.thunderbay.ca/en/business/resources/Documents/EconomicDevelopment/Community-Profile-for-Investors.pdf>

<sup>22</sup> Statistics Canada. 2017. Thunder Bay [Census metropolitan area], Ontario and Ontario [Province] (table). Census Profile. 2016 Census. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017.

### 3.5 Community Economic Development Commission (CEDC)

The CEDC was incorporated in 2006 as an arms-length Community Development Corporation that is led by an independent board with core funding from the City of Thunder Bay. The CEDC helps those interested in business and economic activity in the City of Thunder Bay with community information and statistics, networking and referrals, assistance in site selection and labour market data. It is responsible for business development, businesses retention and expansion, entrepreneurial support, Indigenous community joint projects, opportunity promotion, and collection and assessment of key business data.<sup>23</sup>

The CEDC includes specialized business sectors in aboriginal partnerships, film, forestry, knowledge based, manufacturing, mining and transportation.<sup>24</sup>

#### Mining Division

The CEDC's mining business sector department supports the mining sector in Northwestern Ontario through initiatives including:<sup>25</sup>

- Providing regular updates, [data and information](#) regarding the exploration projects and operating mines in the region.
- Providing links and information to [job opportunities](#).
- A Thunder Bay [Supply and Services Directory](#) that allows local companies to be found based on a company name, keyword or business type category search.
- Government relations.
- Introductions between mining companies, educators, trainers, and associations located in the region.



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<sup>23</sup> <https://www.thunderbay.ca/en/about-cedc.aspx>

<sup>24</sup> <https://www.thunderbay.ca/en/business-sectors.aspx>

<sup>25</sup> <https://www.thunderbay.ca/en/mining.aspx>

## 4.0 Stakeholder Feedback

Stakeholder interviews were conducted with 18 exploration and mining companies, and 25 associations. Each interview consisted of reviewing an interview guide prepared by MNP (Appendix B and C) with questions covering business development in supply and services, workforce training and development, transportation and electrical infrastructure, economic impact of new and existing mines, research and development, and gaps and barriers to exploration and mine development.

### 4.1 Interview Participants

Exploration and Mining	Associations
Avalon Advanced Materials	Ambassadors Northwest
Barrick Gold	Anishinabek Employment & Training Services
Clean Air Metals	Carpenters Union
Evolution Mining	Centre of Excellence for Sustainable Mining and Exploration (CESME)
First Mining Gold	Confederation College
Frontier Lithium	Construction Assoc. of Thunder Bay
Generation Mining	Electrical Workers
Great Bear Resources	Energy Task Force
Greenstone Gold	Fort William First Nation (FWFN)
Harte Gold	Hydro One
Impala Canada	Independent Electricity Systems Operator (IESO)
New Gold Inc.	Lakehead University
Newmont	Nishnawbe Aski Development Fund
Noront Resources	Nokiiwin Tribal Council
Pure Gold Mining	North Superior Workforce Planning Board
Rock Tech Lithium	Northwest Employment Works (NEW)
Treasury Metals	Northwestern Ontario Prospectors Association
Zen Graphene	Ontario Mining Association (OMA)
	Ontario Prospectors Association (OPA)
	Ontario Youth Apprenticeship Program (OYAP)
	Port of Thunder Bay
	Thunder Bay Chamber of Commerce
	Thunder Bay Intl Airport Authority
	Thunder Bay Metal Fabricators Association
	YES Employment
Total: 18	Total: 25

## 4.2 Top Interview Themes

- 1 The CEDC is perceived by mining industry stakeholders as a key facilitator for business introductions and sharing knowledge about economic development opportunities and support.
- 2 City/CEDC needs to advance their marketing and communications strategy to emphasize that Thunder Bay is a full-service hub for Northwestern Ontario.
- 3 Exploration and mining companies will prefer to buy local if their supply chain staff are aware of the local businesses which are qualified to deliver the needed supplies and services.
- 4 There is an emerging opportunity for critical mineral processing and support directly within the municipal boundaries of Thunder Bay.
- 5 There is a near-term great need for skilled trades and numerous types of support services roles as new mines are constructed and begin operations.
- 6 A tailored strategy to support local workers and Indigenous community members gain the job skills along with the logistical support to get to the work sites is needed.
- 7 The city of Thunder Bay has abundant municipal infrastructure to support growth in the regional mining industry, but the broader northwest regional infrastructure has some significant challenges with road and electricity supply.
- 8 Thunder Bay is currently receiving significant economic benefits due to the mining industry and is well perceived and positioned to benefit from the forecasted increase in mining activity.
- 9 All mining companies are willing to partner with local research facilities if the opportunity arises.
- 10 Extended timelines for permitting and approvals is seen as the major impediment to advancing mine development.

## 4.3 Mining Industry Stakeholder Interview Feedback

The feedback and common themes heard from stakeholder interview participants is summarized below for each major category covered in the Mining Readiness Strategy.



### *What we Heard:* Business Development in Supply and Services

1. Enhance the existing local supply and service business directory with additional service offering filters and consistent company descriptions to promote local capabilities to foreign and existing exploration and mining companies.
2. Emerging opportunity to host multiple critical mineral processing facilities (lithium and graphene), attracting clean tech businesses to the city.
3. Local procurement preferred by exploration and mining companies when available and competitively priced to support the region and receive quicker customer support times.
4. Some specialized mining supply and services is procured outside of Thunder Bay (e.g. drilling contractors, who primarily come from Sudbury, Quebec or Winnipeg).
5. Businesses focused on quicker customer service may have the advantage including parts warehousing, logistics and equipment service type companies.
6. CEDC can facilitate and expedite introductions between mining, local businesses and supporting associations becoming a communications hub.
7. Communicate the types of supply and services required by exploration and mining operations to attract new businesses to the area, develop new businesses from local entrepreneurs, or aid students and experienced workers to seek employment in a mining related field.
8. Transition the legacy forestry industry skillset and facilities to mining supply businesses which could now be converted to a mining hub using existing facilities, skillsets, and labour supply.
9. Available commercial and industrial land in the city is an opportunity to attract new businesses, particularly near the waterfront and port's special economic zone.



## What we Heard: Workforce Training and Development

1. Lack of local skilled trades training and labour force, particularly millwrights, heavy equipment, and electricians.
2. Skilled and trained Indigenous workers would provide an advantage for exploration and mine companies working in NW Ontario.
3. Experienced geologists, engineers and managers are in short supply in the region.
4. New emerging opportunities for chemical, plant operators and clean energy professionals from the new critical mineral deposits discovered in NW Ontario.
5. Underground mines present unique common core training challenges, with local labour either not having completed the common core training prior to applying for jobs, or having difficulty acquiring the training due to lack of local options.
6. Workers lacking a drivers' license, or the facilities to complete the driving test, introduces barrier to employment.
7. Directory of positions and skills required to work in mining would provide guidance to students and training centers on what training areas to focus on to support the industry.
8. Thunder Bay's post-secondary training is mostly known for exploration type skill development (e.g. geology programs) and less known for direct mining training.
9. Create awareness about opportunities to work in skilled trades and in the mining sector at the high school level to ensure local students work and remain in the city.
10. Focus on entrepreneurial training to help develop local businesses that could become a supporting business for the exploration and mining sector.
11. Support students with transitioning from high school to post-secondary schooling, including life-skill training opportunities and up-skill training for anyone who lacks a grade 12 high-school diploma.
12. Hire locally for mine construction, training workers in the meantime to transition into the operations phase.
13. Experienced workers lacking official schooling or trades paperwork are valuable to the mining sector and require support to transfer careers and work in mining.
14. Programs such as Supercom and Wataynikaneyap with Valard Construction are known to be successful Indigenous partnerships.



### *What we Heard: Transportation and Electrical Infrastructure*

1. The city is known as a transportation hub due to the existence of an international airport, major port, highway network and railways.
2. Nighttime flights are not currently available out of the Thunder Bay international airport, which cause schedule inconveniences for flying out of the region.
3. Indigenous joint ventures are often utilized in access road maintenance contracts.
4. Power pricing and reliability are top infrastructure concerns.
5. Multiple exploration sites taking advantage of existing forestry roads in the northwest.
6. Cellular service and internet connection are a barrier directly outside of the city and in remote and Indigenous communities.
7. Electrical infrastructure planning is required early in exploration phase as it can take five years to develop.
8. NW Ontario's large geographical area presents challenges for improving and maintaining infrastructure at an affordable cost.
9. Tailored transportation programs to the mine sites would benefit local workers, especially for those lacking a drivers' license.
10. Extension of the Northern Industrial Electricity Rate (NIER) program and Industrial Conservation Initiative program are crucial to keeping electricity prices competitive.



### *What we Heard: Economic Impact of New and Existing Mine Development*

1. Exploration and mining companies are invested in the region. 50 percent of responses stated major spending (\$2M+ per year) in Thunder Bay and the surrounding region, and 31 percent stated a moderate level of spending (up to \$2M per year).
2. Abundant exploration activity is occurring in the northwest with over \$110M being spent by 15 of the exploration and mining companies, primarily on drilling costs.
3. Thunder Bay is well perceived as a full-service community with most amenities (housing, hotels, recreation, health services, etc.) required for residents and visitors.
4. Thunder Bay is well positioned to attract and retain mining sector workers and their families due to the city's premier amenities and opportunities.



### *What we Heard: Research and Development*

1. Exploration and mining companies are all willing to partner with local university and college research centers if or when the opportunity arises.
2. Industry matching funds are available for R&D projects.



### *What we Heard: Gaps and Barriers to Exploration and Mine Development*

1. Permitting timelines are the biggest concern and barrier to mine development in Northwestern Ontario (regulatory and environmental).
2. Understanding of how and when to involve Indigenous communities in the mining sector is a current gap and potential barrier to mine and infrastructure development.
3. The vast area of Northwestern Ontario presents infrastructure challenges including lack of all-season roads and electricity infrastructure for the more remote areas.

The stakeholder response themes which MNP has consolidated above were utilized in understanding the mine supply and service companies the city could attract, employment opportunities for the northwestern region, economic opportunities and strategic recommendations for the CEDC to support exploration and mining in Northwestern Ontario.

## 5.0 Mine Supply and Service Opportunities

Thunder Bay is currently home to an estimated 400-500 mine supply and service companies and has a continued opportunity to host additional businesses in the city to support the exploration and mining sector in Northwestern Ontario. The city has an advantage due to its proximity to many of the mine sites in the region and due to its relatively large amount of available commercial and industrial land. Through stakeholder interviews, specific types of businesses were identified that are best suited to be in Thunder Bay, which included businesses focused on quicker customer service times, general mine support businesses, training centers, structural mining materials, delivery services and chemical processing. Business types not recommended for the city to attract included specialty mine equipment manufacturers and drilling companies that already have a strong base outside of the region.

### City of Thunder Bay Land Assets

Thunder Bay completed an Employment Land Study in late 2020 that analyzed the city's available industrial, commercial, and institutional land supply. The number of sites and area of available land is outlined in Table 2.<sup>26</sup>

*Table 2: Number of Sites and Size of Vacant Land in Thunder Bay, 2020*

Industrial:	Commercial:	Institutional:
<ul style="list-style-type: none"> <li>Nearly 450 total sites</li> <li>Light industrial: 520 gross hectares</li> <li>Heavy industrial: 202 gross hectares</li> <li>Business area: 47 gross hectares</li> </ul>	<ul style="list-style-type: none"> <li>Over 350 individual sites</li> <li>84 gross hectares</li> </ul>	<ul style="list-style-type: none"> <li>16 individual sites</li> <li>24 gross hectares</li> </ul>

The city's land demand analysis identified a considerable supply of vacant, designated lands in the city, indicating that future land requirements can be accommodated on existing sites, and therefore does not require the conversions of any non-employment lands for employment purposes.

Strategic recommendations from the land assessment include:

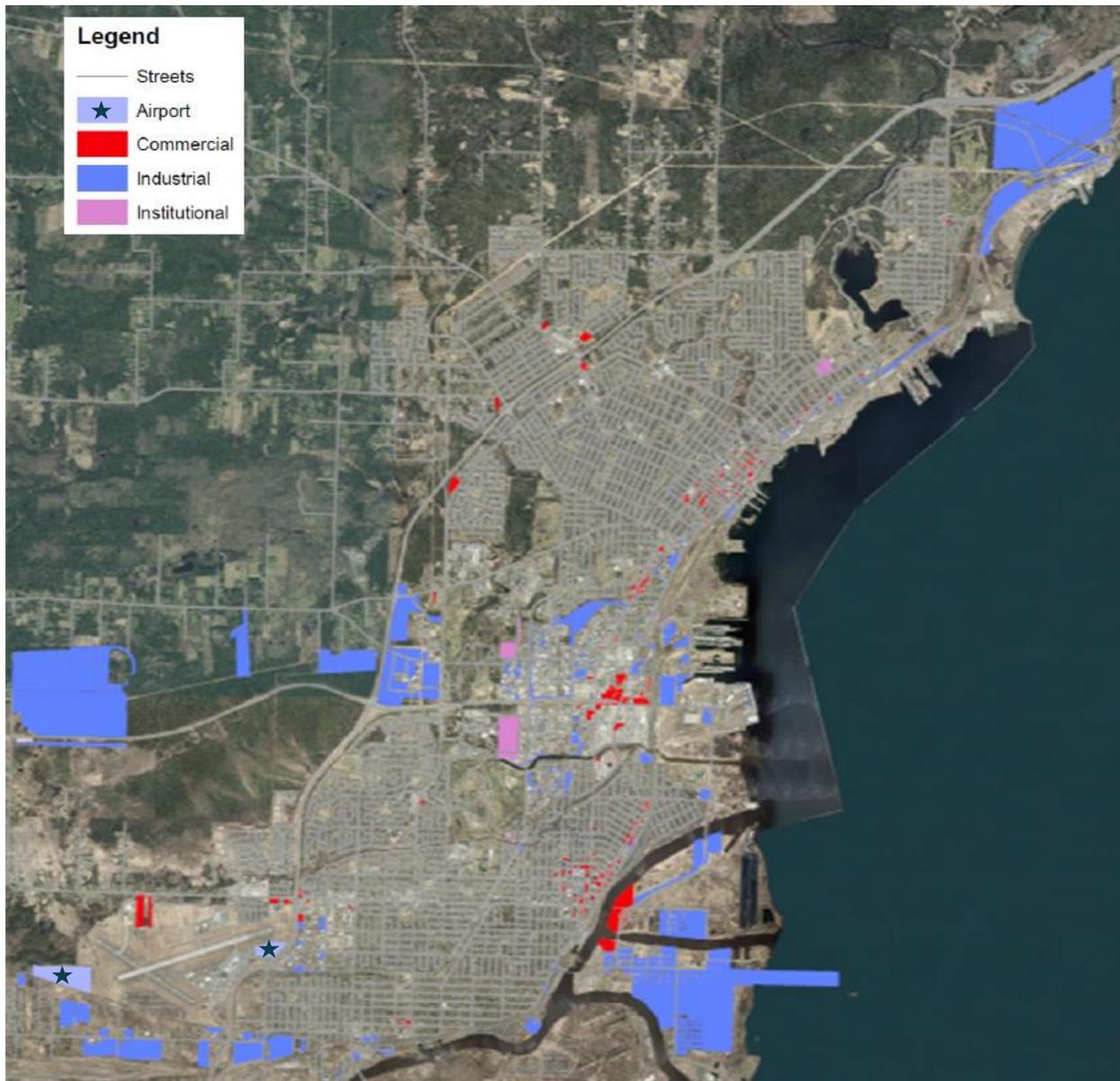
- The city has a more than adequate supply of employment land across all land use designations.
- The city must maintain the designation of its supply of undeveloped, centrally situated Light Industrial lands.
- The city's established heavy industrial base is an asset which requires protection to ensure ongoing operations. However, the vast supply of vacant and underutilized Heavy Industrial sites can withstand some conversion to Light Industrial uses, if such applications arise.

<sup>26</sup> Thunder Bay Employment Land Strategy 2020

- Office space could be a feature of a mixed-use redevelopment of a site in the Strategic Cores or along the waterfront.
- Occupied large Institutional sites/campuses contain undeveloped lands that are suited to accommodate future institutional and related development.
- Promote opportunities for development along the waterfront, while protecting the Port function.

The location of the available vacant designated land in Thunder Bay is provided in Figure 14.

Figure 14: Map of Available Vacant Land in Thunder Bay, 2020



Source: Thunder Bay Employment Land Strategy 2020

## Strategic Businesses for Thunder Bay's Economy

Stakeholder consultations and document research identified several mine supply and service businesses that Thunder Bay should focus on attracting to the city. The suggestions are primarily centered around themes including the city's proximity to the mine sites, quicker turnaround times, workforce training, new opportunities in critical minerals, and the available commercial and industrial land (Figure 15).

Figure 15: Mining Supply and Service Business Recommendations for Thunder Bay



Mine supply and service businesses that Thunder Bay may see of a lesser priority include:

- Specialty heavy mining equipment, which is procured globally from already established suppliers and has inconsistent procurement timelines (e.g. large mining equipment with useable life over 20 years).

## 6.0 Employment Forecast and Analysis

In 2020, Thunder Bay was home to over 800 mine employees that were working in the six operating mines in Northwestern Ontario. With the potential of 15 major exploration projects converting to operating mines over the next 10 years, Thunder Bay has an opportunity to host many more direct mining and mining support employees.

The exploration and mining sector overall require employees with skillsets in the following areas:

- Production: mine labourers, trucker drivers, heavy equipment operators, machine operators, drillers and blasters, mineral and metal processing, etc.
- Skilled trades: heavy-duty mechanics, carpenters, plumbers, pipefitters, millwrights, electricians, welders, etc.
- Professional and physical sciences: engineers (mechanical, electrical, civil, geological, metallurgical, materials, mining, industrial), scientists, etc.
- Supervisors: engineering managers, mine supervisors, construction managers, trades supervisors, etc.
- Technical: engineering technologists (drafting, civil, electronics, mechanical, industrial, chemical, biological), land surveyors, IT consultants, etc.
- Support workers: administration, logistics, inspectors, testers, general office support, etc.
- Human resources and finance: HR professionals, accountants, financial managers, etc.

Stakeholder interview feedback echoed the needs of the above-mentioned occupations for exploration and mining projects. The distribution of skills hired by the mining industry is outlined in Table 3 below.

Table 3: Occupations Required by the Mining Sector, 2020 Data

Occupation Category	Distribution
Other Occupations*	35%
Production Occupations	24%
Trades Occupations	11%
Professional and Physical Science Occupations	9%
Supervisors, Coordinators, and Foremen	7%
Technical Occupations	7%
Support Workers	4%
Human Resources and Financial Occupations	3%

Source: [Canadian Mining Labour Market 10-Year Outlook \(2020\)](#), Mining Industry Human Resources Council

\*Other Occupations refers to a group of occupations that are not exclusive to mining operations (e.g. registered nurses, light duty cleaners, security guards) but are still employed by the mining sector.

A detailed list of occupations included in the above occupation categories is provided in Appendix D.

## 6.1 Northwestern Ontario Employment

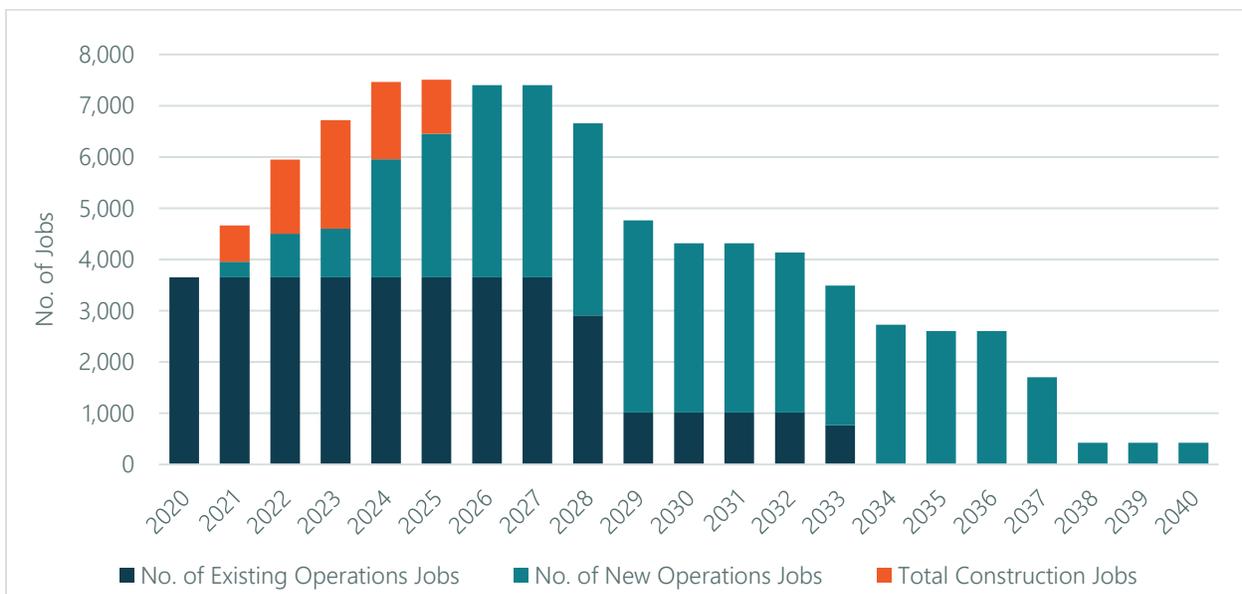
Employment in the mining sector in Northwestern Ontario is currently driven by the 6 operating mines in the region and is poised for growth with 15 exploration sites potentially transitioning to operating mines over the next 5-10 years. Based on current publicly available life of mine projections, employment in construction is estimated to be primarily required between 2021 to 2025 as most of the exploration sites are developed into operating mines. Employment in operations at the existing mines is estimated to remain constant to 2027, and subsequently decline as multiple mines begin decommissioning and closure from 2028 to 2033. New mine operations jobs are projected to grow year-over-year until 2026, before declining to present day levels in 2032. Actual start dates for construction and operations of new mine sites are subject to factors including metal prices, permitting timelines/approvals, discovery rates, project maturity of existing exploration projects, and new exploration projects advancing other than the sites covered in this study (Figure 16).

Figure 16: Estimated Current and Future Mining Employment Trends in Northwestern Ontario



Total projected annual flow of construction and mine operations jobs is outlined in Figure 17 below.

Figure 17: Estimated 20-Year Employment Outlook for Construction and Operations Jobs in Northwestern Ontario

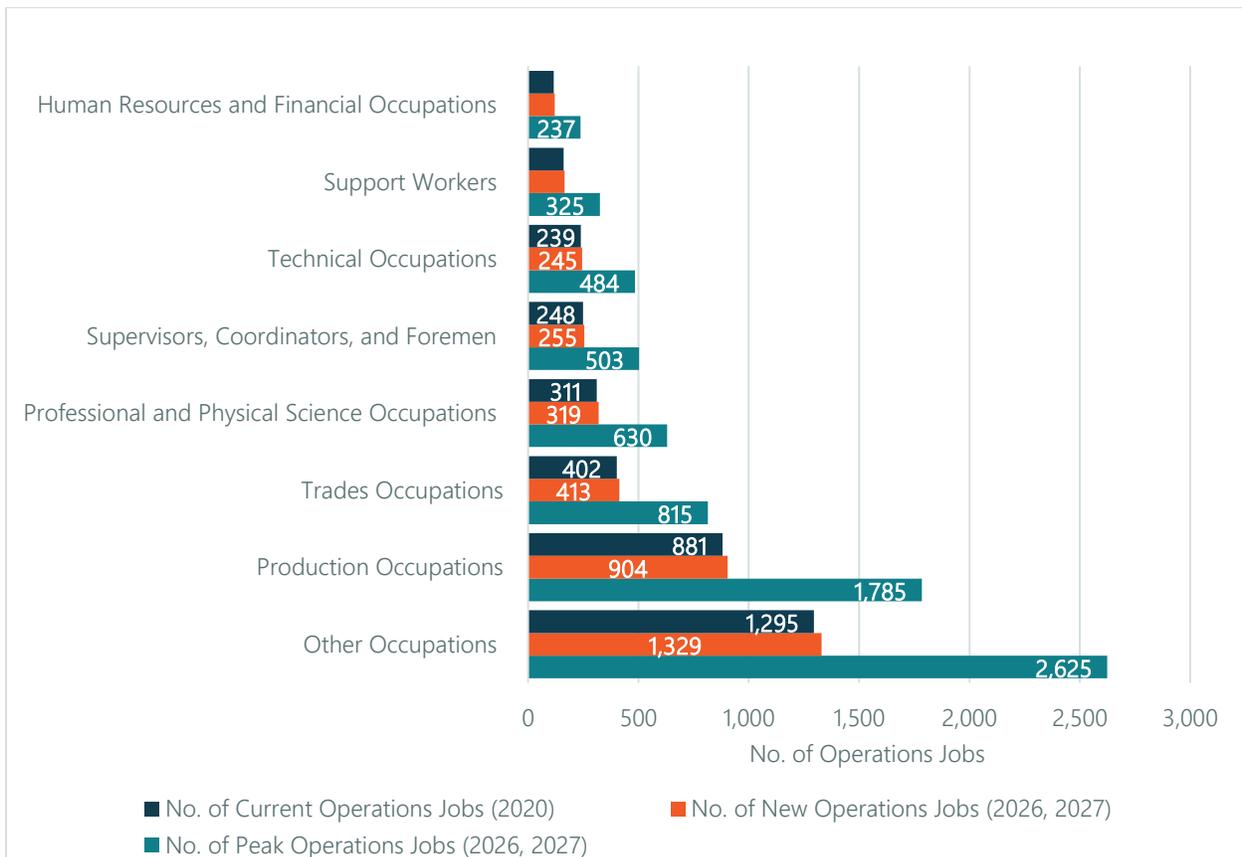


Source: Stakeholder interviews and public documentation.

## Northwestern Ontario Employment Distribution

The types and quantities of positions required for mining operations in Northwestern Ontario is estimated using the above-mentioned occupation distribution data and 20-year employment forecast to estimate the current and peak workforce requirements for the region, and the number of new operations jobs becoming available during peak operations (Figure 18).

Figure 18: Estimated Northwestern Ontario Employment Distribution at Current (2020) and Peak Operational Levels



**By 2026, operations jobs are projected to double in all occupational categories, with 3,600 estimated jobs being required to fill.**

## 7.0 Transportation and Electrical Infrastructure

The transportation and electrical infrastructure requirements for the 15 exploration sites was reviewed to understand the range of requirements for each site to move the projects into the mine operation phase. Data was collected via stakeholder interview responses and reviews of the public technical and feasibility reports of each mine site to determine the needs of each site.

### 7.1 Transportation Requirements

Transportation to exploration and mine sites is made possible by a combination of air travel from Thunder Bay and other local airports to sites, major highway network (Appendix E) and various winter and all-season access roads.

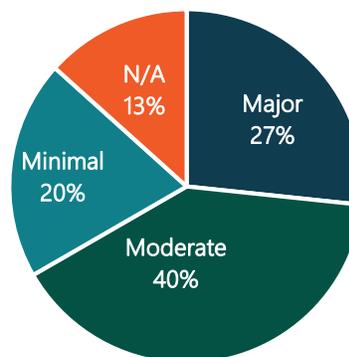
To evaluate each site's transportation infrastructure requirements to be prepared for future mine operations, a four-criteria rating system was developed, including:

- Major: requires brand new road construction to the site.
- Moderate: requires construction to update the existing access road.
- Minimal: requires implementing an access road maintenance plan.
- N/A: information was not available during stakeholder interview or has not yet been published in public reports.

Of the 15 exploration sites reviewed, 60 percent had minimal or moderate access road construction requirements, due mostly to their advantageous location close to the major highway network in Northwestern Ontario (Figure 19). Sites requiring major construction include:

- Access to the Ring of Fire.
- Realigning existing Highway 11 road and electricity infrastructure that is currently passing through the site.
- Construction of all-season roads to improve current access restrictions of air travel and winter road only access (Frontier Lithium's PAK project, and First Mining Gold's Springpole Lake project).

Figure 19: Access Road Construction Requirements for 15 Major Exploration Sites



A detailed review of each exploration site's access road requirements is provided in Appendix F.

### 7.2 Electricity Requirements

Electricity is provided to mine sites via connecting to the provincial grid, constructing power plants on site, or a combination of both in the case where the grid lacks capacity to supply the entire mine site.

To evaluate each site's electricity infrastructure requirements to be prepared for future mine operations, a four-criteria rating system was developed, including:

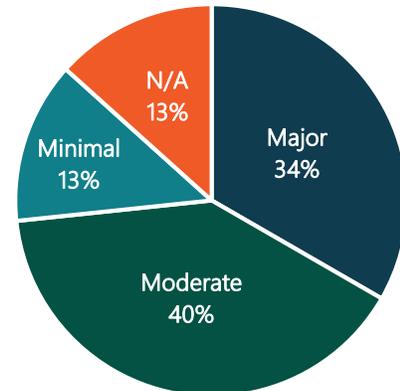
- Major: construction of a transmission line is required 10 km or further away from the site, or a power plant is required to be built on site.
- Moderate: construction of a transmission line is required under 10 km from the mine site.
- Minimal: electricity infrastructure is already in place and requires minor connection work.
- N/A: information was not available during stakeholder interview or has not yet been published in public reports.

Of the 15 exploration sites reviewed, 53 percent had minimal or moderate electricity infrastructure requirements, due to their proximity to nearby transmission lines (Figure 20). Sites requiring major electricity infrastructure construction include:

- Multiple sites requiring over 25 km of new transmission lines.
- Multiple sites requiring power plants to be built due to lack of available local transmission lines or capacity.

A detailed review of each exploration site’s electricity requirements is provided in Appendix G.

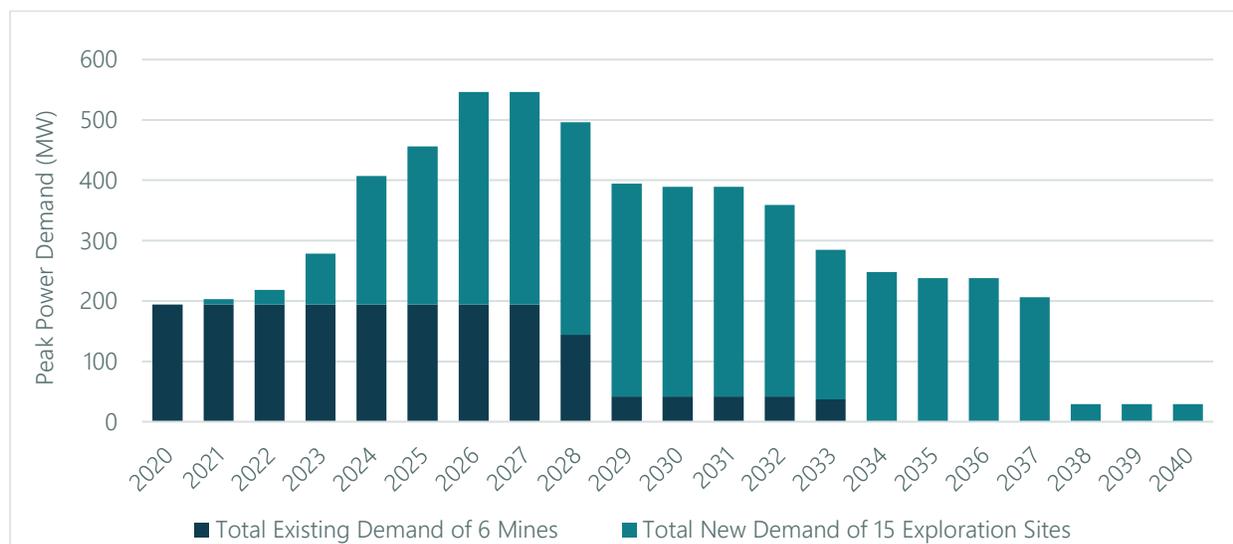
Figure 20: Electricity Infrastructure Construction Requirements for 15 Major Exploration Sites



### Electricity Demand

Peak electricity demand requirements for both the operating mines and exploration site’s projected future demand was gathered to estimate power requirements in Northwestern Ontario over the next 20 years. Demand is expected to peak around 2026 to 2027 as the current operating mines remain in full operation, and numerous exploration sites are coming online, leading to a 180 percent increase in Northwestern Ontario electricity demand. Demand is then expected to decrease around 2029 when several of the current operating mines begin decommissioning (Figure 21).

Figure 21: Estimated Northwestern Ontario Peak Power Demand for Existing 6 Mines and 15 Major Exploration Sites



Source: Stakeholder interviews and public documentation.

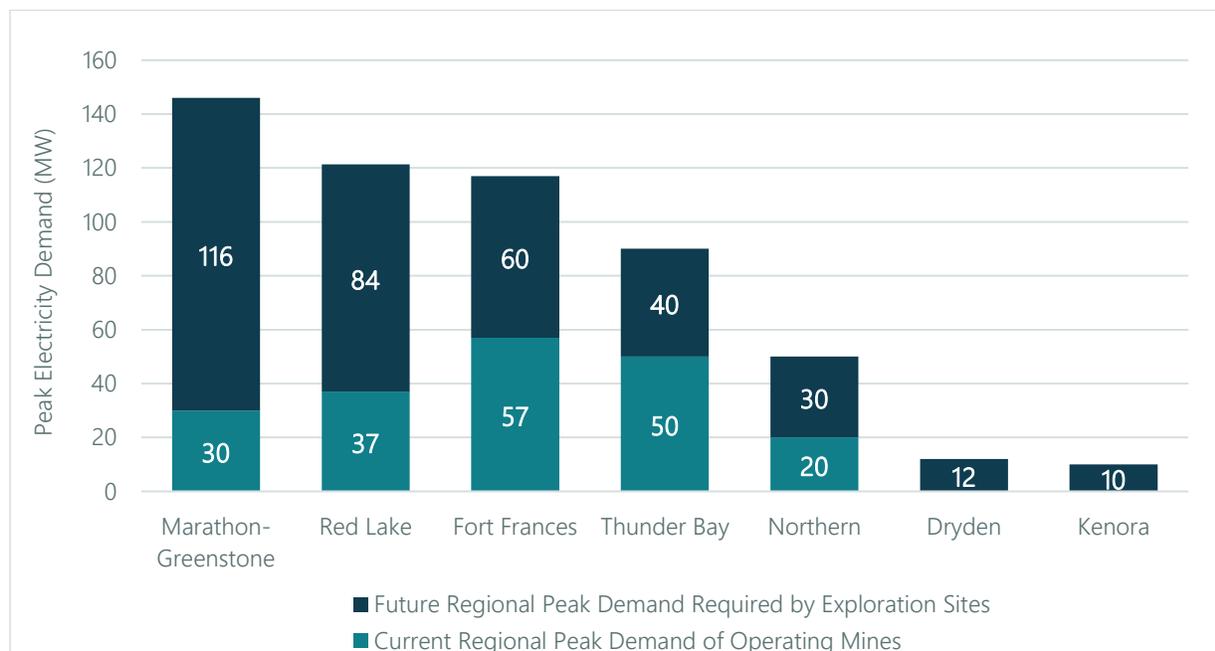
The estimated peak demand requirements for the existing and future mine sites was then filtered into various regions to assist with regional capacity planning initiatives, described in Table 4.

Table 4: Regional Electricity Demand Definitions

<p>Dryden:</p> <ul style="list-style-type: none"> <li>Goliath and Goldlund Deposits</li> </ul> <p>Fort Frances:</p> <ul style="list-style-type: none"> <li>Rainy River Mine</li> </ul> <p>Kenora:</p> <ul style="list-style-type: none"> <li>Separation Rapids Deposit</li> </ul> <p>Marathon-Greenstone:</p> <ul style="list-style-type: none"> <li>Albany Deposit</li> <li>Hardrock Deposit</li> <li>Hemlo Mine</li> <li>Marathon Deposit</li> <li>Sugar Zone Mine</li> </ul>	<p>Northern:</p> <ul style="list-style-type: none"> <li>Eagles Nest Deposit</li> <li>Musselwhite Mine</li> <li>PAK Deposit</li> </ul> <p>Red Lake:</p> <ul style="list-style-type: none"> <li>Bateman Deposit</li> <li>Dixie Lake Deposit</li> <li>Madsen Deposit</li> <li>Red Lake Mine</li> <li>Spingpole Lake Deposit</li> </ul>	<p>Thunder Bay:</p> <ul style="list-style-type: none"> <li>Georgia Lake Deposit</li> <li>Lac des Iles Mine</li> <li>Sunday Lake Deposit</li> <li>Thunder Bay North Deposit</li> </ul>
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The regional peak demand projections are presented in Figure 22.

Figure 22: Estimated Northwestern Ontario Regional Peak Demand Requirements



The regions experiencing the highest rate of future growth include Marathon-Greenstone (380 percent), Red Lake (220 percent), and Northern (150 percent).

## 8.0 Economic Impact

### 8.1 Approach

To estimate the economic impacts of mining in Northwestern Ontario, MNP employed an input-output methodology that uses provincial multipliers published by Statistics Canada. Input-output modeling is a widely used and accepted approach, making it recognizable by many different stakeholders and audiences. The structure of the approach also facilitates easy comparisons between reported results for different projects, organizations or industries.

In general, economic impacts are viewed as being restricted to quantitative, well-established measures of economic activity. The most used of these measures are GDP, employment, labour income, and government revenues:

- Output is the total gross value of goods and services produced by a given organization, industry or project, measured by the price paid to the producer. This is the broadest measure of economic activity.
- Gross Domestic Product (“GDP”), or value added, refers to the additional value of a good or service over the cost of inputs used to produce it from the previous stage of production. Thus, GDP is equivalent to the unduplicated value of goods and services produced.
- Employment is the number of additional jobs created.
- Government Revenues are the total amount of tax and other revenues generated for different levels of government. Please note that because tax revenues can change due to modifications in tax policy, the tax revenue impacts in this report are estimates only and subject to change. They should be viewed as approximate in nature.

Economic impacts may be estimated at the direct, indirect and induced levels.

- Direct impacts are changes that occur in “front-end” businesses that would initially receive expenditures and operating revenue as a direct consequence of the operations and activities of a facility.
- Indirect impacts arise from changes in activity for suppliers of the “front-end” businesses.
- Induced impacts arise from shifts in spending on goods and services as a consequence of changes to the payroll of the directly and indirectly affected businesses.

For a detailed description of our economic impact analysis approach and assumptions, please refer to Appendix H.

### 8.2 Economic Impacts in Northwestern Ontario

The economic impacts of the mining sector are generated by the operations of the operating mines, exploration and construction activities associated with advanced exploration projects as well as the production activities of these projects when they become operating mines. The economic impacts are

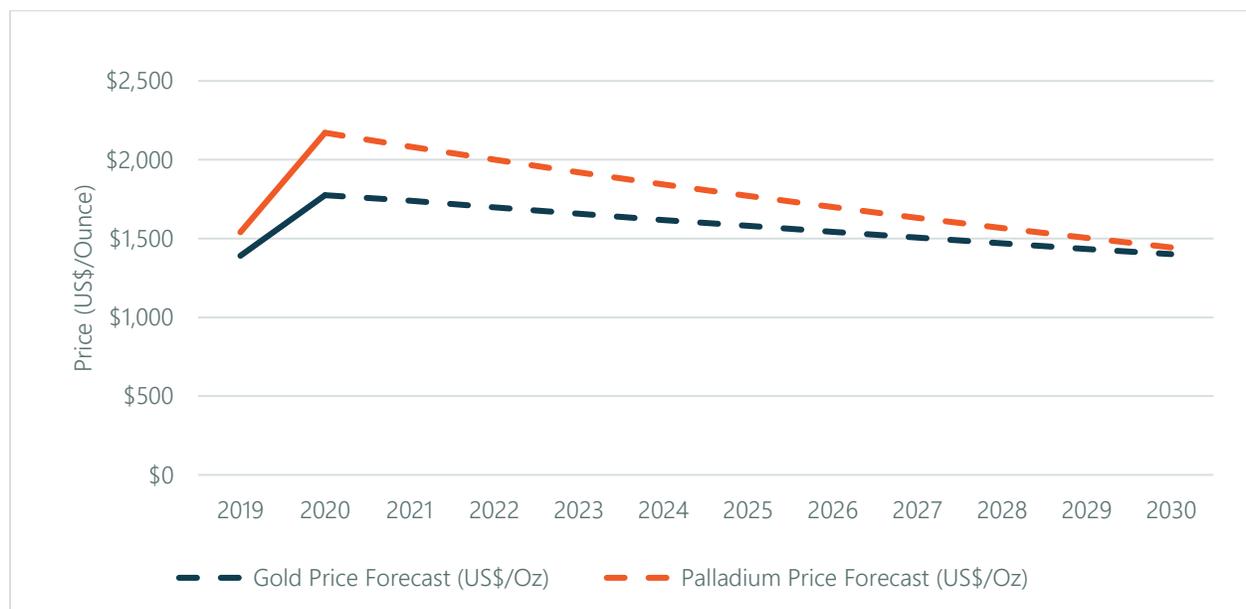
created due to the direct expenditures on goods and services by mining and exploration companies and through the spending by suppliers and employees.

To estimate the economic impact of the mining sector in Northwestern Ontario between 2019 and 2030 MNP developed projections of production from operating mines based on proven and probable reserves, the expected life of mine (LOM) and forecast metal prices. For advanced exploration projects MNP estimated production based on information published in annual reports and feasibility studies.

## Production Projections

In 2019 the operating mines in Northwestern Ontario produced approximately 650,000 ounces of gold and 227,000 ounces of palladium (Figure 4). In 2020 gold production is expected to rise to over 900,000 ounces due to increases in market prices as a result of investors seeking safe assets amid the COVID pandemic. Palladium production is expected to remain relatively stable. Gold and palladium prices are expected to remain elevated through 2021 as the world economy recovers from the COVID pandemic before gradually declining through 2030 (Figure 23).<sup>27</sup>

Figure 23: Forecast Gold and Palladium Prices (US\$/Ounce) – 2019 to 2030



Source: World Bank Commodity Market Outlook, October 2020; LBMA Platinum and Palladium Price Data<sup>28</sup>

## Operating Mines

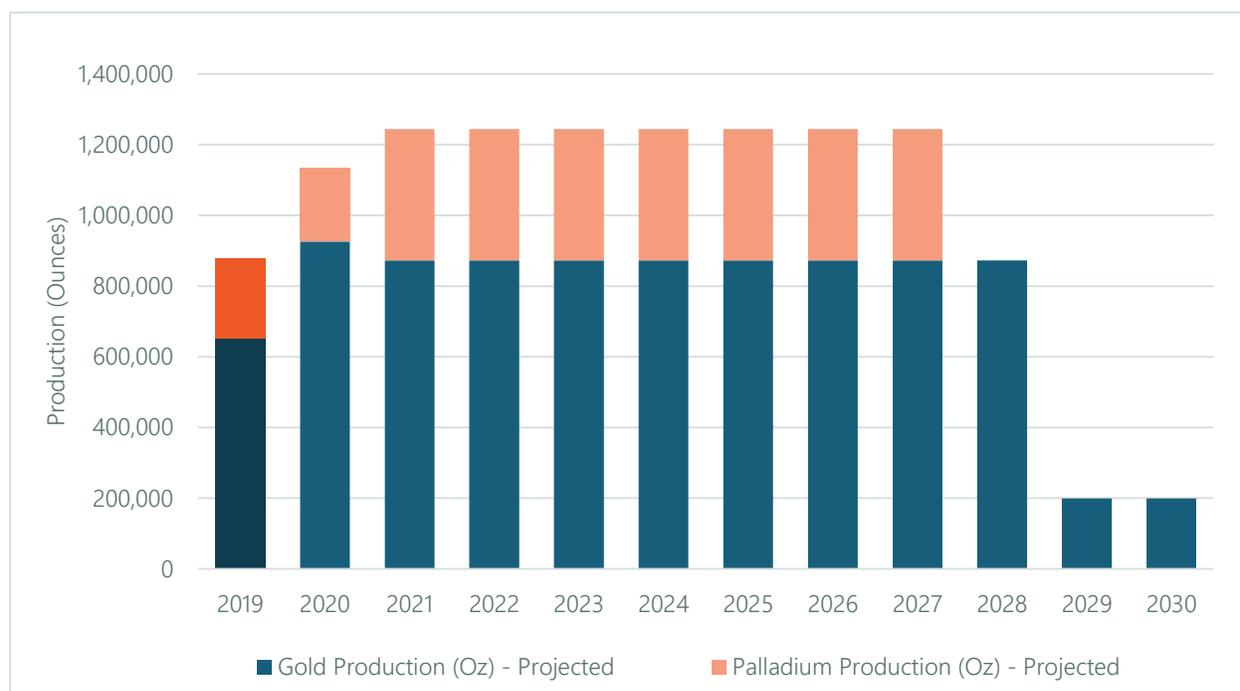
As shown in Figure 24 production was expected to increase between 2019 and 2021 due to the increase in prices. Production was projected to remain stable between 2021 and 2027 before declining in 2028 due to the closure of three gold and one palladium mine that would reach their end-of-life.

<sup>27</sup> World Bank, Commodity Market Outlook, October 2020. Available here:

<https://openknowledge.worldbank.org/bitstream/handle/10986/34621/CMO-October-2020.pdf>

<sup>28</sup> Available here: <https://www.lppm.com/data/#c=pd&y=2020&t=monthly>. Date Accessed: 25<sup>th</sup> November 2020.

Figure 24: Projected Gold and Palladium Production from Operating Mines (Ounces) – 2019 to 2030



Source: Company Annual Reports and Economic Feasibility Reports; Ontario Prospectors Association; World Bank Commodity Market Outlook, October 2020; LBMA Platinum and Palladium Price Data<sup>29</sup>

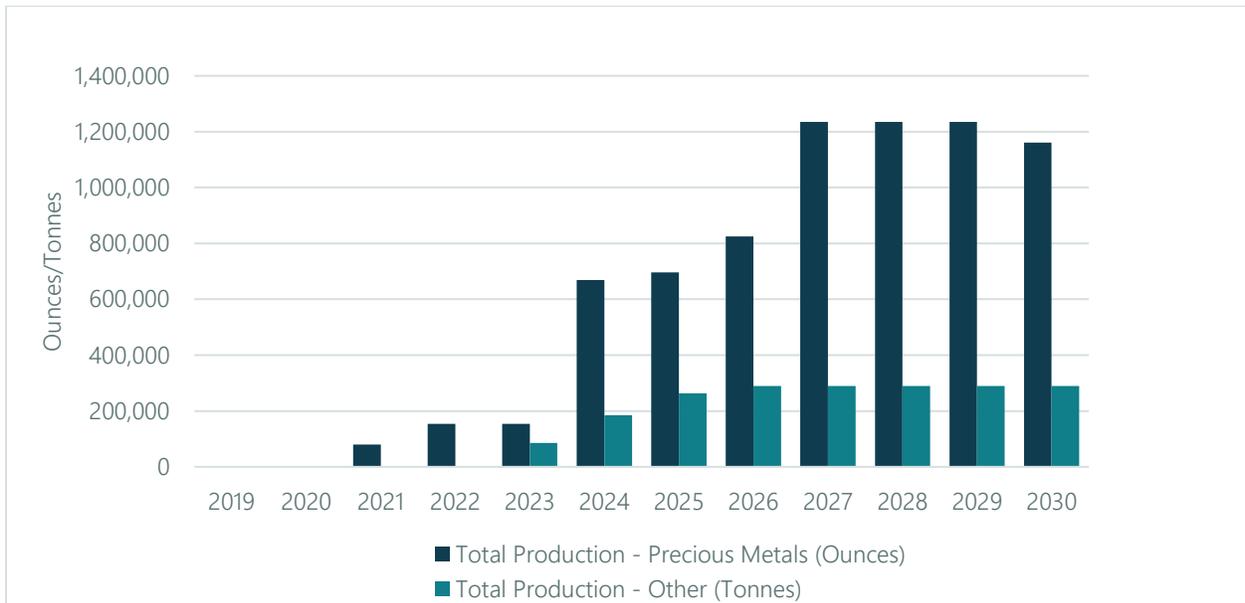
### Advanced Stage Exploration Projects

Of the 15 advanced exploration projects data on construction and development spending were available for 13, and production estimates were available for 11. Between 2020 and 2025 approximately \$5.9 billion is expected to be spent on the construction and development of the 13 advanced stage exploration projects for which data were available. These include seven gold and six palladium, lithium, graphite and nickel-copper-platinum group elements (PGE) exploration projects. Production from 11 of these advanced exploration projects is expected to begin between 2022 to 2026. Figure 25 shows the expected annual production from those 11 advanced exploration projects for precious metals which includes gold, palladium and platinum and other metals including copper, zinc and lithium.<sup>30</sup>

<sup>29</sup> Available here: <https://www.lppm.com/data/#c=pd&y=2020&t=monthly>. Date Accessed: 25<sup>th</sup> November 2020.

<sup>30</sup> Please note that production data was not available for two gold, one palladium and one graphite project.

Figure 25: Estimated Metal and Mineral Production from Advanced Exploration Projects – 2019 to 2030



Source: Economic Feasibility Reports for Advanced Exploration Projects

### Total Economic Impacts to Northwestern Ontario

Projected direct output<sup>31</sup> from the mining sector in Northwestern Ontario between 2019 and 2030 is shown in Figure 26. This creates economic impacts in the Thunder Bay area as well as in other parts of Canada through supply chain linkages.

Figure 26: Direct Output (\$Million) – 2019 to 2030



<sup>31</sup> Direct output is the value of production measured estimated based on forecast prices and production levels.

According to mining representatives interviewed for the study most labour is sourced locally and the operating mines purchase most goods and services in the local area. Goods and services purchased outside the local area are typically related to specialized equipment or services. Using average expenditure profiles for gold and silver ore mines in Ontario published by Statistics Canada<sup>32</sup> and the goods and services interviewees reported purchasing outside the local area we estimated that approximately 70 percent of spending takes place in Northwestern Ontario. The resulting economic impacts that were created in Northwestern Ontario in 2019 are shown in Table 5. Mining in Northwestern Ontario was estimated to contribute direct impacts of approximately \$1,030 million of GDP, 2,675 jobs and \$160 million of revenue for all levels of government. In addition, indirect and induced impacts of approximately \$560 million in GDP, 4,480 jobs and \$170 million in revenue for all three levels of government were created in the local area.

Table 5: Economic Impacts to Northwestern Ontario – 2019

	Output (\$ Million)	GDP (\$ Million)	Wages and Salaries (\$ Million)	Employment (Jobs)	Government Revenue (\$ Million)
Direct	\$1,630	\$1,030	\$400	2,765	\$160
Indirect and Induced	\$990	\$560	\$250	4,480	\$170
Total	\$2,620	\$1,590	\$650	7,245	\$330

The increase in production at operating mines and the development of advanced stage exploration projects would increase the economic impact of mining in the local area. Based on the projected direct output between 2019 and 2030 (Figure 26) the total economic impacts in the local area were projected to increase by over 65 percent in 2020 and then almost double between 2021 and 2028 (see Figure 27 through Figure 31). In 2030 the economic impacts were projected to decline as some operating mines reach their end-of-life but were projected to be approximately 35 percent higher than in 2020. Please note that that detailed impacts are provided in Appendix I.

<sup>32</sup> The expenditure profiles used were from the Supply and Use Tables, 2016.

Figure 27: Total Output - Direct, Indirect and Induced (\$ Million) – 2019 to 2030

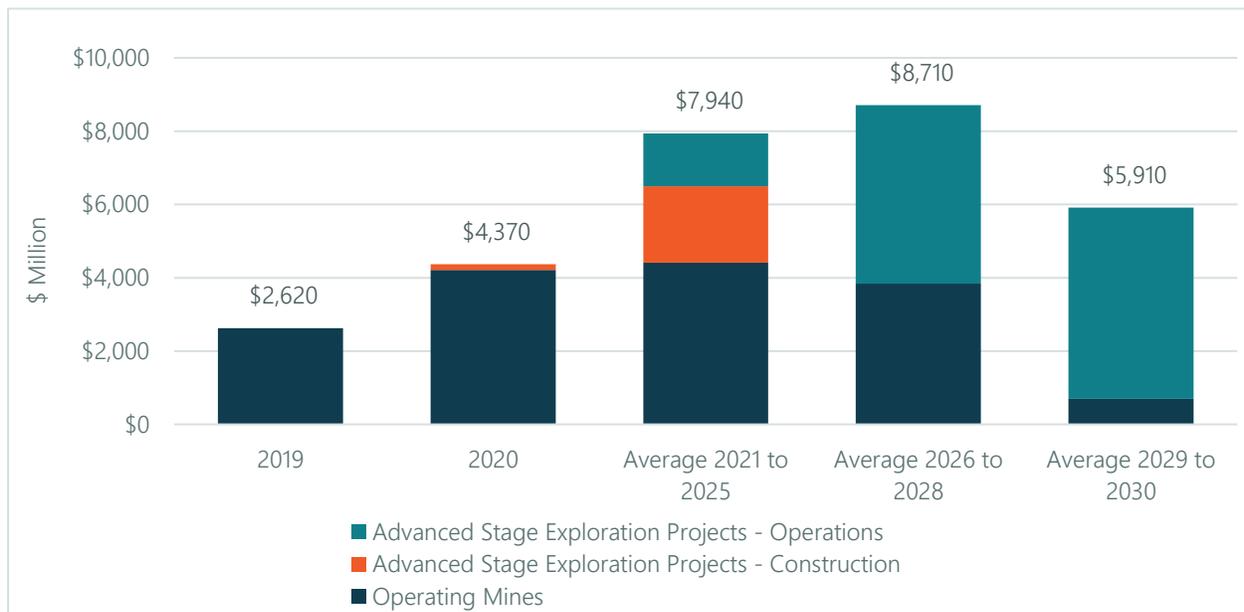


Figure 28: Total GDP - Direct, Indirect and Induced (\$ Million) – 2019 to 2030

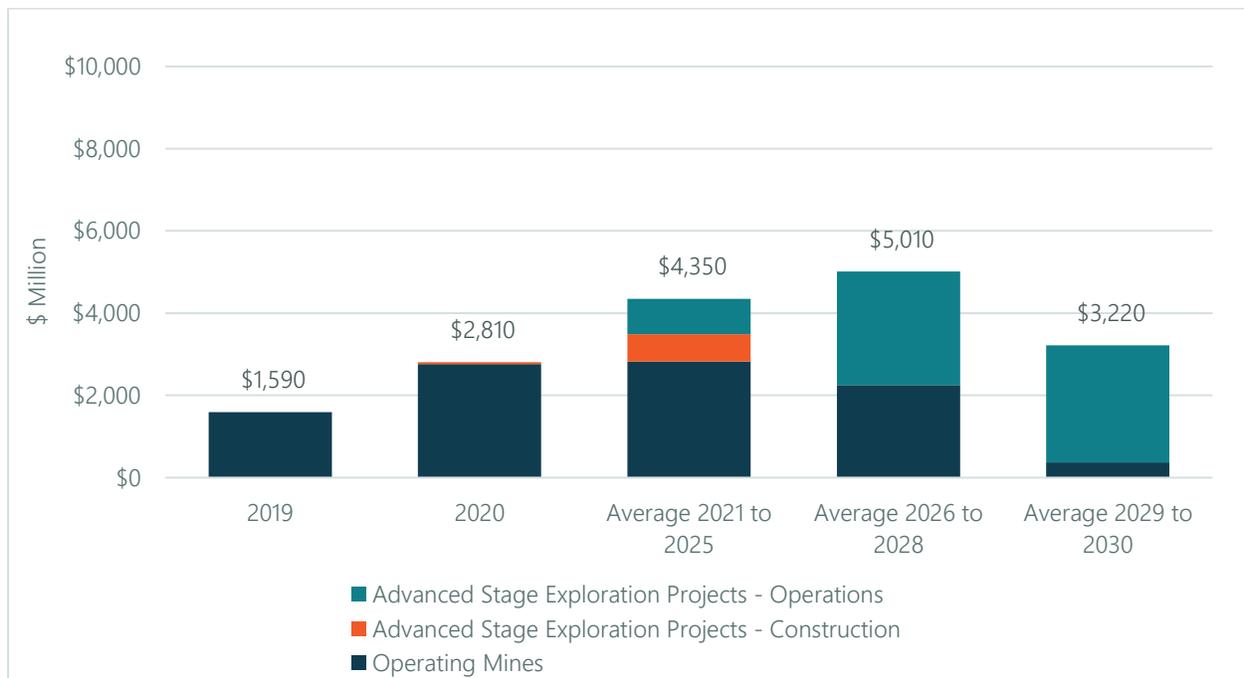


Figure 29: Total Wages and Salaries - Direct, Indirect and Induced (\$ Million) – 2019 to 2030

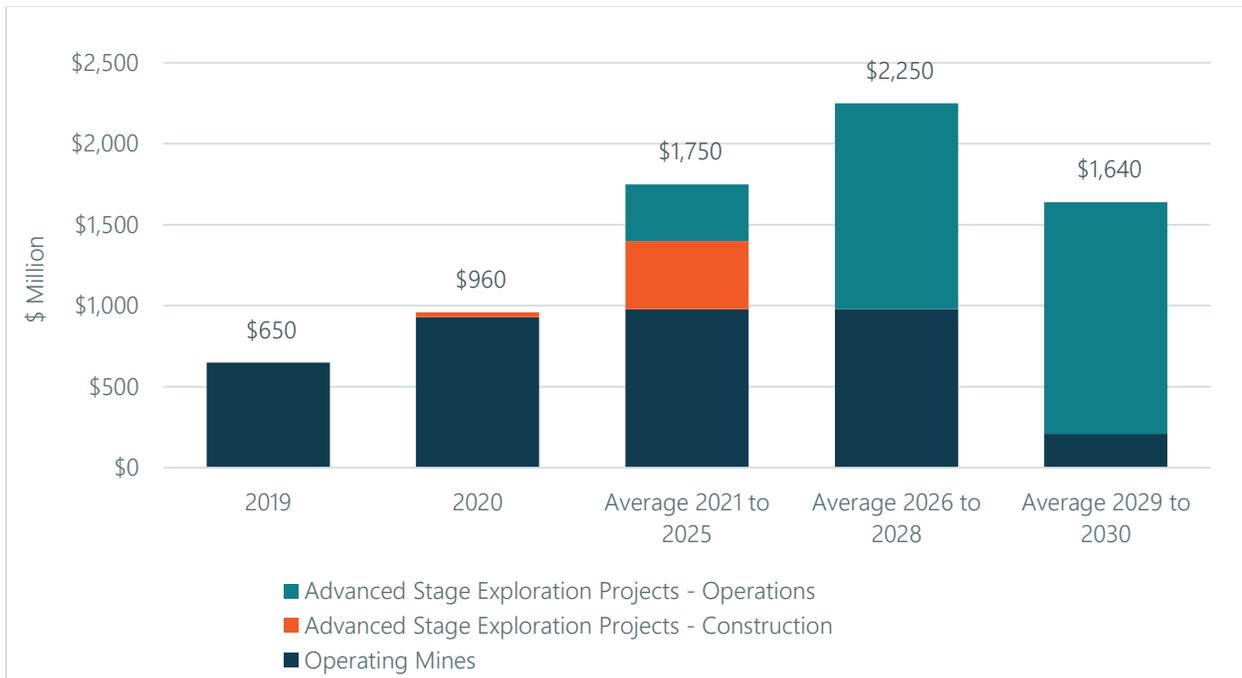


Figure 30: Total Employment- Direct, Indirect and Induced (Jobs) – 2019 to 2030

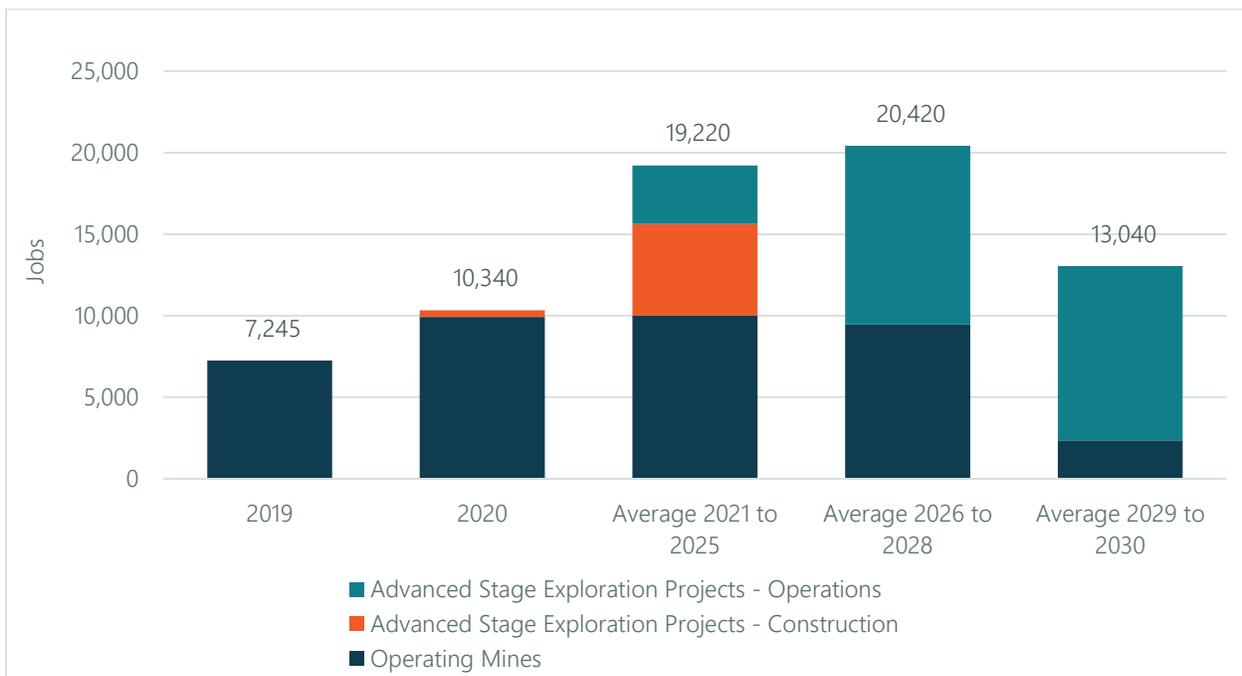
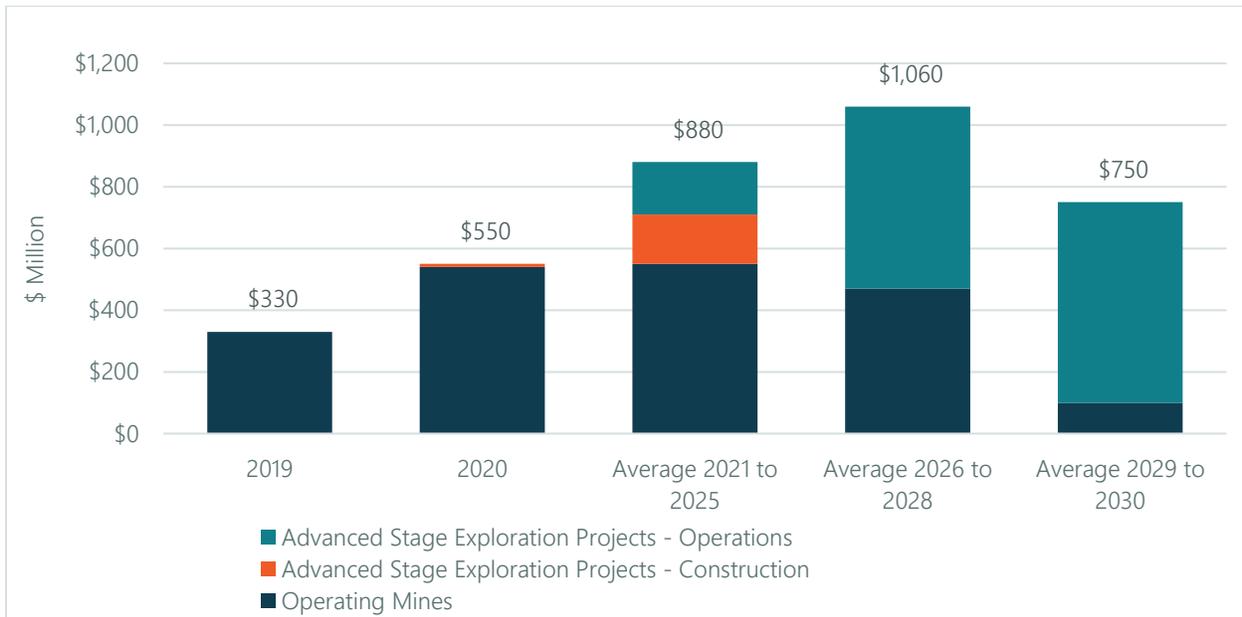


Figure 31: Total Government Revenue - Direct, Indirect and Induced (\$ Million) – 2019 to 2030<sup>33</sup>

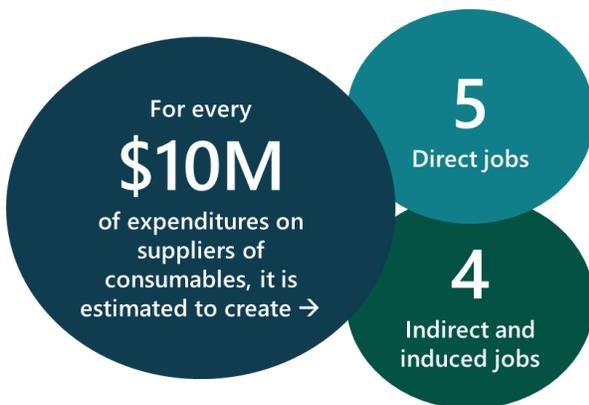


### 8.3 Local Supply and Services

Industry representatives interviewed reported purchasing most goods and services in the local area. The goods and services purchased outside the area include specialized engineering services, specialized processing equipment, drilling services, design and construction services. Goods and services purchased within the local area were estimated to account for approximately 70 percent of spending on vendors by the operating mines. In 2019 this was estimated to be approximately \$500 million.

Increased production in the direct mining operations activities is expected to lead to increased demand for consumables such as small tools, safety supplies, fuels, lubricants, construction materials, equipment rentals, and logistics services amongst numerous other types of indirect production costs (Figure 32).

Figure 32: Typical economic impacts in consumables and product distribution type activities



<sup>33</sup> Government revenue includes corporate income tax, personal income tax on wages, sales tax, royalties as well as property taxes.

## 9.0 Strategic Recommendations

The strategic recommendations developed by MNP are designed to align with stakeholder feedback, the CEDC’s mandate, and the Mining Readiness Strategy’s priority scope categories to ensure each strategic recommendation is measurable, achievable and supports the mining sector in Northwestern Ontario. Due to the imminent growth of the mining sector in Northwestern Ontario, the recommendations by MNP are concise and optimized to ensure they could be implemented by the CEDC in one to two-year timeframe prior to the mining sectors anticipated major growth expected in a few years.

### 9.1 Recommendations Summary

The strategic recommendations based on MNP’s research and analysis are intended to be the cost effective and concise actions which the City/CEDC can take to improve the overall regional industry awareness and involvement in supporting the impending growth in the exploration and mining sector. Although there may be some variation in permitting and approvals timelines for the advance stage exploration projects, there is still a benefit to acting early and getting ahead of the forecast curve.

Note: MNP understands the CEDC is currently undergoing a website update initiative and may have already implemented some of the suggestions outlined in the recommendations.

The strategic recommendations and the specific tasks which the City/CEDC should undertake are detailed in Table 6.

*Table 6: Mining Readiness Strategic Recommendations*

<p>1. The City/CEDC should act quickly to implement the strategic recommendations due to the near-term anticipated growth in the exploration and mining sector.</p>
<p>1.1. Strategic actions should be implemented within the next 12 months as exploration and mining activity will begin ramping up in 2021.</p>
<p>2. Leverage technology and digital media by enhancing the CEDC Mining website. Allows ease of access to contemporary information and facilitate the exchange of data which showcases Thunder Bay as the exploration and mining hub. Stakeholders indicated that one of the most important needs is an easy means to find supply and services listings. A robust website is a cost effective, efficient means to achieve this end.</p>
<p>2.1. Create and implement a website and digital marketing plan that pushes information out to the public in the areas of focus related to the Mining Readiness Strategy:</p> <ul style="list-style-type: none"> <li>2.1.1. Attracting and expanding supply and service businesses.</li> <li>2.1.2. Available vacant land in the city.</li> <li>2.1.3. Existing mining supply and services already located in the city.</li> <li>2.1.4. Workforce training resources.</li> </ul>

- 2.1.5. Job opportunities in mining.
- 2.1.6. Local education, research and training centers.
- 2.1.7. Road construction infrastructure updates.
- 2.1.8. Electrical infrastructure projects, and regional electricity demand forecasts.
- 2.1.9. Economic contributions of the mining sector on the local economy.
- 2.1.10. Government initiatives that support the mining sector nationally, provincially, and in Northwestern Ontario.

3. Develop or Expand on the City/CEDC mining readiness Marketing and Communications plan to ensure the CEDC is widely known as the node for facilitation, collaboration, training and information for the mining sector. The plan should have the key attributes as follows:

- 3.1. Facilitate introductions between the various mining companies and associations through working groups, webinars, panel discussions and quarterly virtual sessions to improve local mining sector communications, expand local business opportunities, and better understand training requirements.
- 3.2. Provide quarterly Northwestern Ontario mining sector email communications with a dashboard of activity in the region (status of exploration projects, job availabilities at the operating mines, infrastructure updates, etc.).
- 3.3. Develop case studies of successful Indigenous community engagements, including operating mines with a high percentage Indigenous workers and Indigenous joint venture businesses to communicate successes, challenges, and best practices to overcome barriers.
- 3.4. Develop strategies to continue to promote Thunder Bay as full-service community that has all the required services available to attract and retain mining workers and their families.
- 3.5. Communicate Northwestern Ontario mining sector updates to all levels of government using industry gathered data on topics such as infrastructure requirements, and exploration and mining permitting barriers.
  - 3.5.1. CEDC to take active role in bringing awareness to the applicable government agencies for the need to improve the efficiency of the permitting process.

4. Advanced facilitation and knowledge transfer about the regional Mining Supply and Services offerings. Promote new opportunities by making prospective clients and companies aware of who's in the region and able to support the growing mining industry.

- 4.1. Promote the capabilities of the existing 400+ mine supply and service businesses in Thunder Bay through enhancing the existing CEDC mining directory, mining website and implementing communication and marketing initiatives.
- 4.2. Focus on communicating and developing the critical mineral processing opportunities that are becoming available due to the Northwestern Ontario lithium and graphite deposits (e.g. Rock Tech Lithium and Avalon Advanced Materials letter of intent).

- 4.3. Update the existing mining supply and services directory on the CEDC Mining website with additional business information such as specialty service offerings, facility sizes and capabilities, and brief business descriptions.
- 4.4. Provide information on the mining supply chain on the CEDC Mining website (mine supply and services) to enhance public knowledge of the mining sector, attract mining related businesses to the region or assist existing businesses transition to the mining sector.
- 4.5. Add the city's available vacant commercial and industrial land to the CEDC website, including location, type, contact and size information. Highlight special economic zones or tax incentives where applicable.

5. Promote Thunder Bay as the Workforce Training and Development hub for mining sector and inform the education and training associations of what types of jobs are needed in the future.

- 5.1. Regular communications with the exploration and mining companies to gather information and data on existing skills gaps, and current and future workforce requirements for their operations.
- 5.2. Facilitate a working group with local training and education providers to breakdown perceived, current or past barriers. CEDC to represent the demand side (mining industry) through providing employment data gathered from existing mining operations.
  - 5.2.1. Communicate mining workforce and training requirements with local education and training centers to assist in job placement services and creating or enhancing training programs.
  - 5.2.2. Engage with educational institutions in planning program offerings.
- 5.3. Promote the skills, positions and training required by existing mining operations to educate locals on how to achieve employment in the local mining sector.
- 5.4. Provide a list of local training centers (university, college, training centers, etc.) on the CEDC website to showcase Thunder Bay as the hub for education in the region.
  - 5.4.1. Create a separate section on the CEDC Mining website that specifies the city's specialized exploration and mining related education opportunities and specialized research centers (e.g. CESME).

6. Improve the regional mining industry stakeholders' awareness of the Transportation and Electrical Infrastructure needs and planned or in-progress projects.

- 6.1. Prioritize regular communications with the exploration and mining companies to gather information and data related to their specific transportation and electricity requirements.
- 6.2. Communicate infrastructure requirements, concerns, and barriers to the appropriate business and government parties.
- 6.3. Provide public updates on infrastructure initiatives in the region:
  - 6.3.1. Electricity requirements for existing and future mining operations to assist with regional capacity planning.

6.3.2. New transportation networks being developed in the region (e.g. developments at the port, Ring of Fire road constructions, airport infrastructure improvements).

6.4. Prioritize the City's International Airport runway and lighting upgrades to facilitate additional flights throughout the day which better align with mining staff's travel needs.

7. Evaluate strategic incentives and municipal infrastructure priorities which incentivize Business and Economic Development for the Mining Sector.

7.1. Consider strategic incentives for mining supply and services companies (community improvement plans, zoning bylaws, support for emerging critical minerals industry, designated special economic zones at the waterfront, mining business support grants, etc.). A further detailed economic study of the cost/benefit of such incentives should be undertaken in early 2021.

7.2. Prioritize municipal infrastructure development for undeveloped commercial properties as new tenants/owners confirm their new business is for the mining sector. In the City's Official Plan, realign resources to facilitate the needed infrastructure on an expedited basis.

7.3. Develop or expand the existing City/CEDC COVID-19 economic recovery plan to prioritize the facilitation of mining supply and service companies in the City.

## 9.2 Recommendations Business Case Summary

Each of the 23 strategic recommendations above was analyzed against value, complexity, investment, and timeline by MNP in order to summarize in the business case table based on the criteria definitions below:

- Value
  - Low: Minimal number of groups (1-2) are impacted, reached or benefit from the action.
  - High: Large number of groups (2+) are impacted, reached or benefit from the action.
- Complexity
  - Low: Minimal CEDC resources or stakeholder group participation (1-2) required.
  - High: Large number of CEDC resources or stakeholder group participation (2+) required.
- Investment
  - Low: Less than \$10k of CEDC investment, or less than 100 hours of internal or contractor time.
  - Medium: Between \$10k to \$50k of CEDC investment, or between 100 to 500 hours of internal or contractor time.
  - High: More than \$50k of CEDC investment, or more than 500 hours of internal or contractor time.

The results of evaluating each recommendation to the above-mentioned criteria is outlined in Table 7 and the CEDC should evaluate and prioritize strategic actions based on the available budget and resources:

Table 7: Business Case Summary of Strategic Recommendations

No.	Recommendation	Value (L/H)	Complexity (L/H)	Investment (L/M/H)	Timeline (months)
1.1	Implement strategic actions within next 12 mths	H	H	L	12
2.1	Digital media and website enhancement plan	H	L	L	6
3.1	Facilitate industry introductions	H	H	H	12
3.2	Provide quarterly dashboard emails	L	L	L	3
3.3	Case studies of successful indigenous relations	H	L	L	3
3.4	Promote Thunder Bay as a full-service community	H	H	M	12
3.5	Regular government communications on mining	H	H	M	12
4.1	Promote existing mining sector supply/services	H	H	H	12
4.2	Communicate/develop critical mineral processing	H	H	H	6
4.3	Enhance existing mining supply/service directory	H	L	H	9
4.4	Mining sector supply chain info on CEDC website	H	H	M	6

No.	Recommendation	Value (L/H)	Complexity (L/H)	Investment (L/M/H)	Timeline (months)
4.5	Available vacant land info on CEDC website	L	L	L	3
5.1	Gather skills gaps and current/future job data	H	H	M	12
5.2	Facilitate working groups with trainers/educators	H	H	M	9
5.3	Promote mining skills, positions and training	H	L	M	12
5.4	Provide information on local education/training	L	L	L	6
6.1	Gather data on site infrastructure requirements	L	L	L	3
6.2	Communicate infrastructure gaps and barriers	L	L	M	3
6.3	Public updates on infrastructure initiatives	L	H	M	6
6.4	Prioritize updating the International Airport	H	H	L	12
7.1	Strategic incentives for attracting businesses	H	H	H	12
7.2	Prioritize municipal infrastructure developments	H	L	L	6
7.3	Develop/expand COVID-19 economic recovery	H	H	H	12

A detailed business case for each strategic recommendation is provided in Appendix J.

### 9.3 Recommendation Priority Heat Map

The strategic recommendations priorities are summarized in the below heat map and are based on their ratio between Value and Complexity, with low complexity and high value as the readily achievable option (Figure 33). One of the reasons that MNP has assessed many recommendations as high complexity is due to the number of participants or stakeholders, but this should not dissuade the CEDC from undertaking. High complexity, high values recommendations may seem as less preferred, but will provide longer term and more impactful benefits if undertaken.

Figure 33: Strategic Recommendations Heat Map





## 9.5 SMART Performance Metrics

MNP has prepared the following table of recommended SMART performance metrics for each of the noted strategic recommendations (Table 8). There is flexibility to what the final CEDC approved measures and performance metrics will be, but it is important for management reporting and overall governance purposes to have an agreed set in order to effectively manage the implementation program.

Table 8: Key Performance Indicators (KPIs) for Strategic Actions

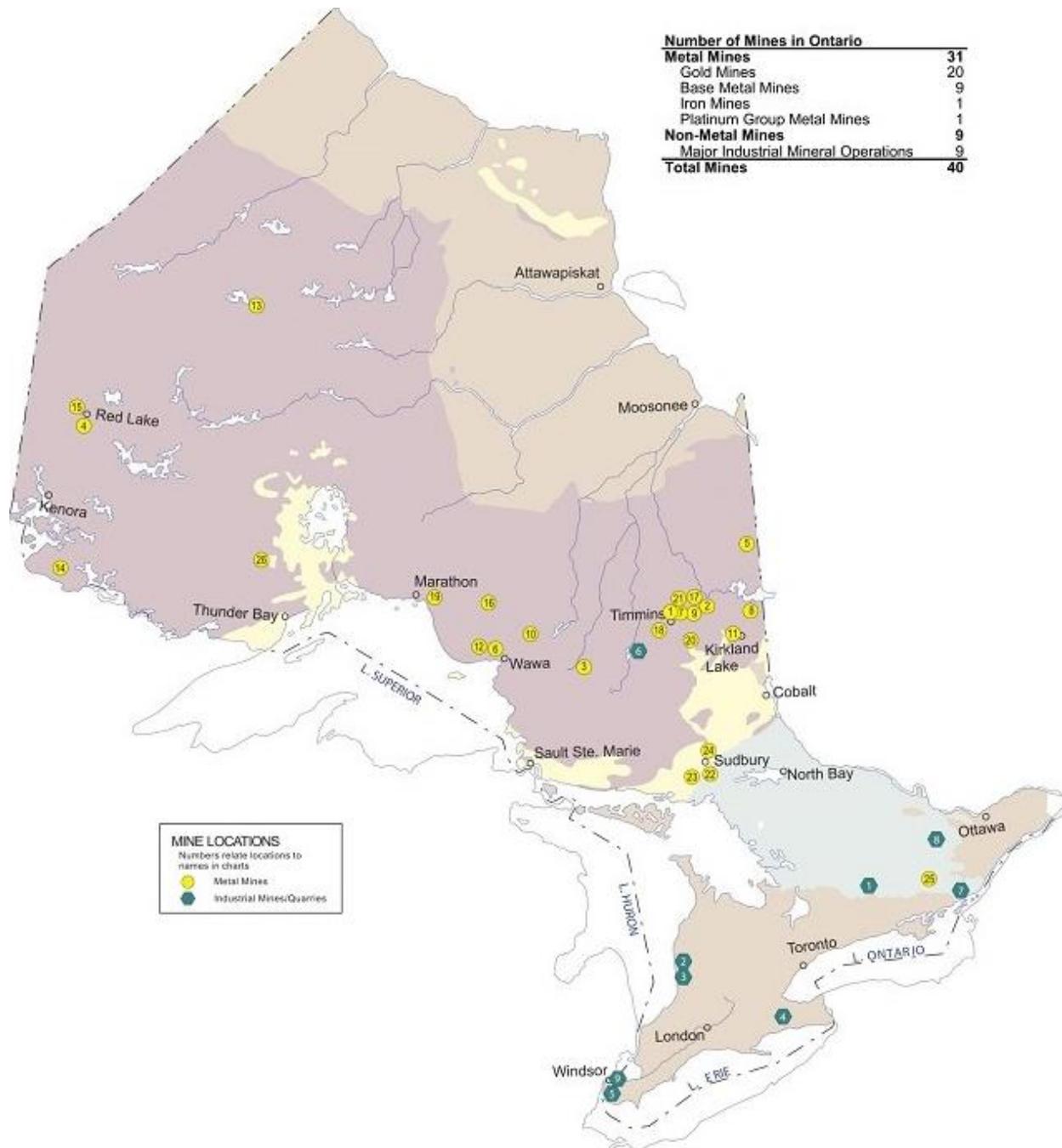
No.	Recommendation	Measure	Performance Indicator
1.1	Implement strategic actions within next 12 months	Number of approved strategic actions	Target 80% completion
2.1	Digital media and website enhancement plan	Website upgrade to design scope completeness (Y/N)	Complete by target date
3.1	Facilitate industry introductions	Number of introductions	Target 5 new business relationships per exploration & mining co.
3.2	Provide quarterly dashboard emails	Quarterly updates complete	Quarterly updates complete over for 36 months
3.3	Case studies of successful indigenous relations	Case studies presented or published	One per quarter
3.4	Promote Thunder Bay as a full-service community	Publications or presentations complete	One per quarter
3.5	Regular government communications on mining	Number of assistance meetings or facilitations complete	Turnaround request within 30 days
4.1	Promote existing mining sector supply/services	Complete enhanced website listing (Y/N)	Complete by target date
4.2	Communicate/develop critical mineral processing strategic support	Complete detailed plan to support critical minerals (Y/N)	Complete by target date
4.3	Enhance existing mining supply/service directory	Complete to directory specifications (Y/N)	Complete by target date
4.4	Mining sector supply chain info on CEDC website	Complete to specifications (Y/N)	Complete by target date
4.5	Available vacant land info on CEDC website	Complete to specifications (Y/N)	Complete by target date
5.1	Gather skills gaps and current/future job data	Complete and upload list to website (Y/N)	Update complete and posted each quarter

No.	Recommendation	Measure	Performance Indicator
5.2	Facilitate working groups with trainers/educators	Number of working groups in progress or planned	Complete quarterly updates per each group
5.3	Promote mining skills, positions and training	Number of publications or website articles complete	Complete one per quarter
5.4	Provide information on local education/training	Number of publications or website articles complete	Complete by target date
6.1	Gather data on site infrastructure requirements	Complete & publish compilation of infrastructure needs	Complete by target date
6.2	Communicate infrastructure gaps and barriers	Number of meetings arranged with government entities	Meetings confirmed within a quarter timeframe
6.3	Public updates on infrastructure initiatives	Number of publications or website articles complete	Complete one per quarter
6.4	Prioritize updating the International Airport infrastructure	Confirm City approval to proceed with upgrade	Complete by target date
7.1	Strategic incentives for attracting businesses	Complete study & specifications of incentives (Y/N)	Complete by target date
7.2	Prioritize municipal infrastructure developments	Complete list of priority municipal development zones (Y/N)	Complete by target date
7.3	Develop/expand COVID-19 economic recovery	Exploration & mining priority actions to support Covid-19 economic recovery are incorporated in the master plan (Y/N)	Complete by target date

# Appendices

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# Appendix A: Ontario Mining Operations 2020



Source : <https://www.oma.on.ca/en/ontariominning/Map.asp>

## Appendix B: Exploration and Mining Interview Guide

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### Part One – Business Development in the Supply and Services sector

- 1) What supply services do you currently receive from vendors in Thunder Bay or surrounding region?
  - a. Equipment and Materials
  - b. Fabrication or Pre-Engineered Components
  - c. Process equipment
  - d. Fleet and vehicles
  - e. Fuels and Gases
  - f. Safety supplies
  - g. Mine/mill parts—Warehousing
  - h. Food and catering services
  - i. Other
- 2) What professional services do you currently receive from vendors in Thunder Bay or surrounding region?
  - a. Environmental
  - b. Laboratories
  - c. Geotechnical and Geological
  - d. Surveying
  - e. Design & Construction
  - f. Maintenance Services
  - g. Trucking & Logistics
  - h. Security
  - i. Helicopter/Flight Services
  - j. Engineering specific (Project management, Mine planning, Processing, Tailings, UG/Surface Operations)
  - k. Professional Consulting (Financial, HR, Government, Indigenous Relations)
  - l. Other
- 3) What is your level of satisfaction with the current Thunder Bay and region service and supply offerings?
- 4) Does your company have a local (Northwestern Ontario and/or Thunder Bay) procurement policy to encourage local buying?
  - a. How do companies become aware of opportunities for procurement of goods or services?
  - b. Do companies have to initially pre-qualify to bid?
- 5) What supply and services, that you do not currently receive from Thunder Bay or regional vendors, would you consider advantageous to have available from local vendors?
- 6) Are there supply or services which are currently available locally, but you have chosen to source outside the region? If so, what are the reasons for this?
- 7) What are the priority supply and services areas which you feel that Thunder Bay should focus on creating opportunities to attract and facilitate vendors establishing in the city?
- 8) Do you currently use any Indigenous owned supply and services companies?
  - a. Do you have an indigenous procurement policy or training program?

- 9) What do you see as the highest growth areas in local supply and services?
- 10) What do you feel are the strategic areas which Thunder Bay should focus on to attract new mining services and supply chain companies to the area?
- 11) Do you have other comments to add regarding supply and service offerings?

#### Part Two – Workforce Training and Development (Education)

- 12) What types of labour skills do you feel are high priority to your current operations?
  - a. Exploration (Drilling, Geotech, Geology)
  - b. Professional (Mining, Engineering, Metallurgy, Management-Supervisory)
  - c. Skilled Trades
  - d. All
  - e. Other
- 13) What is the size of your current workforce (if a mine), or planned workforce at both construction and production?
  - a. Do you have a detailed template/table showing what positions are required? (if major ex project)
  - b. Breaking that down, what is the number, or forecast (planned) number of workers, from Northwestern Ontario, and the number from Thunder Bay?
- 14) What are the current skills or availability gaps that you have observed with local labour supply?
- 15) What type of labour skills do you feel are high priority for your needs over the next 10 years?
- 16) Are you aware of the education programs and institutions (and trade unions-skilled trades) which are available in Thunder Bay to assist with your labour?
- 17) Do you currently endorse, partner with, or promote local education centers?
- 18) Do you currently utilize summer or co-op students in your operations?
- 19) Do you have specific policies to hire local and/or Indigenous community members?
- 20) What education and training programs do you feel that local institutions should improve or expand?
- 21) What certifications or training do you require for your operations staff, such as workplace health and safety, that could be provided by local service providers?
- 22) Do you have any additional recommendations on what other education and training strategies which Thunder Bay should focus on to assist your mine (or project)?

#### Part Three – Transportation and Electrical Infrastructure

- 23) Is the current level of transportation infrastructure (roads, air) sufficient for your needs? If not, what areas need to be improved?
- 24) Do you currently, or do you plan to maintain your own access roads? If yes, do you outsource or have internal staff perform the maintenance?
- 25) Do you have requirements for tailored air transport planning to more efficiently transport workers to destinations across Canada; a role that Thunder Bay International Airport (in conjunction with regional airports) can provide, as customized packages with all carriers.
- 26) What is the level of your future transportation infrastructure needs?
  - a. Minimal – We have sufficient access and only annual maintenance
  - b. Moderate – We are planning some expansions that will require additional road infrastructure
  - c. Major – Significant infrastructure expansion is required to meet our needs

- 27) What are your current electrical load requirements or planned requirements, if not in production yet?
- 28) Are you aware of electrical transmission upgrading or expansion projects in the region to expand supply? If so, please describe.
- 29) (*producing mines*) Do you receive financial reimbursement/subsidies for electrical consumption from Ontario (i.e. NIER—Northern Industrial Electricity Program)?
- 30) What are your main areas of concern when it comes to infrastructure reliability?
  - a. Quality of access roads and highways
  - b. Reliability and quality of electrical supply
  - c. Power pricing
  - d. Other
- 31) Do you have any other comments or areas of concern regarding infrastructure?

Part Four – Economic Impact of New and Existing Mine Development for Thunder Bay

- 32) (*producing mines*) Please provide an order of magnitude estimation of your annual revenues from mining operations in Northwestern Ontario.
- 33) (*producing mines*) Please provide an order of magnitude estimation of your annual expenses from mining operations in Northwestern Ontario.
  - a. Please provide a percentage breakdown of your various mining expenses (e.g. labour, accommodations, operations, etc.)
- 34) (*producing mines*) Who are your current and ten-year forecasted primary customers?
- 35) (*exploration*) Please provide an order of magnitude estimation of your annual exploration expenses in Northwestern Ontario.
  - a. Please provide a percentage breakdown of your various exploration expenses (e.g. labour, accommodations, drilling, etc.)
- 36) What do you estimate is the amount of annual spending your company do with Thunder Bay based businesses, specific to supply or services for exploration, construction, and/or operations?
  - a. Minor – less than \$250k per year
  - b. Moderate – up to \$2 million per year
  - c. Major – millions are spent with local businesses
  - d. None
- 37) (In regard to the previous question) What percentage would that be of your total annual procurement budget?
- 38) What percentage of your exploration or operations and management staff reside in Thunder Bay?
- 39) What factors would you consider in making a decision to spend or invest in Thunder Bay? For example, these could include:
  - a. Workforce availability
  - b. Proximity to exploration or mine sites
  - c. Tax advantages
  - d. Customer service response times
  - e. Other
- 40) What strategic areas of municipal development do you feel Thunder Bay should focus on which would aid your company in the attraction and retention of staff?
  - a. Permanent Housing Developments

- b. Temporary accommodations such as hotels
  - c. Personal services such as dentists, therapists.
  - d. Shopping and mixed-use commercial areas
  - e. Recreation and Amenities
  - f. Assistance with flight arrangements to rotate staff across Canada
  - g. Other
- 41) Do you have an office in Thunder Bay? If not, would you consider having an office in Thunder Bay?
- 42) Would you prefer to use more local vendors or relocating some operations to Thunder Bay if available?

#### Part Five – Research and Development

- 43) Are you aware of, currently funding, or benefited from past research initiatives at local Thunder Bay/regional institutions (including Lakehead University and Confederation College)?
- 44) Do you have any research and development needs which could be performed locally?
- 45) Would you be willing to partner with local institutions on research projects which would improve your operations?

#### Part Six – Gaps and Barriers to Exploration and Mining

- 46) What do you see are the largest gaps for exploration and mine development in NW Ontario?
- 47) What do you see are the largest barriers or impediments for exploration and mine development in NW Ontario?
- 48) Which strategic areas do you feel that Thunder Bay should focus on to help alleviate the existing gaps and barriers to development?

#### Closing Comments

- 49) Are there any additional comments which you may have that we have not covered in our interview guideline questions?

## Appendix C: Association Interview Guide

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### General Introduction

- 1) Please describe your association/organization's main objectives and/or services.
  - a. What is your role specific to the mining industry?
  - b. How are your operations linked to other businesses/organizations/associations within the mining sector? (e.g. exploration and mining companies, universities/colleges, unions, mining associations, energy companies, labour associations, etc.)
- 2) What percentage of your association/organization's time goes towards supporting the mining sector in Thunder Bay/Northwestern Ontario?
  - a. <10%
  - b. 10 – 25%
  - c. 25 – 50%
  - d. 50 – 75%
  - e. 75%+
- 3) Of the major focus areas listed below, what do you believe are the top priorities ranking for the City of Thunder Bay to focus on to support the exploration and mining sector in Northwestern Ontario?
  - a. Business development in the supply and services sector
  - b. Workforce training and development
  - c. Transportation and electrical infrastructure
  - d. Research and development
  - e. Competitive tax rates
  - f. Streamlined municipal permitting
  - g. Other (please explain)
- 4) Does your organization have plans over the next 10 years (2020 to 2030) to support the City of Thunder Bay and Northwestern Ontario with the exploration and mining sector?
  - a. If Yes, please describe the services you would prioritize to ensure optimal economic development and a strong mining sector.
  - b. If No, please describe the current roadblocks, gaps or challenges that need to be resolved before you can support.
- 5) If applicable, please describe initiatives in the mining sector (or related industrial sectors) that you are delivering or pursuing that would benefit mining in NWO over the next 10 years that the City of Thunder Bay should be aware of.

### Part One – Business Development in the Supply and Services sector

- 6) What are the priority supply and services areas which you feel that Thunder Bay should focus on creating opportunities to attract and facilitate vendors establishing in the city specific to mineral exploration or mining?
- 7) What do you feel are the strategic or highest growth areas which Thunder Bay should focus on to attract new exploration/mining services and supply chain companies to the area?
- 8) Does Thunder Bay have sufficient commercial and industrial land, and supporting infrastructure for same for attracting and hosting new supply chain businesses?

- 9) What is your view of the level of high-speed internet and cellular service in NWO? Is the level of service adequate or an impediment to business development?
- 10) Do you have other comments to add regarding business development in supply and service offerings?

#### Part Two – Workforce Training and Development (Education)

- 11) What are the current skills or availability gaps which mining companies would require that you have observed with local labour force?
- 12) What types of labor skills do you feel are high priority for exploration/mining needs over the next 10 years? (e.g. mineral exploration-geology, engineering, management, skilled trades, heavy equipment operators, labourers, etc.)
- 13) What education and training programs do you feel that local institutions should improve or expand?
- 14) Do you have any additional recommendations on what other education and training strategies Thunder Bay should focus on?

#### Part Three – Transportation and Electrical Infrastructure

- 15) In your opinion, what are the key infrastructure priorities for developing exploration sites and the operating mines which Thunder Bay should develop strategies to facilitate and support?
  - a. Development of access roads and highways
  - b. Access to electricity grid connection and affordable power pricing
  - c. Access to alternative energy sources (if grid not available or desirable)
  - d. Thunder Bay airport (and regional airports) support
  - e. All the above
  - f. Other (please explain)
- 16) Do you have any other comments or areas of concern regarding infrastructure (roads, air, electricity, etc.)?

#### Part Four – Economic Impact of New and Existing Mine Development for Thunder Bay

- 17) What strategic areas of municipal development do you feel Thunder Bay should focus on as a full-service community, which would aid mining companies in the attraction and retention of staff?
  - a. Permanent Housing Developments
  - b. Temporary accommodations such as hotels
  - c. Personal services such as dentists, therapists.
  - d. Shopping and mixed-use commercial areas
  - e. Recreation, cultural, social, and Amenities
  - f. Assistance with flight arrangements (charter and scheduled) to rotate staff across Canada
  - g. Schools and children’s programs
  - h. Job placement services for spouses and families of mining staff
  - i. Other (please explain)
- 18) Do you have any other comments or areas of concern regarding economic development and potential growth from the exploration and mining sector?

#### Part Five – Research and Development

- 19) Does your organization fund or currently perform mining related research and development initiatives at local Thunder Bay/regional institutions? If not, are you willing to participate if the opportunity arises?
- 20) Are you aware of any research and development needs which could be performed locally that currently are not?
- 21) Do you have any other comments or areas of concern regarding research and development?

#### Part Six – Gaps and Barriers to Exploration and Mining

- 22) What do you see are the largest gaps (e.g. government policies, skill labour, housing, logistics, etc.) for exploration and mine development in NW Ontario?
- 23) What do you see are the largest barriers or impediments for exploration and mine development in NW Ontario?
- 24) Which strategic areas do you feel that Thunder Bay should focus on to help alleviate the existing gaps and barriers to development?
- 25) Do you have any other comments or areas of concern regarding gaps and barriers?

#### Closing Comments

- 26) Are there any additional comments which you may have that we have not covered in our interview guideline questions?

## Appendix D: List of Mining Occupations

NOC Code	Title
<b>Production Occupations</b>	
8231	Underground production and development miners
7511	Transport truck drivers
7521	Heavy equipment operators (except crane)
8614	Mine labourers
7452	Material handlers
7611	Construction trades helpers and labourers
8411	Underground mine service and support workers
9411	Machine operators, mineral and metal processing
9231	Central control and process operators, mineral and metal processing
9611	Labourers in mineral and metal processing
7372	Drillers and blasters - Surface mining, quarrying and construction
7612	Other trades helpers and labourers
7371	Crane operators
9241	Power engineers and power systems operators
<b>Trades Occupations</b>	
7312	Heavy-duty equipment mechanics
7271	Carpenters
7251	Plumbers
7252	Steamfitters, pipefitters and sprinkler system installers
7311	Construction millwrights and industrial mechanics
7242	Industrial electricians
7237	Welders and related machine operators
<b>Professional and Physical Sciences Occupations</b>	
2132	Mechanical engineers
2133	Electrical and electronics engineers
2113	Geoscientists and oceanographers
2143	Mining engineers
2121	Biologists and related scientists
<b>Professional and Physical Sciences Occupations (cont'd)</b>	

NOC Code	Title
2131	Civil engineers
2148	Other professional engineers, n.e.c.
2144	Geological engineers
2134	Chemical engineers
2142	Metallurgical and materials engineers
2141	Industrial and manufacturing engineers
2115	Other professional occupations in physical sciences
2112	Chemists
<b>Human Resources and Financial Occupations</b>	
1111	Financial auditors and accountants
0112	Human resources managers
1112	Financial and investment analysts
0111	Financial managers
1121	Human resources professionals
<b>Support Workers</b>	
2263	Inspectors in public and environmental health and occupational health and safety
1241	Administrative assistants
2261	Non-destructive testers and inspection technicians
6322	Cooks
1411	General office support workers
1525	Dispatchers
1523	Production logistics coordinators
9415	Inspectors and testers, mineral and metal processing
2262	Engineering inspectors and regulatory officers
1526	Transportation route and crew schedulers
2234	Construction estimators
<b>Technical Occupations</b>	
2253	Drafting technologists and technicians
2231	Civil engineering technologists and technicians
2212	Geological and mineral technologists and technicians

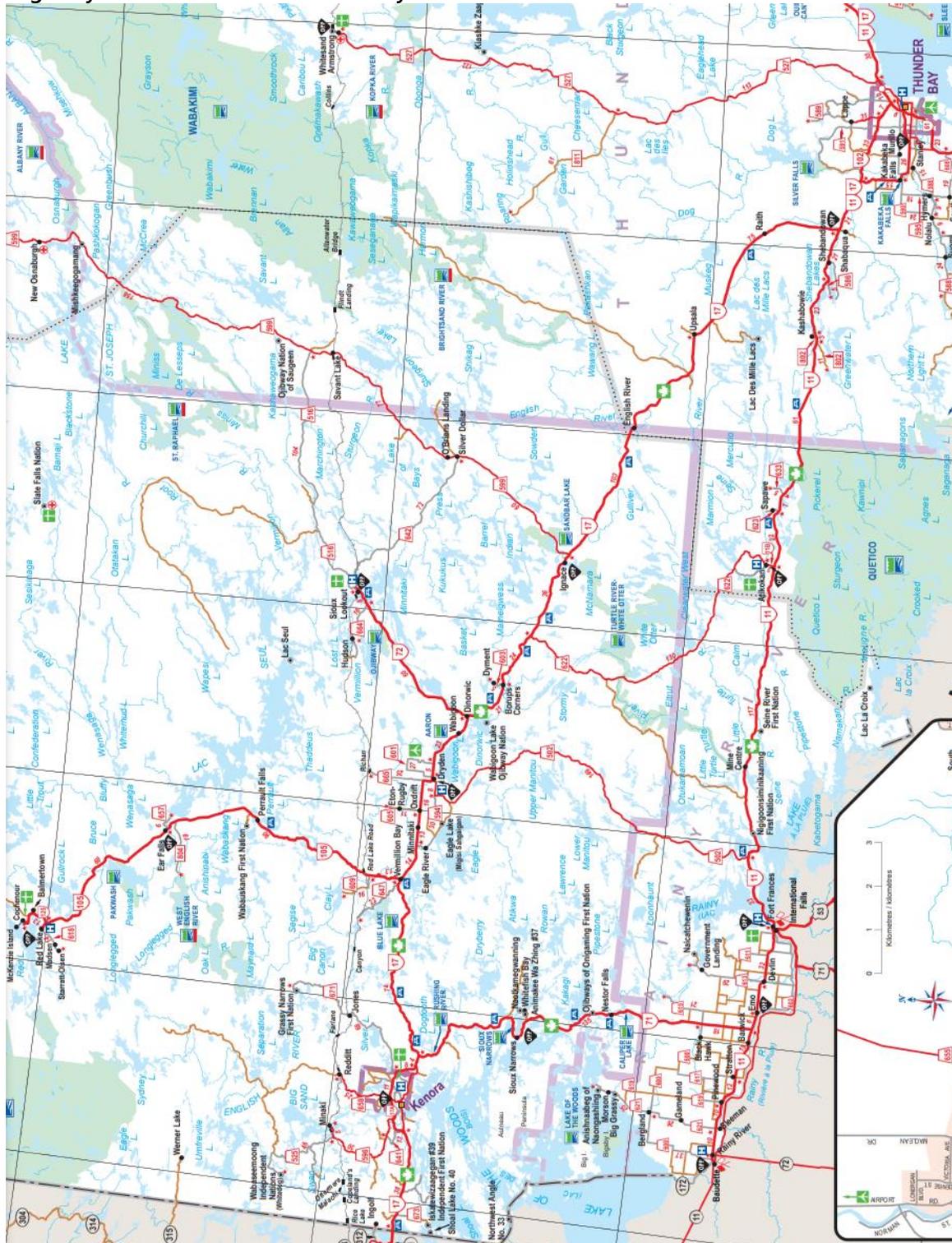
NOC Code	Title
<b>Technical Occupations (cont'd)</b>	
2241	Electrical and electronics engineering technologists and technicians
2154	Land surveyors
2243	Industrial instrument technicians and mechanics
2211	Chemical technologists and technicians
2254	Land survey technologists and technicians
2232	Mechanical engineering technologists and technicians
2171	Information systems analysts and consultants
2233	Industrial engineering and manufacturing technologists and technicians
2255	Technical occupations in geomatics and meteorology
2221	Biological technologists and technicians
<b>Supervisors, Coordinators, and Foremen</b>	
8221	Supervisors, mining and quarrying
0811	Managers in natural resources production and fishing
0711	Construction managers
7203	Contractors and supervisors, pipefitting trades
0211	Engineering managers
9211	Supervisors, mineral and metal processing
7301	Contractors and supervisors, mechanic trades

NOC Code (National Occupational Classification code)

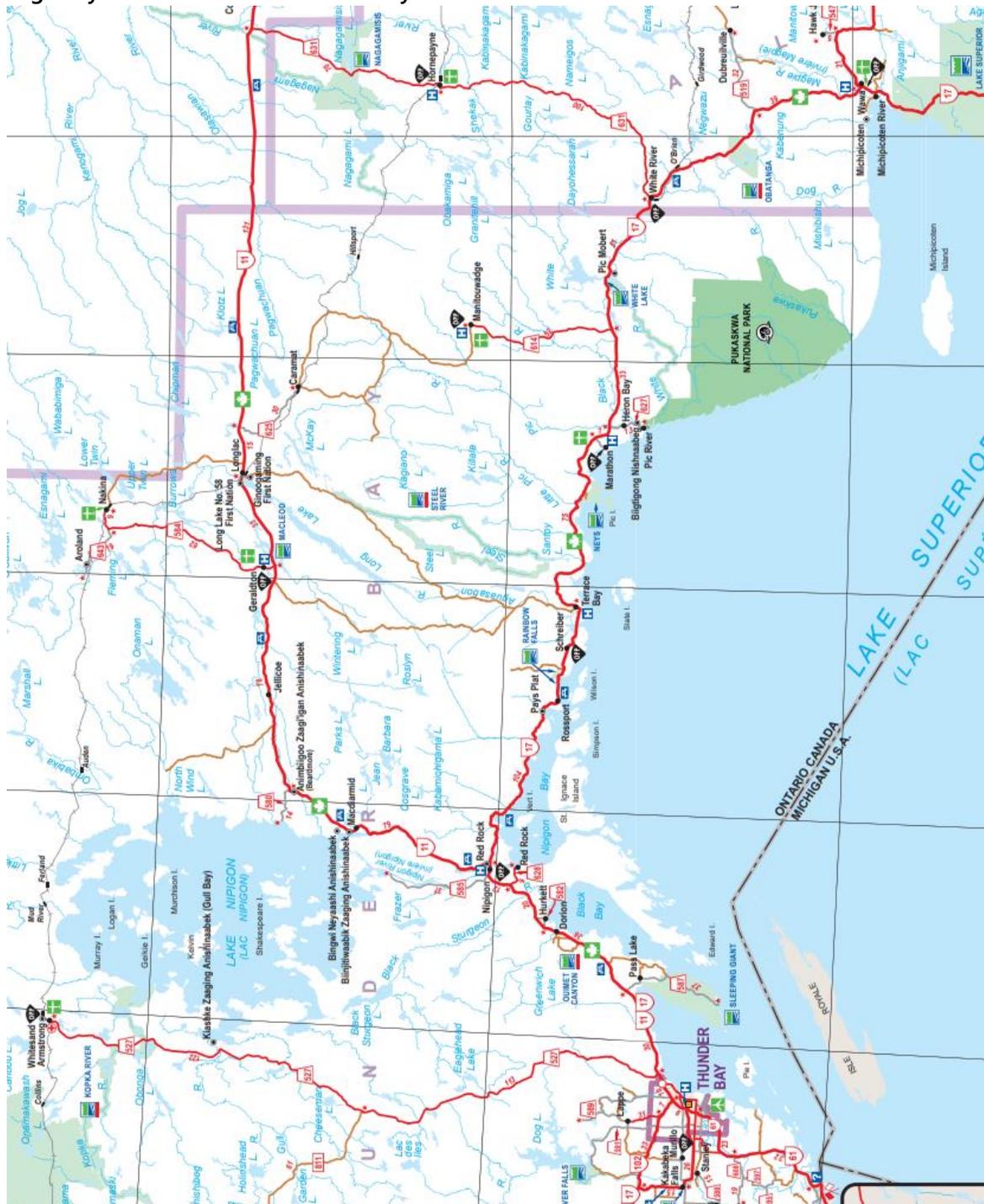
Source: [Canadian Mining Labour Market 10-Year Outlook \(2020\)](#), Mining Industry Human Resources Council

# Appendix E: Northwest Ontario Transportation Network

Highway network west of Thunder Bay.



### Highway network east of Thunder Bay.



Source: [http://www.mto.gov.on.ca/english/publications/official-road-map/pdfs/ORM\\_North\\_2020.pdf](http://www.mto.gov.on.ca/english/publications/official-road-map/pdfs/ORM_North_2020.pdf)

## Appendix F: Transportation Infrastructure Requirements

Access road transportation infrastructure requirements sorted by major, moderate or minimal construction required prior to mine start up.

Company	Site Name	Access Road Requirements	Rating
First Mining Gold	Springpole Lake Deposit	The property is accessible by float plane in the summer months, helicopter during transitional months and either by air or ice road in the winter months.	Major
Greenstone Gold	Hardrock Deposit	Existing infrastructure currently located within the project footprint will be relocated, including a portion of Highway 11 (20 km), a Ministry of Transportation (MTO) Patrol Yard, and a Hydro One substation facility along with few power line segments.	Major
Noront Resources	Eagles Nest	Require all-season road to be built by government to the ring of fire that can handle industrial traffic (300+ km).	Major
Frontier Lithium	PAK Deposit	Service by 150 km of winter road, and 90 km of gravel road from red lake. Currently, access to the property occurs from May 15 (after break-up) to October 15 (5 months) via float plane, and from February 1st, to March 15 (1.5 months) via the winter road.	Major
Avalon Advanced Materials	Separation Rapids Deposit	Total road distance from Kenora to site of 79 km. Development of the project requires upgrading of the 9.5 km long Avalon Road to accommodate mining, concentrate removal and consumable delivery trucks.	Moderate
Clean Air Metals	Thunder Bay North Deposit	The property is accessible using a series of intermittently maintained logging roads branching from Armstrong Highway 527. New road, 9 km, is required when mine develops.	Moderate
Generation Mining	Marathon PGM Deposit	Local access to the Property is primarily by a gravel road off of Trans-Canada Highway No. 17. A new 7 km access road from the Property will be constructed to the existing Peninsula Road that accesses the Trans-Canada Highway.	Moderate
Rock Tech Lithium	Georgia Lake	Require 8 km of road to be upgraded in the future. Existing gravel access road is suitable for now.	Moderate
Treasury Metals	Goliath	Accessible from the Trans-Canada Highway and by various secondary all-weather gravel roads that extend north of the town of Wabigoo. Access road to be upgraded in the future.	Moderate

Company	Site Name	Access Road Requirements	Rating
Zen Graphene	Albany Deposit	Deposit is 30 km north of Highway 11 and has a winter road in place. There is also a forestry access road is 9 km south. Requires construction of all-weather access road.	Moderate
Battle North Gold Corp	Bateman Gold Project	The Bateman Gold Project is accessible via an 8 km gravel road from the community of Cochenour, part of the Municipality of Red Lake.	Minimal
Great Bear Resources	Dixie Lake Prospects	Access to the Dixie property from Red Lake is via Highway 105. From the highway turnoff, the claims are crossed by a network of all-season logging roads and seasonal trails built to service mineral exploration work	Minimal
Pure Gold Mining	Madsen Deposit	On a provincial hiway, 10km south of red lake, close to Madsen. Paved roads exist right to the site.	Minimal
Impala Canada	Sunday Lake Prospect	N/A	N/A
New Gold Inc.	Intrepid Deposit	N/A	N/A

Source: Stakeholder interview responses and technical reports of various sites.

## Appendix G: Electricity Infrastructure Requirements

Electricity infrastructure requirements sorted by major, moderate or minimal construction required prior to mine start up.

Company	Site Name	Electricity Transmission Requirements	Power (MW)	Anticipated Source	Rating
Avalon Advanced Materials	Separation Rapids Deposit	Approximately 10 MW of operating power will be required during operations, supplied from the existing 115 kV system running from Caribou Falls to Whitedog Falls. A stepdown transformer will be installed at the connection point to the 115-kV line and approximately 25 km of transmission line will be installed to the mine site.	10	Transmission Line	Major
First Mining Gold	Springpole Lake Deposit	A 60 km long by 23 m wide right-of-way will be cleared, grubbed and prepared for the installation of a 115 kV wood pole transmission line using 636,000 mils conductor. The right-of-way will start from Highway 105 near Ear Falls and travel a further 90 km alongside the existing Hydro One corridor overland where it will connect to and follow the access corridor road to the project site. The Wataynikaneyap Power project in northwestern Ontario plans to develop transmission lines north from Red Lake which may present an opportunity to reduce the power line construction costs for the Project in future studies.	70	Transmission Line	Major
Greenstone Gold	Hardrock Deposit	Planning to install a gas plant due to insufficient supply from provincial grid. Installation of gas line will be required.	42	On-Site Generation	Major
Noront Resources	Eagles Nest	Power provided by combination of diesel/LNG and renewables	20	On-Site Generation	Major

Company	Site Name	Electricity Transmission Requirements	Power (MW)	Anticipated Source	Rating
		(wind/solar). Watay power line is unlikely to service the Ring of Fire.			
Zen Graphene	Albany Deposit	Currently analyzing difference between grid connection vs. gas cogeneration.	9	Transmission Line or On-Site Generation	Major
Clean Air Metals	Thunder Bay North Deposit	New East-West Tie line will be 6 km from the mine site.	30	Transmission Line	Moderate
Frontier Lithium	PAK Deposit	Watay power line will be 3-4 km away from the site.	10	Transmission Line	Moderate
Generation Mining	Marathon PGM Deposit	Property electrical energy requirements will be supplied by a short connection to the nearby Hydro One 115 kV electrical power grid. 4.6 km away.	65	Transmission Line	Moderate
Great Bear Resources	Dixie Lake Prospects	There is a transmission line nearby feeding entire town of Red Lake. Unsure if lines need to be expanded in future for their mine.	N/A	Transmission Line	Moderate
Rock Tech Lithium	Georgia Lake	There is a power line that runs along the TransCanada highway 11 about 10 km from the property.	10	Transmission Line	Moderate
Treasury Metals	Goliath	Existing power infrastructure includes the 115 kV and 230 Hydro One M2D line that cuts diagonally across the Project property (600 m away).	12	Transmission Line	Moderate
Battle North Gold Corp	Bateman Gold Project	The Bateman Gold Project site is supplied by a 9 km power transmission line connected to Hydro One's 44 kilovolt (kV) grid in the Municipality of Red Lake. Currently, the site is authorized for a load of 5.3 megavolt ampere (MVA). Since 2015, Wataynikaneyap Power LP (WPLP) has undertaken plans to construct a 230-kV transmission line from the Dryden area to Pickle Lake. This tie will off-load Pickle Lake,	5.3	Transmission Line	Minimal

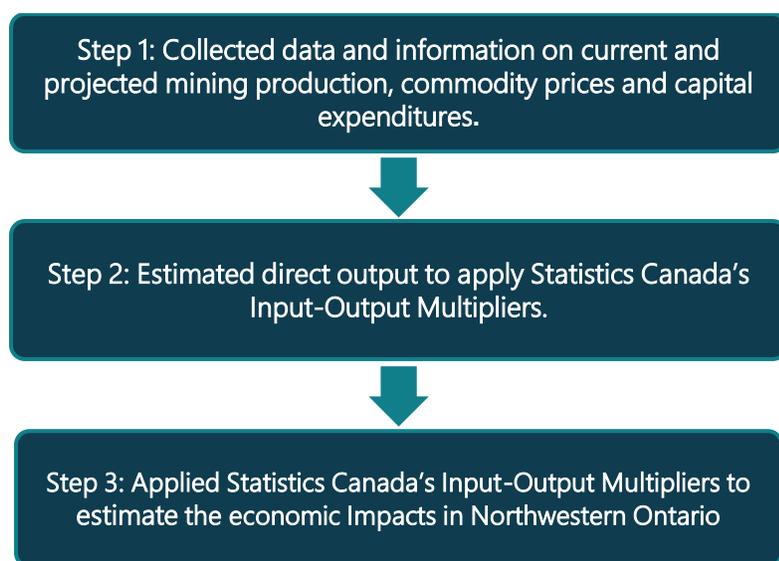
Company	Site Name	Electricity Transmission Requirements	Power (MW)	Anticipated Source	Rating
		resulting in increased capacity of the Red Lake Subsystem without the need to upgrade existing transmission lines.			
Pure Gold Mining	Madsen Deposit	Recently upgraded local substation to 10 MW transformers (Hydro One grid).	9	Transmission Line	Minimal
Impala Canada	Sunday Lake Prospect	N/A	N/A	N/A	N/A
New Gold Inc.	Intrepid Deposit	N/A	N/A	Transmission Line	N/A

Source: Stakeholder interview responses and technical reports of various sites.

## Appendix H: Economic Impact Methodology and Assumptions

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MNP's approach to economic impact modelling is based on published Statistics Canada multipliers and input-output modelling. A step-by-step overview of our methodology is provided below.



*Step 1: Collected data and information on current and projected mining production, commodity prices and capital expenditures.*

First, MNP collected information on:

- Current production of operating mines, proven and probable reserves and the remaining life of the mine.
- Current and projected commodity prices.
- Current and projected capital expenditures associated with the advanced stage exploration projects, estimated date when production was expected to start and projected annual production and revenues.

*Step 2: Estimated direct output to apply Statistics Canada's Input-Output Multipliers.*

In order to estimate the direct output, MNP first estimated the projected annual production. The annual production for operating mines was estimated by dividing the most recent estimates of proven and probable reserves for each mine over the remaining life of the mine. For advanced exploration projects production was estimated based on information published in annual reports and feasibility studies for each property. The projected production was then multiplied by projected commodity prices to estimate the direct output. In case of some exploration projects such as lithium projects where information was available, projected revenues were used as the direct output. The estimate of direct output for the construction stage of the exploration projects was based on projected capital expenditures on construction.

*Step 3: Applied Statistics Canada's Input-Output to estimate the economic Impacts in Northwestern Ontario*

The relevant industry multipliers were the applied to the direct output to estimate the economic Impacts in Northwestern Ontario. Adjustments were made to indirect and induced impacts based on expenditure on local supplies and services.

## Appendix I: Detailed Economic Impacts

### Operating Mines

	Output (\$ Million)	GDP (\$ Million)	Wages and Salaries (\$ Million)	Employment (Jobs)	Government Revenue (\$ Million)
<b>2019</b>					
Direct	\$1,630	\$1,030	\$400	2,765	\$160
Indirect and Induced	\$990	\$560	\$250	4,480	\$170
<b>Total</b>	<b>\$2,620</b>	<b>\$1,590</b>	<b>\$650</b>	<b>7,245</b>	<b>\$330</b>
<b>2020</b>					
Direct	\$2,810	\$1,970	\$570	3,790	\$160
Indirect and Induced	\$1,400	\$790	\$360	6,130	\$380
<b>Total</b>	<b>\$4,210</b>	<b>\$2,760</b>	<b>\$930</b>	<b>9,920</b>	<b>\$540</b>
<b>Average 2021 - 2025</b>					
Direct	\$2,900	\$1,980	\$610	3,790	\$310
Indirect and Induced	\$1,510	\$840	\$370	6,240	\$240
<b>Total</b>	<b>\$4,410</b>	<b>\$2,820</b>	<b>\$980</b>	<b>10,030</b>	<b>\$550</b>
<b>Average 2026 to 2028</b>					
Direct	\$2,310	\$1,400	\$610	3,540	\$230
Indirect and Induced	\$1,530	\$850	\$370	5,910	\$240
<b>Total</b>	<b>\$3,840</b>	<b>\$2,250</b>	<b>\$980</b>	<b>9,450</b>	<b>\$470</b>
<b>Average 2029 to 2030</b>					
Direct	\$380	\$200	\$130	1,150	\$40
Indirect and Induced	\$320	\$170	\$80	1,200	\$60
<b>Total</b>	<b>\$700</b>	<b>\$370</b>	<b>\$210</b>	<b>2,350</b>	<b>\$100</b>

Advanced Stage Exploration Projects - Construction

	Output (\$ Million)	GDP (\$ Million)	Wages and Salaries (\$ Million)	Employment (Jobs)	Government Revenue (\$ Million)
<i>2020</i>					
Direct	\$90	\$20	\$20	90	\$0
Indirect and Induced	\$70	\$30	\$10	330	\$10
Total	\$160	\$50	\$30	420	\$10
<i>Average 2021 - 2025</i>					
Direct	\$1,160	\$260	\$210	1,370	\$60
Indirect and Induced	\$930	\$410	\$210	4,240	\$100
Total	\$2,090	\$670	\$420	5,610	\$160
<i>Average 2026 to 2028</i>					

### Advanced Stage Exploration Projects - Operations

	Output (\$ Million)	GDP (\$ Million)	Wages and Salaries (\$ Million)	Employment (Jobs)	Government Revenue (\$ Million)
<i>Average 2021 - 2025</i>					
Direct	\$890	\$550	\$220	1,350	\$90
Indirect and Induced	\$550	\$310	\$130	2,230	\$80
Total	\$1,440	\$860	\$350	3,580	\$170
<i>Average 2026 to 2028</i>					
Direct	\$2,910	\$1,680	\$800	3,500	\$280
Indirect and Induced	\$1,960	\$1,080	\$470	7,470	\$310
Total	\$4,870	\$2,760	\$1,270	10,970	\$590
<i>Average 2029 to 2030</i>					
Direct	\$3,010	\$1,630	\$900	3,280	\$280
Indirect and Induced	\$2,200	\$1,220	\$530	7,410	\$370
Total	\$5,210	\$2,850	\$1,430	10,690	\$650

## Appendix J: Strategic Recommendation Business Cases

### 1.1 Implement strategic actions within next 12 months

1.1 Implement strategic actions within next 12 months											
Description						Who's affected/needs to be involved?			What Will Change?		
<ul style="list-style-type: none"> <li>Strategic actions should be implemented within the next 12 months as exploration and mining activity will begin ramping up in 2021.</li> </ul>						<ul style="list-style-type: none"> <li>CEDC</li> <li>External consultants and/or contractors</li> </ul>			As Is		To Be
									Continued delivery of CEDC mandate.		Expedited website, marketing, and communications enhancements targeted to support the mining sector.
Benefits/Outcomes			Investments			Risks/Mitigation					
<ul style="list-style-type: none"> <li>Economic development through enhancing CEDC website, marketing and communications, and information sharing.</li> <li>Attracting more mining supply and service businesses to the city.</li> <li>Enhancing local education and training services.</li> <li>Improved community and business relations.</li> </ul>			<ul style="list-style-type: none"> <li>Low: Less than \$10k of CEDC investment, or less than 100 hours of internal or contractor time.</li> </ul>			<ul style="list-style-type: none"> <li>Short time frame</li> </ul>					
Required Enablers			Linkages/Dependencies/Key Assumptions			Change Management					
<ul style="list-style-type: none"> <li>City of Thunder Bay, CEDC</li> </ul>			<ul style="list-style-type: none"> <li>Mining sector will see large growth starting 2021/2022</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>					
Priority Category						Timing			Value/Complexity Matrix		
Business Development	Workforce	Infrastructure	Economic Development	Research & Development	Gaps & Barriers	<3 Months	6-9 Months	12 Months	Value (High/Low)	Complexity (High/Low)	
X	X	X	X	X	X			X	H	H	

### 2.1 Digital media and website enhancement plan

2.1 Digital media and website enhancement plan											
Description						Who's affected/needs to be involved?			What Will Change?		
<ul style="list-style-type: none"> <li>Create and implement a website and digital marketing plan that pushes information out to the public in the areas of focus related to the Mining Readiness Strategy:</li> <li>Attracting and expanding supply and service businesses, Available vacant land in the city, Existing mining supply and services already located in the city, Workforce training resources, Job opportunities in mining, Local education, research and training centers, Road construction infrastructure updates, Electrical infrastructure projects, and regional electricity demand forecasts, Economic contributions of the mining sector on the local economy, Government initiatives that support the mining sector nationally, provincially, and in Northwestern Ontario.</li> </ul>						<ul style="list-style-type: none"> <li>CEDC</li> <li>External consultants and/or contractors</li> </ul>			As Is		To Be
									Existing website and communication plan.		Enhanced website, digital marketing and communications strategy, information and data gathering plan.
Benefits/Outcomes			Investments			Risks/Mitigation					
<ul style="list-style-type: none"> <li>Improved awareness of Thunder Bay and how it can support the mining sector.</li> <li>Improved information and data sharing.</li> <li>Attract more opportunities for economic development.</li> </ul>			<ul style="list-style-type: none"> <li>Low: Less than \$10k of CEDC investment, or less than 100 hours of internal or contractor time.</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>					
Required Enablers			Linkages/Dependencies/Key Assumptions			Change Management					
<ul style="list-style-type: none"> <li>City of Thunder Bay, CEDC</li> </ul>			<ul style="list-style-type: none"> <li>Participation from stakeholders with gathering and sharing data to the CEDC.</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>					
Priority Category						Timing			Value/Complexity Matrix		
Business Development	Workforce	Infrastructure	Economic Development	Research & Development	Gaps & Barriers	<3 Months	6-9 Months	12 Months	Value (High/Low)	Complexity (High/Low)	
X	X	X	X	X			X		H	L	

### 3.1 Facilitate industry introductions

3.1 Facilitate industry introductions										
Description						Who's affected/needs to be involved?		What Will Change?		
								As Is		To Be
<ul style="list-style-type: none"> <li>Facilitate introductions between the various mining companies and associations through working groups, webinars, panel discussions and quarterly virtual sessions to improve local mining sector communications, expand local business opportunities, and better understand training requirements.</li> </ul>						<ul style="list-style-type: none"> <li>CEDC mining</li> <li>Mining sector stakeholders</li> </ul>		Continued industry introductions facilitated by CEDC Mining project manager.		Further industry introductions backed by a strategic communications plan (webinar, working groups, etc.)
Benefits/Outcomes			Investments			Risks/Mitigation				
<ul style="list-style-type: none"> <li>Knowledge transfer and sharing between various associations and mining industry representatives to improve industry awareness, meet mining industry needs, and support local business development.</li> <li>The CEDC to be perceived as the mining facilitation and information hub in the Northwestern Ontario.</li> </ul>			<ul style="list-style-type: none"> <li>High: More than \$50k of CEDC investment, or more than 500 hours of internal or contractor time.</li> </ul>			<ul style="list-style-type: none"> <li>Lower than expected participation rate.</li> <li>Data privacy or mine competition concerns.</li> </ul>				
Required Enablers			Linkages/Dependencies/Key Assumptions			Change Management				
<ul style="list-style-type: none"> <li>City of Thunder Bay, CEDC</li> </ul>			<ul style="list-style-type: none"> <li>Participation from stakeholder.</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>				
Priority Category						Timing			Value/Complexity Matrix	
Business Development	Workforce	Infrastructure	Economic Development	Research & Development	Gaps & Barriers	<3 Months	6-9 Months	12 Months	Value (High/Low)	Complexity (High/Low)
X	X	X	X	X	X			X	H	H

### 3.2 Provide quarterly dashboard emails

3.2 Provide quarterly dashboard emails										
Description						Who's affected/needs to be involved?		What Will Change?		
								As Is		To Be
<ul style="list-style-type: none"> <li>Provide quarterly Northwestern Ontario mining sector email communications with a dashboard of activity in the region (status of exploration projects, job availabilities at the operating mines, infrastructure updates, etc.).</li> </ul>						<ul style="list-style-type: none"> <li>CEDC mining</li> <li>CEDC communications</li> </ul>		N/A		New quarterly email strategy and execution.
Benefits/Outcomes			Investments			Risks/Mitigation				
<ul style="list-style-type: none"> <li>Enhanced mining sector communication with mining companies and various stakeholders.</li> <li>Develop Thunder Bay as the mining sector hub for Northwestern Ontario.</li> </ul>			<ul style="list-style-type: none"> <li>Low: Less than \$10k of CEDC investment, or less than 100 hours of internal or contractor time.</li> </ul>			<ul style="list-style-type: none"> <li>Receiving mining sector data from stakeholders in time for the quarterly emails.</li> </ul>				
Required Enablers			Linkages/Dependencies/Key Assumptions			Change Management				
<ul style="list-style-type: none"> <li>City of Thunder Bay, CEDC</li> </ul>			<ul style="list-style-type: none"> <li>Stakeholders willing to support with data sharing.</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>				
Priority Category						Timing			Value/Complexity Matrix	
Business Development	Workforce	Infrastructure	Economic Development	Research & Development	Gaps & Barriers	<3 Months	6-9 Months	12 Months	Value (High/Low)	Complexity (High/Low)
X	X	X	X	X	X	X			L	L

### 3.3 Case studies of successful indigenous relations

Description						Who's affected/needs to be involved?			What Will Change?			
<ul style="list-style-type: none"> <li>Develop case studies of successful Indigenous community engagements, including operating mines with a high percentage Indigenous workers and Indigenous joint venture businesses to communicate successes, challenges, and best practices to overcome barriers.</li> </ul>						<ul style="list-style-type: none"> <li>CEDC mining</li> <li>CEDC communications</li> </ul>			As Is		To Be	
									Success stories shared verbally as required.		Published success stories that can be shared with the public and mining industry stakeholders.	
Benefits/Outcomes			Investments			Risks/Mitigation						
<ul style="list-style-type: none"> <li>Build confidence in mining industry stakeholders and Indigenous communities through presenting successful case studies of partnerships in Northwestern Ontario mines.</li> <li>Encourage mining companies to hire more Indigenous workers and businesses.</li> <li>Encourage Indigenous communities to work in the mining sector.</li> </ul>			<ul style="list-style-type: none"> <li>Low: Less than \$10k of CEDC investment, or less than 100 hours of internal or contractor time.</li> </ul>			<ul style="list-style-type: none"> <li>Lack of participation from the mining stakeholders that are required to share their success stories.</li> <li>Indigenous community relations.</li> </ul>						
Required Enablers			Linkages/Dependencies/Key Assumptions			Change Management						
<ul style="list-style-type: none"> <li>City of Thunder Bay, CEDC</li> </ul>			<ul style="list-style-type: none"> <li>Assuming mining stakeholders are willing and able to support tell their case studies.</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>						
Priority Category						Timing			Value/Complexity Matrix			
Business Development	Workforce	Infrastructure	Economic Development	Research & Development	Gaps & Barriers	<3 Months	6-9 Months	12 Months	Value (High/Low)	Complexity (High/Low)		
X	X				X	X			H	L		

### 3.4 Promote Thunder Bay as a full-service community

Description						Who's affected/needs to be involved?			What Will Change?			
<ul style="list-style-type: none"> <li>Develop strategies to continue to promote Thunder Bay as full-service community that has all the required services available to attract and retain mining workers and their families.</li> </ul>						<ul style="list-style-type: none"> <li>CEDC (all departments)</li> </ul>			As Is		To Be	
									Existing website and marketing/communications plan.		Strategic plan focused on promoting the city as a full service hub that is able to support new workers (e.g. mining) and their families.	
Benefits/Outcomes			Investments			Risks/Mitigation						
<ul style="list-style-type: none"> <li>Attract more mining sector workers to live in the city.</li> <li>Attract students to the local college and university, and retain them after graduation.</li> <li>Attract businesses that require full service community amenities.</li> </ul>			<ul style="list-style-type: none"> <li>Medium: Between \$10k to \$50k of CEDC investment, or between 100 to 500 hours of internal or contractor time.</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>						
Required Enablers			Linkages/Dependencies/Key Assumptions			Change Management						
<ul style="list-style-type: none"> <li>City of Thunder Bay, CEDC</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>						
Priority Category						Timing			Value/Complexity Matrix			
Business Development	Workforce	Infrastructure	Economic Development	Research & Development	Gaps & Barriers	<3 Months	6-9 Months	12 Months	Value (High/Low)	Complexity (High/Low)		
X	X		X					X	H	H		

### 3.5 Regular government communications on mining

3.5 Regular government communications on mining											
Description						Who's affected/needs to be involved?		What Will Change?			
<ul style="list-style-type: none"> <li>Communicate Northwestern Ontario mining sector updates to all levels of government using industry gathered data on topics such as infrastructure requirements, and exploration and mining permitting barriers.</li> <li>CEDC to take active role in bringing awareness to the applicable government agencies for the need to improve the efficiency of the permitting process.</li> </ul>						<ul style="list-style-type: none"> <li>CEDC mining</li> <li>CEDC executive</li> </ul>		Continued interactions with Ontario Mining Association and Ontario Prospectors Association.		As Is	To Be
											Strategic plan developed to communicate valuable information and data to government parties.
Benefits/Outcomes			Investments			Risks/Mitigation					
<ul style="list-style-type: none"> <li>Emphasis on need for efficient handling of current exploration and mining barriers to ensure healthy exploration and mining activity and investment in Northwestern Ontario.</li> <li>Improved public relations between mining industry stakeholders and government representatives.</li> </ul>			<ul style="list-style-type: none"> <li>Medium: Between \$10k to \$50k of CEDC investment, or between 100 to 500 hours of internal or contractor time.</li> </ul>			<ul style="list-style-type: none"> <li>Industry and government relations.</li> </ul>					
Required Enablers			Linkages/Dependencies/Key Assumptions			Change Management					
<ul style="list-style-type: none"> <li>City of Thunder Bay, CEDC</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>					
Priority Category						Timing			Value/Complexity Matrix		
Business Development	Workforce	Infrastructure	Economic Development	Research & Development	Gaps & Barriers	<3 Months	6-9 Months	12 Months	Value (High/Low)	Complexity (High/Low)	
		X	X		X			X	H	H	

### 4.1 Promote existing mining sector supply/services

4.1 Promote existing mining sector supply/services											
Description						Who's affected/needs to be involved?		What Will Change?			
<ul style="list-style-type: none"> <li>Promote the capabilities of the existing 400+ mine supply and service businesses in Thunder Bay through enhancing the existing CEDC mining directory, mining website and implementing communication and marketing initiatives.</li> </ul>						<ul style="list-style-type: none"> <li>CEDC mining</li> <li>CEDC communications</li> </ul>		CEDC mining and supply service directory and various mining sector reports.		As Is	To Be
											Enhanced digital marketing strategy and updates to existing mining directory.
Benefits/Outcomes			Investments			Risks/Mitigation					
<ul style="list-style-type: none"> <li>Ensure mining companies are aware of the existing expertise, skillset, services and supplies in Thunder Bay.</li> <li>Educate mining company procurement staff on Thunder Bay's capabilities.</li> <li>Support local companies get on preferred vendor lists of mining companies.</li> </ul>			<ul style="list-style-type: none"> <li>High: More than \$50k of CEDC investment, or more than 500 hours of internal or contractor time.</li> </ul>			<ul style="list-style-type: none"> <li>Lack of local vendor participation in sharing their company information.</li> </ul>					
Required Enablers			Linkages/Dependencies/Key Assumptions			Change Management					
<ul style="list-style-type: none"> <li>City of Thunder Bay, CEDC</li> </ul>			<ul style="list-style-type: none"> <li>Companies will be required to submit information about their operations.</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>					
Priority Category						Timing			Value/Complexity Matrix		
Business Development	Workforce	Infrastructure	Economic Development	Research & Development	Gaps & Barriers	<3 Months	6-9 Months	12 Months	Value (High/Low)	Complexity (High/Low)	
X								X	H	H	

## 4.2 Communicate/develop critical mineral processing

Description						Who's affected/needs to be involved?			What Will Change?							
<ul style="list-style-type: none"> <li>Focus on communicating and developing the critical mineral processing opportunities that are becoming available due to the Northwestern Ontario lithium and graphite deposits (e.g. Rock Tech Lithium and Avalon Advanced Materials letter of intent).</li> </ul>						<ul style="list-style-type: none"> <li>CEDC mining</li> <li>CEDC executives</li> <li>CEDC communications</li> </ul>			As Is		Currently have the known critical mineral deposits and have seen some news updates about potential critical mineral processing facilities.		To Be		Strategic plan built to attract the critical mineral processing plants to Thunder Bay.	
Benefits/Outcomes			Investments			Risks/Mitigation										
<ul style="list-style-type: none"> <li>Hundreds of potential jobs in Thunder Bay to construct and operate processing facilities.</li> <li>New industrial business located on Thunder Bay's waterfront/port lands areas.</li> <li>Opportunity to develop a clean tech industry due to the role critical minerals play in technologies such as electric vehicle batteries.</li> <li>Attract students and workers to the city form having a new, high tech industry in Thunder Bay.</li> </ul>			<ul style="list-style-type: none"> <li>High: More than \$50k of CEDC investment, or more than 500 hours of internal or contractor time.</li> </ul>			<ul style="list-style-type: none"> <li>Processing facilities do not locate in Thunder Bay.</li> </ul>										
Required Enablers			Linkages/Dependencies/Key Assumptions			Change Management										
<ul style="list-style-type: none"> <li>City of Thunder Bay, CEDC</li> </ul>			<ul style="list-style-type: none"> <li>Dependant on successful conversion of critical mineral deposits to operating mines.</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>										
Priority Category						Timing			Value/Complexity Matrix							
Business Development	Workforce	Infrastructure	Economic Development	Research & Development	Gaps & Barriers	<3 Months	6-9 Months	12 Months	Value (High/Low)	Complexity (High/Low)						
X							X		H	H						

## 4.3 Enhance existing mining supply/service directory

Description						Who's affected/needs to be involved?			What Will Change?							
<ul style="list-style-type: none"> <li>Update the existing mining supply and services directory on the CEDC Mining website with additional business information such as specialty service offerings, facility sizes and capabilities, and brief business descriptions.</li> </ul>						<ul style="list-style-type: none"> <li>CEDC mining</li> <li>CEDC communications</li> <li>Website consultant (optional)</li> </ul>			As Is		Existing mining supply and service directory is located on the CEDC website.		To Be		Enhancements to be made such as new information fields to increase the exposure of Thunder Bay based businesses.	
Benefits/Outcomes			Investments			Risks/Mitigation										
<ul style="list-style-type: none"> <li>Ensure mining companies are fully aware of the existing and new businesses that locate in Thunder Bay.</li> <li>Ensure new exploration and mining companies that operate in Northwestern Ontario can easily find the supply and services available in Thunder Bay, particularly with procurement staff who are not from the region, province, or country.</li> </ul>			<ul style="list-style-type: none"> <li>High: More than \$50k of CEDC investment, or more than 500 hours of internal or contractor time.</li> </ul>			<ul style="list-style-type: none"> <li>Lack of participation or information provided by local vendors.</li> </ul>										
Required Enablers			Linkages/Dependencies/Key Assumptions			Change Management										
<ul style="list-style-type: none"> <li>City of Thunder Bay, CEDC</li> </ul>			<ul style="list-style-type: none"> <li>Dependant on receiving info from existing and new vendors.</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>										
Priority Category						Timing			Value/Complexity Matrix							
Business Development	Workforce	Infrastructure	Economic Development	Research & Development	Gaps & Barriers	<3 Months	6-9 Months	12 Months	Value (High/Low)	Complexity (High/Low)						
X							X		H	L						

#### 4.4 Mining sector supply chain info on CEDC website

4.4 Mining sector supply chain info on CEDC website										
Description						Who's affected/needs to be involved?		What Will Change?		
								As Is		To Be
<ul style="list-style-type: none"> <li>Provide information on the mining supply chain on the CEDC Mining website (mine supply and services) to enhance public knowledge of the mining sector, attract mining related businesses to the region or assist existing businesses transition to the mining sector.</li> </ul>						<ul style="list-style-type: none"> <li>CEDC mining</li> <li>CEDC communications</li> <li>Mining sector consultant</li> <li>Website consultant</li> </ul>		Existing CEDC mining website with some references to required mining supply and services.		Dedicated mining supply chain section of website supported by information (text) and graphic.
Benefits/Outcomes			Investments			Risks/Mitigation				
<ul style="list-style-type: none"> <li>Educate local businesses on all of the supporting supply and services that are required by the mining industry to assist entrepreneurs in developing these businesses, assist existing businesses re-tool for mining, or attract new businesses into the city.</li> <li>Educate local students and workers on opportunities available to work in mining.</li> </ul>			<ul style="list-style-type: none"> <li>Medium: Between \$10k to \$50k of CEDC investment, or between 100 to 500 hours of internal or contractor time.</li> </ul>			<ul style="list-style-type: none"> <li>Cost to develop</li> </ul>				
Required Enablers			Linkages/Dependencies/Key Assumptions			Change Management				
<ul style="list-style-type: none"> <li>City of Thunder Bay, CEDC</li> </ul>			<ul style="list-style-type: none"> <li>Requires mining sector knowledge and research.</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>				
Priority Category						Timing			Value/Complexity Matrix	
Business Development	Workforce	Infrastructure	Economic Development	Research & Development	Gaps & Barriers	<3 Months	6-9 Months	12 Months	Value (High/Low)	Complexity (High/Low)
X	X						X		H	H

#### 4.5 Available vacant land info on CEDC website

4.5 Available vacant land info on CEDC website										
Description						Who's affected/needs to be involved?		What Will Change?		
								As Is		To Be
<ul style="list-style-type: none"> <li>Add the city's available vacant commercial and industrial land to the CEDC website, including location, type, contact and size information. Highlight special economic zones or tax incentives where applicable.</li> </ul>						<ul style="list-style-type: none"> <li>CEDC</li> </ul>		Update Dec 1, 2020: New 'gotthunderbay' website now contains a listing of available land in the 'Site Selectors' tab.		Continued maintenance of the Site Selectors web page to keep updated information on the website.
Benefits/Outcomes			Investments			Risks/Mitigation				
<ul style="list-style-type: none"> <li>Promote the large amount of available vacant commercial and industrial land in the city.</li> <li>Promote the industrial land, particularly around the waterfront/port lands that has been requested by critical mineral processing companies.</li> <li>Provide an easier, streamlined and digital method to exploring the land assets Thunder Bay has to offer to new businesses.</li> </ul>			<ul style="list-style-type: none"> <li>Low: Less than \$10k of CEDC investment, or less than 100 hours of internal or contractor time.</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>				
Required Enablers			Linkages/Dependencies/Key Assumptions			Change Management				
<ul style="list-style-type: none"> <li>City of Thunder Bay, CEDC</li> </ul>			<ul style="list-style-type: none"> <li>Dependant on internal CEDC information sharing to ensure database is kept up to date.</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>				
Priority Category						Timing			Value/Complexity Matrix	
Business Development	Workforce	Infrastructure	Economic Development	Research & Development	Gaps & Barriers	<3 Months	6-9 Months	12 Months	Value (High/Low)	Complexity (High/Low)
X			X			X			L	L

## 5.1 Gather skills gaps and current/future job data

5.1 Gather skills gaps and current/future job data										
Description						Who's affected/needs to be involved?		What Will Change?		
								As Is		To Be
<ul style="list-style-type: none"> <li>Regular communications with the exploration and mining companies to gather information and data on existing skills gaps, and current and future workforce requirements for their operations.</li> </ul>						<ul style="list-style-type: none"> <li>CEDC mining</li> </ul>		Collection of research data compiled and used by CEDC internally (e.g. Greenstone Gold workforce file).		Collection of employment information and data from each specific mine site and major exploration project to be used in external initiatives.
								<b>Benefits/Outcomes</b> <ul style="list-style-type: none"> <li>Compiled data from each mine site and major exploration project to be utilized in workshops and communications with educators and training centers to support in creating training programs and supplying the mining sector with a local skilled workforce.</li> <li>Communicate mining job and skill requirements on the CEDC website to make information easily accessible.</li> </ul>		
<b>Required Enablers</b> <ul style="list-style-type: none"> <li>City of Thunder Bay, CEDC</li> </ul>						<b>Linkages/Dependencies/Key Assumptions</b> <ul style="list-style-type: none"> <li>Dependant on mining company HR participation.</li> </ul>			<b>Change Management</b> <ul style="list-style-type: none"> <li>Mining sector perceptions on perceived industry competition.</li> </ul>	
Priority Category						Timing			Value/Complexity Matrix	
Business Development	Workforce	Infrastructure	Economic Development	Research & Development	Gaps & Barriers	<3 Months	6-9 Months	12 Months	Value (High/Low)	Complexity (High/Low)
	X							X	H	H

## 5.2 Facilitate working groups with trainers/educators

5.2 Facilitate working groups with trainers/educators										
Description						Who's affected/needs to be involved?		What Will Change?		
								As Is		To Be
<ul style="list-style-type: none"> <li>Facilitate a working group with local training and education providers to breakdown perceived, current or past barriers. CEDC to represent the demand side (mining industry) through providing employment data gathered from existing mining operations.</li> <li>Communicate mining workforce and training requirements with local education and training centers to assist in job placement services and creating or enhancing training programs.</li> </ul>						<ul style="list-style-type: none"> <li>CEDC mining</li> </ul>		Continued ad hoc facilitation of introductions to local training centers and educators.		Formal working group sessions.
								<b>Benefits/Outcomes</b> <ul style="list-style-type: none"> <li>Creation of a formal plan and standard communication of employment and training needs to increase number of Thunder Bay residents working in the mining sector.</li> <li>Create formal plans to develop training and education needs based on actual industry needs, both now and in the future.</li> </ul>		
<b>Required Enablers</b> <ul style="list-style-type: none"> <li>City of Thunder Bay, CEDC</li> </ul>						<b>Linkages/Dependencies/Key Assumptions</b> <ul style="list-style-type: none"> <li>Dependant on wide array of workforce training and education stakeholders.</li> </ul>			<b>Change Management</b> <ul style="list-style-type: none"> <li>N/A</li> </ul>	
Priority Category						Timing			Value/Complexity Matrix	
Business Development	Workforce	Infrastructure	Economic Development	Research & Development	Gaps & Barriers	<3 Months	6-9 Months	12 Months	Value (High/Low)	Complexity (High/Low)
	X						X		X	X

### 5.3 Promote mining skills, positions and training

5.3 Promote mining skills, positions and training										
Description						Who's affected/needs to be involved?		What Will Change?		
								As Is		To Be
<ul style="list-style-type: none"> <li>Promote the skills, positions and training required by existing mining operations to educate locals on how to achieve employment in the local mining sector.</li> </ul>						<ul style="list-style-type: none"> <li>CEDC mining</li> <li>CEDC communications</li> </ul>		Existing educator and training organization websites.		Employment information section added to CEDC mining website.
Benefits/Outcomes			Investments			Risks/Mitigation				
<ul style="list-style-type: none"> <li>Make mining skills, positions and training information easily accessible on the CEDC website and through marketing and communications strategies to attract students and skilled professionals to work in the mining sector.</li> </ul>			<ul style="list-style-type: none"> <li>Medium: Between \$10k to \$50k of CEDC investment, or between 100 to 500 hours of internal or contractor time.</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>				
Required Enablers			Linkages/Dependencies/Key Assumptions			Change Management				
<ul style="list-style-type: none"> <li>City of Thunder Bay, CEDC</li> </ul>			<ul style="list-style-type: none"> <li>Dependant on participation from mining industry stakeholders when gathering information.</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>				
Priority Category						Timing			Value/Complexity Matrix	
Business Development	Workforce	Infrastructure	Economic Development	Research & Development	Gaps & Barriers	<3 Months	6-9 Months	12 Months	Value (High/Low)	Complexity (High/Low)
	X							X	H	L

### 5.4 Provide information on local education/training

5.4 Provide information on local education/training										
Description						Who's affected/needs to be involved?		What Will Change?		
								As Is		To Be
<ul style="list-style-type: none"> <li>Provide a list of local training centers (university, college, training centers, etc.) on the CEDC website to showcase Thunder Bay as the hub for education in the region.</li> <li>Create a separate section on the CEDC Mining website that specifies the city's specialized exploration and mining related education opportunities and specialized research centers (e.g. CESME).</li> </ul>						<ul style="list-style-type: none"> <li>CEDC mining</li> <li>CEDC communications</li> </ul>		Links to education and training already on CEDC website.		Enhance the list of existing links with additional mining sector specific info and Thunder Bay mining expertise.
Benefits/Outcomes			Investments			Risks/Mitigation				
<ul style="list-style-type: none"> <li>Showcase Thunder Bay as the exploration and mining education hub for Northwestern Ontario.</li> <li>Provide easily accessible information for students, workers and mining industry stakeholders.</li> </ul>			<ul style="list-style-type: none"> <li>Low: Less than \$10k of CEDC investment, or less than 100 hours of internal or contractor time.</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>				
Required Enablers			Linkages/Dependencies/Key Assumptions			Change Management				
<ul style="list-style-type: none"> <li>City of Thunder Bay, CEDC</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>				
Priority Category						Timing			Value/Complexity Matrix	
Business Development	Workforce	Infrastructure	Economic Development	Research & Development	Gaps & Barriers	<3 Months	6-9 Months	12 Months	Value (High/Low)	Complexity (High/Low)
	X						X		L	L

## 6.1 Gather data on site infrastructure requirements

6.1 Gather data on site infrastructure requirements										
Description						Who's affected/needs to be involved?		What Will Change?		
								As Is		To Be
<ul style="list-style-type: none"> <li>Prioritize regular communications with the exploration and mining companies to gather information and data related to their specific transportation and electricity requirements.</li> </ul>						<ul style="list-style-type: none"> <li>CEDC mining</li> </ul>		Ad hoc conversations with mining companies and internal only documentation of infrastructure requirements.		Formal and scheduled conversations/check ins with mining companies to receive regular infrastructure updates.
Benefits/Outcomes			Investments				Risks/Mitigation			
<ul style="list-style-type: none"> <li>Obtain valuable infrastructure information on major exploration and operating mine projects to be utilised in initiatives including government communications.</li> </ul>			<ul style="list-style-type: none"> <li>Low: Less than \$10k of CEDC investment, or less than 100 hours of internal or contractor time.</li> </ul>				<ul style="list-style-type: none"> <li>Lack of participation by mining industry or infrastructure stakeholders.</li> </ul>			
Required Enablers			Linkages/Dependencies/Key Assumptions				Change Management			
<ul style="list-style-type: none"> <li>City of Thunder Bay, CEDC</li> </ul>			<ul style="list-style-type: none"> <li>Dependant on participation from mining and infrastructure stakeholders.</li> </ul>				<ul style="list-style-type: none"> <li>N/A</li> </ul>			
Priority Category						Timing			Value/Complexity Matrix	
Business Development	Workforce	Infrastructure	Economic Development	Research & Development	Gaps & Barriers	<3 Months	6-9 Months	12 Months	Value (High/Low)	Complexity (High/Low)
		X				L			L	L

## 6.2 Communicate infrastructure gaps and barriers

6.2 Communicate infrastructure gaps and barriers										
Description						Who's affected/needs to be involved?		What Will Change?		
								As Is		To Be
<ul style="list-style-type: none"> <li>Communicate infrastructure requirements, concerns, and barriers to the appropriate business and government parties.</li> </ul>						<ul style="list-style-type: none"> <li>CEDC mining</li> </ul>		Ad hoc conversations with infrastructure and government parties.		Formal and strategic communications plans backed by industry gathered data.
Benefits/Outcomes			Investments				Risks/Mitigation			
<ul style="list-style-type: none"> <li>Assist the government and infrastructure parties in planning for priority infrastructure projects as required by existing and future mining operations to ensure a viable mining sector in Northwestern Ontario.</li> </ul>			<ul style="list-style-type: none"> <li>Medium: Between \$10k to \$50k of CEDC investment, or between 100 to 500 hours of internal or contractor time.</li> </ul>				<ul style="list-style-type: none"> <li>N/A</li> </ul>			
Required Enablers			Linkages/Dependencies/Key Assumptions				Change Management			
<ul style="list-style-type: none"> <li>City of Thunder Bay, CEDC</li> </ul>			<ul style="list-style-type: none"> <li>Dependant on mining companies supplying infrastructure requirement information.</li> </ul>				<ul style="list-style-type: none"> <li>N/A</li> </ul>			
Priority Category						Timing			Value/Complexity Matrix	
Business Development	Workforce	Infrastructure	Economic Development	Research & Development	Gaps & Barriers	<3 Months	6-9 Months	12 Months	Value (High/Low)	Complexity (High/Low)
		X				X			L	L

### 6.3 Public updates on infrastructure initiatives

6.3 Public updates on infrastructure initiatives											
Description						Who's affected/needs to be involved?		What Will Change?			
<ul style="list-style-type: none"> <li>Provide public updates on infrastructure initiatives in the region:               <ul style="list-style-type: none"> <li>Electricity requirements for existing and future mining operations to assist with regional capacity planning.</li> <li>New transportation networks being developed in the region (e.g. developments at the port, Ring of Fire road constructions, airport infrastructure improvements).</li> </ul> </li> </ul>						<ul style="list-style-type: none"> <li>CEDC mining</li> <li>CEDC communications</li> </ul>		As Is		To Be	
								Existing low visibility information gathered by CEDC mining, used mainly for internal planning.		Section on CEDC website or mining newsletter communication infrastructure needs, projects and improvements in the region.	
Benefits/Outcomes			Investments			Risks/Mitigation					
<ul style="list-style-type: none"> <li>Communicate the major infrastructure needs of each Northwestern Ontario region to ensure exploration and mining companies can properly prepare for their need based on the needs of other projects (e.g. are there electricity capacity shortages in certain regions, are new all-season roads being constructed in certain areas that benefit more than one project, etc.).</li> </ul>			<ul style="list-style-type: none"> <li>Medium: Between \$10k to \$50k of CEDC investment, or between 100 to 500 hours of internal or contractor time.</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>					
Required Enablers			Linkages/Dependencies/Key Assumptions			Change Management					
<ul style="list-style-type: none"> <li>City of Thunder Bay, CEDC</li> </ul>			<ul style="list-style-type: none"> <li>Dependant on gathering information from mining companies.</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>					
Priority Category						Timing			Value/Complexity Matrix		
Business Development	Workforce	Infrastructure	Economic Development	Research & Development	Gaps & Barriers	<3 Months	6-9 Months	12 Months	Value (High/Low)	Complexity (High/Low)	
		X					X		L	H	

### 6.4 Prioritize updating the International Airport

6.4 Prioritize updating the International Airport											
Description						Who's affected/needs to be involved?		What Will Change?			
<ul style="list-style-type: none"> <li>Prioritize the City's International Airport runway and lighting upgrades to facilitate additional flights throughout the day which better align with mining staff's travel needs.</li> </ul>						<ul style="list-style-type: none"> <li>CEDC</li> </ul>		As Is		To Be	
								Airport requires infrastructure updates.		Assist airport if required to receive funding to complete infrastructure upgrades.	
Benefits/Outcomes			Investments			Risks/Mitigation					
<ul style="list-style-type: none"> <li>Potential to increase quantity of flight, particularly during evening and late night periods.</li> </ul>			<ul style="list-style-type: none"> <li>Low: Less than \$10k of CEDC investment, or less than 100 hours of internal or contractor time.</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>					
Required Enablers			Linkages/Dependencies/Key Assumptions			Change Management					
<ul style="list-style-type: none"> <li>City of Thunder Bay, CEDC</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>					
Priority Category						Timing			Value/Complexity Matrix		
Business Development	Workforce	Infrastructure	Economic Development	Research & Development	Gaps & Barriers	<3 Months	6-9 Months	12 Months	Value (High/Low)	Complexity (High/Low)	
		X						H	H	H	

## 7.1 Strategic incentives for attracting businesses

7.1 Strategic incentives for attracting businesses										
Description						Who's affected/needs to be involved?		What Will Change?		
								As Is		To Be
<ul style="list-style-type: none"> <li>Consider strategic incentives for mining supply and services companies (community improvement plans, zoning bylaws, support for emerging critical minerals industry, designated special economic zones at the waterfront, mining business support grants, etc.). A further detailed economic study of the cost/benefit of such incentives should be undertaken in early 2021.</li> </ul>						<ul style="list-style-type: none"> <li>CEDC</li> </ul>		Existing bylaws, zoning plans, employment land study results.		Strategic approach to attracting more business to Thunder Bay.
Benefits/Outcomes			Investments			Risks/Mitigation				
<ul style="list-style-type: none"> <li>Attract more businesses to the city, including mining related services and suppliers.</li> </ul>			<ul style="list-style-type: none"> <li>High: More than \$50k of CEDC investment, or more than 500 hours of internal or contractor time.</li> </ul>			<ul style="list-style-type: none"> <li>Conflicts with industry specific incentives or grants.</li> </ul>				
Required Enablers			Linkages/Dependencies/Key Assumptions			Change Management				
<ul style="list-style-type: none"> <li>City of Thunder Bay, CEDC</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>				
Priority Category						Timing			Value/Complexity Matrix	
Business Development	Workforce	Infrastructure	Economic Development	Research & Development	Gaps & Barriers	<3 Months	6-9 Months	12 Months	Value (High/Low)	Complexity (High/Low)
			X					H	H	H

## 7.2 Prioritize municipal infrastructure developments

7.2 Prioritize municipal infrastructure developments										
Description						Who's affected/needs to be involved?		What Will Change?		
								As Is		To Be
<ul style="list-style-type: none"> <li>Prioritize municipal infrastructure development for undeveloped commercial properties as new tenants/owners confirm their new business is for the mining sector. In the City's Official Plan, realign resources to facilitate the needed infrastructure on an expedited basis.</li> </ul>						<ul style="list-style-type: none"> <li>CEDC</li> </ul>		Existing land use studies and plans.		Focused plan on attracting mining sector businesses.
Benefits/Outcomes			Investments			Risks/Mitigation				
<ul style="list-style-type: none"> <li>Attract and retain more businesses to the city, including mining sector businesses.</li> </ul>			<ul style="list-style-type: none"> <li>Low: Less than \$10k of CEDC investment, or less than 100 hours of internal or contractor time.</li> </ul>			<ul style="list-style-type: none"> <li>Conflicts with industry specific incentives or grants.</li> </ul>				
Required Enablers			Linkages/Dependencies/Key Assumptions			Change Management				
<ul style="list-style-type: none"> <li>City of Thunder Bay, CEDC</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>			<ul style="list-style-type: none"> <li>N/A</li> </ul>				
Priority Category						Timing			Value/Complexity Matrix	
Business Development	Workforce	Infrastructure	Economic Development	Research & Development	Gaps & Barriers	<3 Months	6-9 Months	12 Months	Value (High/Low)	Complexity (High/Low)
			X				X		H	L