Crawford Nickel Project Impact Statement

Chapter 3 Project Description

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Acronyms and Abbreviations

CH_4	methane
CO_2	carbon dioxide
GHG	Greenhouse Gas
H:V	Horizontal: Vertical
IPT	In Process Tailings
km^2	square kilometres
kt/d	kilotonnes per day
MINES	Ministry of Mines
Mm^3	million cubic metres
Mt	million tonnes
MTO	Ministry of Transportation
N_2O	nitrous oxide
NAD	North American Datum
NO_X	nitrogen oxides
PA	Project Area
PM	Particulate Matter
PM_{10}	Particulate Matter less than 10 μm in diameter
$PM_{2.5}$	Particulate Matter less than 2.5 μm in diameter.
ROM	run of mine
SO_2	sulphur dioxide
TMF	Tailings Management Facility
tpd	tonnes per day

3 Project Description

This chapter provides a description of the Crawford Nickel Project ('the Project'), its location, key components, activities, phases, and schedule. In addition, this chapter provides details on potential emissions, discharges, and wastes that are likely to result from Project activities.

Throughout Project planning, Canada Nickel Company (Canada Nickel) has focused on collaboration between the Project engineers, the environmental team, and considerations of feedback received from various Indigenous nations and stakeholders. This has resulted in a Project design that has been modified and adapted to reduce potential environmental effects. These changes have resulted in design modifications from what was presented in the Detailed Project Description (Canada Nickel 2022). A description of Project changes and refinements since the Detailed Project Description (Canada Nickel 2022) is provided in Section 3.9.

The Project description that follows is based on the Crawford Nickel Sulphide Project NI 43-101 Technical Report and Feasibility Study (Ausenco 2023), specifically as illustrated on the Site Layout Plan included in the report.

3.1 Project Overview

Canada Nickel proposes to develop, construct, operate, and progressively reclaim a new open pit nickel mine and processing facility, collectively known as the Crawford Nickel Project, approximately 42 kilometres (km) north of Timmins, Ontario. The Project includes the development of an Open Pit, Stockpiles, two ore Processing Plants, and other mine related infrastructure, as well as a new rail spur line and the relocation of Highway 655 and an existing 500 kilovolt (kV) transmission line (Figure 3.1 and Figure 3.2). Ore will be extracted from a single Open Pit that will be divided into an East Zone and Main Zone. The Project has a mineral reserve estimate of 1,715 million tonnes (Mt) and an expected Project life of 41 years.

Based on the current Project design, the maximum rate of ore extraction will be up to 240,000 tonnes per day (tpd) and an estimated average rate of 160,000 tpd over the life of mine (i.e., yearly average expressed daily based on a total of 1,715 Mt of ore extracted over 30 years). The two ore processing plants and associated service facilities will process Run of Mine (ROM) ore, as well as Ore Stockpiles in the final years of the mine, to produce nickel concentrate, magnetite concentrate, and tailings at a rate of approximately 60,000 tpd at the start of mine life, ramping up to a maximum of 120,000 tpd. In addition to nickel and iron, other metals such as cobalt, chromium, palladium and platinum are expected to be recovered in concentrate streams.

Based on the proposed processing rate and current information regarding the ore body, the current life of the proposed Project is expected to be approximately 41 years. Mining would be completed at a faster pace than milling, thus mining of ore would occur for about 30 years, then milling alone for the last 11 years using existing stockpiles.

Concentrate from the processing plants will be loaded onto rail cars and shipped via the rail spur line for refinement offsite by others.

Sections 3.3 and 3.5 provide further details related to the main Project components and associated activities, while Section 3.4 provides further details on ancillary infrastructure and activities required to operate the mine.

3.2 Project Location

The Project comprises approximately 11,785 hectares (ha) (118 square kilometres [km^2])) along Highway 655 approximately 42 km north of the City of Timmins, Ontario (Figure 3.3). The Project is located within the unorganized geographic townships of Nesbitt, Crawford, Carnegie, Kidd, Beck, Lucas, Prosser, and Wark. The proposed Highway 655 Realignment, transmission line realignment, and rail spur line extend into the geographic Townships of Kidd and Wark (which are considered part of the City of Timmins). Table 3.1 identifies the geographic center of the Project, as well as the terminus of proposed highway and rail line extensions/realignments (discussed in detail in Section 3.4).

Table 3.1 Project Location Coordinates

Name	Latitude	Longitude
Mine Site Centroid	48, 50, 9.805 N	81, 22, 55.3512 W
North Limit of Highway Realignment	48, 54, 26.4096 N	81, 22, 51.4956 W
South Limit of Highway Realignment	48, 41, 54.7224 N	81, 20, 35.4516 W
South limit of Rail Spur	48, 38, 55.8420 N	81, 19, 27.0732 W
North limit of Rail Spur	48, 49, 33.8736 N	81, 24, 43.6176 W

The nearest larger communities are the City of Timmins (42 km to the south), Town of Cochrane (35 km to the northeast), Town of Smooth Rock Falls (50 km to the northwest), and Town of Iroquois Falls (50 km to the east). Site topography is relatively flat, with elevations onsite ranging from 265 to 290 m above mean sea level.

The Project is situated in the Timmins-Cochrane Mining Camp in northeastern Ontario, Canada, a region with a strong mining history of gold, nickel, zinc and lead, and in a province favourable to mining with regulations that reflect this history.

The Project is located in an area well-connected by local infrastructure. The Project is bisected by Highway 655, a two-laned paved provincial highway connecting Highway 101 to Highway 11 (Trans-Canada Highway). An existing rail spur line connects Glencore's existing Kidd Mine west of Highway 655 to the Kidd Metallurgical Site to the southeast of the Project site.

Other local infrastructure includes a regional transmission line (500 kV), which parallels Highway 655 and extends from the Hydro One Porcupine Transformer Station located east of Timmins. In addition, a 115 kV transmission line runs north south along the east side of the Project. A hydro-electric generating station, Lower Sturgeon, is located along Mattagami River to the west of the Project site.

There are no federal lands within the footprint of the Project. The closest lands under federal jurisdiction are the Taykwa Tagamou Nation Reserve lands located approximately 37 km northeast (straight line) from the Project site (14 km southeast of Cochrane).

The Timmins Municipal Airport (Timmins Victor M. Power Airport) is located 47 km (driving) from the site and is serviced by several daily flights to Toronto Pearson International Airport and Billy Bishop Toronto City Airport.

The Project is defined by a combination of 162 mining patents and 161 mining claims. As of the effective date of the report, Canada Nickel holds or is in the process of acquiring a 100% interest in the mining lands that comprise the Project.

Regulation under the provincial *Mining Act* requires that mining claims must be taken to lease prior to mineral development. Canada Nickel is currently working with the Ministry of Mines (MINES) to complete this process. The footprint of the Project is comprised mostly of privately held surface and mining rights. Canada Nickel is also currently working with landowners and mineral rights holders to obtain surface and mineral rights, as required. Parts of the Project are also provincial Crown lands, and reservations to the Crown exists on privately held lands.

3.3 Project Components

The following section provides a description of the Project components associated with the extraction, processing, transportation, and management of ore and other materials, including water, overburden, and rock, required for the creation of marketable concentrates. The dimensions of each component are provided based on the current mine design. These dimensions are approximate and may be refined through detailed design.

3.3.1 Open Pit

The Project will be developed as an open pit operation designed around two discrete, although overlapping, ore bodies – the Main Zone and the East Zone (Figure 3.4). The Open Pit is located generally central to the mine site between the Tailings Management Facility (TMF) to the south and Impoundment Facility to the north.

The Main Zone and the East Zone of the Pit contain an approximately equal tonnage of ore. An estimated 5,932 Mt of material will be removed from the Open Pit, including overburden, waste rock and ore, which includes an estimated 1,715 Mt of ore suitable for processing. The ultimate Open Pit will cover an area of approximately 992 ha, measuring 4,400 m by 3,100 m, extending to a depth of approximately 690 m.

Development of the Open Pit will occur sequentially commencing in Year -2 (2 years prior to the start of milling operations). The overall mining sequence may be refined as the Project progresses to detailed engineering, but currently prioritizes the Main Zone for early extraction to provide an early source of higher value ore to feed the Process Plant and so that it can be made available to store tailings (starting in Year 18). A saddle will be maintained between the two zones to facilitate use of the Main Zone for in pit tailings deposition, while extraction continues within the East Zone.

The Main Zone will be the primary supply of ore for the first 17 years of operations, providing approximately 843 Mt of ore for processing. The ultimate dimensions of the Main Zone will be approximately 3,400 m by 1,700 m with a depth of 690 m below grade. Full development of the Main Zone will require the realignment of Highway 655, which is scheduled to be completed following the start of operations (refer to Section 3.5.2 for additional details on Project phasing).

The East Zone will initially provide materials that will be used for Project construction. Slightly larger than the Main Zone, the East Zone will provide approximately 863 Mt of additional ore for processing. The ultimate dimensions of the East Zone Pit will be approximately 3,800 m by 1,500 m, with a depth of 615 m below grade.

The pits will employ two bench heights. To a depth of 90 m below surface, which is the maximum depth of overburden, the bench height will be 7.5 m. Below this horizon, all material will be rock, and benches will be 15 m. Figure 3.4 provides an illustration of the Open Pit configuration at the end of mine life (approximately Year 30).

Over the course of the pit development and ore extraction, three different sized mine fleets will be employed based on ground conditions and will be employed at different levels within the Open Pit (Figure 3.4). Fleet 1 will be comprised of lighter duty equipment (e.g., 120 t backhoe and 4 t articulated trucks) that are better suited to softer ground conditions. Fleet 2 will be comprised of heavier duty equipment (e.g., 300 t front shovels excavators and 90 t trucks) better suited for operation in sand and till soils. Fleet 3 will be comprised of the heaviest and largest equipment (e.g., 700 t front shovel/rope shovel excavators and 290 t trucks). A trolley assist system will be implemented, and autonomous and remotely controlled electric machinery is being explored, to support all or components of the mining fleet, particularly for Fleet 2 and 3, for the main mining operations.

3.3.2 Stockpiles and Impoundment Facility

The Project involves the construction of various stockpiles and an Impoundment Facility which are proposed to manage ore, waste rock, clay, and overburden generated onsite. Segregation and storage of materials in stockpiles will allow for appropriate water management and environmental monitoring, as well as future reclamation of the mine site following operations.

The main stockpiles include:

- Two Ore Stockpiles located east and west of the pit (referred to as the East and West Stockpile)
- Impoundment Facility to the north of the Open Pit, consisting of a Rock Impoundment, Sand & Till Impoundment, and a Clay Impoundment Facility

Additional smaller stockpiles are also proposed around the mine site, including two Crushed Ore Stockpiles (one to feed each mill/Process Plant), Reclaim Rock Dump (between Collection Pond 2 and the Open Pit), Reclamation Stockpiles (located west and north of the TMF), and Small Organic Material Stockpiles (locations to be determined during construction).

The approximate characteristics of the Primary Stockpiles are provided in Table 3.2.

Table 3.2 Stockpile Characteristics

Stockpile	Surface Area (ha)	Height (m)	Capacity/Anticipate Volume (Mm^3)	Slope (H:V)
Ore Stockpiles				
East Stockpile	253	100	100	6:1
West Stockpile	439	70	165	6:1
Impoundment Facility				
Rock Impoundment	1,801	115	1,438	6:1
Sand and Till Impoundment	252	50	182	6:1
Clay Impoundment	1,078	34	205	2:1 (internal slope) 6:1 (external slope)

3.3.2.1 Ore Stockpiles

During operations phase 1 and 2, ore will be mined at a faster rate than it can be processed. As such, ore of lower value will be stockpiled for processing at a later date, predominately during operations phase 3 or when ore extraction temporarily needs to stop (i.e., during equipment maintenance). Two Ore Stockpiles will be developed on the east and west sides of the pit. The stockpiles will be raised in horizontal lifts.

The East Stockpile will be started during the construction phase and will have a maximum design height of 100 m in Year 20, during operations phase 2, and will have an average height of 50 m. At its peak the East Stockpile with have a storage volume of approximately 100 Mm^3 and will occupy approximately 253 ha.

Development of the West Stockpile will begin during commissioning of the mill expansion at the Process Plant during phase 2 of operations. The current design for the stockpile has its highest height at 70 m and averaging 30 m over its 37-year active life. At its peak, the storage volume will be approximately 165 Mm^3, occupying approximately 439 ha.

Perimeter ditching and access roads will be constructed around the stockpiles (for additional details see Section 3.3.5).

3.3.2.2 Impoundment Facility

The Impoundment Facility will cover an area of approximately 3,150 ha and has been designed with three key storage areas:

- Rock Impoundment – western portion of the Impoundment Facility proposed to store waste rock
- Clay Impoundment – eastern portion of the Impoundment Facility proposed to store clay
- Sand and Till Impoundment – central portion of the Impoundment Facility proposed to store sand and till

The bases and perimeter ditches around the Impoundment Facility will be constructed of low-permeability fill materials to assist in drainage control. As areas of the facility are no longer disturbed by material placement, overburden will be placed, and vegetation applied. The facility will be constructed in a series of lifts as the volume of storage needs increase over the life of the mine.

The Clay Impoundment will be surrounded on all sides by a perimeter berm made of rock. A series of ribs will also be constructed from rock, spaced at a nominal 200 m, within the Clay Impoundment to contain and to provide haulage access to the interior of the Clay Impoundment.

3.3.2.3 Crushed Ore Stockpiles

Crushed Ore Stockpiles (sometimes referred to as ROM will be established adjacent to each of the Process Plant(s). These stockpiles will be housed in a geodesic dome to protect the pile from the elements, as well as reduce dust emissions. The stockpiles will store ore that has been through the crushing process (see Section 3.3.3) with the intent of holding enough ore to allow the Process Plant to process 60 kilotonnes per day (kt/d). The dome covering the stockpile will be approximately 108 m in diameter with a height of 44 m.

3.3.3 Ore Processing Components

To support ore processing, several buildings and infrastructure will need to be constructed or installed including:

- Primary and Secondary Crushers
- Process Plants
- Concentrate load-out buildings

These Project components are centrally located between the Open Pit and the Tailings Management Facility, within the Process Plant Area. The Process Plant Area is illustrated on Figure 3.2 and is an area of the Project Area (PA) where many of the components associated with ore processing, maintenance, and administrative activities will be located. These facilities will be located within the Process Plant Area, but their exact locations will be finalized as design progresses. Two sets of milling facilities will be constructed to serve two separate yet attached Process Plants in order to increase output from 60 kt/d at start up to 120 kt/d (See Section 3.5.2 for more details). Table 3.3 provides the approximate dimensions of the proposed processing infrastructure.

Table 3.3 Characteristics of the Process Plant Area Buildings

Building Name	Preliminary Building Dimensions		
	Length (m)	Width (m)	Height (m)
Primary Crusher	23	13	30
Secondary Crusher	34	34	39
Process Plants	288	88	35
Concentrate Loadout Building	79	100	12

3.3.3.1 Crusher Facilities

Two identical Primary Crusher Buildings will be constructed in order to support ore processing. Each building will consist of a buried concrete vault complete with a stick-built crane-supporting superstructure. The building will house the Primary Crushing Plant, including the ROM bin, rock breaker, Primary Crusher, apron feeder, conveyor, dust collector, access platforms, and support structures. The ROM bin will be able to of hold enough ore to supply the Process Plant with 60 kt/d.

Each of the two buildings and its interior components will be supported on a reinforced concrete raft foundation on bedrock 30 m below finished grade. The raft foundation will also serve as the flooring in the building.

Two identical Secondary Crusher Buildings will be constructed in order to support ore processing. Each building and its interior components will be supported on a reinforced concrete pile cap and steel piles down to bedrock. The pile cap will also serve as the flooring in the building.

All crushing facilities will be equipped with adequate lighting, dust collection, and an overhead crane.

A 3 km Stockpile Feed Conveyor will connect the phase 1 Secondary Crusher Building to the Crushed Ore Stockpile.

3.3.3.2 Process Plant

A Process Plant will be located centrally to the Open Pit, Stockpiles and TMF, in the Process Plant Area. To differentiate the Project phasing and for the purposes of discussion within the Impact Statement, the Process Plant has been divided into two identical subcomponents for milling, with the first Process Plant to be constructed during operations phase 1 and the second to be constructed during operations phase 2.

The Process Plant Building will consist of a pre-engineering rigid frame metal building and its interior components will be supported on a reinforced concrete pile cap and steel piles down to bedrock. The pile cap will also serve as the flooring in the building. The building will house the grinding and chemical processing facilities, including the SAG mill, primary and secondary ball mills, regrind mills, thickeners, coarse flotation cells, fine flotation cells, reagents, and access and operating platforms.

Two identical Concentrate Load-Out Bays will be constructed, the first during operations phase 1 and the second during operations phase 2. These will be attached to the Process Plant Building and will be used to store nickel and magnetite concentrates prior to it being sold and shipped offsite by rail.

The Process Plant is designed to recover a nickel flotation concentrate and a magnetite concentrate. Cobalt, platinum, and palladium are to be recovered in the nickel concentrate, and chromium would be recovered in the magnetite concentrate as well. The conceptual ore milling process is illustrated in Figure 3.6.

Over the life of mine, 8.5 Mt of nickel concentrate, and over 100 Mt of magnetite concentrate, will be produced.

3.3.3.3 In Process Tailings Carbonation Process

The Process Plant will process ore to produce nickel and magnetite concentrates, while also storing CO_2 in the brucite component of the tailings. This storage of CO_2 in brucite occurs naturally; however, Canada Nickel will employ a novel CO_2 sequestration process that they have developed called In Process Tailings (IPT) carbonation to enhance the carbon sequestration potential in the tailings, where tailings generated by the milling process are conditioned with a concentrated source of CO_2. CO_2 delivered to site will be sparged into the tailings slurry and reacts with the minerals to form carbonates, thereby permanently fixing CO_2 in solid mineral form within the tailings. Tailings conditioned with CO_2 will be discharged and stored in the TMF or Open Pit. The process of adding CO_2 after final tailings thickening is identified in the process flow sheet (Figure 3.6).

Initial pilot plant testing of the IPT carbonation process was completed in summer 2023 validated the sequestration models that were developed and confirmed the ability to scale up the process and to store in excess of 1 Mt of CO_2 per year.

3.3.4 Tailings Management Facility

The TMF will be located to the south of the Open Pit and has been designed to hold 495 Mm^3 of tailings covering an area of 2,300 ha. The TMF will be operated as a “thickened tailings cone” with tailings being deposited near the center of the facility, which allows for a steeper beach slope (relative to conventional slurry deposition), thus increasing the TMF storage capacity and limiting the perimeter dam height.

A TMF perimeter dam will be progressively raised as the volume of tailings increases using the centerline method, whereby the dam will be raised vertically with both upstream and downstream shells being raised. The perimeter dam will encircle the TMF and will include a clay core, filter, and transition zones, downstream and upstream shells. The clay core will be covered by a layer of frost protection material (sand) to insulate the core and reduce potential for degradation from freeze-thaw action. Rip-rap erosion protection will be provided over the exposed sand slopes of the frost protection and upstream shell. Based on current feasibility study level design, the downstream (exterior) approach will be sloped at 12:1, while the upstream (interior) approach will be sloped at 3:1. The ultimate dam height will vary from 9 to 23 m. A typical cross-section of the TMF Dam is illustrated on Figure 3.7.

The TMF Dam will be designed in accordance with the Canadian Dam Association Dam Safety Guidelines and the Global Industry Standard on Tailings Management. To enhance worker safety and in accordance with the recommendations of the Tailings Dam Breach Consequence Assessment Report (Appendix P of the Impact Statement), a deflector berm will be constructed north of the TMF extending from the East Stockpile west past the Process Plant. The intent of the berm would be to sustain the tailings and water outflow in the unlikely event of a dam breach.

A permanent pool of water is not required as part of the TMF to cover the tailings, as the mine rock and tailings have not been characterized as potentially acid generating rock.

As the TMF Dam construction is advanced, the seepage collection ditches and ponds will be completed. Runoff within the TMF, together with slurry water will be conveyed by gravity within the TMF and will pass through internal spillways into one of the TMF Collection Ponds. Seepage and runoff from the downstream side of the perimeter dams will be collected in perimeter ditching and directed to the TMF NW or NE Collection Pond. Water within the TMF Collection Ponds can either be treated and discharged to the environment or will be pumped back to the Process Plant where it will be reused as process water.

A perimeter road will also be constructed around the TMF for access and maintenance.

3.3.5 Water Management Facilities and Drainage Works

Detailed water balance and water management information for the TMF, Open Pit, Impoundment Facility and Collection Ponds is provided in the Crawford Site-Wide Water Balance Summary Report (Appendix I of the Impact Statement) and Site-Wide Water Management Plan (Appendix J of the Impact Statement). These reports provide additional details on the various water management constraints incorporated into the water balance models, including details on runoff and seepage collection strategies and systems (e.g., local seepage sedimentation ponds, berms, drainage ditches, pumps) to collect and contain surface water runoff, and groundwater discharge from major Project components (Open Pit, TMF, Impoundment Facility, Stockpiles, Process Plant) during climate normal and extreme weather conditions.

3.3.5.1 Water Diversions

Non-contact water will be managed separately from contact water to reduce the quantity of water requiring treatment and to maintain natural flows to the extent possible. To achieve this, a series of non-contact water diversion channels will be installed around portions of the site to divert flows away from Project components. These diversions will collect natural drainage otherwise destined for the mine site and will convey flows to downstream receiving waterbodies while potentially providing an opportunity for the creation of fish habitat enhancements, particularly in the North Driftwood Diversion Channel as outlined below.

The largest diversion of non-contact water will be in the North Driftwood Diversion Channel. A diversion of a portion of the North Driftwood River, which is proposed to be overprinted by the Open Pit and other mine infrastructure, is proposed to redirect flows from Martin Lake back into the North Driftwood River downstream of the mine site (Figure 3.2). Earthworks will be required at the existing Martin Lake outlet into the North Driftwood River to re-direct flows to the new outlet located further west.

Figure 3.2 illustrates two options currently under consideration for the North Driftwood Diversion Channel alignment, with alignments west and east of the proposed re-aligned Highway 655 corridor. Canada Nickel will determine the preferred alignment for the North Driftwood Channel Diversion during detailed design. For the purposes of the Impact Statement, the North Driftwood Diversion Channel alignment west of the re-aligned Highway 655 corridor was carried through the assessment of effects as a conservative option given that it would result in greater footprint effects (i.e., larger PA) west of the re-aligned Highway 655 corridor and would result in impacts further downstream than the eastern alignment (i.e., realignment connection point would be further downstream). For this reason, with the exception of Figure 3.2 and as addressed in Chapter 5 (Alternatives Assessment), only the North Driftwood Diversion Channel alignment west of the re-aligned Highway 655 is shown on figures throughout the Impact Statement.

The North Driftwood Diversion Channel will be designed using natural channel design principals to emulate local stable reaches of the North Driftwood River, which would include aquatic habitat enhancements and riparian vegetation planting. Goals of the channel realignment include creating an opportunity for a healthy and diverse fish population, designing a stable channel, installing instream structures, conveying and storing flood flows, and establishing riparian vegetation along the river corridor. Further details are provided in the Conceptual Fish Habitat Offsetting Plan (Appendix M of the Impact Statement) and will be refined through detailed design.

3.3.5.2 Mine Water Management

The site-wide water management system, contact water will be collected by a series of ditches and directed to the various Collection Ponds located throughout the site. Ditches will collect surface contact water and seepage from stockpiles. They will be constructed by berming and/or excavating channels around all stockpiles, the TMF and other mine infrastructure.

During construction and early operations, interim water management measures, including a sediment pond and associated discharge to the North Driftwood River, will be employed. The temporary discharge location to the North Driftwood River would be established and decommissioned to accommodate the long-term water management system.

During operations, contact water will be conveyed to five ponds, three ponds will service the various stockpile facilities and other mine components, while two ponds will be dedicated to the TMF. The Collection Ponds will be designed to be permanent settling ponds in addition to providing storage to sustain the mining operations needs and attenuate the water flow peaks. Figure 3.1 illustrates the location of the collection ponds while Table 3.4 provides a summary on the ponds.

The site-wide water management system has been designed to manage up to the 100-year return period, 24-hour duration event. Flows up to the 10-year return period, 24-hour duration storm event will be managed in the collection ponds. Flows between the 10-year return period, 24-hour duration storm event and up to the 100-year return period, 24-hour duration storm event will be managed by controlled release to the Open Pit, to provide temporary storage. Flows from a flood event in excess of the 100-year return period will be directed to an emergency overflow spillway that will discharge to the receiving environment.

Contact water will be conveyed to a series of ponds for storage and treatment prior to being released back to the environment. In addition to treatment within the ponds (e.g., sediment settling), a series of water treatment plants will be located in line with the Collection Pond outlets to provide additional treatment of contact water prior to its release to the surrounding environment. The exact design and location of these water treatment plants will be determined as the Project progresses, but the units are intended to provide supplemental treatment for the parameters of potential concern identified. These treatment plants are anticipated to powered through the site electrical distribution system with a capacity to treat up to approximately 28,000 m^3 per day.

Table 3.4 Collection Pond Details

Collection Pond	Area Serviced	Approximate Active Storage (m^3)	Discharge Watershed
Collection Pond 1	Impoundment Facility (east side)	2.0 M	West Buskegau River
Collection Pond 2	Impoundment Facility (west side), West Stockpile	2.2 M	North Driftwood River
Collection Pond 3	East Stockpile	160,000	West Buskegau River
TMF NE Collection Pond	TMF	1.8 M	North Driftwood River
TMF NW Collection Pond	TMF, Process Plant Area	2.4 M	North Driftwood River

Six discharge locations are shown on Figure 3.2, however, it is noted that the two discharge locations associated with the NE Collection Pond are potential locations for emergency spillways or spillways during the decommissioning and closure phase. The four discharge locations during operations are further discussed in the Site-Wide Water Management Plan (Appendix J of the Impact Statement) and are used for the assessment of potential effects.

3.3.5.3 Process Water

Process water for use in the Process Plants will be obtained primarily by recycling water within the Process Plant, and makeup water obtained from site runoff and Open Pit dewatering that will be stored in the Collections Ponds.

3.3.6 Mining Infrastructure

Several buildings and other facilities will be required to support the mining operations, including the maintenance and repair of equipment, storage and inventory of parts and tools, magazine storage, and other administrative activities. These buildings and facilities will be centrally located between the Open Pit and TMF in proximity to the Process Plants.

3.3.6.1 Potable Water Supply

Potable water for the Project will be supplied by groundwater wells located south-west of the Process Plant and TMF. Potable water will be transferred around the site via pipelines, which will be insulated and heat traced when run outside. Potable water will be treated to meet provincial drinking water standards.

3.3.6.2 Ancillary Buildings

A series of buildings will be constructed between the Open Pit and TMF to house a workshop (including wash station), warehouse, offices, medical building and firehall, and assay lab. Additional ancillary buildings may also be located within this area, as needed. This area has been identified as the Process Plant Area (see Figure 3.2) and the exact locations of ancillary buildings may shift within this area as design progresses. A gate house will be constructed at the site entrance located immediately southwest of the Process Plant.

The workshop will be constructed on reinforced concrete and steel piles given the heavy weight load. The warehouse will be a fabric structure that is supported by shipping containers. All other buildings will be pre-engineered or modular structures placed on pre-cast concrete.

3.3.6.3 Explosives Storage

The technology under consideration for the Project would result in explosives only being sensitized (i.e., prior to sensitizing, the product is inert) when injected with a gassing agent in the bulk delivery truck used to charge the holes. As a result, materials stored onsite will not be considered explosive. This would allow the explosives storage facilities to be located no further than 270 m from other buildings, reducing the footprint of surface operations and cycle times for the bulk delivery trucks.

During construction, bulk explosives products will be trucked to the site and stored in an explosives storage facility (e.g., magazines) proposed on the west side of Martin Lake and Gerry Lake. These facilities will be located in accordance with federal siting guidance. Materials used for explosives will be stored in an inert state (i.e., prior to being injected with a gassing agent), with two magazines erected for the separate storage will be provided for boosters and detonators. Onsite storage facilities totalling 70 t capacity would be erected at site, providing in excess of four days' supply.

Two bulk re-pump trucks will be located onsite to deliver explosives product to the blast holes.

Canada Nickel will provide an explosives pad for the construction of an onsite explosives facility for the mixing of the inert materials to be sensitized. This facility will be designed and operated by a third party. The emulsion will be manufactured at site by a third party. The main ingredient is ammonium nitrate solution, which is non-explosive and can be delivered by larger trucks, with a capacity of 38 t. At the peak production rate, explosives demand would be 151 tpd or approximately four truckloads daily.

3.3.6.4 Fuel Farm

A fuel farm will be located between the Open Pit and the TMF, within the Process Plant area near the workshop. The exact locations of the fuel farm may shift within the Process Plant area as design progresses. The fuel farm will be comprised of fuel tanks, fueling stations, and containment infrastructure. The fuel farm will initially be set up with four diesel tanks, one gasoline tank and one Diesel Exhaust Fluid tank during the initial stages of construction. Storage needs would increase to 13 diesel fuel tanks being required (at Year 16). It is anticipated that each tank will have a capacity of 80 m^3. Fuel requirements will vary over the life of the Project, but it is anticipated that peak demand will be in Year 16 with just under 125,000 m^3 of diesel being consumed.

All fuel tanks will be located within a containment area sized to contain the contents of the fuel farm in the event of spill. Tanks will be installed on a concrete pad to facilitate clean up and reduce potential contamination of soil and groundwater.

3.3.6.5 Site Access and Internal Roads

During construction, access to the site will be via the existing Lower Sturgeon Dam Road and other access roads from Highway 655. To permit access between the Primary Crusher and the Process Plant site prior to the realignment of Highway 655 (see Section 3.4.2), an overpass will be constructed. To facilitate the construction of the overpass, a temporary by-pass of Highway 655 (two lanes wide and approximately 2,700 m long) will be constructed.

As noted, full development of the Main Zone of the Open Pit will require the realignment of Highway 655. See Section 3.4.2 for details on the Highway 655 realignment. Once Highway 655 has been re-aligned, site access will be provided from Highway 655 easterly to the mine buildings. This access will be approximately 3.5 km long and will generally run from the re-aligned Highway 655 to the Process Plant and then in line with the conveyor to the mine buildings (e.g., offices, warehouse, workshop).

A series of internal haul and access roads will be constructed to facilitate access to various Project components. Over the life of the Project, approximately 45 km of surface internal roads will be constructed. Haul roads will be 35 m wide, with the exception on the pit ramps that will be 50 m. All other roads will be 15 m wide. Roads will be constructed of mine rock or aggregate. Culverts and bridges will be located where the internal haul and access roads are proposed to cross ditches/diversions and existing watercourses, as required. Watercourse crossings will be designed in accordance with applicable standards and regulatory requirements.

The location of access and haul roads are shown on Figure 3.1 and Figure 3.2. Additional internal roads within, around, and between Project components will also be constructed within the PA to provide access during construction and for maintenance and monitoring of the site.

3.3.6.6 Power Supply and Distribution

Canada Nickel will construct and operate two substations that will be located near the Process Plant. These substations will have an estimated demand and operating load of 230 kV and 34.5 kV, respectively, and will be built separately in operations phase 1 and 2. These will connect to a 230 kV transmission line to be constructed and operated by others[1]. A network of 34.5 kV overhead lines (totaling approximately 69 km) and 4.16 kV circuits will distribute power around the site.

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[1] A future 230 kV transmission line is being designed, constructed and operated by a fully independent business, which is a jointly owned venture between Transmission Infrastructure Partnerships Limited and Taykwa Tagamou Nation. The 230 kV transmission line is part of an independent transmission expansion project that is expected to promote stronger electricity reliability for northern communities and Indigenous nations that will connect the Porcupine Substation in Timmins. It is anticipated that the transmission line will follow the realigned Highway 655 . A Transmission Facilities Class EA was initiated by others for that project in 2023.

In addition to the overhead lines that will power supply to various Project components, trolley-assist infrastructure will be installed. This infrastructure will consist of an overhead power line on rigid poles connected to a direct current substation. These power lines will transfer electricity to truck mounted pantographs powering the vehicles. Trolley-assist infrastructure is intended to reduce dependence on diesel and improve the efficiency of trucks to climb out of the Open Pit. Trolley-assist will be installed along pit ramps to provide electrical power to assists trucks in climbing out of the Open Pit.

During construction, power will be supplied using diesel generators until power from the grid is available. Generators will also be used to provide standby power in emergency situations during operations. Each diesel generator will be contained within a weatherproof enclosure and will include a neutral ground resistor. A total of 20 diesel generators (10 for each Process Plant) ranging in size from 150 to 1,250 kW are anticipated, as described in Table 3.5. Additional smaller scale generators may be employed in other areas of the site for emergency power backup. Generators may also be employed during closure and decommissioning.

Table 3.5 Description of Emergency Stand-by Generators

Description	Specifications
Emergency / Standby Power to Grinding Area Loads	300 kW, 600 V, 0.8 PF
Emergency / Standby Power to Cleaner/Flotation Area Loads	300 kW, 600 V, 0.8 PF
Emergency / Standby Power to Concentrate Thickener Area Loads	300 kW, 600 V, 0.8 PF
Emergency / Standby Power to Coarse Flotation Area Loads	300 kW, 600 V, 0.8 PF
Emergency / Standby Power to Regrind Area Loads	600 kW, 600 V, 0.8 PF
Emergency / Standby Power to Tailings Area Loads	1250 kW, 4.16 kV, 0.8 PF
Emergency / Standby Power to Secondary Crushing Area Loads	150 kW, 600 V, 0.8 PF
Emergency / Standby Power to Reagents Area Loads	150 kW, 600 V, 0.8 PF
Emergency / Standby Power to Primary Crushing Area Loads	300 kW, 600 V, 0.8 PF
Emergency / Standby Power to Carbon Capture (Phase 1) Loads	1250 kW, 4.16 kV, 0.8 PF

3.3.7 Waste Management

Waste materials will be generated during construction activities and operations of the Project. All wastes will be collected and temporarily stored on site, and then disposed of by licensed operators in accordance with provincial regulations.

3.3.7.1 Sewage Treatment

Domestic sewage generated during the construction and operating phases will be collected and appropriately treated. While the specific method and design of the system has not been confirmed, sewage would be collected in storage tank(s) (for offsite disposal) or managed through an appropriately sized and designed sewage treatment plant or septic system. The design and location of the domestic sewage treatment system(s) will be identified during detailed design; however, the system(s) will be located within the PA.

Temporary sewage facilities will be used during construction, and potentially in the closure phase. These facilities may include disposal offsite or a temporary sewage treatment system that will be located within the PA.

3.3.7.2 Recyclable Material

To the extent possible, all materials used on the mine site will be re-used or recycled to reduce the amount of waste needing disposal. Recyclable materials, such as scrap metal, wood, glass, paper, and cardboard that are not reusable, will be segregated and trucked off site to licensed facilities.

3.3.7.3 Organic and Solid Waste

Domestic wastes, including any organic material or non-hazardous solid waste that are not recyclable, will be collected and temporarily stored on site prior to being transported off site for disposal / management at a licensed waste management facility.

3.3.7.4 Hazardous Waste

Hazardous materials will be generated through onsite activities, such as petroleum products generated through maintenance activities, biomedical waste (e.g., sharps containers), and other hazardous substances. Hazardous waste will be collected and stored in accordance with applicable regulations, with necessary containment until the waste can be transported offsite for disposal / management at a licensed waste management facility.

3.4 Ancillary Facilities and Infrastructure Outside Care and Control of Canada Nickel

There are several components and activities that are ancillary to the Project that are outside of the care and control of Canada Nickel. These ancillary components will be built and/or operated by others but are included in the activities considered in the assessment of effects since they were listed Project components or activities of the TIS Guidelines. These ancillary components include:

- the proposed rail spur line to be owned, operated, and maintained by Ontario Northland Railway (ONR) connecting the Process Plant to the existing ONR spur line close to the existing Kidd Mine near Highway 655
- the relocated section of 500 kV transmission line that will be owned, constructed, operated, and maintained by Hydro One Networks Incorporated (Hydro One)
- the re-aligned segment of Highway 655 that will be owned, operated and maintained by MTO

Construction of the rail spur extension and realigned Highway 655 will be completed by Canada Nickel, before such infrastructure is transferred to ONR and MTO, respectively, while construction of the relocated 500 kV transmission line will be competed under the care and control of Hydro One.

3.4.1 Rail Spur

A new rail spur line approximately 25 km long will be constructed to facilitate the transport of materials to and from the mine. This new spur line will ultimately be owned and operated by ONR, a Crown agency reporting to the MTO. The new rail spur will run from the Process Plant in a southerly direction along the eastern side of the realigned Highway 655 to the existing ONR spur line, which is an existing rail spur line used by Glencore to transport ore from their existing Kidd mine site to the Kidd Metallurgical Site (Kidd Met). The new rail line will include tracks at the Process Plant to accommodate loading and unloading of materials.

Design standards for the proposed spur line will match the design standards for the existing ONR spur line. Due to the proximity of the proposed rail embankment to the realigned Highway 655, the profile of the highway and rail will be coordinated to avoid high/steep slopes between the highway and railway and appropriate setbacks.

Up to four roundtrip trains per 24-hours are anticipated to transport concentrate from the Process Plant for further processing offsite. Transportation of materials by train, including concentrate, would be in the care and control of ONR. As stipulated in the TIS Guideline, transportation of ore concentrate along the new rail spur and existing ONR rail spur between the Process Plant and the Kidd Met where the existing spur meets the provincial rail network, is included in the assessment of Project effects.

3.4.2 Highway 655 Realignment

The existing alignment of Highway 655 is located within the proposed Main Zone of the Open Pit. As such, to accommodate full development of the Open Pit, a realigned section of Highway 655 will be constructed to the west following the start of operations.

To facilitate extraction, approximately 26 km of Highway 655 will be realigned to the west of the mine to divert Highway 655 traffic around the mine site. Once realigned, the existing section of Highway 655 will be decommissioned.

A series of ditches, culverts and bridges will be installed along Highway 655 to collect and convey water along and beneath the highway. Culverts and bridges will be located where the realigned highway is proposed to cross existing watercourses to reduce impacts on flows and fish habitat. Major watercourse crossings, such as Jocko Creek and the North Driftwood River, would be built using bridges or large culverts (i.e., similar to those beneath the existing Highway 655), while smaller tributaries will be conveyed through appropriately sized culverts (size and dimensions to be determined).

Canada Nickel will be responsible for the design and construction of the realignment, including any temporary by-passes, and will transfer the ownership of the highway to MTO once construction is complete. As part of the Project, Canada Nickel is undertaking the design of the highway in consultation with MTO, which includes highway embankments, safety measures, and culverts. For the purposes of the assessment, the realigned highway infrastructure and corresponding construction activities are included in the assessment of Project effects.

3.4.3 500 kV Transmission Line

Similar to Highway 655, the existing alignment of the 500 kV transmission line owned by Hydro One is located within the proposed Main Zone of the Open Pit. As such, to accommodate full development of the Open Pit, a realignment of a portion of the 500 kV transmission line will be constructed to the west along a similar corridor as the proposed realignment of Highway 655.

Approximately 29 km of this transmission line will be relocated. Hydro One, as the owners of the facility, will be completing a Class Environmental Assessment for Transmission Facilities for the relocation of the transmission line. However, since the work is ancillary to the Project, construction of the transmission line, including the establishing of a new corridor to the west of Highway 655, is included in the assessment of Project effects.

3.5 Project Phases and Activities

The timing of activities and installation of Project components will occur in sequence to allow for the efficient extraction of materials. Various construction, operations, and decommissioning activities are proposed throughout the life of the mine, with some construction activities occurring during construction and others continuing or commencing during operations.

For the purposes of the assessment, the Project activities have been identified and assessed according to the following Project phases and timing, based on how the Project is anticipated to be advanced:

- Construction (Year -3 to Year -1)
- Operations
- Operations phase 1 (Year 1 to Year 5): 60 kt/d milling capacity with ore extraction
- Operations phase 2 (Year 5 to Year 30): 120 kt/d milling capacity with ore extraction
- Operations phase 3 (Year 30 to Year 41): 120 kt/d milling capacity with no ore extraction
- Decommissioning and closure
- Active closure (Year 41 to Year 46)
- Passive closure (Year 46+)

The schedule as presented is preliminary and subject to refinement as Project planning progresses.

3.5.1 Construction Phase

The construction phase will include the preparation of the site up to the point at which the first Process Plant has been commissioned and is ready to commence operations. This phase will include site preparation, physical construction, pre-production, and commissioning activities. Construction is anticipated to begin in the Main Zone and East Zone, and rock extracted at this time may be crushed into aggregate using a mobile aggregate crusher for use during the construction of roads and other infrastructure, as necessary.

It is noted that additional construction will occur through the operations phases of the Project, and that this phase is defined by the start of ore processing.

3.5.1.1 Site Preparation

Site preparation will commence with vegetation clearing. Limits of clearing will be marked in advance, only designated areas will be cleared, and clearing will be done incrementally.

During the construction phase, clearing will focus on the Open Pit, Stockpiles, TMF, and the corridor between the Process Plant and the Primary Crusher. For the purposes of this assessment, we have assumed that the full extent of the PA will be cleared and/or disturbed to accommodate project components and activities (See Figure 3.1). As discussed in Section 8.5.1, the PA encompasses the Project footprint and is the anticipated area of physical disturbance associated with the construction, operations, and decommissioning of the Project.

Once clearing is completed, bulk earthworks including stripping, grading, and stockpiling will be completed using heavy equipment such as graders, dozers, and scrapers. Table 3.5 summarizes the anticipated approximate quantity of materials that will be extracted. Earth works will be limited within the TMF and Impoundment Facility as organic materials at the base of these facilities provides a better working surface then the underlying clay. However, the TMF embankment areas and perimeters of the Impoundment Facility will be locally sub-excavated to remove unsuitable material as needed (e.g., soft, loose, or excessively wet soils) as part of foundation preparations.

During this phase, excess overburden, clay, sand and rock will either be used in the construction of haul roads, tailings dams and laydowns or stockpiled in the Impoundment Facility. Rock will also be crushed using a mobile aggregate crusher for use as construction aggregate. Note that it is assumed that aggregate may also be purchased from local quarries, owned and operated by third parties.

Placement of materials into the Impoundment Facility will proceed as a series of lifts. Drainage and benching will be implemented to collect surface water and divert water to the water management facilities. Collection ditches and ponds will provide sediment removal, with water pumped or trucked to a pond onsite.

Table 3.6 Construction Phase Production Amount

Material	Amount (Mt)
Clay	36
Sand and Till	21
Construction Rock	32
Ore	14

Dust suppression, using water obtained from the Open Pit dewatering and the Collection Ponds will be employed to reduce the airborne dust generation from haul roads. A preliminary estimate of water to be used for monthly dust suppression activities is provided in Table 3.7 below. Dust suppression will be limited during operations phase 3 and decommissioning and closure phase as mining activity will cease and will be substantially below the volumes required for construction and operations phase 1 and 2.

Table 3.7 Preliminary Estimate of Average Monthly Water Requirements for Dust Suppression

Project Phase	Source of Water		
	Pond 1 (m^3/month)	Pond 2 (m^3/month)	Open Pit (m^3/month)
Construction	10,808	0	7,420
Operations Phase 1	25,033	3,971	9,253
Operations Phase 2	28,165	22,774	8,695

Erosion and sedimentation control techniques will be employed throughout the site preparation activities, as required. These measures will reduce the total suspended solids prior to discharge to the environment. As the site water management systems comes on-line it will replace the temporary erosion and sediment control measures (e.g., contact water ponds, ditches, sumps, TMF seepage collection).

3.5.1.2 Infrastructure Construction and Equipment Installation

As earthworks progress, mine infrastructure will begin to be developed. One of the first pieces of the mine infrastructure to be developed will be the water management system in the areas where construction work is being performed, including the Collection Ponds and ditches. Non-contact water diversions will also be constructed at this time to divert flows around construction and mining areas. A temporary sedimentation pond will be constructed to manage the construction phase Process Plant Area and pit dewatering. During construction, pit dewatering could also be temporarily pumped to Collection Pond 1 or 3 to be built closer to the Open Pit, until later in the construction phase.

Following the development of the water management system, construction will shift to other Project infrastructure, such the Process Plant, Primary and Secondary Crusher, office, workshop and other buildings and systems. Construction of infrastructure will focus on supporting earth works, foundation construction, and erection of structures so that interior construction can be completed during winter months. As these Project components are constructed, they will be connected to the overhead power line network. The rail spur line connection (Section 3.4.1) will also be constructed at this time.

A temporary grade separation (overpass) will be constructed over the existing Highway 655 corridor to allow the mine haul trucks and conveyor to pass above the highway. A by-pass of Highway 655 will be constructed to allow vehicular traffic to continue with limited interruption during construction of the overpass. Construction of the overpass will be completed during the construction phase. Once completed, the new overpass and haul road will be in service until the realignment of Highway 655 is completed (see Section 3.5.2.1), and traffic is re-routed to the new alignment.

The new rail spur connecting the Process Plant to the existing ONR spur line near the Glencore Kidd mine site will transport of materials to and from the mine. Track construction will include earthworks to build the subgrade and drainage. The track will be assembled on the subgrade, followed by ballasting and lifting to the final position. Construction of the rail spur is anticipated to be completed within the construction phase.

The construction of the North Driftwood Diversion Channel may also commence at the end of the construction phase, although it may be shifted into operations phase 1 in line with the realignment of Highway 655. The establishment of this diversion channel will include construction of the new channel and installation of a diversion structure near the mine access road to divert flows from Martin Lake into the new channel.

3.5.1.3 Pre-Production

As bulk earth work advances around the Open Pit, waste rock and, subsequently, ore will begin to be removed. It is estimated that 126 kt/d of material will be extracted, of which 14 Mt will be ore that will be stored in the East or West Stockpile for future processing.

3.5.1.4 Commissioning

As construction of the first Process Plant is completed, the facility will undergo commissioning. During this time, water will be taken from existing Collection Ponds and other sources, if required.

3.5.2 Operations Phase

The operations phase is focused on the active processing of ore and generation of concentrate for delivery to market, specifically operation of the Process Plant(s). Due to the sequential nature of the mine operations, the operations phase of the Project has been divided into 3 sub-phases for clarity based on the Open Pit extraction schedule and sequential operation of the two Process Plants.

The three sub-phases of the operations phase include:

- Operations phase 1 – This phase includes the operation of the first of two Process Plants that will be operating at an ore processing capacity of approximately 60 kt/d (or 21.9Mt/a). IPT carbonation within the Process Plant may also commence if a CO_2 source is available. Mining operations during this phase will produce more ore than the Process Plant can process, with surplus material to be stockpiled in the East Stockpile location for future processing. Construction will continue during the phase to expand and construct the second Process Plant and other supporting mine infrastructure, including the Highway 655 realignment. Material will begin to be stored within the West Stockpile at the end of this phase.

- Operations phase 2 – This phase includes the operation of both Process Plants that will be operating at an ore processing capacity of approximately 120kt/d (or 43.8 Mt/a), including IPT carbonation. Mining operations during this phase will produce up to 240 kt/d, which is more ore than the Process Plants can process. Low grade ore will continue to be stockpiled in the East and/or the West Stockpiles.
- Operations phase 3 – This phase includes continuation of the operation of both Process Plants at an ore processing capacity of approximately 120kt/d (or 43.8 Mt/a) following completion of mining operations (e.g., no further extraction of ore from the pits). The Process Plants, including IPT carbonation, will continue to operate by processing the ore stockpiled during operations phase 1 and 2. As mine operations cease, there will be an opportunity for progressive reclamation of the pits, haul routes, and other no longer used areas of the Project site.

The primary source of process water will be through recycling water within the Process Plant and makeup water from the Open Pit dewatering and from site runoff as collected in the TMF Northwest and Northeast Collection Ponds.

3.5.2.1 Operations Phase 1

Operations phase 1 can be defined as the time during which the first Process Plant is operational, where throughput ore processing capacity will be 60kt/d (or 21.9 Mt/a). During operations phase 1, mining activities will include development of the Open Pit and extraction of ore. Blasts will be planned and implemented to optimize the number of explosives used and will be performed during daytime only. It is anticipated that there be a maximum of five blasts days per week. Ore and waste rock will be loaded and hauled from the Open Pit and stockpiled at the Impoundment Facility or one of the Ore Stockpiles.

It is estimated that the average annual rate of daily extraction will be 396 kt, of which 126 kt will be ore. Table 3.8 summaries the total anticipated amount of material that will be extracted during operations phase 1. Mine operations at this phase will produce more ore than can be processed and surplus ore will be stockpiled in the East Stockpile location for future milling in operations phase 3.

Table 3.8 Operations Phase One Mine Production Amount

Material	Amount (Mt)
Clay	110
Sand and Till	109
Waste Rock	275
Ore	231

The Process Plant will operate at a rate of approximately 60 kt/d and will produce nickel concentrate, magnetite concentrate, and tailings. Tailings during operations phase 1 will be stored within the TMF. Concentrate will be thickened, filtered, and temporarily stockpiled prior to transportation to third-party processing facilities offsite.

The Project will produce two types of concentrate: a nickel concentrate (containing payable nickel, cobalt, palladium, and platinum), and a magnetite concentrate (containing payable iron, nickel and chromium). These concentrates are slightly wet, dark-grey, fine- to coarse-grained material. Other valuable metals such as cobalt, chromium, palladium and platinum would be recovered indirectly in the different concentrate streams. A separate cobalt, chromium, palladium, and platinum concentrate will not be produced.

During operations phase 1, key mine components will be expanded to accommodate for the processing increase in operations phase 2. Construction activities will include an expansion to the workshop, office, and other ancillary buildings. To increase the capacity of the Process Plant, a second phase of the Process Plant (along with crushing equipment) will be constructed. The Process Plant expansion will be located immediately north of the existing Process Plant, while the Primary Crusher will be located at the southwest corner of the West Stockpile.

In addition to increasing capacity of onsite components, Highway 655 will be relocated to the west in order to accommodate the expansion of the Open Pit, Impoundment Facility, TMF, and to locate the public highway away from mine operations. Approximately 26 km of the highway will need to be rerouted. The existing Highway 655 alignment will remain in operation until the re-aligned portion has been completed, to reduce potential traffic impacts; however, temporary detours may be required for various purposes including safety, traffic control, grading, and other related highway improvements. Detours may involve temporary shoulder widening and temporary flagging during construction. It is assumed that the relocation of Highway 655 will be undertaken by Canada Nickel, although a definitive agreement is not yet in place with MTO. Once complete, ownership of the highway will be transferred, for continued operation of the new bypass route by the province.

The Hydro One 500 kV transmission line will also be relocated to the west side of the relocated portion of Highway 655. It is anticipated that approximately 29 km of transmission line, including 68 support structures, will need to be relocated. It is assumed that the relocation of the 500 kV transmission line will be undertaken by Hydro One, although a definitive agreement is yet not in place with Hydro One at this time. Hydro One will also be completing a Transmission Facility Class EA for the relocation.

The construction of the North Driftwood Diversion Channel (see Section 3.5.1.2) may also occur and/or continue during this phase.

Upon completion of construction, temporary buildings and trailer units will be removed from the PA. Laydown areas and access roads established during construction that are no longer required for operation will be removed and foundations will be demolished to grade. Efforts will be made to promote the reuse of building materials, where possible, and building materials that cannot be reused will be recycled or disposed of in accordance with a Waste Management Plan and applicable regulatory requirements. A Waste Management Plan will be developed for the Project that will outline appropriate disposal methods.

3.5.2.2 Operations Phase 2

Operations phase 2 can be defined as the time upon which the Process Plant throughput will be 120 kt/d (or 43.8 Mt/a). During operations phase 2, mining activities will continue in a similar manner then in operations phase 1. It is estimated that 536 kt of material will be extracted daily (based on average annual extraction rates), of which 240 kt will be ore. Table 3.9 summarises the total anticipated amount of material that will be extracted during operations phase 2. Mine operations at this phase will produce more ore than can be processed and surplus ore will be stockpiled in the East Stockpile location for future milling in operations phase 3.

Table 3.9 Operations Phase Two Mine Production Amount

Material	Amount (Mt)
Clay	129
Sand and Till	207
Rock	3,066
Ore	14,705

At the commencement of operations phase 2, construction on mine infrastructure will be complete and the Process Plant throughput will increase 120kt/d. Two types of concentrate will continue to be produced and will be transported offsite via rail car approximately twice per day, for a total of approximately 730 rail trips per year. For the purposes of this Impact Statement, rail traffic to the Kidd Concentrator (Kidd Met) will be considered a Project activity.

During operations phase 2 (in Year 17), it is anticipated that mining of the Main Zone of the Open Pit will be completed, at which point the tailings deposition in the TMF will cease and the Main Zone pit will be become the new tailings facility for the remainder of operations, starting in Year 18. Ore will continue to be extracted from the East Zone. At the end of operations phase 2, it is estimated that over 60% of the tailings will have been stored in the pit, compared to less than 40% in the TMF, thus reducing the overall mine footprint.

The construction of the North Driftwood Diversion Channel (see Section 3.5.1.2) may also occur and/or continue during this phase.

3.5.2.3 Operations Phase 3

Operations phase 3 can be defined as the time upon which pit mining operations cease. The Process Plant will continue to operate and will continue processing the two Ore Stockpiles. Ore processing activities and transport will be in line with those of operations phase 2.

Progressive rehabilitation of in active areas (e.g., Impoundment Facility, TMF, haul roads) will commence. As the mine advances from development to operations and throughout the operational phase of the Project, opportunities for progressive rehabilitation are possible. These include, but are not limited to, the following:

- removal of construction-related buildings and rehabilitation of laydown areas and access roads used during construction
- progressive reclamation of waste rock, clay and sand and till piles within the Impoundment Facility
- milling of remaining ore from the East and West Stockpiles
- conducting test plot studies
- removal of hazardous and non-hazardous waste materials where possible on a regular basis

Further details on activities associated with progressive rehabilitation are outlined in the Conceptual Closure Plan (Appendix F of the Impact Statement).

3.5.3 Decommissioning and Closure Phase

Following the completion of ore processing, all Project operations will cease, and active closure will commence. Active closure includes the removal of buildings, structures, and other infrastructure, as well as reclamation and site stabilization activities. Once complete, the Project will then enter a passive closure phase as the pit lake fills. During this time, closure monitoring and adaptive mitigation will occur. Following pit lake filling, the Project site will be permanently closed.

Activities completed during the decommissioning and closure phase of the Project are focused on reclaiming the environments, establishing physical, chemical, and biological stability at the site, and to meet desired end land functions and uses. The Mine Development Closure Plan will be updated throughout the life of the Project as necessary to reflect the environmental requirements in place at the time of closure. The Mine Development Closure Plan will be prepared, refined, and implemented in accordance with the Ontario *Mining Act* and Ontario Regulation 35/24. A Conceptual Closure Plan has been prepared to support the Impact Statement and is included as Appendix F.

Progressive reclamation throughout the course of the mine life will occur, but as indicated in Section 3.5.2.3, the majority of the closure activities will commence at the cessation of mining activities and will be completed five years after ore processing cesses. Closure activities can be divided into passive and active phases, which are further discussed below. Ongoing closure monitoring and maintenance activities will be carried out throughout active and passive closure phases until the closure objectives have been satisfied and the Project has been moved to a closed out and abandoned status.

3.5.3.1 Active Closure

These activities are expected to take place within the first five years of the decommissioning and closure phase after ore processing activities cease; however, some activities may commence at the end of operations phase 2, when ore extraction ceases. In general, the closure activities that will be completed for the site include, though are not limited to the following, and will be conducted in accordance with regulations at the time of closure:

- Initiation of pit flooding
- Construction of channels between Collection Ponds and the Open Pit to accelerate pit flooding
- Dismantling and removing site buildings and surface infrastructure for re-use, disposal, or recycling at approved facilities
- Power infrastructure for the Project will be removed when no longer needed.
- Removal of petroleum products, chemicals, reagents, waste, and explosives to an approved facility
- Infilling of collection diches or repurposing according to the Conceptual Closure Plan (Appendix F of the Impact Statement)
- Placement of remaining overburden cover on the Impoundment Facility
- Placement of overburden and seeding of depleted Ore Stockpiles footprint
- Revegetation, including preparation of the ground surface through scarification or ripping of compact surfaces, contouring the ground surface, placing overburden, adding soil amendments to support vegetative growth, and implementing erosion protection measures to protect the soil cover until vegetation is established
- Consideration of a constructed wetland to treat effluent, if further treatment is required
- Monitoring rehabilitation grading and/or scarifying disturbed areas, covering these with overburden and organic materials, where required, and seeding to promote natural revegetation

Any surface contamination from facilities and equipment will be remediated and concrete foundations/pads will be broken up to establish free drainage. Long-term care, monitoring, and maintenance of the integrity of the site, including site drainage, water management, effluent management, and any remaining structures, will be established.

During this phase, environmental protection and monitoring plans will be implemented for closure, environmental monitoring and reporting will be undertaken, and engagement and consultation will continue.

As described in Section 3.24, beginning in Year 18, the TMF will be reclaimed. The proposed timeline for rehabilitation is 5 years.

3.5.3.2 Passive Closure

Following the removal of major site infrastructure and rehabilitation of mine features the site will transition into passive closure monitoring and maintenance to confirm reclamation efforts are established and functioning as intended. During this final phase, emphases will be placed on water quality monitoring, the ongoing filling of the Open Pit with water to create a pit lake, performance monitoring of the completed closure work, and maintenance, as required. Through preliminary modelling, it is predicted that filling the Open Pit with water may require more than 100 years. Although not part of the base case, if beginning in Year 42 the TMF drainage area was diverted to drain into the pit to accelerate pit filling, the pit is predicted to be filled in 65 years.

In general, the closure activities that will be completed in the passive closure phase of Project include, though are not limited to, the following:

- Rehabilitation and/or removal of remaining infrastructure, primarily related to water management and pit filling, once water quality meets criteria for discharge to the environment (e.g., ditches, ponds, water treatment)
- Pit overflow spillway will be constructed, and pit flooding will be completed
- Monitoring and maintenance will continue until the physically and chemical characteristics of the site are deemed acceptable and stable and can be closed out in accordance with applicable regulations

3.5.4 Project Activity List

Based on the above, Table 3.10 provides a list and description of the proposed Project activities proposed during each phase of the Project. This list has been created to assist with the assessment of effects moving forward through the Impact Statement.

Table 3.10 Project Activity List

Activity	Description
Construction Phase	
Mobilization	Mobilizing construction equipment and materials at the site.
Vegetation Clearing	Clearing consists of the removal and disposal of vegetation such as trees, brush, shrubs, and other foliage.
Stripping	Stripping involves the removal of topsoil and other organic materials. To the extent possible, stripped topsoil and organics will be stockpiled at various locations within the PA and used during mine life for progressive reclamation and mine closure to restore disturbed areas.
Grading	Grading involves the removal and placement of overburden, using a bulldozer, excavator, or scraper. Graded material will be stored temporarily and used as fill during construction. If not suitable for reuse, due for example to permeability, high moisture content, or excess quantities, the material may be placed in the overburden stockpile for future reclamation purposes.

Activity	Description
Handling and use of explosives	Drilling and blasting are required to develop the Open Pit and prepare surfaces for construction where bedrock may be at or near the surface (e.g., TMF Dams, plant site)
Excavating and pre-stripping of mine rock	During the first years of site development, mine rock will be excavated from the Open Pit and surrounding area in preparation for the commencement of mining operations. Excavated rock will be loaded onto haul truck and hauled for immediate use in infrastructure development. Rock will be sorted based on size to identify its construction stream. A portable crusher will be used during construction to reduce mine rock to aggregate of various sizes. Erosion sediment control mitigation will be implemented as required during the construction phase.
Development of the Impoundment Facility	The Impoundment Facility is designed for storage of rock, clay, sand and till. During the early stages of construction, the impoundment will be prepared so that the area is ready to begin accepting material at the onset of operations. Most rock generated during construction will be used for building roads, laydowns and pads for buildings. Excess rock will be stockpiled in the Impoundment Facility and all runoff from the material will be contained and managed.
Preparation of Construction Surfaces	Reclaimed graded material, as well as crushed mine rock, will be hauled and consolidated at construction locations to establish building surfaces.
Construction of Water Management Systems	The basic infrastructure of the water management system will be developed during construction so runoff from disturbed areas can be appropriately managed. Water course diversions will also need to be constructed. Additional detail related to the Water Management Systems including water treatment can be found in Section 3.3.1.8.
Construction of Minor Water Diversions	The non-contact water diversions will be installed around the perimeter of the site to divert flows away from Project components. These diversions will collect natural drainage otherwise destined for the mine site and will convey flows to downstream receiving waterbodies.
Dewatering of Natural Waterbodies	As construction progresses, impacted natural waterbodies will be dewatered and filled, if required, to allow for the development of Project infrastructure.
Waste Management	Most waste generated during construction can be recycled. Scrap metal, wood, paper, and cardboard, where not reusable will temporarily managed on site and trucked offsite to a licensed facility. Solid non-hazardous waste will be hauled to licenced disposal site. Hazardous waste will be stored appropriately to prevent spills and hauled offsite by an approved hauler to a licenced disposal facility.
Construction of Mine Infrastructure	Construction of the initial Processing Plant, as well as mine support buildings and other infrastructure, including offices workshop, warehouse, Primary and Secondary Crusher.
Construction of Internal Roads	Construction of internal haul roads and internal access roads, including associated water crossings.
Construction of Power Supply and Distribution Systems	Project site overhead lines and substations would be constructed.
Construction of Temporary Highway 655 By-pass	During the construction phase, an overpass of Highway 655 will be constructed. To facilitate this a temporary by-pass will also be constructed.
Construction of the Rail Spur	The rail spur line will be constructed to the site from the existing ONR rail spur near the Kidd Mine.

Activity	Description
Operations Phase	
Construction of Project Infrastructure	Expansion of the Process Plant, Crushers, and other infrastructure to accommodate increased daily ore production.
Relocation and Decommissioning of Highway 655	A portion of Highway 655 will need to be relocated west, with the existing facilities being decommissioned.
Relocation of 500 kV Transmission Line	A portion of the 500 kV transmission line (approximately 20 km) which runs parallel to the existing Highway 655 will need to be relocated west, with the existing facilities being decommissioned.
Construction of North Driftwood Diversion Channel	Construction of the diversion channel, including potential fish habitat enhancements.
Handling and Use of Explosives	Drilling and blasting within the Main Zone and East Zone of the Open Pit
Ore Extraction	Operations Phase 1 and 2: Ore extraction within the Main Zone and East Zone of the Open Pit, including loading and hauling of mine rock from the pits and storage or ore materials. Operations Phase 3: No extraction
Maintenance and Management of the Impoundment Facility and TMF	Ongoing placement of materials in the Impoundment Facility. Disposal and management of process tailings within the TMF until Year 17. At Year 18, tailings will be placed within the Open Pit and progressive rehabilitation of the TMF will commence.
Ore Processing	Operations Phase 1: Processing of up to 60 kt/d of ore and transport of concentrate from the site, including crushing and processing activities, as well as IPT carbonation Operations Phase 2 and 3: Processing of up to 120 kt/d of ore and transport of concentrate from the site, including crushing and processing activities, as well as IPT carbonation.
Operation of Water Management Systems	Collection, management, treatment, and discharge of contact water from the Open Pit, TMF, Impoundment Facility, and processing plants to the receiving waterbodies via collection ponds, ditches and water treatment plants.
Transportation of Ore via Rail	Loading and transportation of ore via rail spur line from the mine site to a third-party processing facility.
Waste Management	Scrap metal, wood, paper, and cardboard, where not reusable will temporarily managed on site and trucked offsite to a licensed facility. Solid non-hazardous waste will be hauled to licenced disposal site. Hazardous waste will be stored appropriately to prevent spills and hauled offsite by an approved hauler to a licenced disposal facility.
Progressive Rehabilitation	Placement of overburden, stabilization, revegetation, and rehabilitation of areas disturbed throughout the mine life once such areas are no longer active.
Decommissioning and Closure	
Pit Flooding	Pit flooding through the cessation of pit dewatering and construction of channels from Collection Ponds to direct water towards the Open Pit for filling.
Water Management	Collection, management, monitoring, treatment, and discharge of contact water from the Open Pit, TMF, Impoundment Facility to the receiving waterbodies until such a time as water quality meets effluent discharge criteria.

Activity	Description
Building / Infrastructure Removal	Decommissioning, dismantling and/or disposal of structures and materials from site, including breaking up concrete foundations/pads and removal of potable water and sewage systems.
Power Lines and Electrical Equipment Removal	Excluding transmission infrastructure owned and operated by Hydro One, powerlines and transformers will be removed, including supporting infrastructure. Any buildings that remain in place will be powered by generators.
Remove Water Supply and Sewage Systems	Decommissioning of potable water and sewage systems.
Reclamation	Final placement of overburden, stabilization, revegetation, and rehabilitation of areas disturbed throughout the mine life once such areas are no longer active.
Monitoring and Maintenance	Monitoring of physical and chemical characteristics of the site and implementation of corrective actions based on adaptive management.

Vehicle operations are expected during each of the Project phases, whether construction equipment, mining vehicles, or equipment used during decommissioning and closure activities. Similarly, employment and expenditures by Canada Nickel are generated by most Project activities and are the main drivers of many potential socio-economic effects. These activities will occur during each phase of the Project.

3.6 Project Schedule

A preliminary timeline for the Project is outlined in Table 3.11. Note that the commencement of Project activities is dependant on several factors, including timelines for Impact Assessment approval, EA approvals and receipt of all applicable permits and approvals.

Table 3.11 Preliminary Schedule

Project Phase	Timing
Construction Phase	2025 to 2028
Operations Phase	2028 to 2068
Operations Phase 1	2028 to 2032
Operations Phase 2	2033 to 2057
Operations Phase 3	2058 to 2068
Decommissioning and Closure Phase	2069 to 2074+
Active Closure	2069 to 2074
Passive Closure	2074+

Relocation of the 500kV transmission line, ultimate re-alignment of Highway 655, and the construction of the North Driftwood Diversion Channel will be initiated during the operations phase. Expansion of the Process Plant, Crushers, workshop, warehouse, and other mine infrastructure to accommodate expanded operations in operations phase 2 will occur in operations phase 1. Vegetation clearing associated with these activities may commence earlier, if permitted, to accommodate appropriate timing windows.

3.7 Workforce Requirements

The expected average number of staff and full-time equivalents (FTEs) for each Project phase is summarized as follows:

- Construction – An average of 449 FTEs (maximum 1,998 FTEs)
- Phase 1 Operations – An average of 1,200 FTEs (maximum 1,290 FTEs)
- Phase 2 Operations – An average of 850 FTEs (maximum 1,371 FTEs)
- Phase 3 Operations – An average of 300 FTEs (maximum 334 FTEs)
- Decommissioning and reclamation – Employment forecasts are currently under development.

During the operations phases, ore extraction and processing will operate 24-hours a day, seven days a week, 365 days a year. This will be achieved by employing four rotating crews that work 12-hours shifts and on average 42-hours a week. A compliment of office, environmental and other support staff will work a more traditional five-day per week schedule or similar.

The Project will have a peak workforce of approximately 1,998 FTEs and an average of 708 FTEs over the life of the mine. The peak labour force is expected during Year 6 (operations phase 2) when construction (e.g., clay stripping) is still occurring in conjunction with ore extraction. The workforce at this time will include a mixture of staff working on preparing the pit, ore extraction, management, and maintenance activities.

3.7.1 Accommodations

Canada Nickel is not proposing any accommodations or camp facilities for the Project.

3.7.2 Transportation

It is anticipated that staff will commute daily from communities and residences located within proximity of the PA. A shuttle bus may be provided by Canada Nickel to shuttle employees from nearby communities to the Project site.

3.8 Emissions, Discharges and Wastes

3.8.1 Atmospheric Emissions

3.8.1.1 Air Emissions

Air emissions for the Project will be largely derived from fugitive sources and in smaller quantities derived from point sources.

Air emissions during construction and operations will consist of diesel combustion exhaust emissions from construction and mining equipment onsite and heavy-duty trucks transporting ore from the Open Pit to the Stockpiles, trucks delivering fuel, explosives, and processing plant consumables, as well as fugitive dust emissions from construction and mining operations activities.

Diesel fuel combustion associated with vehicle and heavy equipment use will release particulates, sulphur dioxide (SO_2), and nitrogen oxides (NO_X). Nitrogen gases, carbon dioxide (CO_2) and other trace gases are also anticipated to result from explosives usage.

Fugitive dust emissions are anticipated to result from drilling and blasting, loading and offloading of overburden, mine rock and ore, vehicle and heavy equipment travel, and wind entertainment from the TMF, Stockpiles and other exposed earth materials. This result in particulate matter (PM) emissions of various size ranges (e.g., total suspended particulate, PM_{10} and $PM_{2.5}$) that can also be deposited to offsite ground and water surfaces (e.g., dustfall). Dust control for vehicle and heavy equipment travel will be implemented to reduce airborne dust generation by Project activities.

Due to the natural presence of chrysotile within the deposit, programs will be developed for managing chrysotile in airborne dust, if required. One of the benefits of the IPT process is that tailings become hardened as newly formed carbonates bind particles, which would reduce airborne dust potential, including chrysotile. During operations, PM emissions from conveyors and crushing equipment and Process Plant are anticipated. The crushing conveyors and the fine Ore Stockpile are fully covered and therefore, fugitive dust emissions from these areas are not expected to be substantive. Further measures will be taken to minimise dust creation and to employ dust collection devices where practical.

Further information on anticipated air contaminants is provided in the Air Quality Assessment (Appendix C.1 of the Impact Statement) and Chapter 12 of the Impact Statement (Assessment of Potential Effects on the Atmospheric Environment).

3.8.1.2 Greenhouse Gas Emissions

The Project will include sources of direct and indirect greenhouse gas (GHG) emissions in the combustion of fossil fuels producing CO_2, nitrous oxide (N_2O) and methane (CH_4).

The primary sources of emissions for each phase of the Project are as follows:

- Primary sources associated with construction include diesel/gas combustion in mobile equipment, blasting and indirect emissions from purchased electricity.
- Primary sources associated with operations include diesel/gas combustion in mobile equipment, blasting in the Open Pit, processing of ore and indirect emissions from purchased grid power.
- The primary source of emissions associated with decommissioning and closure is diesel/gas combustion in mobile equipment.

Further information on estimated GHG emissions of the Project is provided in the Greenhouse Gases Following the Strategic Assessment of Climate Change (Appendix C.6 of the Impact Statement) and Chapter 20 of the Impact Statement.

3.8.1.3 Noise and Vibration

Noise and vibration will be generated during construction and will be typical of that associated with construction projects involving the movement of heavy mobile equipment such as haul trucks and stationary equipment such as power generators, compressors, crushers, and pumps.

Mining and surface crushing activities, including blasting of rock, and movement of material will be a source of noise and vibration throughout the Project operations phase. Blasting from Open Pit operations are expected to occur at an anticipated maximum rate of five days per week, with a limited duration of one to two minutes. Stationary equipment such as crushers and mills will also generate noise and will be primarily used during operations.

Noise and vibration emissions associated with the construction, and decommissioning and closure of the Project are anticipated to result from the operation of heavy equipment, albeit at a lower expected level than the operations phase. Further information on noise and vibration on site is provided in the Noise and Vibration Assessment (Appendix C.3 of the Impact Statement) and Chapter 13 of the Impact Statement.

3.8.1.4 Light

Site lighting will be provided by a combination of power line pole-mounted fixtures and building-mounted fixtures at the offices, shop, and other miscellaneous buildings. Mobile equipment may also have spot and headlights to facilitate nighttime operation.

Lighting will be designed to reduce spill over light and will be typical of that associated with other industrial mine projects. Further information on light and visibility of the site from various viewpoints is provided in the Lighting Assessment (Appendix C.2 of the Impact Statement) and Chapter 12 of the Impact Statement.

3.8.2 Liquid Discharges and Management

Multiple sources of liquid discharges during the life of the Project will be managed, including site runoff arising from precipitation; dewatering for foundation preparation or other construction purposes; and dewatering of the Open Pit. Liquid discharges can be classified as being either ‘contact’ or ‘non-contact’ water. Contact water is water, surface water or groundwater, that contacts mine workings or interacts with mine rock material. Contact water may also include dewatering associated with the Project. Non-contact water is water that does not contact mine workings and/or interact with mine rock material. The Project site will be designed, as much as practical, to reduce the generation of contact water.

At closure, the water management related infrastructure will be sustained or re-configured to meet the requirements of the approved Mine Development Closure.

Further information and guidance on water management is provided in the Surface Water Resources Assessment (Appendix C.5 of the Impact Statement) and Chapter 15 of the Impact Statement.

3.8.2.1 Contact Water

As described in the Site-Wide Water Management Plan (Appendix J of the Impact Statement), contact water (including direct precipitation and groundwater inflows within the PA) will be collected and diverted to collection ponds and subsequently routed through water treatment plants prior to being discharged at one of four discharge locations to either the North Driftwood River or West Buskegau River.

All effluent discharged from the site will be managed and treated to meet any federal and provincial regulatory requirements. Effluent discharge criteria is further discussed in the Surface Water Resources Assessment (Appendix C.5 of the Impact Statement).

3.8.2.2 Non-Contact Water

Where practical, diversions will be constructed to divert non-contact water around Project facilities.

3.8.2.3 Sewage

Domestic sewage will be generated from different buildings onsite, including from any washroom facilities within proposed office and administrative buildings as well as the mine dry.

A sewage treatment system is proposed to treat domestic sewage for the Project that will discharge to the North Driftwood River at the same location as the discharge location for the TMF Northeast and Northwest Collection Ponds. The system will be designed to meet regulatory requirements (Authorized under Section 53 of the *Ontario Water Resources Act* and completed in accordance with MECP Procedure B.1.5), including an Environmental Compliance Approval issued by the MECP. Further details on the treatment system will be provided as part of the permit applications.

During construction, and potentially in the closure phase, temporary sewage facilities will be employed. These facilities may include disposal offsite or a temporary sewage treatment system that will be located within the PA.

3.8.3 Solid Wastes and Management

The types of solid waste anticipated to be produced over the life of the Project include domestic waste, special management waste and demolition waste.

Waste streams will be (e.g., domestic waste, recyclable materials) and transported off-site to available facilities to reduce the amount of material directed to a landfill.

Special management waste will include vehicle maintenance wastes (waste petroleum products, waste glycol and packaging), petroleum contaminated soil (in case of a spill), waste explosives, and biomedical waste. Special management wastes produced in the construction, operations and decommissioning and closure phases of the Project will be stored indoors and/or in sealed containers in an area with secondary containment until they can be transported to an appropriately licensed facility offsite.

Demolition waste will include concrete, steel, wallboard, and other materials resulting from demolition activities. Salvageable machinery, equipment and other materials will be dismantled and taken offsite for sale or re-use if economically feasible.

No deposition of waste will occur onsite and no onsite waste management facilities are proposed.

3.9 Project Design Changes Since the Detailed Project Description

A preliminary description of the Project was provided in the Detailed Project Description (Canada Nickel 2022), which was used for consultation and development of the TIS Guidelines. Since that time, Canada Nickel has completed the Feasibility Study (Ausenco 2023), which has resulted in refinements the project design to be carried forward into the assessment of effects.

Canada Nickel has made two major revisions to the Project design since the filing of the Detailed Project Description, which include:

- Consolidation of the mine rock stockpile locations (now referred to as Impoundment Facility) into a single facility to the east of the realigned Highway 655, north of the Open Pit, instead of having a portion of the mine rock located west of the realigned Highway 655.
- Dispersion of the water management discharge locations across multiple watersheds rather than to a single location (previously identified as the Mattagami River). The resulting affect also shifted the location of water management infrastructure to the east side of the realigned Highway 655 and avoids the need for the construction and operation of a water discharge pipeline to the Mattagami River.

These changes have allowed for the Project footprint and activities to be consolidated on one side of Highway 655 while also reducing potential environmental effects. Additional details on the design of these two Project elements can be found in Section 3.3.5 and 3.3.2.2. Table 3.12 summaries these key refinements made to the Project design and the corresponding environmental, economic, and community benefits.

Table 3.12 Project Changes Since Detailed Project Description

Project Change	Rationale	Environmental, Economic and Community Benefits
Impoundment Facility (Rock Stockpile) location	• Reduces the expansion of Project infrastructure to the west of the realignment Highway 655, thus reducing potential interactions between Project activities and those along Highway 655 • Keeps stockpiles closer to the Open Pit, thus reducing haul route distances • Increases separation between the Project and the Mattagami River and the Mahaffy Township Conservation Reserve. • Reduces number of water Collection Ponds and ditches	• Reduces emission and operational costs by locating facility closer to Open Pit. • Eliminates need for a permanent overpass on Highway 655 • Eliminates potential direct impacts to the Mattagami River and the Mahaffy Township Conservation Reserve

Project Change	Rationale	Environmental, Economic and Community Benefits
Revised Discharge Locations	• Reduces the expansion of Project infrastructure to the west of the realignment Highway 655 • Better maintains natural flow/water balance by dispersing runoff through multiple discharges • Reduces capital costs associated with construction of a discharge pipeline	• Allows for mine water balance and discharge operations to better mimic existing drainage patterns • Avoids potential or perceived impacts to water quality and use of the Mattagami River given its social and cultural importance • Reduced capital costs

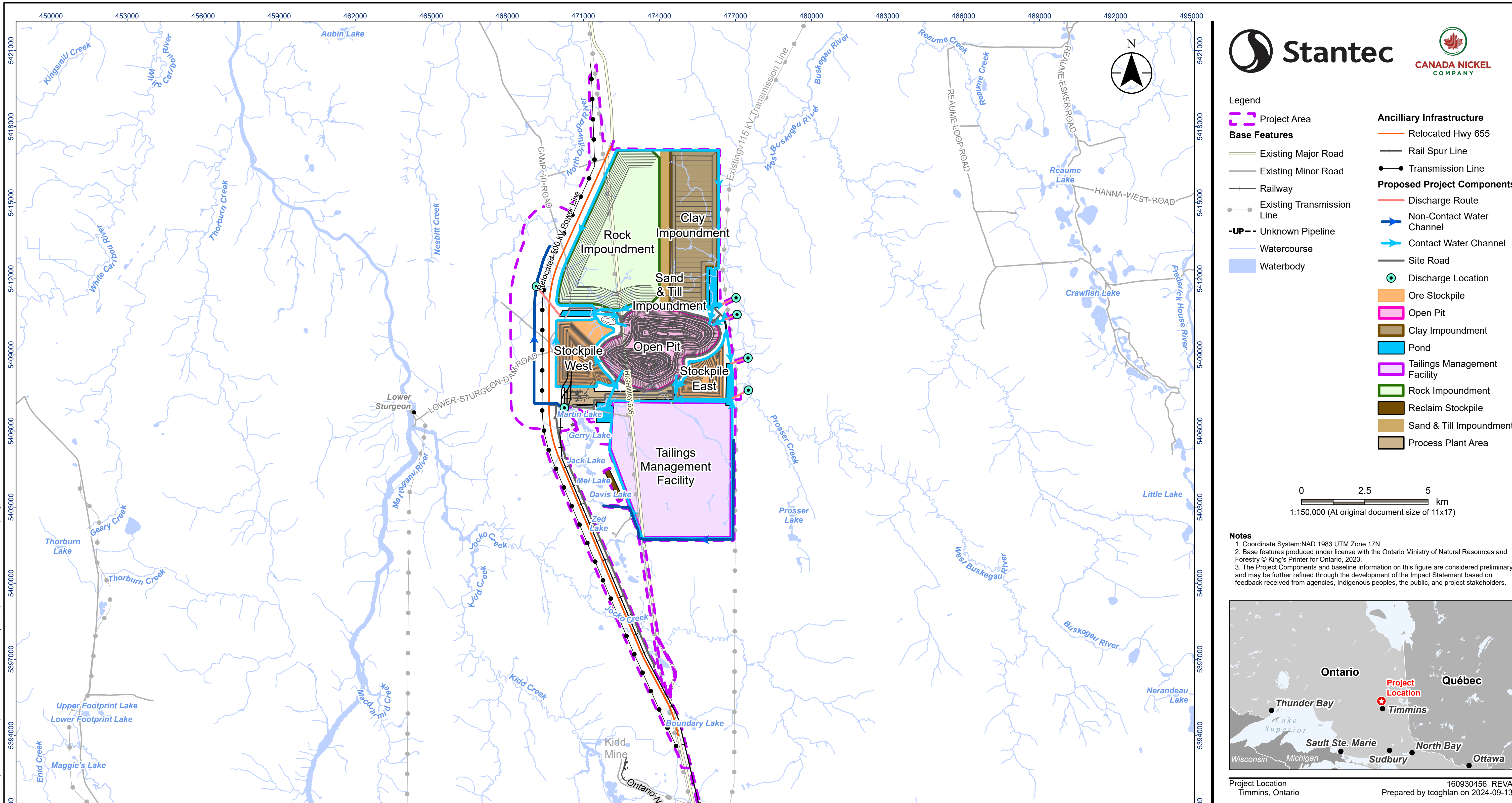
Further information regarding the rationale for these design changes, as well as the implications for various alternative means for the design of the Project, is provided in Chapter 5 of the Impact Statement.

3.10 References

Ausenco Engineering Canada ULC (Ausenco). 2023. Crawford Nickel Sulphide Project NI 43-101 Technical Report and Feasibility Study. Retrieved November 24, 2023, from https://canadanickel.com/wp-content/uploads/2023/11/Crawford-NI-43-101-FINAL-REPORT_Nov24_R2.pdf.

Canada Nickel. 2022. Detailed Project Description Crawford Nickel Project. Available at: https://iaac-aeic.gc.ca/050/documents/p83857/145854E.pdf.

3.11 Figures



Notes
1. Coordinate System:NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.
3. The Project Components and baseline information on this figure are considered preliminary and may be further refined through the development of the Impact Statement based on feedback received from agencies, Indigenous peoples, the public, and project stakeholders.

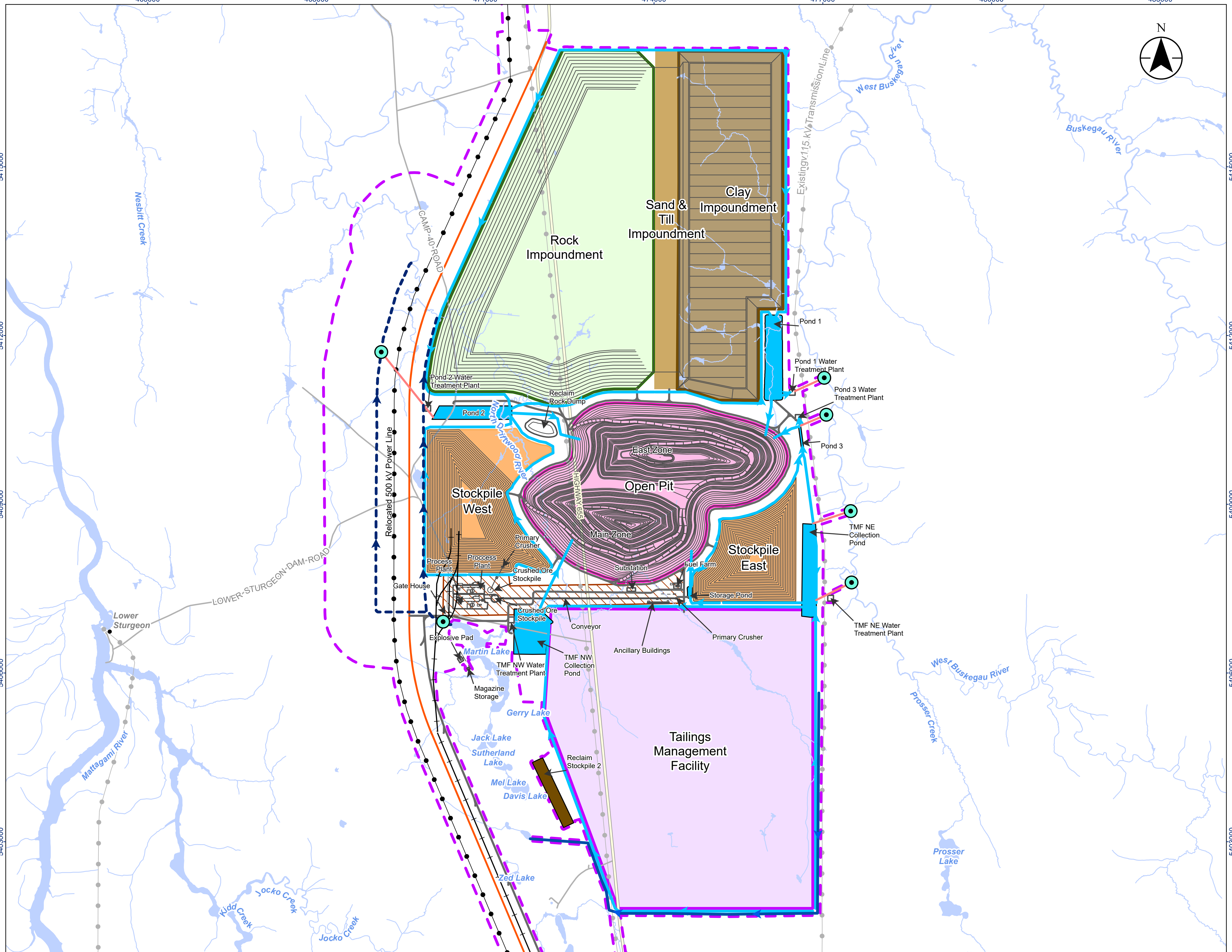
Project Location
Timmins, Ontario

160930456 REVA
Prepared by tcoghlan on 2024-09-13

Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
3.1

Title
Project Site Plan - Project Area



Stantec

CANADA NICKEL COMPANY

Legend

- Project Area

Base Features

- Existing Major Road
- Existing Minor Road
- Existing Transmission Line
- Watercourse
- Waterbody

Ancilliary Infrastructure

- Relocated Hwy 655
- Rail Spur Line
- Transmission Line

Proposed Project Components

- Discharge Route
- Site Road
- Non-Contact Water Channel
- Contact Water Channel
- North Driftwood Diversion Channel Alternative
- Discharge Location
- Ore Stockpile
- Open Pit
- Clay Impoundment
- Pond
- Tailings Management Facility
- Rock Impoundment
- Reclaim Stockpile
- Sand & Till Impoundment
- Process Plant Area

0 1 2 km

1:70,000 (At original document size of 11x17)

Notes

1. Coordinate System:NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.
3. The Project Components and baseline information on this figure are considered preliminary and may be further refined through the development of the Impact Statement based on feedback received from agencies, Indigenous peoples, the public, and project stakeholders.

Project Location
Timmins, Ontario

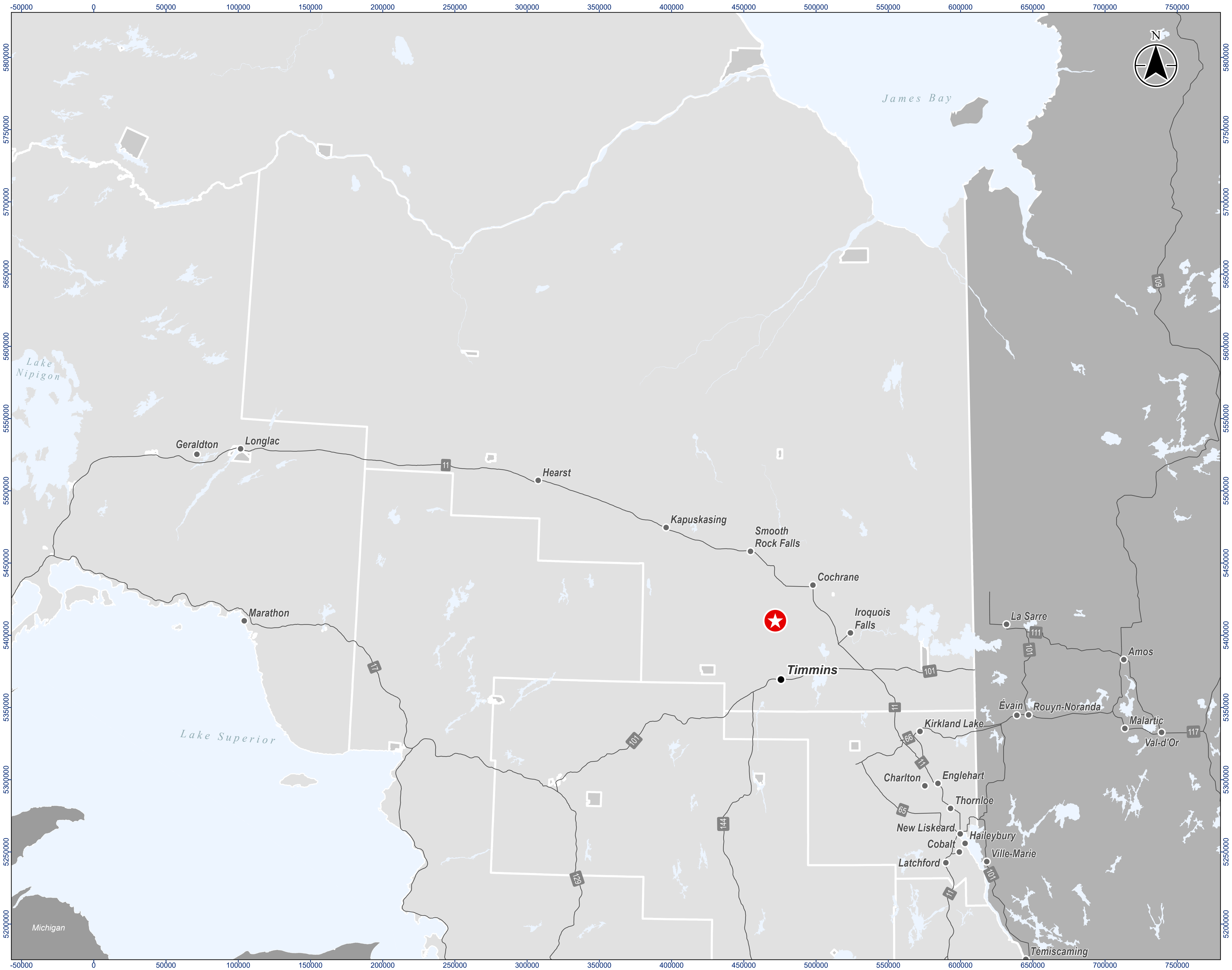
160930456 REVA
Prepared by tcoghlan on 2024-09-13

Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
3.2

Title
Project Site Plan - Mine Site

\\cd1004-f01\01609\active\160930456\gis_cad\gis\mxds\IS\IS_Chapter\160930456_IS_Chp_PD.aprx\160930456_IS-VC_PD_Fig03.2_Mine Site Revised: 2024-09-13 By: tcoghlan



Stantec

Legend

Project Location

Major Road

Waterbody

0 50 100 km

Notes
1. Coordinate System:NAD 1983 UTM Zone 17N
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Project Location
Timmins, Ontario

REVA
Prepared by tcoghlan on 2024-09-13

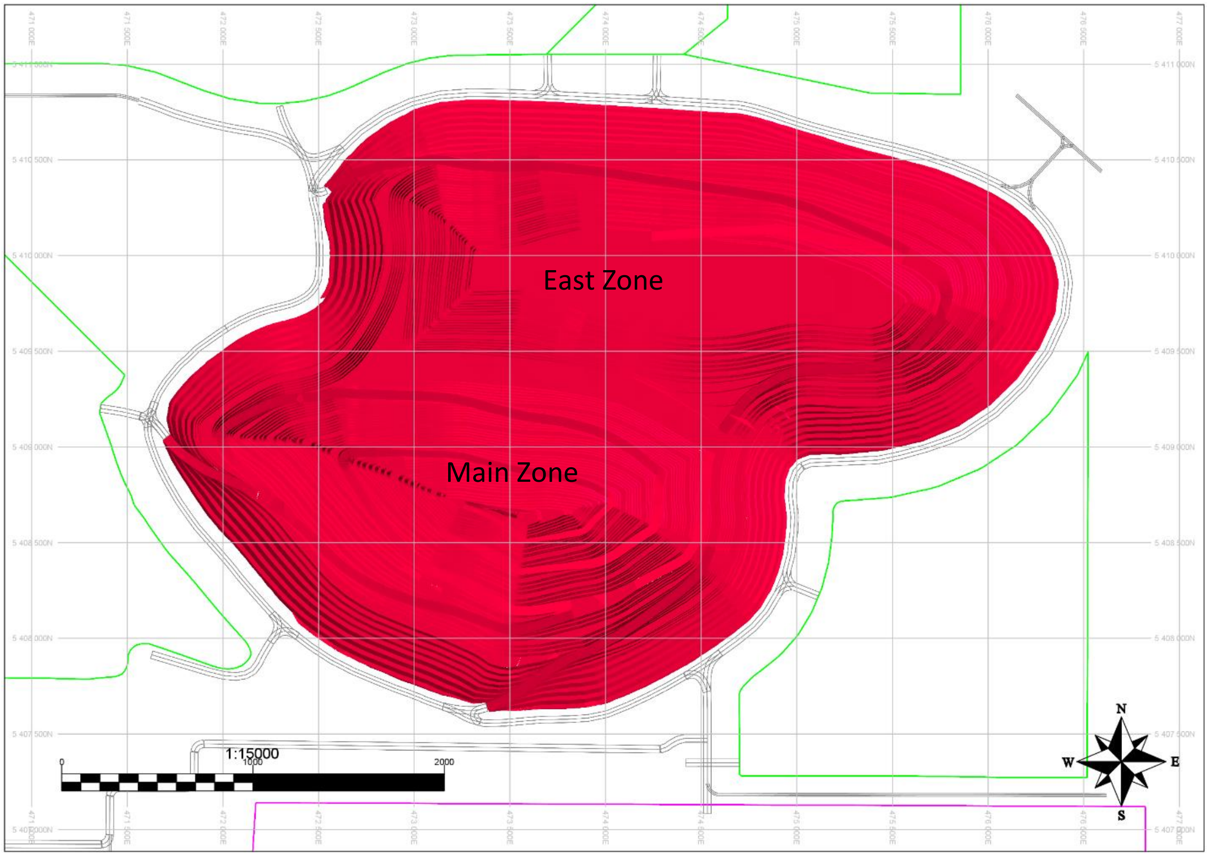
Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
3.3

Title
Project Location

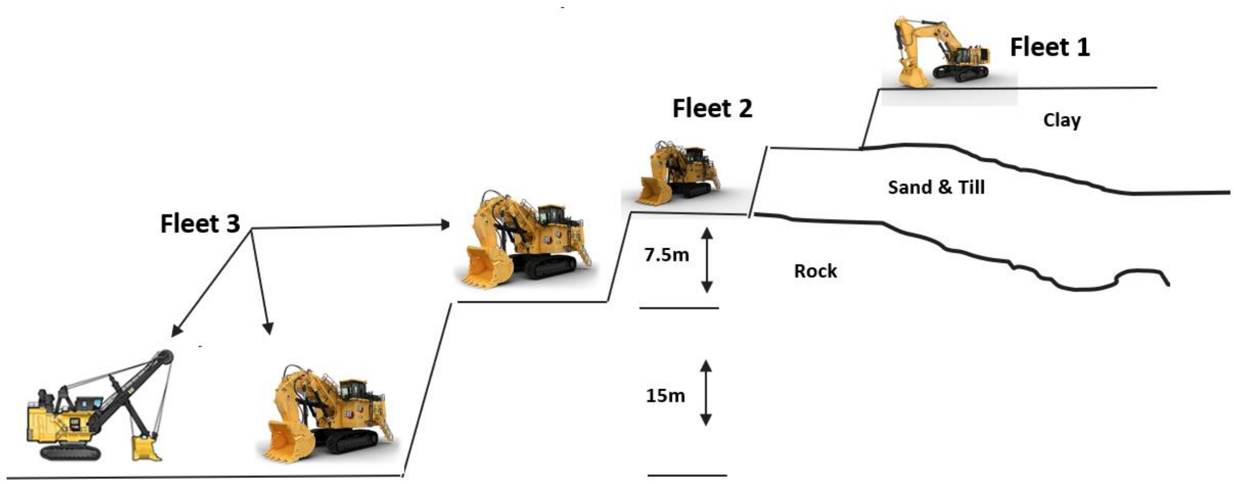
Revised: 2024-09-13 By: tcoghlan

Figure 3.4 Pit Configuration



Source: Ausenco, 2023

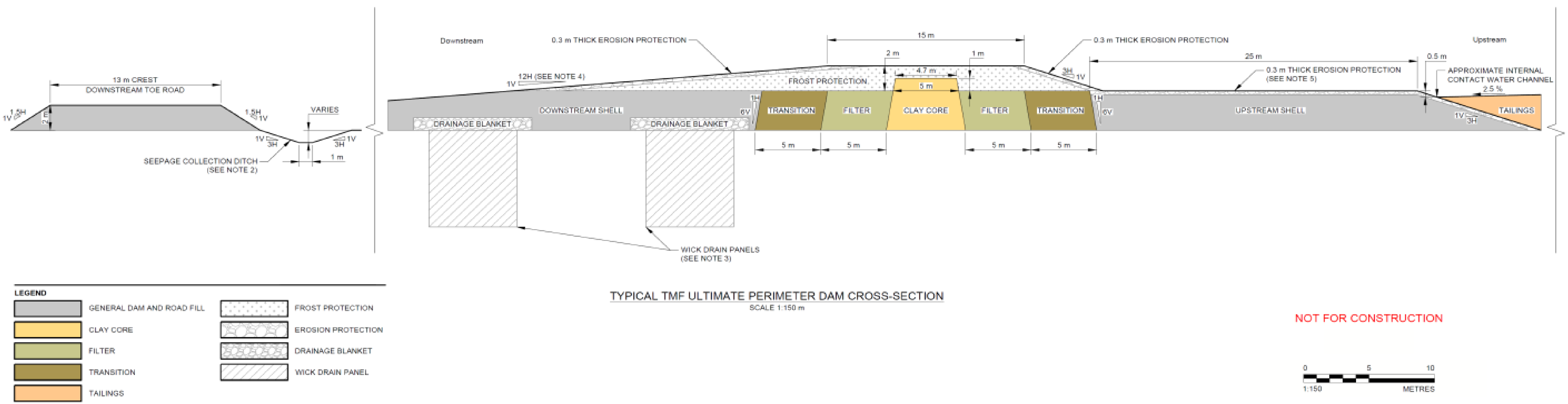
Figure 3.5 Mine Fleet



Source: Ausenco 2023

Figure 3.6: Process Flow Diagram

Figure 3.7 Typical TMF Dam Cross-Section



Source: Ausenco 2023