



CANADA NICKEL
COMPANY



Stantec

Crawford Nickel Project Impact Statement

Chapter 16 Assessment of Potential Effects on Vegetation,
Riparian, and Wetland Environments



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Table of Contents

16	Assessment of Potential Effects on Vegetation, Riparian, and Wetland Environments	16.1
16.1	Scope of Assessment	16.2
	16.1.1 Regulatory and Policy Setting	16.2
	16.1.2 The Influence of Consultation and Engagement on the Assessment	16.4
	16.1.3 Potential Effects, Pathways and Measurable Parameters	16.8
	16.1.4 Boundaries	16.9
	16.1.5 Residual Effects Characterization	16.10
	16.1.6 Significance Definition	16.12
16.2	Existing Conditions for Vegetation, Riparian and Wetland Environments	16.13
	16.2.1 Methods.....	16.13
	16.2.2 Overview.....	16.15
16.3	Project Interactions with Vegetation, Riparian and Wetland Environments.....	16.29
16.4	Assessment of Residual Effects on Vegetation, Riparian, and Wetland Environments	16.32
	16.4.1 Analytical Assessment Techniques.....	16.32
	16.4.2 Change in Vegetation Communities and Species Diversity	16.33
	16.4.3 Change in Riparian Form and Function	16.41
	16.4.4 Change in Wetland Form and Function	16.44
	16.4.5 Summary of Project Residual Effects.....	16.51
16.5	Significance of Adverse Federal Effects	16.53
16.6	Potential Effects on Federal Land.....	16.54
16.7	Prediction Confidence	16.54
	16.7.1 Change in Vegetation Communities and Species Diversity.....	16.54
	16.7.2 Change in Riparian Form and Function	16.55
	16.7.3 Change in Wetland Form and Function	16.55
16.8	Assumptions.....	16.56
16.9	Follow-up and Monitoring.....	16.56
16.10	References.....	16.57
16.11	Figures	16.60

List of Tables

Table 16.1	Summary of Key Legislation, Policy, and Regulatory Guidance Documents for Vegetation, Riparian and Wetland Environments	16.3
Table 16.2	Summary of Key Information, Indigenous Knowledge, and Concerns for the Project Related to Vegetation, Riparian and Wetland Environments	16.5
Table 16.3	Potential Effects, Effect Pathways and Measurable Parameters for Vegetation, Riparian and Wetland Environments.....	16.8
Table 16.4	Characterization of Residual Effects on Vegetation, Riparian and Wetland Environments.....	16.11
Table 16.5	Summary of Land Cover in the Project Area, Local Study Area and Regional Study Area	16.16
Table 16.6	Summary of Ecological Land Classification in the Project Area and Local Study Area	16.18
Table 16.7	Summary of Estimated Peat Volumes in the Project Area and Local Study Area	16.21
Table 16.8	Summary of Riparian Areas in the Project Area and Local Study Area.....	16.22
Table 16.9	Summary of Landscape Fragmentation in the Regional Study Area	16.22
Table 16.10	Summary of Potential Rare Vegetation Ecosites Identified in the Project Area and Local Study Area	16.23

Table 16.11	Summary of Wetland Ecosites in the Project Area and Local Study Area	16.24
Table 16.12	Summary of Estimated Peat Volumes in the Project Area and Local Study Area	16.25
Table 16.13	Plant Species of Management Concern in the Local Study Area	16.26
Table 16.14	Plant Species Noted as Being Harvested by Indigenous Nations Identified in the Local Study Area	16.27
Table 16.15	Invasive Plant Species Occurring in the Local Study Area	16.28
Table 16.16	Project Interactions with Vegetation, Riparian and Wetland Environments	16.29
Table 16.17	Summary of Residual Potential Rare Vegetation Communities in the Local Study Area	16.38
Table 16.18	Summary of Post-Construction Fragmentation in the Regional Study Area	16.40
Table 16.19	Summary of Residual Effects from Direct Loss of Riparian Habitat in the Local Study Area	16.43
Table 16.20	Summary of Direct Residual Effects to Wetland Community Abundance in the Local Study Area	16.46
Table 16.21	Summary of Wetlands Intersecting Fish Habitat	16.47
Table 16.22	Summary of Direct Residual Effects to Peat Volumes in the Project Area	16.48
Table 16.23	Summary of Residual Indirect Effects of Mine Pit Dewatering on Wetlands in the Local Study Area	16.50
Table 16.24	Summary of Project Residual Effects on Vegetation, Riparian and Wetland Environments.....	16.52

List of Figures

Figure 16.1	Local Study Area and Regional Study Area for Vegetation, Riparian, and Wetland Environments.....	16.61
Figure 16.2	Ecological Land Classification Study Plots in the Local Study Area	16.62
Figure 16.3	Ecological Land Classification in the Local Study Area	16.63
Figure 16.4	Wetlands in the Local Study Area	16.95
Figure 16.5	Species at Risk and Species of Conservation Concern in the Local Study Area	16.127
Figure 16.6	Riparian Habitat within the Local Study Area	16.128
Figure 16.7	Wetlands with Potential to be Indirectly Impacted by Groundwater Drawdown.....	16.160

Acronyms and Abbreviations

COSEWIC	Committee on the Status of Endangered Wildlife in Canada
COSSARO	Committee on the Status of Species at Risk in Ontario
ELC	ecological land classification
ESA	<i>Endangered Species Act</i>
FQI	Floristic quality index
FRI	Forest Resources Inventory
IAA	<i>Impact Assessment Act, 2019</i>
IAAC	Impact Assessment Agency of Canada
LIO	Land Information Ontario
LSA	Local Study Area
MNR	Ministry of Natural Resources (formerly Ministry of Natural Resources and Forestry [MNRF])
MNRF	Ministry of Natural Resources and Forestry (now the Ministry of Natural Resources [MNR])
NHIC	Natural Heritage Information Centre
NWWG	National Wetlands Working Group
PA	Project Area
PSW	Provincially Significant Wetland
RSA	Regional Study Area
SAR	Species at Risk
SARA	<i>Species at Risk Act</i>
SARO	Species at Risk in Ontario

Crawford Nickel Project Impact Statement
Acronyms and Abbreviations – Chapter 16 Assessment of Potential Effects on Vegetation, Riparian, and
Wetland Environments
September 30, 2024

SOCC	Species of Conservation Concern
SOMC	Species of Management Concern
VC	Valued Component

Glossary of Technical Terms

Bog	Nutrient-poor, acidic and peat-forming wetlands that receive water only from precipitation.
Ecosite	Area of uniform soil and vegetation conditions.
Fen	Mineral rich wetland with deep peat and fluctuating water table.
Floristic quality index	A measurement of the floristic quality of a vegetation community determined using the conservation value of a species and the number of species in a community. Changes in FQI are used to assess changes in plant communities.
Invasive plant species	Plant species listed under the <i>Invasive Species Act</i> , 2015 and in Regulation 1096 under the <i>Weed Control Act</i> , 1990.
Marsh	Nutrient rich, minerotrophic wetlands with fluctuating water table above the rooting zone for extended periods. Dominated by non-woody vegetation.
Plant Species of Management Concern	Vascular and non-vascular plant species at risk, species of Conservation Concern, and species of importance to Indigenous nations.
Rare Vegetation Communities	Plant communities listed in Section 1.2 of the Significant Wildlife Habitat Criteria Schedules for Ecoregion 3E.
Riparian communities	Non-wetland communities occurring on regularly flooded sites.
Species At Risk (SAR)	Vascular and non-vascular plant species listed as endangered or threatened on the current Species at Risk in Ontario (SARO) list (Ontario Regulation 230/08); these species are afforded protection by the provincial <i>Endangered Species Act</i> (ESA, [2007]).
Species of Conservation Concern	Species listed as S1, S2, or S3 by the Ontario Natural Heritage Information Centre and/or as Special Concern.

Species of Importance to Indigenous nations	Plant species harvested or qualified as important by Indigenous nations listed in the Indigenous Engagement and Partnership Plan (IAAC 2023).
Swamp	Forested or tall shrub dominated wetlands and peatlands with water tables below the rooting zone during most of the growing season.
Wetland	Wetlands are land where the water table is at, near or above the surface or which is saturated for a long enough period to promote such features as wet-altered soils and water tolerant vegetation. Wetlands include organic wetlands or “peatlands” and mineral wetlands or mineral soil areas that are influenced by excess water but produce little or no peat.

16 Assessment of Potential Effects on Vegetation, Riparian, and Wetland Environments

Vegetation, Riparian, and Wetland Environments were selected as a Valued Component (VC) because biodiversity and associated ecosystem functions that vegetation, including riparian and wetland areas, provide are essential to maintaining the health of natural ecosystems. Plants are of value to Indigenous nations and the public and are protected in part in Ontario through the *Endangered Species Act (ESA)* and in Canada through the *Species at Risk Act (SARA)*. The distribution and diversity of native vegetation and wetlands directly affect ecosystem functions (i.e., carbon sequestration, forage, habitat), environmental cycles (i.e., nutrient cycling, water cycling) and cultural benefits (i.e., spiritual and recreational values).

The Vegetation, Riparian, and Wetlands VC includes native plant communities and species, riparian areas, and wetland communities. The Crawford Nickel Project ('the Project') may impact vegetation, riparian, and wetland environments directly through the removal of vegetation and habitat and indirectly through changes in wetland and riparian hydrology or edge effects near cleared areas.

Vegetation, Riparian, and Wetland environments in this Impact Statement include:

- Plant Species of Management Concern (SOMC) – SOMC include vascular and non-vascular plant Species at Risk (SAR), Species of Conservation Concern (SOCC), and plant species of importance to Indigenous nations, where:
 - SAR are species listed as endangered or threatened on Schedule 1 of the *Species at Risk Act* or on the current Species at Risk in Ontario (SARO) list (Ontario Regulation 230/08); these species are afforded protection by the ESA.
 - SOCC are species designated or listed as endangered, threatened, or special concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), SARA, the Committee on the Status of Species at Risk in Ontario (COSSARO), and the Species at Risk in Ontario (SARO) List (excluding endangered and threatened species), as well as provincially rare species. Provincial sub-national ranks (S-ranks) are used by the Ontario Ministry of Natural Resources (MNR) Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and vegetation communities; provincial rare species are those with an S-rank of S1 (Critically Imperiled), S2 (Imperiled), and S3 (Vulnerable).
 - Plant species of importance to Indigenous nations engaged on the Project, as derived from the Project-specific reports prepared by participating Indigenous nations engagement outcomes, and publicly available information.
- Invasive plant species – plant species listed under the *Invasive Species Act* and under the Revised Regulations of Ontario (R.R.O.) Regulation 1096 under the *Weed Control Act* (1990).
- Rare vegetation communities – plant communities listed in section 1.2 of the Significant Wildlife Habitat Criteria Schedules for Ecoregion 3E (MNR 2015).

- Riparian communities – non-wetland communities occurring on regularly flooded sites. For this study, riparian communities are defined as non-wetland communities below the two-time bankfull depth.
- Wetlands and wetland functions – wetlands are defined as “land which is saturated for a long enough period to promote wetland, or aquatic processes as indicated by hydric soils, hydrophytic vegetation, and various kinds of biological activity that are adapted to the wet environment” (National Wetlands Working Group [NWWG] 1997). Wetlands are described and classified to the ecosite level following Ecosites of Ontario (Banton et al. 2009). Wetland functions include hydrological, biogeochemical, and habitat functions, as described by Hanson et al. (2008).

Vegetation, riparian, and wetland environments are linked to other VCs, including:

- Atmospheric Environment (Chapter 12), whereby vegetation may be affected by dust and emissions from project activities.
- Groundwater (Chapter 14), whereby changes to groundwater levels through activities such as water table drawdown from pit dewatering may alter wetland hydrology.
- Surface Water (Chapter 15), whereby changes in surface water quantity and quality may affect wetland and riparian ecosystem composition and function by altering nutrients, hydrology, and causing sedimentation.
- Bird and Bird Habitats (Chapter 18), whereby changes in the abundance and distribution of wetlands, grasslands, and forests may affect availability of suitable habitat for migratory birds.
- Wildlife and Wildlife Habitat (Chapter 19), whereby changes in the abundance and distribution of vegetation, riparian and wetland environments may affect habitat quality for wildlife species potentially resulting in changes to wildlife populations.
- Climate Change (Chapter 20), whereby changes to forest cover and other vegetation communities may affect natural carbon capture cycle.
- Social Conditions (Chapter 22), whereby changes in abundance and distribution of some plant species (e.g., berries) may affect the land and resource use activities.
- Indigenous Interests (Chapters 25-28), whereby changes in the abundance and distribution of plant species may impact species of importance to Indigenous nations and may affect plant harvesting by Indigenous nations for subsistence and cultural purposes.

16.1 Scope of Assessment

16.1.1 Regulatory and Policy Setting

The management of vegetation and wetlands is subject to several statutes, policies, and frameworks. Table 16.1 provides a list of the key legislation, policy, and regulatory guidance documents applicable to the assessment of vegetation, wetlands, and riparian environments. Table 16.1 identifies additional sources of information on existing conditions collected for this VC and applicable standards and guidance that have been identified to date.

Table 16.1 Summary of Key Legislation, Policy, and Regulatory Guidance Documents for Vegetation, Riparian and Wetland Environments

Legislation, Policy, or Regulatory Guidance	Description
Federal	
<i>Species at Risk Act</i> (2002)	The SARA prohibits killing, harming, or taking of threatened or endangered species; these prohibitions apply to threatened or endangered aquatic species and migratory bird species on federal and non-federal lands and to all threatened or endangered species and their habitat on federal lands. It requires identifying potential adverse effects on SARA-listed species during project review by the Impact Assessment Agency of Canada (IAAC) (for reviewable projects and projects on federal lands) and taking measures to avoid or lessen effects. Measures must be consistent with any applicable recovery strategies and action plans.
Federal Policy on Wetland Conservation (Government of Canada [GOC] 1991)	The Federal Policy on Wetland Conservation identifies seven strategies for the use and management of wetlands to preserve wetland function. Objectives of the policy are to promote the conservation of wetlands to sustain ecological and economic function.
Canadian Wetland Classification System (NWWG 1997)	The Canadian Wetland Classification System (NWWG 1997) identifies three hierarchical levels of wetland classification: class, form, and type. There are five classes of wetlands (bog, fen, marsh, swamp, and shallow open water); wetland forms divide up the classes based on surface morphology, water type, and other characteristics. Wetland types are subdivisions of the form and are based on vegetation communities (NWWG 1997). The Canadian Wetland Classification System includes tidal water wetlands.
Wetland Ecological Functions Assessment: An Overview of Approaches (Hanson et al. 2008)	The Wetland Ecological Functions Assessment: An Overview of Approaches (Hanson et al. 2008) document provides an outline of wetland ecological functions assessments.
Provincial	
<i>Endangered Species Act</i> (2007)	The ESA and its associated regulations that are amended from time to time, identifies wildlife species considered to be at risk in Ontario and designates them as threatened, endangered, extirpated, or of special concern. The ESA protects SAR and their habitats by prohibiting anyone from killing, harming, harassing, or possessing protected species (those listed as endangered or threatened), and prohibiting damage or destruction to the habitat of protected species.
<i>Invasive Species Act</i> (2015)	The Act lists four plant species regulated by the Ontario government to help prevent, control, and reduce their spread.
<i>Weed Control Act</i> (1990) and Weed Control Regulation	The <i>Weed Control Act</i> and associated regulations requires control of designated noxious plants, which are defined provincially and regionally. The Northwest Invasive Plant Council also identifies species which are of management concern within its region.

16.1.2 The Influence of Consultation and Engagement on the Assessment

Canada Nickel Company (Canada Nickel) has engaged with potentially affected Indigenous nations, regulators, the public, and stakeholders. Table provides a summary of the topics, key information including Indigenous knowledge and concerns that Canada Nickel identified as part of their engagement efforts that relate to vegetation, riparian and wetland environments, as well as a summary of the influence that the outcomes of this engagement had on the assessment.

Overall, feedback and concerns related to vegetation, riparian, and wetlands included impacts to black ash (*Fraxinus nigra*), effects of dust on vegetation, provincially rare plant species in the Project Area (PA), invasive and/or noxious species, impacts of the Project on wetlands, and mitigation measures for impacts.

This information was considered when evaluating whether Canada Nickel's planned mitigation will effectively manage the identified potential interactions, or whether additional or refined mitigation is warranted. Additional and specific mitigation measures were added to address one or more of the concerns, as described in Table 16.2.

Table 16.2 Summary of Key Information, Indigenous Knowledge, and Concerns for the Project Related to Vegetation, Riparian and Wetland Environments

Topic	Key Information, Indigenous Knowledge, and Concerns	Influence on the Assessment	Where Information is Addressed in the Impact Statement
Plant SAR, rare vegetation communities and SOCC	<ul style="list-style-type: none"> Members of the public and/or stakeholders expressed concern about: <ul style="list-style-type: none"> impacts on black ash, which is widespread and common, but in decline due to an invasive beetle the location of black ash, how the species would be managed, and how it is regulated under the ESA Members of the public and/or stakeholders recommend additional information on provincially rare plant species identified in the Project vicinity, and measures to preserve or protect them. 	<ul style="list-style-type: none"> Contributed to an understanding of existing conditions for vegetation. Documented black ash occurrences in the LSA were mapped in the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement) and Vegetation, Riparian and Wetland Environments Supplemental Baseline Report (Appendix B.7.1 of the Impact Statement). Impacts to documented and potential presence of plant SAR and SOCC are assessed in the Impact Statement and mitigation measures provided. 	<ul style="list-style-type: none"> Chapter 16 (Assessment of Potential Effects on Vegetation, Riparian and Wetland Environments), Section 16.4.2 Terrestrial Baseline Reports (Appendix B.7 of the Impact Statement)
Effects of pollution, pesticides and fugitive dust on vegetation, including food and medicinal plants	<ul style="list-style-type: none"> Members of the public and/or stakeholders expressed concern about potential effects on vegetation from metals in fugitive dust. Apitipi Anicinapek Nation, Flying Post First Nation, Métis Nation of Ontario – Region 3, and Taykwa Tagamou Nation expressed concern regarding contamination of vegetation from fugitive dust, metals, and nitrogen from explosives. Matachewan First Nation, Mattagami First Nation and Taykwa Tagamou Nation expressed concern regarding impacts to food, plant, and plant medicine quality and usability from mine dust and air pollution (e.g., safety, trade). Flying Post First Nation, Matachewan First Nation and Mattagami First Nation expressed concern regarding impacts of the dry stack tailings on flora. Apitipi Anicinapek Nation expressed concern regarding contamination and degradation of plant resources. Mattagami First Nation expressed concern regarding: <ul style="list-style-type: none"> changes to the quantity and quality of food plants due to industrial activities and development lack of trust in the safety of harvesting areas because of known or expected chemical spraying associated with industrial activity (e.g., within or along transmission line corridors) Métis Nation of Ontario – Region 3 expressed concern regarding effects of discharge locations to the harvesting of plants and mushrooms. Matachewan First Nation expressed concerns regarding: <ul style="list-style-type: none"> direct and indirect effects to medicinal plants due to site operations dust dispersal and deposition due to wind effects on tailings as this has been observed on other projects in the region Flying Post First Nation, Matachewan First Nation and Mattagami First Nation recommend involvement in monitoring of medicines, plants or berries that are affected by fugitive dust. Members of the public and/or stakeholders recommend information sharing on mitigation measures, follow-up program to manage uncertainty, and monitoring plans to prevent adverse effects of metal exposure in fugitive dust. 	<ul style="list-style-type: none"> Contributed to an understanding of existing conditions for vegetation. Considered in the development of mitigation and management measures and supported scope of issues assessed. Dust included as an indirect effects pathway on vegetation and is also assessed as part of the air quality assessment (Chapter 12 of the Impact Statement [Assessment of Potential Effects on the Atmospheric Environment]) and health assessment (Chapter 21 of the Impact Statement [Assessment of Potential Effects on Health]). Specific effect pathways for dust assessed in the Human Health and Ecological Risk Assessment (Appendix C.7 of the Impact Statement). Mitigation for dust was considered and monitoring to be completed as describe in Chapter 12 of the Impact Statement (Assessment of Potential Effects on the Atmospheric Environment). Additional mitigation measures for surface and groundwater effects are provided in Chapters 14 (Assessment of Potential Effects on Groundwater) and 15 of the Impact Statement (Assessment of Potential Effects on Surface Water), and those for accidents and malfunctions are provided in Chapter 31 of the Impact Statement (Accidents and Malfunctions). The Project’s proposed tailings management facility will be operated as a “thickened tailings cone” and is described further in Chapter 3, Section 3.3.4 of the Impact Statement (Project Description). Canada Nickel will not have dry stack tailing storage. Informed the assessment on Indigenous interests in Chapters 25 to 28 of the Impact Statement (Assessment of Potential Effects on Indigenous Interests). Canada Nickel’s responses to mitigation recommendations made by the Indigenous nations are provided in Chapters 25 to 28 of the Impact Statement (Assessment of Potential Effects on Indigenous Interests). 	<ul style="list-style-type: none"> Chapter 3 (Project Description), Section 3.3.4 Chapter 12 (Assessment of Potential Effects on the Atmospheric Environment), Section 12.9 Chapter 14 (Assessment of Potential Effects on Groundwater) Chapter 15 (Assessment of Potential Effects on Surface Water) Chapter 16 (Assessment of Potential Effects on Vegetation, Riparian and Wetland Environments), Section 16.4.2 Chapter 21 (Assessment of Potential Effects on Health) Chapters 25 to 28 (Assessment of Potential Effects on Indigenous Interests) Chapter 31 (Accidents and Malfunctions) Human Health and Ecological Risk Assessment (Appendix C.7 of the Impact Statement)
Wetland hydrology	<ul style="list-style-type: none"> Apitipi Anicinapek Nation, Flying Post First Nation, Matachewan First Nation, Mattagami First Nation, Métis Nation of Ontario – Region 3, and Taykwa Tagamou Nation expressed concerns about potential effects to muskeg and wetlands in the PA and LSA (e.g., change in function, hydrology). 	<ul style="list-style-type: none"> Hydrological effects on wetlands and discussion of mitigation measures are provided in Chapter 16, Section 16.4.4 of the Impact Statement (Assessment of Potential Effects on Vegetation, Riparian and Wetland Environments). Informed the assessment on Indigenous interests in Chapters 25 to 28 of the Impact Statement (Assessment of Potential Effects on Indigenous Interests). 	<ul style="list-style-type: none"> Chapter 16 (Assessment of Potential Effects on Vegetation, Riparian and Wetland Environments), Section 16.4.4 Chapters 25 to 28 (Assessment of Potential Effects on Indigenous Interests)

Topic	Key Information, Indigenous Knowledge, and Concerns	Influence on the Assessment	Where Information is Addressed in the Impact Statement
Plant species of importance to Indigenous Nations	<ul style="list-style-type: none"> • Apitipi Anicinapek Nation expressed that maintaining and protecting the current use of lands and resources for traditional purposes includes plant and medicine harvesting and ability to exercise rights to harvest plants. Some traditional species of importance include moss, fungi, reindeer lichen, blueberries, raspberries, gooseberries, Labrador tea, tamarack, and mushrooms. • Flying Post First Nation stated that plant harvesting is a right-based value and an important part of Indigenous identity. Some traditional species of importance include pin cherry, wild blueberry, wild cranberry, wild raspberry, wild strawberry, bark, sage, sweetgrass, wild rice and tobacco. • Matachewan First Nation stated that obtaining food plants from the land is important for both sustenance and maintaining traditional ecological knowledge. Some traditional species of importance include blueberry, raspberry, pin cherry, bamagilla buds (balsam poplar), swampy tea, cedar, mint, birch bark, mountain ash, mushroom chaga, sage, willow, and rose. The spirit berry is a culturally important species. • Mattagami First Nation reported harvesting at several preferred locations. Some traditional species of importance include rosehips, blueberries, raspberries, cranberries, chokecherries, strawberries, sweetgrass, cedar, birch, maple, balsam, tamarack, red willow, swampy sage, white grandmother sage, mushrooms (chanterelle, puffball, shaggy mane). • Taykwa Tagamou Nation reported that passing on land-based knowledge, including where and how to gather, has been integral to members' continual practice of these traditional activities. Some traditional species of importance include blueberries, spruce, gooseberries, tamarack, raspberries, sage, sweetgrass, rosehip berries, horsetail, mullein, goldenrod, cattail, yarrow, plantain, swamp aster, pearly everlasting, cedar, and Labrador tea. • Métis Nation of Ontario – Region 3 stated that traditional species of importance include, but are not limited to, moss, fungi, reindeer lichen, blueberries, raspberries, gooseberries, Labrador tea, tamarack and mushrooms. • Flying Post First Nation, Matachewan First Nation and Mattagami First Nation recommends Canada Nickel work with nations for site reclamation plans and use plants of cultural significance during site reclamation and revegetation. • Apitipi Anicinapek Nation recommends: <ul style="list-style-type: none"> ▪ Canada Nickel provides information about plant species in the PA, specifically plants used as medicines or country foods. ▪ Consultation with Apitipi Anicinapek Nation to identify plant species of cultural importance. • Taykwa Tagamou Nation recommends: <ul style="list-style-type: none"> ▪ Canada Nickel research best plants to revegetate the PA following decommissioning, including culturally important species. ▪ Canada Nickel provides a complete list of plants inventoried at the Project site, to assess the impacts on harvesters. ▪ Involvement of multiple generations in reclamation efforts following decommissioning and closure to support with knowledge transfer and the restoration of traditional and/or medicinal plants. 	<ul style="list-style-type: none"> • Contributed to an understanding of existing conditions for vegetation. • Considered in the development of mitigation and management measures and supported scope of issues assessed. • Contributed to design of the country foods sampling program to support the health effects assessment (Chapter 21 of the Impact Statement [Assessment of Potential Effects on Health]). • The identification of plant species of importance to Indigenous nations was carried forward for the vegetation, riparian and wetland assessment and informed the assessment on Indigenous interests in Chapters 25 to 28 of the Impact Statement (Assessment of Potential Effects on Indigenous Interests). • Additional consultation was executed or planned to include plant species of importance to Indigenous nations in the closure plan. • Canada Nickel's responses to mitigation recommendations made by the Indigenous nations are provided in Chapters 25 to 28 of the Impact Statement (Assessment of Potential Effects on Indigenous Interests). 	<ul style="list-style-type: none"> • Chapter 16 (Assessment of Potential Effects on Vegetation, Riparian and Wetland Environments), Section 16.2.2 and Section 16.4.2. • Chapter 21 (Assessment of Potential Effects on Health) • Chapters 25 to 28 (Assessment of Potential Effects on Indigenous Interests)
Increased harvesting pressure / competition	<ul style="list-style-type: none"> • Flying Post First Nation, Matachewan First Nation and Mattagami First Nation expressed concern regarding impacts to plant harvesting caused by increased population. 	<ul style="list-style-type: none"> • Contributed to an understanding of existing conditions for vegetation. • Potential effects on land and resource use, including effects related to increases in population, were carried forward for the Social Conditions assessment in Chapter 22 of the Impact Statement (Assessment of Potential Effects on Social Conditions) and informed the assessment of effects on Indigenous interests in Chapters 25 to 28 of the Impact Statement (Assessment of Potential Effects on Indigenous Interests). 	<ul style="list-style-type: none"> • Chapter 22 (Assessment of Potential Effects on Social Conditions), Sections 22.4.6 and 22.4.7 • Chapters 25 to 28 (Assessment of Potential Effects on Indigenous Interests)

Topic	Key Information, Indigenous Knowledge, and Concerns	Influence on the Assessment	Where Information is Addressed in the Impact Statement
Cumulative effects	<ul style="list-style-type: none"> • Apitipi Anicinapek Nation expressed concern regarding cumulative effects of forest clearing. • Taykwa Tagamou Nation expressed concern regarding potential contamination of harvested foods and medicinal plants, including cumulative effects associated with aerial spraying by forestry companies. • Flying Post First Nation and Matachewan First Nation expressed concern regarding effects on the abundance, quality, and productivity (e.g. bearing fruit) of culturally important plants, attributed to cumulative effects of forestry activities, including logging and spraying, and soil contamination. • Matachewan First Nation recommends a cumulative effects assessment on Indigenous nations and their traditional territories including plants. 	<ul style="list-style-type: none"> • Chapter 29 of the Impact Statement (Cumulative Effects Assessment) provides the assessment of cumulative effects relative to each of the VCs considered in the Impact Statement. The results of the cumulative effects assessment completed in Chapter 29 of the Impact Statement (Cumulative Effects Assessment) inform the assessment of cumulative effects on Indigenous interests conducted in Chapters 25 to 28 of the Impact Statement (Assessment of Potential Effects on Indigenous Interests). 	<ul style="list-style-type: none"> • Chapters 25 to 28 (Assessment of Potential Effects on Indigenous Interests) • Chapter 29 (Cumulative Effects Assessment)

Where made available by Indigenous nations through engagement, information gathering, and voluntary information sharing, Indigenous knowledge has been considered and incorporated into the Impact Statement, as applicable. Refer to the Description of Engagement with Indigenous Peoples (Chapter 7 of the Impact Statement) for detailed methods regarding the incorporation of Indigenous knowledge to the Impact Statement.

16.1.3 Potential Effects, Pathways and Measurable Parameters

The potential effects of the Project on Vegetation, Riparian, and Wetland Environments are identified in Table 16.3. For each effect in Table 16.3, effect pathways and indicators/measurable parameters have been identified to characterize the quantitative or qualitative measurement of change in Project-specific effects.

Where possible, the assessment of potential effects uses measurable parameters that are quantifiable (e.g., area of direct vegetation loss). However, not all effects pathways can be quantified (e.g., potential for introduction and establishment of invasive species and edge effects). Therefore, some effects are predicted qualitatively through use of scientific literature, professional judgment, and project experience.

Table 16.3 Potential Effects, Effect Pathways and Measurable Parameters for Vegetation, Riparian and Wetland Environments

Potential Effect	Effect Pathway	Measurable Parameter(s) and Units of Measurement
Change in vegetation communities and species diversity	<ul style="list-style-type: none"> • Loss or alteration of native vegetation communities, including ecological communities of management concern, arising from vegetation clearing and ground disturbance, including fragmentation. • Loss or alteration of plant SAR and SOMC arising from vegetation clearing and ground disturbance. • Loss or alteration of plant species that have traditionally been used by Indigenous nations arising from vegetation clearing and ground disturbance. • Alteration of vegetation communities arising from the introduction or spread of invasive, noxious, and prohibited noxious species through vehicle and equipment movement. 	<ul style="list-style-type: none"> • Occurrences and population attributes (frequency, density and/or cover) of: <ul style="list-style-type: none"> - traditional use plant resources of importance to Indigenous nations - provincially or federally listed plant SAR - non-native invasive plant species • Area (hectares [ha]) of the following: <ul style="list-style-type: none"> - native vegetation communities - rare vegetation communities • Changes in moisture regimes for rare plants per Floristic Quality Index (FQI) parameters • Mean patch size and perimeter to area ratios of vegetation communities

Potential Effect	Effect Pathway	Measurable Parameter(s) and Units of Measurement
Change in riparian form and function	<ul style="list-style-type: none"> Loss or alteration of riparian area arising from vegetation clearing and ground disturbance. Project-related changes in surface water flow that may affect riparian function. 	<ul style="list-style-type: none"> Areal extent (ha) of loss or disturbance to riparian area along watercourses that will remain Average width (metres [m]) of loss or disturbance to riparian area along watercourses that will remain Biodiversity measurements in riparian areas
Change in wetland form and function	<ul style="list-style-type: none"> Loss or alteration of wetland area or changes in wetland class arising from vegetation clearing and ground disturbance. Project-related changes in wetland sediments, surface water flow or vegetation that may affect wetland function. 	<ul style="list-style-type: none"> Areal extent (ha) of loss or disturbance to wetland ecosystems (by class and vegetation structure) Qualitative discussion of wetland function (using indicators such as vegetation cover, species composition, topography, and surface water flow)

16.1.4 Boundaries

16.1.4.1 Spatial Boundaries

The spatial boundaries presented in this VC represent the areas where data was compiled/collected to allow for an understanding of the vegetation, riparian and wetland environments in support of the Project-specific effects assessment and the cumulative effects assessment (Chapter 29 of the Impact Statement). The Project is located 42 kilometres (km) north of Timmins along Highway 655, within Ecoregion 3E (Figure 16.1).

The **Project Area (PA)** encompasses the Project footprint and is the anticipated area of physical disturbance associated with the construction, operations, and decommissioning/closure of the Project (Figure 16.1). The PA includes the Open Pit, Stockpiles, Impoundment Facility, Tailings Management Facility (TMF), 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 kV transmission line.

The **Local Study Area (LSA)** for Vegetation, Riparian and Wetland Environments encompasses the area in which the Project-related effects (direct or indirect) were predicted or measured with a level of confidence appropriate for the assessment and in which there is a reasonable expectation that the potential effects in the LSA are of public interest.

The Vegetation, Riparian and Wetland Environments LSA is identical to the Surface Water LSA as changes in surface water have the potential to affect wetlands. The LSA includes the PA and subwatersheds on the west side of the West Buskegau River main channel, several catchments within the Jocko Creek watershed, and headwater subwatersheds of the North Driftwood River. The LSA continues downstream on the West Buskegau River and North Driftwood River, away from the PA. The LSA is shown on Figure 16.1.

The **Regional Study Area (RSA)** includes the area within which the cumulative effects on vegetation, riparian and wetland environments may occur, depending on the location of other past, present, or reasonably foreseeable future projects or activities.

The Vegetation, Riparian and Wetland Environments RSA was designed to conform to regional watersheds where possible. The RSA includes the Northeast Mattagami Watershed, North Driftwood Watershed, and the Buskegau River/Fredrick House River watershed, or a 20 km boundary from the LSA, whichever is greater, due to the irregularity of some watershed boundaries. The RSA was selected based on regional context needed for the vegetation and wetlands assessment to align with wetland connectivity (Figure 16.1).

16.1.4.2 Temporal Boundaries

The temporal boundary of the assessment includes all Project phases from the start of construction through to the end of closure. Based on the current Project schedule, the Project phases include:

- Construction (Year -3 to Year -1)
- Operations
 - Operations phase 1 (Year 1 to Year 5): 60 kilotonnes per day (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+)

16.1.5 Residual Effects Characterization

The characterizations used to assess residual effects on vegetation, riparian and wetland environments are provided in Table 16.4.

Table 16.4 Characterization of Residual Effects on Vegetation, Riparian and Wetland Environments

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The long-term trend of the residual effect	<p>Positive – a residual effect that moves measurable parameters in a direction beneficial to vegetation, riparian, and wetland environments relative to baseline</p> <p>Adverse – a residual effect that moves measurable parameters in a direction detrimental to vegetation, riparian, and wetland environments relative to baseline</p> <p>Neutral – no net change in measurable parameters for the vegetation, riparian, and wetland environments relative to baseline</p>
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions	<p>Negligible – no measurable change in the effect can be noted</p> <p>Low – a measurable change in abundance of plant species of management concern, abundance or condition of rare plant communities, riparian communities, or wetlands from existing conditions that affects a portion of the known extent of population or community or functions within the RSA, but where the remaining portion is sufficient to sustain that population, community, or function without active management</p> <p>Moderate – measurable change in abundance of plant species of management concern, abundance or condition of rare plant communities, riparian communities, or wetlands from existing conditions that affects a portion of the known extent of population or community or functions within the RSA, but the remaining portion is sufficient to sustain that population, community, or function with active management</p> <p>High – measurable change in abundance of plant species of management concern, abundance, or condition of rare plant communities, riparian communities, or wetlands from existing conditions affecting a portion of the known extent of population or community or functions within the RSA that is lost without active management</p>
Geographic Extent	The geographic area in which a residual effect occurs	<p>PA – residual effects are restricted to the PA</p> <p>LSA – residual effects extend into the LSA</p> <p>RSA – residual effects extend into the RSA</p>
Timing	Considers when the residual effect is expected to occur, where relevant to the VC.	<p>No sensitivity – seasonal effects are unlikely to impact residual effects on vegetation, riparian, and wetland resources</p> <p>Moderate sensitivity – effect may occur during a lower sensitive period of a critical life stage; for many species this is the start or end of the critical period (e.g., during the growing season for plants)</p> <p>High sensitivity – effect occurs during a critical life stage or culturally important activities (e.g., plant harvesting)</p>

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Duration	The time required until the measurable parameter or the VC returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived	Short-term – the residual effect is restricted to no more than five growing seasons; enough time for herbaceous species and shrubs to demonstrate recovery of percent cover Medium-term – the residual effect extends through the operations phases Long-term – the residual effect extends beyond the life of the Project
Frequency	Identifies how often the residual effect occurs and how often during the project or in a specific phase	Single event Multiple irregular events – occurs at no set schedule Multiple regular events – occurs at regular intervals Continuous – occurs continuously
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the project activity ceases	Reversible – the residual effect is likely to be reversed after activity completion and reclamation Irreversible – the residual effect is unlikely to be reversed

16.1.6 Significance Definition

The Impact Statement must characterize the extent of significance of any residual adverse federal effect, which includes residual adverse effects within federal jurisdiction and any adverse direct or incidental effects as defined in section 2 of the *Impact Assessment Act*. The removal of waterbodies and the alteration of surface water quality are associated with federal decisions under the *Fisheries Act* and *Metal and Diamond Mining Effluent Regulations* that will cause adverse environmental effects to wetlands, and therefore a change in wetlands associated with these pending decisions is considered an effect within federal jurisdiction for which a determination of the extent of significance is required. As such, the extent to which residual adverse effects on such wetlands are considered significant is presented below.

- **High:** A residual adverse effect of high significance on wetlands is one that, following the application of avoidance and mitigation measures, is likely to cause or further contribute to the exceedance of a conservation-based threshold and threatens the long-term persistence or viability of wetland function within the RSA.
- **Moderate:** A residual adverse effect of moderate significance on wetland is one that, following the application of avoidance and mitigation measures, is likely to cause or further contribute to the exceedance of a conservation-based threshold but is not likely to threaten the long-term persistence or viability of wetland function within the RSA.
- **Negligible/Low:** A residual adverse effect of negligible/low significance on wetlands is one that, following the application of avoidance and mitigation measures, is not likely to cause or further contribute to the exceedance of a conservation-based threshold and does not threaten the long-term persistence or viability of wetland function within the RSA.

16.2 Existing Conditions for Vegetation, Riparian and Wetland Environments

This section summarizes the sources of information and existing conditions for the vegetation, riparian and wetland environments in the PA, LSA, and RSA. For more details refer to the Vegetation, Riparian and Wetland Environments Supplemental Baseline Report (Appendix B.7.1 of the Impact Statement) and the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement).

16.2.1 Methods

Characterization of baseline conditions in the PA, LSA, and RSA were gathered through a review of traditional knowledge, publicly available information, relevant literature, previous studies, and ecological land classification (ELC) mapping.

16.2.1.1 Background Review

Stantec Consulting Ltd. (Stantec) completed a background review of natural environment features including records of designated natural areas, SAR, SOCC, and rare vegetation communities. The desktop data was used to supplement previous field surveys completed for the LSA.

Information on landscape context, natural heritage features, SAR and SOCC applicable to the RSA was obtained through a review of background documents and online data sources including:

- Ministry of Natural Resources (MNR) Natural Heritage Information Centre (NHIC) online database (MNRF 2024a)
- Land Information Ontario (LIO) Natural Heritage Area Mapping tool (MNRF 2024b)
- LIO Ontario Land Cover Compilation v.2.0 (LIO 2024)
- SARA, Schedule 1 (GOC 2024)
- SARO List (MECP 2024)
- iNaturalist (2024)

Desktop mapping and land classification of the RSA was accomplished by using the Provincial Land Cover, 2nd Edition (LIO 2002), and replacing areas with the Ontario Wetland Evaluation System, where available (LIO 2002).

Indigenous knowledge and information about the Indigenous use of vegetation was collected through Project-specific studies. Indigenous use plant species lists may not include every plant species with Indigenous uses. Refer to Chapters 25-28 of the Impact Statement (Assessment of Effects on Indigenous Interests) for nation-specific information.

Vegetation communities within the LSA were delineated and described according to the Ontario Ecosite Classification system (Banton et al. 2009). Forest Resources Inventory (FRI) Versions 1 and 2 were used as a baseline for vegetation boundaries between wetlands, forests, and vegetation communities (LIO 2007, 2021). FRI from the Abitibi River Forest, Romeo Malette Forest, and Gordon Cosens Forest were used to update the baseline FRI. Some manual adjustments to polygon boundaries and classification were made based on visual aspects of the polygon and surrounding habitats.

Ontario Land Cover Classification v2 was used for the RSA areas outside the LSA (LIO 2023). FRI was not available for all areas of the RSA, as a result land cover between the RSA and LSA is not comparable.

Peat volumes were estimated for wetlands using organic matter thickness within soil management units within the PA. A minimum peat depth of 40 centimetres (cm) was assumed where depths were not provided. Where a range of peat depths was provided, the middle value was used. Where only a minimum depth was provided, the minimum depth was used. Wetland area was multiplied by peat depth for each soil management unit to determine peat volumes in cubic metres (m³). Information on the determination of soil management units is described in the Soils and Terrain Baseline Report (Appendix B.1 of the Impact Statement). For this assessment, riparian areas include areas within 30 m of stream orders 1-4, and within 80 m of the centre line of stream orders 5-6. Riparian areas exclude wetlands to avoid double counting. Stream orders were determined as described in Chapter 17 of the Impact Statement (Assessment of Potential Effects on Fish and Fish Habitat).

Baseline fragmentation was assessed by combining vegetation ecosites into the following landcover classes and determining the mean patch size and mean perimeter/area ratio: treed upland communities, tree wetland communities, open wetland, disturbed/regenerating, and non-vegetated.

16.2.1.2 Site Investigations

Information specific to site investigations conducted for this Project are summarized in the Terrestrial Baseline Reports, which can be found in Appendix B.7 of the Impact Statement.

Field investigations were conducted by WSP in 2021 and 2022 to collect baseline information on vegetation and wetlands. Across all studies, 162 plots were surveyed within the LSA (Figure 16.2). Sites were chosen based on initial desktop FRI delineation (LIO 2007, 2020). At each location, the following information was collected:

- Ecosite classification according to Banton et al. (2009)
- Complete list of vascular plant species
- Dominant plant species in vegetation layers
- General classification of sites into broad habitat categories (e.g., forest, bog, fen, marsh, swamp)
- Basic soil classification by hand auger

Further details of field methods are available in the Vegetation, Riparian and Wetland Environments Supplemental Baseline Report (Appendix B.7.1 of the Impact Statement) and the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement).

16.2.1.3 Limitations

Key limitations to the datasets and analyses used in the assessment are:

- Occurrence of plant SAR and plant SOCC are limited to observations made during field studies and those recorded in publicly available information (e.g., iNaturalist and the NHIC). Other plant species have potential to occur but were not recorded during field studies. Although the likelihood of their presence is low, the potential for them to occur cannot be ruled out completely.
- Vegetation communities within the LSA were delineated and described according to the Ontario Ecosite Classification system (Banton et al. 2009). FRI Versions 1 and 2 were used as a baseline for vegetation boundaries between wetlands, forests, and vegetation communities (LIO 2007, 2021). FRI from the Abitibi River Forest, Romeo Malette Forest, and Gordon Cosens Forest were used to update the baseline FRI. Some manual adjustments to polygon boundaries and classification were made based on visual aspects of the polygon and surrounding habitats. However, Ontario Land Cover Classification v2 was used for the RSA areas outside the LSA (LIO 2023). FRI was not available for all areas of the RSA; as a result, land cover between the RSA and LSA is not comparable, leading to different land cover values for features such as wetlands and requiring differing assumptions with respect to determination of potential presence of rare vegetation communities in the RSA.

16.2.2 Overview

An overview of the baseline conditions for vegetation, riparian, and wetlands environments is provided in Appendix B.7.1 (Vegetation, Riparian and Wetland Environments Supplemental Baseline Report) and B.7.4 (2023 Terrestrial Ecology Baseline Study) of the Impact Statement. The baseline information presented herein provides an overview of the vegetation, riparian, and wetland environment baseline conditions for reference.

16.2.2.1 Ecological Land Classification and Land Cover

Within the RSA, upland treed habitat covers approximately 47 percent (%) (502,956 ha) with mixed forests and coniferous treed forests the most common upland forest types (Table 16.5). Wetlands are the largest ecosystem category in the RSA, covering approximately 40% (422,875 ha) of the RSA, with swamps the most common wetland class covering approximately 27% (287,638 ha) of the RSA followed by fens with 5.0% (53,719 ha) and bogs with 4.7% (50,792 ha) of the RSA. Water, such as lakes, rivers, and ponds, covers a relatively small area of approximately 4% (45,730 ha) of the RSA and <1% (168 ha) of the LSA. The RSA and LSA are in a relatively undisturbed state with anthropogenic and sparsely vegetated areas covering approximately 9% (99,205 ha) of the RSA and 2% (1,329 ha) of the LSA. Cuts (harvested areas) are the largest anthropogenic or sparsely vegetated areas in the RSA and LSA, reflecting the history of logging in the RSA, followed closely by settlement and infrastructure areas.

Table 16.5 Summary of Land Cover in the Project Area, Local Study Area and Regional Study Area

Ecosystem Category	Land Cover Class	Project Area		Local Study Area		Regional Study Area	
		Area (ha)	Area (%)	Area (ha)	Area (%)	Area (ha)	Area (%)
Upland - Treed	Coniferous Forest	490	4	4,796	9	167,902	16
	Deciduous Forest	99	1	486	1	30,091	3
	Mixed Forest	1,447	12	6,316	12	241,990	23
	Sparse Forest	216	2	1,218	2	62,972	6
Total Upland Treed		2,251	19	12,817	24	502,956	47
Wetland	Unclassified Bog	598	5	5,020	9	38,709	4
	Open Bog	25	<1	88	<1	1,420	<1
	Treed Bog	407	4	984	2	10,663	1
	<i>Subtotal Bog</i>	<i>1,030</i>	<i>9</i>	<i>6,092</i>	<i>11</i>	<i>50,792</i>	<i>5</i>
	Unclassified Fen	372	3	4,133	8	51,254	5
	Open Fen	1	<1	4	<0.1	588	<1
	Treed Fen	13	<1	87	<1	1,877	<1
	<i>Subtotal Fen</i>	<i>386</i>	<i>3</i>	<i>4,224</i>	<i>8</i>	<i>53,719</i>	<i>5</i>
	Marsh	260	2	656	1	11,153	1
	Swamp	7,414	63	29,039	54	287,638	27
Other Wetland	-	-	-	-	19,573	2	
Total Wetland		9,091	77	40,010	74	422,875	40
Water	Open Water	-	-	-	-	408	<1
	Water - Deep or Clear	11	<1	168	<1	45,322	4
Total Water		11	<1	168	<1	45,730	4

Ecosystem Category	Land Cover Class	Project Area		Local Study Area		Regional Study Area	
		Area (ha)	Area (%)	Area (ha)	Area (%)	Area (ha)	Area (%)
Sparsely Vegetated or Anthropogenic	Bedrock	24	<1	24	<1	76	<1
	Burns	-	-	-	-	1,430	<1
	Cropland	-	-	-	-	25	<1
	Cuts	72	1	776	1	73,843	7
	Pasture	-	-	-	-	3,871	<1
	Sand/Gravel/Mine Tailings	5	<1	8	<1	6,688	1
	Settlement, Infrastructure	332	3	521	1	13,272	1
Total Sparsely Vegetated or Anthropogenic		432	4	1,329	2	99,205	9
Grand Total		11,785	100	54,324	100	1,070,765	100

A total of 50 ecosites and mapping units were identified in the LSA and 42 in the PA (Table 16.6, Figure 16.3). Most of the LSA and PA are in a relatively natural condition. Wetlands cover most of the LSA and PA, occupying 72% (39,175 ha) and 74% (8,667 ha), respectively. Upland forests cover 24% (2,837 ha) of the PA and 26% (14,273 ha) of the LSA (Table 16.6). Conifer forests are the dominant upland forest type, covering 21% (2,521 ha) of the PA and 23% (12,386 ha) of the LSA (Table 16.6).

Open water is relatively uncommon in the LSA and occurs as scattered ponds and small lakes as well as rivers and creeks, occupying approximately <1% (26 ha) of the PA and <1% (288 ha) of the LSA (Table 16.6; Figure 16.3, Figure 16.4).

Anthropogenic and other poorly vegetated areas cover 2.2% (254.8 ha) of the PA and 1.1% (577.8 ha) of the LSA (Table 16.6). Utility corridors account for the largest anthropogenic areas, covering 1.4% (167 ha) of the PA and 0.7% (359.8 ha) of the LSA and run throughout the LSA (Figure 16.3).

Table 16.6 Summary of Ecological Land Classification in the Project Area and Local Study Area

Land Cover Class	Ecosite Code or Mapping Unit	Ecosite Name	Project Area		Local Study Area	
			Area (ha)	%	Area (ha)	%
Upland Coniferous Forest	B012	Very Shallow, Dry to Fresh: Pine – Black Spruce Conifer	-	-	48	0
	B026	Very Shallow, Humid: Conifer	10	0	190	0
	B034	Dry, Sandy: Jack Pine – Black Spruce Dominated	10	0	15	0
	B035	Dry, Sandy: Pine – Black Spruce Conifer	-	-	6	0
	B050	Dry to Fresh, Coarse: Pine – Black Spruce Conifer	-	-	47	0
	B052	Dry to Fresh, Coarse: Spruce – Fir Conifer	7	<1	47	<1
	B065	Moist, Coarse: Pine – Black Spruce Conifer	13	<1	557	1
	B066	Moist, Coarse: Hemlock – Cedar Conifer	-	-	9	<1
	B067	Moist, Coarse : Spruce – Fir Conifer	13	<1	64	<1
	B068	Moist, Coarse: Conifer	-	-	66	<1
	B082	Fresh, Clayey Jack Pine – Black Spruce Dominated	16	<1	81	<1
	B083	Fresh, Clayey: Pine – Black Spruce Conifer	0	0	0	<1
	B085	Fresh, Clayey Spruce – Fir Conifer	4	<1	13	<1

Crawford Nickel Project Impact Statement
Chapter 16 Assessment of Potential Effects on Vegetation, Riparian, and Wetland Environments
September 30, 2024

Land Cover Class	Ecosite Code or Mapping Unit	Ecosite Name	Project Area		Local Study Area	
			Area (ha)	%	Area (ha)	%
	B098	Fresh, Silty to Fine Loamy Jack Pine – Black Spruce Dominated	7	<1	169	<1
	B099	Fresh, Silty to Fine Loamy: Pine – Black Spruce Conifer	739	6	1,630	3
	B101	Fresh, Silty to Fine Loamy: Spruce – Fir Conifer	473	4	1,178	2
	B102	Fresh, Silty to Fine Loamy: Conifer	234	2	362	<1
	B114	Moist, Fine: Pine – Black Spruce Conifer	881	7	7,403	14
	B115	Moist, Fine: Hemlock- Cedar Conifer	1	<1	43	<1
	B116	Moist, Fine: Spruce – Fir Conifer	81	<1	341	<1
	B117	Moist, Fine: Conifer	30	<1	116	<1
<i>Subtotal Coniferous Forest</i>			<i>2,521</i>	<i>21</i>	<i>12,386</i>	<i>23</i>
Upland Deciduous Forest	B040	Dry, Sandy: Aspen – Birch Hardwood	8	<1	57	<1
	B055	Dry to Fresh, Coarse: Aspen – Birch Hardwood	14	<1	114	<1
	B070	Moist, Coarse: Aspen – Birch Hardwood	<1	-	111	<1
	B088	Fresh, Clayey: Aspen – Birch Hardwood	<1	-	44	<1
	B104	Fresh, Silty to Fine Loamy Aspen – Birch Hardwood	135	1	751	1
	B119	Moist, Fine: Aspen – Birch Hardwood	159	1	810	1
<i>Subtotal Deciduous Forest</i>			<i>316</i>	<i>3</i>	<i>1,887</i>	<i>3</i>
Subtotal Upland Forest			2,837	24	14,273	26
Wetland – Bog	B126	Treed Bog	2,353	20	7,662	14
	B137	Sparse Treed Bog	-	-	198	<1
	B138	Open Bog	5	<1	32	<1
<i>Subtotal Wetland – Bog</i>			<i>2,358</i>	<i>20</i>	<i>7,892</i>	<i>15</i>
Wetland - Fen	B136	Sparse Treed Fen	781	7	4,465	8
	B139	Poor Fen	7.21	<1	143	<1
	B140	Open Moderately Rich Fen	<1	<1	52	<1
	B141	Open Extremely Rich Fen	-	-	16	<1
	B146	Open Shore Fen	-	-	22	<1
<i>Subtotal Wetland - Fen</i>			<i>789</i>	<i>7</i>	<i>4,698</i>	<i>7</i>
Wetland - Marsh	B142	Mineral Meadow Marsh	12	<1	143	<1
	B144	Organic Meadow Marsh	740	6	1,152	2
<i>Subtotal Wetland - Marsh</i>			<i>752</i>	<i>6</i>	<i>1,295</i>	<i>2</i>

Land Cover Class	Ecosite Code or Mapping Unit	Ecosite Name	Project Area		Local Study Area	
			Area (ha)	%	Area (ha)	%
Wetland - Swamp	B127	Poor Conifer Swamp	95	<1	1,249	2
	B128	Intermediate Conifer Swamp	2,931	25	19,938	37
	B129	Rich Conifer Swamp	625	5	1,538	3
	B133	Hardwood Swamp	3	<1	7	<1
	B134	Mineral Thicket Swamp	4	<1	31	<1
	B135	Organic Thicket Swamp	933	8	2,001	4
	B222	Mineral Poor Conifer swamp	177	2	334	<1
	B223	Mineral Intermediate Conifer Swamp	<1	<1	192	<1
<i>Subtotal Wetland - Swamp</i>			<i>4,768</i>	<i>40</i>	<i>25,290</i>	<i>47</i>
Subtotal Wetland			8,667	74	39,175	72
Water	-	Lakes, Rivers, Ponds	26	<1	288	<1
Subtotal Water			26	<1	288	<1
Anthropogenic and Poorly Vegetated	B197	Pavement/Concrete	74	<1	196	<1
	U997	Commercial/Residential	13	<1	20	<1
	U998	Utilities	167	1	360	<1
	B007	Active Mineral Barren	<1	<1	12	<1
Subtotal Anthropogenic and Poorly Vegetated			255	2	289	1
Grand Total			11,785	100	54,324	100

Wetlands in the PA and LSA contain large, estimated volumes of peat. Within the PA a minimum of 34 Mm³ of peat is present, while in the LSA a minimum of 100 Mm³ is present. Bogs and Swamps contain the largest amounts of peat, accounting for 28% and 54%, in the PA and 20% and 64% in the LAA, respectively (Table 16.7).

Table 16.7 Summary of Estimated Peat Volumes in the Project Area and Local Study Area

Land Cover Class	Ecosite Code	Ecosite Name	Project Area			Local Study Area		
			Area (ha)	Peat Volume		Area (ha)	Peat Volume	
				m ³	%		m ³	%
Wetland - Bog	B126	Treed Bog	2,353	9,411,032	28	7,662	30,646,896	20
	B137	Sparse Treed Bog	-	-	-	198	793,098	1
	B138	Open Bog	5	20,720	<1	32	126,444	<1
<i>Subtotal Wetland -Bog</i>			<i>2,358</i>	<i>9,431,752</i>	<i>28</i>	<i>7,892</i>	<i>31,566,437</i>	<i>20</i>
Wetland - Fen	B136	Sparse Treed Fen	781	3,125,380	9	4,465	17,861,585	12
	B139	Poor Fen	7	28,850	<1	143	570,987	<1
	B140	Open Moderately Rich Fen	<1	770	<1	52	207,008	<1
	B141	Open Extremely Rich Fen	-	-	-	16	65,249	<1
	B146	Open Shore Fen	-	-	-	22	88,448	<1
<i>Subtotal Wetland - Fen</i>			<i>789</i>	<i>3,155,000</i>	<i>9</i>	<i>4,698</i>	<i>18,793,277</i>	<i>12</i>
Wetland - Marsh	B144	Organic Meadow Marsh	740	2,960,381	9	1,152	4,608,002	3
<i>Subtotal Wetland - Marsh</i>			<i>740</i>	<i>2,960,381</i>	<i>9</i>	<i>1,152</i>	<i>4,608,002</i>	<i>3</i>
Wetland - Swamp	B127	Poor Conifer Swamp	95	380,998	1	1,249	4,996,879	3
	B128	Intermediate Conifer Swamp	2,931	11,723,785	35	19,938	79,750,633	52
	B129	Rich Conifer Swamp	625	2,498,748	7	1,538	6,152,127	4
	B133	Hardwood Swamp	3	12,059	<1	7	29,388	<1
	B135	Organic Thicket Swamp	933	3,731,844	11	2,001	8,004,222	5
	B223	Mineral Intermediate Conifer Swamp	<1	814	<1	192	766,393	<1
<i>Subtotal Wetland - Swamp</i>			<i>4,587</i>	<i>18,348,249</i>	<i>54</i>	<i>24,925</i>	<i>99,699,642</i>	<i>64</i>
Total Wetlands			8,474	33,895,382	100	38,667	154,667,359	100

Riparian habitat covers 221 ha in the PA and 621 ha in the LSA (Table 16.8, Figure 16.6). The majority of riparian habitat is forested with 80% (178 ha) in the PA and 89% (552 ha) in the LSA. Anthropogenic riparian habitat covers 20% (44 ha) in the PA and 11% (70 ha) in the LSA.

Table 16.8 Summary of Riparian Areas in the Project Area and Local Study Area

Broad Land Classification	Land Cover Class	Project Area		Local Study Area	
		Area (ha)	Area (%)	Area (ha)	Area (%)
Upland Forest	Coniferous Forest	167	76	524	84
	Deciduous Forest	10	5	28	4
<i>Subtotal Upland Forest</i>		<i>178</i>	<i>80</i>	<i>552</i>	<i>89</i>
Anthropogenic	Constructed	21	10	30	5
	Anthropogenic	22	10	40	6
<i>Subtotal Anthropogenic</i>		<i>44</i>	<i>20</i>	<i>70</i>	<i>11</i>
Total		221	100	621	100
Note: Numbers may not add up due to rounding.					

Baseline landscape fragmentation within the RSA is summarized in Table 16.9. Anthropogenic and non-vegetated communities have a lower mean patch size and higher perimeter to area ratio than naturally vegetated communities.

Table 16.9 Summary of Landscape Fragmentation in the Regional Study Area

Broad Land Cover Category	Land Cover Class	Mean Patch Size (ha)	Mean Perimeter/Area Ratio (km/ha)
Natural Vegetated Communities	Treed Communities	35	2
	Treed Wetland	2	1
	Open Wetland	137	1
<i>Subtotal Natural Vegetated Communities</i>		<i>174</i>	<i>3</i>
Anthropogenic and Non-vegetated Communities	Disturbed, Regenerating	8	1
	Non-vegetated	6	4
<i>Subtotal Anthropogenic and Non-vegetated Communities</i>		<i>14</i>	<i>5</i>
Total		188	8
Note: Numbers may not add up due to rounding.			

16.2.2.2 Rare Vegetation Communities

One ecosite with potential to support rare vegetation communities - Hardwood swamps (ecosite B133) - occurs in the PA and LSA (Table 16.10, Figure 16.3).

Table 16.10 Summary of Potential Rare Vegetation Ecosites Identified in the Project Area and Local Study Area

Rare Vegetation Community	Ecosite Code	Ecosite Name	Project Area		Local Study Area	
			Area (ha)	Area (%)	Area (ha)	Area (%)
Hardwood Swamp	B133	Hardwood Swamp	3	<1	7	<1
Grand Total			3	<1	7	<1

16.2.2.3 Wetlands and Wetland Functions

Wetlands are the dominant land cover in the LSA, covering 72% of the area (39,175 ha, Table 16.6, Figure 16.3, Figure 16.4). Wetlands in the LSA are relatively diverse, with all four wetland classes (bog, fen, marsh, and swamp) present and distributed throughout the LSA (Table 16.11). Swamps are by far the most common wetland class within the PA and LSA, accounting for 55% (4,768 ha) of the PA and 65% (25,290 ha) of the LSA, while bogs cover 27% (2,358 ha) of the PA and 20% (7,892 ha) of the LSA. Fens and marshes are less common in the PA and LSA compared to swamps and bogs.

The most common swamp communities are intermediate conifer swamps (B128), accounting for approximately 34% (2,931 ha) of all wetlands in the PA and approximately 51% (19,938 ha) in the LSA. Treed bogs are the most common bog accounting for 27% (2,354 ha) of the PA and approximately 20% (7,662 ha) of the LSA. Sparse treed fens are by far the most common type of fen, covering approximately 9% (781 ha) in the PA and approximately 11% (4,465 ha) of the LSA.

Table 16.11 Summary of Wetland Ecosites in the Project Area and Local Study Area

Land Cover Class	Ecosite Code	Ecosite Name	Project Area		Local Study Area	
			Area (ha)	%	Area (ha)	%
Wetland - Bog	B126	Treed Bog	2,353	27	7,662	20
	B137	Sparse Treed Bog	-	-	198	<1
	B138	Open Bog	5	<1	32	<1
Subtotal Wetland - Bog			2,358	27	7,892	20
Wetland - Fen	B136	Sparse Treed Fen	781	9	4,465	11
	B139	Poor Fen	7	<1	143	<1
	B140	Open Moderately Rich Fen	<1	<1	52	<1
	B141	Open Extremely Rich Fen	-	-	16	<1
	B146	Open Shore Fen	-	-	22	<1
Subtotal Wetland - Fen			789	9	4,698	12
Wetland - Marsh	B142	Mineral Meadow Marsh	12	<1	143	<1
	B144	Organic Meadow Marsh	740	9	1,152	3
Subtotal Wetland - Marsh			752	9	1,295	3
Wetland - Swamp	B127	Poor Conifer Swamp	95	1	1,249	3
	B128	Intermediate Conifer Swamp	2,931	34	19,938	51
	B129	Rich Conifer Swamp	625	7	1,538	4
	B133	Hardwood Swamp	3	<1	7	<1
	B134	Mineral Thicket Swamp	4	<1	31	<1
	B135	Organic Thicket Swamp	933	11	2,001	5
	B222	Mineral Poor Conifer swamp	177	2	334	<1
	B223	Mineral Intermediate Conifer Swamp	<1	<1	192	<1
Subtotal Wetland - Swamp			4,768	55	25,290	65
Total Wetlands			8,667	100	39,175	100

Wetlands in the PA and LSA contain large, estimated volumes of peat. Within the PA a minimum of 33.9 Mm³ of peat is present, while in the LSA a minimum of 99.7 Mm³ is present. Bogs and Swamps contain the largest amounts of peat, accounting for 28% and 54%, in the PA and 20% and 64% in the LSA, respectively (Table 16.12).

Table 16.12 Summary of Estimated Peat Volumes in the Project Area and Local Study Area

Land Cover Class	Ecosite Code	Ecosite Name	Project Area			Local Study Area		
			Area (ha)	Peat Volume		Area (ha)	Peat Volume	
				m ³	%		m ³	%
Wetland - Bog	B126	Treed Bog	2,353	9,411,032	28	7,662	30,646,896	20
	B137	Sparse Treed Bog	-	-	-	198	793,098	1
	B138	Open Bog	5	20,720	<1	32	126,444	<1
Subtotal Wetland -Bog			2,358	9,431,752	28	7,892	31,566,437	20
Wetland - Fen	B136	Sparse Treed Fen	781	3,125,380	9	4,465	17,861,585	12
	B139	Poor Fen	7	28,850	<1	143	570,987	<1
	B140	Open Moderately Rich Fen	<1	770	<1	52	207,008	<1
	B141	Open Extremely Rich Fen	-	-	-	16	65,249	<1
	B146	Open Shore Fen	-	-	-	22	88,448	<1
Subtotal Wetland - Fen			789	3,155,000	9	4,698	18,793,277	12
Wetland - Marsh	B144	Organic Meadow Marsh	740	2,960,381	9	1,152	4,608,002	3
Subtotal Wetland - Marsh			740	2,960,381	9	1,152	4,608,002	3
Wetland - Swamp	B127	Poor Conifer Swamp	95	380,998	1	1,249	4,996,879	3
	B128	Intermediate Conifer Swamp	2,931	11,723,785	35	19,938	79,750,633	52
	B129	Rich Conifer Swamp	625	2,498,748	7	1,538	6,152,127	4
	B133	Hardwood Swamp	3	12,059	<1	7	29,388	<1
	B135	Organic Thicket Swamp	933	3,731,844	11	2,001	8,004,222	5
	B223	Mineral Intermediate Conifer Swamp	<1	814	<1	192	766,393	<1
Subtotal Wetland - Swamp			4,587	18,348,249	54	24,925	99,699,642	64
Total Wetlands			8,474	33,895,382	100	38,667	154,667,359	100

16.2.2.4 Plant Species of Management Concern

16.2.2.4.1 Plant SAR and SOCC

A total of 238 species or genera of vascular plants were identified in the LSA. Of the 18 plant and lichen SAR and SOCC identified in the Terrestrial Supplemental Baseline Report (Appendix B.7 of the Impact Statement) as having potential to occur in the RSA, only black ash (*Fraxinus nigra*) was recorded within the LSA). Black ash is listed as endangered in Ontario under the ESA and as threatened by COSEWIC (Table 16.13; Figure 16.5). One occurrence of black ash has been mapped in the LSA and another immediately west of the LSA. Both occurrences were in ecosite B119 (moist fine aspen-birch hardwood). Ecosite B119 is the most common upland deciduous forest community and occurs in small stands throughout the LSA and PA (Table 16.6).

No other plant SAR or SOCC have been documented in the LSA. No plant SAR or SOCC occur within the PA.

Table 16.13 Plant Species of Management Concern in the Local Study Area

Plant Group	Common Name	Scientific Name	S-Rank	SARO Status	COSEWIC Status	SARA
Tree	Black ash	<i>Fraxinus nigra</i>	S4	END	THR	-
Notes: S4 - Apparently Secure END - Endangered THR - Threatened						

Black ash is classified as endangered in Ontario based on projected declines in the total number of individuals by more than 70% over the next 100 years (two generations) because of the emerald ash borer (COSSARO 2020). Predicted mortality of black ash is expected to exceed 90% across much of the area affected by the emerald ash borer (COSSARO 2020). The species and habitat protection regulations under the ESA apply only in areas of the province where black ash has experienced significant mortality due to the invasive emerald ash borer. The PA, LSA, and RSA are located outside of the municipalities where protection might apply and, as a result, no legislation protects black ash within the Project's spatial boundaries.

16.2.2.4.2 Plant Species of Importance to Indigenous Nations

Fifty-two plant species or general of importance to Indigenous nations were identified for the LSA (Table 16.14). Of these, nine species were collected as part of the human health risk assessment. All species or genera are relatively common and widely distributed throughout Ecoregion 3E. Given the relatively common occurrence of the species, it is likely that all species are present within the PA.

Table 16.14 Plant Species Noted as Being Harvested by Indigenous Nations Identified in the Local Study Area

Lifeform	Scientific Name	Common Name
Trees	<i>Abies balsamea</i>	Balsam fir
	<i>Betula papyrifera</i>	Paper birch (birch bark)
	<i>Larix laricina</i>	Tamarack
	<i>Picea mariana</i> ^a	Black spruce
	<i>Populus balsamifera</i>	Balsam poplar
	<i>Populus balsamifera</i>	Balsam poplar (bark buds)
	<i>Thuja occidentalis</i>	Eastern white cedar
	Acer spp.	Maple
Shrubs	<i>Acer spicatum</i>	Mountain maple
	<i>Betula pumila</i>	Bog birch
	<i>Corylus cornuta</i>	Beaked hazelnut
	<i>Prunus pensylvanica</i>	Pin cherry
	<i>Prunus virginiana</i>	Chokecherry
	<i>Rhododendron groenlandicum</i> ^a	Labrador tea (swamp tea)
	Ribes spp.	Gooseberries
	<i>Rosa acicularis</i>	Prickly rose
	Rosa spp.	Rosehips
	<i>Rubus idaeus</i>	Red raspberry
	<i>Rubus pubescens</i>	Dwarf raspberry
	Salix spp.	Willows
	Sorbus spp.	Mountain ash
	<i>Vaccinium angustifolium</i>	Early lowbush blueberry
	<i>Vaccinium myrtilloides</i>	Velvet-leaved blueberry
	<i>Vaccinium oxycoccos</i> ^a	Small cranberry
<i>Vaccinium vitis-idea</i> ^a	Mountain cranberry	
Forbs	<i>Achillea millefolium</i> ^a	Yarrow
	<i>Anaphalis margaritacea</i>	Pearly everlasting
	Fragaria (spp.)	Wild strawberry
	<i>Lobelia inflata</i>	Tobacco
	<i>Melilotus albus</i> ^a	White sweet clover
	<i>Mentha arvensis</i>	Wild mint
	<i>Oenothera biennis</i> ^a	Evening primrose

Lifeform	Scientific Name	Common Name
Forbs	<i>Plantago major</i>	Common plantain
	<i>Sarracenia purpurea</i> ^a	Pitcher plant
	Solidago spp.	Goldenrod
	<i>Symphotrichum puniceum</i>	Purple-stemmed aster (swamp aster)
	Verbascum spp.	Mullein
Graminoides	<i>Hierochloe odorata</i>	Sweetgrass
	<i>Typha latifolia</i>	Cattail
Horsetails	Equisetum spp.	Horsetail
Mosses	Bryophytes	Moss
Lichen	Usnea spp. ^a	Old man's beard
	Cladonia spp.	Reindeer lichen
Fungi	<i>Inonotus obliquus</i>	Chaga
	<i>Cantharellus cibarius</i>	Chanterelle
	<i>Calvatia gigantea</i>	Puffball
	<i>Coprinus comatus</i>	Shaggy mane
Notes: Bold names refer to genera. a. Collected as part of the human health risk assessment		

16.2.2.5 Invasive Plant Species

Three noxious weed species (designated by the *Weed Control Act* and associated regulations) were documented in the LSA (Table 16.15) and include wild parsnip (*Pastinaca sativa*), bull thistle (*Cirsium vulgare*), and Canada thistle (*Cirsium arvense*), with bull thistle and Canada thistle also documented in the PA. Thirty-one additional exotic vascular plant species were also identified within the LSA (Appendix B.7.1 of the Impact Statement [Vegetation, Riparian and Wetland Environments Supplemental Baseline Report]).

Table 16.15 Invasive Plant Species Occurring in the Local Study Area

Common Name	Scientific Name	Documented within PA	Documented within LSA
Wild parsnip	<i>Pastinaca sativa</i>	N	Y
Bull thistle	<i>Cirsium vulgare</i>	Y	Y
Canada thistle	<i>Cirsium arvense</i>	Y	Y
Notes: N – No Y – Yes			

16.3 Project Interactions with Vegetation, Riparian and Wetland Environments

Table 16.16 identifies, for each potential effect, the physical activities that might interact with the VC and result in the identified effect. These interactions are indicated by a check mark (✓) and are discussed in detail in Section 16.4, in the context of effects pathways, standard and project-specific mitigation/enhancement, and residual effects.

Table 16.16 Project Interactions with Vegetation, Riparian and Wetland Environments

Physical Activities	Effects		
	Change in Vegetation Communities and Species Diversity	Change in Riparian Form and Function	Change in Wetland Form and Function
Construction			
Mobilization of construction equipment and materials on site.	✓	✓	✓
Vegetation clearing, including the removal and disposal of trees, brush, shrubs, and other foliage.	✓	✓	✓
Stripping, including the removal of topsoil and other organic materials, as well as storing of some materials for use in reclamation.	✓	✓	✓
Grading of overburden to be used as fill.	✓	✓	✓
Handing and use of explosives, including blasting.	✓	✓	✓
Excavating and pre-stripping of mine rock from the Open Pit and surrounding area.	✓	✓	✓
Development of the Impoundment Facility for storage of rock, clay, sand and till.	✓	✓	✓
Preparation of construction surfaces, including hauling reclaimed graded material and crushed mine rock to construction locations.	✓	✓	✓
Construction of water management systems to collect, manage, treat and discharge contact water from mine components to the receiving waterbodies via collection ponds, ditches, and water treatment plants.	✓	✓	✓
Construction of minor water diversions around perimeter of the mine site to collect and divert flows.	✓	✓	✓
Dewatering of natural water bodies within the PA.	✓	✓	✓
Waste management, including collection and temporary storage.	✓	✓	✓

Physical Activities	Effects		
	Change in Vegetation Communities and Species Diversity	Change in Riparian Form and Function	Change in Wetland Form and Function
Construction of mine infrastructure, including crusher facilities, process plant and TMF, as well as the potable water well, and ancillary infrastructure (e.g., offices, workshop, fuel farm, magazine storage and explosives pad).	✓	✓	✓
Construction of internal haul roads and internal access roads, including water crossings.	✓	✓	✓
Construction of power supply and distribution systems.	✓	✓	✓
Construction of temporary Highway 655 by-pass and overpass.	✓	✓	✓
Construction of the rail spur.	✓	✓	✓
Vehicle operation within the PA.	✓	✓	✓
Employment and expenditures ¹ .	–	–	–
Operations (Mining and Processing)			
Construction of Project infrastructure, including the expansion of ore processing components.	✓	✓	✓
Relocation and decommissioning of Highway 655 and associated infrastructure.	✓	✓	✓
Relocation of 500 kV transmission line.	✓	✓	✓
Construction of the North Driftwood Diversion Channel.	✓	✓	✓
Handling and use of explosives including blasting.	–	–	–
Ore extraction in the Main Zone and East Zone of the Open Pit, including drilling, loading and hauling of mine rock from the pits.	–	–	–
Maintenance and management of mine rock stockpiles, overburden, and TMF.	–	–	–
Ore processing, including conveyor, crushing and processing activities with and between the Stockpiles, crusher facilities and Process Plant.	–	–	–
Operation of water management systems, including the collection, management, treatment and discharge of contact water from mine components to the receiving waterbodies via collection ponds, ditches and water treatment plants.	–	–	–
Transportation of Ore via the rail spur line.	–	–	–
Waste management, including collection and temporary storage.	–	–	–
Vehicle operation within the PA.	–	–	–

Physical Activities	Effects		
	Change in Vegetation Communities and Species Diversity	Change in Riparian Form and Function	Change in Wetland Form and Function
Progressive reclamation of disturbed areas.	✓	✓	✓
Employment and expenditures ¹ .	–	–	–
Decommissioning and Closure			
Pit flooding through the creation of channels from the collection ponds towards the Open Pit.	✓	✓	✓
Water management, including groundwater and surface water.	✓	✓	✓
Decommissioning, dismantling and/or disposal of buildings and mine infrastructure.	✓	✓	✓
Removal of power lines and electrical equipment.	✓	✓	✓
Decommissioning of potable water and sewage systems.	–	–	–
Vehicle operation within the PA.	–	–	–
Reclamation, including the placement of overburden, seeding and re-grading.	✓	✓	✓
Monitoring and maintenance.	✓	✓	✓
Employment and expenditures ¹ .	–	–	–
Notes: ✓ = Potential interaction – = No interaction 1. Project employment and expenditures are generated by most Project activities and are the main drivers of many potential socio-economic effects. Rather than acknowledging this by placing a checkmark against each of these activities, 'employment and expenditures' is listed as a separate item under each phase of the Project.			

Project activities and physical works that have no potential to cause a measurable interaction with vegetation, riparian, and wetland environments are not considered further in the assessment. A justification for effects considered to have no interaction is provided below for each Project activity and physical work.

Vehicle operation and transportation of materials (e.g., ore) are unlikely to interact with vegetation, riparian and wetland environments because vehicle travel will occur on constructed roads and rail lines within the PA.

During operations, activities associated with ore processing will occur within a constructed facility with movement of ore along constructed roads with a low likelihood for interactions with vegetation, riparian, and wetland environments.

16.4 Assessment of Residual Effects on Vegetation, Riparian, and Wetland Environments

The potential residual environmental effects of the Project on vegetation, riparian, and wetland environments associated with the construction, operations, and decommissioning and closure of the Project are described in the sections below. Each potential effect is characterized by change in vegetation communities and species diversity, change in riparian function, and change in wetland form and function.

16.4.1 Analytical Assessment Techniques

The assessment methods used in the assessment of residual effects are described below, specifically analytical methods and residual effects characterization definitions.

Direct Effects

The assessment of change in vegetation, riparian, and wetland environments is determined by overlaying, where possible, spatial boundaries (the PA, LSA, and RSA) on plant species point occurrence field data, for plant species of management concern (plant SAR, SOCC, and plant species of importance to Indigenous nations) and ELC, for rare plant communities, riparian communities, and wetlands. The potential residual effect is quantified based on the number of point occurrences intersected or the area of each ecological community intersected by each spatial boundary.

Indirect Effects

Edge effects, such as changes in light and hydrology, occur when there is a transition between an existing ecological community and a new edge (e.g., clearing a portion of a mature forest stand). The distance from the new edge into the ecological community that can experience these effects is influenced by the heterogeneity of the ecological communities that existed before the edge was created (Harper et al. 2004). A relatively homogenous forested community may experience greater edge effects than a complex landscape with different structural stages and ecological communities (e.g., wetlands and forests). A newly created edge in a forest can result in structural damage to trees from increases in wind, which can have positive effects (e.g., increase of coarse woody debris) and adverse effects (e.g., loss of trees). An increase in light at a cut edge can result in recruitment of different types and forms of vegetation, such as shrubs or shade-intolerant trees (Harper et al. 2004). This change can also have positive or adverse effects: the biodiversity of a stand may increase as new species establish in the area, but invasive species are known to colonize edges and disturbed areas.

Edge effects typically influence temperature and moisture levels in forested ecological communities up to 60 m to 120 m from the cleared edge (Chen et al. 1992; Voller 1998). Edge effects will lessen over time as vegetation re-establishes along a cut edge, reducing the light levels and providing a buffer for wind (Harper et al. 2015). The length of time and magnitude of edge effects depends on many factors, which includes climate (e.g., wind, precipitation), stand attributes (e.g., species composition, height, age), and soil type and depth (Harper et al. 2005).

Mine dewatering can result in water table drawdown in areas near the mine and may change the hydrology of adjacent wetlands by lowering groundwater, potentially altering wetland conditions. Wetlands potentially impacted by water table drawdown are quantified spatially using the modelled extent of groundwater drawdown.

Construction of drainage infrastructure and the installation of impermeable surfaces may alter drainage patterns and decreased infiltration, which can lead to localized effects on drainage and soil moisture in adjacent ecological communities (see Chapters 14 and 15 of the Impact Statement [Assessment of Potential Effects on Groundwater and Assessment of Potential Effects on Surface Water, respectively]).

The indirect effects that each plant species or ecological community could experience will vary because of site-specific conditions and are not quantified in the assessment. Instead, a description of the potential edge effects that plants, ecological communities, or wetlands could experience is described, along with mitigation measures that will help to reduce potential edge effects.

Assumptions

This assessment is based on assumptions that are considered conservative and that likely overstate the residual effects. These assumptions include:

- That the entire area of the PA will be cleared of vegetation; however, while the PA defines the maximum permitted area of clearing, the actual extent of cleared areas (i.e., final Project footprint) is likely to be smaller than the PA.
- That uncleared areas of vegetation are likely to persist within the PA after clearing, such as along fence lines, road edges, and between Project components.
- That overburden and rock stockpiles (i.e., Impoundment Facility) within the PA are assumed to be completely cleared of vegetation; however, vegetation will be allowed/encouraged to regrow in these areas during operations (i.e., for a minimum of 41 years) as progressive restoration prior to reclamation and closure.
- That water table drawdown occurs to the maximum potential extent (as determined and described in Chapter 14 of the Impact Statement [Assessment of Potential Effects on Groundwater]).

16.4.2 Change in Vegetation Communities and Species Diversity

This section describes the pathways, mitigation measures, and predicted Project residual effects related to changes in vegetation communities and species diversity. The change in vegetation communities and species diversity is quantified by overlaying the PA onto plant occurrence and community occurrence data, based on field surveys and desktop ELC mapping results, to determine the effect on plant SOMC and rare vegetation communities. This analysis is conducted for the PA and LSA using plot data of known plant species of interest collected through fieldwork, publicly available data, and ecosite mapping, and comparing the results to the data available for the vegetation resources RSA for the characterization of the effect.

Potential edge effects are accounted for by consideration of an additional 120 m area surrounding the PA. This conservatively estimates the predicted maximum area where potential edge effects may occur outside the Project footprint (Chen et al. 1992). This is consistent with Ontario's Natural Heritage Reference Manual (MNR 2010) which recommends 120 m as the distance from features for considering negative impacts such as provincially significant woodlands and wetlands.

16.4.2.1 Project Pathways

Vegetation clearing of the PA during the construction phase and operations phases 1 and 2 has the potential to remove plant species of importance to Indigenous nations and rare vegetation communities that may exist within the PA. Plant SAR and SOCC have not been observed within the PA.

Vegetation clearing can also cause indirect edge effects that may affect rare vegetation communities adjacent to the PA via changes in light, moisture, and hydrology. These effects are expected to occur within the LSA, within 120 m of the PA.

During operations, changes in hydrology from water table drawdown have potential to alter hydrology of vegetation communities outside the PA. Facility and infrastructure maintenance during operation may include activities such as brushing and tree removal, within the Project footprint; this may affect vegetation communities of interest by repeatedly impacting communities adjacent to the Project footprint (maintained in an herbaceous or shrub state).

Project activities, including the operation of construction equipment around the site, has potential to introduce or spread invasive plant species through use of equipment and soil movement. Reclamation activities, including the re-purposing of project infrastructure and decommissioning of mine infrastructure, have the potential to establish rare vegetation communities, potentially mitigating residual effects in the long term.

Vehicle and equipment use in the construction phase, operations phases, and decommissioning phase, have potential to increase the abundance of invasive plants. As well, vehicle and equipment use may cause edge effects to plant species of importance to Indigenous nations adjacent to the Project footprint through fugitive dust emissions and the potential introduction or spread of invasive plants.

Invasive plant species are a management concern because they have the potential to decrease biodiversity in the area, can out-compete native species and/or plant SOMC, affect ecosystem structure and functions, and can have economic impacts (e.g., cost to manage invasive plant species).

Fragmentation of the landscape occurs through anthropogenic vegetation clearing. When vegetation is cleared, edge effects to the remaining portion of the patch occur through changes to microclimate (i.e., light intensity, evaporation). These changes to the microclimate influence species composition and density, resulting in changes to plant community composition along the edge and for a distance into the remaining patch (Bramble and Byrnes 1983; Luken et al. 1992; Wagner et al. 2014).

16.4.2.2 Mitigation and Enhancement Measures

The following mitigation measures have been incorporated into the design of the Project and/or are proposed to avoid or reduce Project-related effects on vegetation communities and plant SOMC:

- Canada Nickel will restrict clearing to the approved Project Area.
- Canada Nickel will mark clearing boundaries prior to site preparation to maintain clearing activities within the designated footprint.
- Canada Nickel will avoid or reduce vegetation clearing activities within identified areas of plant species of management concern (SOMC) within the Project Area (if present), where practical.
- Canada Nickel will implement dust suppression measures, as identified in Chapter 12 of the Impact Statement, to reduce the generation and deposition of dust on vegetation adjacent to Project activities.
- Canada Nickel will implement industry-standard management practices to reduce and control the introduction or spread of invasive plants and noxious weeds, such as development of a clean equipment protocol.
- Canada Nickel will progressively revegetate disturbed areas in the Project Area to reduce the potential for colonization of disturbed areas by invasive plant species.
- Canada Nickel will use only native Ontario species and nurse crops when conducting progressive reclamation.
- Where invasive plant species are discovered within the Project Area, Canada Nickel will implement vegetation control to eliminate the occurrence and prevent further spread.
- Canada Nickel will incorporate plant species at risk (SAR) and species of conservation concern (SOCC) in reclamation planning, if and where habitat is deemed suitable.
- Canada Nickel will incorporate plant species of importance to Indigenous nations into reclamation planning, if and where habitat is deemed suitable.
- Canada Nickel will incorporate rare vegetation communities into reclamation planning, if and where habitat is deemed suitable.
- Canada Nickel will implement progressive rehabilitation in accordance with the Mine Development Closure Plan for temporary workspace occurring on or adjacent to rare vegetation communities, if present.
- Canada Nickel will revegetate areas of vegetation clearing along edges of rare vegetation communities (if present) as soon as practical to reduce the extent of edge effects.
- Canada Nickel will develop and implement an Erosion and Sediment Control Plan which will describe measures and best management practices to protect the environment through reduction of site erosion and protection of nearby environment from sedimentation.

- Prior to disturbance, Canada Nickel will provide Indigenous nations some time to harvest plant species of interest from within the Project Area, if requested.
- Canada Nickel will develop and implement a Construction Environmental Protection Plan which will describe the proposed mitigation measures to reduce effects on vegetation resources.

Revegetation strategies will be detailed in the Mine Development Closure Plan, including incorporation of the mitigation measures for vegetation communities identified above. The Conceptual Closure Plan (Appendix F of the Impact Statement) describes the following strategies:

- **Vegetation Test Plot Studies** - During operations, Canada Nickel will carry out vegetation test plot studies to evaluate the most effective revegetation approach for various application areas (i.e., dry slope aspects, coarse soils, wet flat areas, tailings). The purpose of these studies will be to explore different soil cover types, seed mixtures, planting species, irrigation, mulching and fertilization requirements. Seed mixtures will be composed of non-invasive native species. The results of these studies will be used to update and inform the revegetation approach within the Vegetation Management Plan that will be established for the Project as well as the future Mine Development Closure Plan.
- **Revegetation** - Revegetation will occur as soon as practical after Project components are no longer actively used. The objectives of the revegetation program are to stabilize surface materials from wind and water erosion, improve aesthetics, and establish self-sustainable non-invasive vegetation growth. Land use goals will include the revegetation of the TMF, rock Impoundment Facility, laydowns, roads and other areas of disturbance. Details of the growth media, seed mixture, mulching, and fertilization requirements will be established through the vegetation test plot studies.
- **Monitoring** - A monitoring program will be developed to monitor the success of revegetation considering the end land use goals. The program will be designed to assess revegetated areas such as the Impoundment Facility, TMF, and other areas, which would be inspected during late spring and summer during active rehabilitation and at a reduced frequency in passive closure. The objectives of the program are to determine whether revegetation measures are successful.

16.4.2.3 Project Residual Effects

Characterization of residual effects for plant SOMC, including plant SAR and SOCC, plant species of importance to Indigenous nations, and invasive plant species is provided for the construction, operations, and decommissioning and closure phases of the Project.

16.4.2.3.1 Plant Species at Risk and Species of Conservation Concern

No plant SAR or SOCC are documented in the PA. Only black ash (endangered) was identified in the LSA (Figure 16.5). However, black ash is located more than 120 m from the PA and is not expected to be impacted by direct or indirect Project effects. As such, no loss or alteration of plant SAR or SOMC is anticipated as a result of vegetation clearing and ground disturbance associated with the Project.

No adverse impacts are anticipated on plant SAR and SOCC because of the Project.

16.4.2.3.2 Plant Species of Importance to Indigenous Nations

Construction

Site preparation and clearing during construction will result in a direct loss in plant species of importance to Indigenous nations. No change in plant species richness in the LSA is expected due to Project construction as the species that were identified in the LSA are common and widely distributed in the Ecoregion and are expected to be present and persist in the LSA.

Edge effects are anticipated following site clearing during construction. Edge effects will likely differ according to species' habitat requirements; shade intolerant species (e.g., chokecherry and red raspberry) are likely to increase in abundance near edges, while species requiring shade (e.g., mountain maple and balsam fir) are likely to decrease in abundance. Changes in temperature and wind (microclimates) may also result in warmer and drier conditions in areas near new forest edges. As a result, species composition may change over time to adjust to different conditions.

Operations

There is low potential for a change in the abundance of plant species of importance to Indigenous nations after the first few years of Project operations, since the majority of vegetation clearing will have been completed during construction and early operations. Some direct effects are expected through the loss of plant species from continued construction activities during operations phases 1 and 2 (e.g., highway realignment, stockpiles expansion). Indirect effects such as deposition of dust and continuing edge effects will be the dominant effects during operations phase 3. Deposition of dust on vegetation has potential to affect vegetation growth by reducing physiological processes such as photosynthesis and respiration. Some species and communities may be affected more than others; for example, Farmer (1993) reported that lichen and Sphagnum moss (*Sphagnum spp.*) dominated communities were more sensitive to dust deposition than other vegetation communities studied.

Where infrastructure is removed and the land is restored, and while details regarding the closure plan will be determined through further consultation with Indigenous nations, the opportunity exists to integrate plants species of Indigenous interest into the closure plan. As such, it is anticipated that vegetation cover established would include plant species of importance to Indigenous nations. However, species composition may change from existing conditions.

16.4.2.3.3 Invasive Plant Species

Construction

Project activities during construction and operations have the potential to result in the introduction and spread of invasive plant species, which could impact native plant and ecological communities. Three noxious weed species (Canada thistle, bull thistle and wild parsnip) are documented in the LSA. There is potential for such activities to spread these invasive species or for additional species to be brought to site through transportation of construction equipment and spread through soil movement and ground

disturbance. However, mitigation measures to reduce potential for introduction of invasive plant species are well understood and will be implemented as part of the Project mitigation. Should noxious weeds and/or invasive plant species be introduced to the site, standard mitigation measures to control them will be implemented.

Operations

During operations, continued use of vehicles throughout the PA and the maintenance of roads and edge areas conditions for the continued introduction and spread of invasive plant species remains.

Decommissioning and Closure

Decommissioning and closure of the Project has the potential to introduce or spread invasive plants through ground disturbance, vehicle travel, and soil movement. However, the introduction of native plants species during restoration and closure activities will reduce the potential or invasive species to propagate.

16.4.2.3.4 Rare Vegetation Communities

Construction

Site preparation and clearing during construction of the Project will result in a direct loss of approximately 11,785 ha of land area, including 11,504 ha of naturally vegetated communities. Of these, 3 ha of potential rare vegetation communities will be directly affected by Project development, resulting in a loss of approximately 75% of potential rare vegetation communities in the LSA (Table 16.17). The Project will result in the direct loss of approximately 3 ha of Hardwood Swamp, which corresponds to approximately 41% of the habitat in the LSA.

Additional indirect edge effects on potential rare vegetation communities can occur outside the PA from changes in wind, light, and hydrology could occur. Hydrological changes could affect Hardwood Swamp communities through changes in drainage, resulting in drier conditions for the wetland community. Indirect edge effects will extend into the LSA with changes in light and wind limited to 120 m from the PA while changes to hydrology may extend farther into the LSA depending on the extent of hydrological impacts.

Table 16.17 Summary of Residual Potential Rare Vegetation Communities in the Local Study Area

Rare Vegetation Community	Ecosite Code	Ecosite Name	Project Area	Local Study Area	
			Area (ha)	Area (ha)	% Change from PA
Hardwood Swamp	B133	Hardwood Swamp	3	4	-75
Grand Total			3	4	-75

Operations

Impacts to potential rare vegetation communities during operations are expected to be limited to edge effects associated with vegetation management in adjacent habitat and changes to hydrology from water table drawdown associated with mine pit dewatering.

Decommissioning and Closure

No measurable adverse changes to rare vegetation communities are predicted due to decommissioning and closure or re-purposing because the PA will have been previously cleared during construction. With the implementation of a reclamation plan, impacts to rare vegetation communities are predicted to be positive with the potential to re-establish potential rare vegetation communities in the PA and reverse indirect impacts from Project construction and operations.

16.4.2.3.5 Fragmentation

Construction

Construction of the Project will result in an overall decrease in mean patch size in all land cover classes (naturally vegetated, anthropogenic and non-vegetated communities) of <1% and an increase in perimeter to area ratio of 1% within the RSA (Table 16.18). Naturally vegetated communities are predicted to decrease in mean patch size of 2% and an increase in mean perimeter to area ratio of 1%.

Additional indirect edge effects have potential to further decrease effective mean patch size and increase perimeter to area ratios in the RSA. Indirect edge effects from construction in the PA will extend into the LSA with changes in light and wind limited to 120 m from the PA while changes to hydrology may extend farther into the LSA depending on the extent of hydrological impacts.

Table 16.18 Summary of Post-Construction Fragmentation in the Regional Study Area

Broad Land Cover Category	Land Cover Class	Mean Patch Size (ha)			Mean Perimeter/Area Ration (km/ha)		
		Baseline	Post-construction	Change (%)	Baseline	Post-construction	Change (%)
Natural Vegetated Communities	Treed Communities	35	36	2	2	2	1
	Treed Wetland	2	12	-5	1	1	3
	Open Wetland	137	133	-3	1	1	<-1
<i>Subtotal Natural Vegetated Communities</i>		<i>174</i>	<i>171</i>	<i>-2</i>	<i>3</i>	<i>3</i>	<i>1</i>
Anthropogenic and Non-vegetated Communities	Disturbed, Regenerating	8	8	1	9	1	<-1
	Non-vegetated	6	8	40	4	4	2
<i>Subtotal Anthropogenic and Non-vegetated Communities</i>		<i>14</i>	<i>16</i>	<i>17</i>	<i>5</i>	<i>5</i>	<i>1</i>
Total		188	187	<-1	8	8	1
Note: Numbers may not add up due to rounding							

Operations

Impacts to vegetation communities from increased fragmentation during operations are expected to be limited to edge effects associated with vegetation management in adjacent habitat and changes to hydrology from water table drawdown associated with mine pit dewatering.

Decommissioning and Closure

No measurable adverse changes from fragmentation are predicted due to decommissioning and closure or re-purposing because the PA will have been previously cleared during construction. With the implementation of a reclamation plan, impacts of fragmentation are predicted to be positive with the potential to re-establish natural vegetation communities and increase mean patch size and decrease perimeter to area ratios and reverse indirect impacts from Project construction and operations.

16.4.2.3.6 Summary

The change in abundance and distribution of plant species of importance to Indigenous nations due to Project operations is expected to be adverse, low in magnitude, long-term in duration, and reversible following the end of Project operations. The effect will occur continuously during operations. Timing is not applicable. The overall risk to plant species of importance to Indigenous nations is low.

The effects on native plant and ecological communities from invasive plant species are expected to be low in magnitude. Effects of invasive species, if introduced or discovered, would occur within the LSA. Given the mitigation measures, effects are expected to be short-term and reversible as control methods are industry standard and effective. Timing is not applicable. Spread of invasive species could occur over multiple irregular events. The overall risk to native plants and ecological communities of invasive plants is low due to a minor consequence (low in magnitude and within the PA) and minor to moderate likelihood of occurring.

The loss in abundance of potential hardwood swamp rare vegetation communities is expected to be adverse and low in magnitude since rare vegetation communities' occurrences in the PA and LSA have not been confirmed. No sensitivity to timing is predicted with the duration occurring over the long-term from single and repeated events. Residual effects to potential rare vegetation communities are predicted to be reversible.

During the construction phase of the Project, the decrease in mean patch size and increase in mean perimeter/area ratio in naturally vegetated communities is expected to be adverse and low in magnitude due to the relatively low change within the RSA and the already fragmented landscape within the RSA from other forms of anthropogenic disturbance (e.g., roads and forestry). No sensitivity to timing is predicted with the duration occurring over the long-term from single and repeated events. Residual effects of fragmentation are predicted to be reversible in the long term through mine closure and reclamation.

16.4.3 Change in Riparian Form and Function

This section describes the pathways, mitigation measures, and predicted Project residual effects relative to change in abundance and condition of riparian communities.

16.4.3.1 Project Pathways

Vegetation clearing of the Project footprint during site preparation and clearing has the potential to change the abundance of riparian communities and riparian function (associated with a change in structure). Vegetation clearing adjacent to riparian communities can also cause indirect edge effects such as changes in light and wind exposure. Site preparation adjacent to riparian communities may also cause changes in hydrology, specifically changes to flooding regimes. A change in groundwater levels could result in a change to riparian communities downstream of Project infrastructure. Changes in surface water quantity may result in localized effects on drainage and soil moisture.

During operations, pit dewatering is predicted to cause water table drawdown in areas surrounding the PA, potentially causing a drop in the water levels in the LSA close to the PA, resulting in indirect impacts to riparian communities through changes in flood regime. Facility and infrastructure maintenance during operations will include activities such as brushing, and tree removal within the Project footprint; this may affect riparian communities by repeatedly reducing the structural stage of vegetation adjacent to the Project footprint (maintained in an herbaceous or shrub state).

During construction, there is a potential for edge effects that could affect adjacent riparian communities through sedimentation or changes in soil moisture. During the construction, operations, and decommissioning and closure phases, there is potential for equipment to introduce or spread invasive species present in the LSA (e.g., Canada thistle) via equipment or construction material movement.

Decommissioning and closure of infrastructure and site regrading and revegetation could re-disturb riparian communities adjacent to the Project footprint, cause sedimentation, or introduce or spread invasive plants to riparian communities within or adjacent to the footprint through equipment movement.

Many of these predicted effects on abundance and function of riparian communities can be mitigated by application of construction mitigation measures and subsequent adaptive management (e.g., reclamation) measures, where required. These mitigation and reclamation measures will protect and aid in the recovery of wetlands and, therefore, wetland functions.

16.4.3.2 Mitigation and Enhancement Measures

The following mitigation measures have been incorporated into the design of the Project and/or are proposed to avoid or reduce Project-related effects on riparian communities:

- Canada Nickel will mark clearing boundaries prior to site preparation to maintain clearing activities within the designated footprint.
- Canada Nickel will adjust the limits of clearing and disturbance to avoid riparian communities, where practical.
- When crossing watercourses and wetlands that will be preserved over the Project duration with linear features such as roads, Canada Nickel will maintain hydrological connectivity using appropriately sized culverts to reduce impacts on riparian vegetation.
- Canada Nickel will develop and implement an Erosion and Sediment Control Plan which will describe measures and best management practices to protect the environment through reduction of site erosion and protection of nearby riparian communities from sedimentation.
- Canada Nickel will implement industry standard management practices to reduce the introduction or spread of invasive plant species.
- Where invasive plant species are discovered within the Project Area, Canada Nickel will implement vegetation control to eliminate the occurrence and prevent further spread.
- Canada Nickel will incorporate riparian communities into reclamation planning, where habitat is deemed suitable.
- Canada Nickel will develop and implement a Construction Environmental Protection Plan which will describe the proposed mitigation measures to reduce effects on vegetation resources.

Revegetation strategies will be detailed in the Mine Development Closure Plan, including incorporation of the mitigation measures for riparian communities identified above. The Conceptual Closure Plan (Appendix F of the Impact Statement) describes the strategies for vegetation plot studies, revegetation and monitoring (which are discussed further in Section 16.4.2.2).

16.4.3.3 Project Residual Effects

Construction

Site preparation and clearing during construction of the Project will result in a direct loss of approximately 11,785 ha of land area, including approximately 11,504 ha of naturally vegetated communities. Of these, up to 221 ha of riparian habitat will be directly affected by Project development, resulting in a loss of 36% of riparian habitat in the LSA and of which 178 ha is naturally vegetated resulting in a loss of 32% of naturally vegetated riparian habitat in the LSA (Table 16.19).

Additional indirect edge effects on riparian communities may occur outside the PA from changes in wind, light, and hydrology. Hydrological changes to riparian communities occur through changes in drainage, resulting in drier conditions for the community. Indirect edge effects will extend into the LSA with changes in light and wind limited to 120 m from the PA while changes to hydrology may extend further into the LSA depending on the extent of hydrological impacts.

Table 16.19 Summary of Residual Effects from Direct Loss of Riparian Habitat in the Local Study Area

Broad Land Classification	Land Cover Class	Direct Loss in Project Area Area (ha)	Remaining Riparian Area in the Local Study Area	
			Area (ha)	% Change in the Local Study Area
Upland Forest	Coniferous Forest	167	357	-32
	Deciduous Forest	10	17	-37
<i>Subtotal Upland Forest</i>		<i>178</i>	<i>374</i>	<i>-32</i>
Anthropogenic	Constructed	22	8	-72
	Anthropogenic	22	18	-56
<i>Subtotal Anthropogenic</i>		<i>44</i>	<i>26</i>	<i>-63</i>
Total		222	400	-36

Operations

Direct impacts to riparian communities will continue in phases 1 and 2 of operations through continued construction activities (e.g., mine component expansion and Highway 655 realignment). Impacts to riparian communities during operations are predicted to be predominantly indirect during phase 3 and limited to edge effects associated with vegetation management in adjacent habitat and changes to hydrology from water table drawdown associated with mine pit dewatering, potentially impacting riparian community function by altering species composition, diversity, and plant health.

Pit dewatering has the potential to draw down the water table in the LSA outside the north and east side of the PA, potentially resulting in drier conditions in riparian areas in the LSA (Figure 16.6). Drier conditions in riparian communities may impact species composition, diversity, and plant health.

Decommissioning and Closure

During decommissioning and closure, no measurable adverse changes to riparian community abundance and function are predicted due to decommissioning or re-purposing because the PA will have been previously cleared during construction and operations. With the application of a reclamation plan, effects to riparian communities are predicted to be positive with the potential to re-establish riparian communities in portions of the PA and reverse some direct losses of wetlands from Project construction. Indirect effects are expected to be largely reversed through re-establishment of the water table and reduction in edge effects through revegetation activities.

16.4.3.3.1 Summary

Over the life of the Project, the loss in area of riparian communities is expected to be adverse and high in magnitude, but contained to the limits of the PA. Changes in riparian function are expected to be adverse and moderate in magnitude and occur in the LSA within 120 m of the PA. No sensitivity to timing is predicted, with the duration occurring over the long-term from single and repeated events. The magnitude of direct and indirect effects to riparian communities may be reduced through fish habitat offsetting (see Appendix M of the Impact Statement [Conceptual Fish Habitat Offsetting Plan] for additional details). Residual effects to riparian communities are predicted to be reversible to irreversible, as areas of riparian communities may not be possible to re-establish during reclamation.

16.4.4 Change in Wetland Form and Function

This section describes the pathways, mitigation measures, and predicted Project residual effects relative to predicted changes in abundance and function of wetlands.

16.4.4.1 Project Pathways

Vegetation clearing of the Project footprint during site preparation and clearing has the potential to change the abundance of wetlands and change wetland functions including changes in wetland structure and loss of peat volumes (associated with a change in structure). Vegetation clearing adjacent to wetlands can also cause indirect edge effects such as changes in light and wind exposure. Site preparation adjacent to wetlands can cause changes in hydrology, specifically decreased recharge rates and decreased groundwater infiltration. The development of the water management system to manage contact water and divert non-contact water may have localized hydrological effects by drawing moisture from surrounding wetlands, however the water management system has been designed to mimic local hydrology to the extent practical. A change in groundwater levels could result in a change to wetland hydrology downstream of Project infrastructure. Changes in surface water quantity may result in localized effects on drainage and soil moisture.

During operations, pit dewatering is predicted to cause water table drawdown in areas surrounding the PA, potentially causing a drop in the water levels in wetlands in the LSA close to the PA, resulting in indirect impacts to wetlands. Facility and infrastructure maintenance during operations will include activities such as brushing and tree removal, within the Project footprint; this may affect wetlands by repeatedly reducing the structural stage of vegetation adjacent to the Project footprint (maintained in a herbaceous or shrub state).

During construction and operations there is a potential for edge effects that could affect adjacent wetlands through sedimentation or changes in soil moisture. During the construction, operations, and decommissioning and closure phases, there is potential that equipment could introduce or spread invasive species present in the LSA (e.g., Canada thistle) via equipment or construction material movement.

Decommissioning and closure of infrastructure and site regrading and revegetation could re-disturb wetlands adjacent to the Project footprint, cause sedimentation to wetlands, or introduce or spread invasive plants to wetlands within or adjacent to the footprint through equipment movement.

Many of these predicted effects on wetlands and wetland function can be mitigated by application of construction mitigation measures and subsequent adaptive management (e.g., reclamation) measures, where required. These mitigation measures will aid in the recovery of wetlands and, therefore, wetland functions.

16.4.4.2 Mitigation and Enhancement Measures

The following mitigation measures have been incorporated into the design of the Project and/or are proposed to avoid or reduce Project-related effects on wetland communities:

- Canada Nickel will mark clearing boundaries prior to site preparation to maintain clearing activities within the designated footprint.
- When crossing wetlands that will be preserved over the Project duration with linear features such as roads, Canada Nickel will maintain hydrological connectivity using appropriate features such as properly placed and sized culverts.
- Canada Nickel will develop and implement an Erosion and Sediment Control Plan which will describe measures and best management practices to protect the environment through reduction of site erosion and protection of nearby wetlands sedimentation
- Canada Nickel will implement industry standard management practices to reduce the introduction or spread of invasive plant species.
- Where invasive plant species are discovered within the Project Area, Canada Nickel will implement vegetation control to eliminate the occurrence and prevent further spread.
- Canada Nickel will incorporate wetlands into reclamation planning, where habitat is deemed suitable.

Revegetation strategies will be detailed in the Mine Development Closure Plan, including incorporation of the mitigation measures for wetlands identified above. The Conceptual Closure Plan (Appendix F of the Impact Statement) describes the strategies for vegetation plot studies, revegetation and monitoring (which are discussed further in Section 16.4.2.2).

16.4.4.3 Project Residual Effects

Construction

Site preparation and clearing during construction of the Project will result in a predicted direct loss of approximately 8,667 ha of wetland area, 22% of the wetlands in the LSA (Table 16.20). The greatest wetland loss is predicted to be from swamps, with approximately 4,768 ha lost (19% of swamps in the LSA) followed by bogs with 2,358 ha lost (30% of bogs present in the LSA). Smaller amounts of fens and marshes will be removed during construction, with 789 ha of fens (17% of the LSA) and 752 ha of marshes (58% of the LSA) predicted to be lost.

Additional indirect edge effects on wetlands outside the PA are predicted from changes in wind, light, and hydrology. Hydrological changes could affect wetland communities through changes in drainage, resulting in drier conditions for the wetland community. Indirect edge effects will extend into the LSA with changes in light and wind limited to 120 m from the PA while changes to hydrology may extend further into the LSA depending on the extent of hydrological impacts.

Table 16.20 Summary of Direct Residual Effects to Wetland Community Abundance in the Local Study Area

Land Cover Class	Ecosite Code	Ecosite Name	Direct Loss in Project Area	Remaining Wetland in Local Study Area	
			Area (ha)	Area (ha)	% Change in Local Study Area
Wetland - Bog	B126	Treed Bog	2,353	5,309	-31
	B137	Sparse Treed Bog	<1	198	<1
	B138	Open Bog	5	26	-16
<i>Subtotal Wetland -Bog</i>			2,358	5,534	-30
Wetland - Fen	B136	Sparse Treed Fen	781	3,684	-18
	B139	Poor Fen	7	136	-5
	B140	Open Moderately Rich Fen	<1	52	<1
	B141	Open Extremely Rich Fen	<1	16	<1
	B146	Open Shore Fen	<1	22	<1
<i>Subtotal Wetland - Fen</i>			789	3,910	-17

Land Cover Class	Ecosite Code	Ecosite Name	Direct Loss in Project Area	Remaining Wetland in Local Study Area	
			Area (ha)	Area (ha)	% Change in Local Study Area
Wetland - Marsh	B142	Mineral Meadow Marsh	12	131	-9
	B144	Organic Meadow Marsh	740	412	-64
<i>Subtotal Wetland - Marsh</i>			752	543	-58
Wetland - Swamp	B127	Poor Conifer Swamp	95	1,154	-8
	B128	Intermediate Conifer Swamp	2,931	17,007	-15
	B129	Rich Conifer Swamp	625	913	-41
	B133	Hardwood Swamp	3	4	-41
	B134	Mineral Thicket Swamp	4	28	-11
	B135	Organic Thicket Swamp	933	1,068	-47
	B222	Mineral Poor Conifer swamp	177	156	-53
	B223	Mineral Intermediate Conifer Swamp	<1	191	<1
<i>Subtotal Wetland - Swamp</i>			4,768	20,522	-19
Total Wetlands			8,667	30,508	-22

Several wetlands within the PA will be directly impacted through activities that will be subject to Authorization under the *Fisheries Act* and/or Approvals under the MDMER since these wetlands also support fish habitat. Table 16.21 identifies the size of each wetland community that provides direct fish habitat within the PA that will be impacted by such activities.

Table 16.21 Summary of Wetlands Intersecting Fish Habitat

Wetland Class	Ecosite Code	Ecosite Name	Area (ha)	Area (%)
Bog	B126	Treed Bog	8	7
	<i>Total Bog</i>		8	7
Fen	B139	Poor Fen	1	1
	B136	Sparse Treed Fen	5	5
	<i>Total Fen</i>		6	5
Marsh	B142	Mineral Meadow Marsh	1	1
	B144	Organic Meadow Marsh	82	71
	<i>Total Marsh</i>		83	72

Wetland Class	Ecosite Code	Ecosite Name	Area (ha)	Area (%)
Swamp	B128	Intermediate Conifer Swamp	4	4
	B222	Mineral Poor Conifer swamp	<1	1
	B127	Poor Conifer Swamp	<1	<1
	B129	Rich Conifer Swamp	2	1
	B135	Organic Thicket Swamp	11	10
	<i>Total Swamp</i>			18
Grand Total			115	100.0
Note: Numbers may not add up due to rounding				

Site preparation and clearing of wetlands during construction of the Project will result in a predicted direct loss of approximately 8,474 ha of peat-containing wetlands within the Project Area. Clearing of peatlands will result in the loss of over 34 Mm³ of peat and a change in peat volumes of 28% in the LSA (Table 16.22).

Table 16.22 Summary of Direct Residual Effects to Peat Volumes in the Project Area

Land Cover Class	Ecosite Code	Ecosite Name	Direct Peat Loss in Project Area	Remaining Peat in the Local Study Area	
			Peat Volume (m ³)	Peat Volume (m ³)	Change in Peat Volume (%)
Wetland - Bog	B126	Treed Bog	-9,411,032	21,235,865	-44
	B137	Sparse Treed Bog	-	793,098	-
	B138	Open Bog	-20,720	105,724	-20
<i>Subtotal Wetland -Bog</i>			<i>-9,431,752</i>	<i>22,134,686</i>	<i>-43</i>
Wetland - Fen	B136	Sparse Treed Fen	-3,125,380	14,736,205	-21
	B139	Poor Fen	-28,850	542,137	-5
	B140	Open Moderately Rich Fen	-770	206,238	<1
	B141	Open Extremely Rich Fen	-	65,249	-
	B146	Open Shore Fen	-	88,448	-
<i>Subtotal Wetland - Fen</i>			<i>-3,155,000</i>	<i>15,638,277</i>	<i>-20</i>
Wetland - Marsh	B144	Organic Meadow Marsh	-2,960,381	1,647,621	-180
<i>Subtotal Wetland - Marsh</i>			<i>-2,960,381</i>	<i>1,647,621</i>	<i>-180</i>

Land Cover Class	Ecosite Code	Ecosite Name	Direct Peat Loss in Project Area	Remaining Peat in the Local Study Area	
			Peat Volume (m ³)	Peat Volume (m ³)	Change in Peat Volume (%)
Wetland - Swamp	B127	Poor Conifer Swamp	-380,998	4,615,881	-8
	B128	Intermediate Conifer Swamp	-11,723,785	68,026,848	-17
	B129	Rich Conifer Swamp	-2,498,748	3,653,379	-68
	B133	Hardwood Swamp	-12,059	17,328	-70
	B135	Organic Thicket Swamp	-3,731,844	4,272,378	-87
	B223	Mineral Intermediate Conifer Swamp	-814	765,579	<1
<i>Subtotal Wetland - Swamp</i>			<i>-18,348,249</i>	<i>81,351,393</i>	<i>-23</i>
Total Wetlands			-33,895,382	120,771,977	-28

Operations

Direct impacts to wetlands will continue in the operations phase through continued construction activities (e.g., mine component expansion and Highway 655 realignment). Impacts to wetlands during operations phase 3 are predicted to be predominantly indirect and limited to edge effects associated with vegetation management in adjacent habitat and changes to hydrology from water table drawdown associated with mine pit dewatering.

Mine pit dewatering has the potential to draw down the water table in the LSA outside the north and east side of the PA, potentially resulting in drier conditions in wetlands in the LSA (Figure 16.5, Table 16.23) Up to approximately 542 ha of wetlands (1% of the LSA) are predicted to potentially be impacted by a lowering of the water table. Swamps are the largest wetland class, with approximately 473 ha (2% of swamps in the LSA) subject to water table drawdown, with intermediate conifer swamps the most common type of swamp occupying approximately 426 ha (2% of those present in the LSA). Much smaller areas of bogs, fens, and marshes will be subject to water table drawdown with no other wetland class having more than 27 ha impacted.

Table 16.23 Summary of Residual Indirect Effects of Mine Pit Dewatering on Wetlands in the Local Study Area

Land Cover Class	ELC Code	Ecosite Name	Local Study Area		
			Potential Area Impacted (ha)	Unaffected Area (ha)	Area Impacted in Local Study Area (%)
Bog	B126	Treed Bog	27	7,635	Between 0 and -1
<i>Subtotal Bog</i>			27	7,635	Between 0 and -1
Fen	B136	Sparse Treed Fen	17	4,448	Between 0 and -1
	B139	Poor Fen	4	139	-3
<i>Subtotal Fen</i>			21	21	<i>Between 0 and -1</i>
Marsh	B142	Mineral Meadow Marsh	4	140	-3
	B144	Organic Meadow Marsh	17	1,135	-1
<i>Subtotal Marsh</i>			21	1,274	-2
Swamp	B128	Intermediate Conifer Swamp	426	19,512	-2
	B129	Rich Conifer Swamp	1	1,537	Between 0 and -1
	B135	Organic Thicket Swamp	5	1,996	Between 0 and -1
	B222	Mineral Poor Conifer swamp	41	292	-12
<i>Subtotal Swamp</i>			473	23,337	-2
Total Wetland			542	32,267	-1
Water	-	Lakes, Rivers, Ponds	<1	287	Between 0 and -1
Grand Total			1,026	44,191	-3

Decommissioning and Closure

During decommissioning and closure, no measurable adverse changes to wetland form and function are predicted due to decommissioning or re-purposing because the PA will have been previously cleared during construction and operations. With the implementation of a reclamation plan, restoration of wetland communities are proposed in portions of the PA.

Summary

Over the life of the project, the loss in abundance of wetland communities and their function is expected to be adverse and moderate in magnitude and will occur within the PA. No sensitivity to timing is predicted, with the duration occurring over the long-term from single and repeated events. Residual effects to wetland communities are predicted to be 'reversible' to 'irreversible', as areas of wetland communities may not be possible to re-establish during reclamation.

Effects of water table drawdown are expected to decrease as distance from the pit increases and are predicted to be minor in the LSA. Residual effects of water table drawdown in the LSA on wetland communities are expected to be adverse in direction, low in magnitude, and occur within the LSA, but near the PA boundary. No timing sensitivity is expected. The duration is expected to be short-term to medium-term for the life of Project operation and occur continuously. Effects are expected to be reversible over the long-term.

16.4.5 Summary of Project Residual Effects

Table 16.24 summarizes Project residual effects on vegetation, riparian and wetland environments.

Table 16.24 Summary of Project Residual Effects on Vegetation, Riparian and Wetland Environments

Residual Effect	Effects Characterization							
	Project Phase	Direction	Magnitude	Geographic Extent	Timing	Duration	Frequency	Reversibility
Change in Vegetation Communities and Species Diversity	C, O, D	A	L	PA-LSA	NS	LT	IR	R
Change in Riparian Form and Function	C, O, D	A	L	PA-LSA	NS	ST-LT	S-C	R-IR
Change in Wetland Form and Function	C, O, D	A	M	PA-LSA	NS	ST-LT	S-C	R-IR
<p>KEY See Table 16.4 for detailed definitions.</p> <p>Project Phase C: Construction O: Operation D: Decommissioning and closure</p> <p>Direction: P: Positive A: Adverse N: Neutral</p> <p>Magnitude: N: Negligible L: Low M: Moderate H: High</p> <p>Geographic Extent: PA: Project Area LSA: Local Study Area RSA: Regional Study Area</p> <p>Timing NS: No sensitivity MS: Moderate sensitivity HS: High sensitivity</p> <p>Duration: ST: Short-term MT: Medium-term LT: Long-term</p> <p>Frequency: S: Single event IR: Irregular event R: Regular event C: Continuous</p> <p>Reversibility: R: Reversible I: Irreversible</p> <p>N/A: Not applicable</p>								

16.4.5.1 Summary of Adverse Residual Effects

Direct loss of vegetation communities will be offset in part by progressive reclamation during operations, and final reclamation and revegetation activities after the operations phase is complete. Progressive reclamation will occur during all three phases of the Project with the TMF reclamation starting during operations. Constructed wetland and vegetation test plot pilot studies will be initiated during the operations phase and will be used to inform ongoing rehabilitation efforts during progressive reclamation and at final closure. Most of the PA will be rehabilitated before the closure phase.

16.4.5.2 Summary of Positive Residual Effects

Positive Project residual effects are based on the implementation of the following activities for vegetation, riparian and wetland environments:

- Establishment of plant species of management concern such as SAR and SOCC through inclusion in reclamation, where appropriate, potentially resulting in an increase in these species.
- Establishment of rare vegetation communities such as black ash, red pine, and white pine through inclusion in reclamation activities, where appropriate, resulting in an increase in these communities within the RSA. Creation of new wetland and riparian habitats and function through establishment of these communities during progressive reclamation such as along the by-pass channel and during mine closure.
- Creation of peat forming wetland communities during progressive reclamation and final mine reclamation activities, where appropriate.
- Decrease in fragmentation through removal of roads and establishment of contiguous natural vegetation communities during mine closure and reclamation.
- Restoration of caribou habitat within the Kesagami Range of the PA, where appropriate.
- Incorporation of plants harvested by Indigenous nations in revegetation, where feasible.

16.5 Significance of Adverse Federal Effects

Change in Direct Fish Habitat Wetlands

Given the abundance of wetlands in the LSA and RSA, the relatively small changes in wetlands area restricted to the PA are not predicted to threaten the long-term viability and quality of wetlands in the LSA or RSA. The Project will result in a net loss of 115 ha of wetlands supporting fish habitat. Direct fish habitat wetland loss is limited to the PA, with indirect effects extending some distance into the LSA. The magnitude change in fish-supporting wetland area is anticipated to be moderate with approximately 30,920 ha (77%) of wetlands remaining in the LSA and 413,785 ha (98%) in the RSA. The majority of direct fish habitat wetland loss will occur during construction as a result of stripping, grading, and other construction activities and will continue through operations. Progressive restoration has the potential to reverse a portion of the wetland loss beginning in operations. During decommissioning and closure, impacts from the change in direct fish habitat wetland are expected to be reduced as mining disturbance ceases and habitat restoration progresses.

Progressive reclamation, beginning during operations and continuing into active closure, is expected to restore some wetland habitat. Following active closure, wetlands are expected to increase due to the establishment of waterbodies and wetlands in the PA, which are expected to contain fish habitat; details of which will be further developed through the Closure Plan.

The reduction in wetland area in the LSA and RSA during construction and operation is not expected to result in a substantial reduction in wetland function, with remaining wetlands in the LSA likely adequate to provide continued such support (for example, as suggested in Åhlén et al. 2020).

As such, with the application of mitigation measures described above, Project residual effects to wetlands supporting fish habitat are predicted to be of a moderate extent of significance.

16.6 Potential Effects on Federal Land

There are no federal lands within the LSA or RSA. The closest Federal lands are the Taykwa Tagamou Nation Reserve lands located approximately 37 km away (straight line) from the PA (14 km southeast of Cochrane). No additional mitigation measures beyond those identified are specifically required for federal lands.

16.7 Prediction Confidence

The prediction confidence in the conclusions for Project residual effects for vegetation, riparian, and wetland environments is based on several assumptions and limitations in data including the following:

- Confidence in the mapping undertaken for the Project, such as the accuracy of mapping from publicly available sources and forest management companies.
- Assumptions and conservatism used in the assessment, for example (as stated in Section 16.4.1):
 - The PA defines the maximum permitted area of clearing; however, the actual extent of clearing is likely to be smaller than the PA.
 - Overburden stockpiles within the PA are assumed to be completely cleared of vegetation; however, vegetation may be allowed/encouraged to regrow in these areas during operations as progressive restoration prior to reclamation and closure.
- That water table drawdown occurs to the maximum potential extent (as determined and described in Chapter 14 of the Impact Statement [Assessment of Potential Effects on Groundwater]).
- An incomplete understanding of the final closure plan and reclamation and revegetation activities.
- Professional judgment based on previous projects.

Prediction confidence for residual effects is higher for direct effects, where losses in vegetation species or community areas are easily understood and quantified from activities such as vegetation clearing. However, prediction confidence for indirect effects is lower as edge effects such as changes in light, wind, or water table drawdown are not easily predicted and some species or communities may be unaffected by changes in environmental conditions, while other species may be sensitive to minor changes.

16.7.1 Change in Vegetation Communities and Species Diversity

Prediction confidence for residual Project effects on changes in vegetation communities and species diversity is low for direct and indirect effects on plant SAR and SOCC because these species typically occur in low numbers, in widely dispersed areas, can be cryptic in nature, and are easily overlooked in field surveys or may not be well-documented in previous studies.

Prediction confidence is high for direct effects on changes in abundance of plant species of importance to Indigenous nations as all species are common and are likely to occur in large numbers at multiple locations throughout the LSA and RSA. Vegetation clearing within the PA is likely to result in the direct loss of many plant species of importance to Indigenous nations while indirect effects from edge effects are likely to impact some species more than others, specifically species requiring more shade or higher moisture levels.

Prediction confidence is moderate for invasive plant species as noxious and invasive plant species are not well documented in the RSA and many species occur in low numbers, may be cryptic in nature, and Project effects on increases in abundance of invasive plant species are not easily predicted. However, the application of an appropriate mitigation is expected to reduce the likelihood and extent of invasive plant colonization of the PA during construction and operations.

Prediction confidence for residual Project effects on abundance and distribution of rare vegetation communities is low. Additionally, Project residual effects are likely overestimated by assuming the entire PA will be disturbed.

Prediction confidence for residual project effects on fragmentation in the RSA is moderate. Determination of the contribution of the Project to fragmentation within the RSA is dependent on other activities in the RSA over the life of the Project. Additionally, Project residual effects of fragmentation are likely overestimated by assuming the entire PA will be disturbed and not taking into consideration progressive reclamation occurring during the life of the Project.

16.7.2 Change in Riparian Form and Function

Prediction confidence for residual Project effects on changes in riparian form and function is moderate overall. Changes in riparian community areas are moderate as riparian communities are not easily defined but areas can be mapped in the PA and LSA with a reasonable level of confidence and direct loss from vegetation clearing and soil movement can be quantified. Additionally, stream realignment has the potential to offset some riparian area losses, although the quality of habitat is not quantifiable at this stage. Changes in riparian function, such as biodiversity loss, are low as the magnitude and extent of edge effects and water table drawdown are not quantifiable with absolute certainty. The magnitude of effect is likely to vary by species and decrease rapidly with increasing distance from the PA; the extent of effects is expected to be less than the 120 m maximum for edge effects.

16.7.3 Change in Wetland Form and Function

Prediction confidence for residual Project effects on changes in wetland form and function is overall moderate. Prediction confidence for changes in wetland area are high as wetlands in the LSA are well mapped and their classification to the ecosite level is likely accurate. Change in wetland function through biodiversity loss, vegetation cover, species composition, and surface water flow is low as the magnitude and extent of edge effects and effects of water table drawdown are not easily quantifiable; the magnitude of effect is likely to vary by species and is expected to decrease rapidly with increasing distance from the PA, expected to be less than the 120 m maximum for edge effects. Groundwater drawdown is based on modelling and represents a maximum limit for a minimum of 1 m of drawdown. Wetlands outside the PA

are not proximal to the area of pit dewatering and are unlikely to be subject to the maximum amount of water table drawdown, likely limiting residual effects. Similarly, edge effects are not well understood and are likely to be less than the 120 m maximum.

16.8 Assumptions

This assessment is based on assumptions which are likely to overstate the predicted direct effects and understate the predicted indirect effects.

Direct effects are likely overstated by assuming the entire area of the PA is to be cleared of vegetation. However, the PA is the maximum permitted area of clearing and the final Project footprint is likely to be smaller than the PA. The extent of effects on vegetation, riparian, and wetland environments will be reduced if smaller areas of the PA are cleared during construction and operations. Similarly, uncleared areas of vegetation are likely to persist within the PA after clearing such as along fence lines, road edges, and between Project components, further reducing the area of vegetation cleared. Overburden stockpiles within the PA are assumed to be completely cleared of vegetation; however, vegetation will be allowed to regrow in these, and other areas, during operations (i.e., for a minimum of 41 years), potentially allowing robust vegetation cover in some areas of the PA.

Direct and indirect Project effects on plant SAR and SOCC may be understated as black ash (the only SAR or SOCC species identified in the LSA) was recorded at two locations but may also occur elsewhere in the LSA. Given the cryptic nature of many rare plant species, their low abundance, and difficulty surveying the entire PA and LSA given their size and logistical challenges, the effects on plant SAR and SOCC may be understated. Similarly, three invasive plant species have been identified in the LSA which is likely to be an underestimate of the actual number of species, given the cryptic nature of many species and difficulty surveying the entire PA and LSA.

Potential rare vegetation communities have not been evaluated for qualification as rare vegetation communities in the field. Desktop mapping of candidate ecosites has likely resulted in an overestimate of direct areas removed and indirect effects. Field investigations of these habitats may not identify rare vegetation communities in the LSA.

The 1 m water table drawdown limit reflects the actual area subject to water table drawdown. The impermeable nature of the bedrock in the LSA and fine-textured soils present are likely to impede drainage of wetlands, regardless of pit dewatering. As a result, the area impacted by water table drawdown is likely to be an overestimate.

16.9 Follow-up and Monitoring

Canada Nickel will implement follow-up and monitoring programs to verify the accuracy of effects and to evaluate the effectiveness of mitigation measures, the results of which will be used to identify and implement adaptive management measures, as appropriate. As it relates to vegetation, riparian, and wetland environments, follow-up and monitoring measures will be implemented to monitor black ash stands, communities with plant species of importance to Indigenous nations, invasive plant species, riparian communities, and wetland communities at key Project locations. Monitoring data will be used to

verify and confirm the predicted effects and to meet regulatory requirements related to specific permits or conditions of approval. Chapter 34 of the Impact Statement includes additional details on follow-up and monitoring programs proposed by Canada Nickel.

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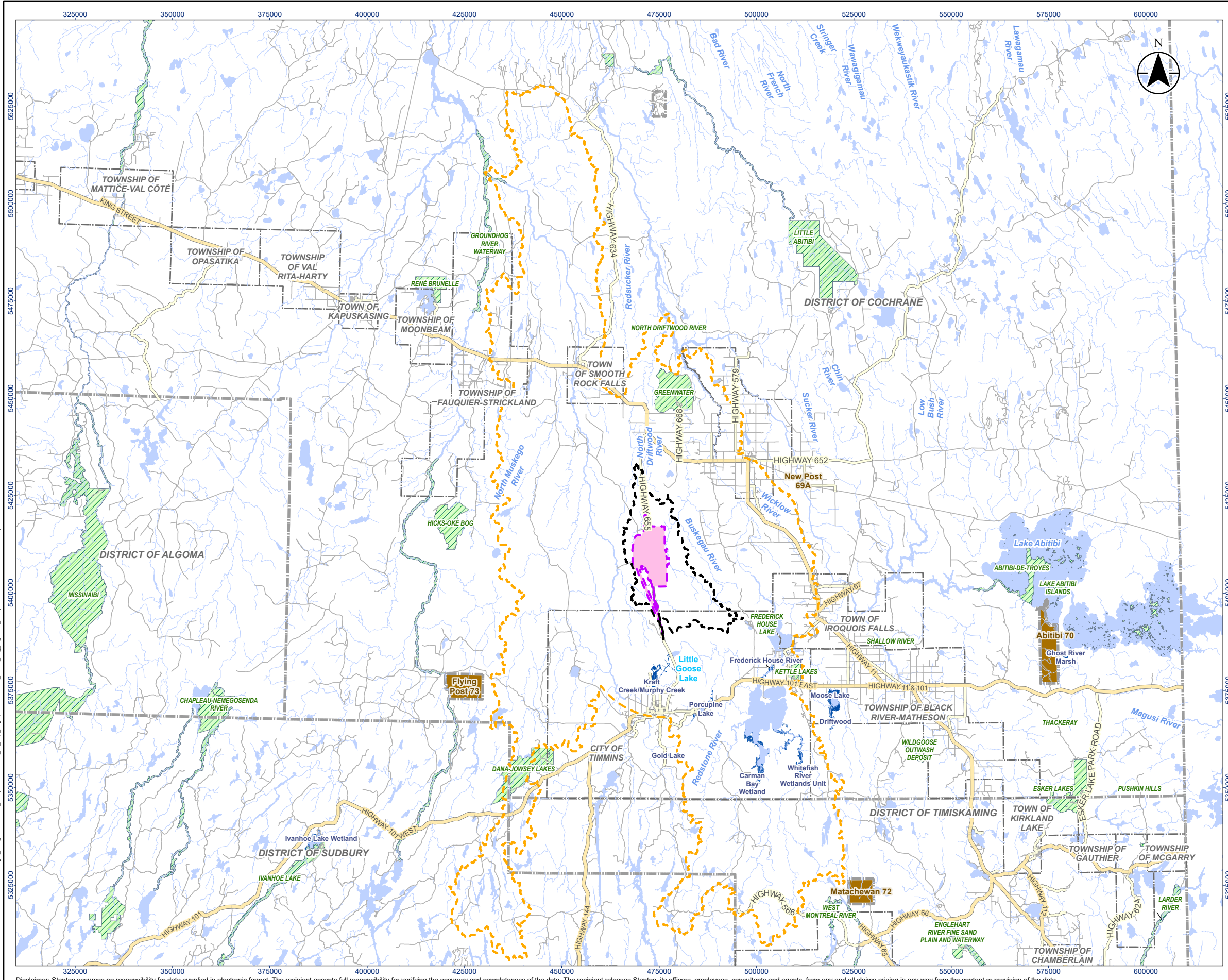
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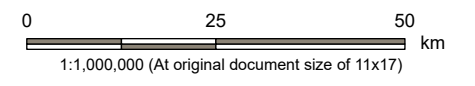
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16.11 Figures



Legend

- Project Area
- Local Study Area
- Regional Study Area
- Base Features**
- Expressway / Highway
- Major Road
- Minor Road
- Watercourse
- Municipal Boundary - Lower Tier
- First Nation Reserve
- Provincial Park
- Waterbody
- Wetland, Provincially Significant
- Wetland, Other Evaluated



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
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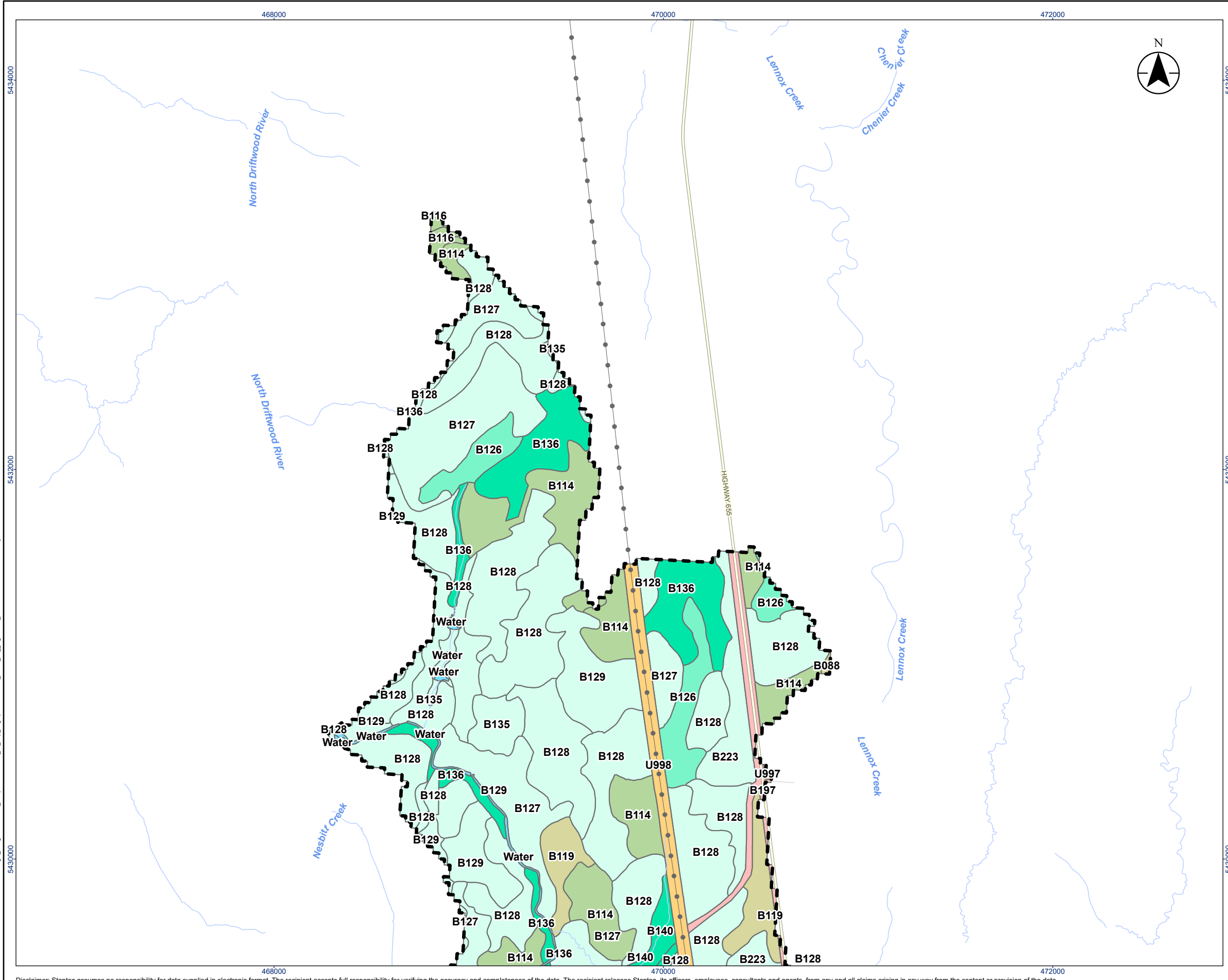


Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23

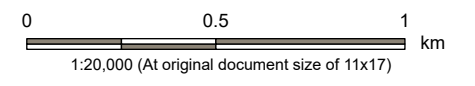
Client/Project:
 Canada Nickel Company (CNC)
 Crawford Nickel Project

Figure No. **16.1**
 Title **Local Study Area and Regional Study Area for Vegetation, Riparian, and Wetland Environments**

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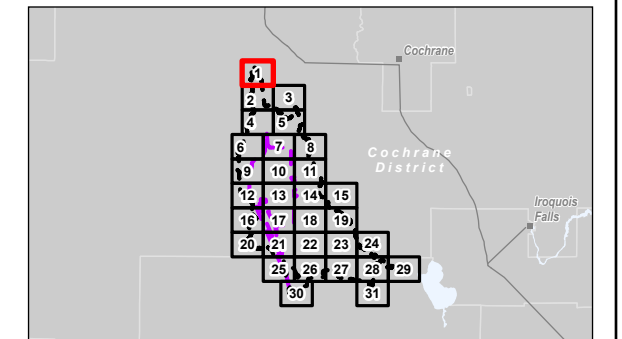


- Legend
- Local Study Area**
- Base Features**
- Major Road
 - Minor Road
 - Hydro Line
 - Watercourse (Permanent)
 - Waterbody
- Ecological Land Classification**
- Forested Area**
- Coniferous Forest/Stand
 - Deciduous Forest/Stand
- Wetland**
- Bog
 - Fen
 - Swamp
- Water**
- Water
- Anthropogenic**
- Anthropogenic
 - Constructed



Notes

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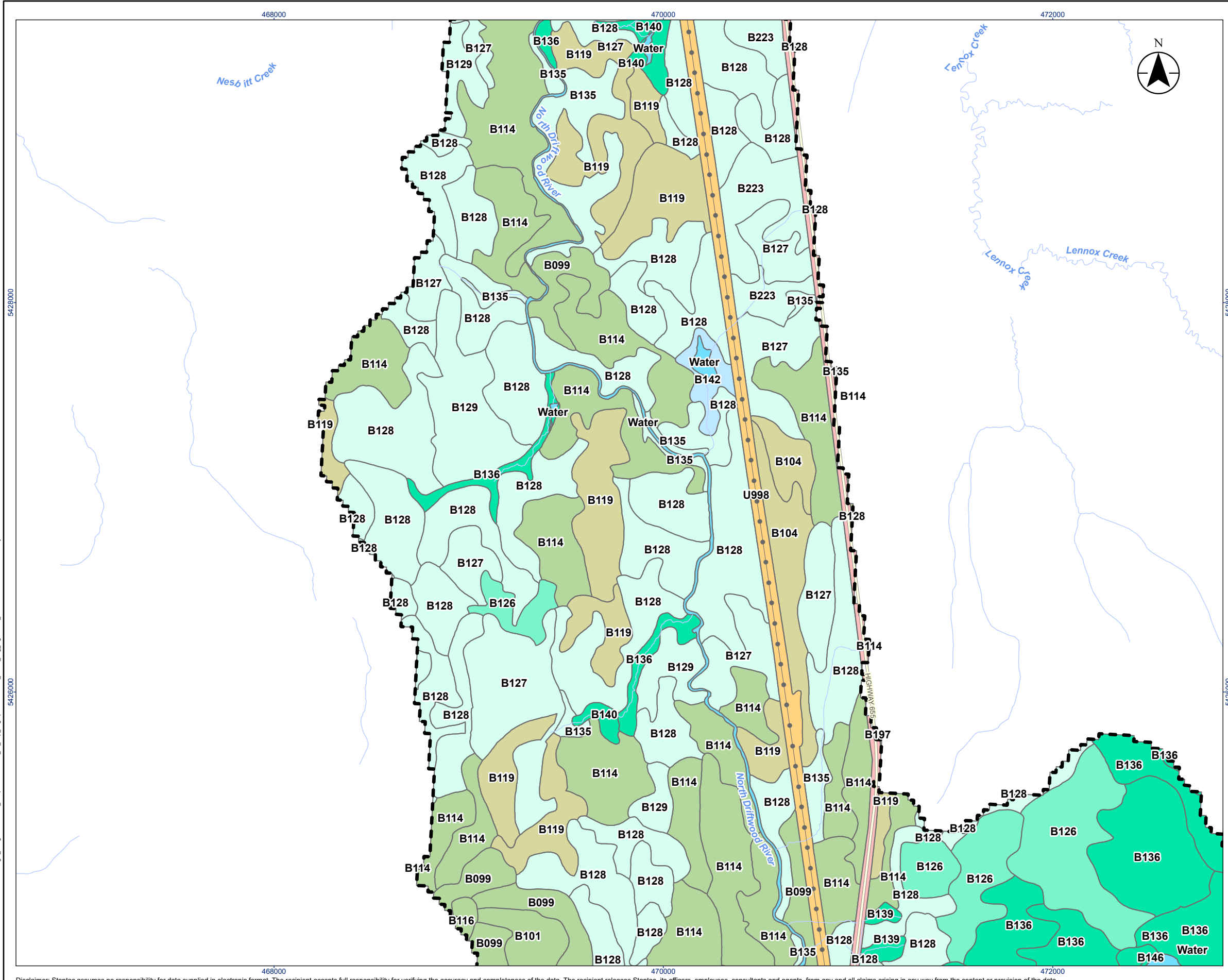


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 Prepared by: awhite on 2024-09-23

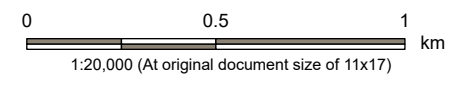
Client/Project: Canada Nickel Company (CNC)
 Crawford Nickel Project

Figure No.: **16.3.1**
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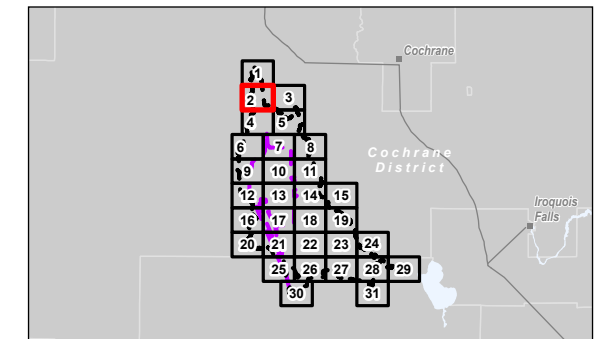
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- Legend**
- Local Study Area**
 Local Study Area
- Base Features**
 Major Road
 Hydro Line
 Watercourse (Permanent)
 Waterbody
- Ecological Land Classification**
- Forested Area**
 Coniferous Forest/Stand
 Deciduous Forest/Stand
- Wetland**
 Bog
 Fen
 Swamp
 Meadow Marsh
- Water**
 Water
- Anthropogenic**
 Anthropogenic
 Constructed



Notes
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 160930456 REVA

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Figure No.: **16.3.2**
 Title: **Ecological Land Classification in the LSA**

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 5426000

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Legend

Local Study Area

Base Features

Minor Road

Watercourse (Permanent)

Waterbody

Ecological Land Classification

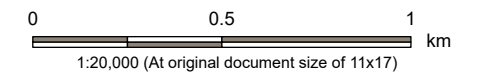
Forested Area

Coniferous Forest/Stand

Wetland

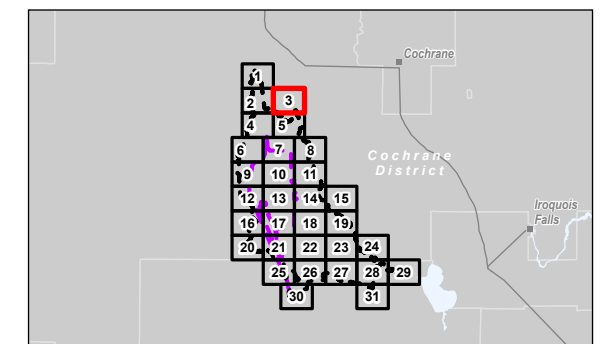
Fen

Swamp



Notes

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Figure No.
16.3.3

Title
Ecological Land Classification in the LSA

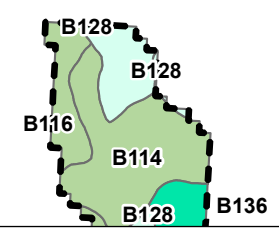
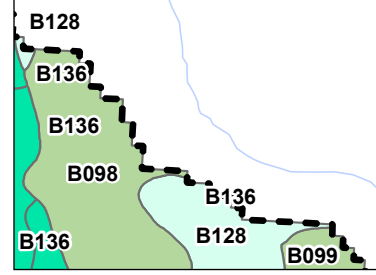
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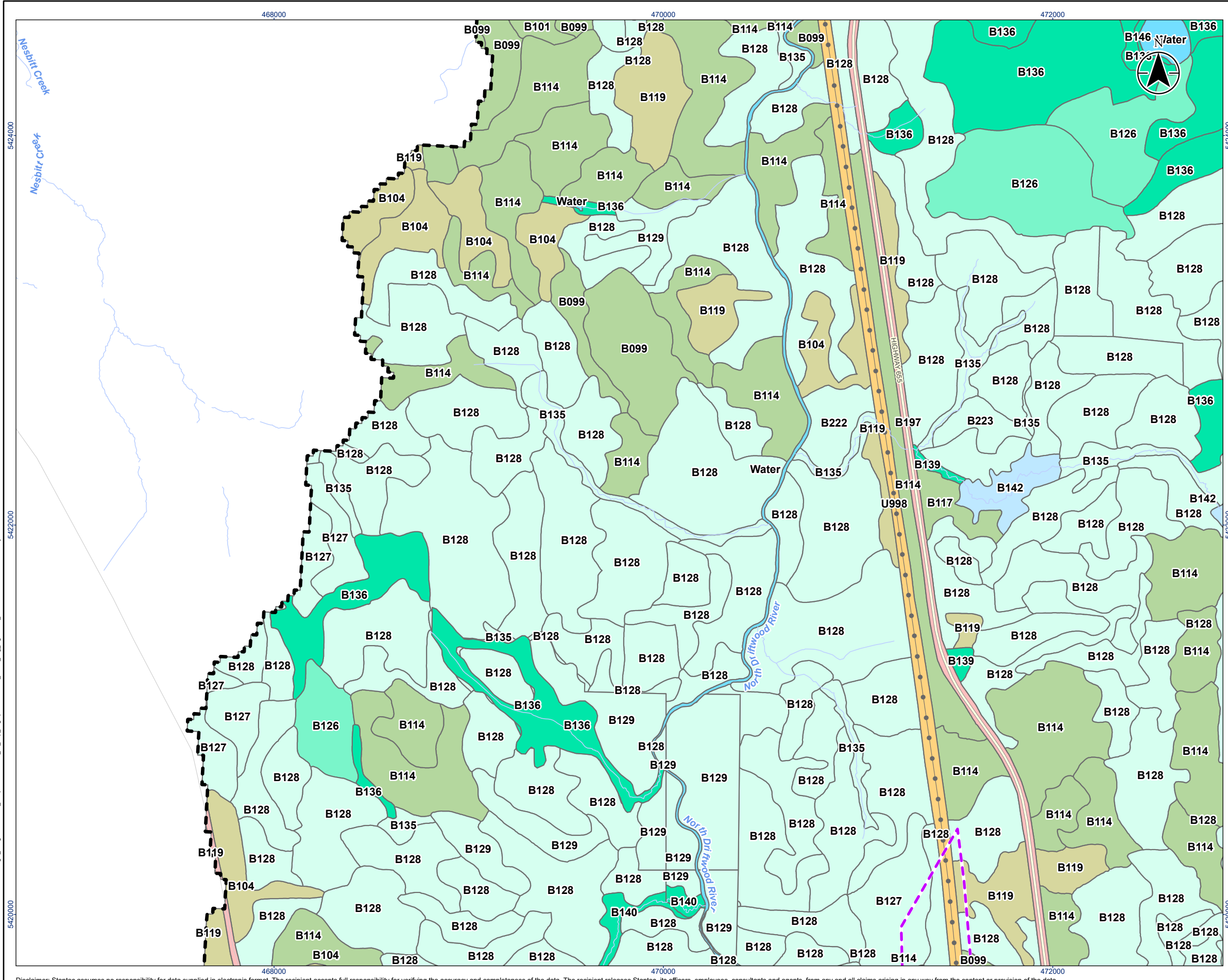


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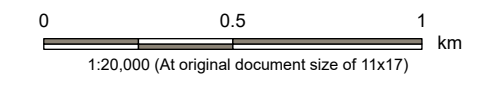
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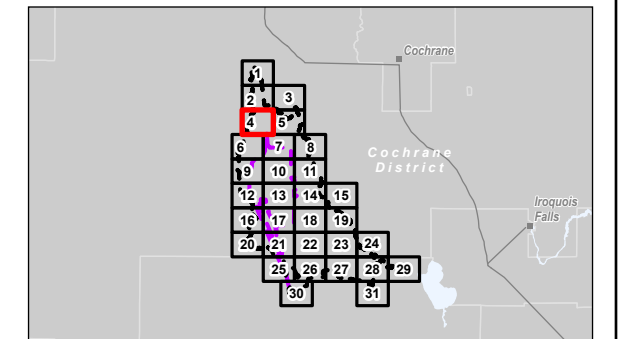


- Legend
- Project Area
 - Local Study Area
- Base Features**
- Major Road
 - Minor Road
 - Hydro Line
 - Watercourse (Permanent)
 - Waterbody
- Ecological Land Classification**
- Forested Area**
- Coniferous Forest/Stand
 - Deciduous Forest/Stand
- Wetland**
- Bog
 - Fen
 - Swamp
 - Meadow Marsh
- Water**
- Water
- Anthropogenic**
- Anthropogenic
 - Constructed



Notes

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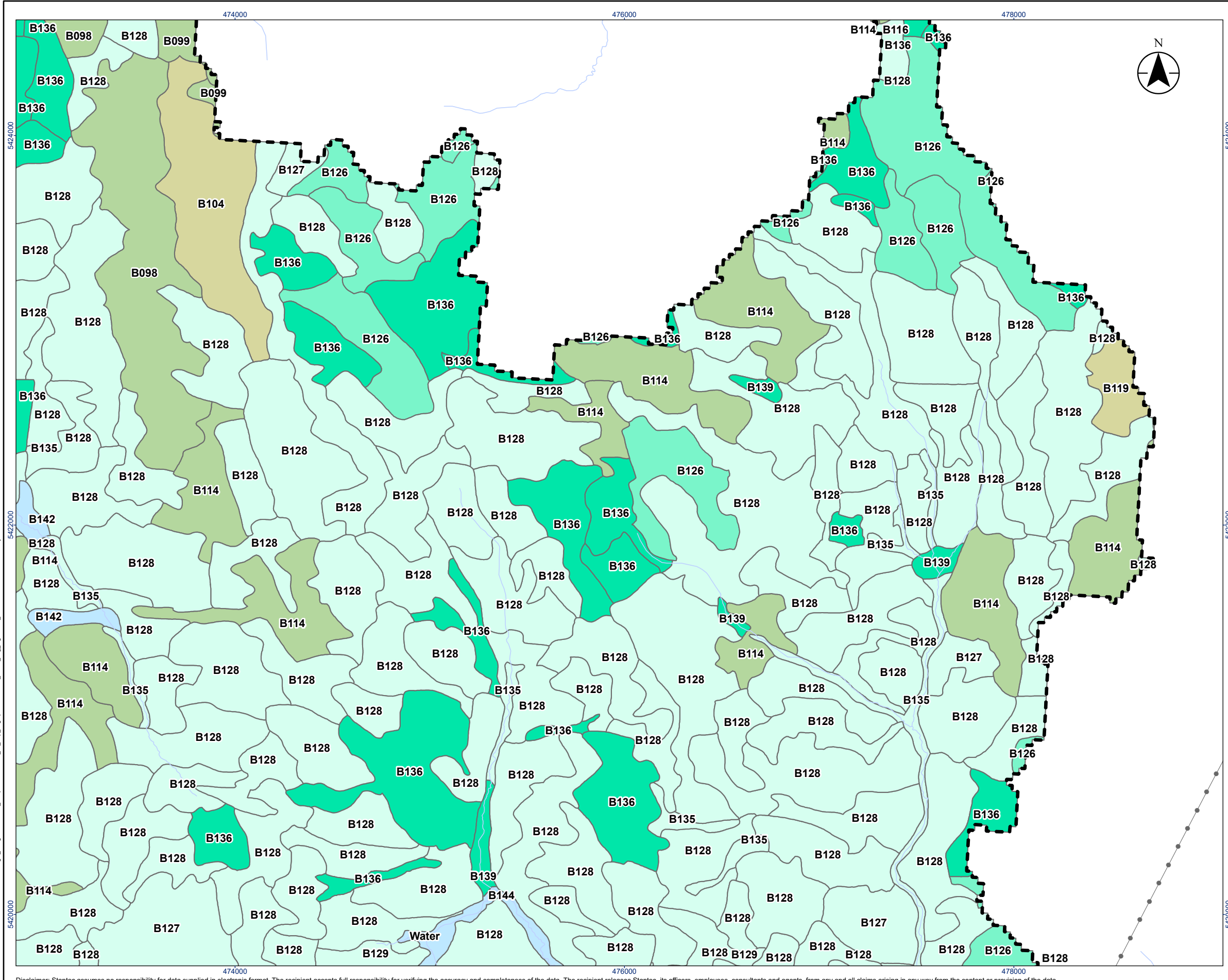


Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23




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

Figure No.: **16.3.4**
 Title: **Ecological Land Classification in the LSA**

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Legend





-  Local Study Area
-  Hydro Line
-  Watercourse (Permanent)

Ecological Land Classification


Forested Area

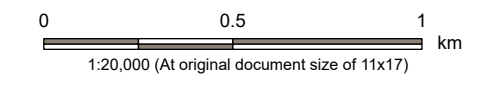
-  Coniferous Forest/Stand
-  Deciduous Forest/Stand

Wetland

-  Bog
-  Fen
-  Swamp
-  Meadow Marsh

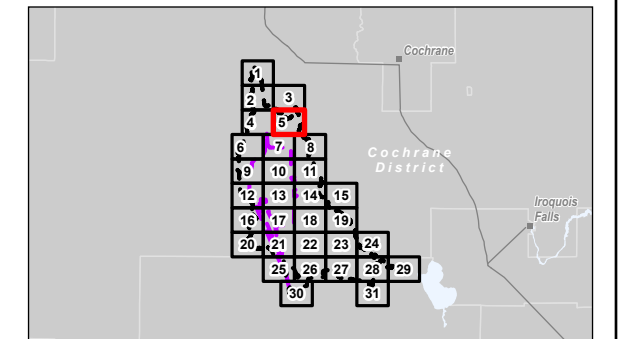
Water

-  Water



Notes

- Coordinate System: NAD 1983 UTM Zone 17N
- Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.

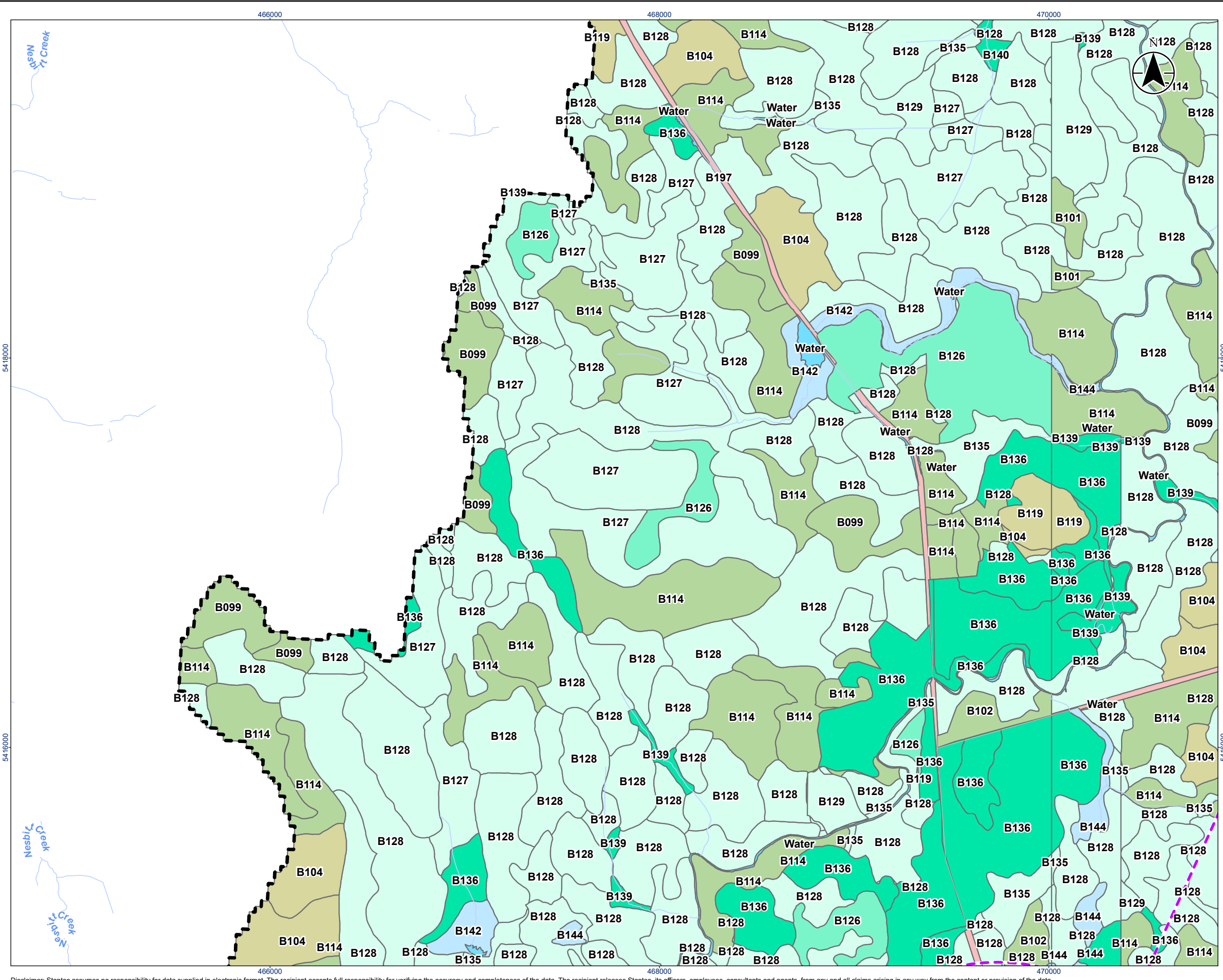


Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23

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

Figure No. **16.3.5**
 Title **Ecological Land Classification in the LSA**

V:\1004-10109\active\160930456\160930456\gis_data\mxd\BIS_Chapter160930456_IS_Chp_Veg.aprx\160930456_IS_VC_Veg_Fig16.03x_ELC_Revise.dwg 2024-09-23 By: awhite
 5422000



Legend

Project Area
Local Study Area

Base Features

- Minor Road
- Watercourse (Permanent)
- Waterbody

Ecological Land Classification

Forested Area

- Coniferous Forest/Stand
- Deciduous Forest/Stand

Wetland

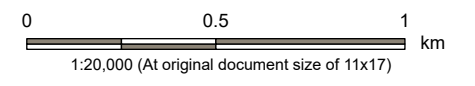
- Bog
- Fen
- Swamp
- Meadow Marsh

Water

- Water

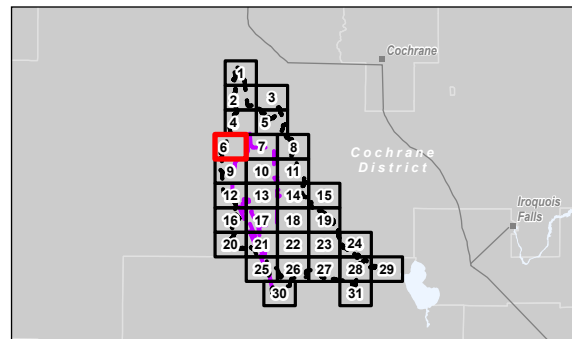
Anthropogenic

- Constructed



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.

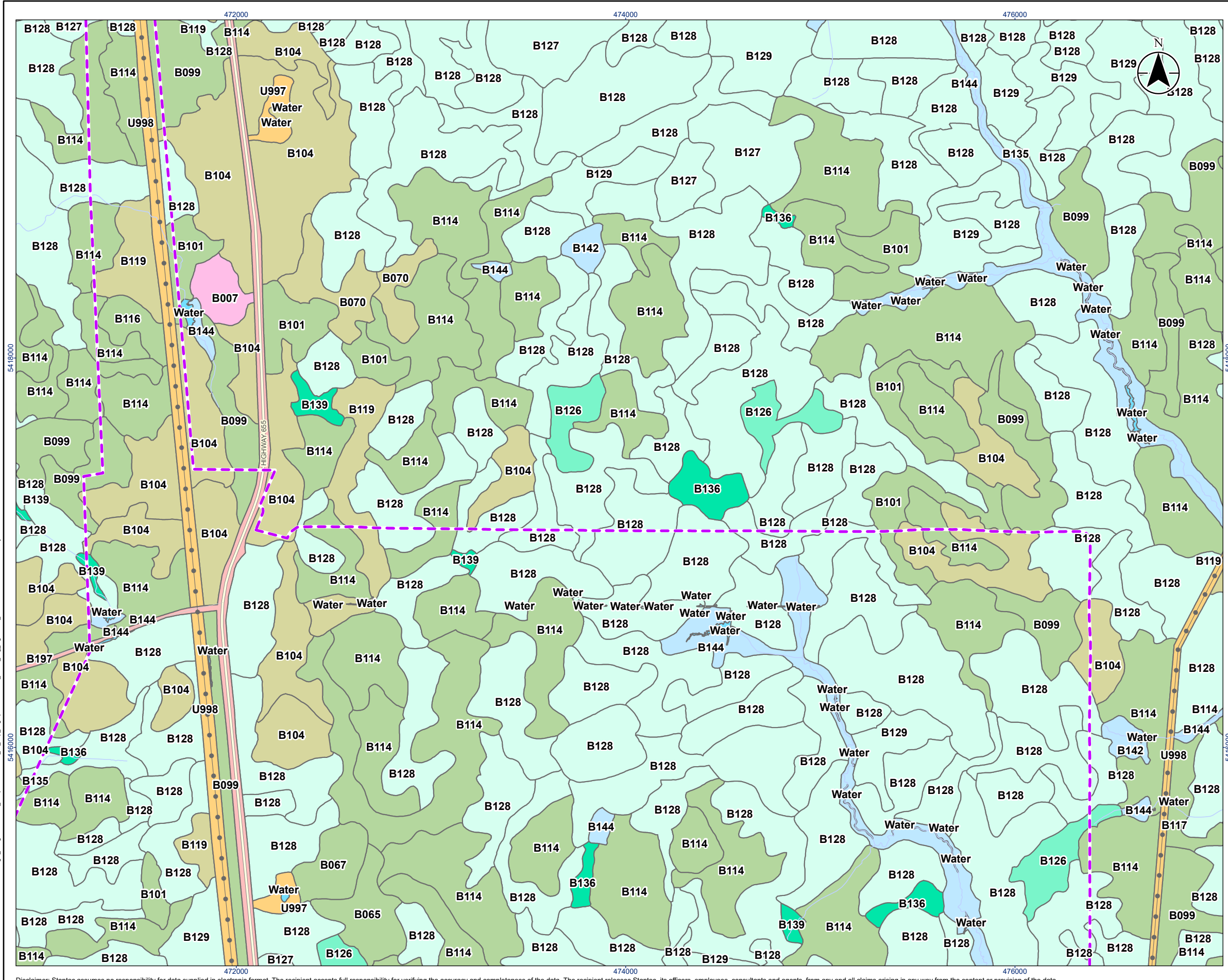


Project Location: Timmins, Ontario
Prepared by: awhite on 2024-09-23

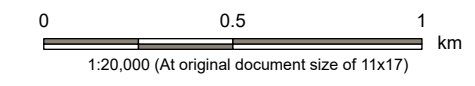
Client/Project:
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No. **16.3.6**
Title **Ecological Land Classification in the LSA**

V:\1004-10\1009\active\160930456\160930456_IS_Chp_Veg\appx\160930456_IS_VC_Veg_Fig16.03x_ELC_Revisead_2024-09-23 By: awhite
5416000

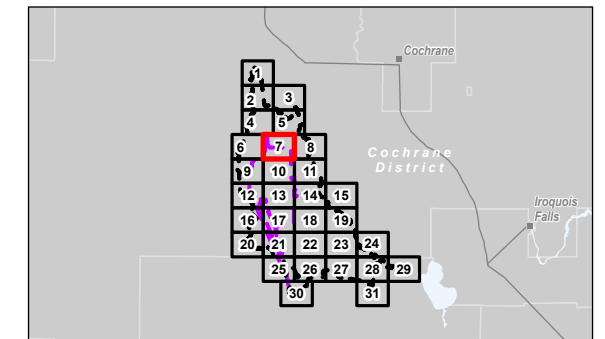


- Legend
- Project Area**
- Project Area (Dashed purple line)
- Base Features**
- Major Road (Thick orange line)
 - Minor Road (Thin orange line)
 - Hydro Line (Dotted black line)
 - Watercourse (Permanent) (Blue line)
 - Waterbody (Blue area)
- Ecological Land Classification**
- Forested Area**
- Coniferous Forest/Stand (Light green)
 - Deciduous Forest/Stand (Yellow-green)
- Wetland**
- Bog (Light cyan)
 - Fen (Cyan)
 - Swamp (Light blue)
 - Meadow Marsh (Light blue)
- Water**
- Water (Blue)
- Anthropogenic**
- Anthropogenic (Yellow)
 - Constructed (Pink)
- Other**
- Barren (Light pink)



Notes

- Coordinate System: NAD 1983 UTM Zone 17N
- Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.

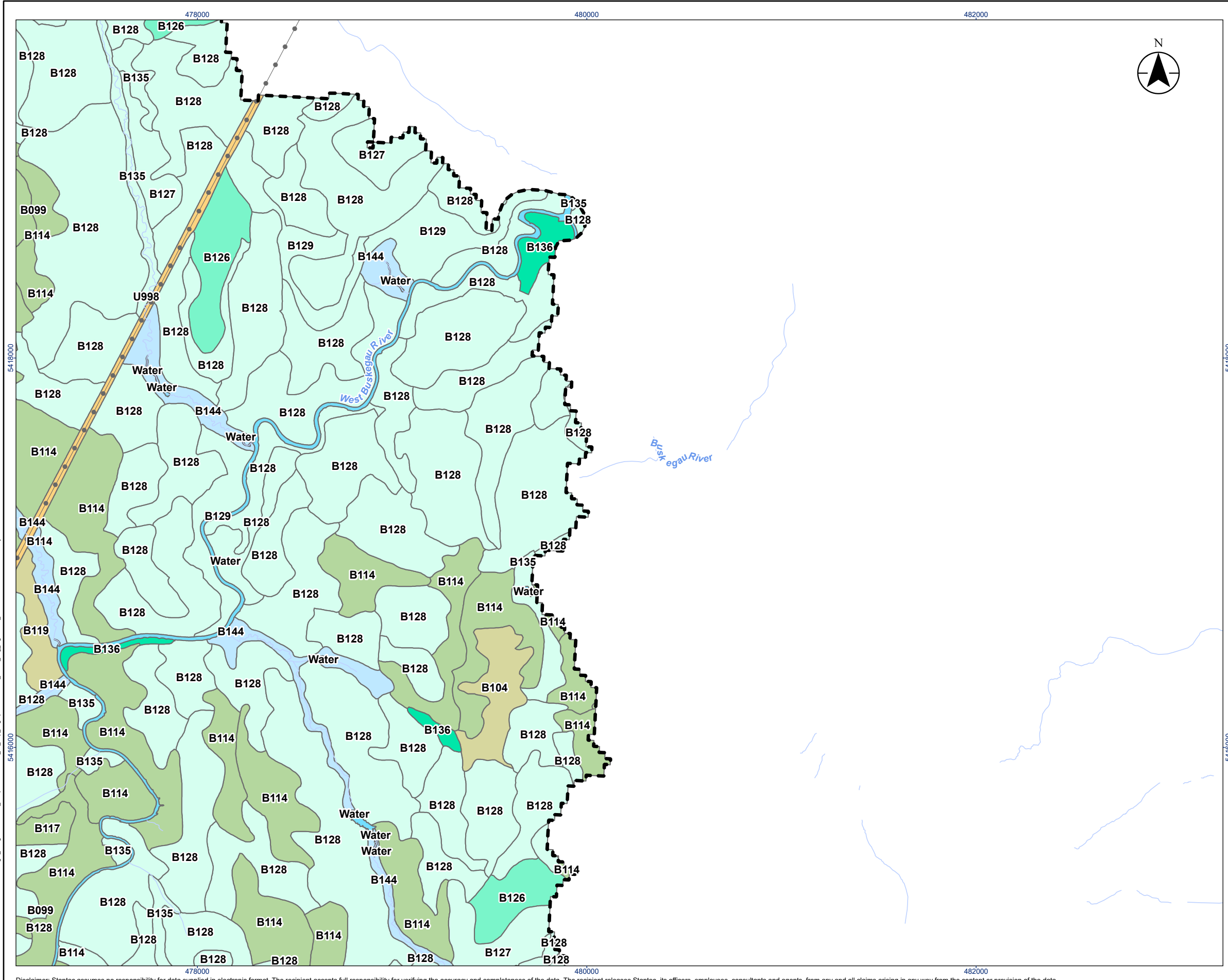


Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23

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

Figure No. **16.3.7**
 Title **Ecological Land Classification in the LSA**

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Legend

- Local Study Area
- Hydro Line
- Watercourse (Permanent)
- Waterbody

Ecological Land Classification

Forested Area

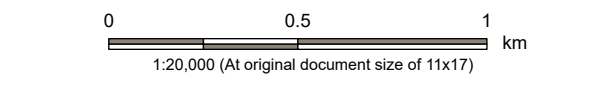
- Coniferous Forest/Stand
- Deciduous Forest/Stand

Wetland

- Bog
- Fen
- Swamp
- Meadow Marsh

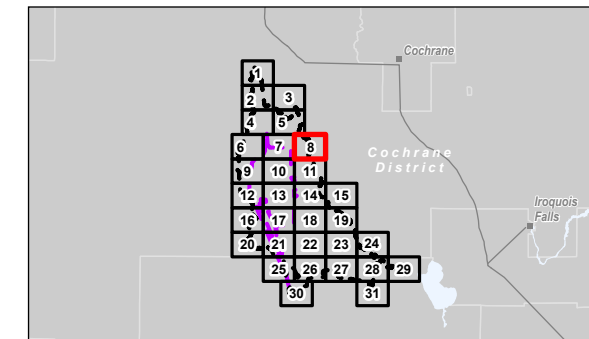
Water

- Water
- Anthropogenic



Notes

- Coordinate System: NAD 1983 UTM Zone 17N
- Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.
















Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23

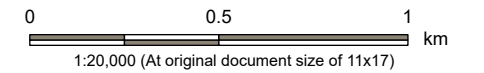
Client/Project: Canada Nickel Company (CNC)
 Crawford Nickel Project

Figure No.: **16.3.8**
 Title: **Ecological Land Classification in the LSA**

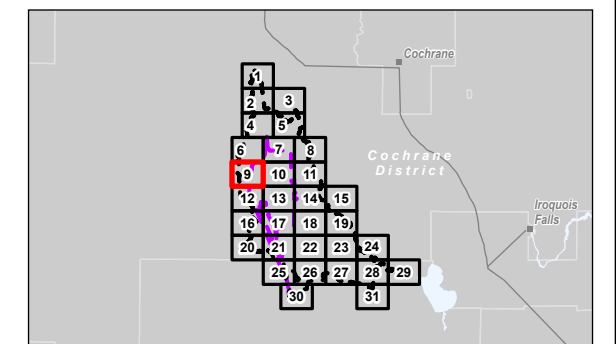
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Legend

-  Project Area
 -  Local Study Area
- Base Features**
-  Minor Road
 -  Watercourse (Permanent)
 -  Waterbody
- Ecological Land Classification**
- Forested Area**
-  Coniferous Forest/Stand
 -  Deciduous Forest/Stand
- Wetland**
-  Bog
 -  Fen
 -  Swamp
 -  Meadow Marsh
- Water**
-  Water
- Anthropogenic**
-  Constructed



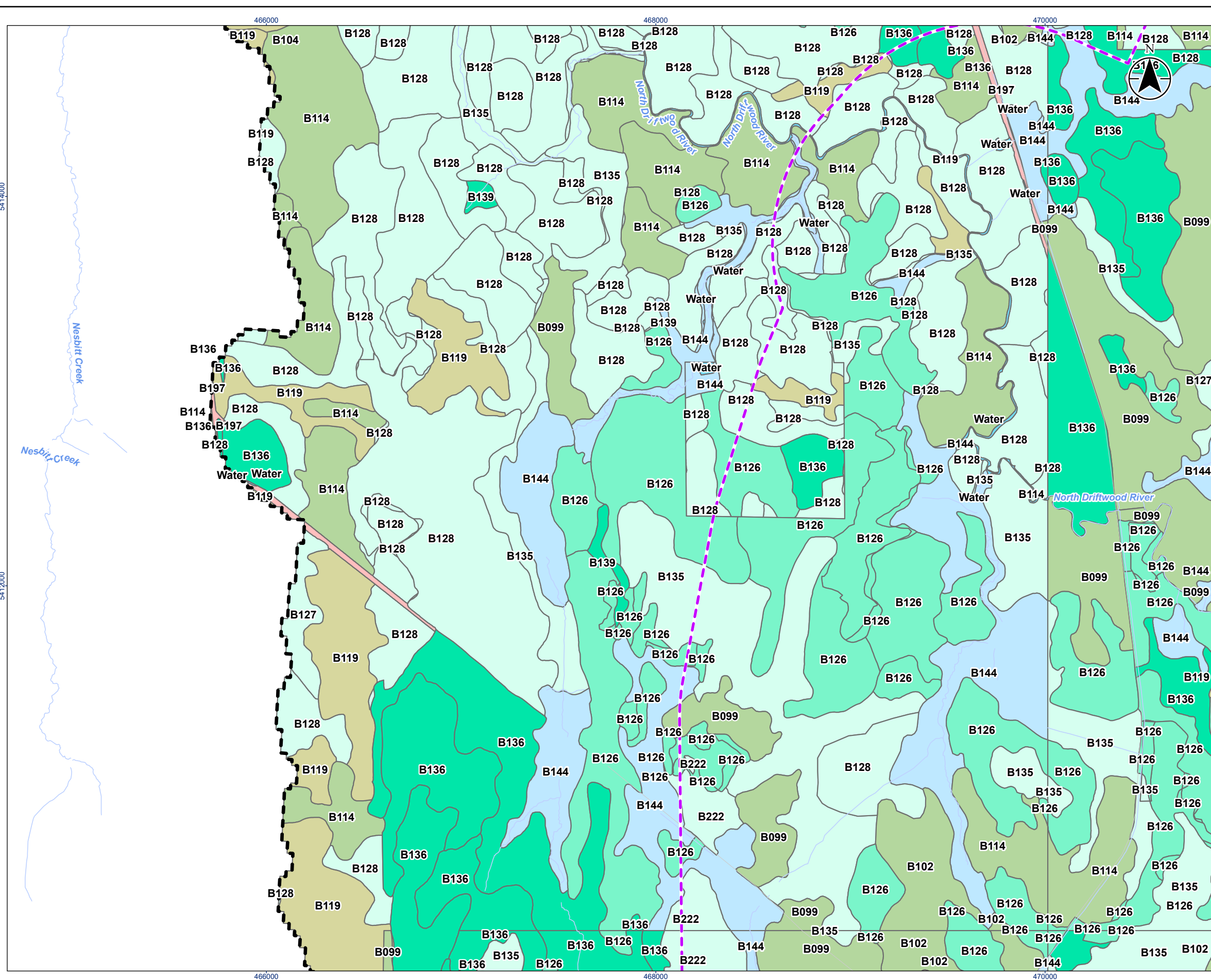
- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
 2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.

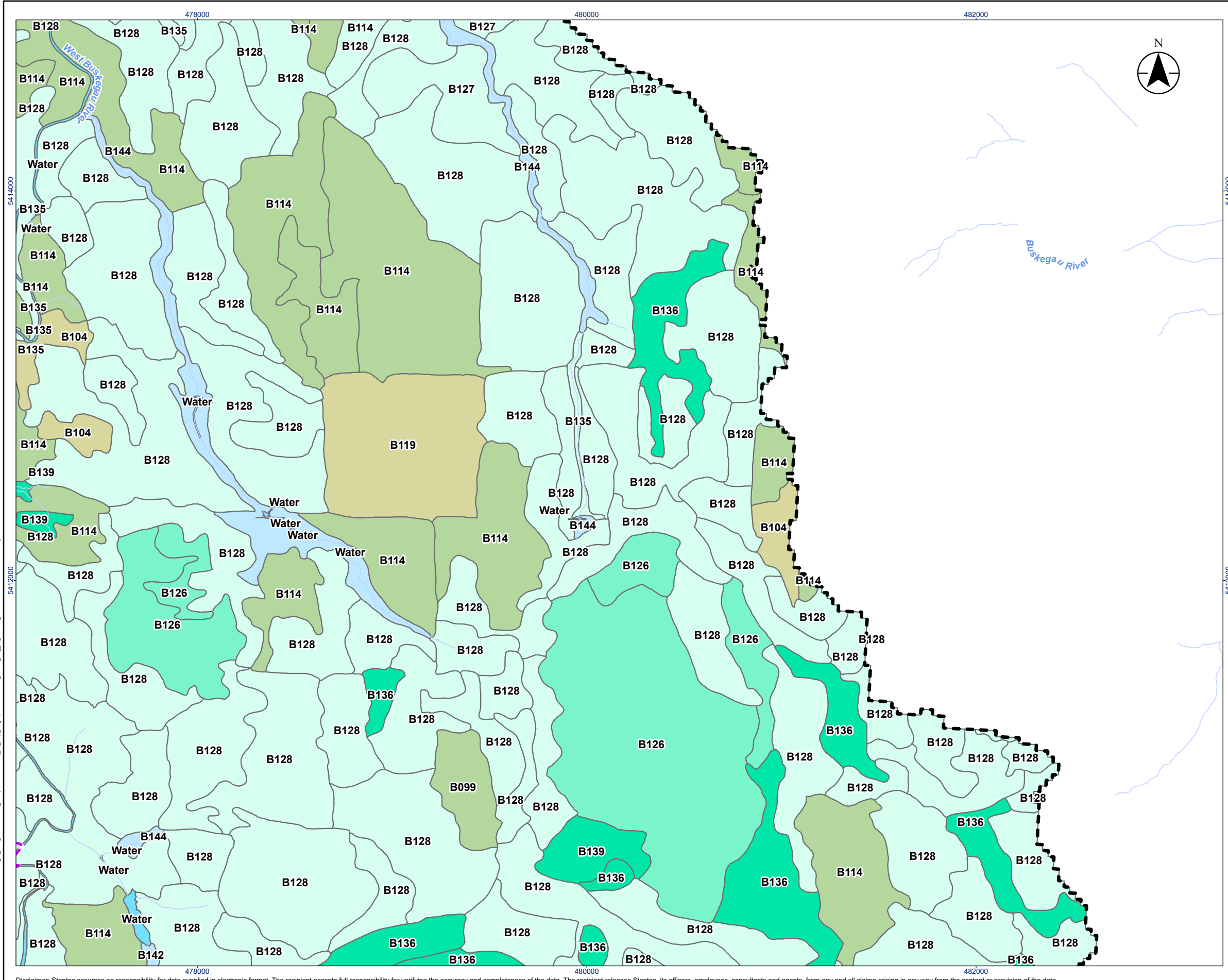


Project Location: Timmins, Ontario
 Prepared by: REVA 160930456
 Prepared by: awhite on 2024-09-23

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

Figure No.: **16.3.9**
 Title: **Ecological Land Classification in the LSA**





Legend

- Project Area
- Local Study Area
- Watercourse (Permanent)
- Waterbody

Ecological Land Classification

Forested Area

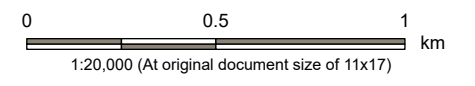
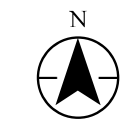
- Coniferous Forest/Stand
- Deciduous Forest/Stand

Wetland

- Bog
- Fen
- Swamp
- Meadow Marsh

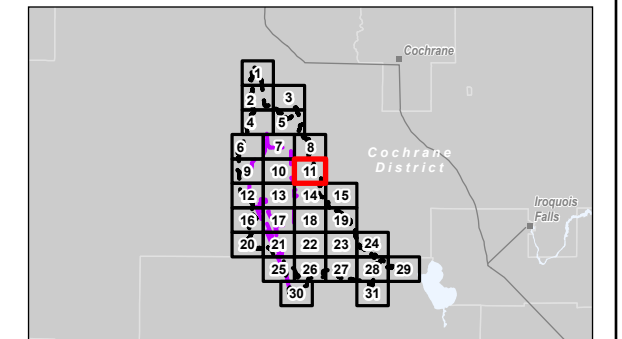
Water

- Water



Notes

- Coordinate System: NAD 1983 UTM Zone 17N
- Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.

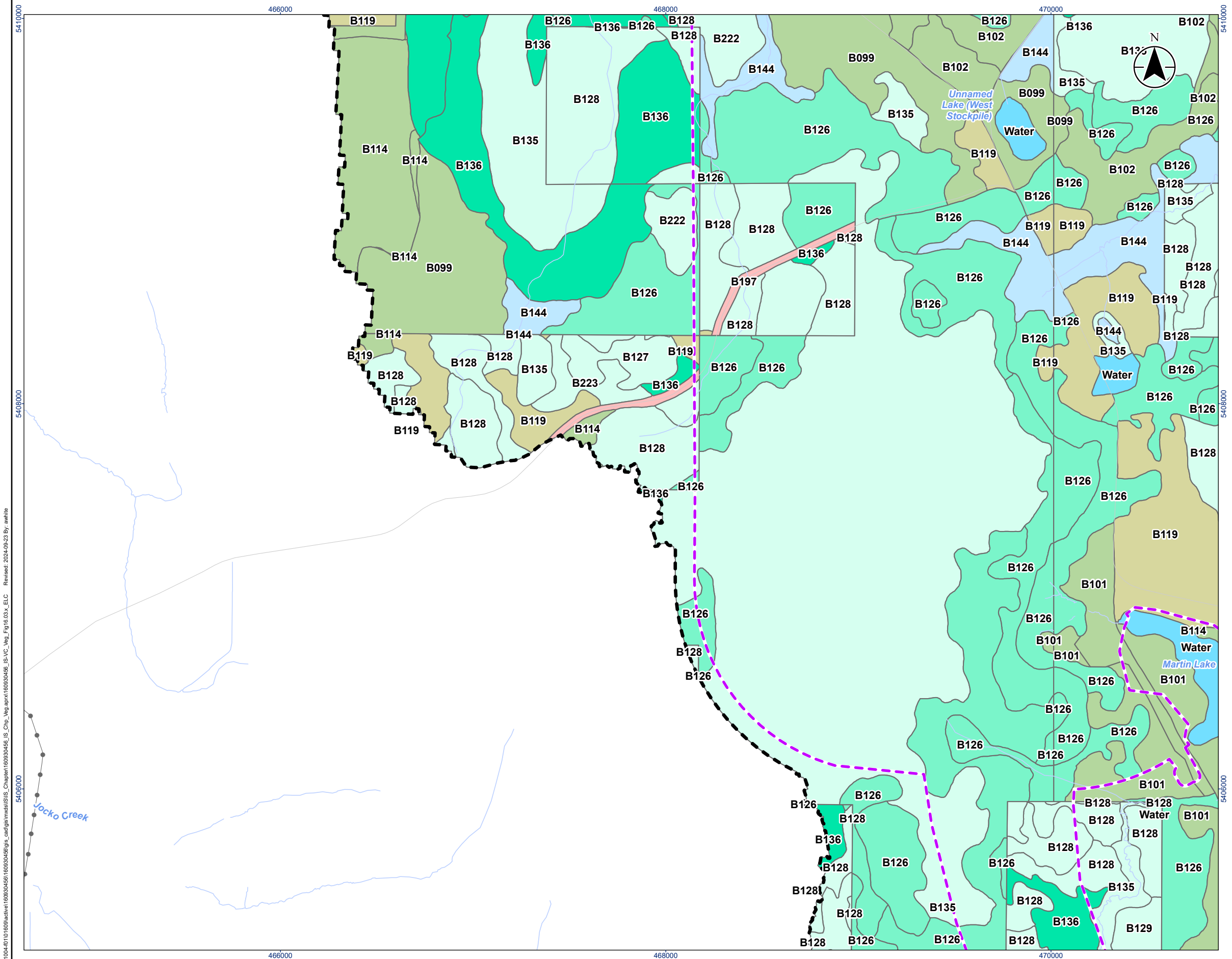


Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23

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

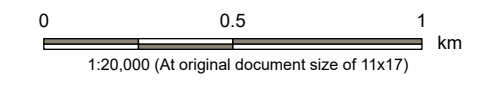
Figure No.: **16.3.11**
 Title: **Ecological Land Classification in the LSA**

V:\1004-1010\160930456\160930456\gis_data\mxd\B16\IS_Chap\160930456_IS_VC_Veg_Fig16.03x_ELC_Revise.dwg 2024-09-23 By: awhite



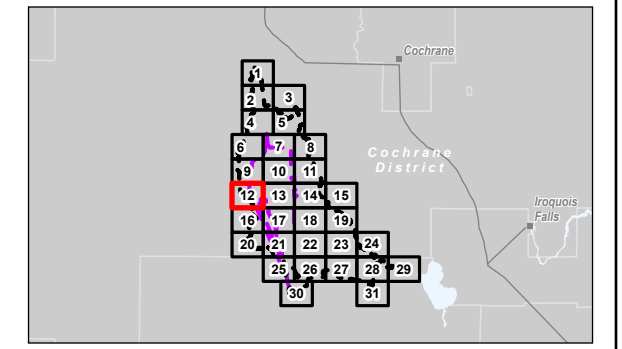
- Legend
- Project Area
 - Local Study Area
- Base Features**
- Minor Road
 - Hydro Line
 - Watercourse (Permanent)
 - Waterbody

- Ecological Land Classification**
- Forested Area**
- Coniferous Forest/Stand
 - Deciduous Forest/Stand
- Wetland**
- Bog
 - Fen
 - Swamp
 - Meadow Marsh
- Water**
- Water
- Anthropogenic**
- Constructed



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.



Project Location: Timmins, Ontario

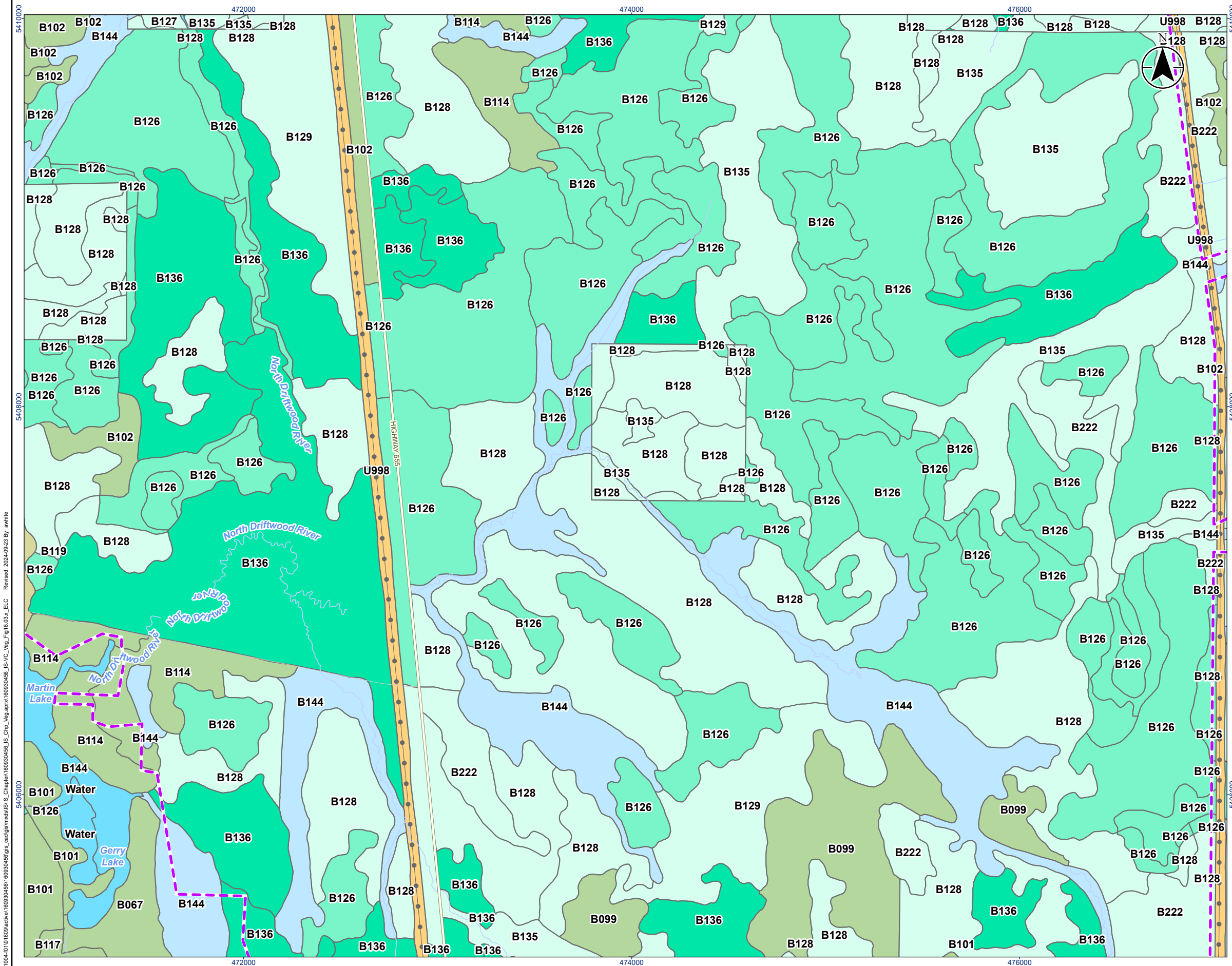
160930456 REVA
Prepared by awhite on 2024-09-23

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

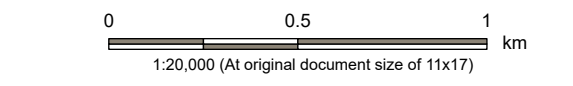
Figure No. **16.3.12**

Title: **Ecological Land Classification in the LSA**

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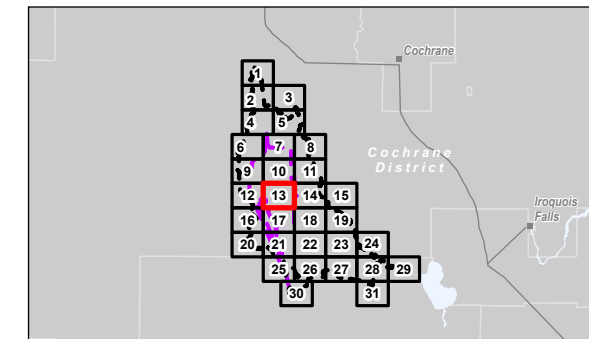


- Legend
- Project Area**
- Project Area (dashed purple line)
- Base Features**
- Major Road (thick orange line)
 - Minor Road (thin orange line)
 - Hydro Line (dotted black line)
 - Watercourse (Intermittent) (dashed blue line)
 - Watercourse (Permanent) (solid blue line)
 - Waterbody (solid blue area)
- Ecological Land Classification**
- Forested Area**
- Coniferous Forest/Stand (light green)
 - Deciduous Forest/Stand (medium green)
- Wetland**
- Bog (light green)
 - Fen (medium green)
 - Swamp (light green)
 - Meadow Marsh (light blue)
- Water**
- Water (blue)
- Anthropogenic**
- Anthropogenic (orange)



Notes

- Coordinate System: NAD 1983 UTM Zone 17N
- Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.

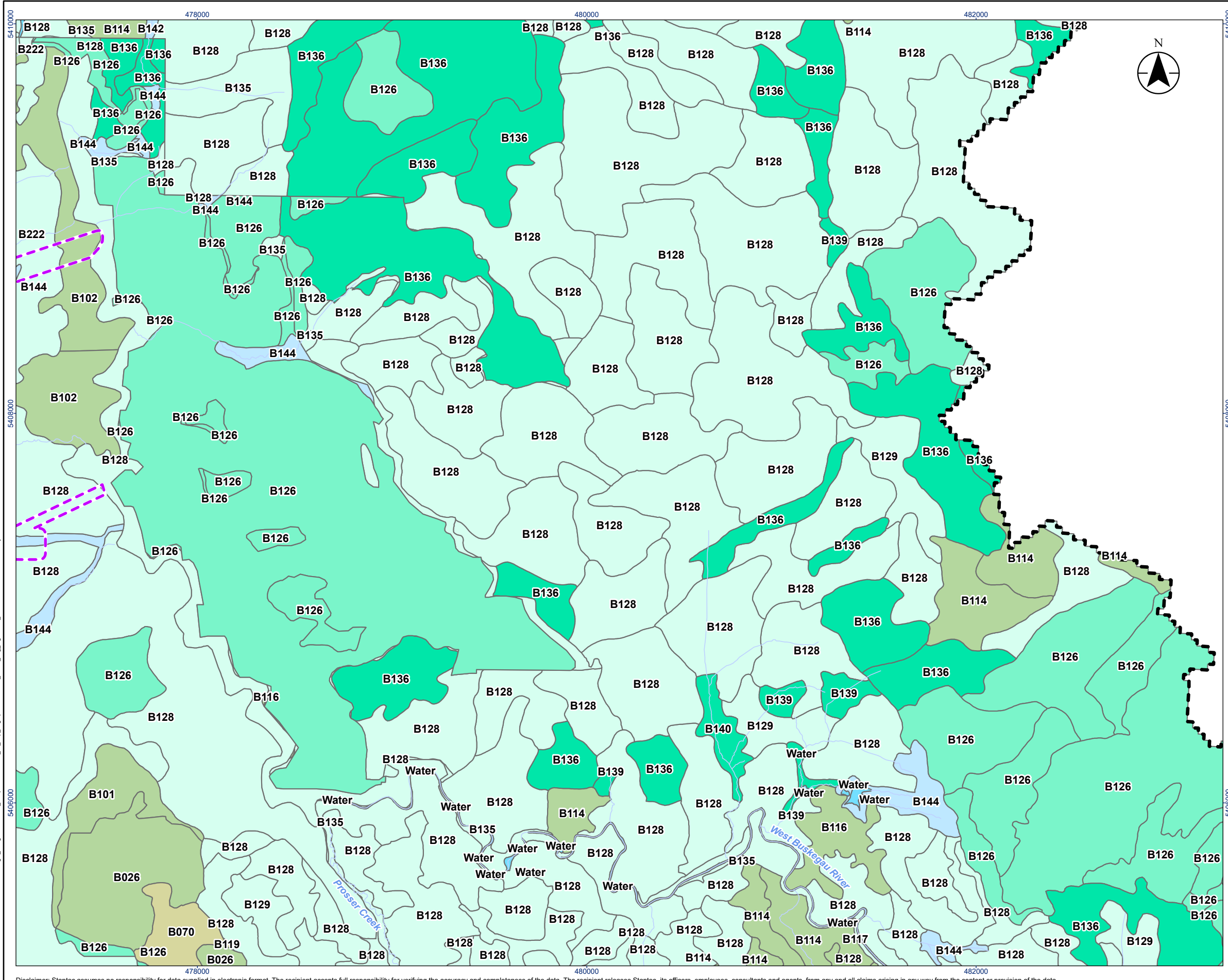


Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23





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

Figure No.: **16.3.13**
 Title: **Ecological Land Classification in the LSA**

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Legend





-  Project Area
-  Local Study Area
-  Watercourse (Permanent)
-  Waterbody

Ecological Land Classification


Forested Area

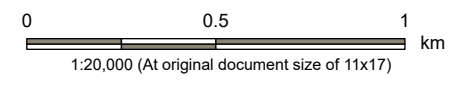
-  Coniferous Forest/Stand
-  Deciduous Forest/Stand

Wetland

-  Bog
-  Fen
-  Swamp
-  Meadow Marsh

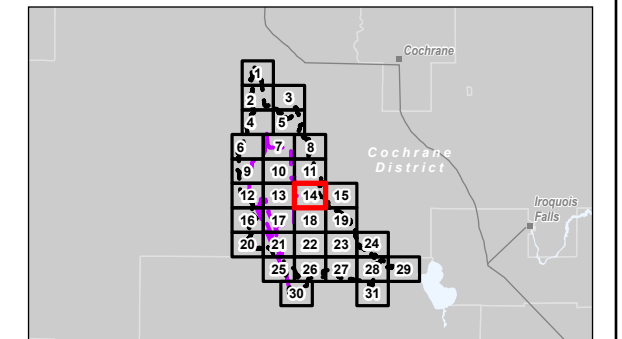
Water

-  Water



Notes

- Coordinate System: NAD 1983 UTM Zone 17N
- Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.

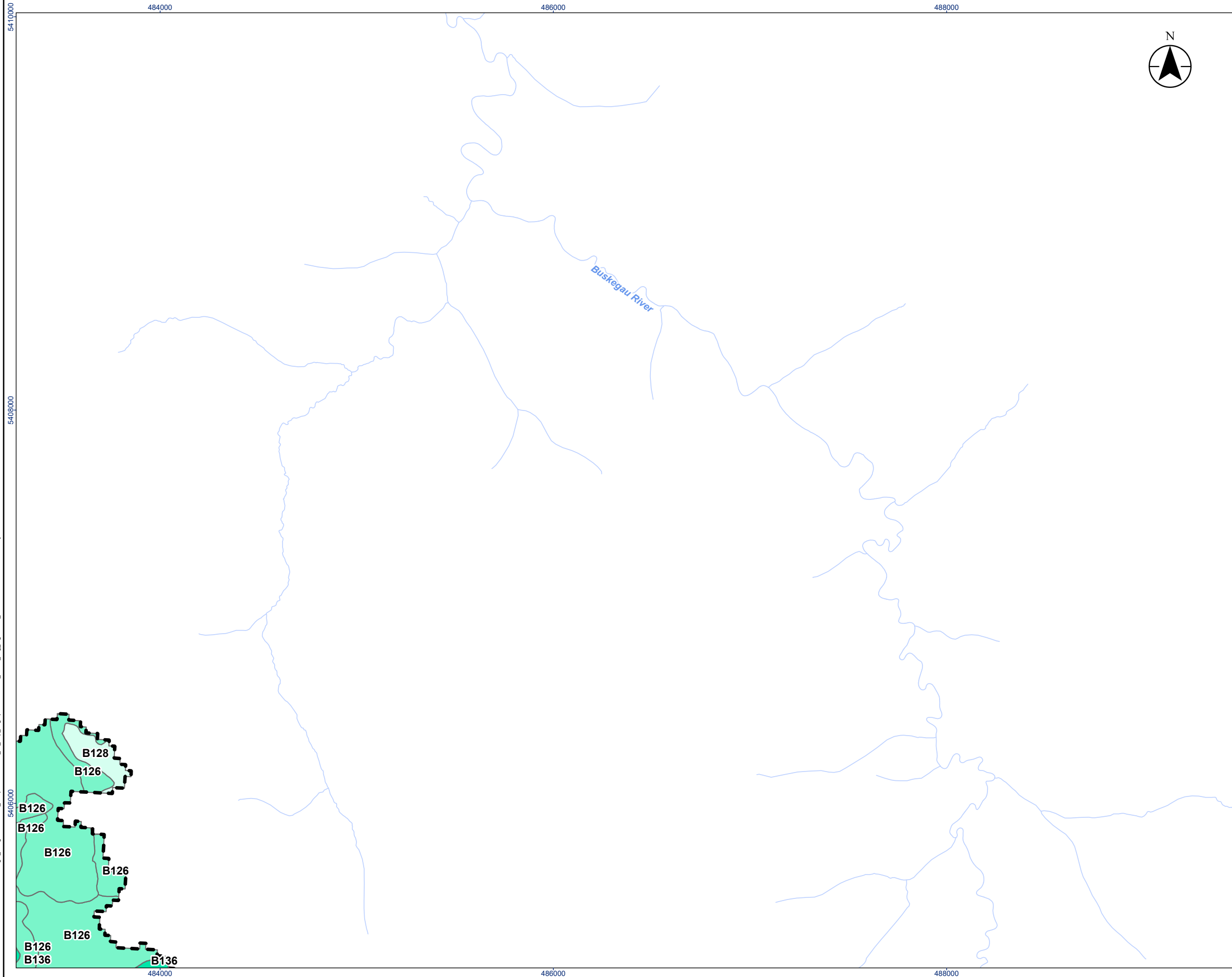


Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23
 Project Number: 160930456 REVA



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

Figure No. **16.3.14**
 Title **Ecological Land Classification in the LSA**

V:\1004-101009\active\160930456\160930456\gis_data\gis_data\160930456_160930456_IS_VC_Veg_Fig16.03x_ELC_Revise.dwg 2024-09-23 By: awhite






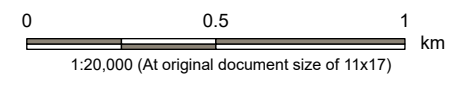
Legend

-  Local Study Area
-  Watercourse (Permanent)

Ecological Land Classification

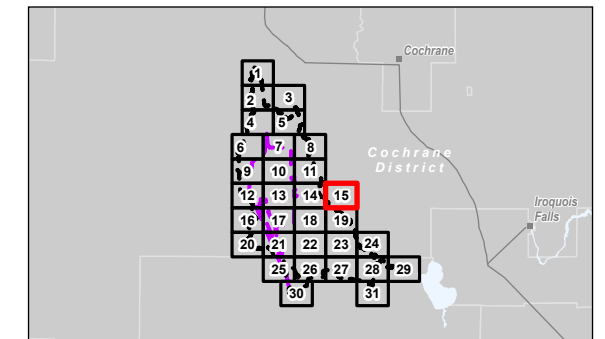
Wetland

-  Bog
-  Fen
-  Swamp



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.

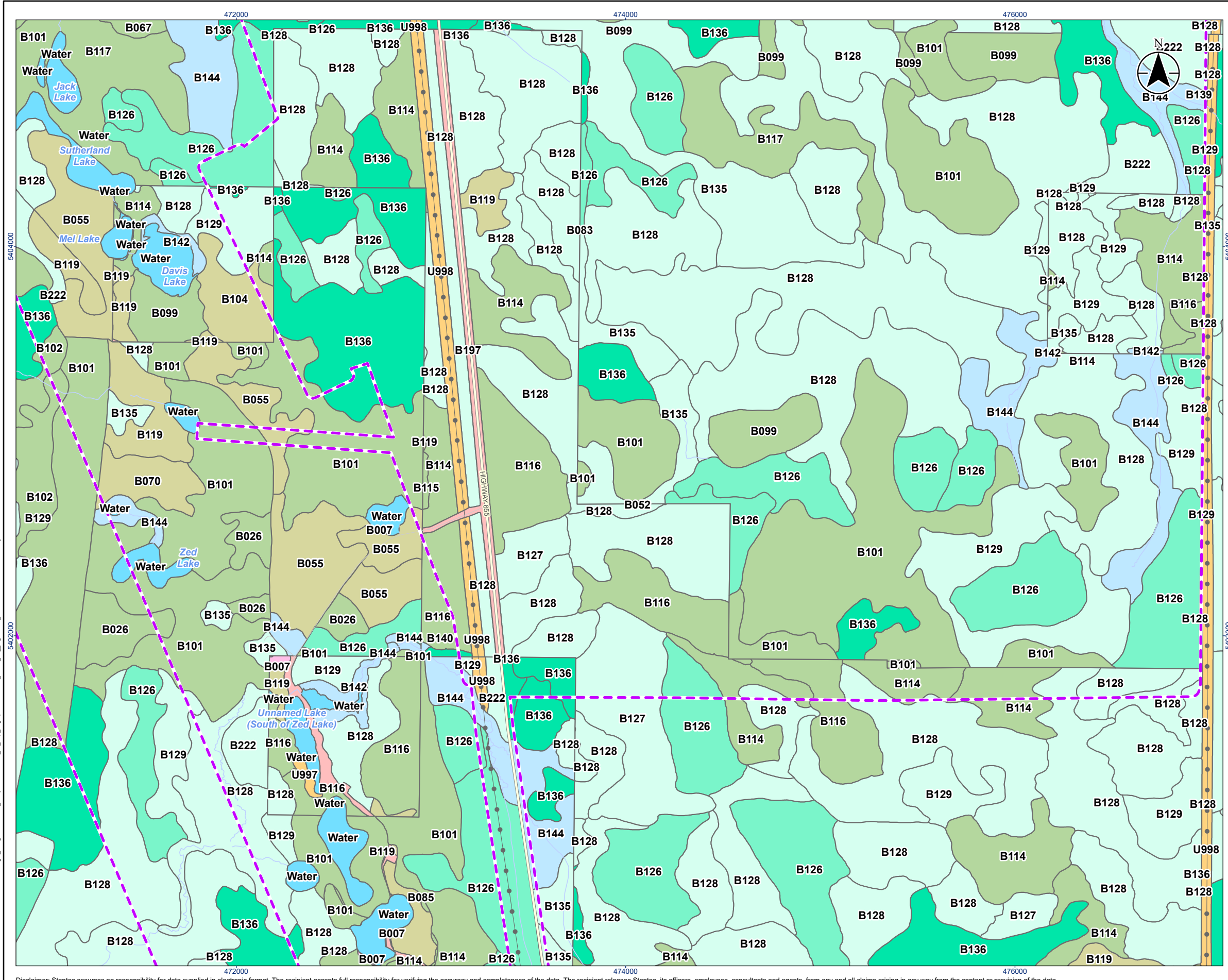


Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23


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






Figure No.: **16.3.15**
 Title: **Ecological Land Classification in the LSA**

\s1004-101009\active\160930456\160930456\gis_data\gis_md\sls\Chapter160930456_IS_VC_Veg_Fig16.03x_ELC_Revise.dwg 2024-09-23 By: awhite









Legend


Project Area
 Project Area



Base Features
 Major Road
 Minor Road
 Hydro Line
 Watercourse (Permanent)
 Waterbody


Ecological Land Classification

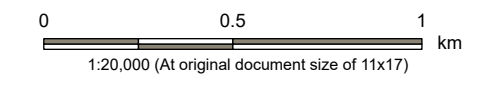
Forested Area
 Coniferous Forest/Stand
 Deciduous Forest/Stand

Wetland
 Bog
 Fen
 Swamp
 Meadow Marsh

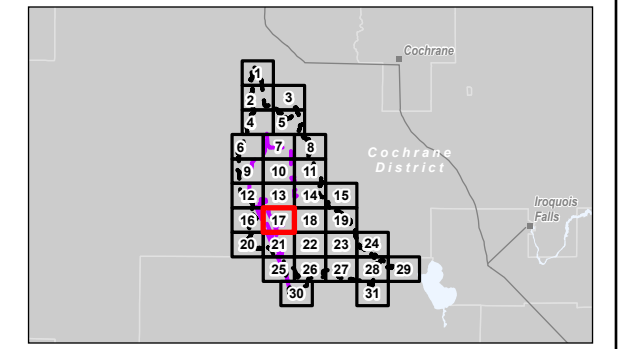
Water
 Water

Anthropogenic
 Anthropogenic
 Constructed

Other
 Barren



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.

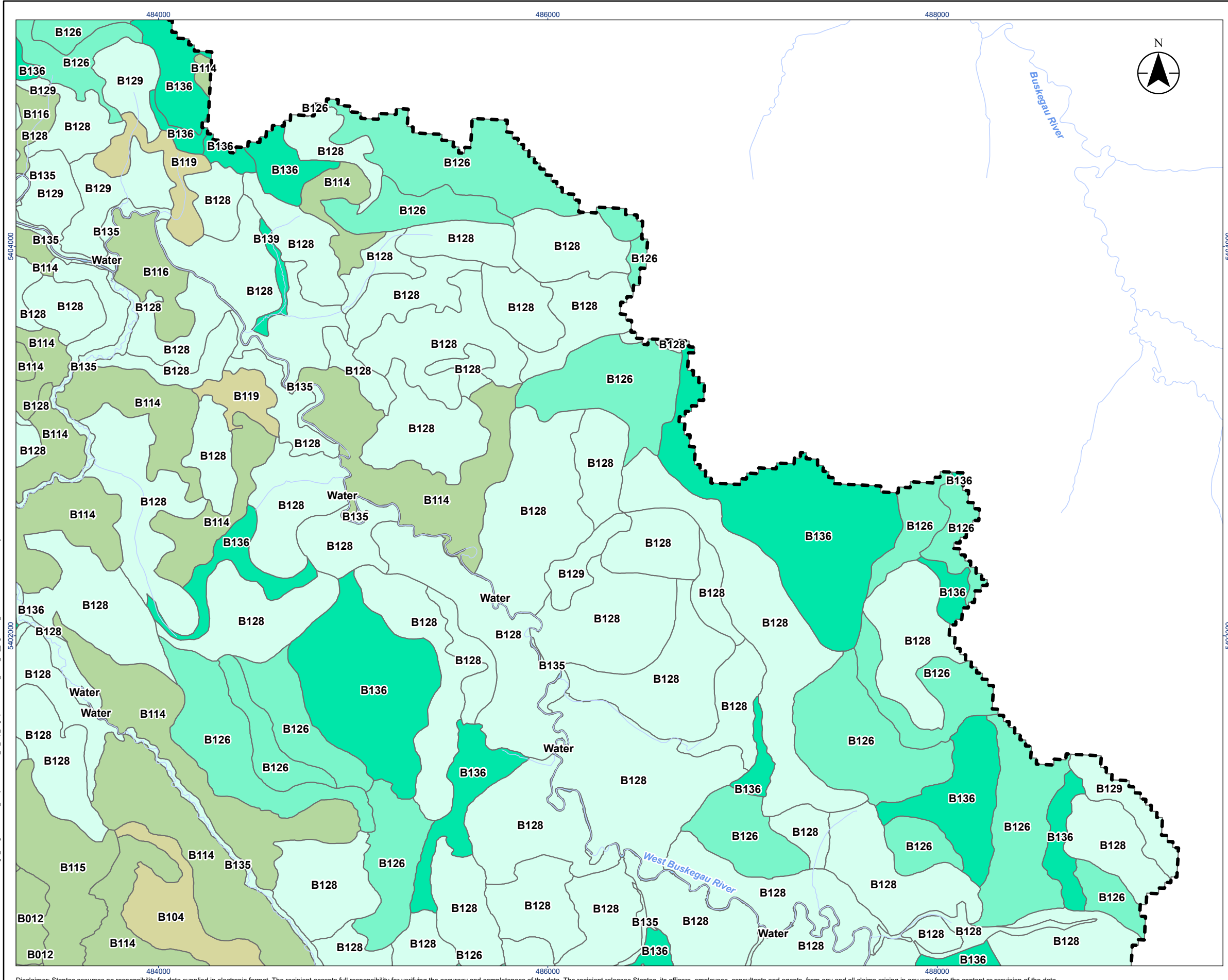


Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23


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


Figure No.: **16.3.17**

Title: **Ecological Land Classification in the LSA**





Legend

 Local Study Area




 Watercourse (Permanent)

Ecological Land Classification


Forested Area

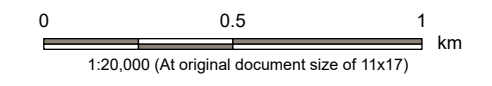
-  Coniferous Forest/Stand
-  Deciduous Forest/Stand

Wetland

-  Bog
-  Fen
-  Swamp

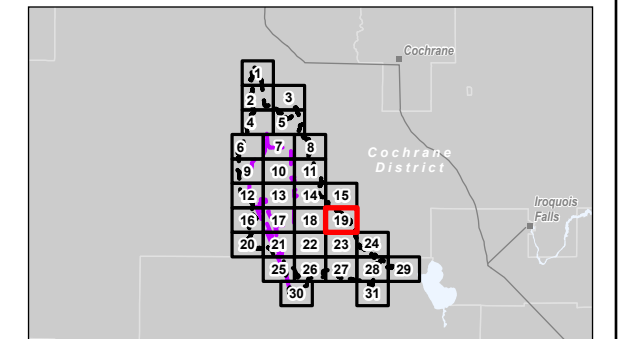
Water

-  Water



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.

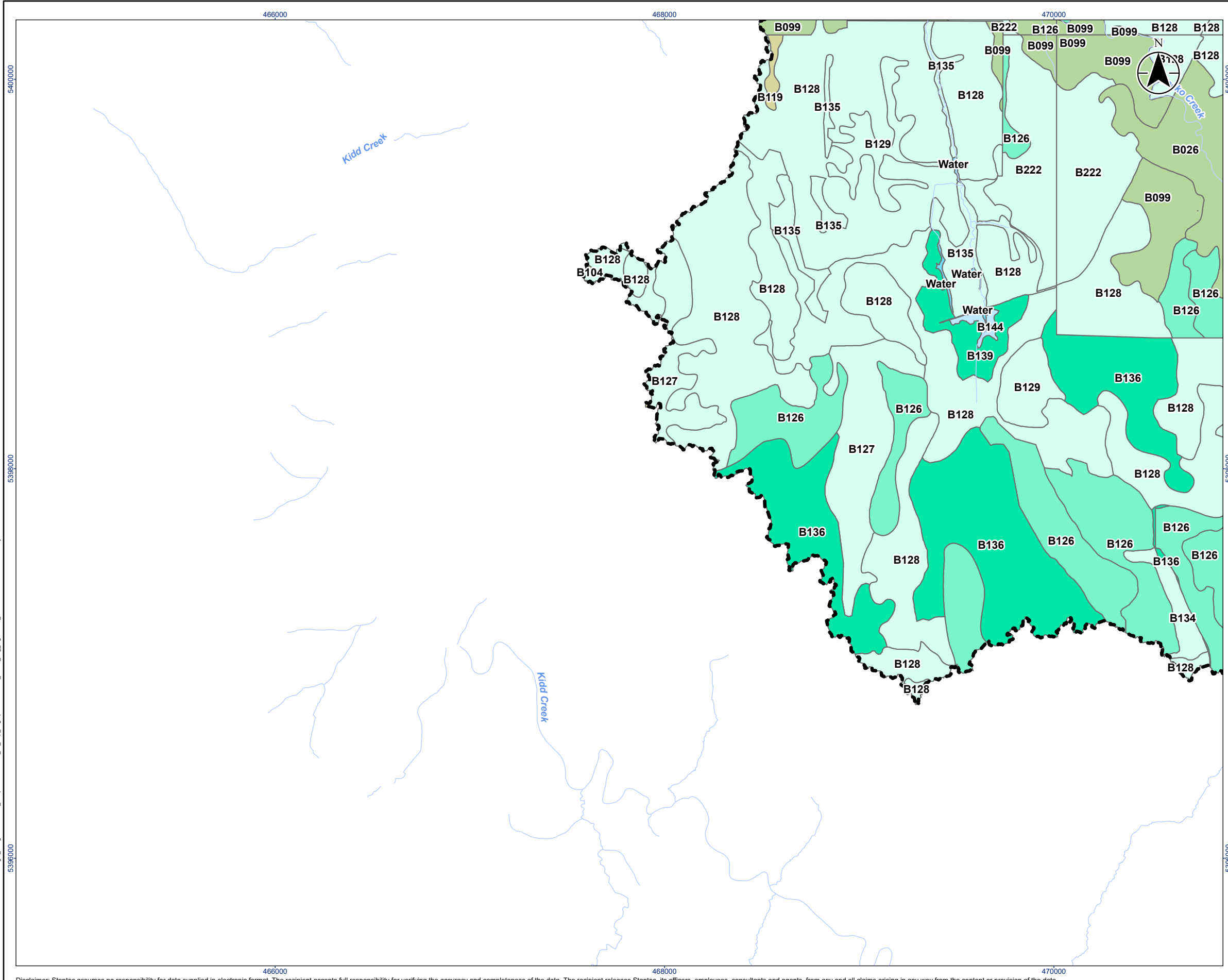


Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by: awhite on 2024-09-23




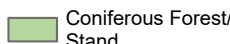

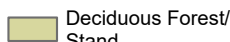





Client/Project:
 Canada Nickel Company (CNC)
 Crawford Nickel Project

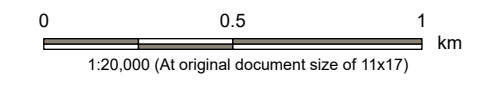
Figure No.: **16.3.19**
 Title: **Ecological Land Classification in the LSA**

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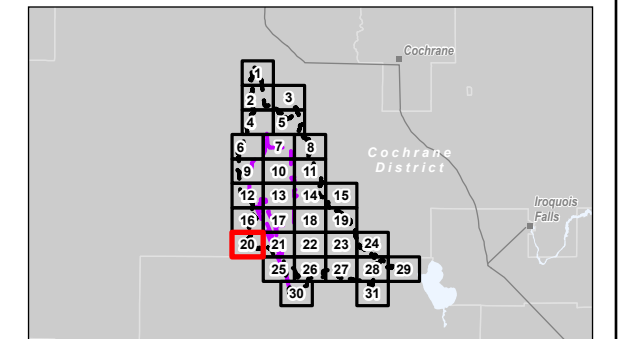


Legend

 Local Study Area	Ecological Land Classification
 Watercourse (Intermittent)	Forested Area
 Watercourse (Permanent)	 Coniferous Forest/Stand
 Waterbody	 Deciduous Forest/Stand
	Wetland
	 Bog
	 Fen
	 Swamp
	 Meadow Marsh
	Water
	 Water



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.

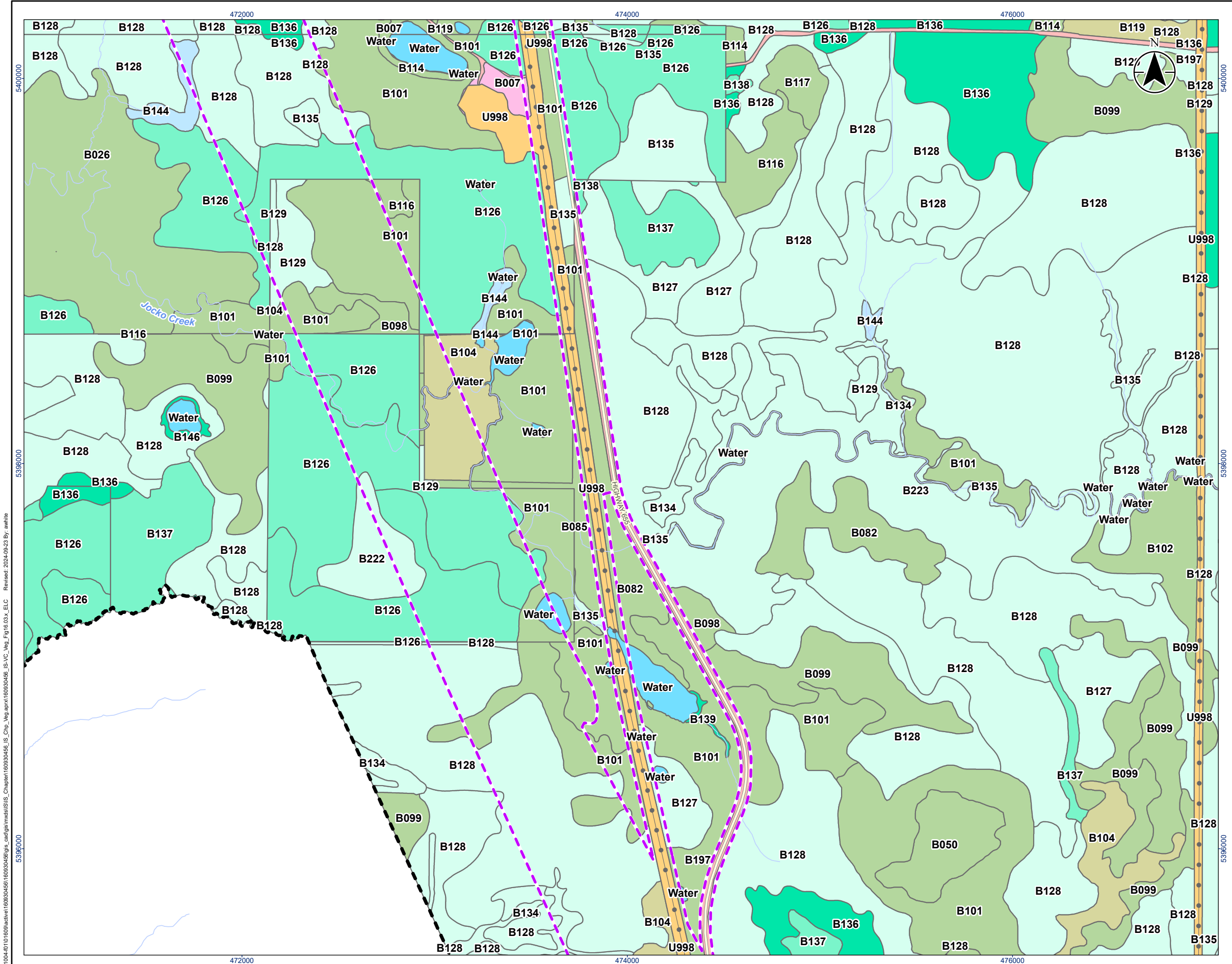


Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23


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


Figure No.: **16.3.20**
 Title: **Ecological Land Classification in the LSA**






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 Revised: 2024-09-23 By: awhite
 160930456





Legend


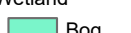

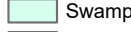
Project Area
 Project Area


Local Study Area
 Local Study Area



Base Features
 Major Road
 Hydro Line
 Watercourse (Intermittent)
 Watercourse (Permanent)
 Waterbody


Ecological Land Classification

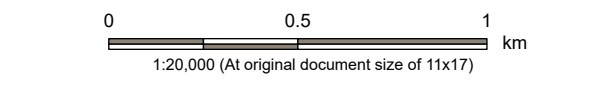
Forested Area
 Coniferous Forest/Stand
 Deciduous Forest/Stand

Wetland
 Bog
 Fen
 Swamp
 Meadow Marsh

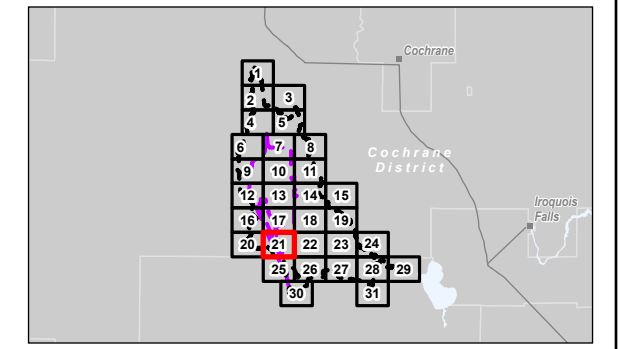
Water
 Water

Anthropogenic
 Anthropogenic
 Constructed

Other
 Barren



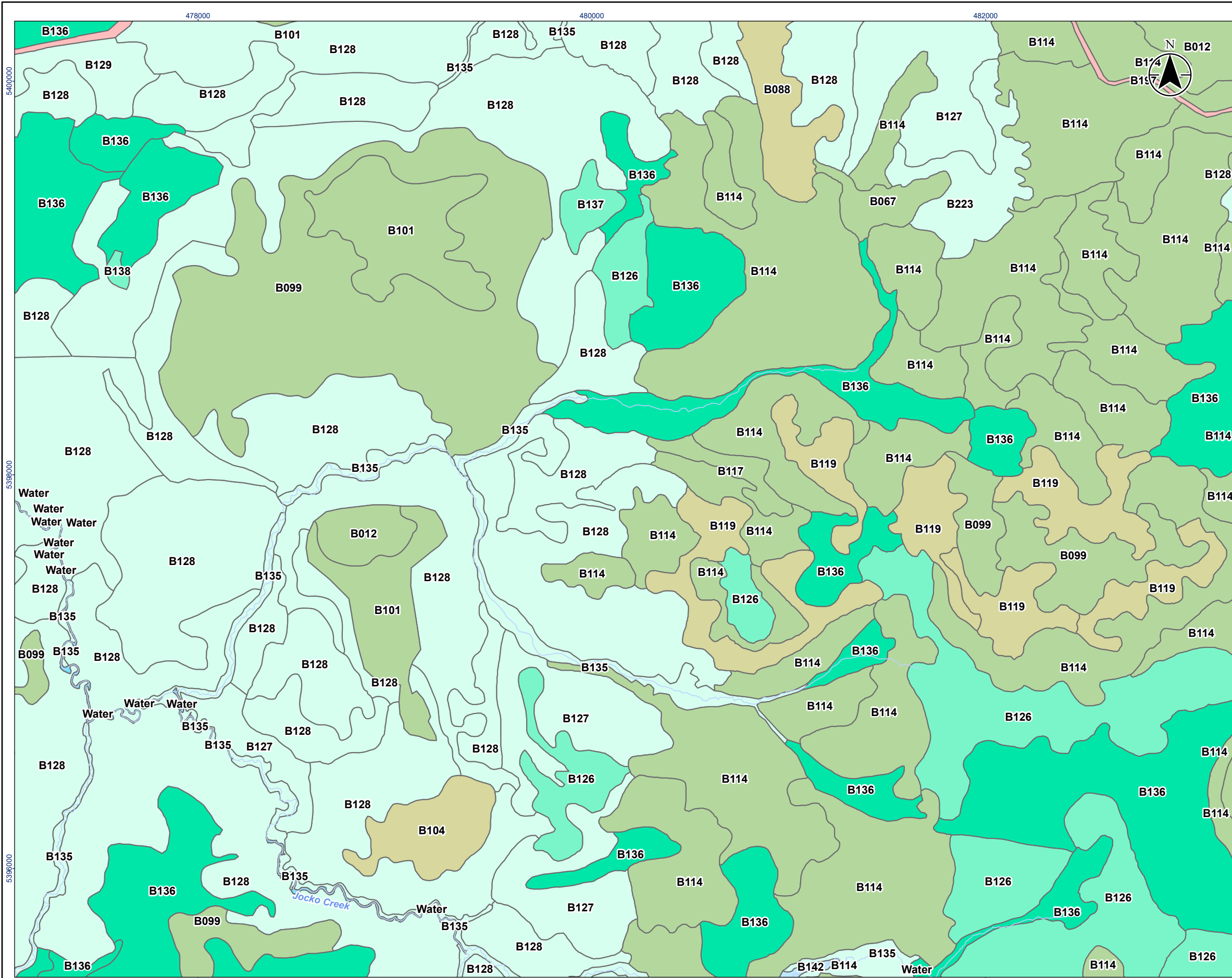
Notes
 1. Coordinate System: NAD 1983 UTM Zone 17N
 2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.



Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23
 Client/Project: Canada Nickel Company (CNC) Crawford Nickel Project

Figure No.: **16.3.21**
 Title: **Ecological Land Classification in the LSA**

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Legend

Watercourse (Permanent)

Ecological Land Classification

Forested Area

- Coniferous Forest/Stand
- Deciduous Forest/Stand

Wetland

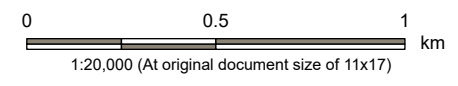
- Bog
- Fen
- Swamp
- Meadow Marsh

Water

- Water

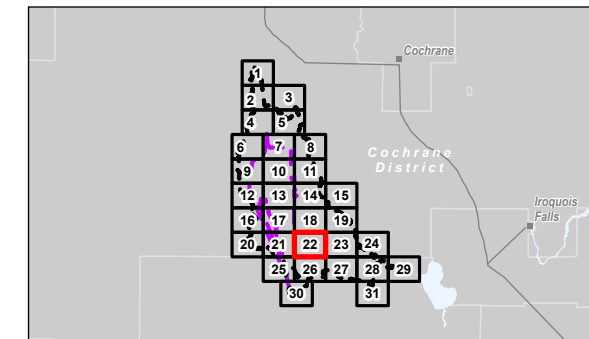
Anthropogenic

- Constructed



Notes

- Coordinate System: NAD 1983 UTM Zone 17N
- Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.



Project Location: Timmins, Ontario

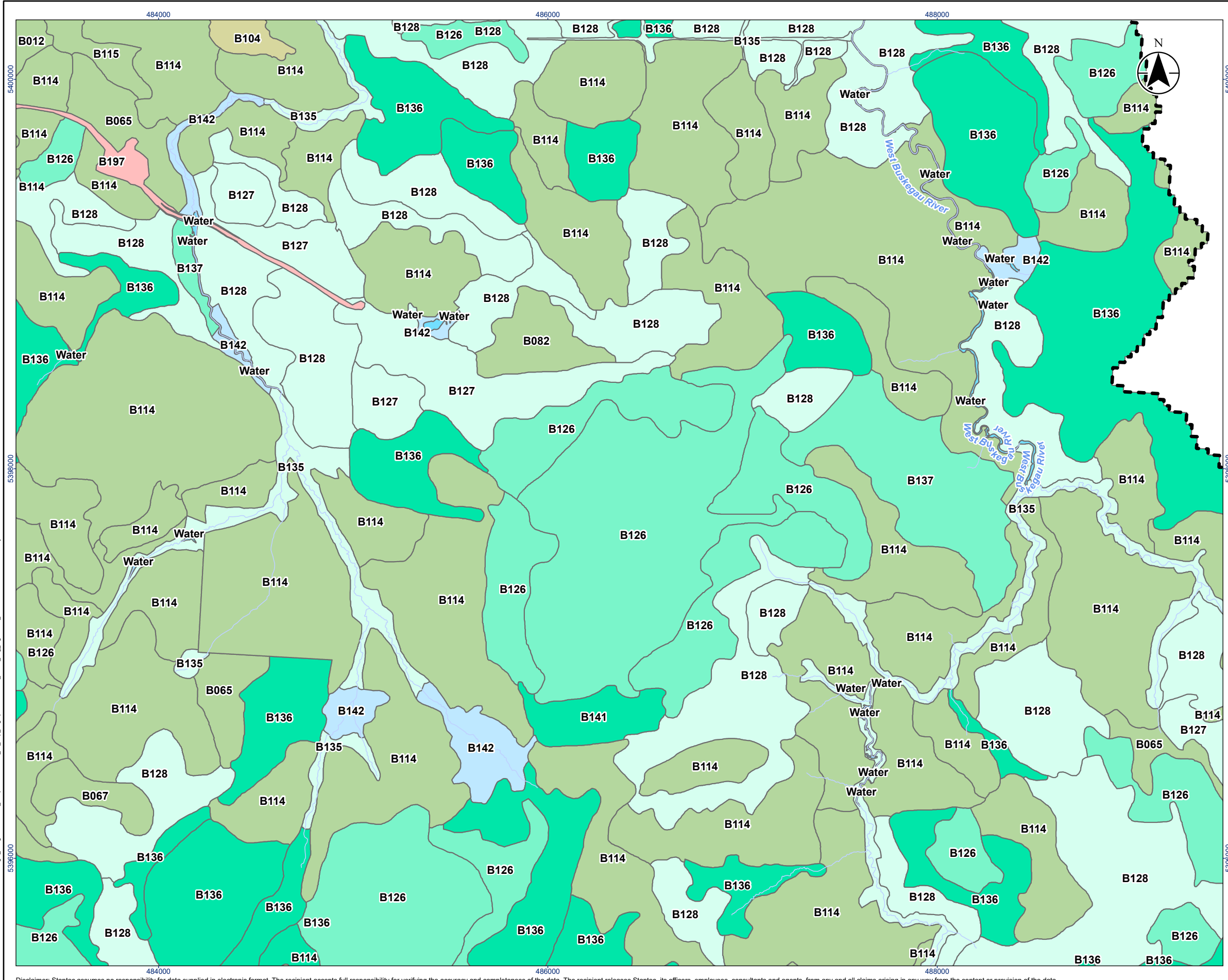
160930456 REVA
Prepared by awhite on 2024-09-23

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




Figure No. **16.3.22**

Title: **Ecological Land Classification in the LSA**

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Legend





-  Local Study Area
-  Watercourse (Permanent)
-  Waterbody

Ecological Land Classification


Forested Area

-  Coniferous Forest/Stand
-  Deciduous Forest/Stand


Wetland

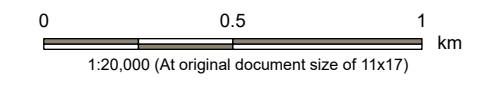
-  Bog
-  Fen
-  Swamp
-  Meadow Marsh

Water

-  Water

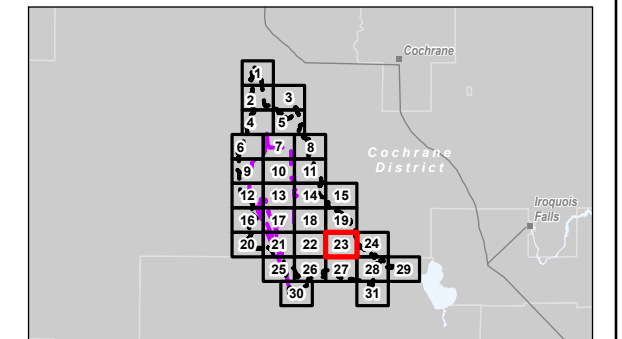
Anthropogenic

-  Constructed



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.

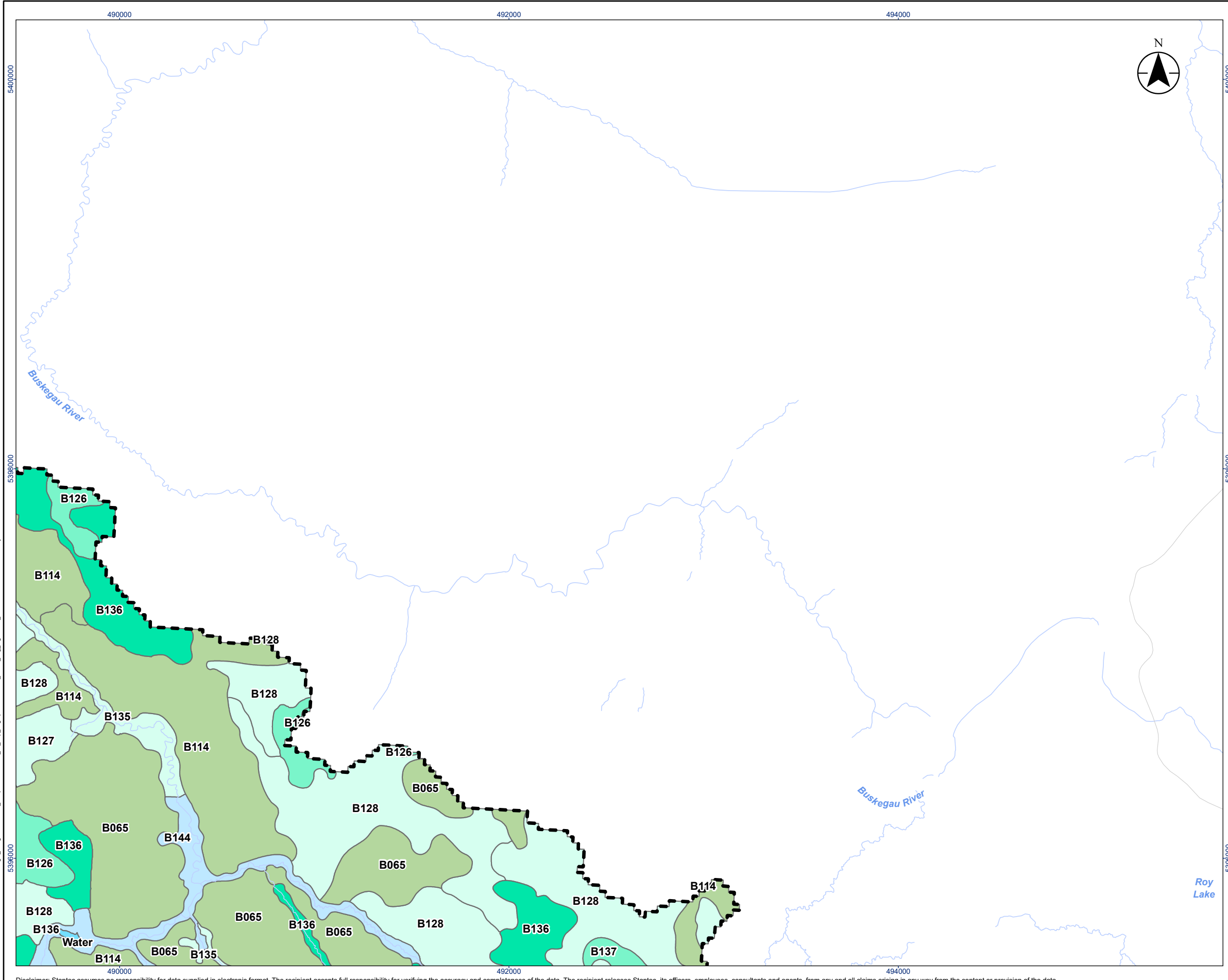


Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23

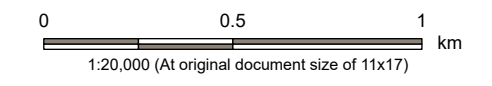
Client/Project: Canada Nickel Company (CNC)
 Crawford Nickel Project

Figure No.: **16.3.23**
 Title: **Ecological Land Classification in the LSA**

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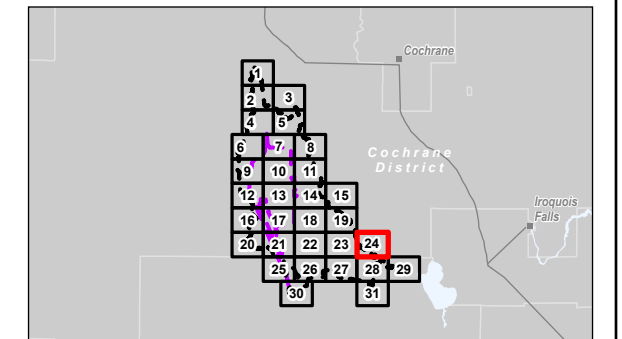


- Legend
- Local Study Area**
- Base Features**
- Minor Road
 - Watercourse (Permanent)
 - Waterbody
- Ecological Land Classification**
- Forested Area**
- Coniferous Forest/Stand
- Wetland**
- Bog
 - Fen
 - Swamp
 - Meadow Marsh
- Water**
- Water



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.



Project Location: Timmins, Ontario

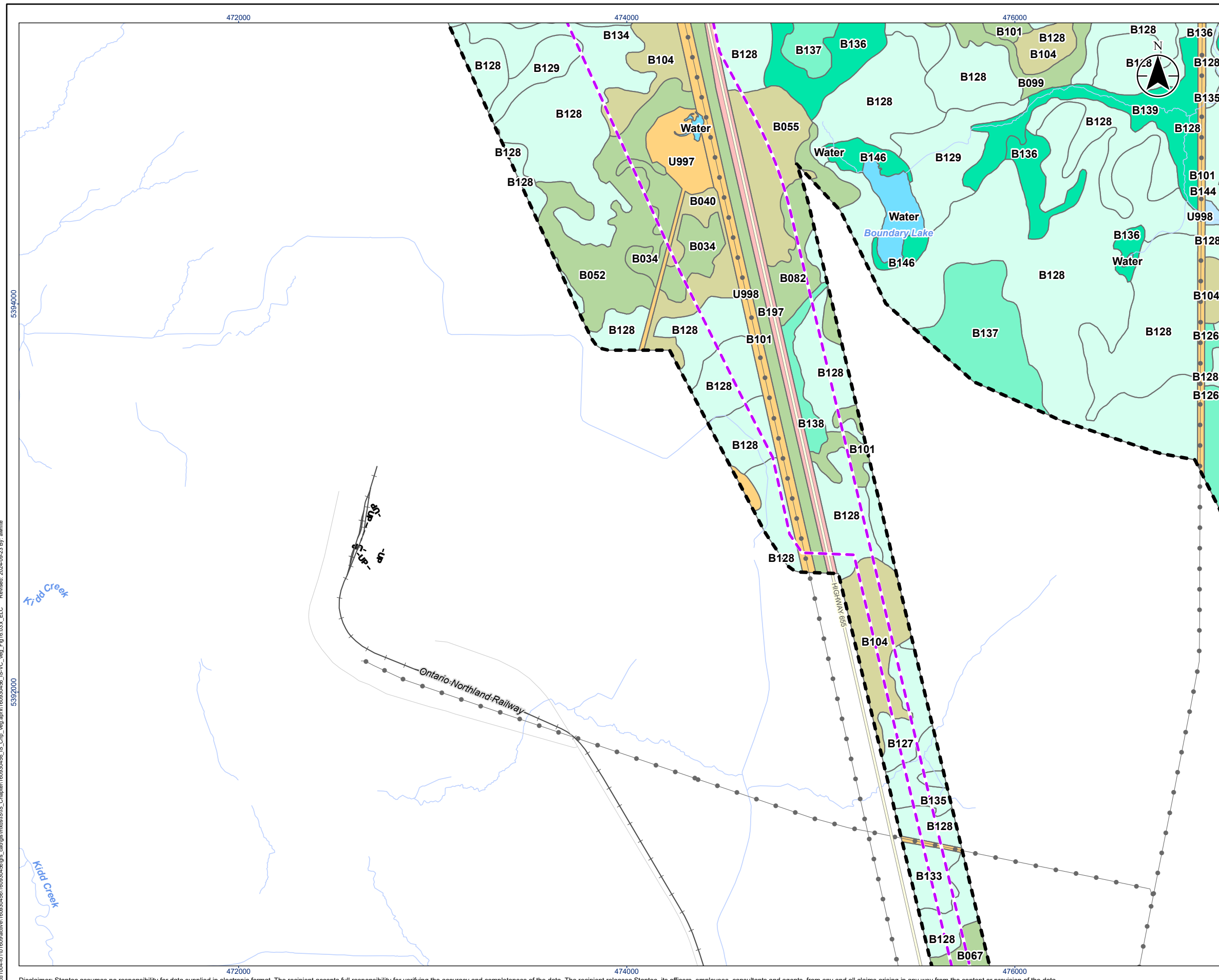
160930456 REVA
Prepared by: awhite on 2024-09-23

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


Figure No.: **16.3.24**


Title: **Ecological Land Classification in the LSA**

V:\1004-10\160930456\160930456\gis_data\gis_data\mxd\160930456_LSA_Chp_Veg.aprx\160930456_LSA_VC_Veg_Fig16.03x_ELC_Revise.dwg: 2024-09-23 By: awhite











Legend

Project Area
 Project Area



Local Study Area
 Local Study Area

Base Features





-  Major Road
-  Minor Road
-  Railway
-  Hydro Line
-  Unknown Pipeline
-  Watercourse (Intermittent)
-  Watercourse (Permanent)
-  Waterbody

Ecological Land Classification


Forested Area

-  Coniferous Forest/Stand
-  Deciduous Forest/Stand



Wetland

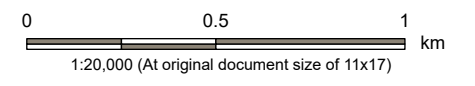
-  Bog
-  Fen
-  Swamp
-  Meadow Marsh

Water

-  Water

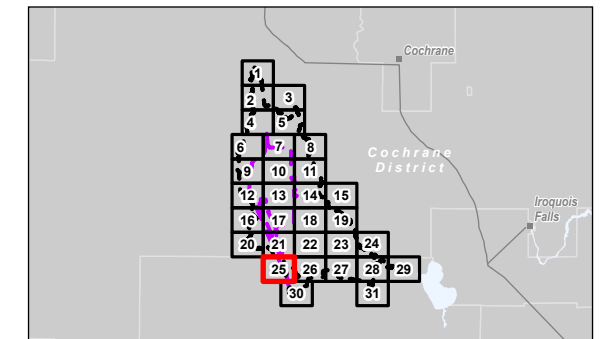
Anthropogenic

-  Anthropogenic
-  Constructed



Notes

- Coordinate System: NAD 1983 UTM Zone 17N
- Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.

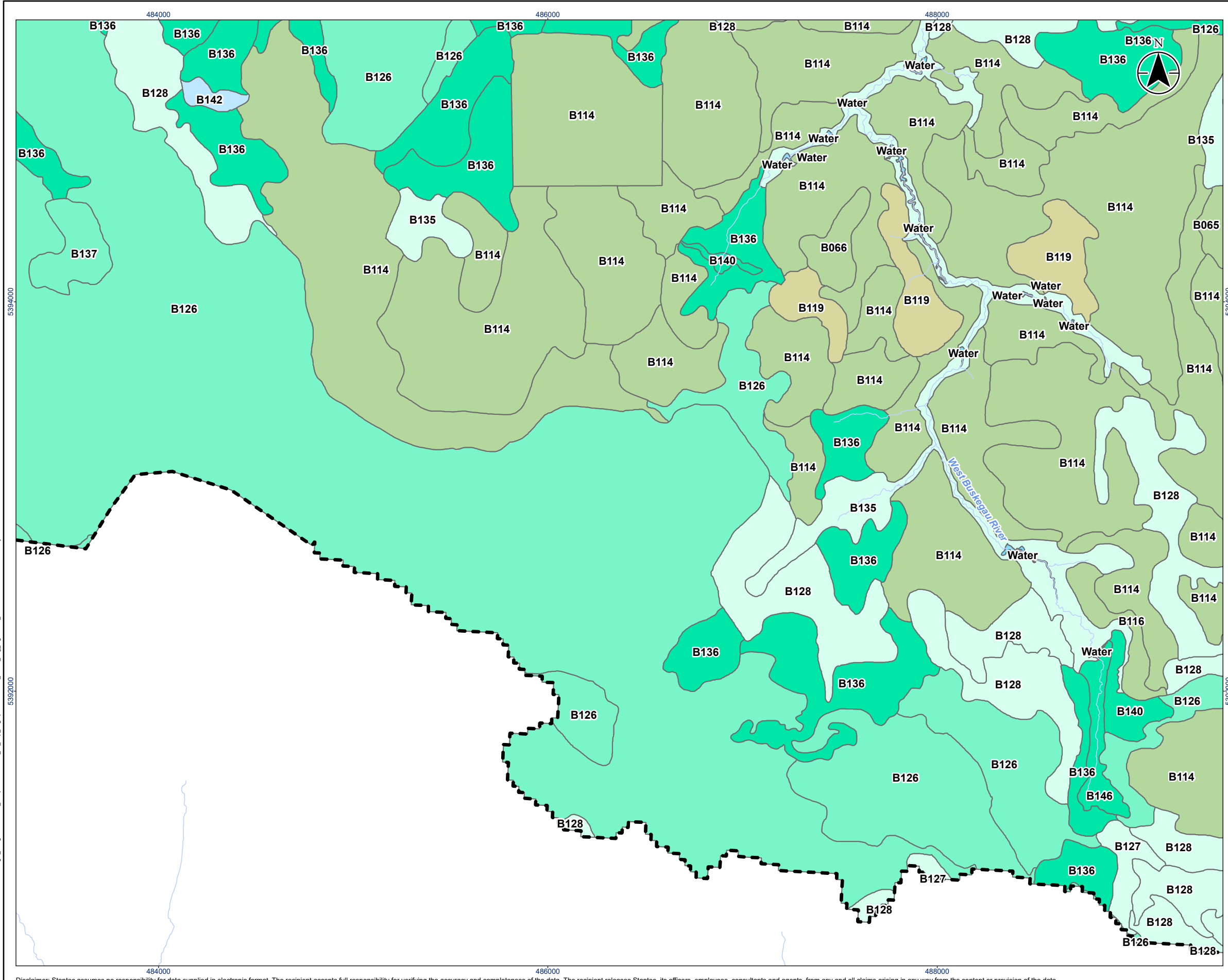


Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by: awhite on 2024-09-23


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


Figure No.: **16.3.25**

Title: **Ecological Land Classification in the LSA**





Legend

 Local Study Area





 Watercourse (Permanent)

Ecological Land Classification


Forested Area

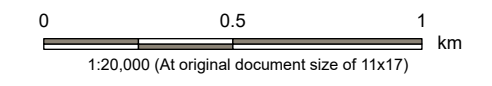
-  Coniferous Forest/Stand
-  Deciduous Forest/Stand

Wetland

-  Bog
-  Fen
-  Swamp
-  Meadow Marsh

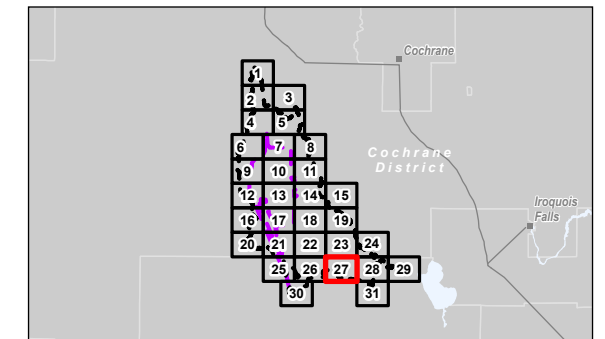
Water

-  Water



Notes

- Coordinate System: NAD 1983 UTM Zone 17N
- Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.



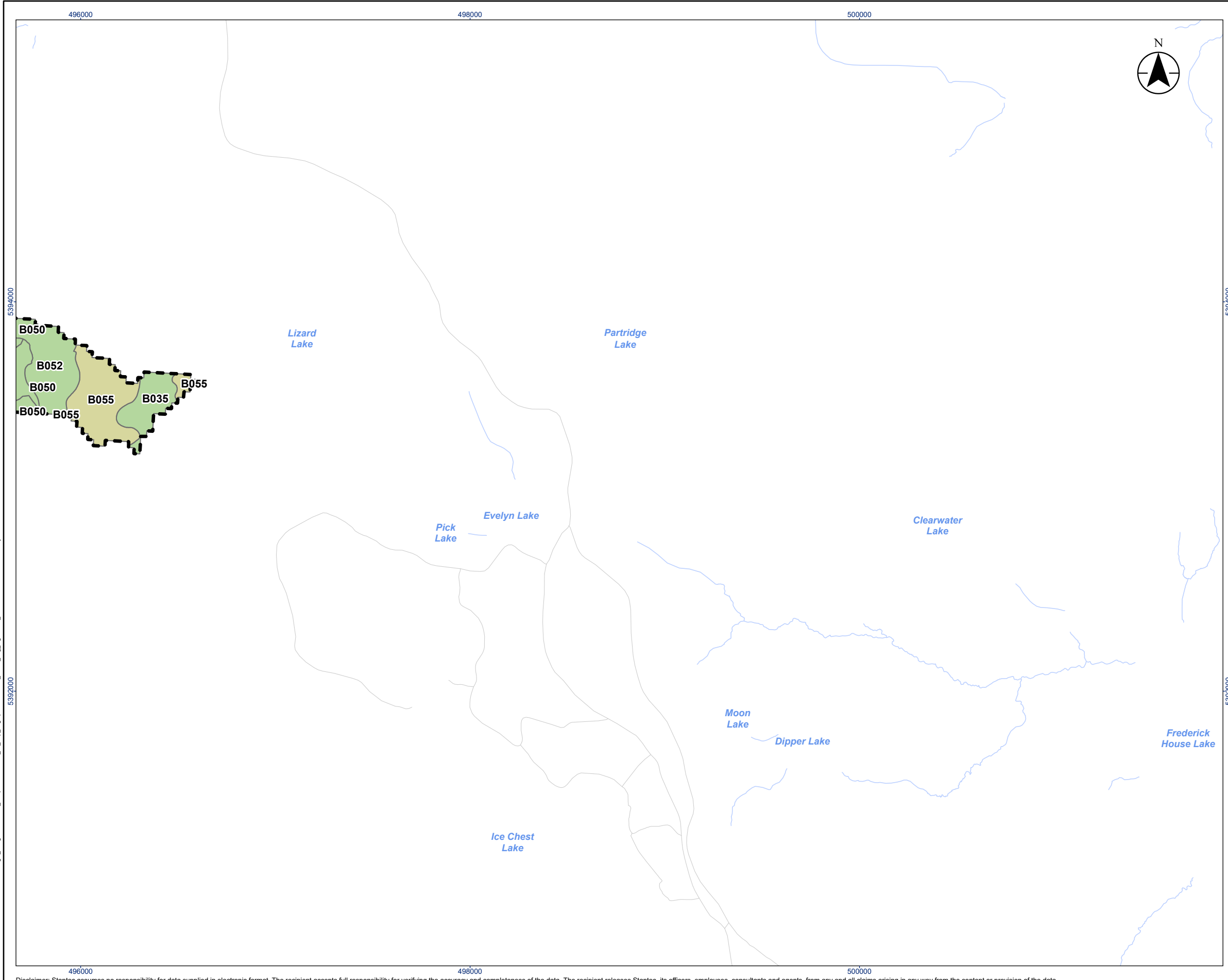
Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23

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

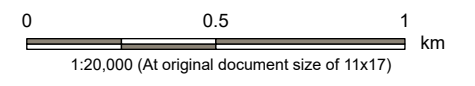
Figure No.: **16.3.27**

Title: **Ecological Land Classification in the LSA**

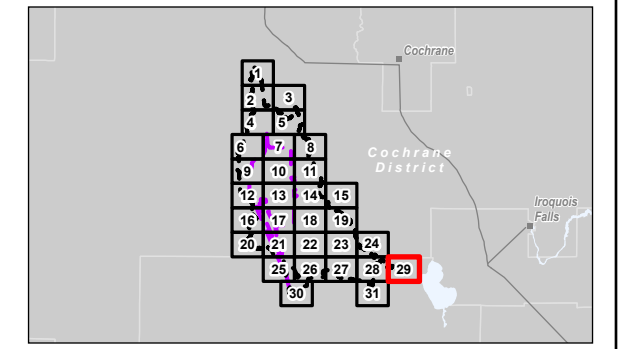
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 5392000
 5394000



- Legend
- Local Study Area**
- Base Features**
- Minor Road
 - Watercourse (Intermittent)
 - Watercourse (Permanent)
 - Waterbody
- Ecological Land Classification**
- Forested Area
- Coniferous Forest/Stand
 - Deciduous Forest/Stand



- 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.



Project Location: Timmins, Ontario
 Prepared by: awwhite on 2024-09-23

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

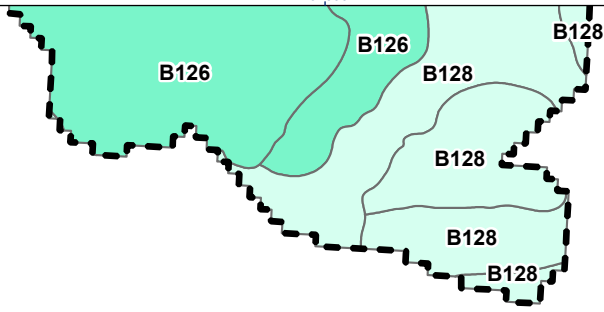
Figure No.: **16.3.29**
 Title: **Ecological Land Classification in the LSA**

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 5394000







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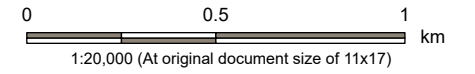
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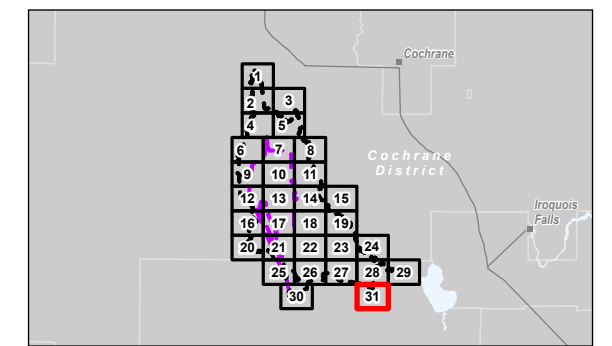
Legend

- | | |
|--|---|
|  Local Study Area | Ecological Land Classification |
|  Watercourse (Intermittent) | Wetland |
|  Watercourse (Permanent) |  Bog |
|  Waterbody |  Swamp |



Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
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Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by awhite on 2024-09-23

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

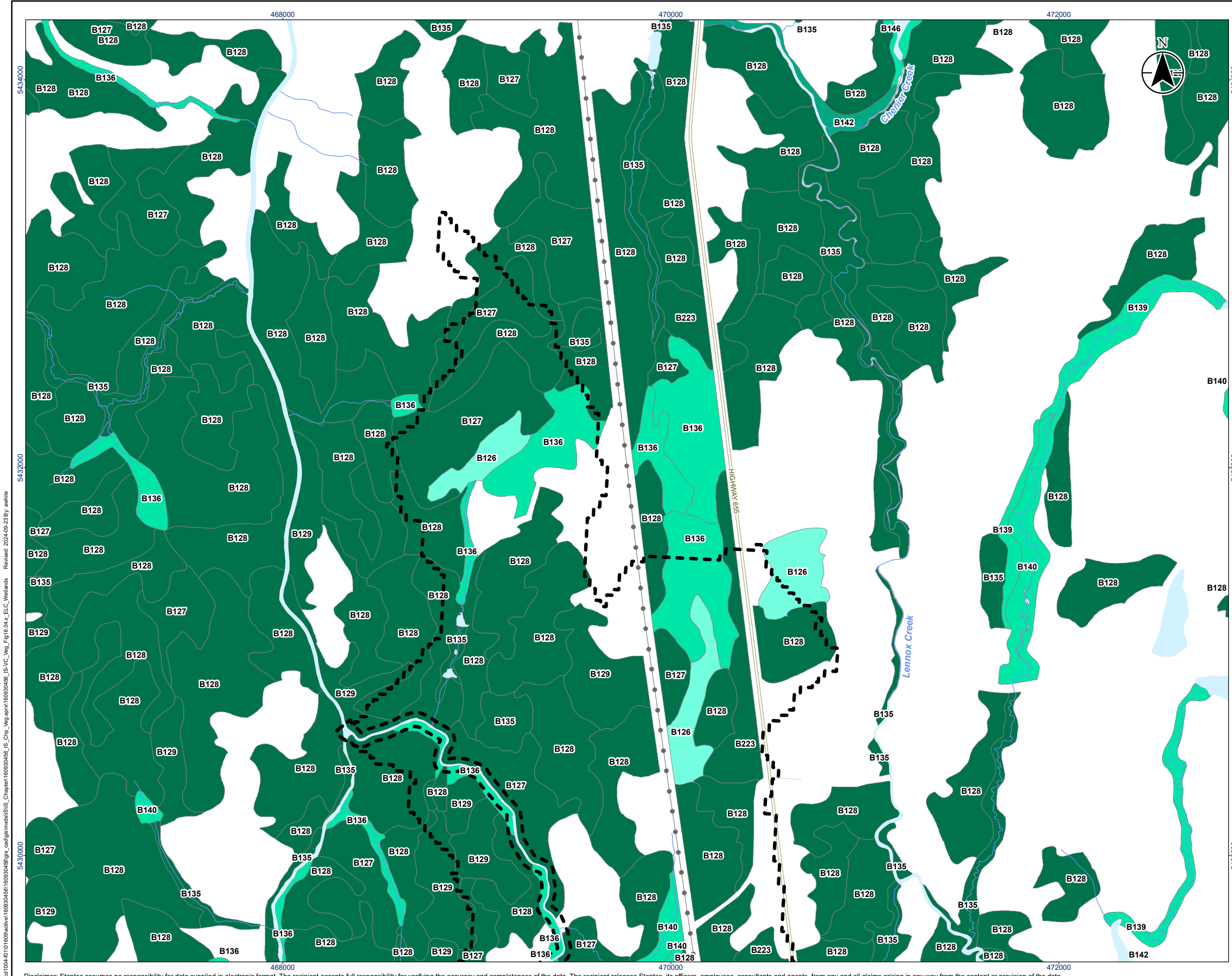
Figure No. **16.3.31**
 Title **Ecological Land Classification in the LSA**

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Gowanmarsh Creek

490000 492000 494000 5386000 5388000 5390000






Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.



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


Local Study Area

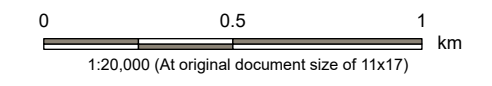
Base Features

-  Major Road
-  Minor Road
-  Hydro Line
-  Watercourse (Permanent)
-  Waterbody

Ecological Land Classification

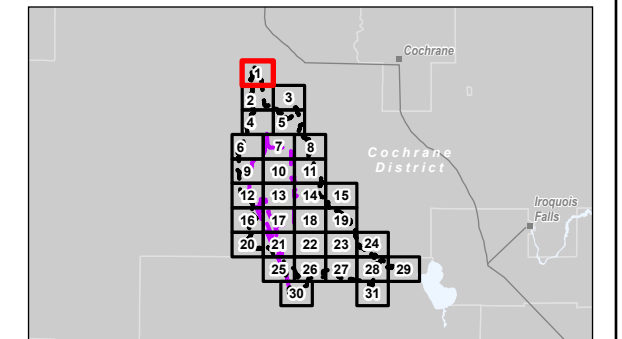
Wetland

-  Bog
-  Fen
-  Meadow Marsh
-  Swamp



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.



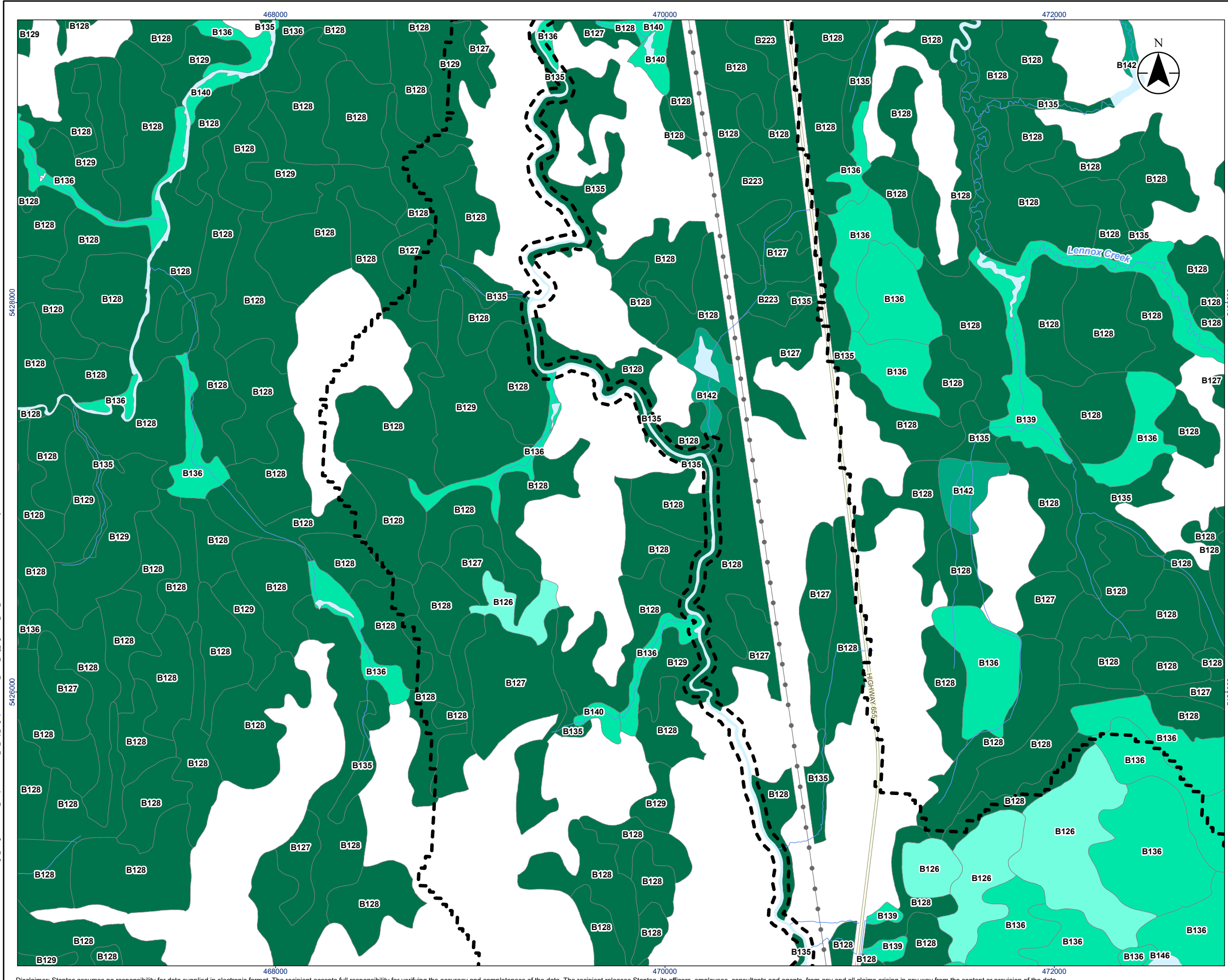
Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by: awhite on 2024-09-23

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


Figure No.: **16.4.1**

Title: **Wetlands in the LSA**





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Legend





 Local Study Area

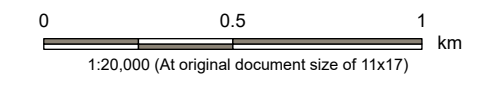
Base Features

-  Major Road
-  Hydro Line
-  Watercourse (Permanent)
-  Waterbody

Ecological Land Classification

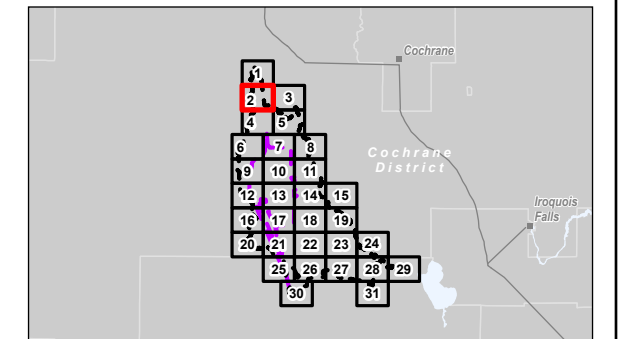
Wetland

-  Bog
-  Fen
-  Meadow Marsh
-  Swamp



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.



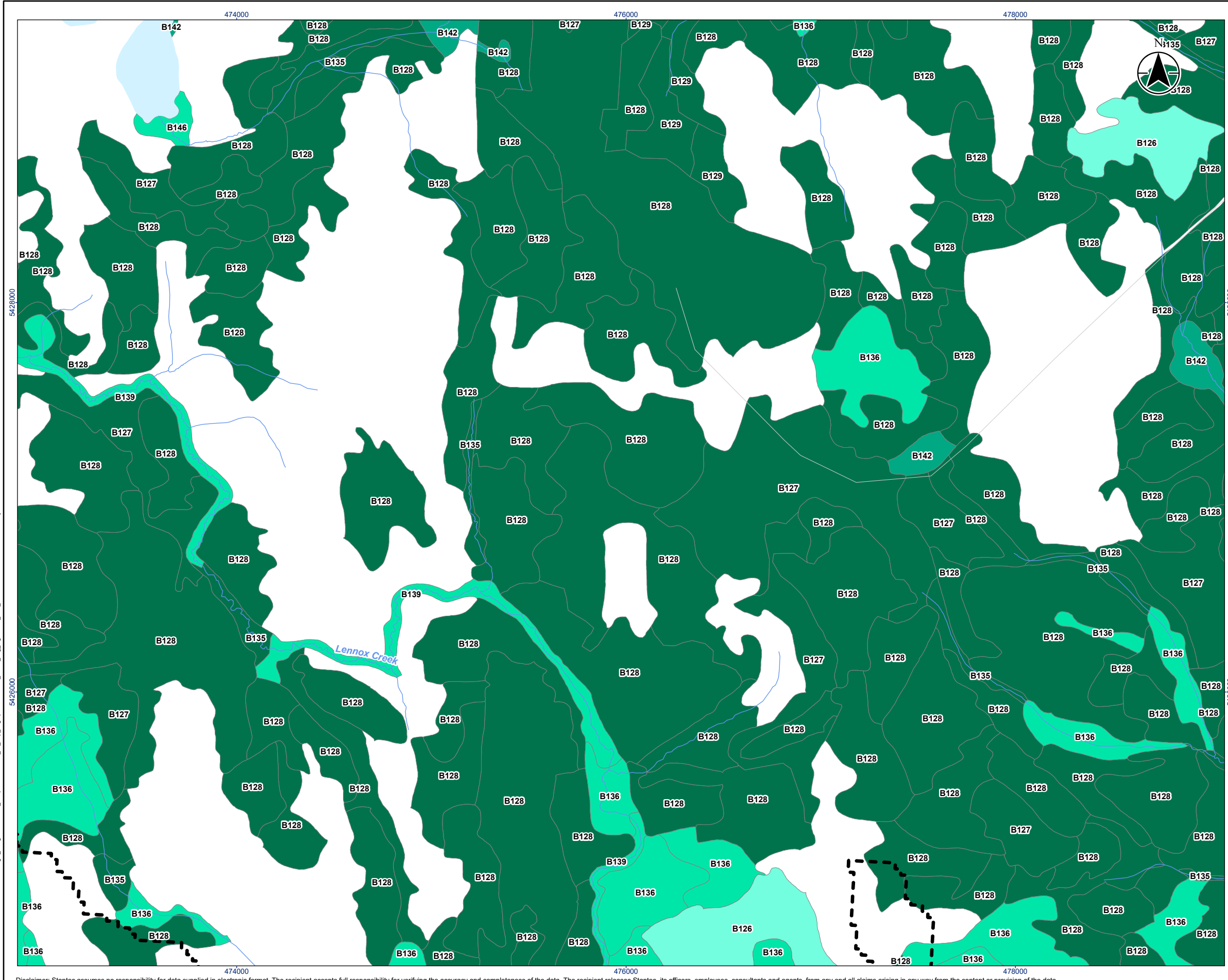
Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23

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


Figure No.: **16.4.2**

Title: **Wetlands in the LSA**




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


 Local Study Area

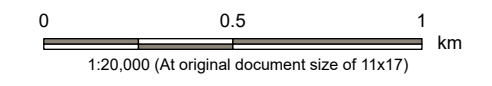
Base Features

-  Minor Road
-  Watercourse (Permanent)
-  Waterbody

Ecological Land Classification

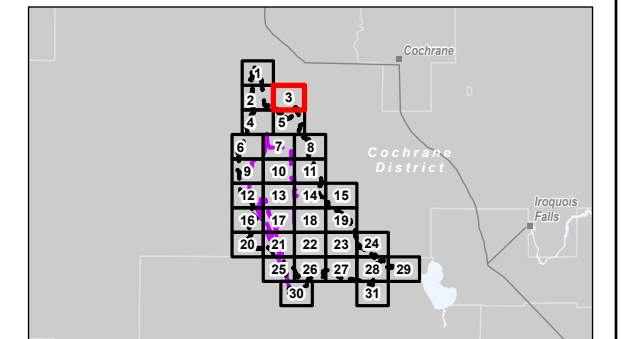
Wetland

-  Bog
-  Fen
-  Meadow Marsh
-  Swamp



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.



Project Location: Timmins, Ontario

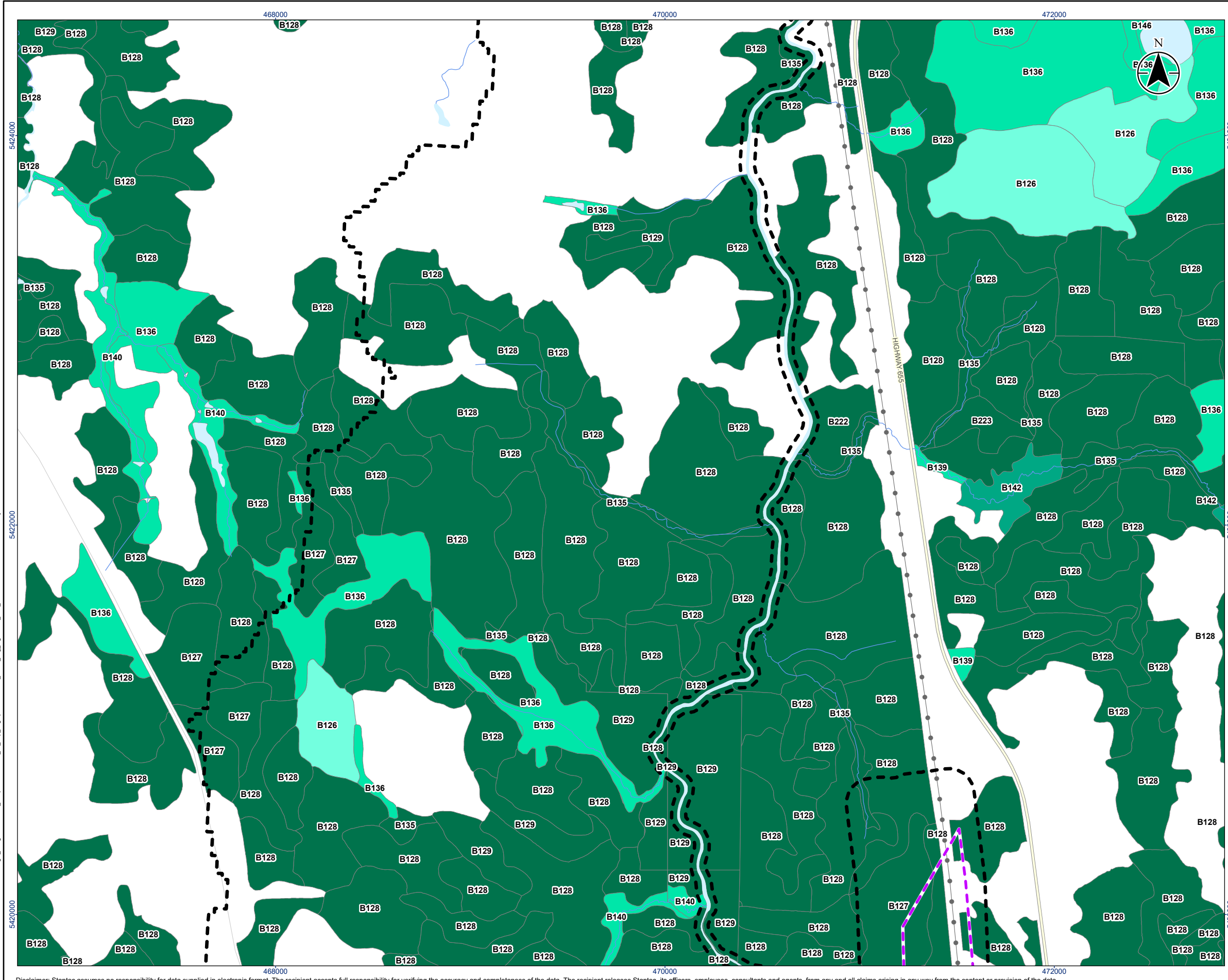
160930456 REVA
Prepared by: awhite on 2024-09-23

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

Figure No.
16.4.3

Title
Wetlands in the LSA

V:\1004\101\160930456\160930456\gis_data\gis_md\160930456_160930456_IS_VC_Veg_Fig16_04x_ELC_Wetlands_2024-09-23_By: awhite
 Revised: 2024-09-23 By: awhite



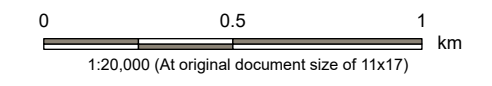
Legend

Project Area
 Project Area
 Local Study Area

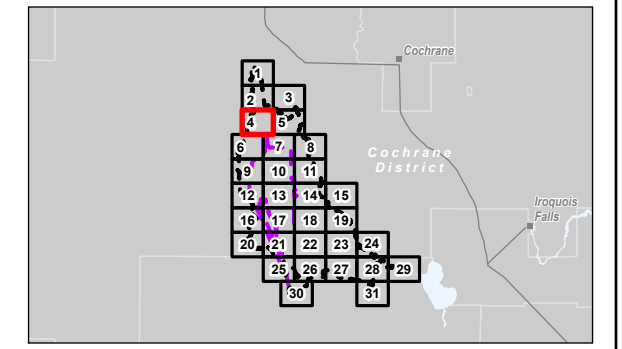
Base Features
 Major Road
 Minor Road
 Hydro Line
 Watercourse (Permanent)
 Waterbody

Ecological Land Classification

Wetland
 Bog
 Fen
 Meadow Marsh
 Swamp



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.

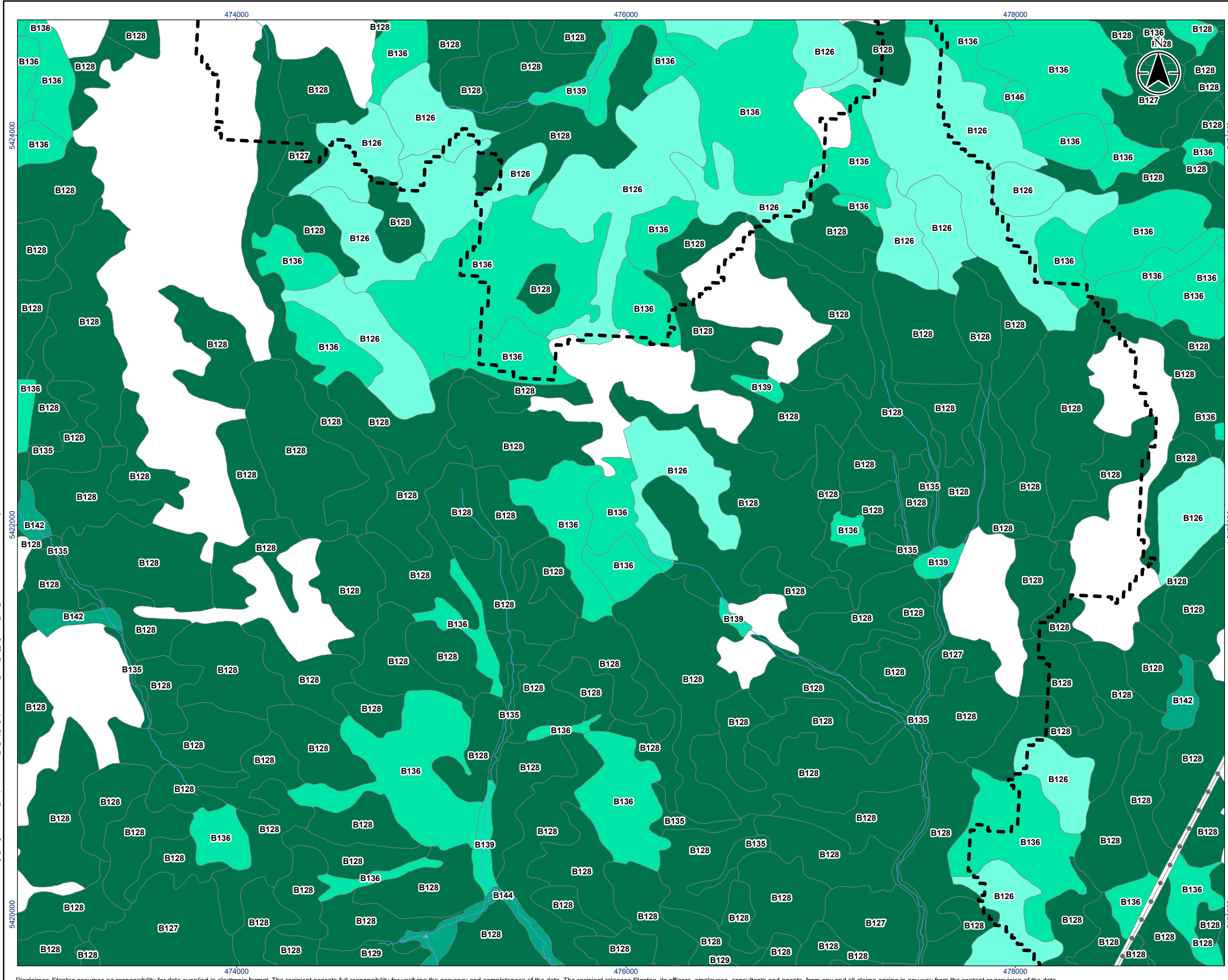


Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by: awhite on 2024-09-23




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

Figure No.
16.4.4
 Title
Wetlands in the LSA

V:\1004-101\009\active\160930456\160930456_chapter1\00930456_gis_cad\gis_cad\gis_cad\gis_cad\160930456_IS_VC_Veg_Fig16.04x_ELC_Wetlands
 Revised: 2024-09-23 By: awhite







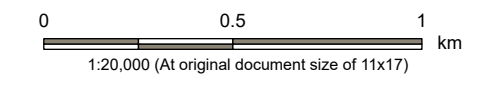
Legend

-  Local Study Area
-  Hydro Line
-  Watercourse (Permanent)

Ecological Land Classification

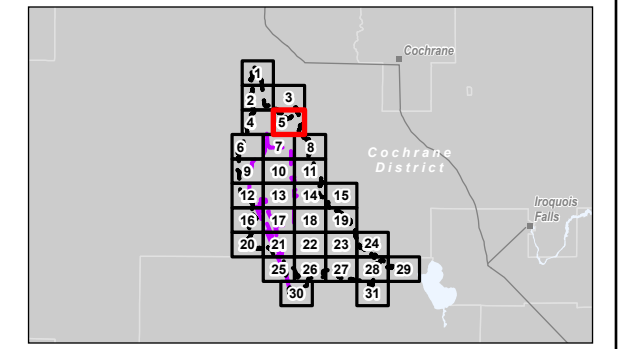
Wetland

-  Bog
-  Fen
-  Meadow Marsh
-  Swamp



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.

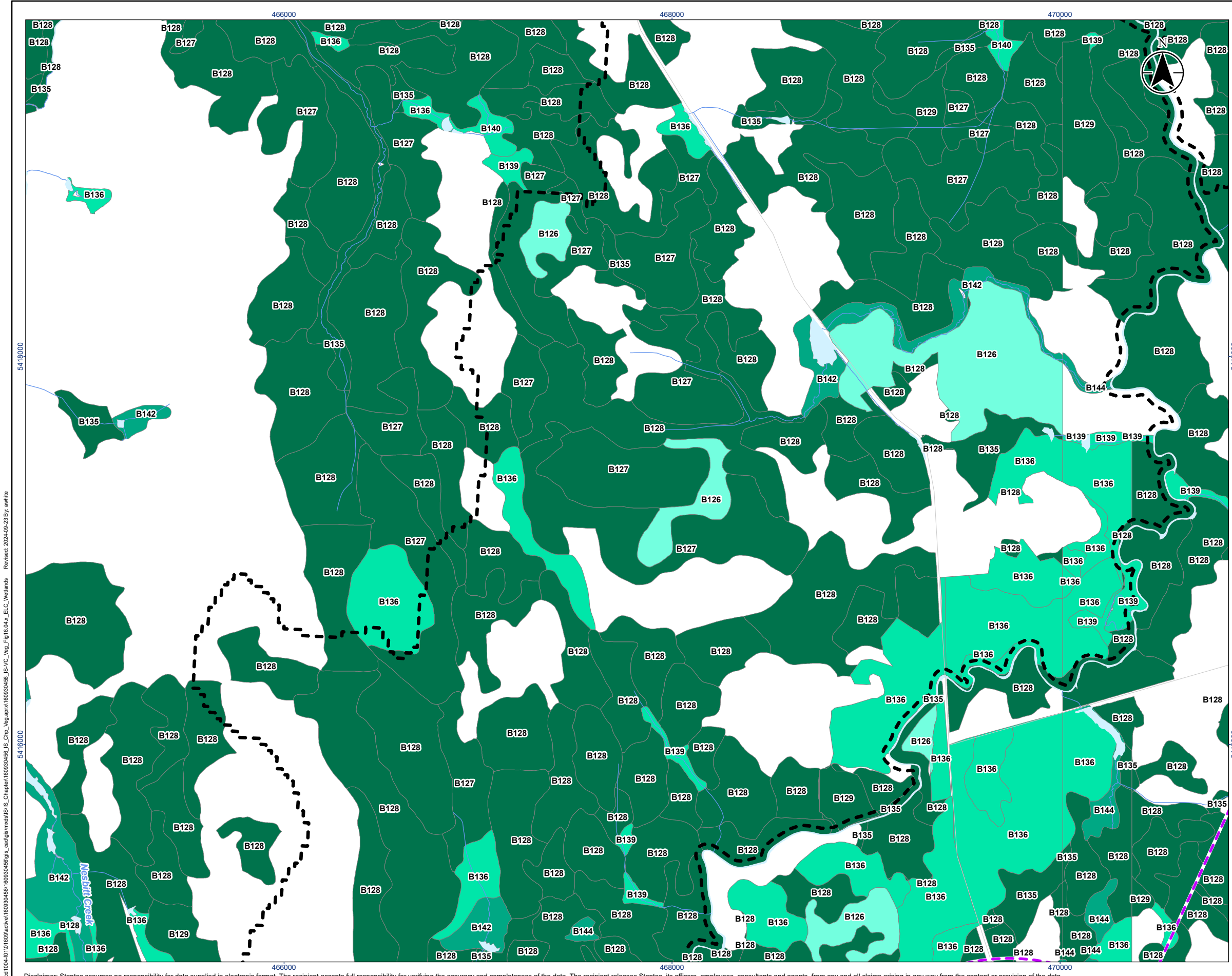


Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23
 160930456 REVA


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

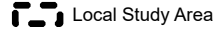
Figure No. **16.4.5**
 Title **Wetlands in the LSA**

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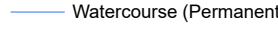



Legend

 Project Area



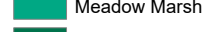

 Local Study Area

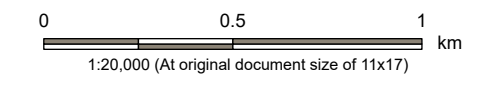
Base Features

-  Minor Road
-  Watercourse (Permanent)
-  Waterbody

Ecological Land Classification

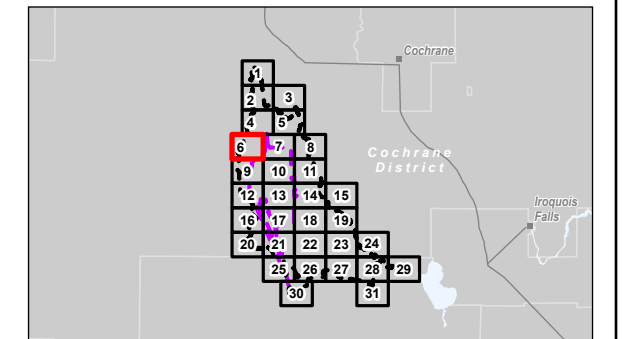
Wetland

-  Bog
-  Fen
-  Meadow Marsh
-  Swamp



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.



Project Location: Timmins, Ontario

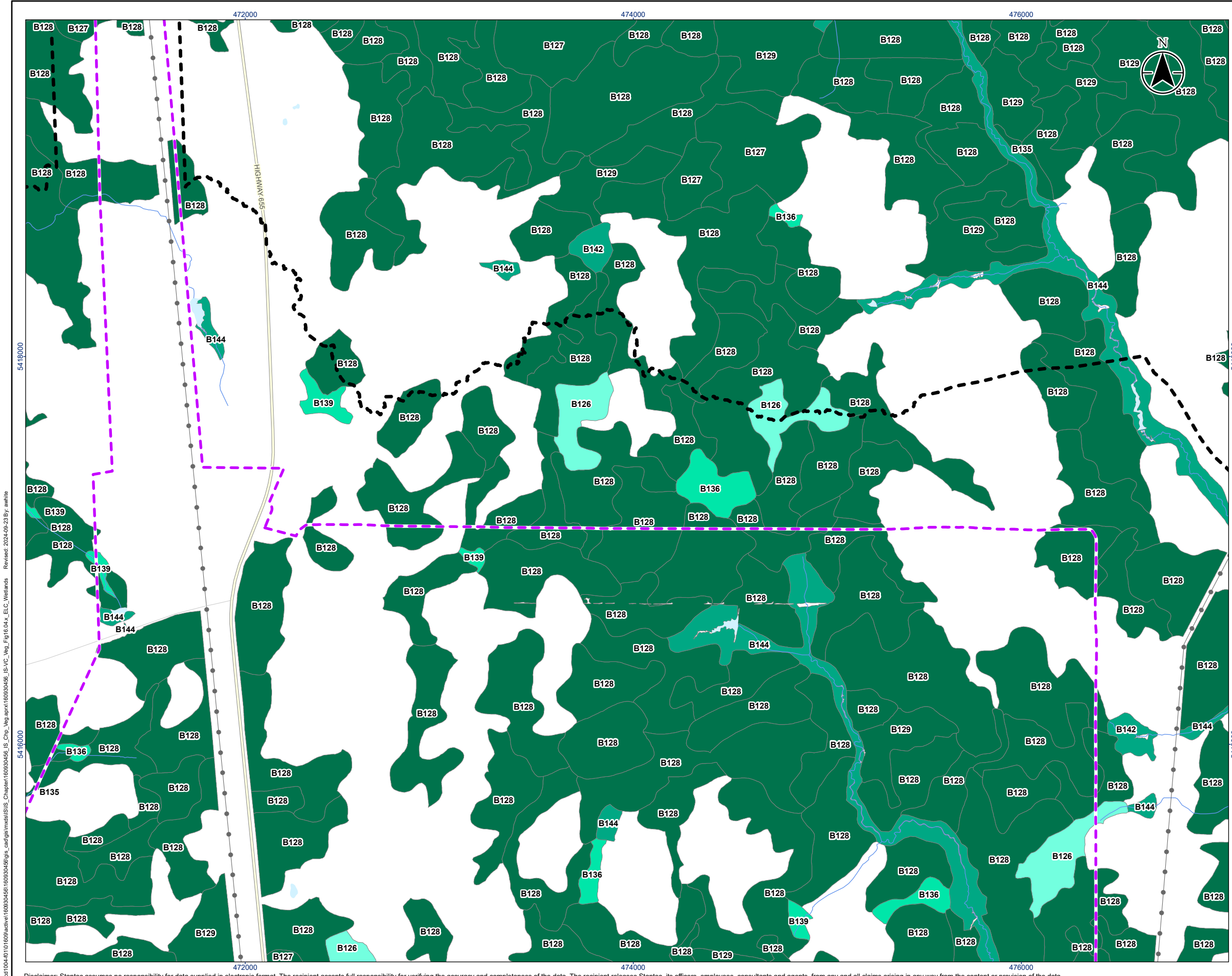
160930456 REVA
Prepared by: awhite on 2024-09-23

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

Figure No.
16.4.6

Title
Wetlands in the LSA

V:\1004-101\160930456\160930456\GIS\Map_Series\160930456_160930456_IS_VC_Veg_Fig16.04x_ELC_Wetlands_2024-09-23 By: awhite
 Revised: 2024-09-23 By: awhite






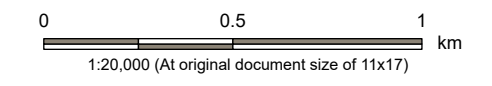
Legend

Project Area
 Project Area
 Local Study Area

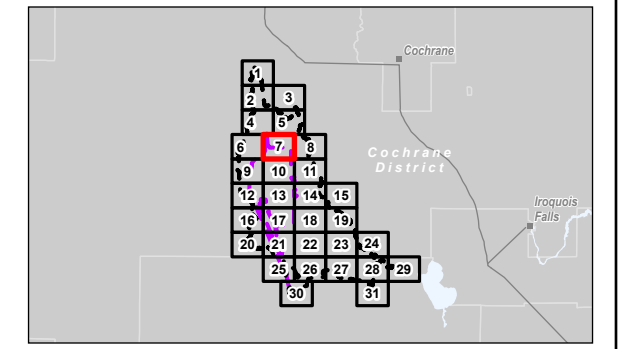
Base Features
 Major Road
 Minor Road
 Hydro Line
 Watercourse (Permanent)
 Waterbody

Ecological Land Classification

Wetland
 Bog
 Fen
 Meadow Marsh
 Swamp



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.

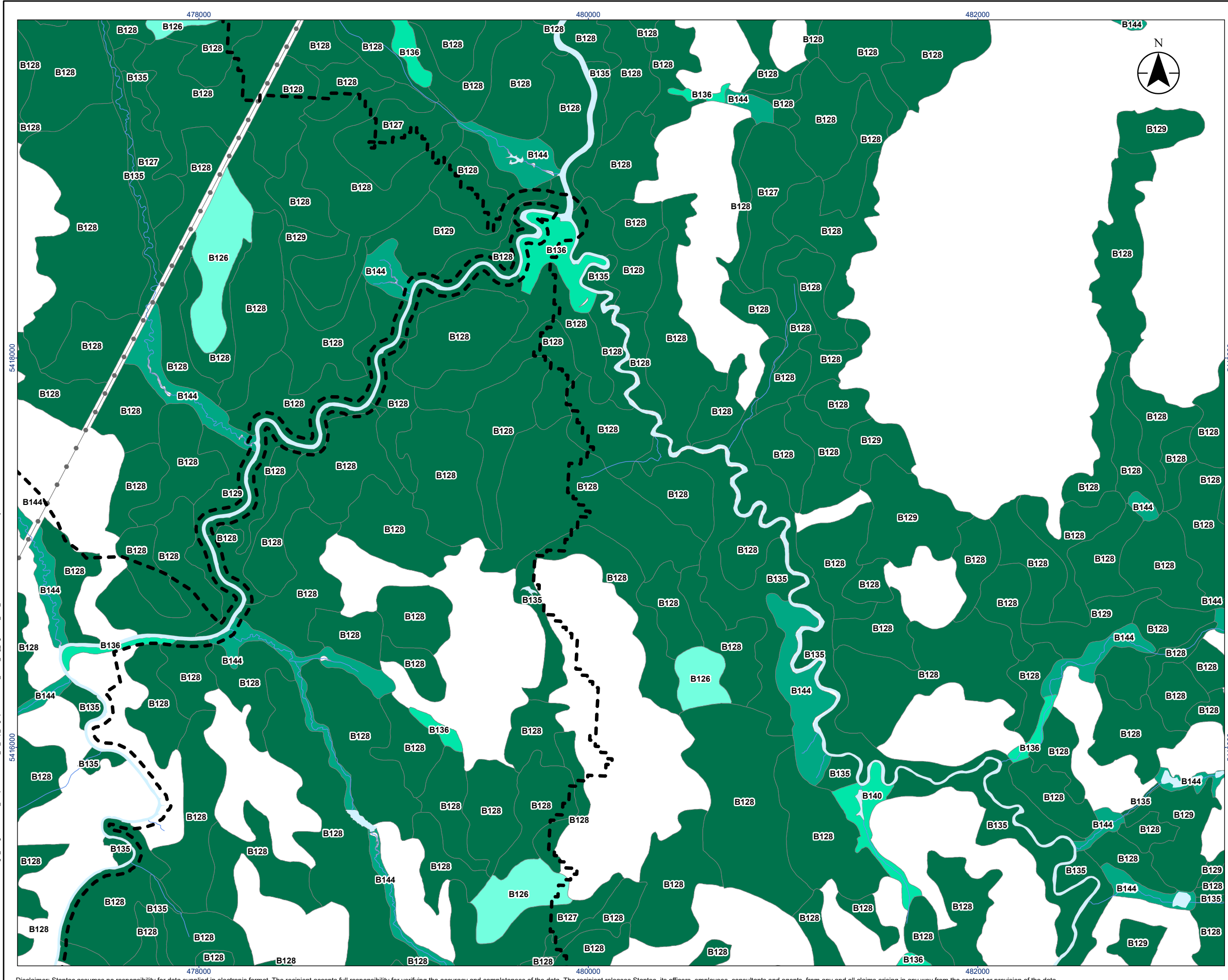


Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by: awhite on 2024-09-23

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

Figure No.: **16.4.7**
 Title: **Wetlands in the LSA**

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 Revised: 2024-09-23 By: awhite



Legend

Local Study Area

Hydro Line

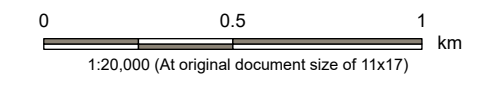
Watercourse (Permanent)

Waterbody

Ecological Land Classification

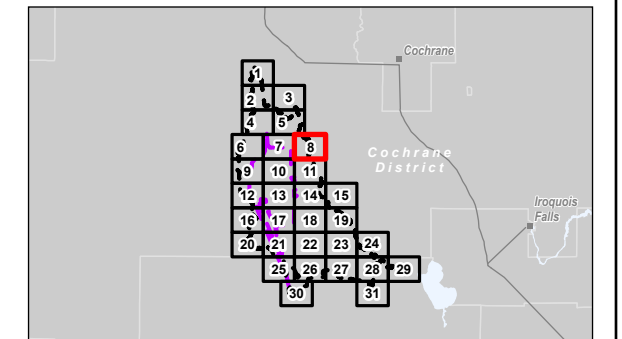
Wetland

- Bog
- Fen
- Meadow Marsh
- Swamp



Notes

- Coordinate System: NAD 1983 UTM Zone 17N
- Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.



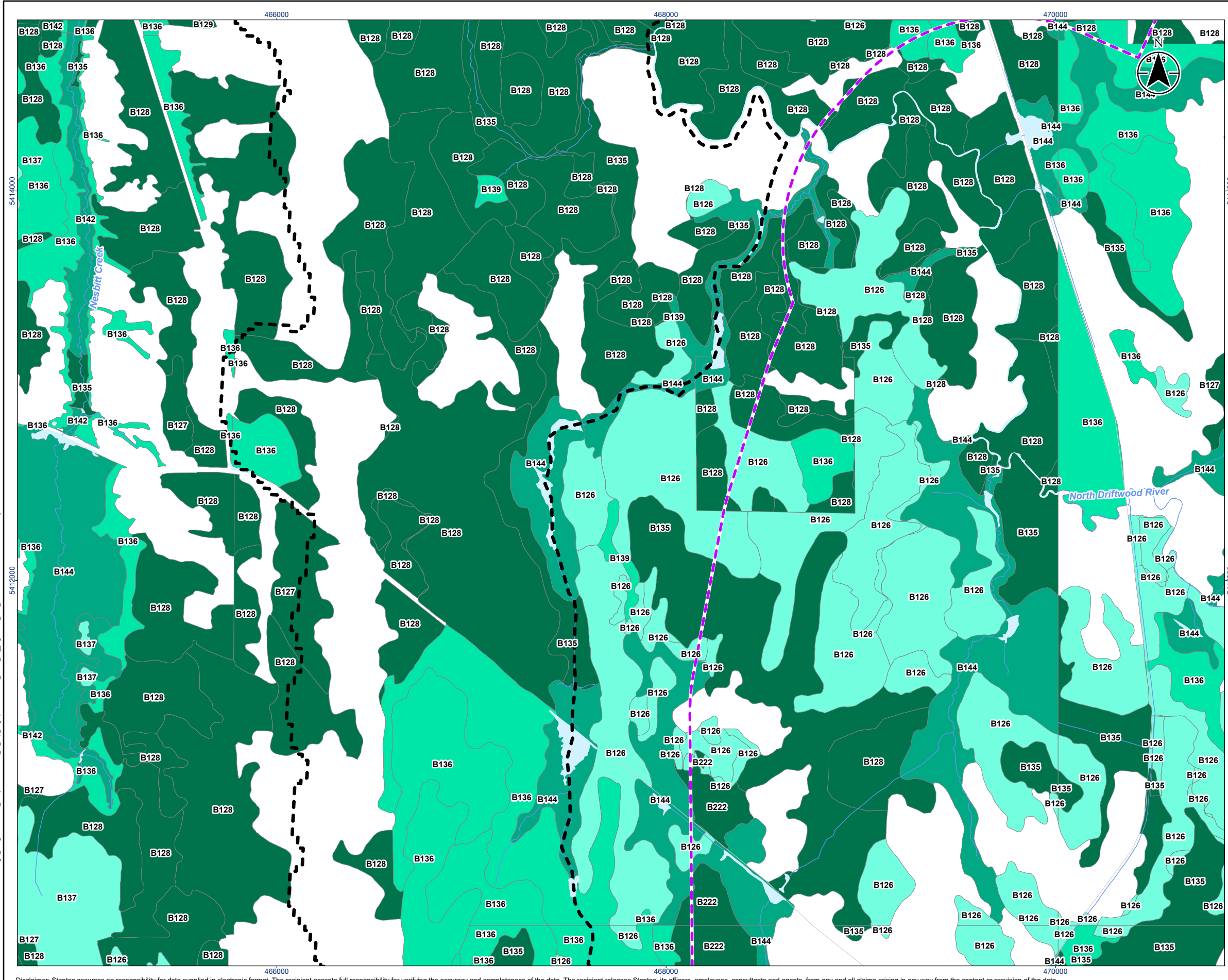
Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23

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


Figure No. **16.4.8**


Title: **Wetlands in the LSA**

V:\1004-101009\active\160930456\160930456\gis\mxd\160930456\160930456_IS_VC_Veg_Fig16.04x_ELC_Wetlands_2024-09-23 By: awhite
 Revised: 2024-09-23 By: awhite





Legend


 Project Area

 Local Study Area

Base Features


 Minor Road


 Watercourse (Permanent)


 Waterbody


Ecological Land Classification

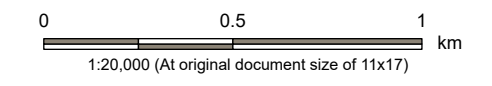
Wetland

 Bog

 Fen

 Meadow Marsh

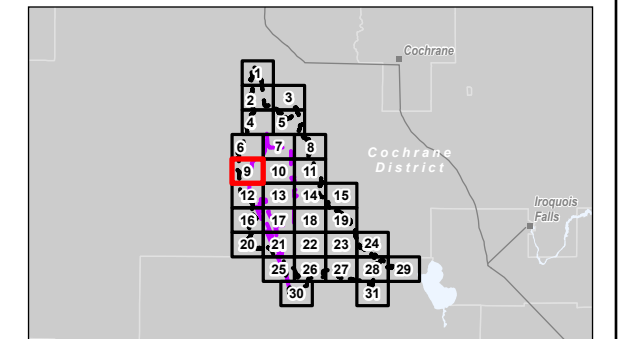
 Swamp



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.



Project Location: Timmins, Ontario

160930456 REVA

Prepared by: awhite on 2024-09-23

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

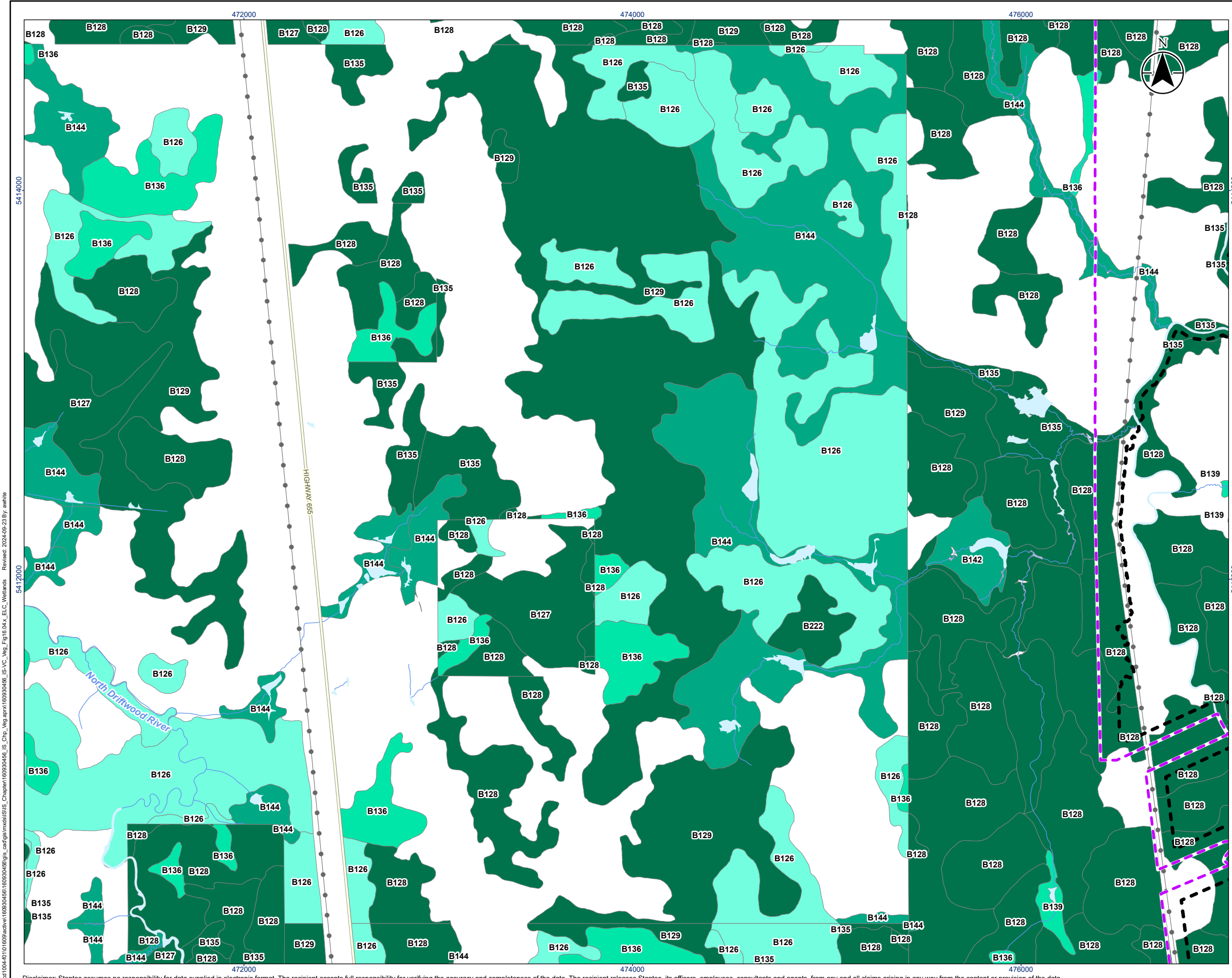
Figure No.

16.4.9

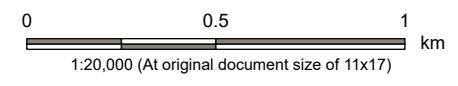
Title

Wetlands in the LSA

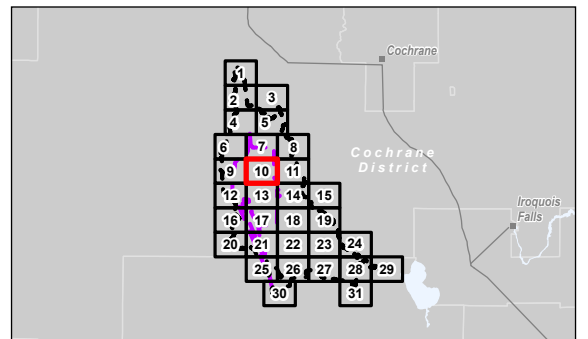
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- Legend**
- Project Area
 - Local Study Area
 - Base Features**
 - Major Road
 - Hydro Line
 - Watercourse (Permanent)
 - Waterbody
- Ecological Land Classification**
- Wetland**
- Bog
 - Fen
 - Meadow Marsh
 - Swamp



- 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.

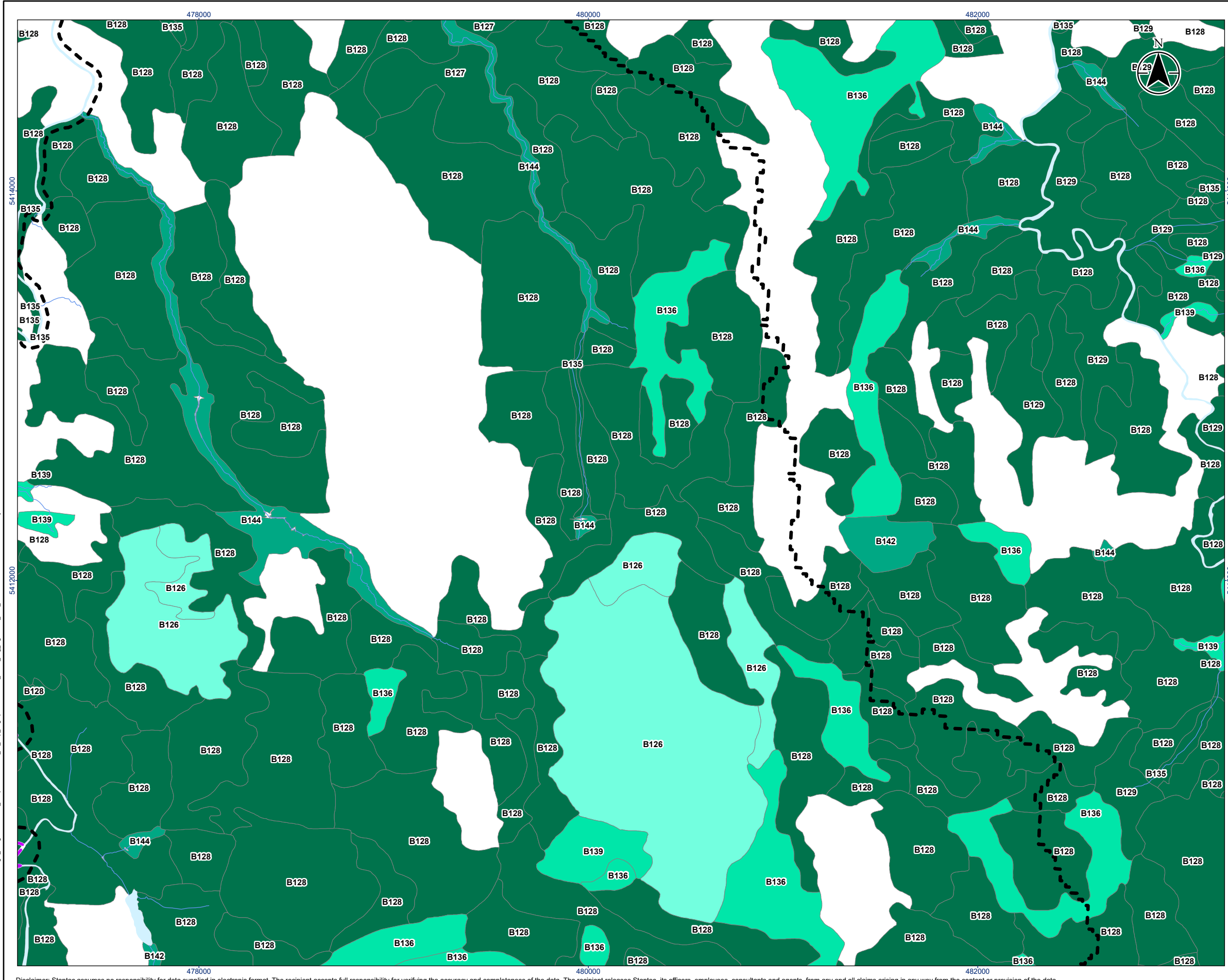


Project Location: Timmins, Ontario
 Prepared by: awwhite on 2024-09-23

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

Figure No.: **16.4.10**
 Title: **Wetlands in the LSA**

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 5414000
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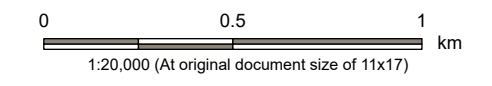
Legend

- Project Area
- Local Study Area
- Watercourse (Permanent)
- Waterbody

Ecological Land Classification

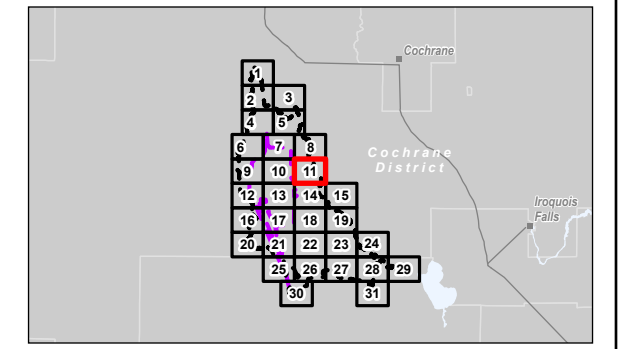
Wetland

- Bog
- Fen
- Meadow Marsh
- Swamp



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.

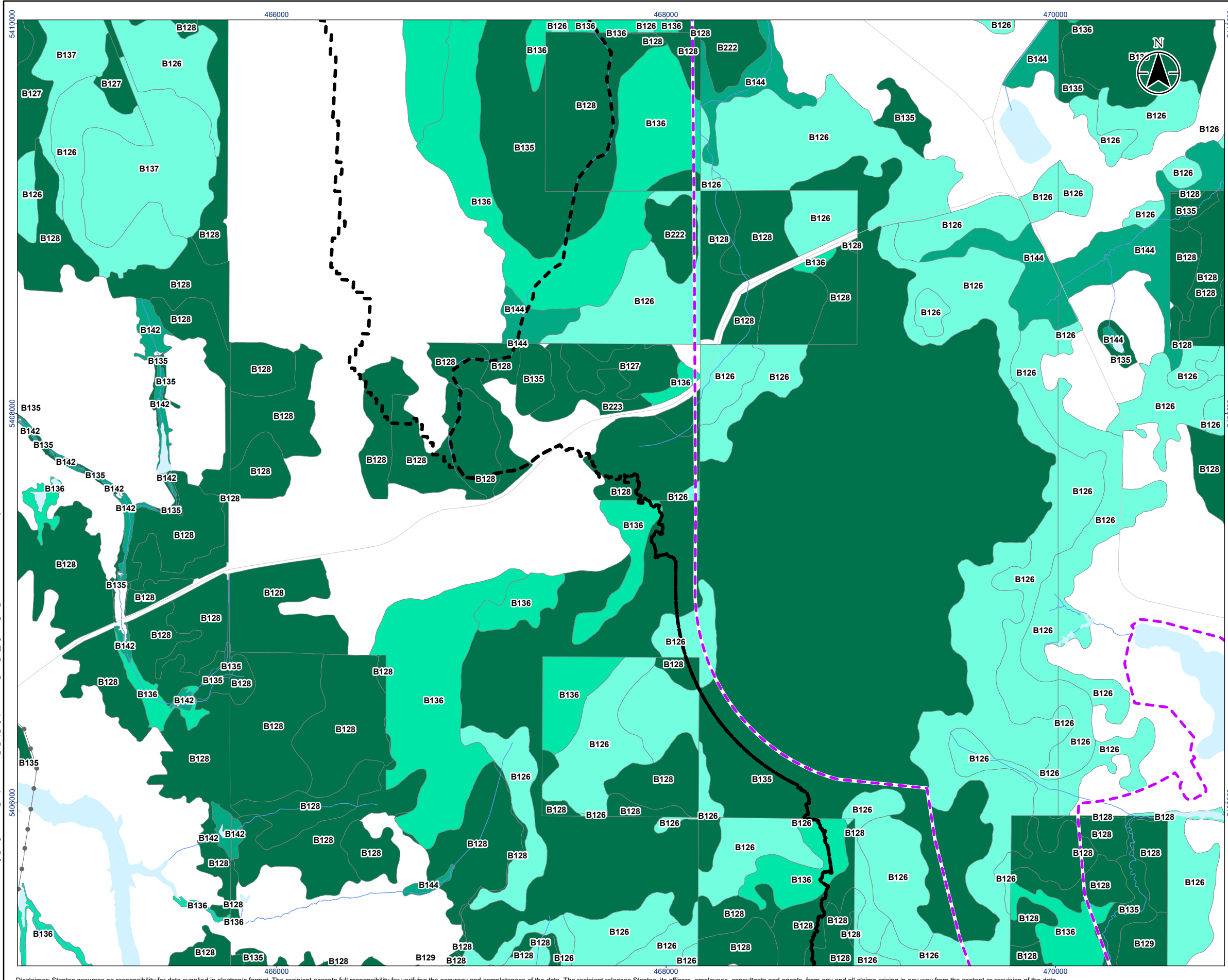


Project Location: Timmins, Ontario
 Prepared by: REVA 160930456
 Prepared by: awhite on 2024-09-23



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





Figure No.: **16.4.11**
 Title: **Wetlands in the LSA**

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 Revised: 2024-09-23 By: awhite
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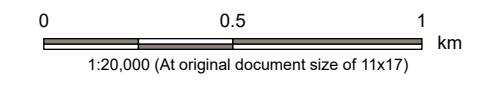
Legend

Project Area
 Project Area
 Local Study Area

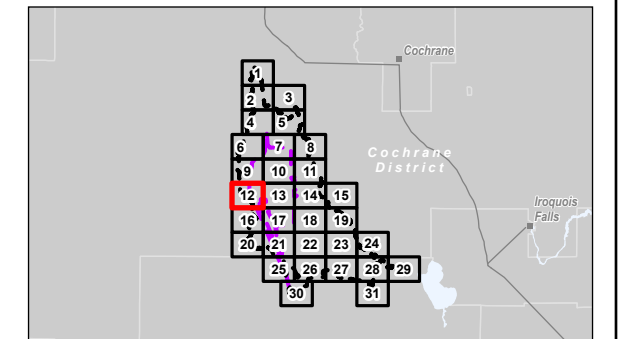
Base Features
 Minor Road
 Hydro Line
 Watercourse (Permanent)
 Waterbody

Ecological Land Classification

Wetland
 Bog
 Fen
 Meadow Marsh
 Swamp



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.



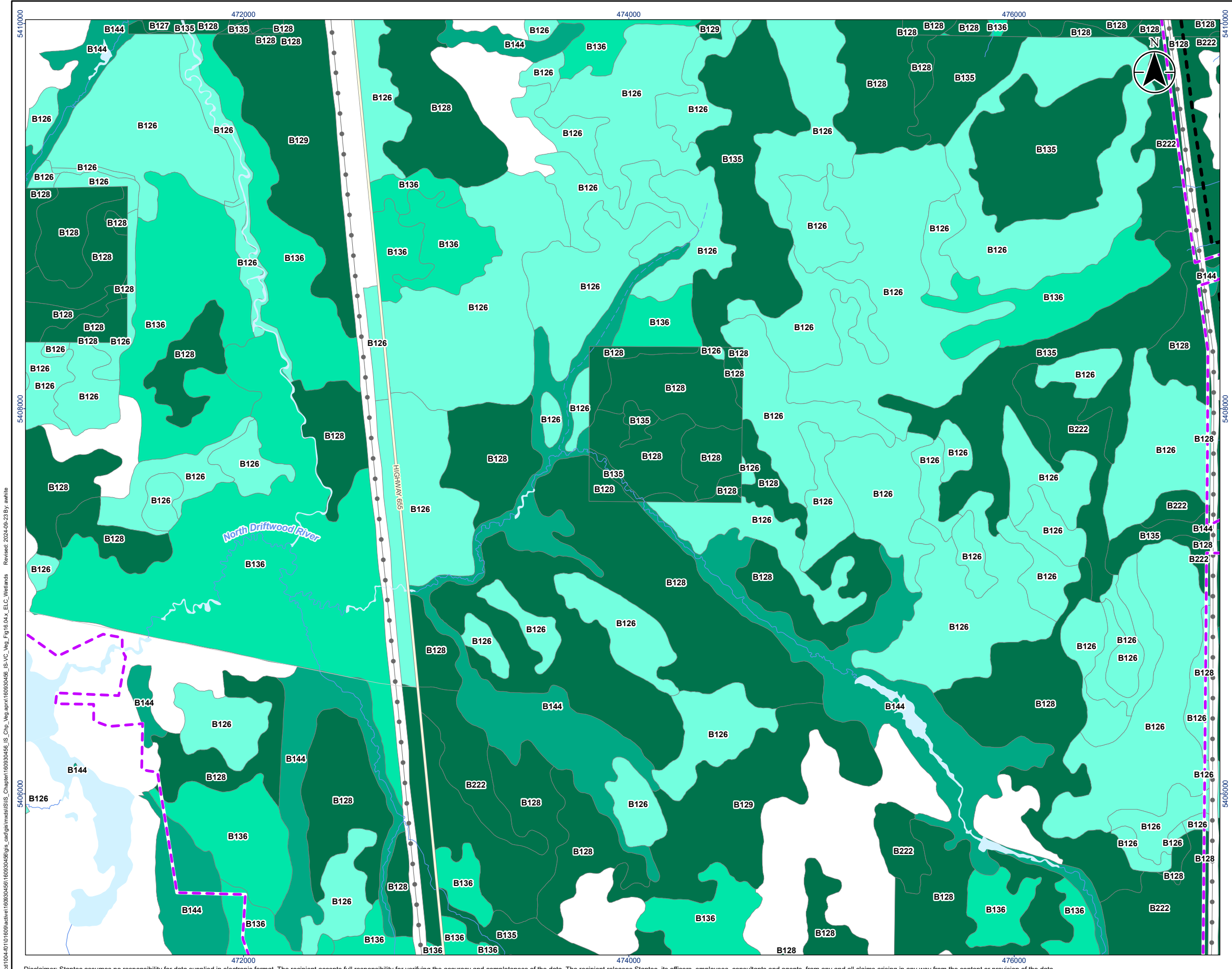
Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by: awhite on 2024-09-23

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


Figure No.: **16.4.12**


Title: **Wetlands in the LSA**

V:\1004-101\160930456\160930456\gis_cad\gis_md\160930456\160930456_IS_VC_Veg_Veg_Fig16_04x_ELC_Wetlands_Revised_2024-09-23_By: awhite



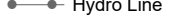
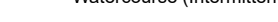




Legend

Project Area
 Project Area

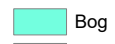

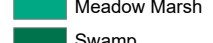

Local Study Area
 Local Study Area

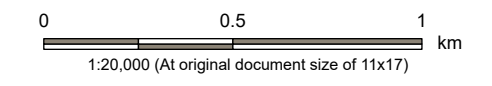
Base Features

-  Major Road
-  Minor Road
-  Hydro Line
-  Watercourse (Intermittent)
-  Watercourse (Permanent)
-  Waterbody

Ecological Land Classification

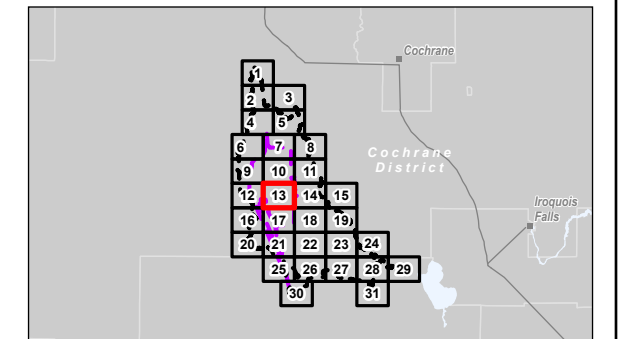
Wetland

-  Bog
-  Fen
-  Meadow Marsh
-  Swamp



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.



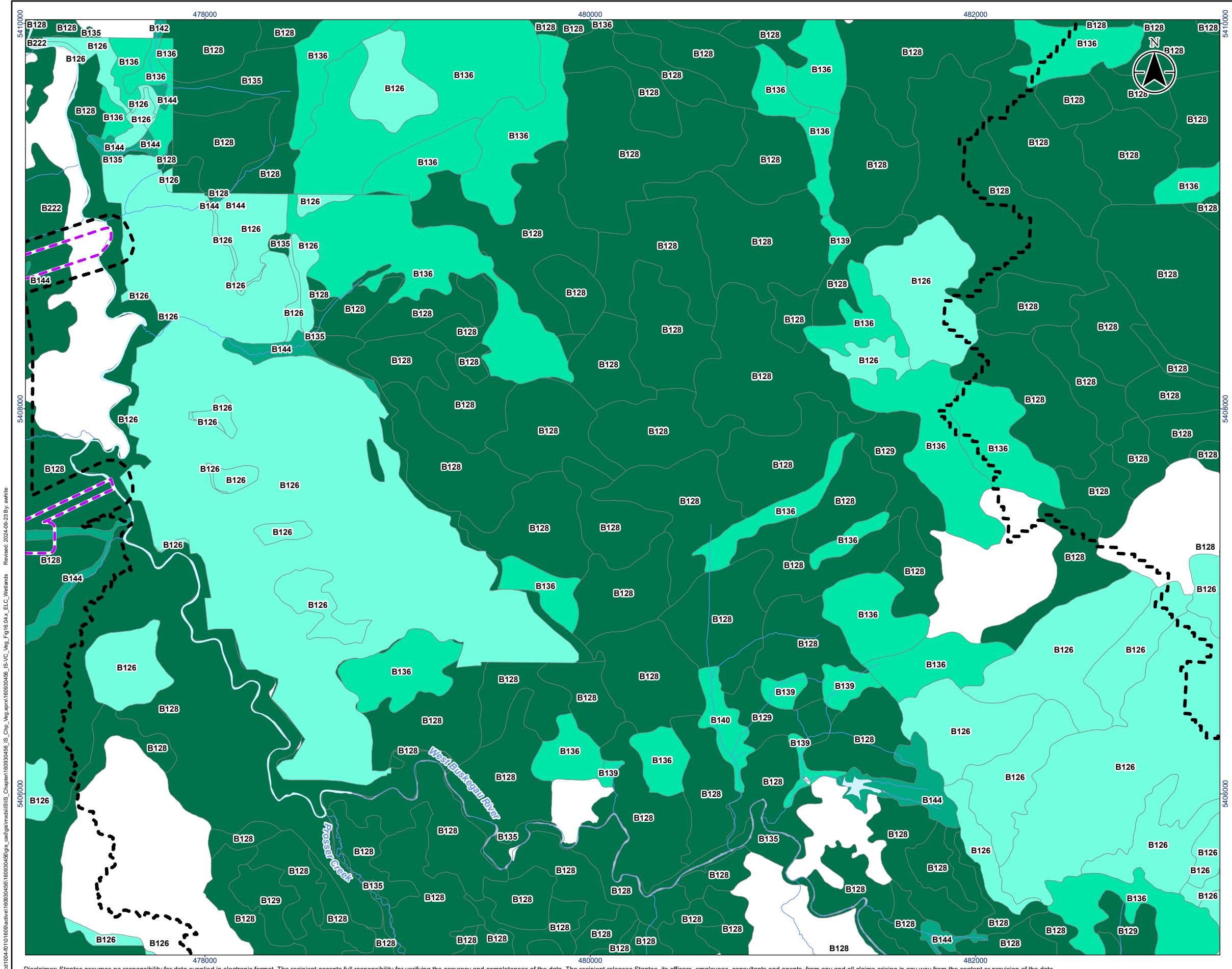
Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by: awhite on 2024-09-23

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





Figure No.: **16.4.13**

Title: **Wetlands in the LSA**

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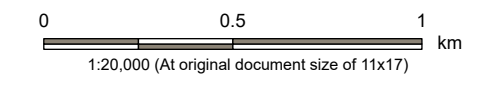
Legend

-  Project Area
-  Local Study Area
-  Watercourse (Permanent)
-  Waterbody

Ecological Land Classification

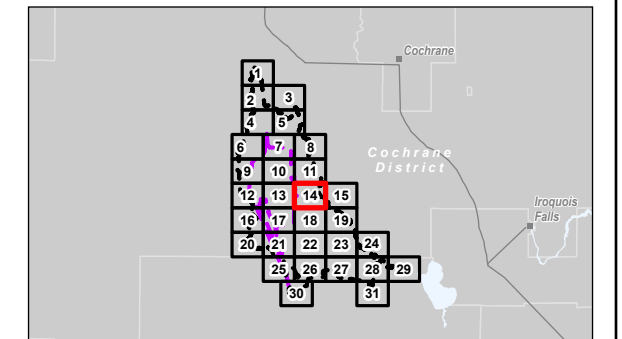
Wetland

-  Bog
-  Fen
-  Meadow Marsh
-  Swamp



Notes

- Coordinate System: NAD 1983 UTM Zone 17N
- Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.

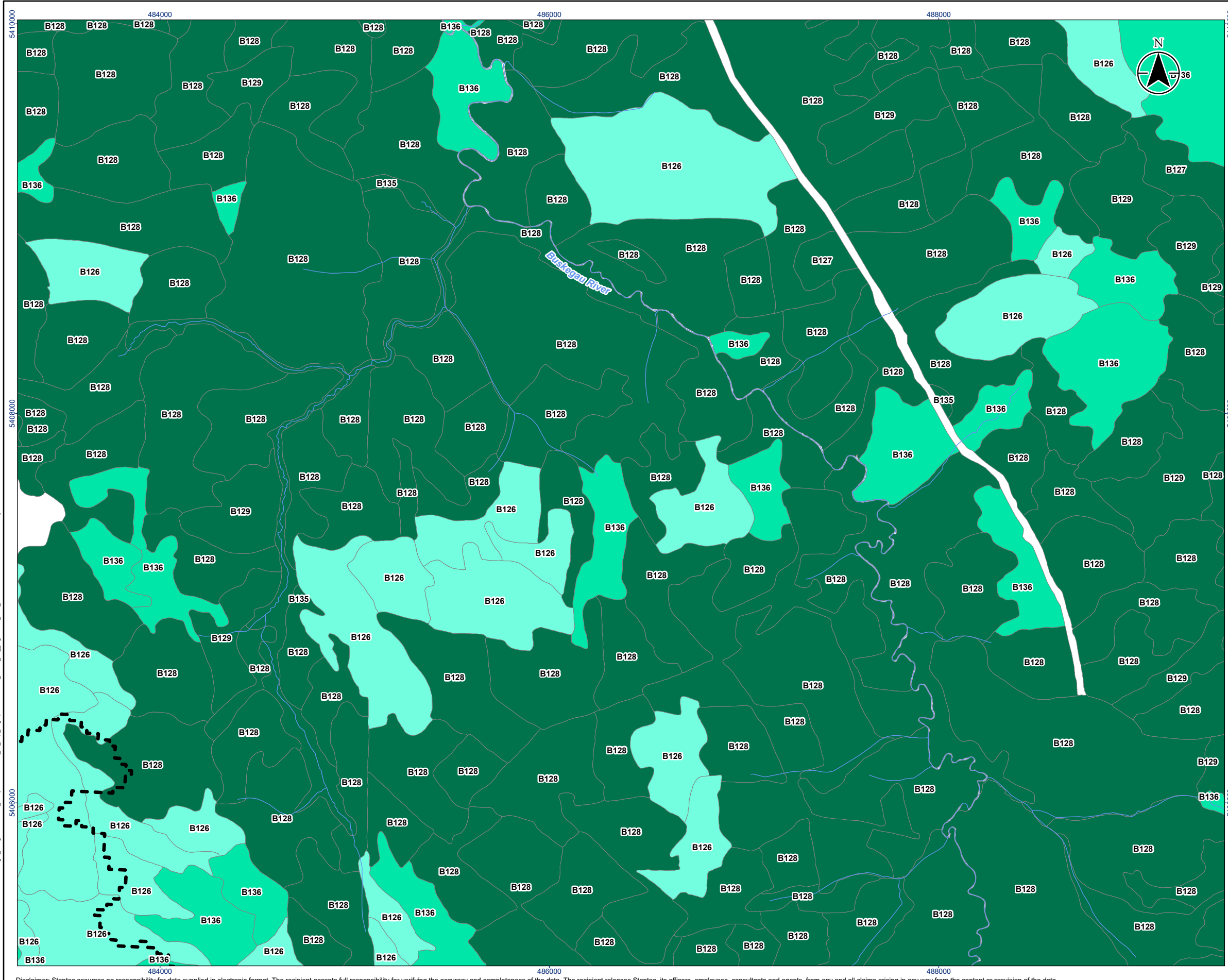


Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by: awhite on 2024-09-23

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

Figure No.: **16.4.14**
 Title: **Wetlands in the LSA**

V:\1004-101009\active\160930456\160930456\gis_data\gis_data\160930456_160930456_IS_VC_Veg_Fig16_04x_ELC_Wetlands_Revised_2024-09-23 By: awhite



Legend

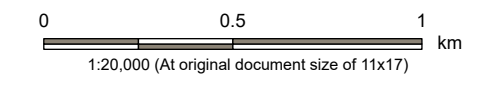
Local Study Area

Watercourse (Permanent)

Ecological Land Classification

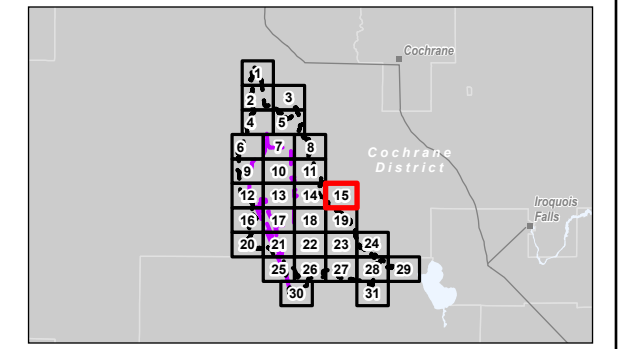
Wetland

- Bog
- Fen
- Swamp



Notes

- Coordinate System: NAD 1983 UTM Zone 17N
- Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.



Project Location: Timmins, Ontario

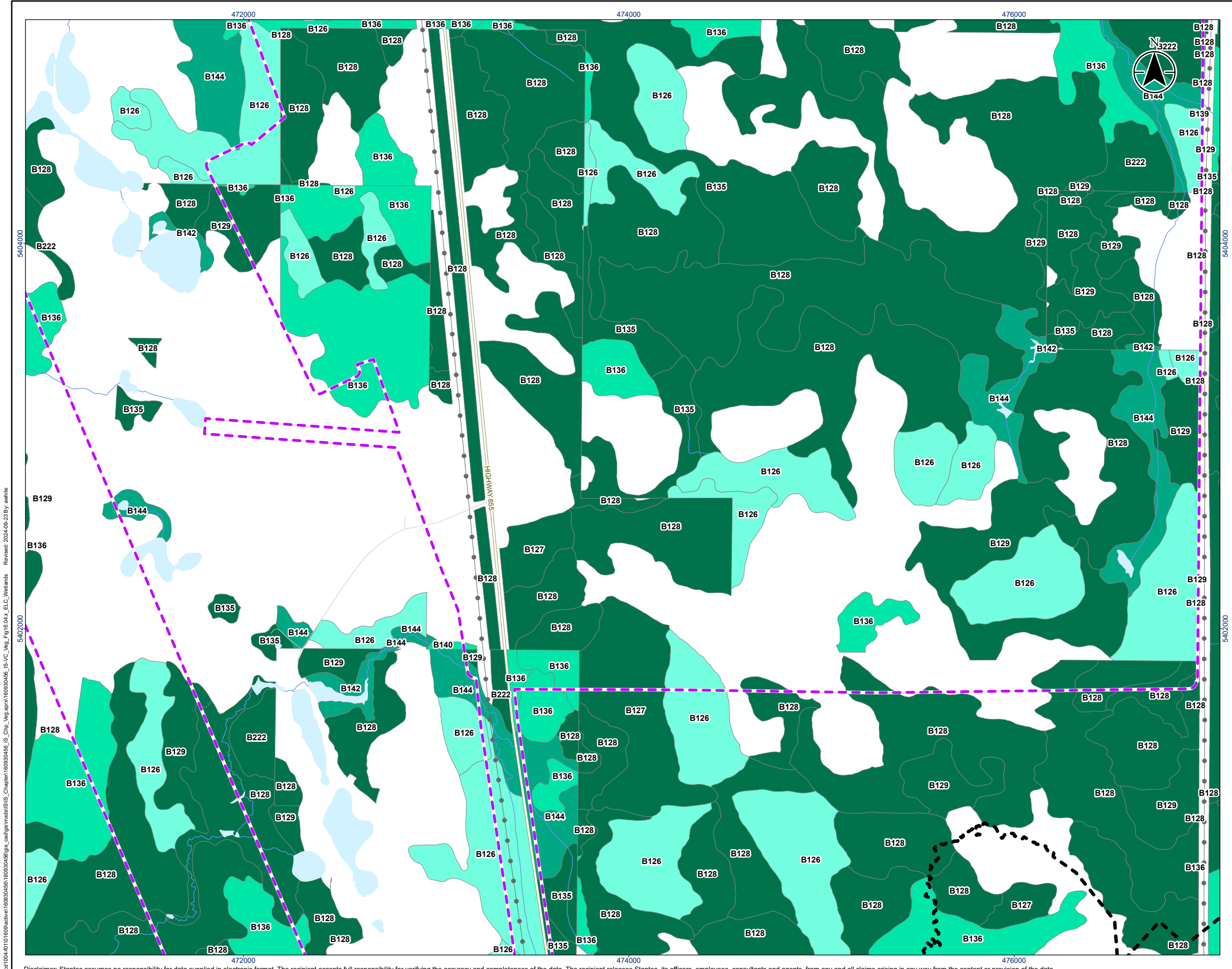
160930456 REVA
Prepared by awhite on 2024-09-23

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

Figure No. **16.4.15**

Title **Wetlands in the LSA**

V:\1004-10109\active\160930456\160930456\gis_data\gis_data\mxd\BIS_Chapter1\160930456_IS_VC_Veg_Fig16.04x_ELC_Wetlands_2024-09-23 By: awhite
 Revised: 2024-09-23 By: awhite

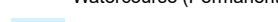


Legend

Project Area
 Project Area


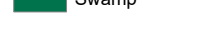
Local Study Area
 Local Study Area

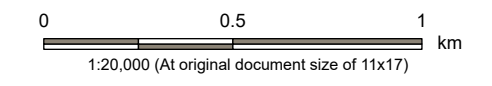
Base Features

-  Major Road
-  Minor Road
-  Hydro Line
-  Watercourse (Permanent)
-  Waterbody

Ecological Land Classification

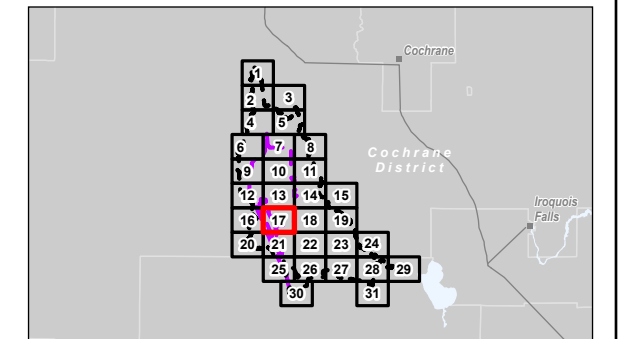
Wetland

-  Bog
-  Fen
-  Meadow Marsh
-  Swamp



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.



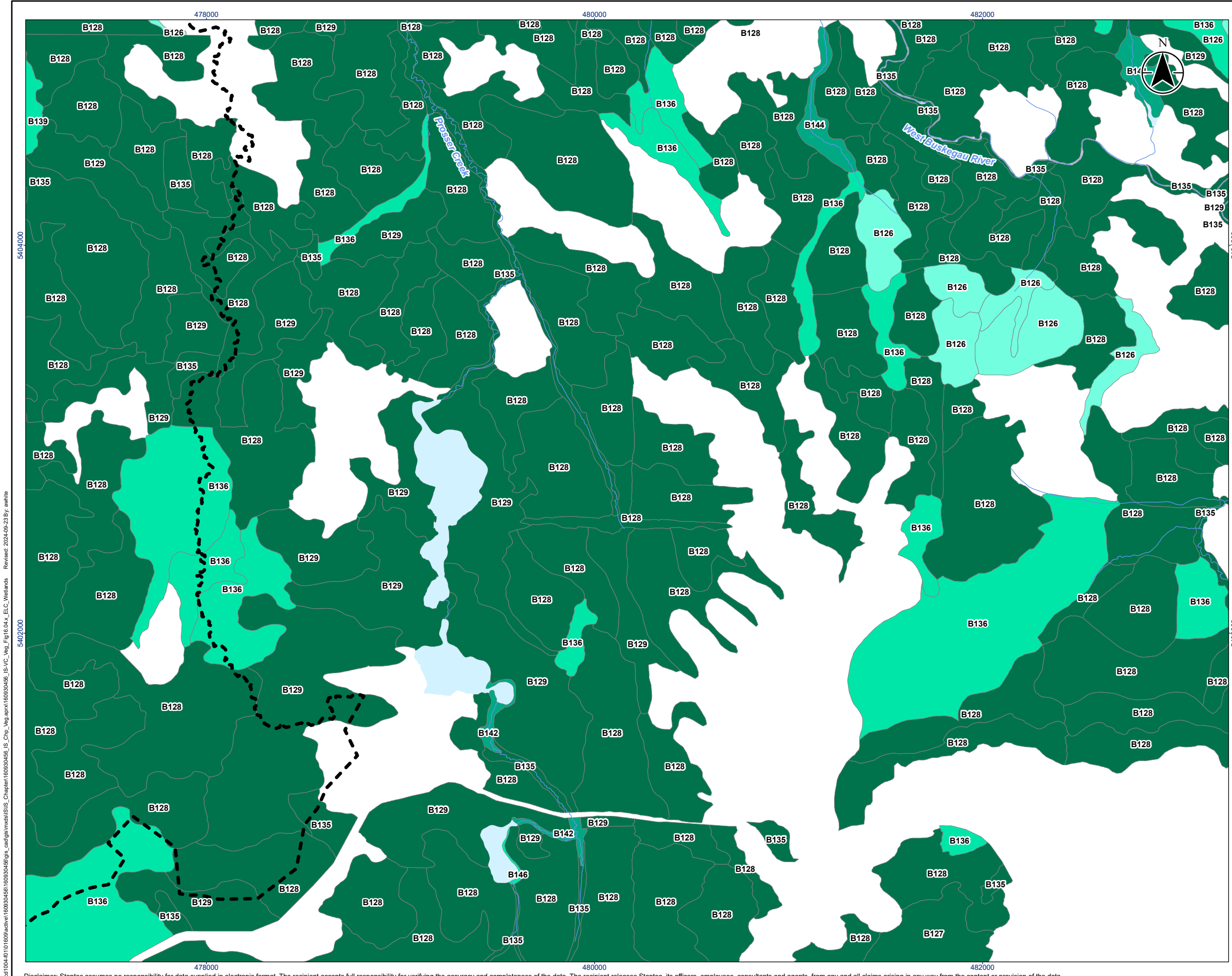
Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23

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

Figure No.: **16.4.17**

Title: **Wetlands in the LSA**

V:\1004-101\009\active\160930456\160930456\GIS_Chapert\160930456_IS_VC_Veg_Fig16.04x_ELC_Wetlands_Revised_2024-09-23 By: awhite
 Revised: 2024-09-23 By: awhite



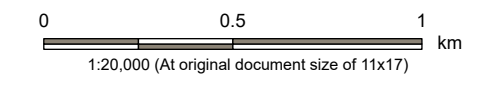
Legend

- Local Study Area (dashed black line)
- Watercourse (Permanent) (blue line)
- Waterbody (light blue area)

Ecological Land Classification

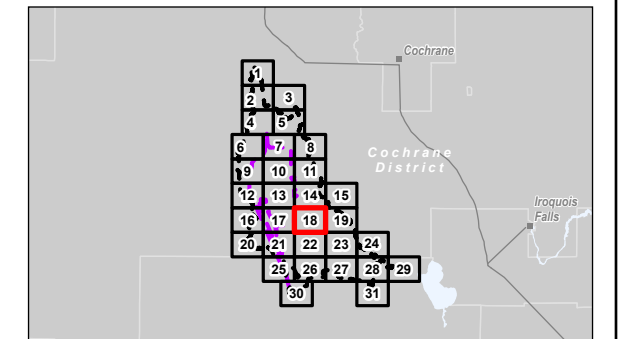
Wetland

- Bog (light green)
- Fen (medium green)
- Meadow Marsh (dark green)
- Swamp (darkest green)



Notes

- Coordinate System: NAD 1983 UTM Zone 17N
- Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.



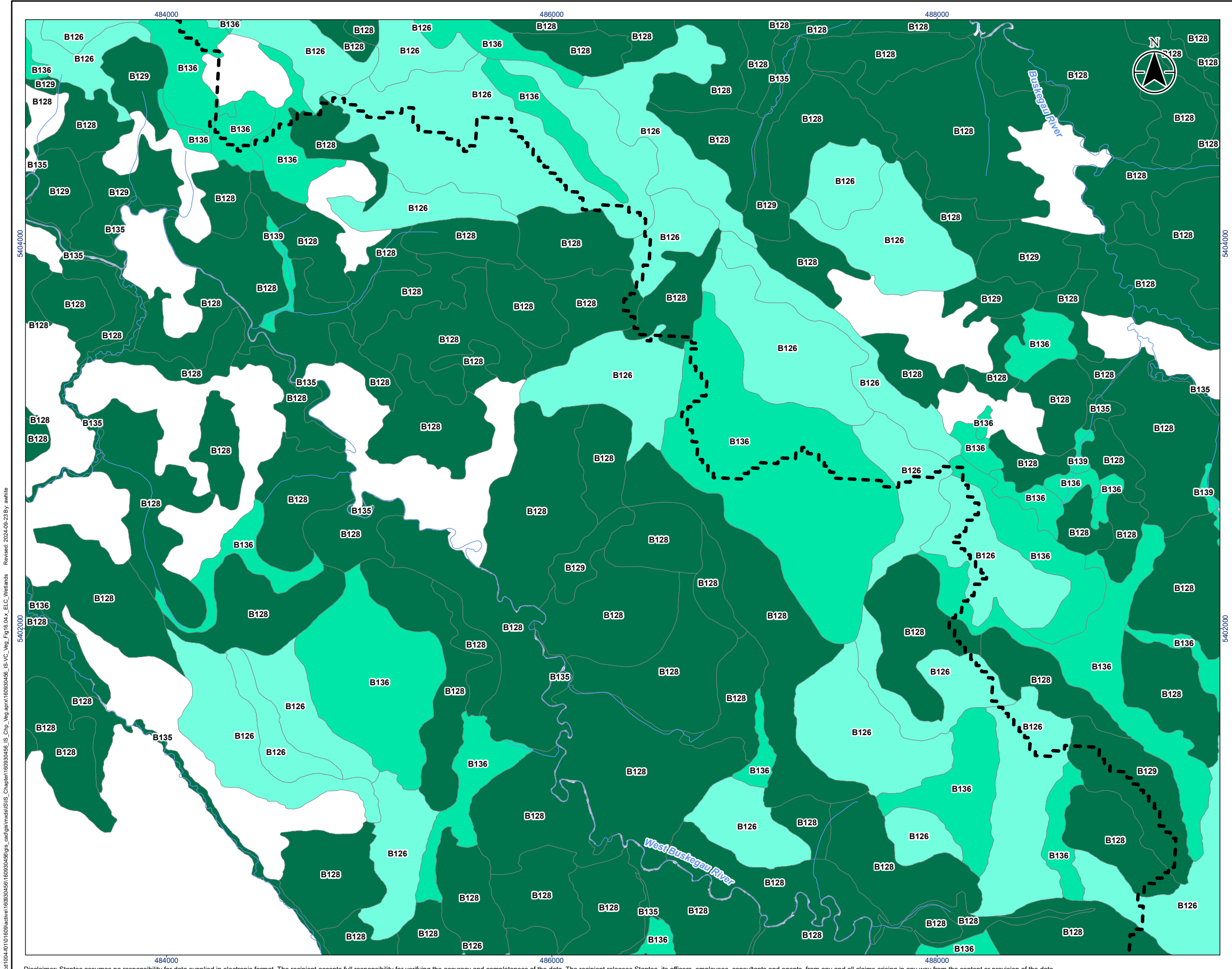
Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23

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



Figure No.: **16.4.18**

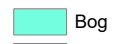


Title: **Wetlands in the LSA**

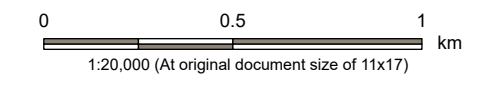
V:\1004-101\1009\active\160930456\160930456\gis_data\160930456\160930456_IS_VC_Veg_Fig16.04x_ELC_Wetlands_2024-09-23 By: awhite
 Revised: 2024-09-23 By: awhite



Legend

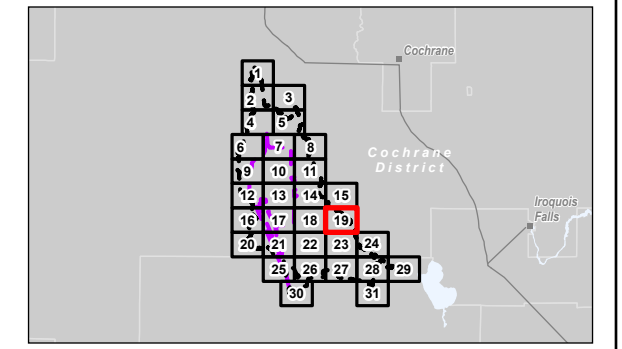
 Local Study Area
 Watercourse (Permanent)

Ecological Land Classification
 Wetland
 Bog
 Fen
 Swamp



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.

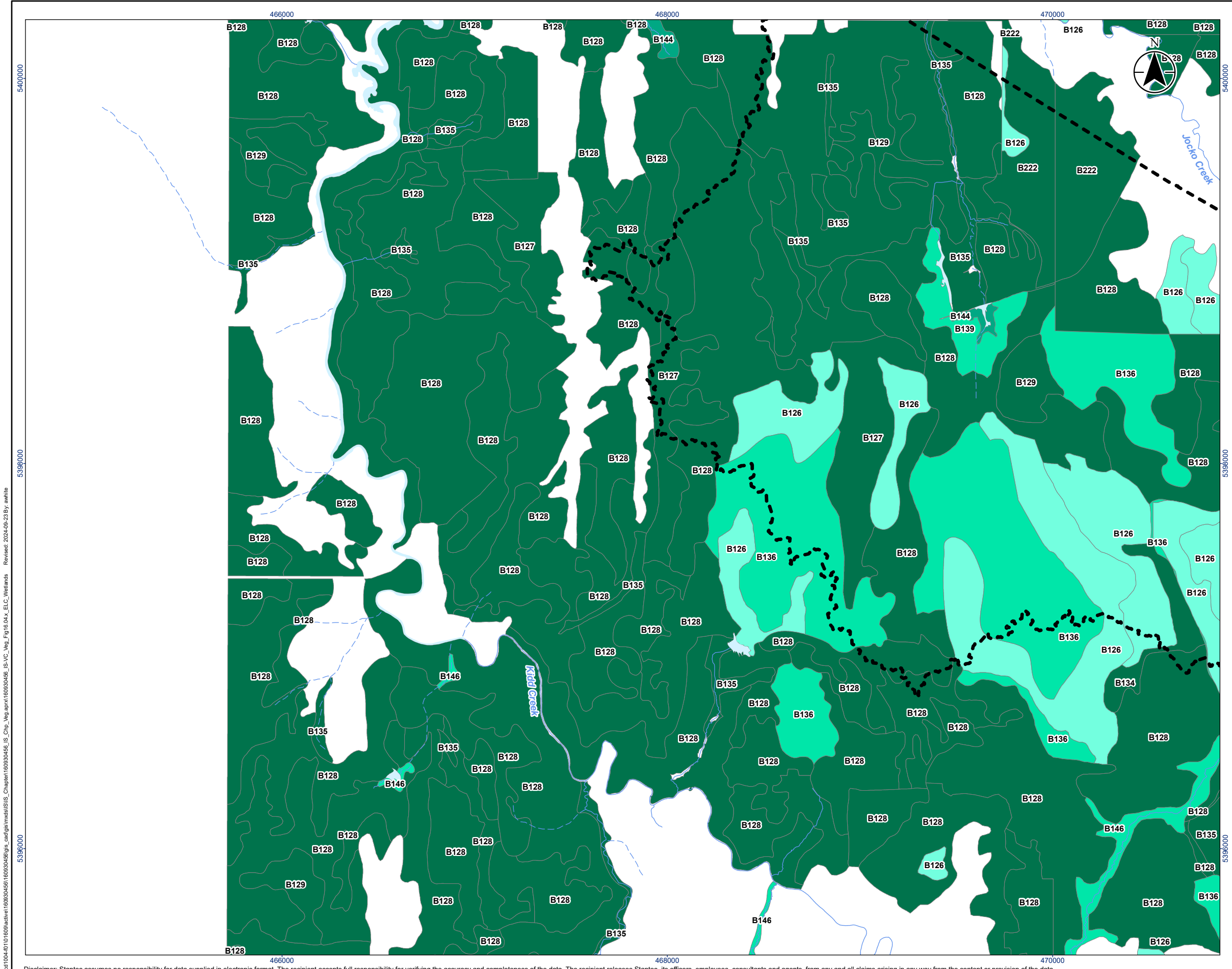


Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23









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

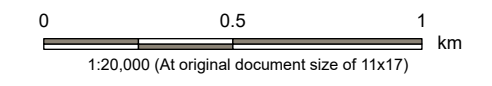
Figure No.: **16.4.19**
 Title: **Wetlands in the LSA**

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 Revised: 2024-09-23 By: awhite



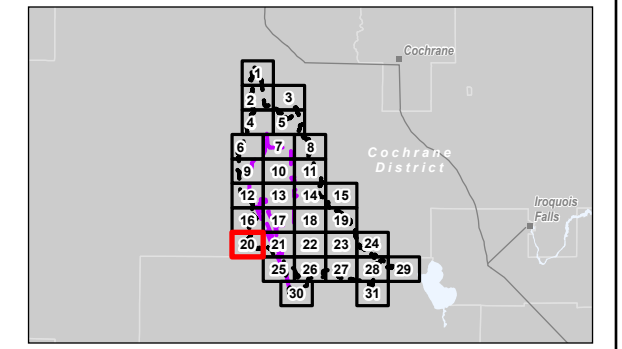
Legend

 Local Study Area	Ecological Land Classification
 Watercourse (Intermittent)	Wetland
 Watercourse (Permanent)	 Bog
 Waterbody	 Fen
	 Meadow Marsh
	 Swamp



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.

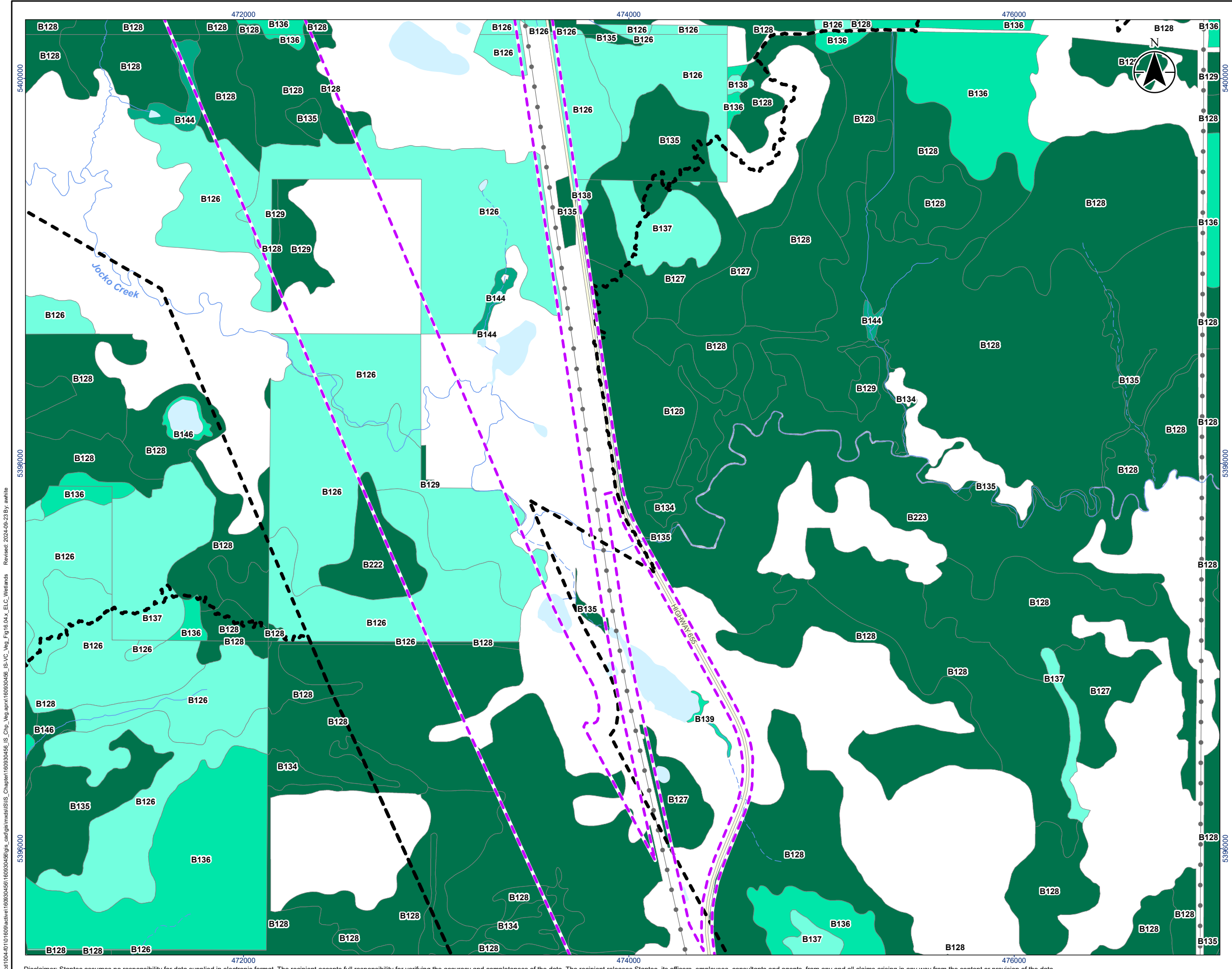


Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by: awhite on 2024-09-23


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

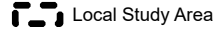
Figure No.: **16.4.20**
 Title: **Wetlands in the LSA**

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 Revised: 2024-09-23 By: awhite


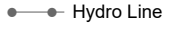
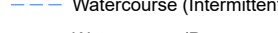
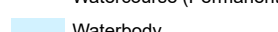


Legend

Project Area
 Project Area



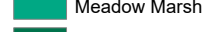

Local Study Area
 Local Study Area

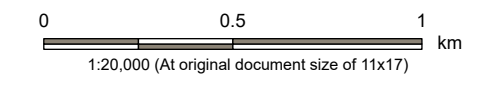
Base Features

-  Major Road
-  Hydro Line
-  Watercourse (Intermittent)
-  Watercourse (Permanent)
-  Waterbody

Ecological Land Classification

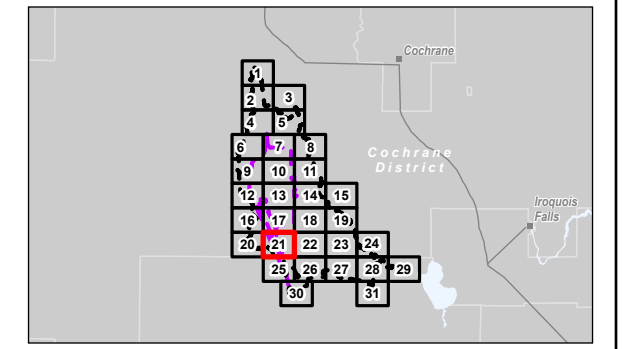
Wetland

-  Bog
-  Fen
-  Meadow Marsh
-  Swamp



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.



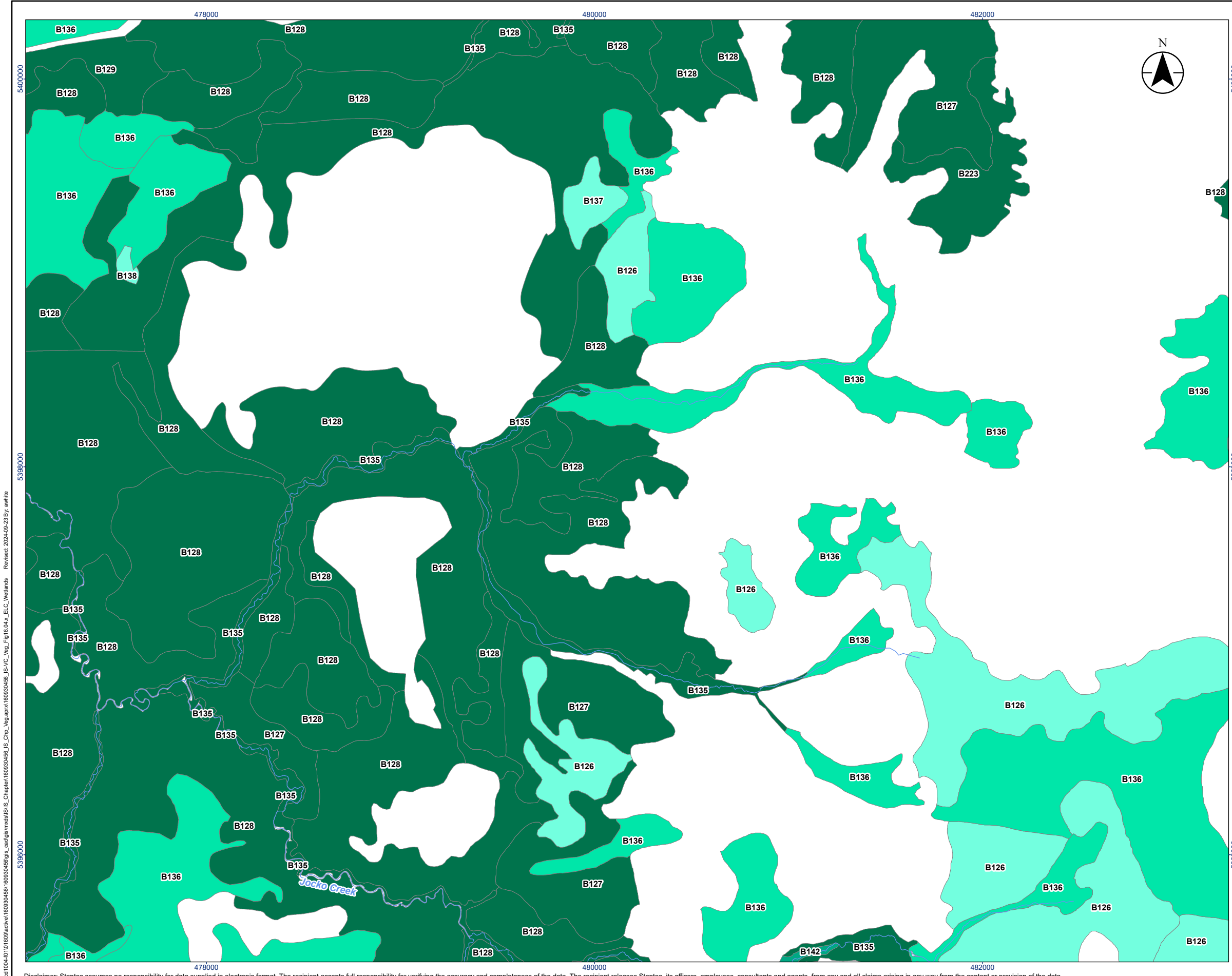
Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by: awhite on 2024-09-23

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

Figure No.
16.4.21

Title
Wetlands in the LSA

V:\1004-101\160930456\160930456\gis_data\gis_data\mxd\BIS_Chapter160930456_IS_VC_Veg_Fig16.04x_ELC_Wetlands_2024-09-23 By: awhite
 Revised: 2024-09-23 By: awhite



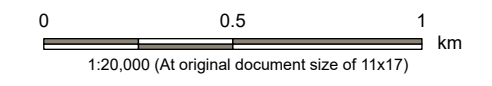
Legend

— Watercourse (Permanent)

Ecological Land Classification

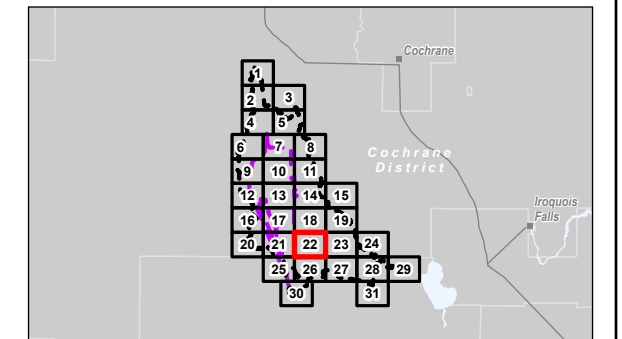
Wetland

- Bog
- Fen
- Meadow Marsh
- Swamp



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.



Project Location: Timmins, Ontario

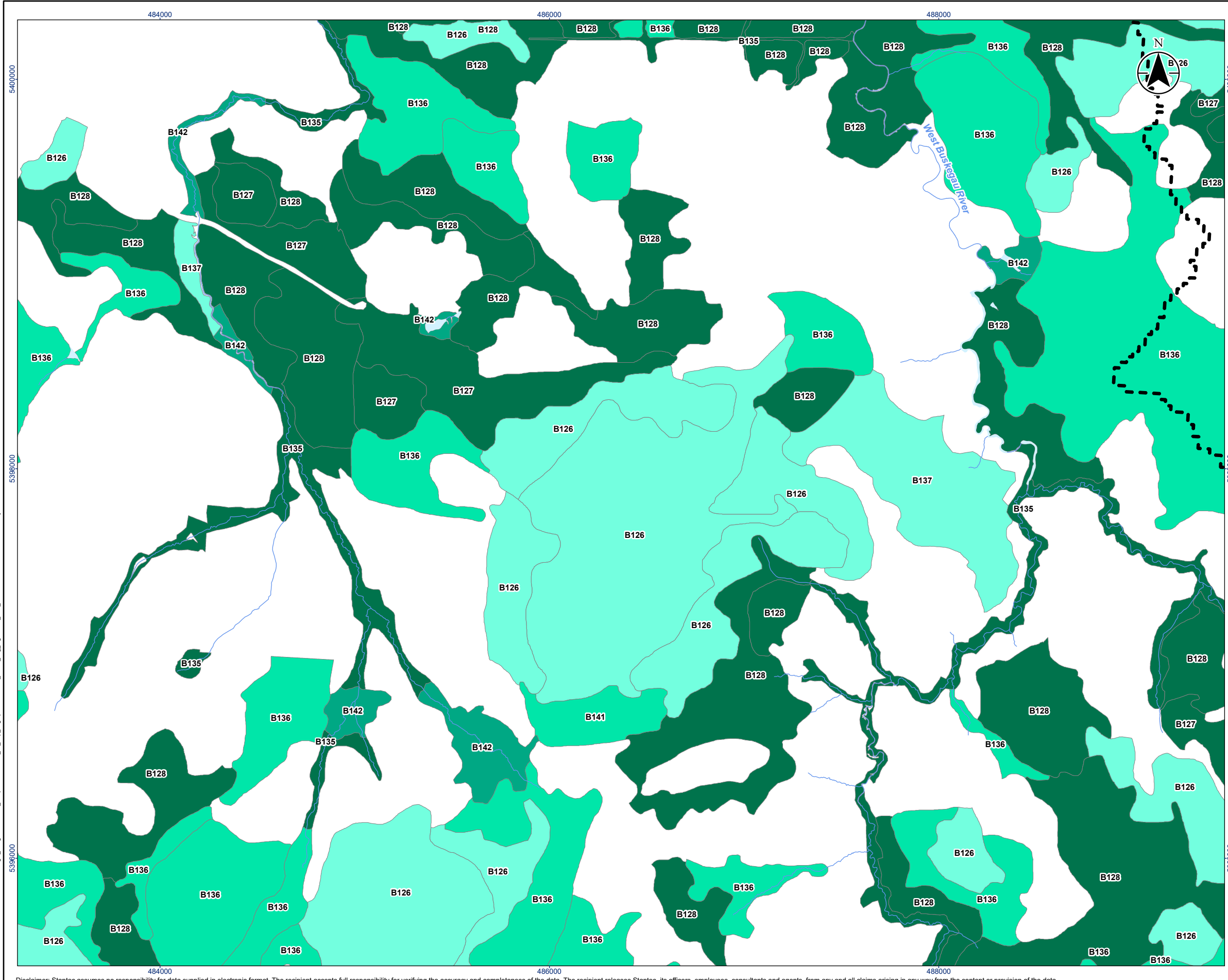
160930456 REVA
Prepared by: awhite on 2024-09-23

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


Figure No.: **16.4.22**


Title: **Wetlands in the LSA**


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 Revised: 2024-09-23 By: awhite



Legend





 Local Study Area

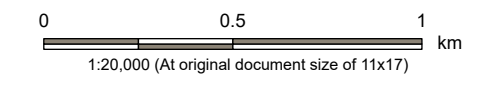
 Watercourse (Permanent)

 Waterbody

Ecological Land Classification

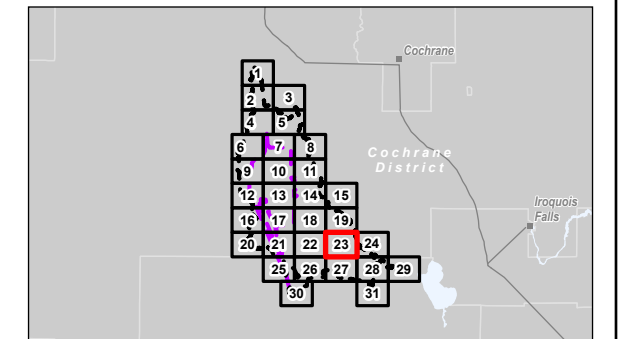
Wetland

-  Bog
-  Fen
-  Meadow Marsh
-  Swamp



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.



Project Location: Timmins, Ontario

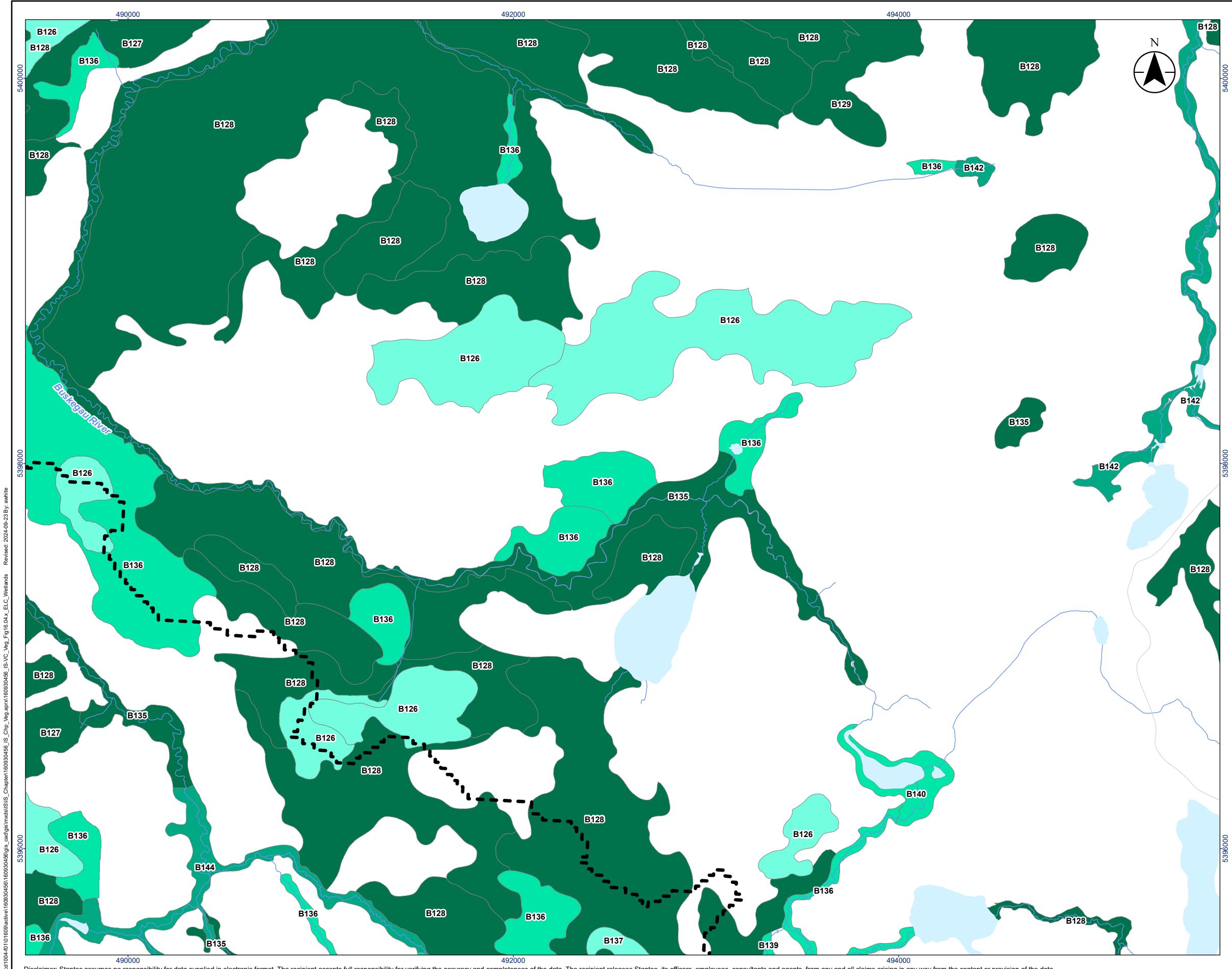
160930456 REVA
Prepared by: awhite on 2024-09-23

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

Figure No.
16.4.23

Title
Wetlands in the LSA

V:\1004-101009\active\160930456\160930456\gis_data\gis_data\160930456_Chapter16\160930456_IS_VC_Veg_Fig16.04x_ELC_Wetlands_Revised_2024-09-23 By: awhite



Legend

Local Study Area

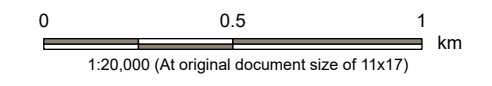
Base Features

- Minor Road
- Watercourse (Permanent)
- Waterbody

Ecological Land Classification

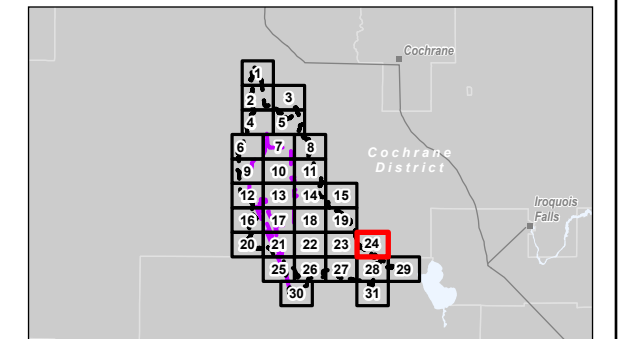
Wetland

- Bog
- Fen
- Meadow Marsh
- Swamp



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.



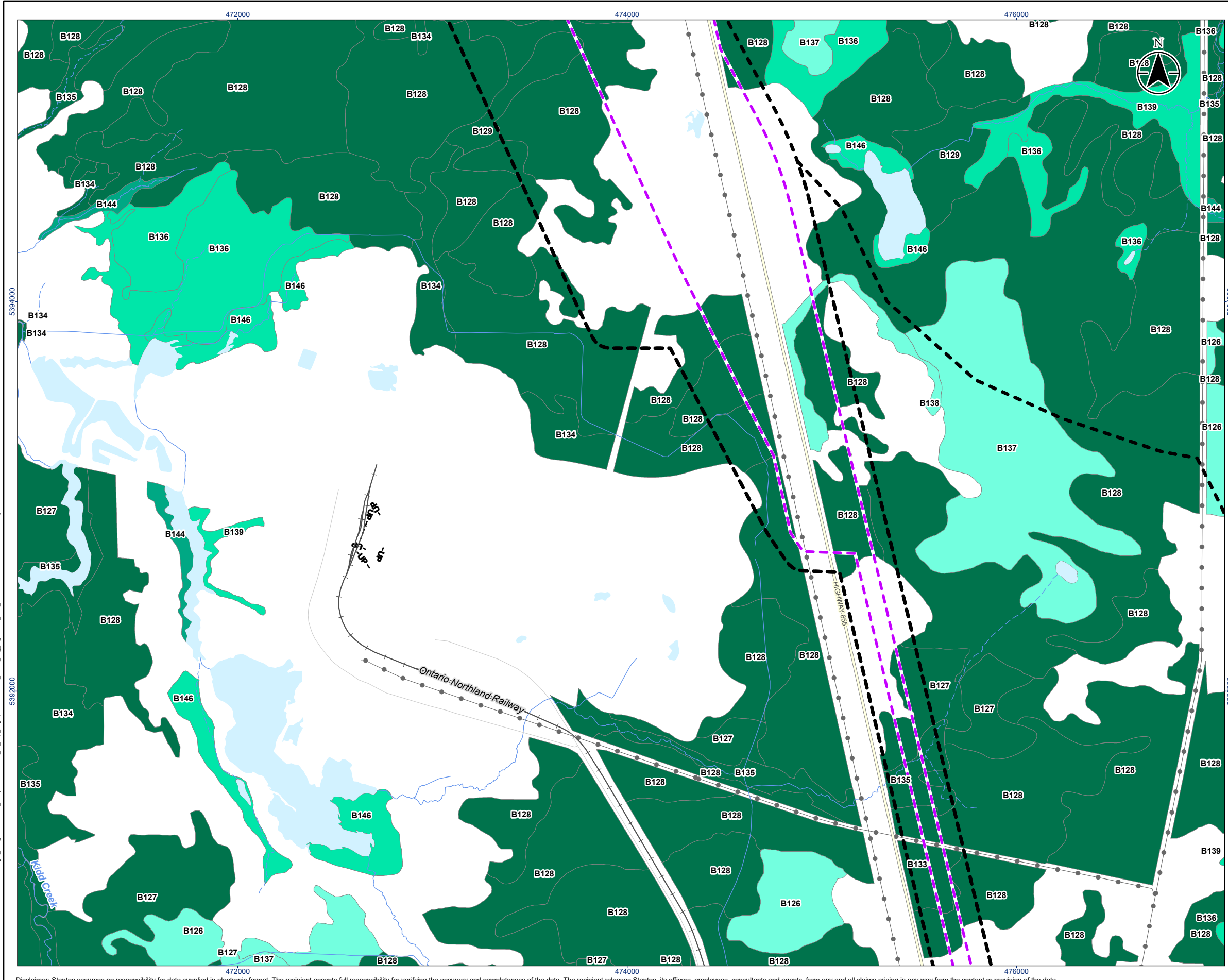
Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by: awhite on 2024-09-23

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


Figure No.: **16.4.24**


Title: **Wetlands in the LSA**

V:\1004-101\160930456\160930456\gis_data\gis_data\mxd\160930456_IS_VC_Veg_Fig16.04x_ELC_Wetlands_2024-09-23 By: awhite
 Revised: 2024-09-23 By: awhite











Legend

Project Area
 Project Area





Local Study Area
 Local Study Area

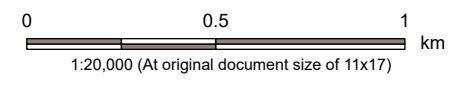
Base Features

-  Major Road
-  Minor Road
-  Railway
-  Hydro Line
-  Unknown Pipeline
-  Watercourse (Intermittent)
-  Watercourse (Permanent)
-  Waterbody

Ecological Land Classification

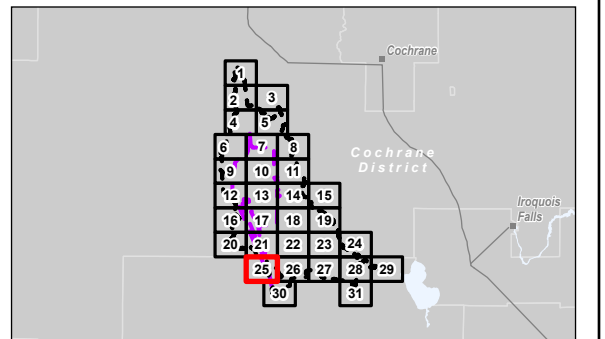
Wetland

-  Bog
-  Fen
-  Meadow Marsh
-  Swamp



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.



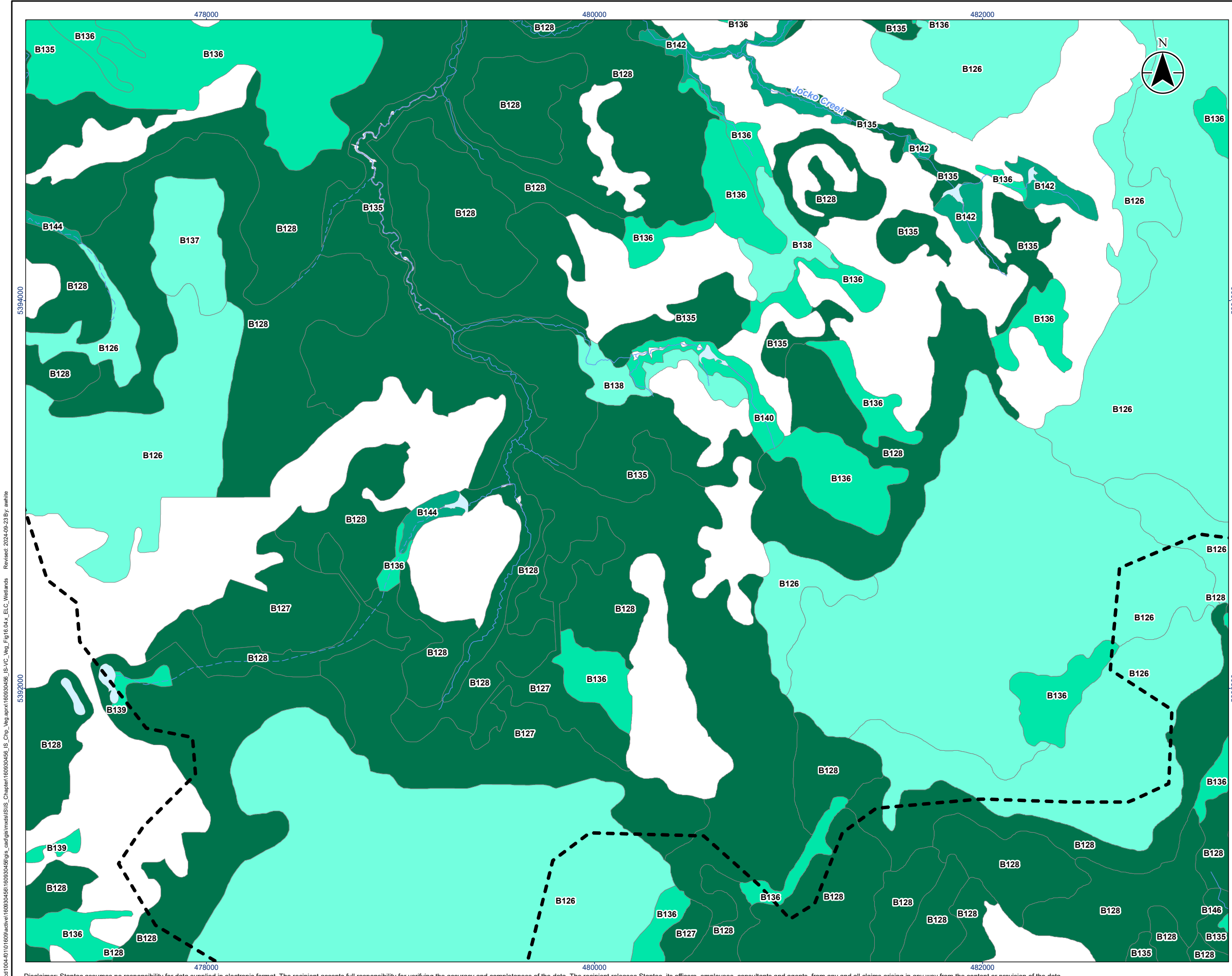
Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by: awhite on 2024-09-23

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









Figure No.: **16.4.25**

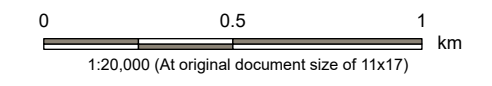
Title: **Wetlands in the LSA**

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 Revised: 2024-09-23 By: awhite



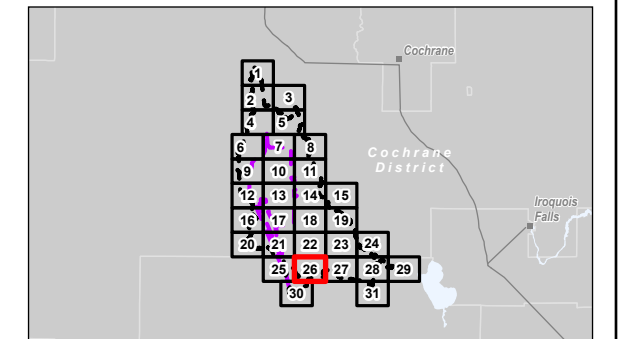
Legend

 Local Study Area	Ecological Land Classification
 Watercourse (Intermittent)	Wetland
 Watercourse (Permanent)	 Bog
 Waterbody	 Fen
	 Meadow Marsh
	 Swamp



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.



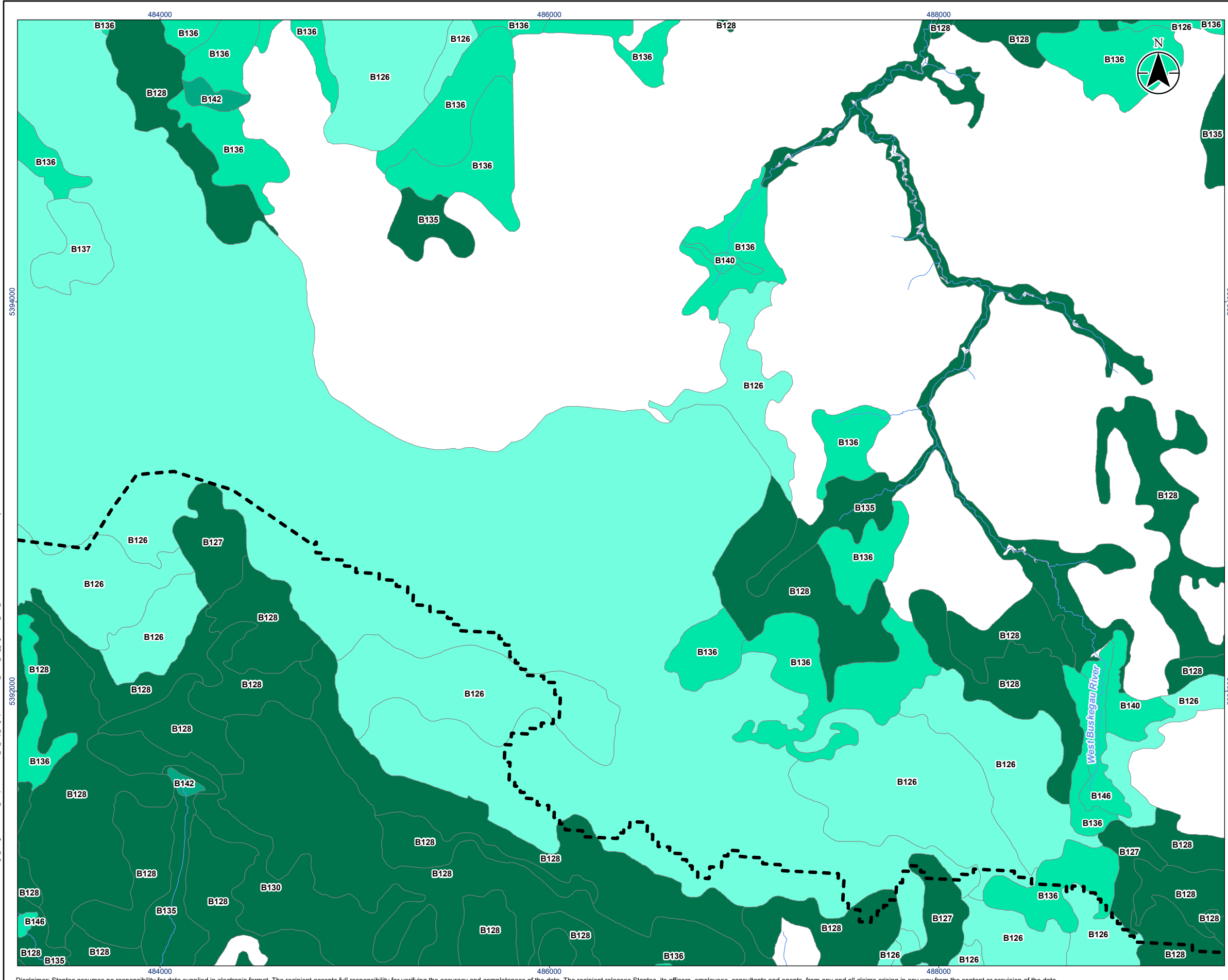
Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by: awhite on 2024-09-23

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


Figure No.
16.4.26


Title
Wetlands in the LSA

V:\1004-101\160930456\160930456\gis_data\gis_data\mxd\160930456_IS_VC_Veg_Fig16.04x_ELC_Wetlands_Rev2024-09-23_By: awhite
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 5394000







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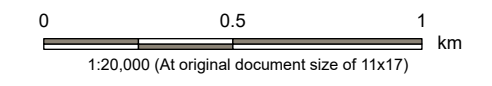
 Local Study Area

 Watercourse (Permanent)

Ecological Land Classification

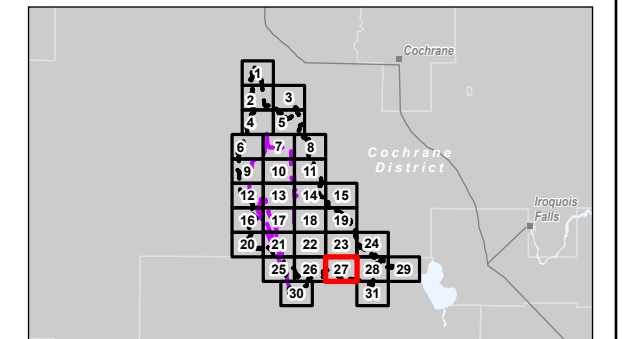
Wetland

-  Bog
-  Fen
-  Meadow Marsh
-  Swamp



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.



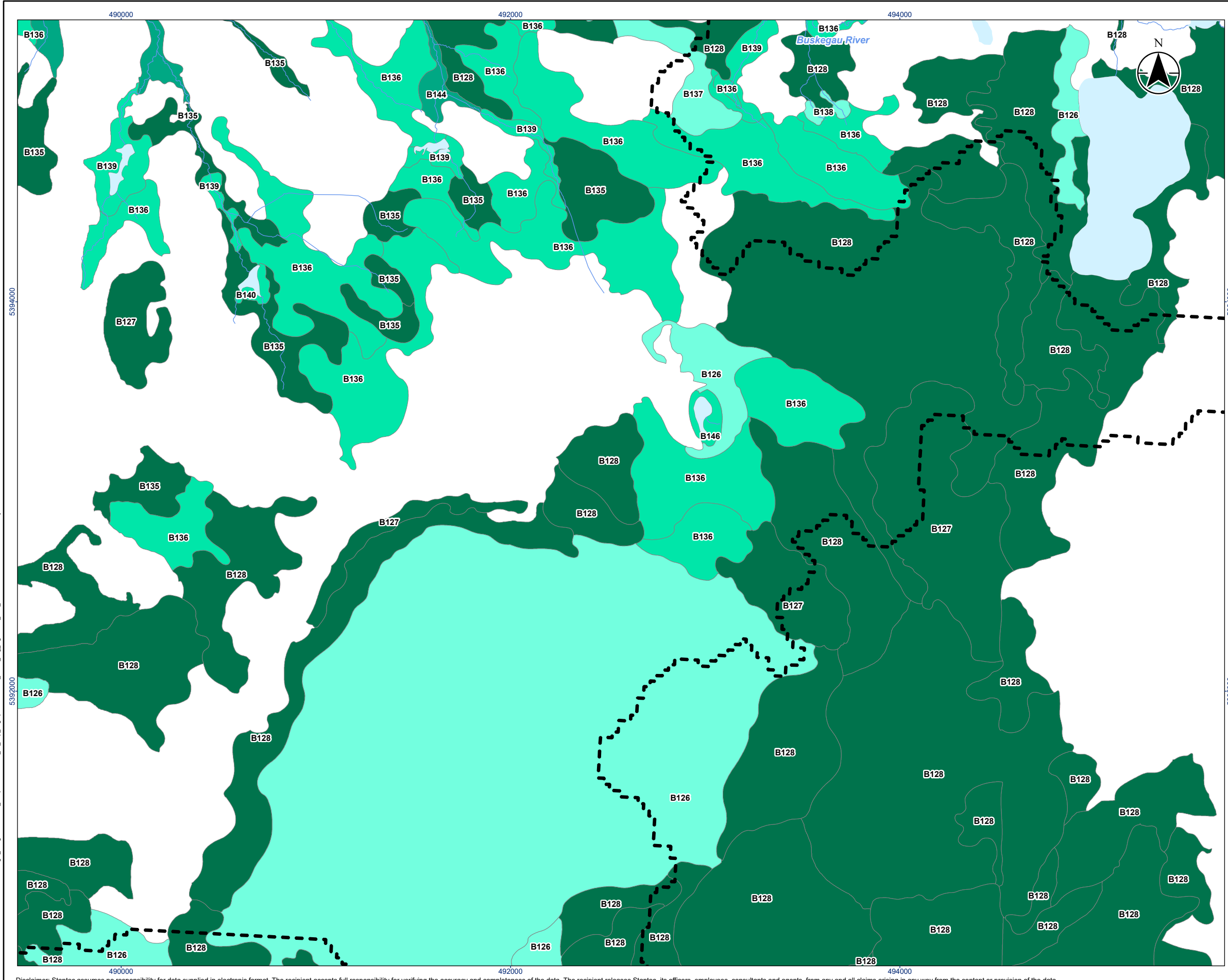
Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23

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


Figure No.: **16.4.27**


Title: **Wetlands in the LSA**


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 Revised: 2024-09-23 By: awhite



Legend





 Local Study Area

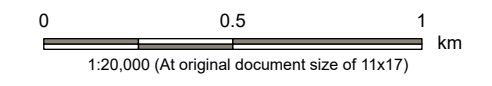
 Watercourse (Permanent)

 Waterbody

Ecological Land Classification

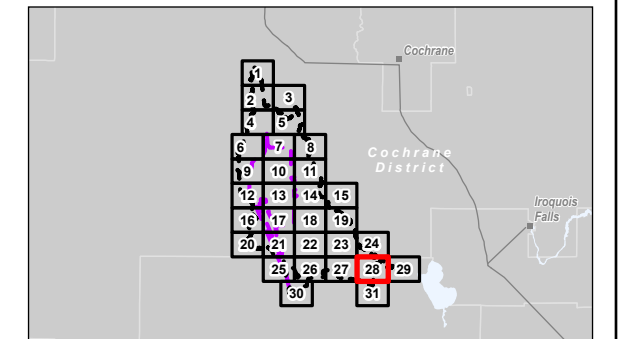
Wetland

-  Bog
-  Fen
-  Meadow Marsh
-  Swamp



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.



Project Location: Timmins, Ontario

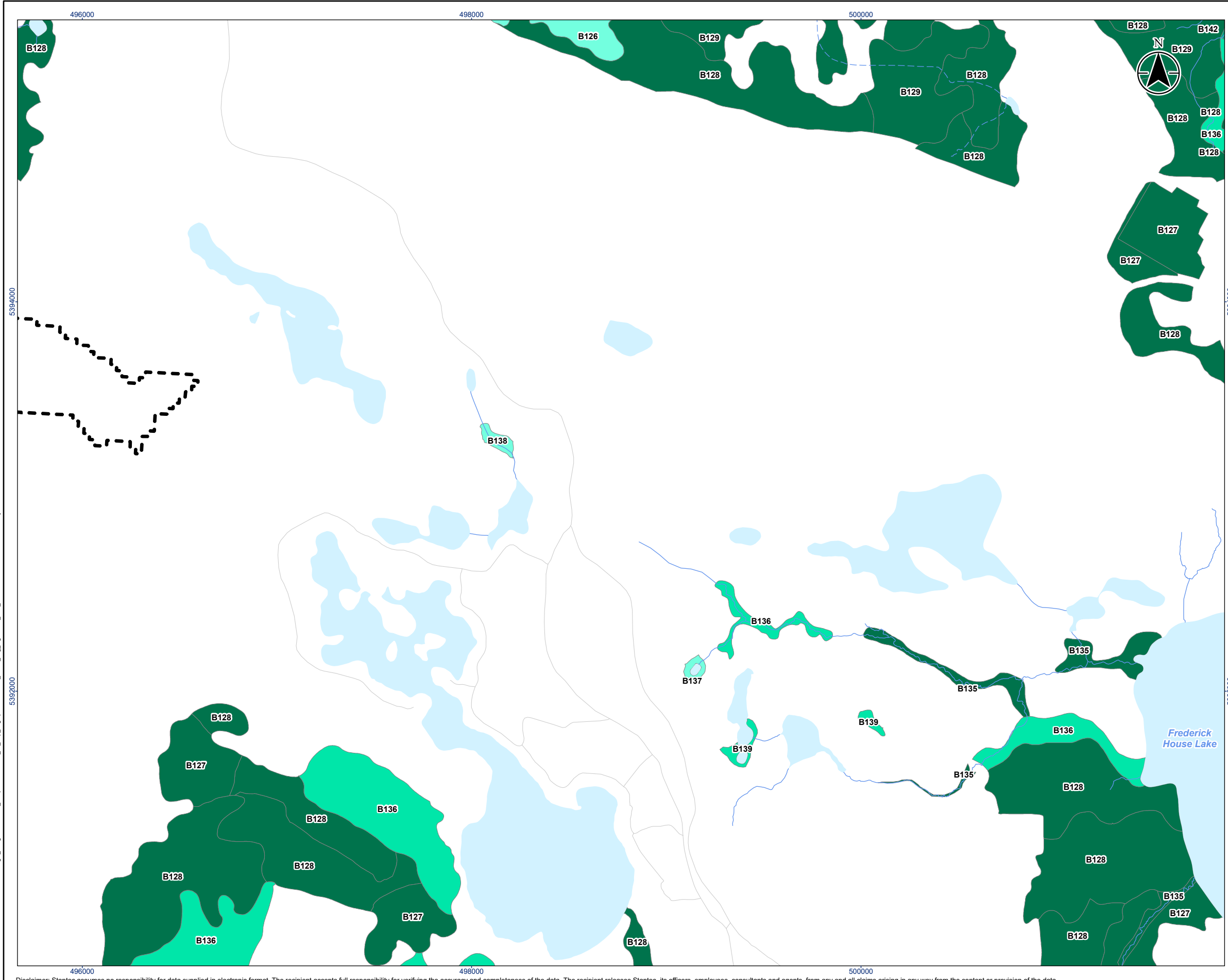
160930456 REVA
Prepared by: awhite on 2024-09-23

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

Figure No.: **16.4.28**

Title: **Wetlands in the LSA**

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Legend

Local Study Area

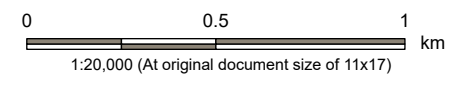
Base Features

- Minor Road
- Watercourse (Intermittent)
- Watercourse (Permanent)
- Waterbody

Ecological Land Classification

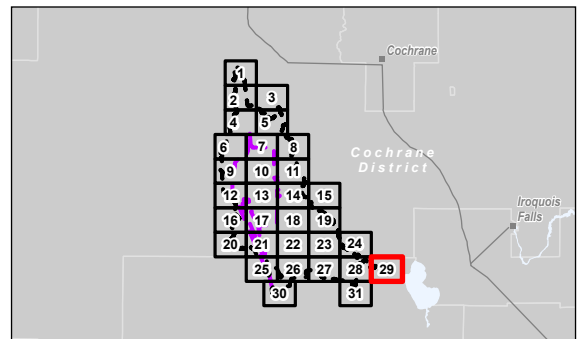
Wetland

- Bog
- Fen
- Meadow Marsh
- Swamp



Notes

- Coordinate System: NAD 1983 UTM Zone 17N
- Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.



Project Location: Timmins, Ontario

160930456 REVA

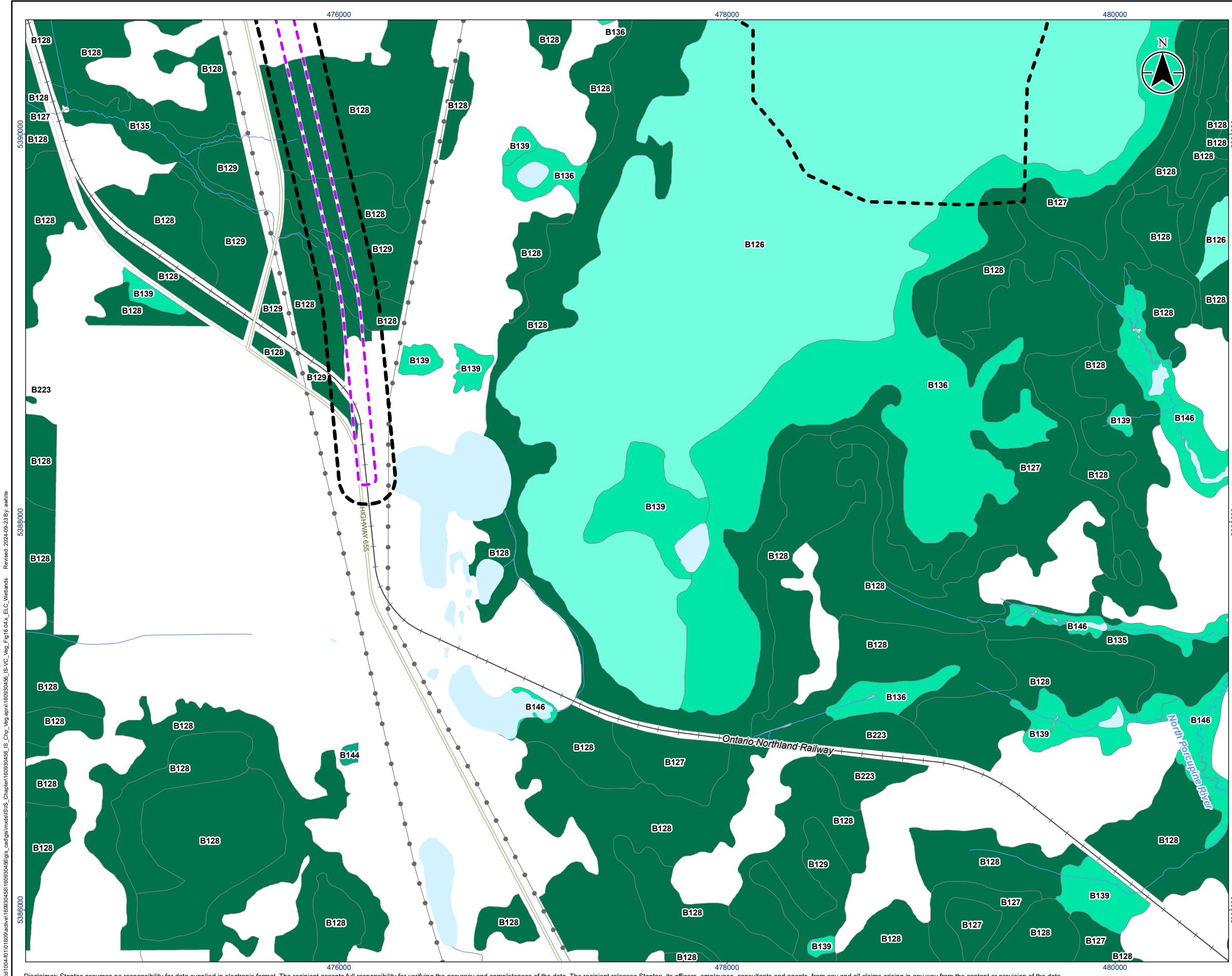
Prepared by: awhite on 2024-09-23






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

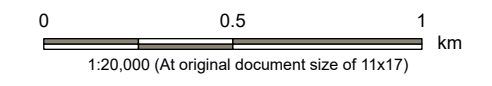
Figure No.: **16.4.29**

Title: **Wetlands in the LSA**

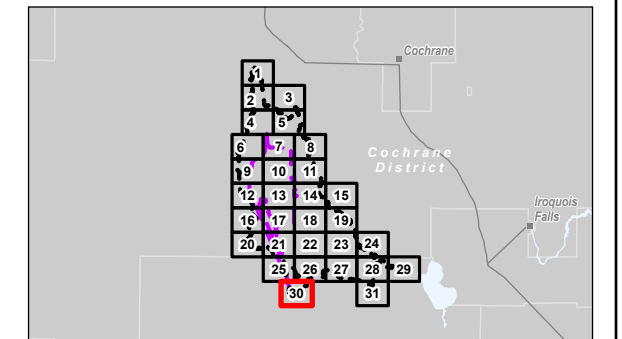
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 Revised: 2024-09-23 By: awhite
 5392000
 5394000



- Legend**
- Project Area**
 Project Area
- Local Study Area**
 Local Study Area
- Base Features**
-  Major Road
 -  Minor Road
 -  Railway
 -  Hydro Line
 -  Watercourse (Permanent)
 -  Waterbody
- Ecological Land Classification**
- Wetland**
-  Bog
 -  Fen
 -  Meadow Marsh
 -  Swamp



- 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.



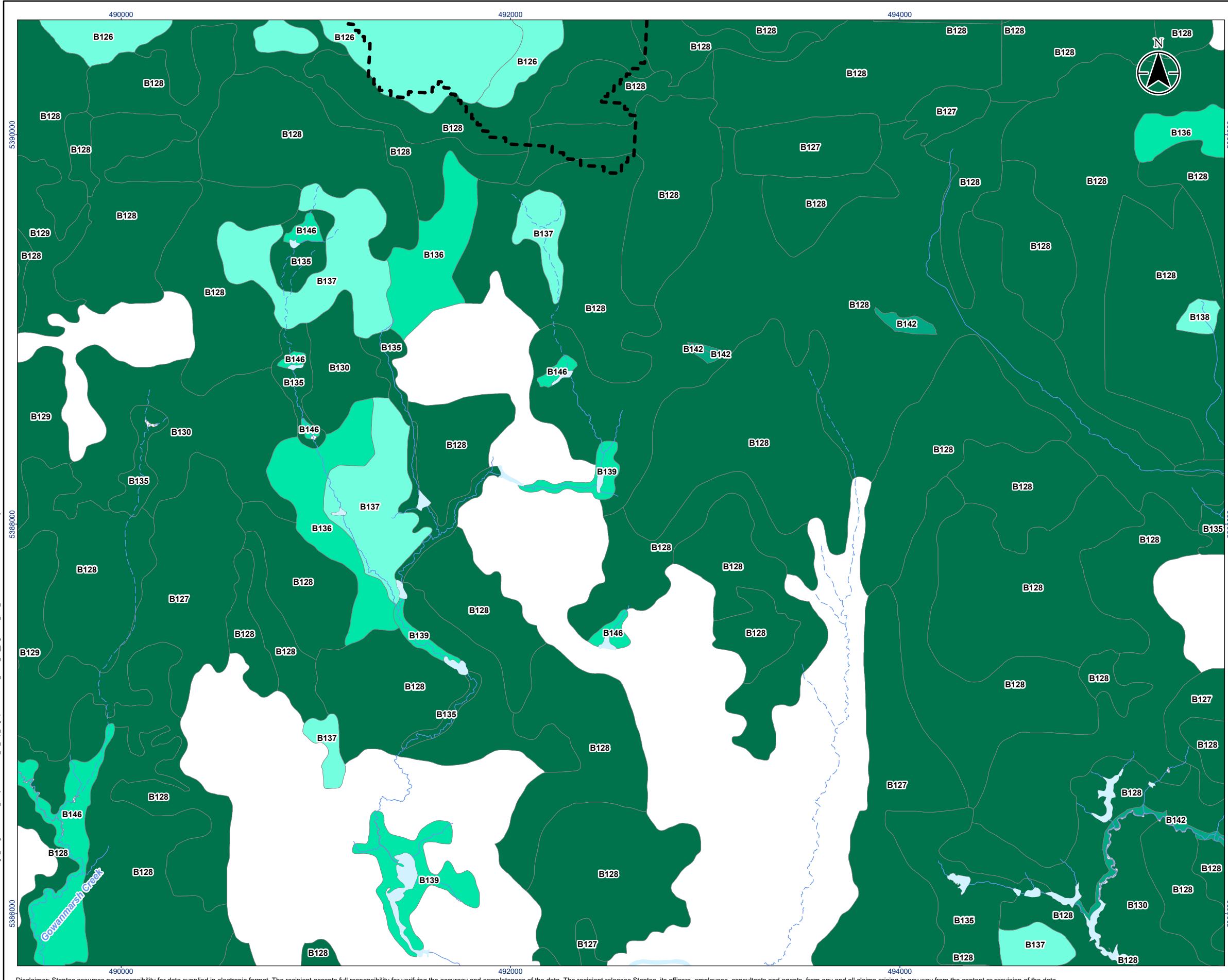
Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by: awhite on 2024-09-23

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





Figure No.
16.4.30

Title
Wetlands in the LSA

V:\1004-1010\160930456\160930456\GIS\Map\160930456_LSA_Veg_Fig16.04x_ELC_Wetlands_2024-09-23 By: awhite
 Revised: 2024-09-23 By: awhite
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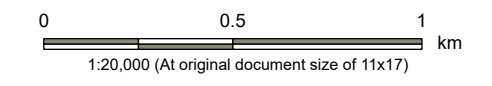
Legend

-  Local Study Area
-  Watercourse (Intermittent)
-  Watercourse (Permanent)
-  Waterbody

Ecological Land Classification

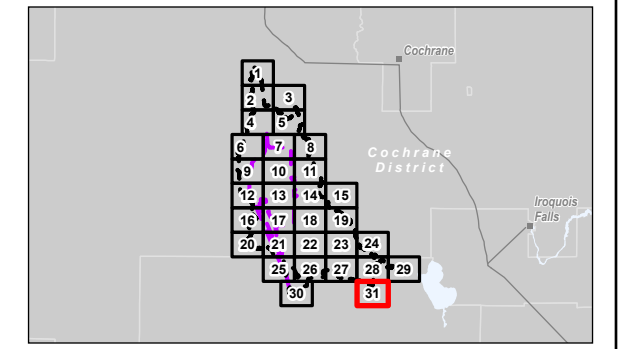
Wetland

-  Bog
-  Fen
-  Meadow Marsh
-  Swamp



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.

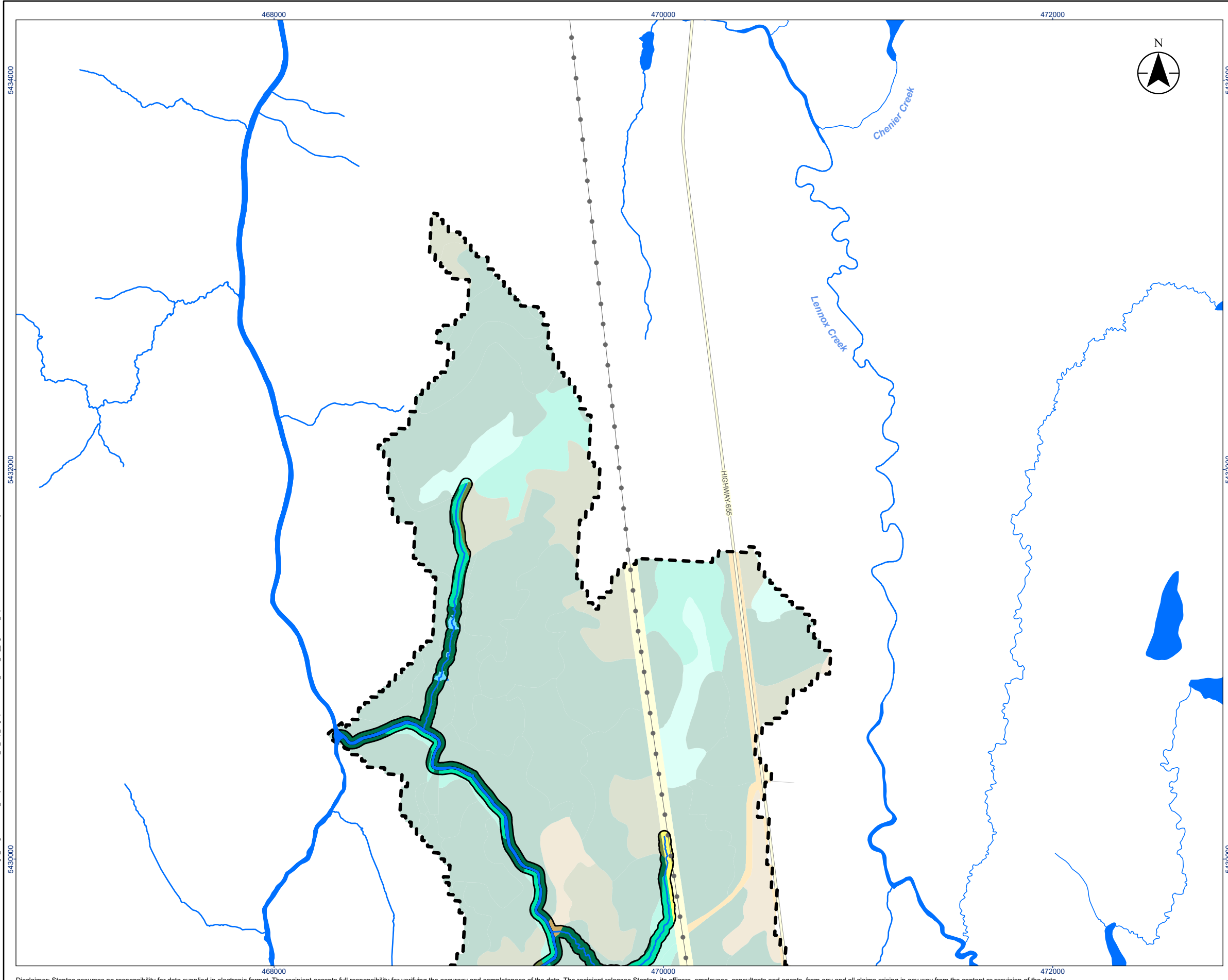


Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23
 160930456 REVA

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

Figure No.: **16.4.31**
 Title: **Wetlands in the LSA**

V:\1004-101\160930456\160930456\GIS_Cad\GIS_Cad\GIS_Cad\160930456_IS_VC_Veg_Fig16_04x_ELC_Wetlands_2024-09-23 By: awhite Revised: 2024-09-23



Legend

Local Study Area

Base Features

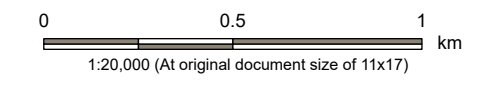
- Major Road
- Minor Road
- Hydro Line
- Watercourse (Permanent)
- Waterbody

Ecosite Type

- Coniferous Forest/Stand
- Deciduous Forest/Stand
- Bog
- Fen
- Swamp
- Water
- Anthropogenic
- Constructed

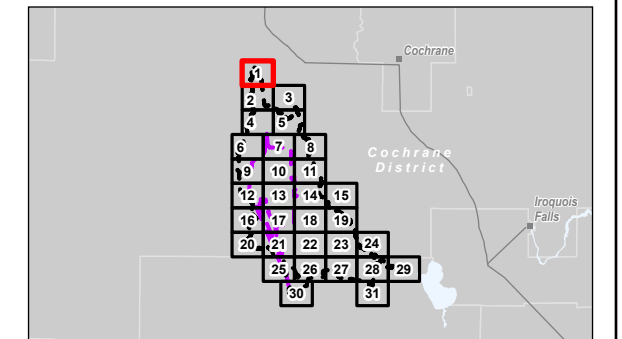
Riparian Area

- Coniferous Forest/Stand
- Deciduous Forest/Stand
- Bog
- Fen
- Swamp
- Water
- Anthropogenic



Notes

- Coordinate System: NAD 1983 UTM Zone 17N
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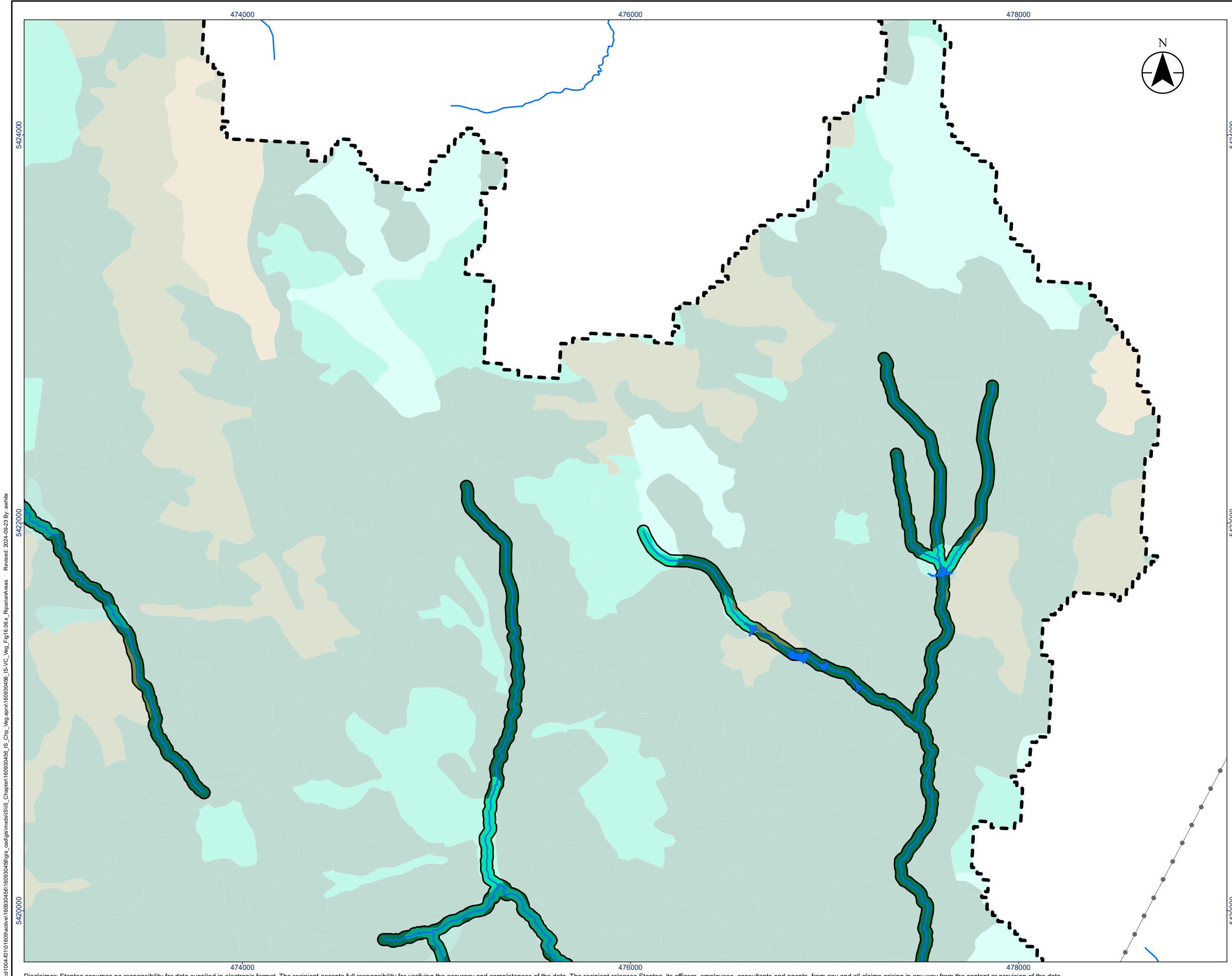


















Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by awhite on 2024-09-23

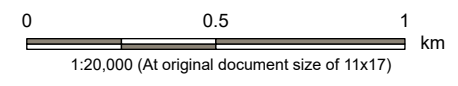
Client/Project: Canada Nickel Company (CNC)
 Crawford Nickel Project

Figure No.: **16.6.1**
 Title: **Riparian Habitat in the LSA**

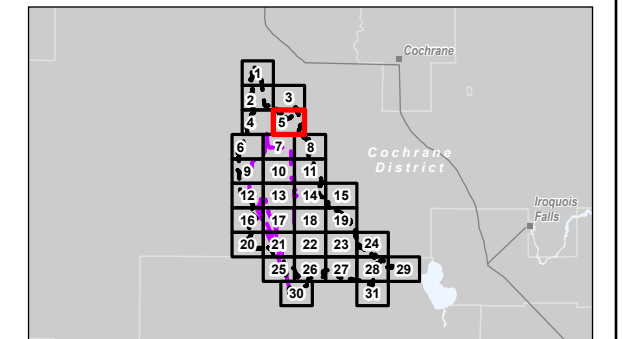
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 Revised: 2024-09-23 By: awhite
 \s1004-1010\160930456\160930456\gis_data\160930456\160930456_IS_VC_Veg_Fig16.06x_Riparian.kreas



- Legend
-  Local Study Area
 -  Hydro Line
 -  Watercourse (Permanent)
- Ecosite Type**
-  Coniferous Forest/Stand
 -  Deciduous Forest/Stand
 -  Bog
 -  Fen
 -  Meadow Marsh
 -  Swamp
 -  Water
- Riparian Area**
-  Coniferous Forest/Stand
 -  Bog
 -  Fen
 -  Meadow Marsh
 -  Swamp
 -  Water



- 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.



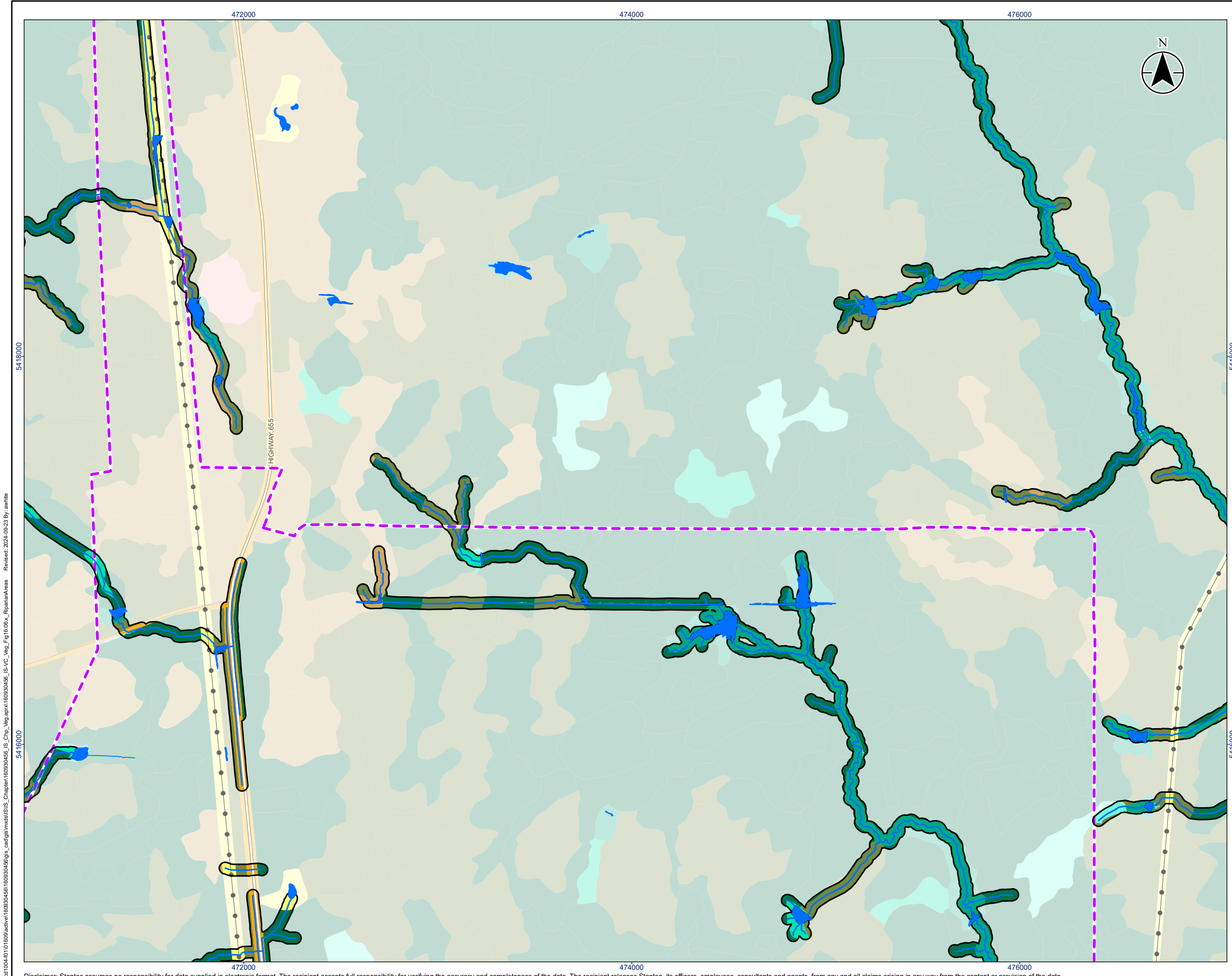
Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by awhite on 2024-09-23

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

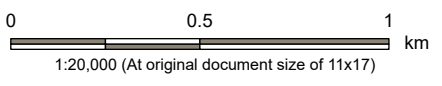
Figure No.: **16.6.5**

Title: **Riparian Habitat in the LSA**

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 Chapter160930456_IS_VC_Veg_Fig16.06x_RiparianArea
 Reviewed: 2024-09-23 By: awhite

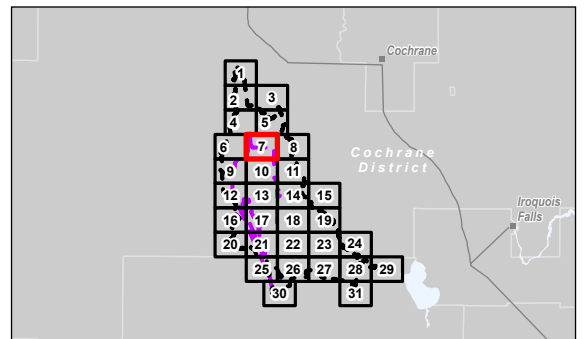


- Legend**
- Project Area**
- Project Area
- Base Features**
- Major Road
 - Minor Road
 - Hydro Line
 - Watercourse (Permanent)
 - Waterbody
- Ecosite Type**
- Coniferous Forest/Stand
 - Deciduous Forest/Stand
 - Bog
 - Fen
 - Meadow Marsh
 - Swamp
 - Water
 - Anthropogenic
 - Constructed
 - Barren
- Riparian Area**
- Coniferous Forest/Stand
 - Deciduous Forest/Stand
 - Bog
 - Fen
 - Meadow Marsh
 - Swamp
 - Water
 - Anthropogenic
 - Constructed



Notes

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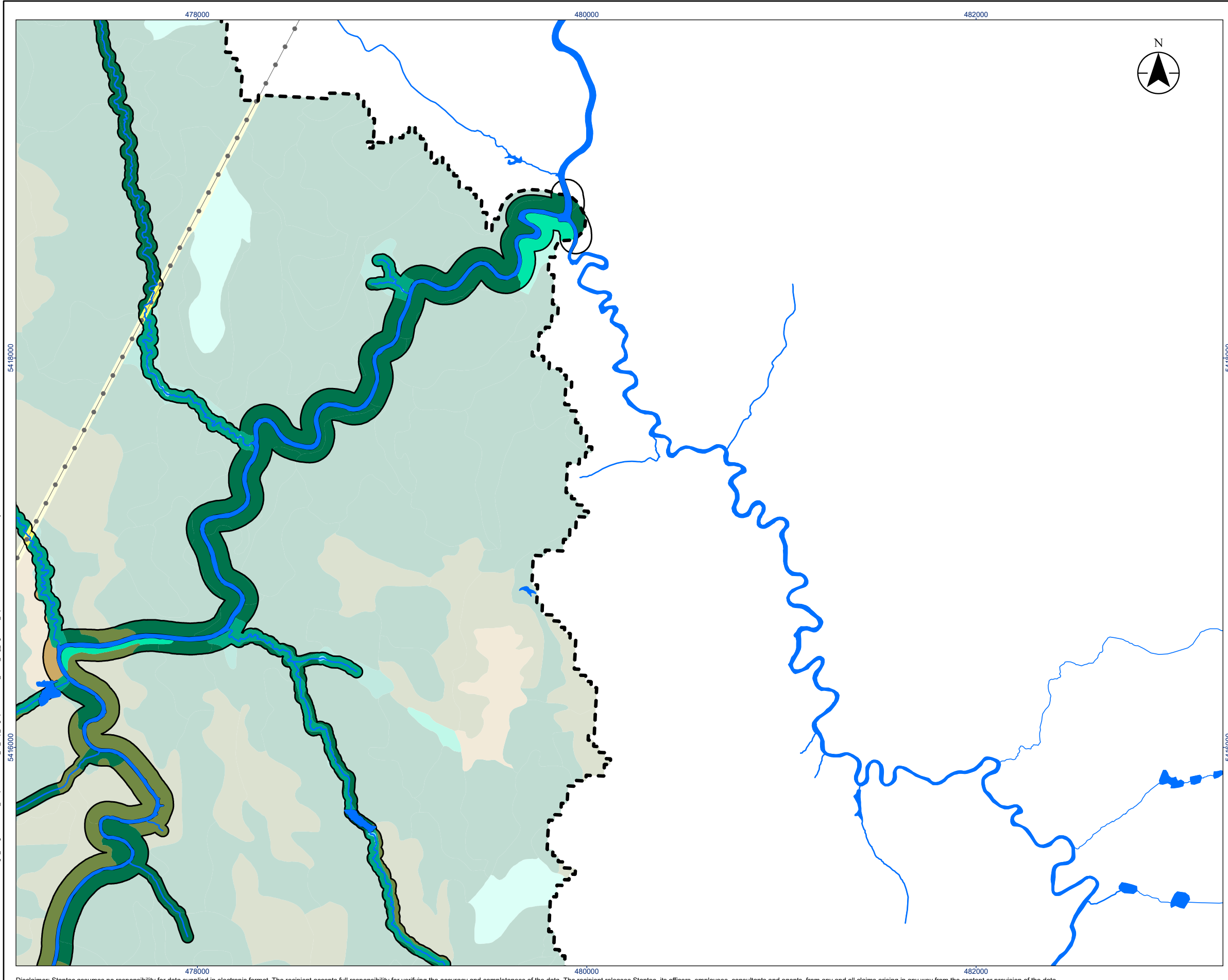


Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by awhite on 2024-09-23



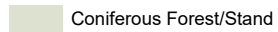

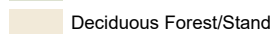



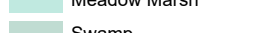

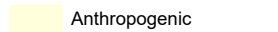

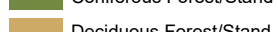


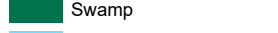

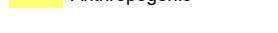

Client/Project: Canada Nickel Company (CNC)
 Crawford Nickel Project

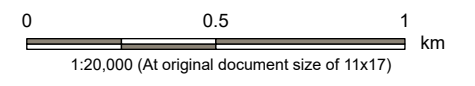
Figure No.: **16.6.7**
 Title: **Riparian Habitat in the LSA**

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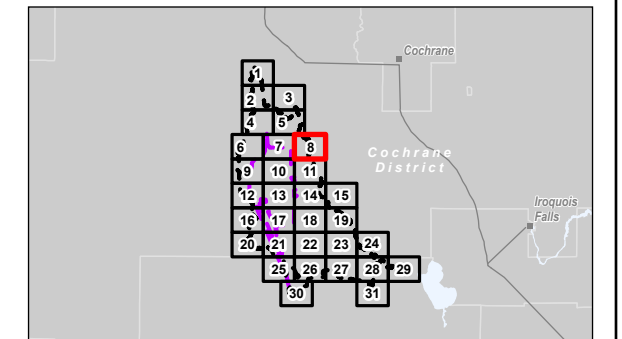


Legend

- | | |
|---|---|
|  Local Study Area | Ecosite Type |
|  Hydro Line |  Coniferous Forest/Stand |
|  Watercourse (Permanent) |  Deciduous Forest/Stand |
|  Waterbody |  Bog |
| |  Fen |
| |  Meadow Marsh |
| |  Swamp |
| |  Water |
| |  Anthropogenic |
| | Riparian Area |
| |  Coniferous Forest/Stand |
| |  Deciduous Forest/Stand |
| |  Fen |
| |  Meadow Marsh |
| |  Swamp |
| |  Water |
| |  Anthropogenic |



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.

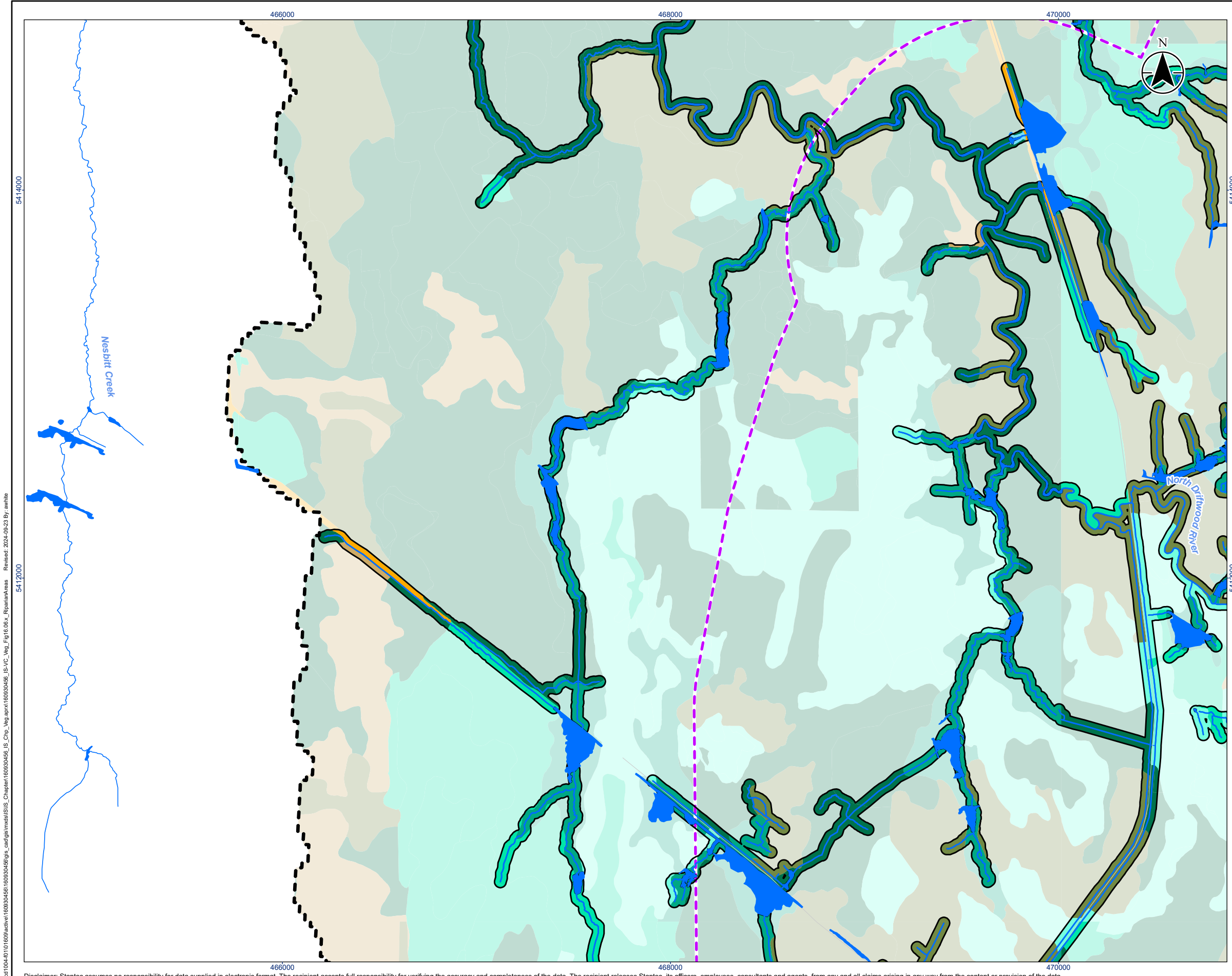


Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by: awhite on 2024-09-23

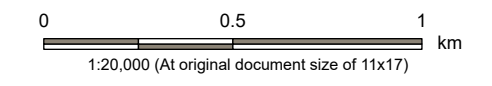
Client/Project:
 Canada Nickel Company (CNC)
 Crawford Nickel Project

Figure No.
16.6.8

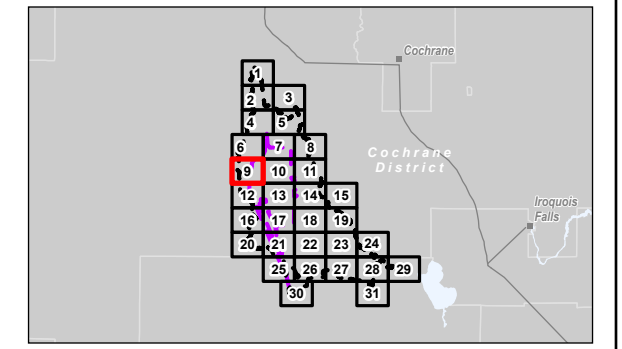
Title
Riparian Habitat in the LSA



- Legend**
- Project Area
 - Local Study Area
- Base Features**
- Minor Road
 - Watercourse (Permanent)
 - Waterbody
- Ecosite Type**
- Coniferous Forest/Stand
 - Deciduous Forest/Stand
 - Bog
 - Fen
 - Meadow Marsh
 - Swamp
 - Water
 - Constructed
- Riparian Area**
- Coniferous Forest/Stand
 - Deciduous Forest/Stand
 - Bog
 - Fen
 - Meadow Marsh
 - Swamp
 - Water
 - Constructed



- 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.

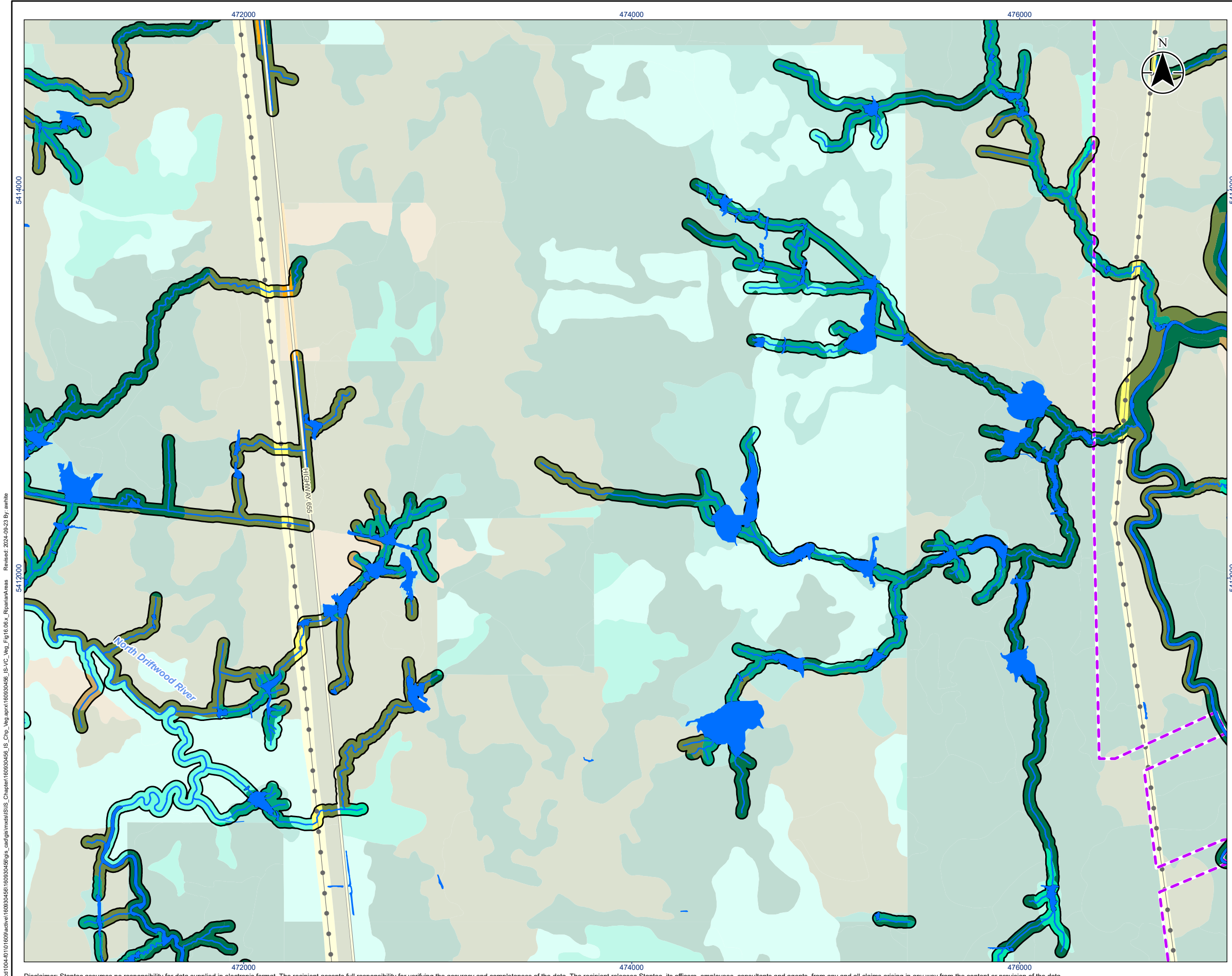


Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23

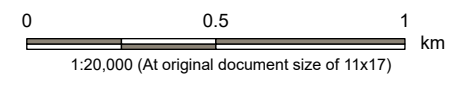
Client/Project: Canada Nickel Company (CNC)
 Crawford Nickel Project

Figure No.: **16.6.9**
 Title: **Riparian Habitat in the LSA**

V:\1004-10\1009\active\160930456\160930456\gis_cad\gis_cad\gis_cad\gis_cad\160930456_IS_VC_Veg_Fig16.06x_RiparianArea_Reviewed: 2024-09-23 By: awhite

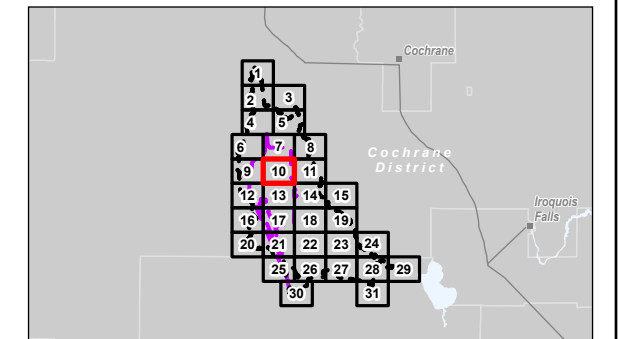


- Legend**
- Project Area**
- Project Area (Dashed purple line)
- Base Features**
- Major Road (Yellow line)
 - Hydro Line (Black line with dots)
 - Watercourse (Permanent) (Blue line)
 - Waterbody (Blue area)
- Ecosite Type**
- Coniferous Forest/Stand (Light green)
 - Deciduous Forest/Stand (Light brown)
 - Bog (Light cyan)
 - Fen (Light green)
 - Meadow Marsh (Light green)
 - Swamp (Light green)
 - Water (Light blue)
 - Anthropogenic (Yellow)
 - Constructed (Orange)
- Riparian Area**
- Coniferous Forest/Stand (Dark green)
 - Deciduous Forest/Stand (Brown)
 - Bog (Cyan)
 - Fen (Green)
 - Meadow Marsh (Dark green)
 - Swamp (Dark green)
 - Water (Blue)
 - Anthropogenic (Yellow)
 - Constructed (Orange)



Notes

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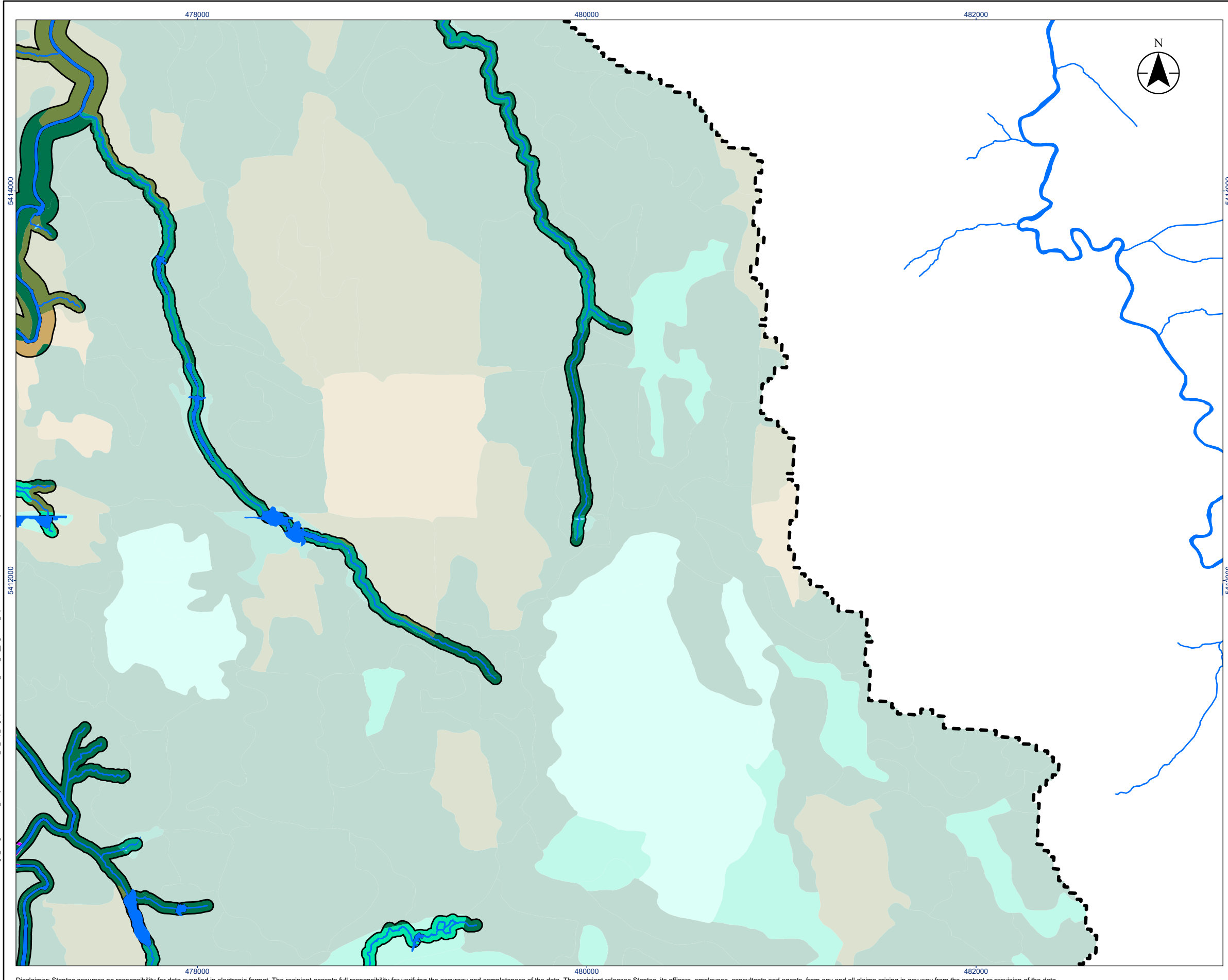


Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by: awhite on 2024-09-23

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

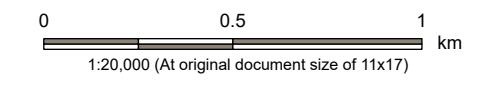
Figure No.: **16.6.10**
 Title: **Riparian Habitat in the LSA**

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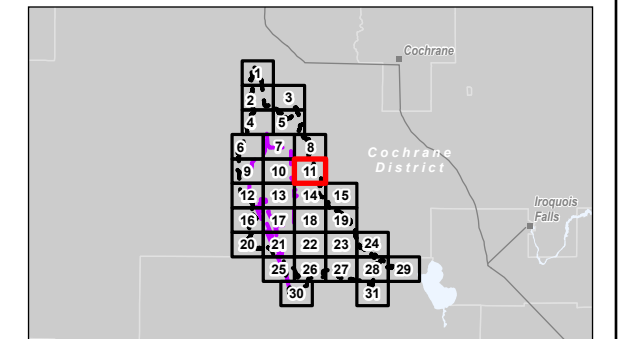


Legend

-  Project Area
 -  Local Study Area
 -  Watercourse (Permanent)
 -  Waterbody
-
- Ecosite Type**
-  Coniferous Forest/Stand
 -  Deciduous Forest/Stand
 -  Bog
 -  Fen
 -  Meadow Marsh
 -  Swamp
 -  Water
-
- Riparian Area**
-  Coniferous Forest/Stand
 -  Deciduous Forest/Stand
 -  Fen
 -  Meadow Marsh
 -  Swamp
 -  Water



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.



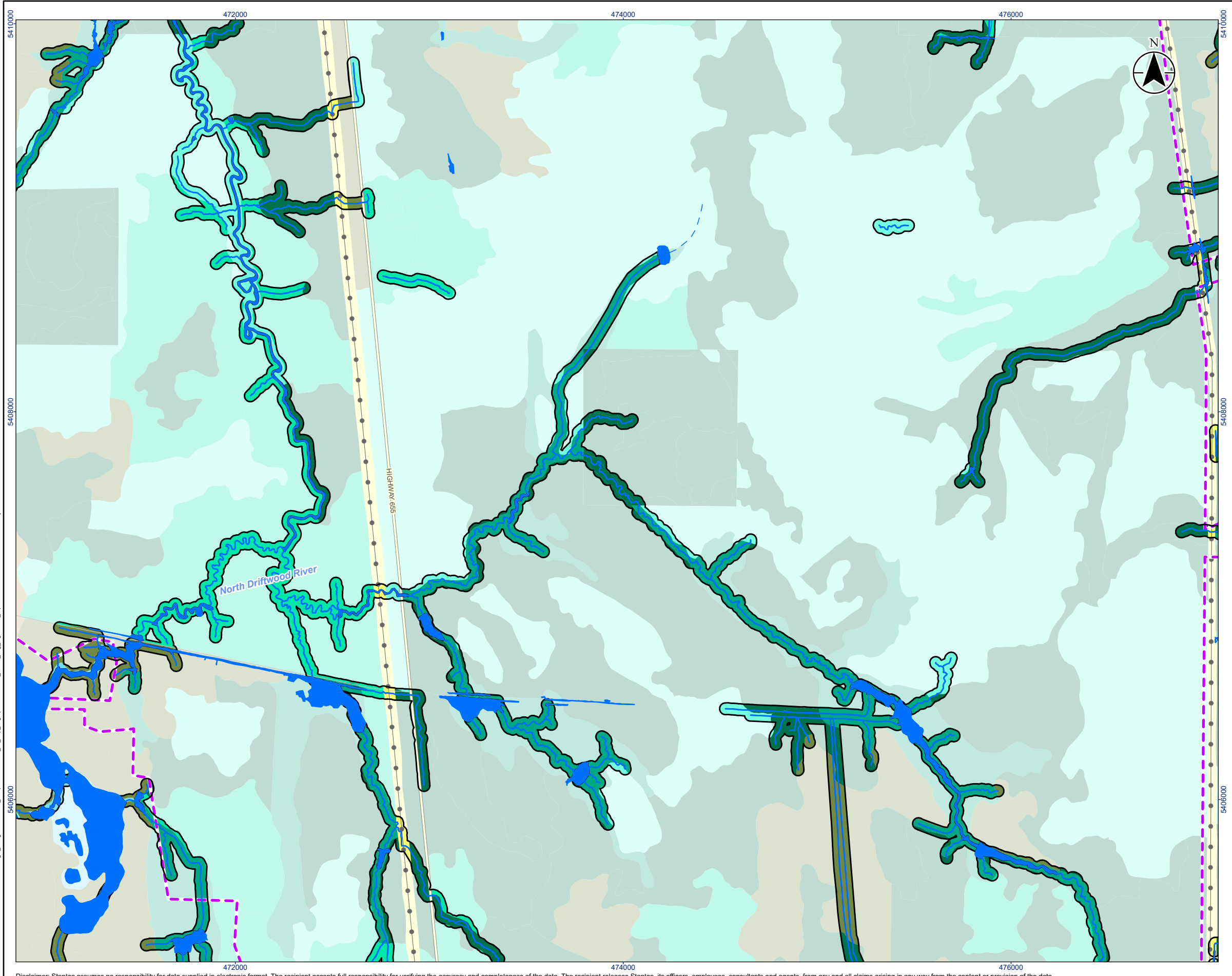
Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by awhite on 2024-09-23

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

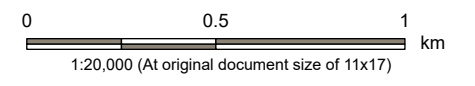
Figure No.: **16.6.11**

Title: **Riparian Habitat in the LSA**

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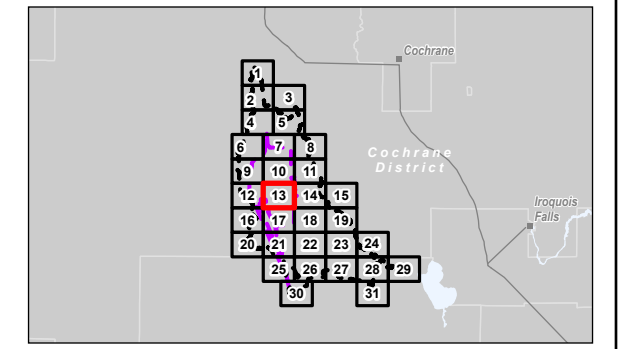


- Legend**
- Project Area**
- Project Area (Purple dashed line)
- Base Features**
- Major Road (Yellow line)
 - Minor Road (Grey line)
 - Hydro Line (Black line with dots)
 - Watercourse (Intermittent) (Blue dashed line)
 - Watercourse (Permanent) (Blue solid line)
 - Waterbody (Blue solid area)
- Ecosite Type**
- Coniferous Forest/Stand (Light green)
 - Deciduous Forest/Stand (Light brown)
 - Bog (Light cyan)
 - Fen (Light green)
 - Meadow Marsh (Light green)
 - Swamp (Light green)
 - Water (Light blue)
 - Anthropogenic (Yellow)
- Riparian Area**
- Coniferous Forest/Stand (Dark green)
 - Bog (Light cyan)
 - Fen (Light green)
 - Meadow Marsh (Light green)
 - Swamp (Light green)
 - Water (Light blue)
 - Anthropogenic (Yellow)



Notes

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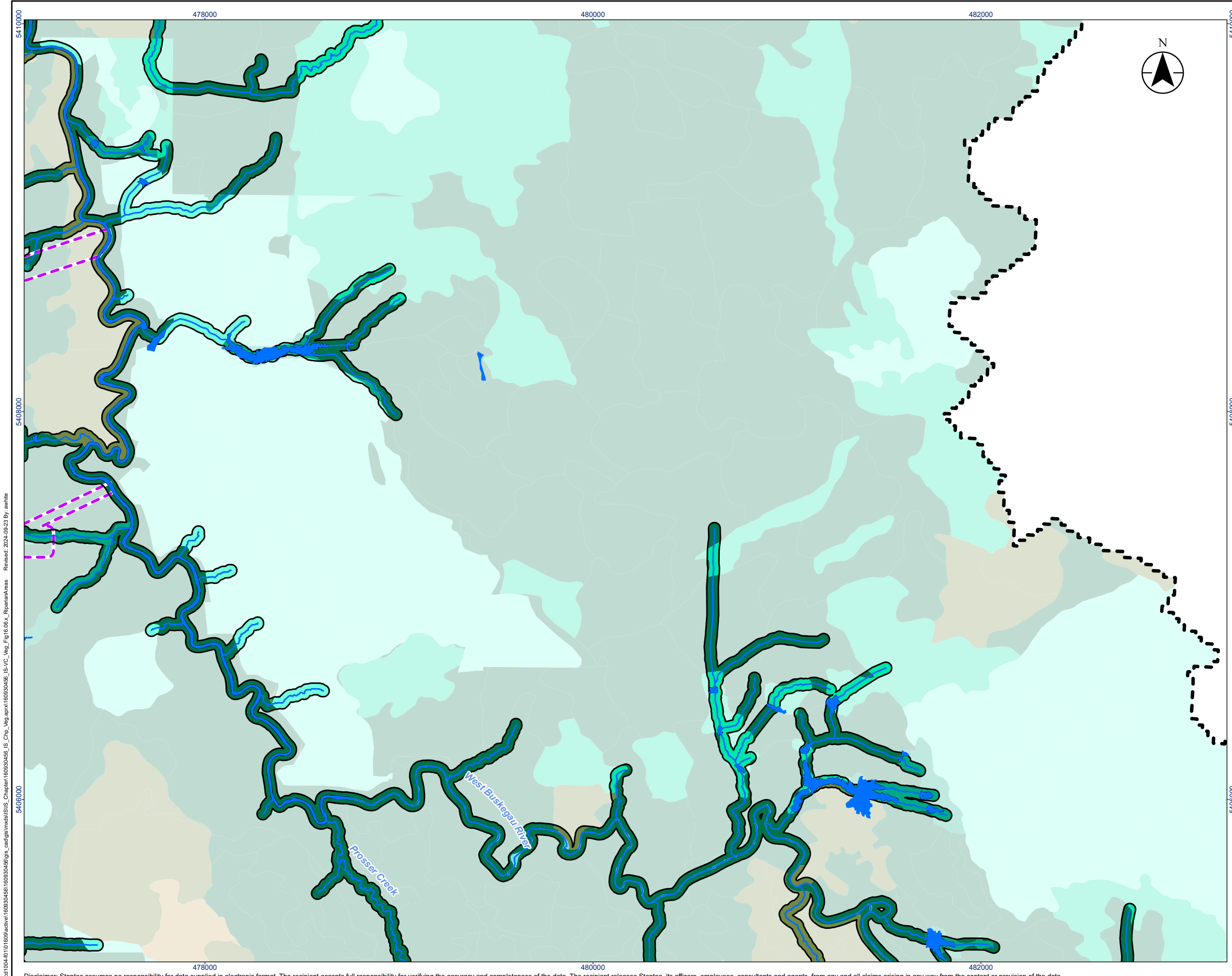


Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by awhite on 2024-09-23





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

Figure No.: **16.6.13**








Title: **Riparian Habitat in the LSA**









Legend

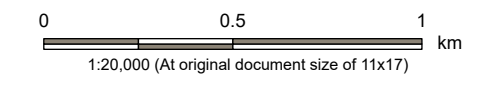
-  Project Area
-  Local Study Area
-  Watercourse (Permanent)
-  Waterbody

Ecosite Type

-  Coniferous Forest/Stand
-  Deciduous Forest/Stand
-  Bog
-  Fen
-  Meadow Marsh
-  Swamp
-  Water

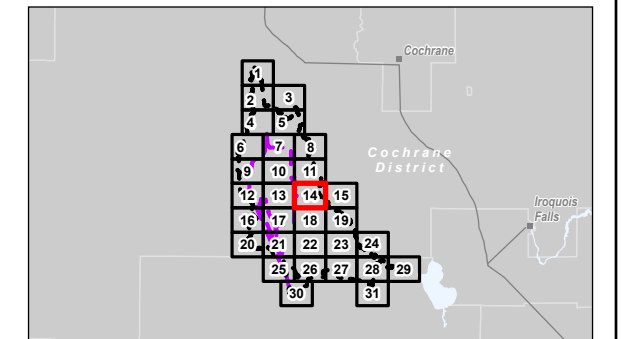
Riparian Area

-  Coniferous Forest/Stand
-  Bog
-  Fen
-  Meadow Marsh
-  Swamp
-  Water



Notes

- Coordinate System: NAD 1983 UTM Zone 17N
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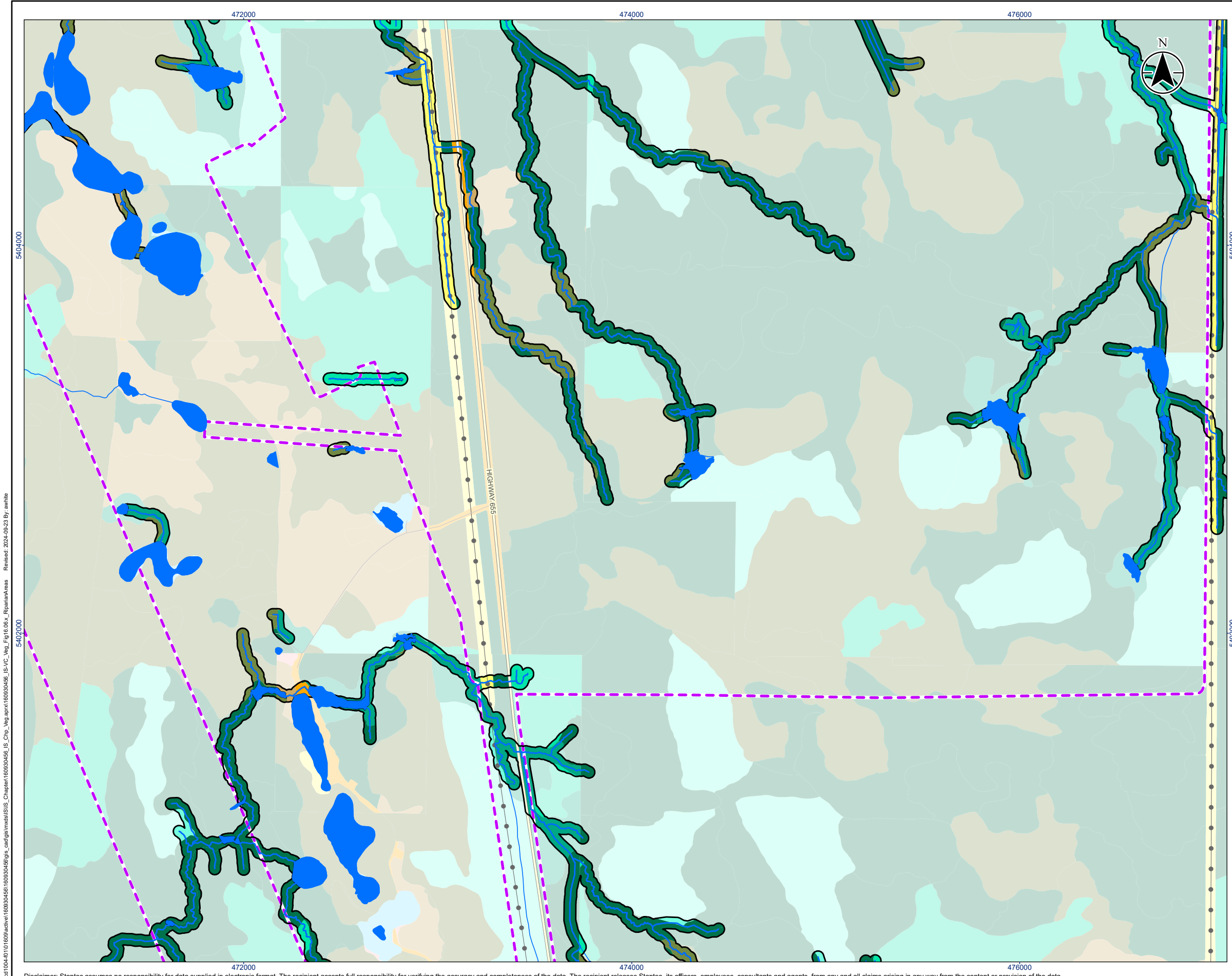
Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23

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

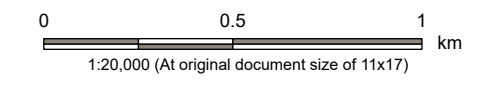
Figure No.: **16.6.14**

Title: **Riparian Habitat in the LSA**

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 Revised: 2024-09-23 By: awhite

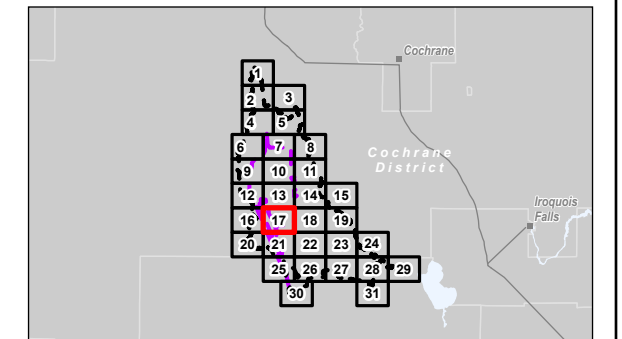


- Legend**
- Project Area**
- Project Area (Dashed purple line)
- Base Features**
- Major Road (Thick yellow line)
 - Minor Road (Thin yellow line)
 - Hydro Line (Dotted black line)
 - Watercourse (Permanent) (Blue line)
 - Waterbody (Blue area)
- Ecosite Type**
- Coniferous Forest/Stand (Light green)
 - Deciduous Forest/Stand (Light brown)
 - Bog (Light cyan)
 - Fen (Light green)
 - Meadow Marsh (Light green)
 - Swamp (Light green)
 - Water (Light blue)
 - Anthropogenic (Yellow)
 - Constructed (Orange)
 - Barren (Pink)
- Riparian Area**
- Coniferous Forest/Stand (Dark green)
 - Deciduous Forest/Stand (Brown)
 - Bog (Cyan)
 - Fen (Green)
 - Meadow Marsh (Dark green)
 - Swamp (Dark green)
 - Water (Blue)
 - Anthropogenic (Yellow)
 - Constructed (Orange)



Notes

- Coordinate System: NAD 1983 UTM Zone 17N
- Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.



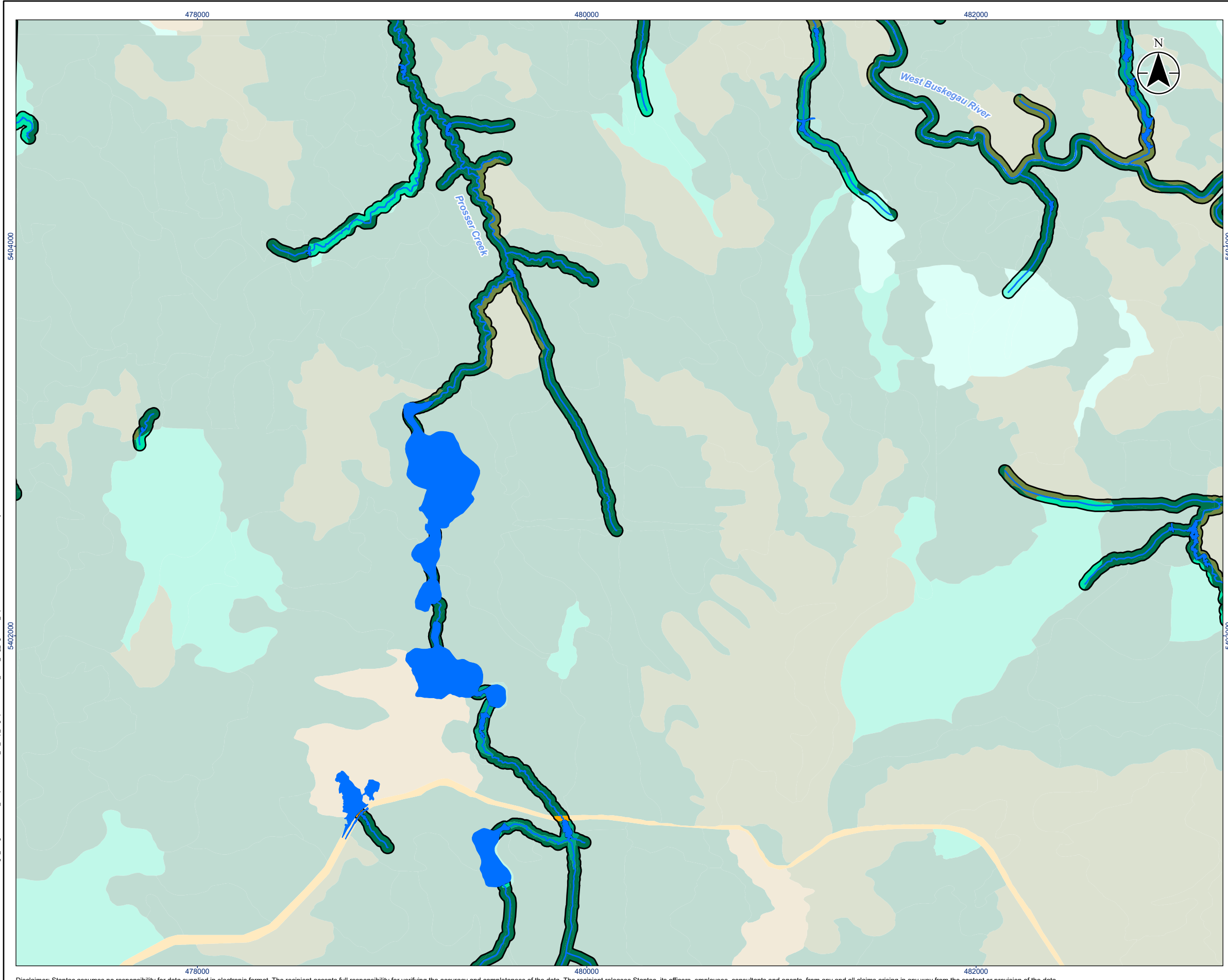
Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23

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

Figure No.: **16.6.17**

Title: **Riparian Habitat in the LSA**

V:\0104-10\1009\active\160930456\160930456\gis_cad\gis_cad\gis_cad\gis_cad\160930456_160930456_IS_VC_Veg_Fig16.06_x_RiparianAreas_Reviewed_2024-09-23_By_ahwhite



Legend

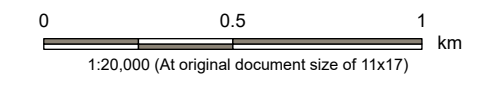
— Watercourse (Permanent)
 ■ Waterbody

Ecosite Type

- Coniferous Forest/Stand
- Deciduous Forest/Stand
- Bog
- Fen
- Meadow Marsh
- Swamp
- Water
- Constructed

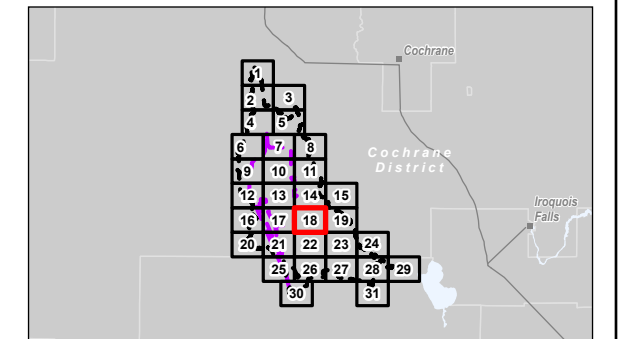
Riparian Area

- Coniferous Forest/Stand
- Bog
- Fen
- Meadow Marsh
- Swamp
- Water
- Constructed



Notes

- Coordinate System: NAD 1983 UTM Zone 17N
- Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.

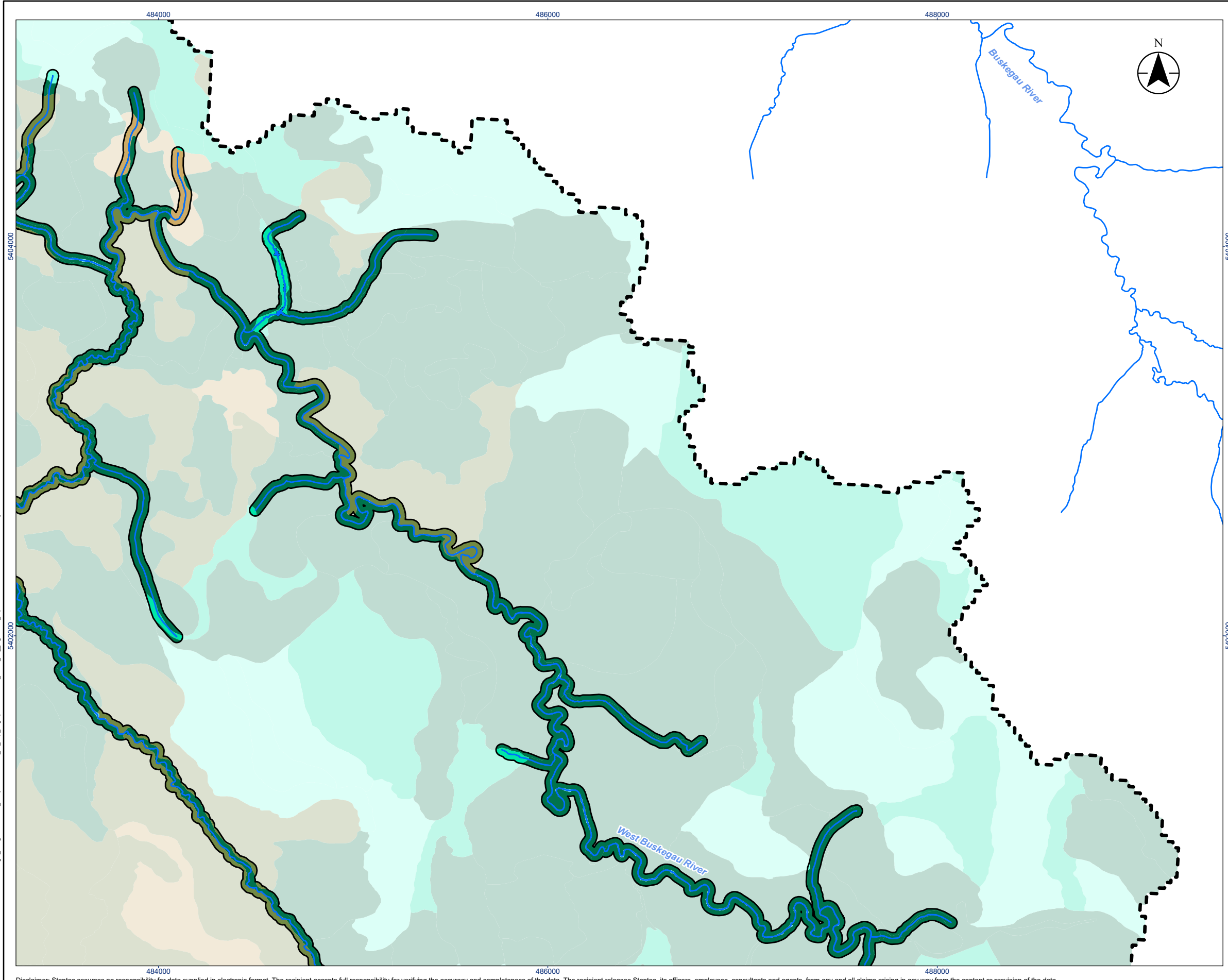


Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23


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


Figure No.: **16.6.18**
 Title: **Riparian Habitat in the LSA**

V:\1004-10\160930456\160930456\gis_cad\gis_md\160930456_Chapter16\160930456_LSA_VC_Veg_Fig16.06_x_RiparianArea.mxd
 Reviewed: 2024-09-23 By: awhite









Legend







 Local Study Area

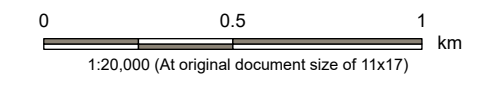
 Watercourse (Permanent)

Ecosite Type

-  Coniferous Forest/Stand
-  Deciduous Forest/Stand
-  Bog
-  Fen
-  Swamp
-  Water

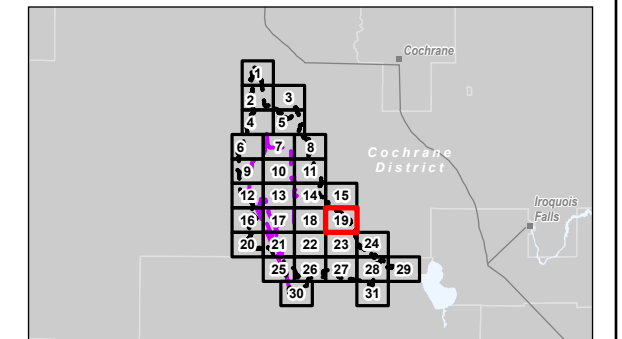
Riparian Area

-  Coniferous Forest/Stand
-  Deciduous Forest/Stand
-  Bog
-  Fen
-  Swamp
-  Water



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.



Project Location: Timmins, Ontario

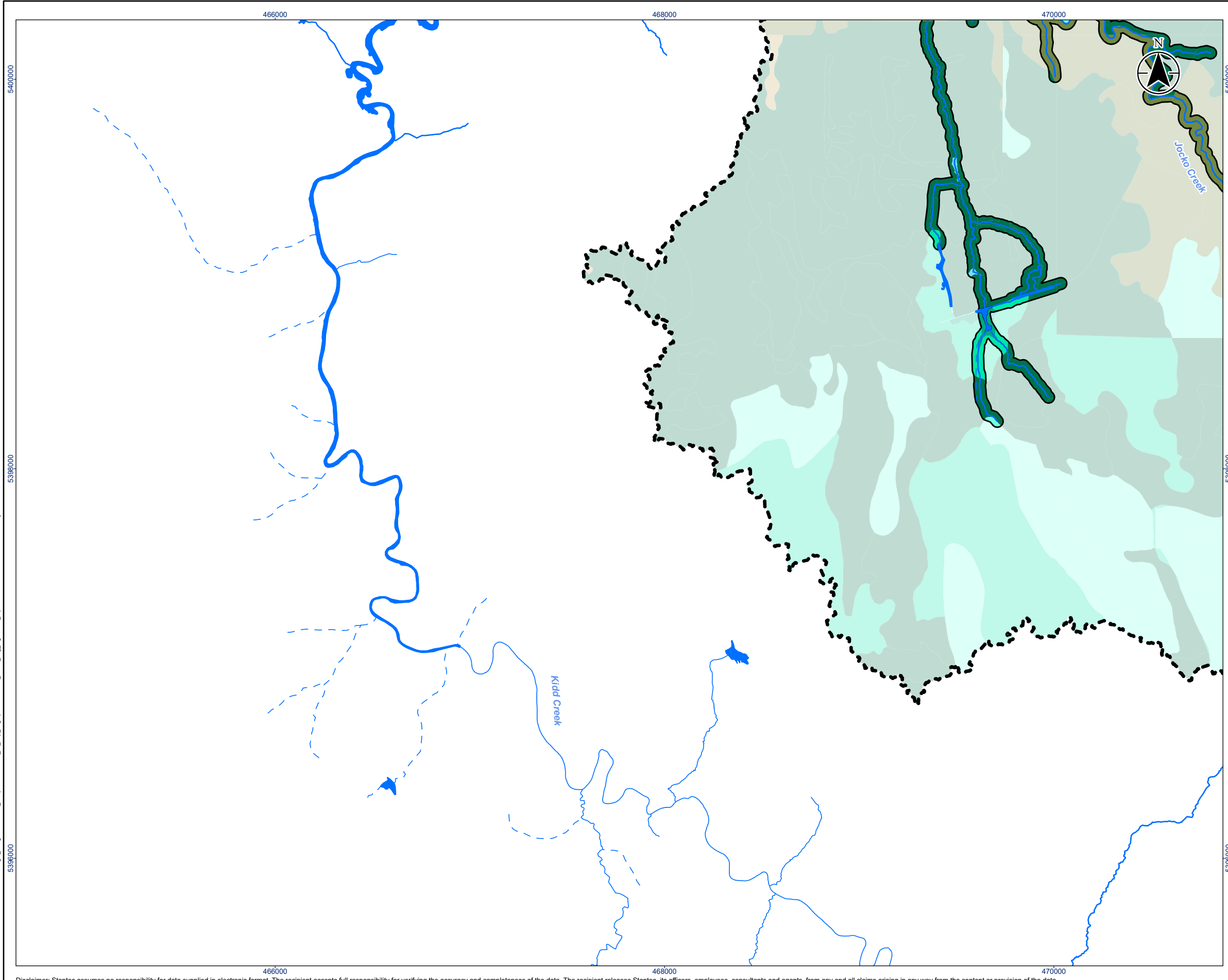
160930456 REVA
Prepared by awhite on 2024-09-23

















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

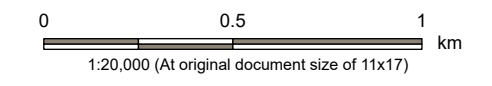
Figure No.: **16.6.19**

Title: **Riparian Habitat in the LSA**

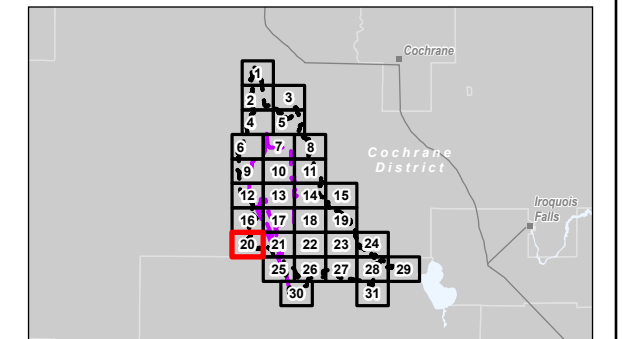
V:\1004-10\160930456\160930456\gis_data\mxd\160930456_160930456_IS_VC_Veg_Fig16.06x_RiparianAreas_2024-09-23 By awhite



- Legend**
-  Local Study Area
 -  Watercourse (Intermittent)
 -  Watercourse (Permanent)
 -  Waterbody
- Ecosite Type**
-  Coniferous Forest/Stand
 -  Deciduous Forest/Stand
 -  Bog
 -  Fen
 -  Meadow Marsh
 -  Swamp
 -  Water
- Riparian Area**
-  Coniferous Forest/Stand
 -  Bog
 -  Fen
 -  Meadow Marsh
 -  Swamp
 -  Water



- 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.

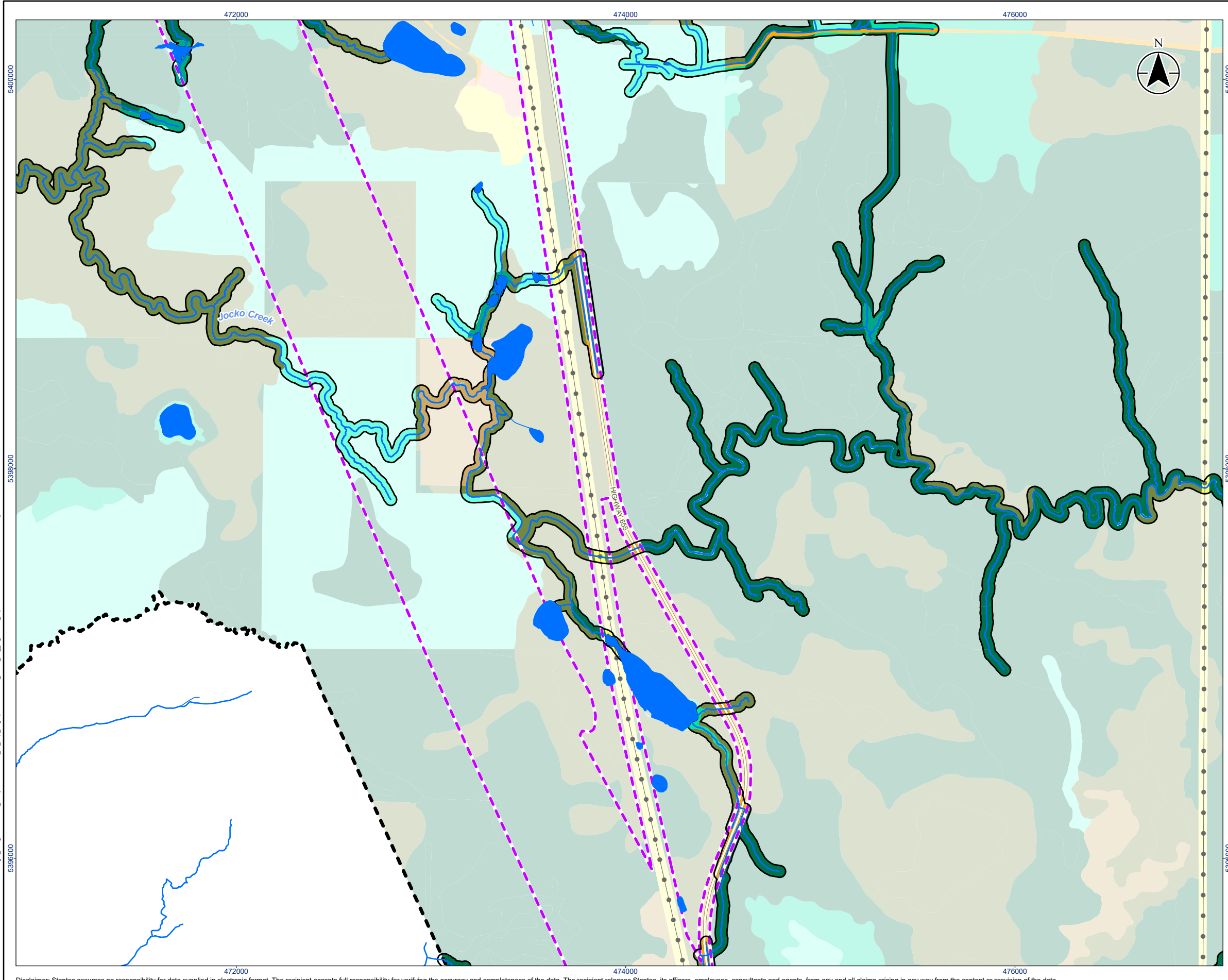


Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23

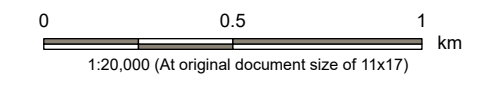
Client/Project: Canada Nickel Company (CNC)
 Crawford Nickel Project

Figure No.: **16.6.20**
 Title: **Riparian Habitat in the LSA**

V:\04-10\160930456\160930456\gis_data\gis_data\160930456_LSA_Veg_Fig16.06x_RiparianAreas_Reviewed_2024-09-23 By: awhite

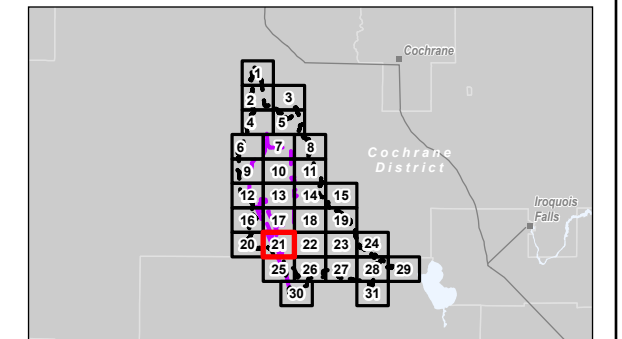


- Legend**
- Project Area
 - Local Study Area
- Base Features**
- Major Road
 - Hydro Line
 - Watercourse (Intermittent)
 - Watercourse (Permanent)
 - Waterbody
- Ecosite Type**
- Coniferous Forest/Stand
 - Deciduous Forest/Stand
 - Bog
 - Fen
 - Meadow Marsh
 - Swamp
 - Water
 - Anthropogenic
 - Constructed
 - Barren
- Riparian Area**
- Coniferous Forest/Stand
 - Deciduous Forest/Stand
 - Bog
 - Fen
 - Meadow Marsh
 - Swamp
 - Water
 - Anthropogenic
 - Constructed



Notes

- Coordinate System: NAD 1983 UTM Zone 17N
- Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.

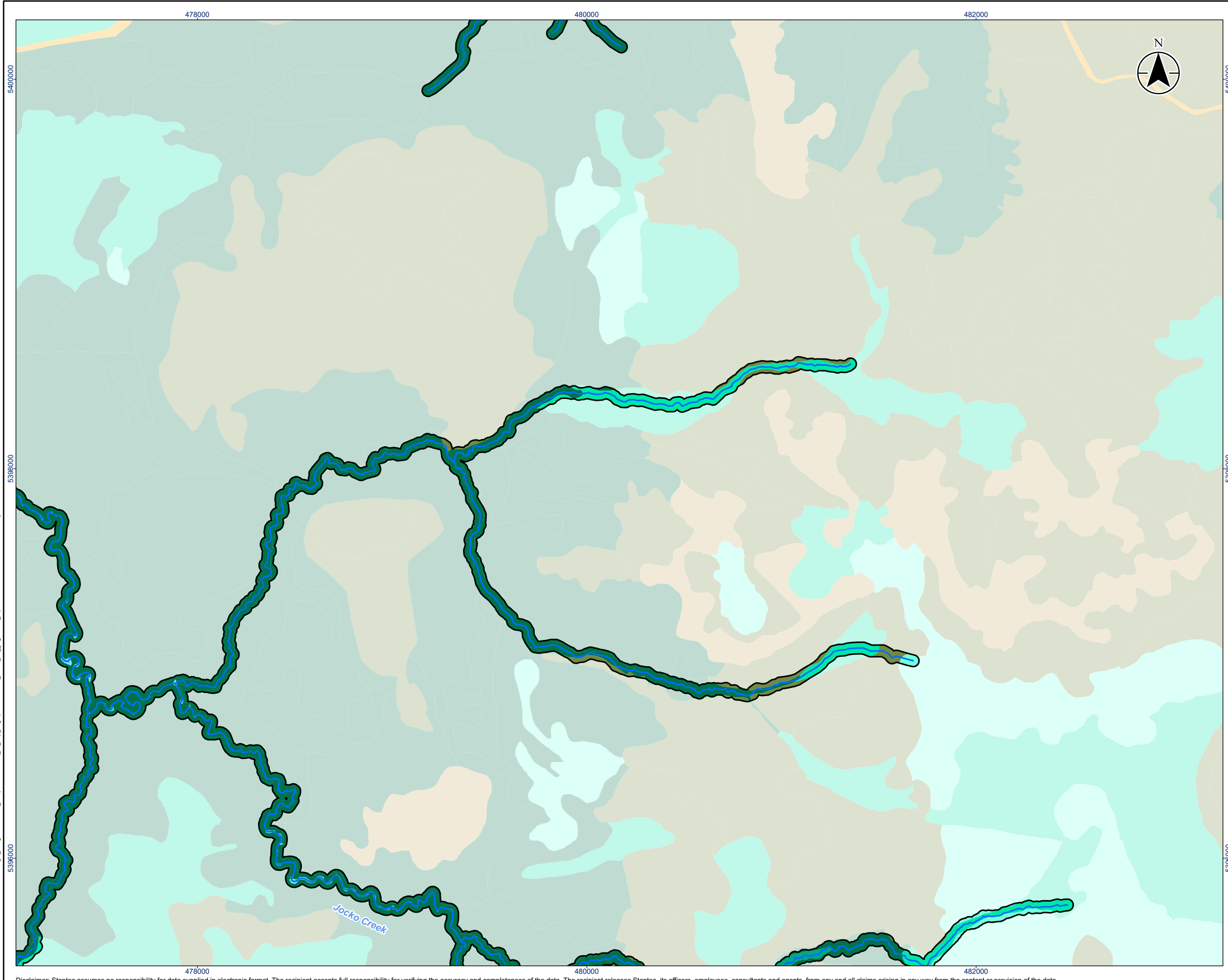


Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by awhite on 2024-09-23

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

Figure No.: **16.6.21**
 Title: **Riparian Habitat in the LSA**

V:\04-10\160930456\160930456\gis_data\mxd\160930456_IS_VC_Veg_Fig16.06x_RiparianAreas_Reviewed_2024-09-23 By awhite



Legend

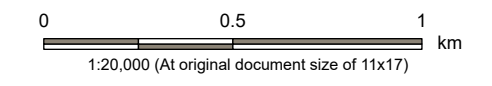
— Watercourse (Permanent)

Ecosite Type

- Coniferous Forest/Stand
- Deciduous Forest/Stand
- Bog
- Fen
- Meadow Marsh
- Swamp
- Water
- Constructed

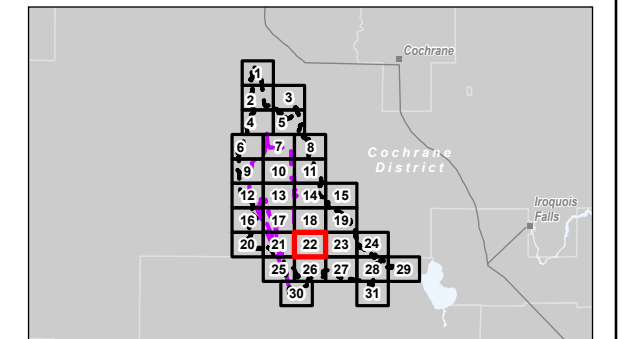
Riparian Area

- Coniferous Forest/Stand
- Bog
- Fen
- Meadow Marsh
- Swamp
- Water



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.



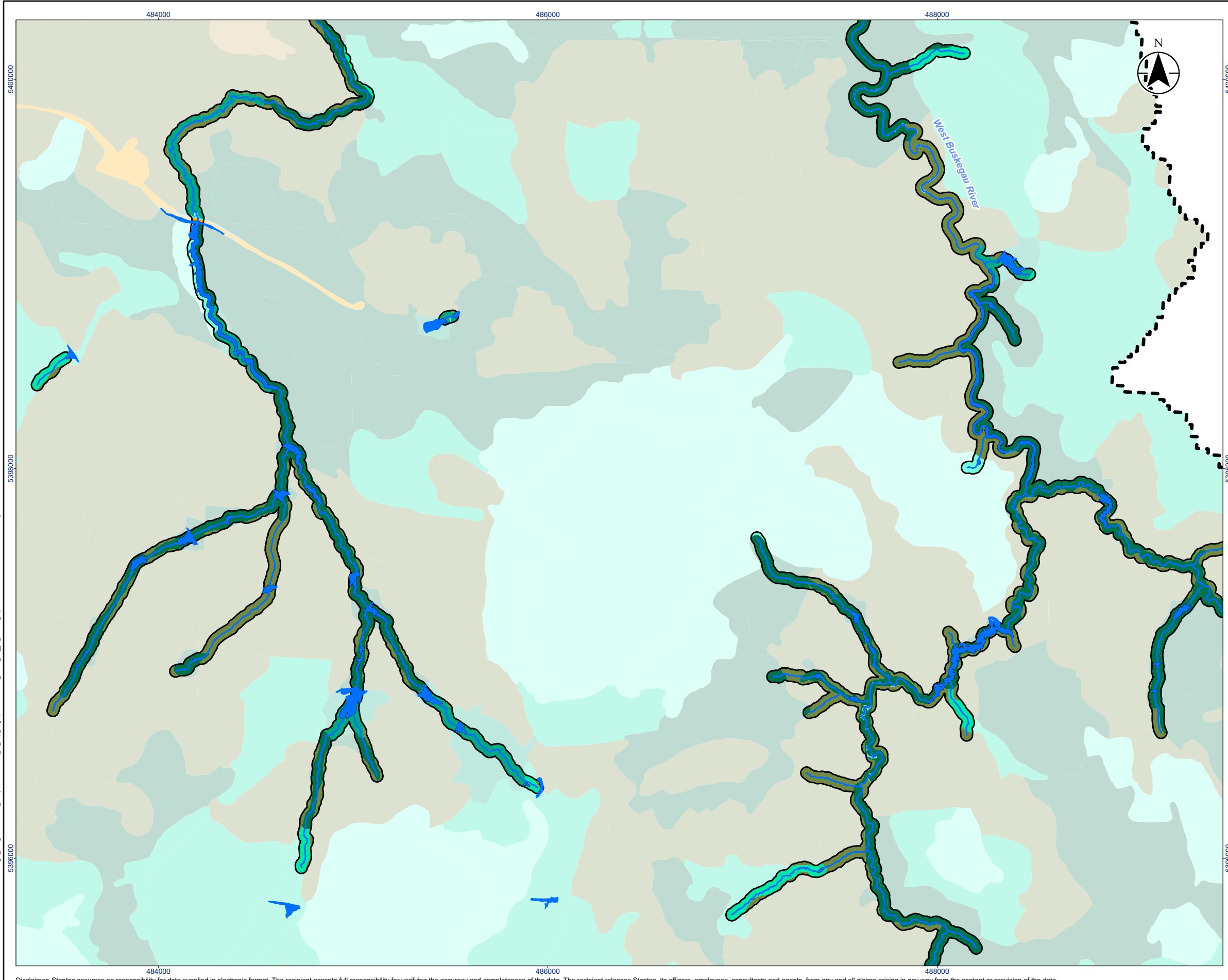
Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23



















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

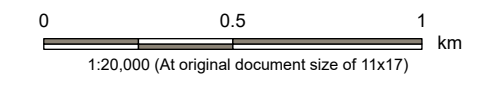
Figure No.: **16.6.22**

Title: **Riparian Habitat in the LSA**

\s1\004\010\160930456\160930456\gis_sad\gis_sad\gis_sad\160930456_IS_VC_Veg_Fig16.06x_RiparianAreas_Reviewed: 2024-09-23 By: awhite

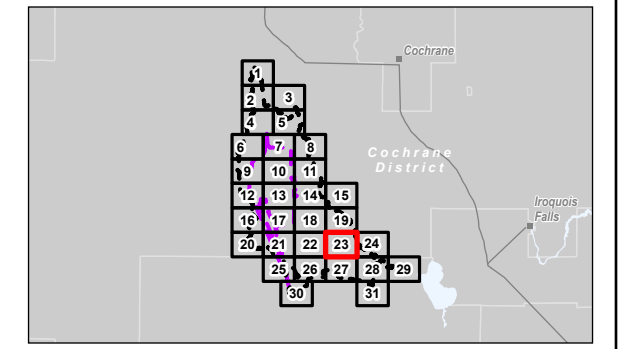


- Legend**
-  Local Study Area
 -  Watercourse (Permanent)
 -  Waterbody
- Ecosite Type**
-  Coniferous Forest/Stand
 -  Deciduous Forest/Stand
 -  Bog
 -  Fen
 -  Meadow Marsh
 -  Swamp
 -  Water
 -  Constructed
- Riparian Area**
-  Coniferous Forest/Stand
 -  Bog
 -  Fen
 -  Meadow Marsh
 -  Swamp
 -  Water
 -  Constructed



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.

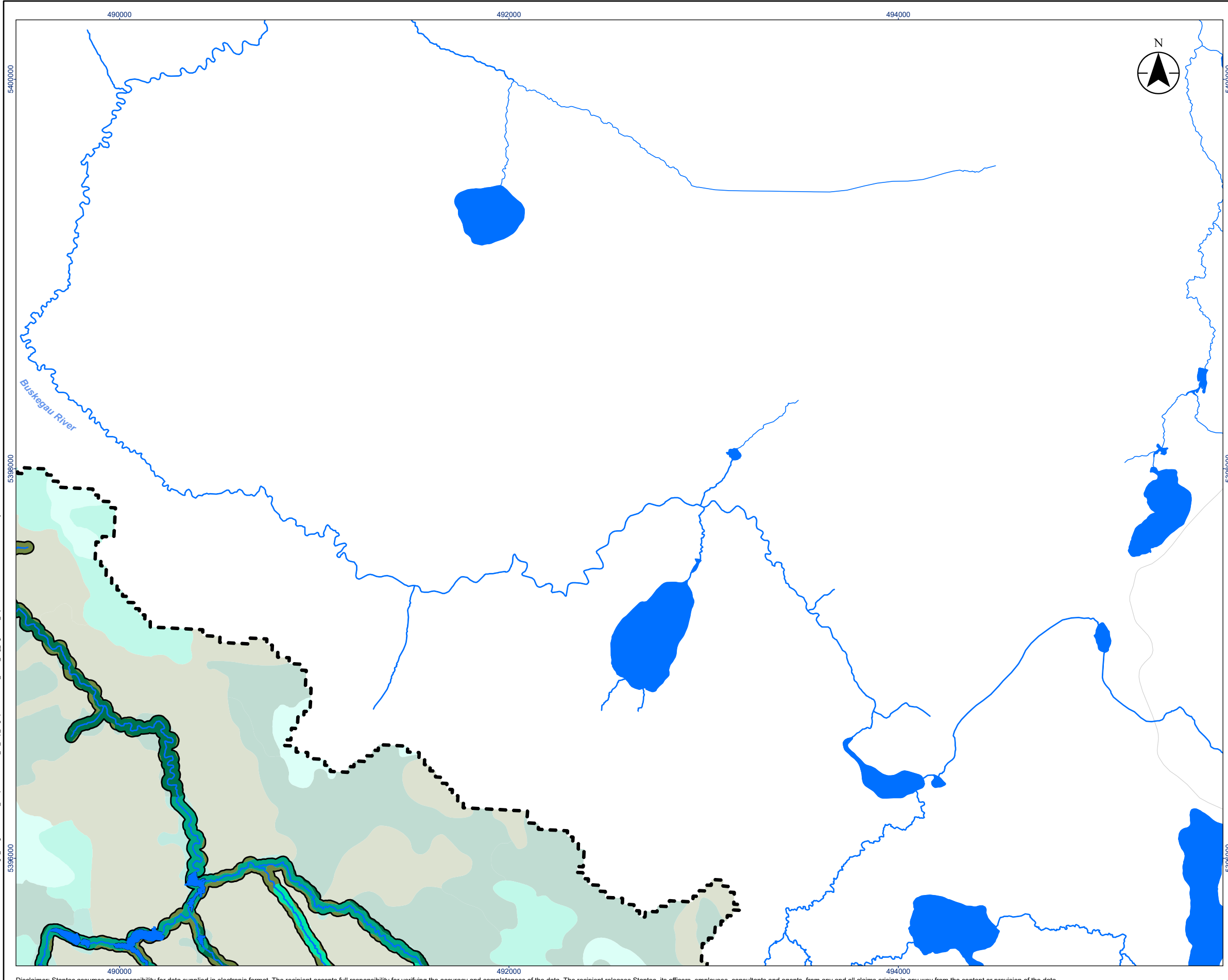


Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by awhite on 2024-09-23

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

Figure No.: **16.6.23**
 Title: **Riparian Habitat in the LSA**

V:\1004-101\160930456\160930456\gis_data\160930456\160930456_IS_VC_Veg_Fig16.06x_RiparianAreas_Reviewed_2024-09-23_By_ahwhite



Legend

Local Study Area

Base Features

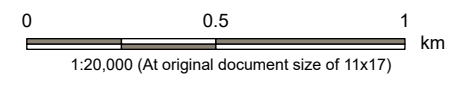
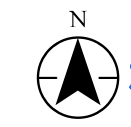
- Minor Road
- Watercourse (Permanent)
- Waterbody

Ecosite Type

- Coniferous Forest/Stand
- Bog
- Fen
- Meadow Marsh
- Swamp
- Water

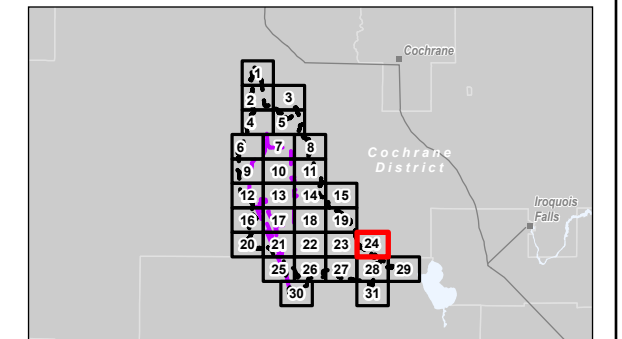
Riparian Area

- Coniferous Forest/Stand
- Fen
- Meadow Marsh
- Swamp
- Water



Notes

- Coordinate System: NAD 1983 UTM Zone 17N
- Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.



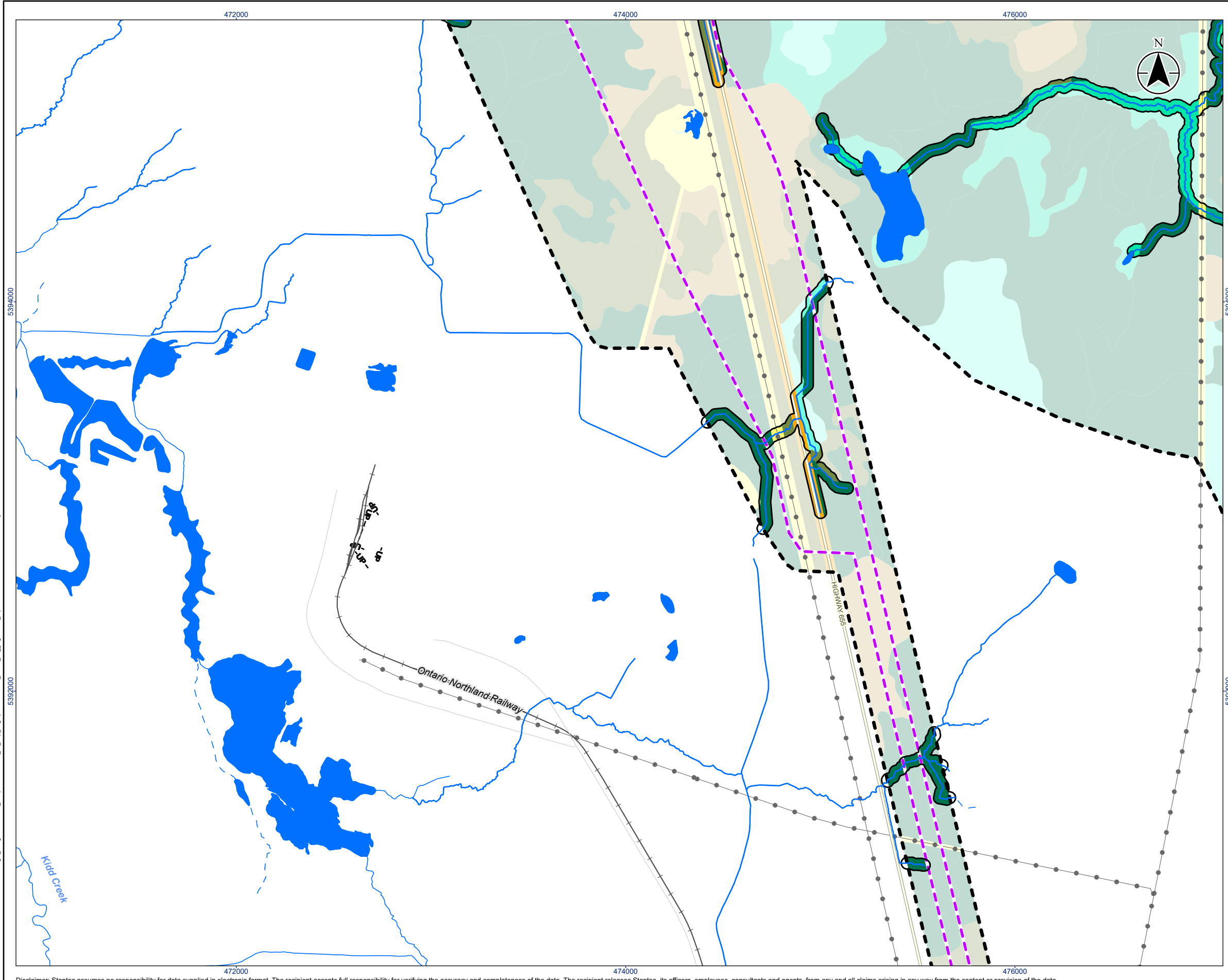
Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by awhite on 2024-09-23

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

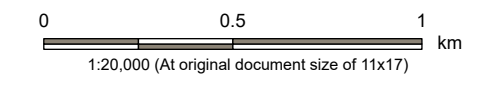
Figure No.: **16.6.24**

Title: **Riparian Habitat in the LSA**

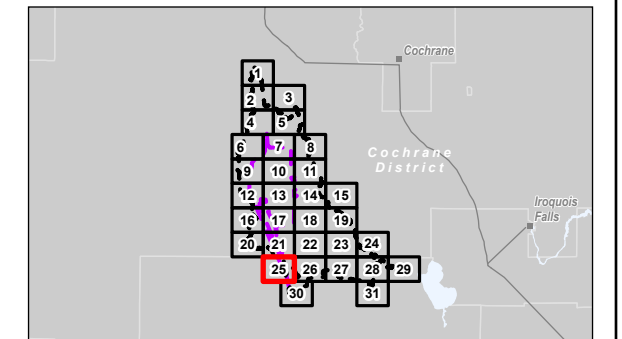
\s1\004\010\160930456\160930456\gis_data\gis_data\160930456_LSA_Veg_Fig16.06x_RiparianAreas_Reviewed_2024-09-23 By awhite



- Legend**
- Project Area
 - Local Study Area
- Base Features**
- Major Road
 - Minor Road
 - Railway
 - Hydro Line
 - Unknown Pipeline
 - Watercourse (Intermittent)
 - Watercourse (Permanent)
 - Waterbody
- Ecosite Type**
- Coniferous Forest/Stand
 - Deciduous Forest/Stand
 - Bog
 - Fen
 - Meadow Marsh
 - Swamp
 - Water
 - Anthropogenic
 - Constructed
- Riparian Area**
- Coniferous Forest/Stand
 - Bog
 - Fen
 - Meadow Marsh
 - Swamp
 - Water
 - Anthropogenic
 - Constructed



- 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.

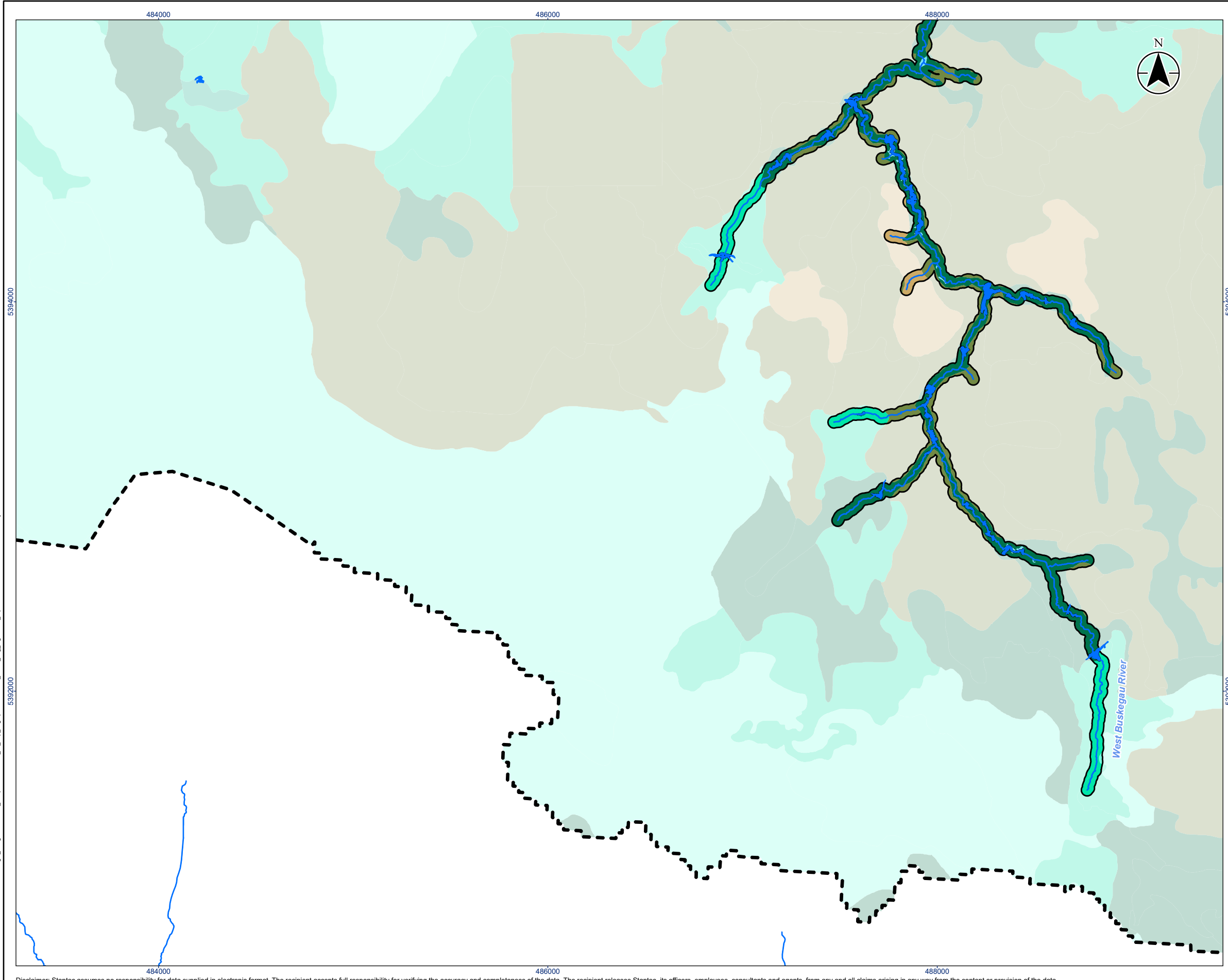


Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23








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

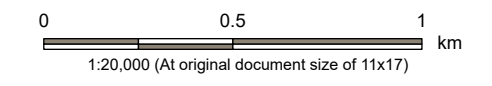
Figure No.: **16.6.25**

Title: **Riparian Habitat in the LSA**

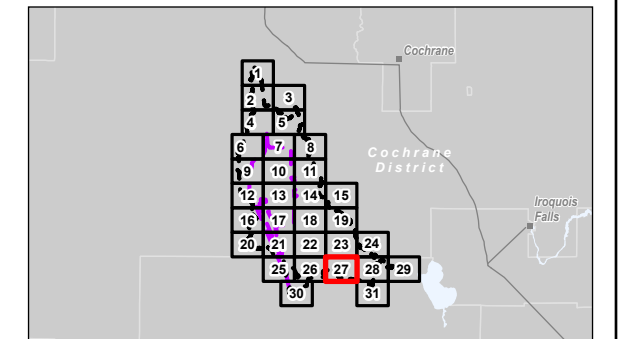


Legend

-  Local Study Area
 -  Watercourse (Permanent)
- | Ecosite Type | Riparian Area |
|---|---|
|  Coniferous Forest/Stand |  Coniferous Forest/Stand |
|  Deciduous Forest/Stand |  Deciduous Forest/Stand |
|  Bog |  Bog |
|  Fen |  Fen |
|  Meadow Marsh |  Swamp |
|  Swamp |  Water |
|  Water | |



- 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.

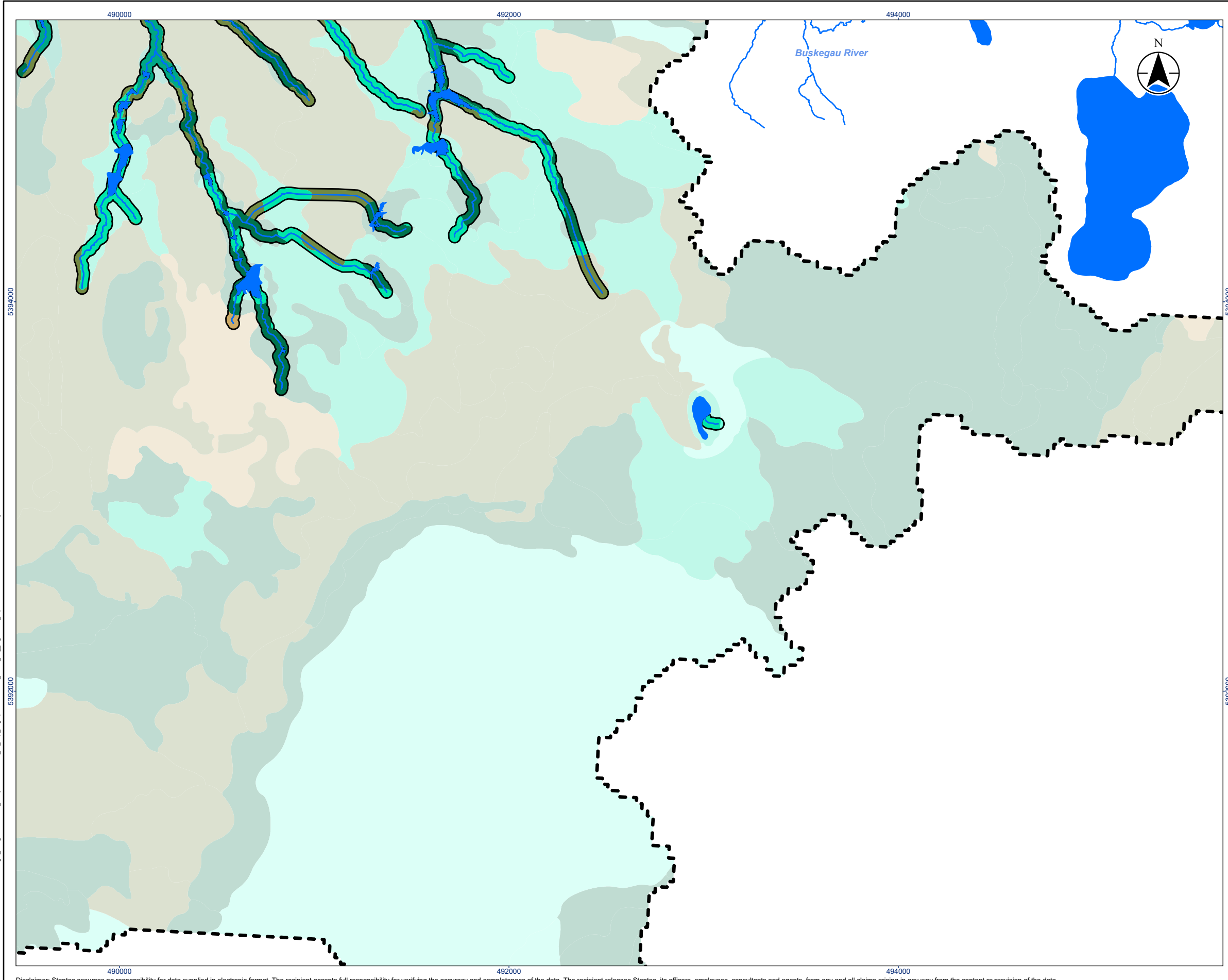



















Project Location: Timmins, Ontario
 Prepared by: awhite on 2024-09-23

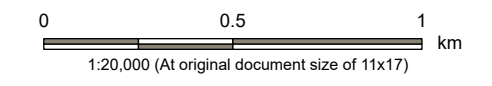
Client/Project: Canada Nickel Company (CNC)
 Crawford Nickel Project

Figure No.: **16.6.27**

Title: **Riparian Habitat in the LSA**

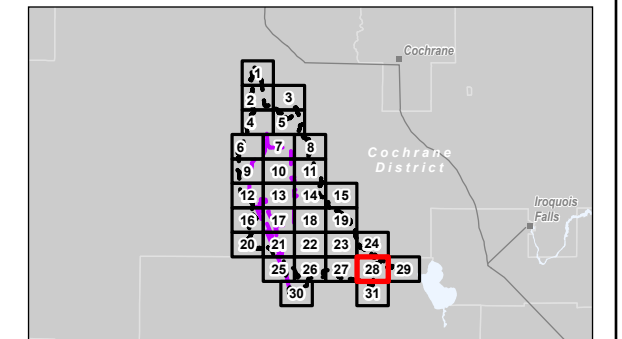


- Legend**
-  Local Study Area
 -  Watercourse (Permanent)
 -  Waterbody
- Ecosite Type**
-  Coniferous Forest/Stand
 -  Deciduous Forest/Stand
 -  Bog
 -  Fen
 -  Meadow Marsh
 -  Swamp
 -  Water
- Riparian Area**
-  Coniferous Forest/Stand
 -  Deciduous Forest/Stand
 -  Bog
 -  Fen
 -  Meadow Marsh
 -  Swamp
 -  Water



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.



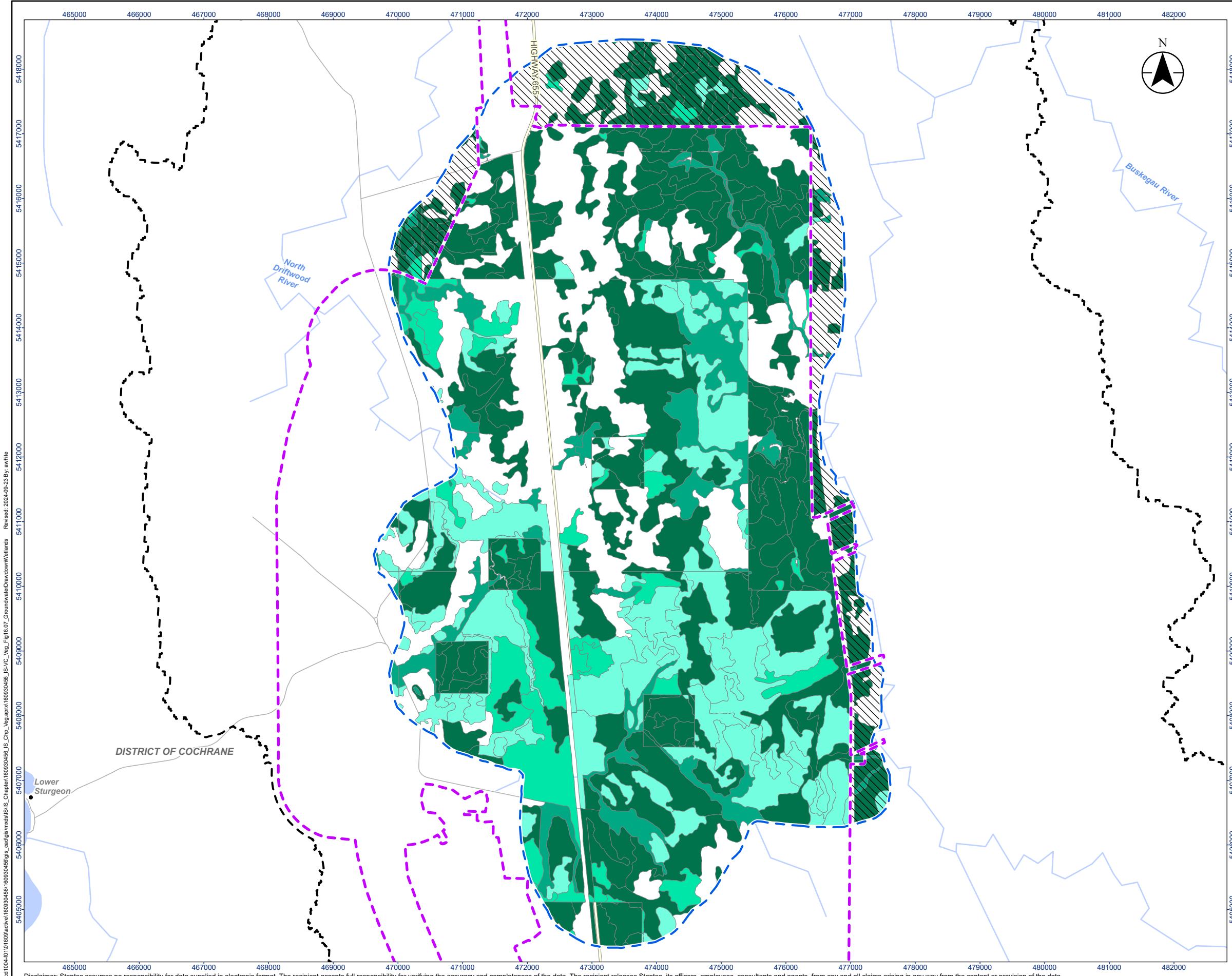
Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by awhite on 2024-09-23

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

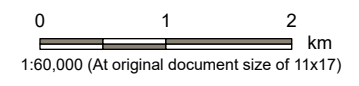
Figure No.: **16.6.28**

Title: **Riparian Habitat in the LSA**

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- Legend**
- Project Area
 - Local Study Area
 - Year 31 1 m Groundwater Drawdown Contour
 - Bog
 - Fen
 - Meadow Marsh
 - Swamp
 - Area of Indirect Impact
 - Base Features**
 - Major Road
 - Minor Road
 - Watercourse
 - Waterbody



- 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.



Project Location: Timmins, Ontario
 160930456 REVA
 Prepared by awhite on 2024-09-23

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

Figure No.
16.7

Title
Wetlands with Potential to be Indirectly Impacted by Groundwater Drawdown

\srt\004\010\160930456\160930456\gis_data\gis_md\160930456\160930456\IS_VC_Veg_Fig16.07_GroundwaterDrawdownWetlands Revised: 2024-09-23 By: awhite