Crawford Nickel Project
Impact Statement

Chapter 34 Follow-up Programs and Adaptive Management

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Canada Nickel Company

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Acronyms and Abbreviations

dbh	diameter-at-breast-height
ECA	Environmental Compliance Approval
FDP	final discharge points
GHG	greenhouse gas
LSA	Local Study Area
MDMER	Metal and Diamond Mining Effluent Regulations
NPRI	National Pollutant Release Inventory
NO_2	nitrogen dioxide
PA	Project Area
PM_{10}	particulate matter smaller than 10 microns
$PM_{2.5}$	particulate matter smaller than 2.5 microns
SAR	species at risk
SPM	suspended particulate matter
TMF	Tailings Management Facility
VC	Valued Component

34 Follow-up Programs and Adaptive Management

Canada Nickel Company (Canada Nickel) is committed to achieving its sustainability principles and objectives (Chapter 33 of the Impact Statement [Extent to Which the Project Contributes to Sustainability]). In meeting this goal, follow-up programs will be prepared and implemented to monitor environmental protection and follow-up requirements for the Crawford Nickel Project ('the Project') and to identify opportunities for corrective actions and/or refinements to identified mitigation measures to further avoid or reduce potential impacts from the Project.

Follow-up programs are proposed to verify the accuracy of the impact assessment and evaluate the effectiveness of mitigation measures. These programs are an effective way to address uncertainty with predicted effects and/or the effectiveness of mitigation measures.

Adaptive management is an important component of any project, and adaptive management plans are a means to iteratively assess, design, implement, monitor, evaluate, and adjust the Project where there is an element of uncertainty and adaptive management is technically feasible.

The purpose of this Chapter is to outline how Canada Nickel will implement, manage, and report on environmental protection measures, specifically through the proposed follow-up programs and management plans. Ultimately, these plans will be developed in consultation with relevant authorities, including government agencies and potentially affected Indigenous nations with an interest and expertise in their implementation, and in accordance with applicable conditions of approval contained in the Decision Statement as well as other authorizations and permit requirements applicable to the Project.

Canada Nickel is responsible for the implementation of the mitigation measures and commitments outlined in the Impact Statement. Accountability and compliance with the follow-up programs will be enforced with contractors and subcontractors through construction contracts and training.

34.1 Scoping of Proposed Follow-up Programs

34.1.1 Objectives

The primary objectives for the development of the proposed follow-up and monitoring programs for the Project includes:

- to verify the accuracy of the environmental, health, cultural, social and economic effects and the impacts on the rights of Indigenous Peoples predicted during the impact assessment
- to evaluate the effectiveness of mitigation measures

The results of the follow-up programs will also be used to identify and implement adaptive management measures, as appropriate, and to determine the effectiveness of those measures at avoiding or reducing impacts.

Further, follow-up programs provide an opportunity to continue engaging with impacted Indigenous nations and other relevant stakeholders to collaboratively implement solutions-oriented approaches to adaptive management.

34.1.2 Approach

Follow-up programs are typically recommended where there is uncertainty in the Project residual or cumulative effects prediction or known effectiveness of mitigation measures, or where there is a particular risk. In cases where there is uncertainty about effects outcomes, adaptive management measures are applied. Adaptive management is a planned process for responding to uncertainty or to an unanticipated or underestimated Project effect. Information learned from monitoring actual Project effects is applied and compared to predicted effects. Where a variance between the actual and predicted effects occurs, a determination is made as to whether modifications or other actions are necessary to revise the existing mitigation measures. In cases where there may be no other mitigating options available, the appropriate information will be shared with the applicable regulatory authorities in a timely manner.

The goal of the follow-up programs is to provide information to guide any necessary measures and controls to reduce the potential for environmental degradation during all Project phases, and to provide defined action plans and emergency response procedures to account for protection of environment, health, social and economic conditions. The follow-up programs demonstrate Canada Nickel's commitment to an appropriate and thorough process of verifying changes to the environment as a result of the Project are as predicted and that adverse effects are managed.

The need for and focus of each follow-up program is based on the results of the Valued Component (VC)-specific assessments presented in Chapters 10 to 23 and 25 to 28 of the Impact Statement. A preliminary description of each environmental, health, social and economic follow-up program is provided, in recognition that each program will be further developed in consultation with relevant authorities and interested parties, including Indigenous nations and government agencies, as appropriate.

When developed, each follow-up program will contain the following information:

- the methodology, location, frequency, timing, and duration of monitoring associated with the follow-up program
- scope, content, and frequency of reporting of the results of the follow-up program
- the frequency at which the follow-up program will be updated
- the levels of environmental change relative to baseline that would require Canada Nickel to implement modified or additional mitigation measure(s) (i.e., threshold levels, triggers)
- the technically and economically feasible mitigation measures to be implemented by Canada Nickel if monitoring conducted as part of the follow-up program shows that the threshold levels of environmental change have been reached or exceeded

Follow-up programs will be developed and implemented in accordance with the conditions of approval anticipated in the Decision Statement to be issued under the *Impact Assessment Act*, 2019 for this Project.

34.1.3 Adaptive Management

Adaptive management is a planned and systematic process and intervention mechanism for continuously improving environmental management practices and adjusting monitoring by learning from outcomes. Adaptive management provides the flexibility to address/accommodate new circumstances, to adjust monitoring, or implement new mitigation measures where required.

Adaptive management is a means to address high uncertainties associated with the effectiveness of mitigation measures or predicted effects and to help achieve expected outcomes. While specific adaptive management measures are not identifiable at this point, an adaptive management strategy has been developed that integrates adaptive management into the follow-up programs, while decisions to adopt specific adaptive management measures will be identified later during the implementation of the follow-up programs as a result of the analysis of data generated during construction, operations and/or decommissioning and closure of the Project.

Adaptive management is an integral part of the impact assessment process, which does not end at the completion of the impact assessment phase. The iterative process that includes assessment, design, implementation, monitoring, evaluation, and adjustment provides a framework to address uncertainty and to rectify or improve mitigation throughout the life of the Project.

Adaptive Management Plans are considered necessary in addition to follow-up programs if it meets each of the following criteria:

- there is high uncertainty around the effectiveness of mitigation measures or predicted effects
- there is a need for, or benefit to, reducing uncertainties through an Adaptive Management Plan
- adaptive management is technically feasible

Based on the information provided in the VC-specific assessments presented in Chapters 10 to 23 and 25 to 28, while adaptive management as a concept has been integrated into the follow-up programs, no Adaptive Management Plans are proposed.

As appropriate, adaptive management will be integrated into the follow-up programs so that the results of the verification of effects and evaluation of mitigation measures leads to improvements in the avoidance, reduction, restoration or offsetting of impacts.

34.1.4 Communication and Reporting

The results of the follow-up programs will be documented and provided to the Impact Assessment Agency of Canada and to the relevant authorities (i.e., government agencies and potentially affected Indigenous nations) involved in the development of each follow-up program, as needed. Information contained in each annual report could include:

- a description (i.e., methods) of the monitoring undertaken during the monitoring period to verify the accuracy of the predicted environmental, health, cultural, social and economic effects and to determine the effectiveness of any mitigation measures
- a description of any analysis conducted during the monitoring period to verify the accuracy of the predicted environmental, health, cultural, social and economic effects and to determine the effectiveness of any mitigation measures
- a determination of whether modified or additional mitigation measure(s) were required based on the monitoring and analysis undertaken and, where implemented, a description of any modified or additional mitigation measures required, applicable timing, and the conditions necessitating their implementation

To disseminate the results of the follow-up programs, a summary of the results of each follow-up program will be included in the Annual Report that will be posted to the Project's website.

Any comments received from government agencies and potentially affected Indigenous nations will be reviewed and considered to inform future implementation of the follow-up programs and the identification of adaptive management measures.

34.1.5 The Influence of Consultation and Engagement

Canada Nickel has engaged with potentially affected Indigenous nations, regulators, the public, and other stakeholders. Table 34.1, provides a summary of the key topics, key information including Indigenous knowledge, and concerns that Canada Nickel identified as part of their engagement efforts that relate to follow-up programs, as well as a summary of the influence that the outcomes of this engagement had on the assessment.

Table 34.1 Engagement Considerations Related to Follow-Up Monitoring and Management Plans

Topic	Key Information, Indigenous Knowledge, and Concerns	Influence on the Assessment	Where Information is Addressed in the Impact Statement
Soil Quality	• Flying Post First Nation, Matachewan First Nation and Mattagami First Nation, Matachewan First Nation and Flying Post First Nation expressed concern regarding the potential for stockpiled materials to leach toxins into the environment and requested participation in follow-up and monitoring programs related to soil quality • Taykwa Tagamou Nation requested that Canada Nickel demonstrate contingency plans to ensure Stockpile or tailings runoff can be managed in a manner that allows for runoff waste to be safely discharged to the environment following Project closure and requested participation in follow-up and monitoring programs related to soil quality • Apitipi Anicinapek Nation and the Métis Nation of Ontario - Region 3 requested participation in follow-up and monitoring activities for biophysical components, including soil quality	• The proposed plan to manage the potential for metal leaching and acid rock drainage is provided in Appendix L of the Impact Statement (Conceptual Metal Leaching and Acid Rock Drainage Management Plan) • The Conceptual Closure Plan (Appendix F of the Impact Statement) provides continency measures related to effluent water quality during decommission and closure. The water quality from the Impoundment Facility and Tailings Management Facility (TMF), and pit lake have been predicted using a site wide water balance and water quality model (Appendices I and K of the Impact Statement, respectively). The modelling approach incorporates conservative assumptions to support the assessment of potential effects for the Impact Statement. As the Project progresses modeling will be updated and contingency measures for decommissioning and closure (potentially including passive treatment systems such as wetland treatment) will be identified based on those updates. • A Site-Wide Water Management Plan (Appendix J of the Impact Statement) was developed for the Project which outlines water management, including contact water, for all Project phases • Canada Nickel will engage with Indigenous nations in the design and implementation of the follow-up programs, and evaluation of follow-up results and subsequent updates to the program • Canada Nickel will further engage potentially affected Indigenous nations for participation in various monitoring programs on a go-forward basis, where appropriate	• Appendix F of the Impact Statement, Conceptual Closure Plan • Appendix I of the Impact Statement, Crawford Site-Wide Water Balance Summary Report • Appendix J of the Impact Statement, Site-Wide Water Management Plan • Appendix K of the Impact Statement, Water Quality Assessment • Appendix L of the Impact Statement, Conceptual Metal Leaching and Acid Rock Drainage Management Plan • Chapter 10, Section 10.10 of the Impact Statement • Chapters 7, 25 to 28 of the Impact Statement

Topic	Key Information, Indigenous Knowledge, and Concerns	Influence on the Assessment	Where Information is Addressed in the Impact Statement
Emissions, Dust and Human Health	• Members of the public and other stakeholders expressed concern regarding proposed mitigation measures to manage changes to air quality, including best management practices and monitoring plans • Flying Post First Nation, Matachewan First Nation and Mattagami First Nation recommend involvement in dust management plans and consultation on dust suppressants to be used on the Project, including participating in follow-up and monitoring • Apitipi Anicinapek Nation and the Métis Nation of Ontario - Region 3 requested participation in follow-up and monitoring activities for biophysical components, including greenhouse gas (GHG) emissions and health conditions	• A preliminary follow-up program is proposed to monitor changes in air quality, including dust, from the Project. Monitoring activities, thresholds, and considerations for adaptive management, are included and will be refined in consultation with various parties. • An Air Quality Management Plan will be developed for Project construction and operations. The Air Quality Management Plan will specify the mitigation measures for the management and reduction of air emissions during Project construction and operations. • Canada Nickel will engage with Indigenous nations in the design and implementation of the follow-up programs, and evaluation of follow-up results and subsequent updates to the program • Canada Nickel will further engage potentially affected Indigenous nations for participation in various monitoring programs on a go-forward basis, where appropriate	• Chapter 12 of the impact Statement, Section 12.8 and 12.9 • Chapter 34 of the impact Statement, Section 34.2.3 • Chapters 7, 25 to 28 of the Impact Statement
Noise and Vibration	• Members of the public and other stakeholders expressed concern regarding methods to monitor noise emissions, and thresholds beyond which additional measures would be implemented to manage noise • Flying Post First Nation, Mattagami First Nation, Matachewan First Nation, Apitipi Anicinapek Nation, Taykwa Tagamou Nation and the Métis Nation of Ontario - Region 3 recommend vibration and noise emission mitigation and monitoring measures throughout all phases of the Project, including participation in follow-up and monitoring activities for acoustic changes and methods to address noise complaints	• Canada Nickel will have a complaint resolution process that will also address any potential Project noise and vibration complaints • A preliminary follow-up program is proposed to monitor changes in noise from the Project. Monitoring activities, thresholds, and considerations for adaptive management, are included and will be refined in consultation with various parties. • Canada Nickel will engage with Indigenous nations in the design and implementation of the follow-up programs, and evaluation of follow-up results and subsequent updates to the program • Canada Nickel will further engage potentially affected Indigenous nations for participation in various monitoring programs on a go-forward basis, where appropriate	• Chapters 25 to 28 of the impact Statement • Chapter 34 of the impact Statement, Section 34.2.4

Topic	Key Information, Indigenous Knowledge, and Concerns	Influence on the Assessment	Where Information is Addressed in the Impact Statement
Groundwater and Surface Water Quality	• Flying Post First Nation, Matachewan First Nation and Mattagami First Nation recommend opportunities to provide input on the water management plans including matters related to dewatering, storm runoff, surface water, groundwater quality monitoring, emergency warning infrastructure, site-specific closure plans, water recycling, decommissioning of groundwater wells, groundwater treatment ponds and levels, and other water management infrastructure on site • Apitipi Anicinapek Nation and the Métis Nation of Ontario - Region 3 requested participation in follow-up and monitoring activities for biophysical components, including ground water quality and quantity	• A preliminary follow-up program is proposed to monitor changes in groundwater quality from the Project. Monitoring activities, thresholds, and considerations for adaptive management, are included and will be refined in consultation with various parties. • Opportunities for the involvement of potentially affected Indigenous nations in the follow-up program design and implementation will be considered under the context of Impact Benefit Agreement(s) or Mutual Support Agreement(s) with specific First Nations (refer to Section 2.1.5, Chapter 2 of the Impact Statement). • Canada Nickel will engage with Indigenous nations in the design and implementation of the follow-up programs, and evaluation of follow-up results and subsequent updates to the program • Canada Nickel will further engage potentially affected Indigenous nations for participation in various monitoring programs on a go-forward basis, where appropriate	• Chapter 2 of the Impact Statement • Chapter 34 of the Impact Statement, Sections 34.2, 34.25 and 34.2.5 • Chapters 7, 25 to 28 of the Impact Statement
Surface Water Quality Monitoring	• Matachewan First Nation, Mattagami First Nation, and Flying Post First Nation expressed concern regarding the Water Management Plan, including how water recycling will be used and requested involvement in follow-up and monitoring activities related to the plan • Apitipi Anicinapek Nation and the Métis Nation of Ontario - Region 3 requested participation in follow-up and monitoring activities for biophysical components, including surface water quality and quantity • Apitipi Anicinapek Nation recommended monitoring of surface water flow impacts to the Abitibi River • Taykwa Tagamou Nation recommended ongoing monitoring of mercury and methyl	• A Site-Wide Water Management Plan (Appendix J of the Impact Statement) was developed for the Project which outlines water management for all Project phases • A preliminary monitoring plan to monitor surface water quantity and quality has been developed to verify and confirm the predicted effects identified and meet regulatory requirements related to surface water. The plan includes monitoring for mercury and methylmercury. • Canada Nickel will engage with Indigenous nations in the design and implementation of the follow-up programs, and evaluation of follow-up results and subsequent updates to the program • Canada Nickel will further engage potentially affected Indigenous nations for participation in various monitoring programs on a go-forward basis, where appropriate	• Appendix J of the Impact Statement, Site-Wide Water Management Plan • Chapter 34 of the Impact Statement, Section 34.2.6 • Chapters 7, 25 to 28 of the Impact Statement

Topic	Key Information, Indigenous Knowledge, and Concerns	Influence on the Assessment	Where Information is Addressed in the Impact Statement
	mercury be conducted in the downstream environment of any or all water sources, for the duration of the Project life		
Plant species at risk (SAR), rare vegetation communities and species of conservation concern	• Apitipi Anicinapek Nation and the Métis Nation of Ontario - Region 3 requested participation in follow-up and monitoring activities for biophysical components, including SAR • Takwa Tagamou Nation, Flying Post First Nation, Matachewan First Nation, and Mattagami First Nation requested opportunities to participate in mitigation plans and monitoring for SAR	• A preliminary monitoring plan to monitor black ash stands, invasive plant species, riparian communities, and wetland communities has been developed to verify and confirm the predicted effects identified in the Impact Statement and to meet regulatory requirements related to specific permits or conditions of approval	• Chapter 34 of the Impact Statement, Section 34.2.7 • Chapters 7, 25 to 28 of the Impact Statement
Effects of pollution, pesticides and fugitive dust on vegetation, including food and medicinal plants	• 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 • 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 • Apitipi Anicinapek Nation and the Métis Nation of Ontario - Region 3 requested participation in follow-up and monitoring activities for biophysical components, including vegetation	• Mitigation for dust was considered and described in Chapter 12 of the Impact Statement • A follow-up program for the atmospheric environment is provided in Chapter 34 of the Impact Statement, Section 34.2.3 • A communications and reporting protocol for follow-up programs is provided in Chapter 34 of the Impact Statement, Section 34.1.4. • Canada Nickel will engage with Indigenous nations in the design and implementation of the follow-up programs, and evaluation of follow-up results and subsequent updates to the program • Canada Nickel will further engage potentially affected Indigenous nations for participation in various monitoring programs on a go-forward basis, where appropriate	• Chapter 12 of the Impact Statement • Chapter 34 of the Impact Statement, Sections 34.1.4 and 34.2.3 • Chapters 7, 25 to 28 of the Impact Statement

Topic	Key Information, Indigenous Knowledge, and Concerns	Influence on the Assessment	Where Information is Addressed in the Impact Statement
Effects to Fish and Fish Habitat	• Taykwa Tagamou Nation recommended monitoring of fish tissue through the duration of the Project life cycle, to monitor for potential contaminants that could pose a risk to the environment or Taykwa Tagamou members who consume fish that interact with the downstream environment. • Apitipi Anicinapek Nation and the Métis Nation of Ontario - Region 3 requested participation in follow-up and monitoring activities for biophysical components, including fish • Flying Post First Nation, Mattagami First Nation, and Matachewan First Nation recommended monitoring programs for fish and fish habitats and requested opportunities to participate in monitoring activities, fisheries offsetting plans, and any fish relocation programs proposed for the Project	• A follow-up program for fish, including changes in fish health, growth and survival in downstream environments, is provided in Chapter 34 of the Impact Statement, Section 34.2.8 • Canada Nickel will engage with Indigenous nations in the design and implementation of the follow-up programs, and evaluation of follow-up results and subsequent updates to the program • Canada Nickel will further engage potentially affected Indigenous nations for participation in various monitoring programs on a go-forward basis, where appropriate	• Chapter 34, Section 34.2.8 • Chapters 7, 25 to 28 of the Impact Statement
Effects to wildlife and wildlife habitat	• Taykwa Tagamou Nation recommended monitoring of wildlife tissue through the duration of the Project life cycle, to monitor for potential contaminants that could pose a risk to the environment or Taykwa Tagamou members who consume wildlife that interact with the downstream environment. • Apitipi Anicinapek Nation and the Métis Nation of Ontario - Region 3 requested participation in follow-up and monitoring activities for biophysical components, including wildlife • Flying Post First Nation, Mattagami First Nation, and Matachewan First Nation recommended monitoring programs for wildlife, including Nation-led moose studies	• A follow-up program for wildlife is provided in Chapter 34 of the Impact Statement, Section 34.2.10 • Canada Nickel will engage with Indigenous nations in the design and implementation of the follow-up programs, and evaluation of follow-up results and subsequent updates to the program • Canada Nickel will further engage potentially affected Indigenous nations for participation in various monitoring programs on a go-forward basis, where appropriate	• Chapter 34, Section 34.2.10 • Chapters 7, 25 to 28 of the Impact Statement

Topic	Key Information, Indigenous Knowledge, and Concerns	Influence on the Assessment	Where Information is Addressed in the Impact Statement
Engagement with and Effects on Indigenous nations	• Taykwa Tagamou Nation requested the establishment of an environmental monitoring committee with Nation member involvement (e.g., to review on-site sampling and activities, monitor environmental issues, compliance throughout the lifetime of the Project) • Mattagami First Nation, Flying Post First Nation, Matachewan First Nation, requested consideration of the need for Indigenous monitors, long-term environmental monitoring, and enforcements mechanisms to mitigate risk of Project impacts • Apitipi Anicinapek Nation, Mattagami First Nation, Flying Post First Nation, Matachewan First Nation, Taykwa Tagamou Nation, and the Métis Nation of Ontario - Region 3 requested that Canada Nickel be accountable to commitments made to complete Project remediation • Apitipi Anicinapek Nation, Mattagami First Nation, Flying Post First Nation, Matachewan First Nation, Taykway Tagamou Nation, and the Métis Nation of Ontario - Region 3 requested funding for their communities to support their participation in the post-approval phases of the impact assessment process	• Informed the engagement plans and/or development of agreements with the Indigenous nations • Canada Nickel has provided, and will continue to provide, Project information to Indigenous nations, as applicable • Canada Nickel has established agreements with the Indigenous nations to support their participation in the impact assessment process and Canada Nickel is currently negotiating forward-looking agreements with the Indigenous nations, which will include measures for nation involvement in follow-up and monitoring, as applicable. • Canada Nickel will continue to engage Indigenous nations to understand and mitigate the Project's impacts on their Indigenous interests, explore opportunities to enhance Project benefit. Through this ongoing collaboration, Canada Nickel aims to foster a positive long-term relationship with the Indigenous Nations throughout the life of the Project. • Canada Nickel will engage with Indigenous nations in the design and implementation of the follow-up programs, and evaluation of follow-up results and subsequent updates to the program • Canada Nickel will further engage potentially affected Indigenous nations for participation in various monitoring programs on a go-forward basis, where appropriate	• Chapter 34 of the Impact Statement, Section 34.2.15 • Chapters 7, 25 to 28 of the Impact Statement • Appendix F of the Impact Statement, Conceptual Closure Plan

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, including the development of Follow-up Programs and Adaptive Management Planning, as applicable. Refer to the Description of Engagement with Indigenous Peoples (Chapter 7 of the Impact Statement) for methods regarding the incorporation of Indigenous knowledge to the Impact Statement.

34.2 Proposed Follow-up Programs

Canada Nickel will implement follow-up 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. Preliminary environmental, health, social and economic follow-up programs are presented below, based on the results of the VC-specific assessments presented in Chapters 10 to 23 and 25 to 28 of the Impact Statement.

Follow-up programs are recommended for the following VCs:

- Geology and Geohazards
- Soil
- Atmospheric Environment - Air Quality
- Acoustic Environment
- Groundwater
- Surface Water
- Vegetation, Riparian and Wetland Environments
- Fish and Fish Habitat
- Birds and Bird Habitat
- Wildlife and Wildlife Habitat

Targeted follow-up programs are not anticipated to be required for Light, Climate Change, Health, Social Conditions, Economic Conditions, and Indigenous Interests; rationale is provided in the relevant subsections below.

A preliminary description of each program is provided that includes the following information regarding the design and implementation of each follow-up program:

- identification of VCs that warrant a follow-up program and rationale
- preliminary description of follow-up studies planned, as well as their main characteristics
- anticipated duration of the follow-up programs
- expected outcomes and targets of the follow-up programs that will be further discussed during formal program planning with relevant authorities and potentially affected Indigenous nations
- regulatory requirements for monitoring

- the methodology and mechanisms for monitoring the effectiveness of mitigation and reclamation
- indicators to be used to assess the purpose of the follow-up program
- monitoring activities that could pose a risk to environmental, health, social and economic conditions

A summary of the follow-up programs for applicable VCs is provided in Table 34.2 with details of each preliminary follow-up programs outlined in Sections 34.2.1 through to 34.2.15.

In addition to the above content, the final follow-up programs, where applicable, will describe:

- sampling procedures, quality control and assurance programs, laboratory methods and protocols, and reporting requirements
- a tracking mechanism for issues related to environmental issues
- triggers and intervention mechanism used in the event that the effects to the environment or impacts on rights of Indigenous peoples and cultures attributed to the Project are not as predicted
- a protocol to explain if the differences in predicted effects versus actual measured effects are attributed to either uncertainty related to predictions or to effectiveness of the mitigation measures

Canada Nickel will engage with relevant regulatory authorities and Indigenous nations in the design and implementation of the follow-up programs, and evaluation of follow-up results and subsequent updates to the program. Canada Nickel will further engage potentially affected Indigenous nations for participation in various monitoring programs on a go-forward basis, where appropriate. Opportunities for the involvement of potentially affected Indigenous nations in the follow-up program design and implementation will be considered under the context of Impact Benefit Agreement(s) or Mutual Support Agreement(s) with potentially affected First Nations (refer to Section 2.1.5, Chapter 2 of the Impact Statement).

Proposed mechanisms for the dissemination of follow-up program results, including consideration for the sharing of data with the general population, are presented in Section 34.1.4.

Table 34.2 Summary of Proposed Follow-up Programs

VC Follow-up Program	Follow-up Program Component	Description	Timing / Duration	Expected Outcomes / Targets	How the Expected Outcome will be Achieved	Regulatory Instrument Requiring Monitoring (If Applicable)	Effectiveness of Mitigation and Reclamation Monitoring	Indicators	Risks as a Result of Monitoring Programs
Geology and Geohazards - TMF Dam Stability FUP	TMF Dam Stability	• Monitor the stability of the TMF dams in accordance with the Global Industry Standard on Tailings Management and Canadian Dam Association guidelines	• Annual inspections • Reviews every five years	• Monitoring dam stability throughout the life of the mine	• Ongoing inspections and reviews	• Canadian Dam Association guidelines • Global Industry Standard on Tailings Management • *Mining Act*	• Results of the monitoring program align with the Canadian Dam Association guidelines and the *Mining Act*	• Pore water pressure • Slove movement • Temperature profile • Visual inspections for signs of sloughing, piping, erosion, sliding, water control structures (e.g., ditches, spillways), beaver and rodent activity, vegetative cover, review of instrumentation, and review of the Operations, Maintenance and Surveillance manual	• None identified
Soil – Soil Depth and Quality FUP	Soil Depth and Soil Quality	• As part of the Mine Development Closure Plan, monitor soil depth replacement adequacy to support vegetation and soil quality parameters	• Five to ten years after soil replacement	• Soil is of a sufficient depth and quality to support rehabilitation measures	• Ongoing inspections during decommissioning and closure	• Ontario Regulation 35/24	• Revegetation of the Project Area (PA) in accordance with the end land use goals to be established through the Mine Development Closure Plan	• Depth of soil replacement • pH • Soil Organic Carbon • Calcium Carbonate Equivalent	• None identified
Atmospheric Environment – Air Quality FUP	Air Quality	• Ambient monitoring for suspended particulate matter (SPM), particulate matter smaller than 10 microns (PM_{10}), particulate matter smaller than 2.5 microns ($PM_{2.5}$), metals in SPM, dustfall, and nitrogen dioxide (NO_2) • Meteorological parameters	• Implemented prior to the start of physical construction on the site and continue to the end of operations, as per the MECP Operations Manual for Air Quality Monitoring in Ontario	• Monitoring CoPCs to determine predicted residual effects as it relates to exceedances of predicted criteria	• Establishment of monitoring stations	• *Environmental Protection Act*	• Comparison of monitoring results to predicted residual effects and applicable regulatory criteria	• Federal and provincial air quality standards and objectives • Environmental Compliance Approval (ECA) requirements	• None identified
Acoustic Environment – Acoustic FUP	Noise	• Monitoring at representative location(s) around the Open Pit, processing plant, TMF, stockpiles, and the rail corridor	• Construction, operations, decommissioning and closure	• Monitoring noise levels to determine predicted residual effects as it relates to exceedances of predicted criteria	• Establishment of monitoring stations	• *Environmental Protection Act*	• Comparison of monitoring station results to predicted residual effects and applicable regulatory criteria	• Applicable limits and Project-specific regulatory approvals (i.e., ECA for Noise/Vibration)	• None identified
	Vibration	• Monitoring at representative location(s) around the Open Pit, processing plant, TMF, stockpiles, and the rail corridor	• Construction, operations, decommissioning and closure	• Monitoring vibration levels to determine predicted residual effects as it relates to exceedances of predicted criteria	• Establishment of monitoring stations	• *Environmental Protection Act*	• Comparison of monitoring station results to predicted residual effects and applicable regulatory criteria	• Applicable limits and Project-specific regulatory approvals (i.e., ECA for Noise/Vibration)	• None identified

VC Follow-up Program	Follow-up Program Component	Description	Timing / Duration	Expected Outcomes / Targets	How the Expected Outcome will be Achieved	Regulatory Instrument Requiring Monitoring (If Applicable)	Effectiveness of Mitigation and Reclamation Monitoring	Indicators	Risks as a Result of Monitoring Programs
Groundwater – Groundwater FUP	Groundwater Quantity and Quality	• Monitor groundwater levels and groundwater quality at key Project locations	• Construction, operations, decommissioning and closure • Quantity and quality data to be collected in spring, summer and fall, as possible	• Monitoring groundwater levels • Monitoring concentrations of parameters in groundwater as it relates to exceedances of predicted criteria	• Establishment of monitoring stations	• *Environmental Protection Act* • *Ontario Water Resources Act*	• Comparison of monitoring station results to predicted residual effects and applicable regulatory criteria	• Regulatory standards set out in Guidelines for Canadian Drinking Water Quality, Ontario Drinking Water Quality Standards, Provincial Water Quality Objectives • Project-specific regulatory approvals (i.e., Permit to Take Water, Environmental Compliance Approval for Industrial Sewage)	• None identified
Surface Water – Surface Water FUP	Surface Water Quantity and Quality	• Monitor surface water watercourse flows and/or waterbody levels and surface water quality at key Project locations	• Construction, operations, decommissioning and closure • Quantity – sub-daily, daily or monthly water level and flow monitoring depending on monitoring approach • Quality – daily, weekly, monthly, bi-annually or quarterly, depending on the parameter	• Monitoring surface water quantity (levels, flows) to determine exceedance / decreases beyond the 10% threshold • Monitoring surface water quality as it relates to exceedances of predicted and regulatory criteria	• Establishment of monitoring stations	• *Environmental Protection Act* • *Ontario Water Resources Act* • *Fisheries Act* • *Mining Act* • Metal and Diamond Mining Effluent Regulations (MDMER)	• Comparison of monitoring station results to predicted residual effects and applicable regulatory criteria	• Project-specific regulatory approvals (i.e., Environmental Compliance Approval for Industrial Sewage, *Fisheries Act* Authorization)	• None identified

VC Follow-up Program	Follow-up Program Component	Description	Timing / Duration	Expected Outcomes / Targets	How the Expected Outcome will be Achieved	Regulatory Instrument Requiring Monitoring (If Applicable)	Effectiveness of Mitigation and Reclamation Monitoring	Indicators	Risks as a Result of Monitoring Programs
Vegetation, Riparian and Wetland Environments – Vegetation FUP	Vegetation	• Black ash monitoring for indirect effects • Plants of importance to Indigenous nations for food, medicinal or other purposes • Invasive species for presence / absence	• Black ash to be monitored annually in July for 5 years following the end of construction activities in the first period of the operations phase • Plants of importance to Indigenous nations to be monitored for five years (during years 1, 3 and 5) following the end of construction activities in the first period of the operations phase • Monitoring for invasive species will occur during construction, operations, decommissioning and closure	• Monitoring black ash health for declines in health of trees • Monitoring plants of importance to Indigenous for declines in health or decrease in abundance • Monitoring invasive species to identify increases in abundance	• Visual surveys	• *Invasive Species Act* • *Weed Control Act*	• Comparison of monitoring results to predicted residual effects • No change in health of black ash • Limited reductions in health or loss of plants of importance to Indigenous nations as a result of edge effects Limited increase in number / abundance of invasive species	• Black ash indicators as identified in the Ecological Monitoring and Assessment Network Tree Health methods (Ecological Monitoring and Assessment Network 2007). • Presence and health of plants of importance to Indigenous nations • Presence and abundance invasive species	• None identified
	Riparian	• Wetland function changes due to water table drawdown	• Semi-annually between July and August and continuing for five years following the end of construction activities in the first period of the operations phase	• Monitoring riparian environments to identify changes in plant species composition and vegetation / plant health	• Visual surveys	• Not applicable	• Comparison of monitoring results to predicted residual effects • Limited changes to riparian environments in the Local Study Area (LSA) within 120 m of the PA	• Ecosite classifications • Plant species composition • Plant species of importance to Indigenous nations • Coefficient of conservatism • Floristic quality index • Vegetation health	• None identified
	Wetlands	• Monitor for changes in wetland function due to water table drawdown	• Semi-annually between July and August at a similar time of year each year and continue for ten years following the end of construction activities in the first period of the operations phase.	• Monitoring wetland environments to identify changes in plant species composition and moisture associated with water table drawdown	• Visual surveys	• Not applicable	• Limited changes to wetland environments in the LSA within 120 m of the PA, in comparison to baseline	• Changes in plant species composition • Plant species of importance to Indigenous nations • Coefficient of conservatism floristic quality index • Wetness index • Changes in moisture • Indications of wetland drying • Changes in wetland classification	• None identified

VC Follow-up Program	Follow-up Program Component	Description	Timing / Duration	Expected Outcomes / Targets	How the Expected Outcome will be Achieved	Regulatory Instrument Requiring Monitoring (If Applicable)	Effectiveness of Mitigation and Reclamation Monitoring	Indicators	Risks as a Result of Monitoring Programs
Fish and Fish Habitat – Fish and Fish Habitat FUP	Fish Habitat	• Apply a “before-after-impact-control” study approach for physical habitat metrics important to fish	• To be confirmed prior to construction of the Project	• Monitoring fish habitat to assess fish use of existing and created habitat • Monitoring of benthic invertebrate community to assess changes in abundance in existing and created habitat	• Establishment of monitoring stations • Visual surveys • Fish community sampling • Benthic invertebrate sampling	• *Fisheries Act* • MDMER	• Continued fish use of existing habitats • Fish use of constructed offsetting habitat • Benthic invertebrate abundance and composition within existing range	• Fish utilization of constructed offsetting habitat • Physical habitat conditions (substrate, water depth and flow, vegetation establishment) at locations where offsetting habitat has been constructed • Benthic invertebrate metrics	• None identified
	Fish Health, Growth or Survival	• Apply a “before-after-impact-control” study approach for biological parameters	• To be confirmed prior to construction of the Project	• Monitoring to align with the requirements of MDMER • Monitoring fish tissues samples in comparison to the provincial and federal guidelines for mercury and methylmercury for the protection of human health and wildlife consumers of aquatic biota	• Establishment of monitoring stations • Fish tissue sampling	• *Fisheries Act* • MDMER	• Fish tissue samples align with baseline conditions • Water quality and sediment quality align with applicable criteria and standards • Abundance, diversity, and composition of benthic invertebrates communities aligns with baseline conditions	• Effluent and water quality • Sediment quality • Benthic invertebrate communities • Fish tissue sampling • Population studies • Federal Environmental Quality Guidelines • Canadian Tissue Residue Guideline for the Protection of Wildlife Consumers of Aquatic Biota • Guide to Eating Ontario Fish • Health Canada’s Maximum Levels for Chemical Contaminants in Foods	• Fish tissue sampling will necessitate the extermination of a representative sample of fish from large and small bodied fish species
Birds and Bird Habitat - Birds and Bird Habitat FUP	Breeding Bird Surveys	• Conducted at varying distances from the mine infrastructure using survey locations from baseline studies	• Construction, operations, decommissioning and closure • Interval to be confirmed through discussions with relevant regulatory authorities	• Breeding bird surveys to monitor relative abundance and diversity of the bird community	• Autonomous recording units	• Not applicable	• Breeding birds identified align with baseline composition	• Presence / absence of bird species • Diversity of bird community • Relative abundance	• None identified

VC Follow-up Program	Follow-up Program Component	Description	Timing / Duration	Expected Outcomes / Targets	How the Expected Outcome will be Achieved	Regulatory Instrument Requiring Monitoring (If Applicable)	Effectiveness of Mitigation and Reclamation Monitoring	Indicators	Risks as a Result of Monitoring Programs
Wildlife and Wildlife Habitat - Wildlife and Wildlife Habitat FUP	Abundance and Distribution of Moose	• Surveys to assess relative abundance and distribution of moose within the LSA	• Prior to construction and extending throughout construction and year one, year five, and every ten years during operations	• Monitoring moose abundance and distribution	• Visual encounter surveys	• Not applicable • Survey requested by Indigenous nations	• Limited changes to moose abundance and distribution within the LSA, in comparison to baseline	• Number and spatial locations of surveyed moose	• None identified
	Overall Benefit Permit Monitoring	• Presence / absence of SAR (Blanding's turtle, boreal caribou and bats) in the LSA • Details to be confirmed through the Overall Benefit Permit	• To be confirmed through the Overall Benefit Permit	• To be confirmed through the Overall Benefit Permit	• To be confirmed through the Overall Benefit Permit	• *Endangered Species Act*	• To be confirmed through the Overall Benefit Permit	• To be confirmed through the Overall Benefit Permit	• None identified

34.2.1 Geology and Geologic Hazards

Potential residual effects to terrain stability were identified as a consequence of activities resulting in substantial alteration of baseline slope gradients and material characteristics.

Canada Nickel will develop a follow-up and monitoring program to monitor the stability of the TMF dams. Monitoring data will be used to verify stability of the dams and to meet the Global Industry Standard on Tailings Management and Canadian Dam Association guidelines. An Operations, Maintenance and Surveillance manual will be developed, and followed, in accordance with the recommendations of the Mining Association of Canada Guide to the Management of Tailings Facilities (Mining Association of Canada 2011). Dam safety inspections and reviews will be carried out for the TMF in accordance with the Canadian Dam Association guidelines (Canadian Dam Association 2013) and the Ontario *Mining Act*. It is expected that dam safety inspections will be required annually, and reviews will be required every five years; however, the required frequencies will ultimately be based on the Hazard Classification of each dam.

The monitoring plan will be defined further during detailed design and as permits and approvals are obtained, but could include the following measures:

- The installation of a network of vibrating wire piezometers to monitor pore water pressure with the glaciolacustrine clay material that will be used for dam core construction. These instruments would be helpful in assessing the dam raise schedule and in verifying the stability models.
- The installation of slope inclinometers or other suitable instrumentation through the dam upstream shell, downstream shell, and the foundation soils. The purpose of the slope inclinometers is to monitor for slope movement (displacement and velocity) which may provide advance warning of slope instability.
- The installation of a thermistor on the dam crest to log the temperature profile through the frost protection layer. The purpose of the thermistor is to monitor for the depth of frost penetration and verify that the dam core is not exposed to freeze-thaw cycles.
- The use of a remote data monitoring system with alert functionality where thresholds are exceeded.
- Dam safety inspections including visual inspection of the tailings embankments for signs of sloughing, piping, erosion, sliding, water control structures (e.g., ditches, spillways), beaver and rodent activity, vegetative cover, review of instrumentation, and review of the Operations, Maintenance and Surveillance manual.
- Dam safety reviews consisting of a review of the current legislation related to the dam, a risk assessment, failure assessment, hazard classification, hydrotechnical, geotechnical, and operational assessment of the facility.

The results of the follow-up monitoring will be used to identify and implement adaptive management measures, as appropriate for the Project.

There are no risks to the environment associated with geology and geologic hazards follow-up monitoring.

34.2.2 Soil

There is a predicted adverse change in soil quality and soil quantity due to soil erosion, soil compaction, soil mixing, soil contamination and changes in soil cover depths. Soil management will be addressed through the Soil Management and Rehabilitation Plan, Construction Environmental Protection Plan, Spill Prevention and Contingency Plan, Erosion and Sediment Control Plan, and Mine Development Closure Plan. As part of the Mine Development Closure Plan to be developed under Ontario Regulation 35/24, the following monitoring will be undertaken:

- Soil depth replacement on the reclaimed landscape will be monitored to determine if the soils are able to support the desired vegetative cover/end land use. Monitoring will continue for five to 10 years after soil replacement
- Evaluation of the expected vegetative cover successional growth on the reclaimed landscape based on the difference (if any) in soil quality parameters (e.g., pH, Soil Organic Carbon or Calcium Carbonate Equivalent) between replaced cover soil/overburden and native undisturbed soils

Further, while compliance monitoring will be conducted during construction activities in accordance with the Erosion and Sediment Control Plan, no separate follow-up program is proposed for soils.

34.2.3 Atmospheric Environment

The atmospheric environment VC consists of ambient air quality and ambient light. The proposed follow-up program plans for ambient air quality are outlined below. With proper design and mitigation of lighting sources, follow-up and monitoring is not anticipated to be required for ambient light.

Based on the maximum outside the MMB CoPC concentrations predicted in the air quality assessment, potential contaminants for ambient monitoring were identified. Ambient monitoring for SPM, PM_{10}, $PM_{2.5}$, metals in SPM, dustfall, and NO_2 will be conducted during the construction and operations phases of the Project. Monitoring of meteorological parameters (wind speed/direction, temperature, relative humidity, barometric pressure and precipitation) will also be conducted (at one location).

Ambient monitoring for SPM, PM_{10}, $PM_{2.5}$, metals in SPM and dustfall will be conducted at two locations (predominantly upwind and downwind). Those locations will be determined in consultation with the Ministry of the Environment, Conservation and Parks (MECP) and will consider engagement input from potentially affected Indigenous nations and other parties. Ambient concentrations of NO_2 will also be monitored at the predominantly downwind station. The siting of these stations will take into account the following:

- the locations of sensitive receptors (locations where human activity more regularly takes place)
  - The area around the Project is sparsely populated; nevertheless, Canada Nickel will provide a buffer around the PA similar to those at other mines and industrial areas. People (on snowmobile trails, rivers, other trails), may still pass through this area (but outside the PA), but their time within this area would be limited and no overnight stays would be possible

- availability of power and year-round access to the stations
- MECP siting criteria for ambient air quality monitoring stations
- the winds at the site blow predominantly from the southerly, northwesterly, and southwesterly directions
- the ambient air quality monitor(s) should be situated to capture impacts of the Project and therefore should be located at a distance from the PA in the range of hundreds of metres to 4 km
- the dispersion modelling predicted that higher concentrations would occur near the Project. The dispersion model predictions for each parameter to be measured will be used to aid in determining the monitoring station locations

Additional dustfall monitoring stations may be considered to supplement the primary monitoring locations.

The measurement program at selected monitoring sites may include continuous monitors for PM_{10}, NO_2 and meteorology and non-continuous monitors for SPM, metals in SPM, $PM_{2.5}$, and dustfall. Monitoring will be conducted per the methods and analysis recommended by the MECP Operations Manual for Air Quality Monitoring in Ontario (Ministry of the Environment, Conservation and Parks 2018). Non-continuously monitored parameters will be measured at the frequencies specified in the MECP Operations Manual for Air Quality Monitoring in Ontario.

The ambient monitoring program will be implemented prior to the start of physical construction on the site and continue to the end of operations. Canada Nickel may request modifications to the ambient air monitoring program from the MECP if the monitoring data provides sufficient justification to change or discontinue monitoring.

The off-property air quality monitoring data will be compared to applicable legislative, regulatory, permit and other relevant obligations, including the following:

- federal and provincial air quality standards and objectives
- ECA requirements

The trigger for adaptive management will be either:

- an exceedance of a provincial ambient air quality criteria (AAQC) or O.Reg.419 Schedule 3 standard at or outside the MMB and attributable to the Project
- frequently measured concentrations greater than 85% of a provincial AAQC or O.Reg.419 Schedule 3 standard at or outside the MMB and attributable to the Project

Adaptive management for air quality may be used to:

- address situations in which the objectives or standards are exceeded; the process for responding to these events will include reviewing causes and assessing the need for additional mitigation measures
- guide the continual improvement process

- incorporate changes to the management and monitoring plans related to introduction of new regulatory requirements, revised objectives or criteria, or updated best practices or technology.

There are no risks to the environment associated with the air quality follow-up program.

In addition to reporting requirements outlined in Section 34.1.4, on an annual basis Canada Nickel will be required to report to the National Pollutant Release Inventory (NPRI) on the Project, which is Canada's legislated inventory of pollutant releases (to air, water and land), disposals, and transfers for recycling under the *Canadian Environmental Protection Act* (1999). Reports to the NPRI are typically due on June 1 of the year following the reporting calendar year. Updates to NPRI reporting requirements are published as NPRI Notices in the Canada Gazette.

34.2.4 Acoustic Environment

It is predicted that noise levels within the vicinity of the Project during construction and operations will increase and could exceed applicable guideline criteria and thresholds at several receptors. However, by imposing mitigation measures, specifically the imposition of restrictions within the Modelled Mine Boundary, it is predicted that noise levels at nearby receptors can be mitigated to be compliant with applicable limits. Vibration effects and blasting noise from construction and operations of the Project are not expected to exceed vibration limits at receptors.

The noise and vibration follow-up program will monitor noise and vibration at key Project locations, representative of the most-impacted receptors, and they will include both Indigenous and non-Indigenous receptors. Monitoring data will be used to verify and confirm the predicted effects from the noise and vibration models, and to show that regulatory requirements related to specific permits and/or conditions of approval are met.

The noise and vibration follow-up program will focus noise and vibration monitoring during construction, operation and blasting activities in consideration of the following key areas:

- Monitoring will be conducted at representative location(s) around the Open Pit, TMF, stockpiles, and the rail corridor during the construction and decommissioning phases of the Project to track noise and vibration levels. Similarly, monitoring will be conducted at representative location(s) around the Open Pit, processing plant, stockpiles, TMF, and the rail corridor during the Project's operations phase. Monitoring locations may be added or removed from the monitoring program based on the location of the activities and result of the monitoring program. Monitoring will continue at each location until it is no longer necessary. If a location is no longer required but is part of a regulatory approval, it will only be removed from the monitoring program once the necessary amendments are approved.
- Monitoring parameters for noise will include hourly equivalent sound levels ($L_{eq,\ 1\text{-}hour}$) in A-weighted decibels (dBA), day-night average sound levels (L_{dn}) in dBA and blasting overpressure sound levels in linear decibels (dBL). Similarly, monitoring parameters for vibration will include peak particle velocity in millimeters per second (mm/s) and root mean square velocity in mm/s. Root mean square measurements will be conducted only if the receptors are within the vibration zone of influence for blasting.

- Follow-up monitoring results will be compared with the applicable limits and Project-specific regulatory approvals (i.e., ECA for Noise/Vibration).

Noise monitoring equipment for the follow-up program will meet the following specifications:

- Type 1 integrating sound level meter
  - Capable of logging L_{eq} and L_{max} sound levels in dBA
  - Battery-powered units to enable automated (unattended) noise monitoring
  - Capable of recording short audio files in the event of an exceedance to verify the noise sources
- Calibrated within the last two years by the manufacturer or an independent accredited laboratory
- Field calibrated with a portable calibrator at the beginning of the measurements and will continue once a month until the monitoring is completed
- To address noise complaints, noise measurement equipment capable of measuring spectral data (1/3rd octave) will be used for attended monitoring.
- Blast monitoring equipment used for the follow-up monitoring will meet the following specifications:
- Capable of logging peak sound levels in dBL (linear values)
  - Capable of logging vibration as peak particle velocity in mm/s
  - Set to log instantaneous air overpressure and ground vibration velocity
  - Battery powered units to complete automated monitoring (unattended)
- Calibrated within the last two years by the manufacturer or an independent accredited laboratory

The follow-up monitoring locations, frequency of sample collections, and duration of the program are summarized in Table 34.3 and will be finalized in consultation with relevant authorities, including government agencies and Indigenous nations.

Table 34.3 Noise and Vibration Follow-up Program

Activity	Monitoring Parameter	Monitoring Duration and Frequency	POR ID	POR Description	Significant Source(s)
Construction	Steady Noise	Short-Term (Minimum 1 Week or Until Compliance) at the beginning of construction and during peak activity	R2	Camp/Cottage on Davis Lake	• Rail construction activity • Process plant construction activity • Trucks at the Open Pit area
		Short-Term (Minimum 1 Week or Until Compliance) at the beginning of construction and during peak activity	R3	Camp on the West Buskegau River	• Trucks at the Open Pit area • Machinery at bottom of the Open Pit • Trucks at the East Stockpile • Surface truck movement from East Stockpile to the Open Pit • Excavator(s) at Collection Pond 4
		Short-Term (Minimum 1 Week or Until Compliance) at the beginning of construction and during peak activity	R4	Camp/Cottage East of Site	• Trucks at the Open Pit area • Trucks at the East Stockpile • Surface truck movement from East Stockpile to East Zone entrance of the Open Pit • Roadstone secondary crushing • Truck tractor and tire handler related to Process Plant construction activity
		Short-Term (Minimum 1 Week or Until Compliance) at the beginning of construction and during peak activity	R5	Camp/Cottage Near Highway 655 South of Site	• Rail construction activity
		Long-Term (Continuous) from the beginning of construction	R9	Overnight Indigenous Location	• Rail construction activity

Activity	Monitoring Parameter	Monitoring Duration and Frequency	POR ID	POR Description	Significant Source(s)
Operations	Steady Noise	Short-Term (Minimum 1 Week or Until Compliance) at the beginning of operations and during peak operations (Year 7)	R2	Camp/Cottage on Davis Lake	• Process plants • Surface truck movement along TMF perimeter road • Conveyor operation • Canada Nickel rail operations • Truck tractor, rock breaker, water truck, flatbed truck in the plant area • Surface truck movement from west stockpile to primary crusher area • Water truck activity along haul routes • Trucks at the bottom of the Open Pit
		Short-Term (Minimum 1 Week or Until Compliance) at the beginning of operations and during peak operations (Year 7)	R3	Camp on the West Buskegau River	• Trucks at the bottom of the Open Pit • Trucks at East Stockpile • Surface truck movement from primary crusher area to Open Pit
		Short-Term (Minimum 1 Week or Until Compliance) at the beginning of operations and during peak operations (Year 7)	R4	Camp/Cottage East of Site	• Water truck along haul routes • Surface truck movement along TMF perimeter road • Grader along haul routes
		Short-Term (Minimum 1 Week or Until Compliance) at the beginning of operations and during peak operations (Year 7)	R5	Camp/Cottage Near Highway 655 South of Site	• Canada Nickel rail operations
		Long-Term (Continuous) from the beginning of operations	R8	Overnight Indigenous Location	• Surface truck movement from West Stockpile to primary crusher area • Process Plant • Trucks at Rock Impoundment Area

Activity	Monitoring Parameter	Monitoring Duration and Frequency	POR ID	POR Description	Significant Source(s)
					• Canada Nickel rail operations • Surface truck movement from the Open Pit to West Stockpile • Surface truck movement on access road • Truck tractor, rock breaker, water truck, flatbed trucks in the plant area
		Long-Term (Continuous) from the beginning of operations	R9	Overnight Indigenous Location	• Canada Nickel rail operations
		Short-Term (Minimum 1 Week or Until Compliance) at the beginning of operations and during peak operations (Year 7)	R12	Camp/Cottage North of Existing Rail Corridor	• Canada Nickel rail operations
Blasting	Overpressure (Air) and Vibration	Long-Term (Continuous) from the beginning of operations	R1	House South of Site, At Lake 300m East of Highway 655	• Blasting
		Long-Term (Continuous) from the beginning of operations	R2	Camp/Cottage on Davis Lake	• Blasting
		Short-Term (Minimum 1 Week or Until Compliance) at the beginning of operations and during peak blasting period	R3	Camp on the West Buskegau River	• Blasting

Monitoring locations are selected based on the proposed construction/operations/blasting activities from the Project, relative locations of the receptors and the predicted noise and vibration levels at the receptors. Both Indigenous and non-Indigenous receptors have been considered for this follow-up monitoring program. Canada Nickel will have a complaint resolution process that will also address any potential Project noise and vibration complaints.

There are no risks to the environment associated with the noise and vibration follow-up monitoring.

The results of the follow-up program will be used to identify and implement adaptive management measures, as appropriate, for the Project.

34.2.5 Groundwater

The predicted effect on groundwater quantity and flow is a lowering of the water table as a result of dewatering the Open Pit during construction and operations and to a lesser extent during passive closure when the Open Pit refills to form a pit lake. The predicted effect on groundwater quality is the increase in concentrations of parameters in groundwater due to seepage from the Impoundment Facility, Stockpiles, and TMF to groundwater. In addition, groundwater quality may be affected by the tailings impounded in the Open Pit during operations and closure.

Canada Nickel will develop a follow-up and monitoring program to monitor groundwater levels and groundwater quality at key Project locations. Monitoring data will be used to verify and confirm the predicted effects identified in the three-dimensional groundwater flow model and to meet regulatory requirements related to specific permits or conditions of approval. The exact monitoring locations will be based on consultation with government agencies and interested Indigenous nations. However, it is expected that the monitoring program will focus on the following key areas:

- Monitoring wells will be established at select locations around the Open Pit to monitor groundwater levels during each Project phase as the Main Zone and East Zone of the Open Pit are dewatered during construction and operation and subsequently recover during passive closure.
- Monitoring wells/drive point piezometers in the vicinity of the surface water features with the greatest predicted effects of the Project on groundwater discharge, namely, North Driftwood River, West Buskegau River, Unnamed Lake (South of Zed Lake), Jack Lake, and Martin Lake. The monitoring wells/drive point piezometers will be used to collect groundwater levels during construction, operations, and decommissioning and closure to monitor the effects on surface water and shallow groundwater levels due to Open Pit dewatering during operations and recovery during passive closure.
- Monitoring wells upgradient, cross gradient, and downgradient of the Impoundment Facility, and TMF will be established to collect groundwater levels and water quality during construction, operations, and decommissioning and closure to document changes to groundwater levels and flow and groundwater quality.

- Monitoring wells upgradient, cross gradient, and downgradient of the Stockpiles will be established to collect groundwater levels and water quality during construction and operation to document changes to groundwater levels and flow and groundwater quality.
- Two monitoring wells will be established between the TMF and the residential supply well southwest of the TMF to act as sentry wells for movement of parameters of potential concern from the TMF towards the supply well.

Groundwater monitoring locations will be reviewed at regular intervals. Monitoring locations/stations may be added or removed from the monitoring program in accordance with their utility in monitoring the effects of the Project on the environment.

Monitoring locations will be maintained until the location is no longer required. If a monitoring location/station is no longer required but is identified as part of a regulatory approval, it will only be removed from the monitoring program once the required amendments are approved.

The follow-up and monitoring program methodology including the type of monitoring equipment, frequency of sample collection, and duration of the program will be developed in consultation with relevant authorities, including government agencies and Indigenous Nations. However, it is expected that the monitoring program will be comprised of the following key elements:

- A representative subset of monitoring wells will be instrumented with data loggers to collect regular groundwater levels. Groundwater levels will be manually measured, and data loggers downloaded in spring, summer, and fall, as possible.
- Groundwater quality samples from monitoring wells will be monitored in spring, summer, and fall, as possible, during construction, operations, and decommissioning and closure with the frequency progressively reduced based on monitoring results and Project phase. Winter groundwater sampling is not feasible as, based on the baseline data, the monitoring wells are generally frozen and not possible to sample. Groundwater quality samples will be analyzed for general chemistry and select dissolved metals.
- Follow-up monitoring results will be compared with applicable regulatory standards set out in Guidelines for Canadian Drinking Water Quality, Ontario Drinking Water Quality Standards, Provincial Water Quality Objectives, and Project-specific regulatory approvals.
- A water well survey will be completed with willing participants adjacent to the PA to confirm the understanding of nearby groundwater supply users.

The results of the follow-up monitoring will be used to identify and implement adaptive management measures, as appropriate for the Project.

There are no risks to the environment associated with the groundwater quality follow-up monitoring.

34.2.6 Surface Water

Modelling for surface water quantity predicted no flow reductions above the 10% threshold for the Jocko Creek or the West Buskegau watersheds for any mine life phase at the downstream extent of the hydrologic model. For the North Driftwood watershed there were 20 days during the operations phase with flow reductions greater than the 10% threshold at the hydrologic model outlet, however none fell below the environmental flow value. No other days above the 10% reduction threshold were predicted for the North Driftwood watershed for subsequent mine life phases. The LSA is expected to completely accommodate changes in surface water quantity for all mine life phases. For the Jocko Creek, West Buskegau River, and North Driftwood River watersheds days with decreases to flow in exceedance of 10% that fall below environmental thresholds are not predicted at the respective downstream boundary of the LSA.

Surface water quality will comply with regulatory requirement limits/guidelines at the final discharge points (i.e., as will be established in the ECA for Industrial Sewage in addition the MDMER). The LSA is predicted to completely accommodate changes in surface water quality for all mine phases. Local water quality immediately downstream of some final discharge points (within the mixing zones) will experience increases of parameters of potential concern above baseline levels and the Canadian Water Quality Guidelines for Protection of Freshwater Aquatic Life, however, these changes are expected to be contained within the boundaries of the LSA and to be dissipated at the edge of the mixing zone.

The frequency of sampling and rationale for the surface water quantity monitoring locations are presented in Table 34.4 and Figure 34.1. Surface Water quantity monitoring will include the following:

- Parameters listed in Table 34.4 will be monitored at surface water quantity sites during construction, operations, and decommissioning and closure phases of the Project.
- As part of operations, mine water effluent discharge will be recorded on a daily basis. Gauges will be installed at final discharge points (FDPs) to facilitate flow monitoring. Records will include daily and monthly total and average volumes.
- Hydrometric monitoring will be conducted at the FDPs at a minimum accuracy of 15% of the total discharge, according to the flow measurement requirements outlined in the MDMER.
- Monitoring flows will be conducted at hydrometric stations for comparison against predicted reductions or increases in watercourses and lakes using reference hydrometric stations in upstream or Project adjacent catchments.

Monitoring locations will be reviewed at regular intervals. Monitoring locations may be added or removed from the monitoring program in accordance with their utility in monitoring the effects of the Project on the environment. The results of the follow-up monitoring will be used to identify and implement adaptive management measures, as appropriate for the Project.

Table 34.4 Surface Water Quantity Monitoring Locations, Frequency, and Rationale

Watershed	Flow/Waterbody Level	Station	Frequency	Rationale
FDP Monitoring Stations				
North Driftwood River	Flow	FDP-SP-TEMP_01 (Construction and Operations Phase I)	Daily (continuous water level measurements with datalogger and periodic flow measurements to confirm supporting flow equations, or continuous flow monitoring device)	FDP
	Flow	FDP-TMF-SP	Daily (continuous water level measurements with datalogger and periodic flow measurements to confirm supporting flow equations, or continuous flow monitoring device)	FDP
	Flow	FDP-SP-02	Daily (continuous water level measurements with datalogger and periodic flow measurements to confirm supporting flow equations, or continuous flow monitoring device)	FDP
West Buskegau River	Flow	FDP-SP-01	Daily (continuous water level measurements with datalogger and periodic flow measurements to confirm supporting flow equations, or continuous flow monitoring device)	FDP
	Flow	FDP-SP-03	Daily (continuous water level measurements with datalogger and periodic flow measurements to confirm supporting flow equations, or continuous flow monitoring device)	FDP
To Characterize Background and Reference Sites				
Jocko Creek	Flow	SW-7	Monthly Manual Water Level Supplemented with Datalogger Water Level Measurements and Monthly Manual Flow [1]	Upstream of culvert crossing under Highway 655
North Driftwood River	Flow	NCRK-01	Monthly Manual Water Level Supplemented with Datalogger Water Level Measurements and Monthly Manual Flow [1]	Nesbitt Creek background reference station
West Buskegau River	Flow	SW-11	Monthly Manual Water Level Supplemented with	Upstream reference site for the Project

Watershed	Flow/Waterbody Level	Station	Frequency	Rationale
			Datalogger Water Level Measurements and Monthly Manual Flow [1]	
To Assess Environmental Effects of Mine				
Jocko Creek	Flow	SW-8	Monthly Manual Water Level Supplemented with Datalogger Water Level Measurements and Monthly Manual Flow [1]	Downstream of SW-7
	Waterbody Level	ZDLK	Monthly Manual Water Level Supplemented with Datalogger Water Level Measurements	Monitor water levels in Zed Lake
North Driftwood River	Flow	SW-2b	Monthly Manual Water Level Supplemented with Datalogger Water Level Measurements and Monthly Manual Flow [1]	Downstream of PA along the North Driftwood River
	Flow	SW-9 (Construction and operations phase I)	Monthly Manual Water Level Supplemented with Datalogger Water Level Measurements and Monthly Manual Flow [1]	Monitor outlet of Martin Lake. SW-9 will be maintained until the North Driftwood River realignment
	Waterbody Level	SW-10	Monthly Manual Water Level Supplemented with Datalogger Water Level Measurements	Monitor water level of Martin Lake
	Flow	SW-12	Monthly Manual Water Level Supplemented with Datalogger Water Level Measurements and Monthly Manual Flow [1]	Monitor flow coming to the North Driftwood Diversion
	Flow	SW-13	Monthly Manual Water Level Supplemented with Datalogger Water Level Measurements and Monthly Manual Flow [1]	Monitor flow leaving the North Driftwood Diversion
	Flow	SW-14	Monthly Manual Water Level Supplemented with Datalogger Water Level Measurements and Monthly Manual Flow [1]	North Driftwood River watershed hydrologic model outlet
	Waterbody Level	SuthLk	Monthly Manual Water Level Supplemented with Data Logger	Monitor water level of Sutherland Lake

Watershed	Flow/Waterbody Level	Station	Frequency	Rationale
West Buskegau River	Flow	SW-5	Monthly Manual Water Level Supplemented with Datalogger Water Level Measurements and Monthly Manual Flow [1]	Upstream of FDP-SP-01
	Flow	SW-6b	Monthly Manual Water Level Supplemented with Datalogger Water Level Measurements and Monthly Manual Flow [1]	Downstream of FDP-SP-03
	Flow	SW-15	Monthly Manual Water Level Supplemented with Datalogger Water Level Measurements and Monthly Manual Flow [1]	West Buskegau River watershed hydrologic model outlet

Notes:
1. The frequency of monitoring will be reduced to quarterly if sufficient data has been collected to complete a rating curve with a robust dataset.

The frequency of sampling and rationale for the surface water quantity monitoring locations are presented in Table 34.5 and Figure 34.2. Surface water quantity monitoring will include the following:

- Parameters listed in Table 34.5 will be monitored at surface water quality monitoring sites during construction, operations, and decommissioning and closure phases of the Project.
- Pursuant to the MDMER (subsections 5, 14, and 15), monthly acute toxicity and bi-annual sublethal toxicity testing must also be completed for effluent from the FDPs to support environmental effects monitoring.
- Surface water quality criteria will be developed based on predicted discharge quality, site-specific treatment discharge effluent criteria and environmental effects of mine effluent in relation to baseline water quality in receiving watercourses and waterbodies, to satisfy requirements of the federal and provincial guidelines.

The results of the follow-up monitoring will be used to identify and implement adaptive management measures, as appropriate for the Project.

There are no risks to the environment associated with the surface water follow-up monitoring.

Table 34.5 Surface Water Quality Monitoring Locations, Frequency, and Rationale

Watershed	Site	Rationale	Water Quality Parameters	Monitoring Frequency
MDMER Required Monitoring Stations				
North Driftwood River	FDP-SP-TEMP_01	FDP (in Construction and Operations Phase I)	General[A] Acute Toxicity Sublethal Toxicity Temperature pH	Weekly Monthly Bi-Annually Daily Weekly
	FDP-TMF-SP	FDP	General[A] Acute Toxicity Sublethal Toxicity Temperature pH	Weekly Monthly Bi-Annually Daily Weekly
	FDP-SP-02	FDP	General[A] Acute Toxicity Sublethal Toxicity Flow and Temp. pH	Weekly Monthly Bi-Annually Daily Weekly
West Buskegau River	FDP-SP-01	FDP	General[A] Acute Toxicity Sublethal Toxicity Flow and Temp. pH	Weekly Monthly Bi-Annually Daily Weekly
	FDP-SP-03	FDP	General[A] Acute Toxicity Sublethal Toxicity Flow and Temp. pH	Weekly Monthly Bi-Annually Daily Weekly
To Characterize Background and Reference Sites				
Jocko Creek	JCRK-02	Upstream of proposed TMF	General[A]	Quarterly
North Driftwood River	NCRK-01	Nesbitt Creek background reference station	General[A]	Quarterly
West Buskegau River	SW-11	Upstream reference site for the Project	General[A]	Quarterly
To Assess Environmental Effects of Mine				
Jocko Creek	JCRK-03	Downstream of proposed TMF	General[A]	Quarterly
North Driftwood River	SUTHLK	Sutherland Lake, proximate to the proposed TMF and process plant	General[A]	Quarterly

Watershed	Site	Rationale	Water Quality Parameters	Monitoring Frequency
	MARLK	Martin Lake, proximate to the proposed TMF and process plant	General[A]	Quarterly
	NDR-S-02	To support continuity and anticipated requirements for effects monitoring before and during diversion of the North Driftwood River	General[A]	Quarterly
	NDR-S-06	Downstream of Impoundment Facility	General[A]	Quarterly
	NDR-S-07	Hydrologic Model outlet and downstream of Project Infrastructure	General[A]	Quarterly
	NDR-S-08	LSA outlet	General[A]	Quarterly
West Buskegau River	PRSLK	Prosser Lake, within the vicinity of the TMF	General[A]	Quarterly
	WBR-S-06	Downstream of outflows from Prosser Lake and the TMF, proximate to the open pit	General[A]	Quarterly
	WBR-S-04	Proximate to the waste rock storage are	General[A]	Quarterly
	WBR-S-07	Downstream of Impoundment Facility	General[A]	Quarterly
	WBR-S-09	Hydrologic Model outlet and downstream of Project Infrastructure	General[A]	Quarterly
	WBR-S-10	LSA outlet	General[A]	Quarterly

Note:
A. General parameters to be monitored in accordance with MDMER: Dissolved Aluminum (0.2 µm), Un-ionized Ammonia, Total Arsenic, Total Chromium (III and VI), Total Cobalt, Total Copper, Fluoride, Total Iron, Total Nickel, Nitrite, Nitrate, pH, Total Phosphorus, Total Suspended Solids, Total Vanadium, Total Zinc, Hardness, and Dissolved Organic Carbon.

34.2.7 Vegetation, Riparian and Wetland Environments

Predicted effects to vegetation, riparian and wetland environments include direct loss of natural vegetation communities, indirect edge effects, introduction of invasive plant species, and changes to hydrology from water table drawdown.

Canada Nickel will develop a follow-up and monitoring program to confirm predicted changes to vegetation community types, wetlands, and riparian environments and to identify occurrences of invasive species. The details of this follow-up program will be developed in consultation with government agencies and potentially affected Indigenous nations. However, it is expected that the monitoring program will focus on the following key areas:

- Black ash (*Fraxinus nigra*) is found in the LSA within 120 m of the PA. Where access is available, black ash will be identified and representative subsets monitored for indirect effects from Project activities including changes in tree health, loss of individual trees, and changes in environmental conditions from edge effects. Monitoring will be conducted on black ash with a minimum of 8 cm diameter-at-breast-height (dbh). Monitoring will continue for five years following the end of construction activities in the first period of the operations phase or as needed, depending on construction schedules. Monitoring will be conducted at a similar time each year (e.g., mid-July) and be guided by the Ecological Monitoring and Assessment Network Tree Health methods (Ecological Monitoring and Assessment Network 2007). The following information will be recorded:
  - Geolocation of each black ash tree greater than 8 cm dbh
  - Photo documentation of each tree
  - Signs of emerald ash borer (*Agrilus planipennis*)
  - Tree dbh
  - Tree status (e.g., living, recently dead, old dead, cut down)
  - Crown class
  - Stem damage
  - Crown rating
- Representative vegetation communities with plant species of importance to Indigenous nations in the LSA within 120 m of the PA where access is available will be monitored to assess if reductions in health or loss of individuals are occurring as a result of edge effects. Monitoring will continue for five years (during years 1, 3 and 5) following the end of construction activities in the first period of the operations phase.
- Monitoring for invasive plant species listed under the *Invasive Species Act* (2015) or as noxious weeds under the *Weed Control Act* (O. Reg. 1096) with potential to occur in the LSA will occur during all phases of the Project to identify occurrence and spread of invasive plant species and to apply appropriate treatments, as necessary. Monitoring will focus on disturbed areas and edge areas within 120 m of clearing boundaries.
- A monitoring plan for riparian communities in the LSA and within 120 m of the PA where access is available will be developed to monitor for changes in riparian area function including changes in ecosite classifications, plant species composition, plant species of importance to Indigenous nations, coefficient of conservatism, floristic quality index, vegetation health, and photo documentation. Monitoring will occur semi-annually at a similar time of year (e.g., mid July)

between July and August, and continue for five years following the end of construction activities in the first period of the operations phase.

- A monitoring plan for wetlands outside the PA, within the area of water table drawdown, will be developed to determine if changes in wetland function occur because of water table drawdown. Specific parameters proposed for monitoring include changes in plant species composition, plant species of importance to Indigenous nations, coefficient of conservatism, floristic quality index, wetness index, changes in moisture, indications of wetland drying (e.g., exposed roots), and changes in wetland classification (i.e., ecosite classification). Monitoring will occur bi-annually between July and August at a similar time of year in each monitoring year (e.g., mid-July) and continue for ten years following the end of construction activities in the first period of the operations phase. Baseline sampling will be conducted prior to the start of water table drawdown (e.g., prior to operation) with monitoring occurring in years 2, 4, 6, 8, and 10 of operations.

The results of the follow-up monitoring will be used to identify and implement adaptive management measures, as appropriate for the Project.

There are no risks to the environment associated with the vegetation, riparian and wetland environments follow-up monitoring.

34.2.8 Fish and Fish Habitat

Clearing, site preparation, and the construction of Project infrastructure will result in the in-filling or overprinting of watercourses and waterbodies leading to the direct loss of fish habitat which will negatively affect the forage fish populations and the northern pike, white sucker, and walleye populations that reside in this habitat or rely on the contributions of flow, nutrients, organic debris, invertebrates, and sediment. Predicted changes in flow are expected to be more noticeable in the riffle habitat than in run and pool habitats and have the potential to affect the timing and magnitude of spawning migrations, alter the timing of access to habitat, alter the amount of available wetted habitat, and alter the hydraulic variables (i.e., water depth, water velocity) important to various fish life stages (e.g., spawning adults). Adverse effects to fish health, growth and survival are expected to occur within the LSA downstream of the Project from changes in water quality and possible reduction in aquatic invertebrate abundance.

The monitoring of potential changes in fish and fish habitat will be based on a “before-after-impact-control” study design, where feasible. This will include comparisons of physical habitat metrics important to fish (e.g., water depths, substrate, etc.) and biological parameters measured before mine construction (i.e., baseline condition) to these same metrics after construction/during operations. Similar metrics will be measured in reference/control sites (lakes and streams that will not be affected by the Project).

The exact monitoring locations for all programs detailed below will be selected based on consultation with government agencies and interested Indigenous nations. Monitoring locations will be reviewed at regular intervals. Monitoring locations may be added or removed from the monitoring program in accordance with their utility in monitoring the effects of the Project on the environment. The frequency, duration, analytical parameters, and detection limits for the monitoring programs detailed below will be established prior to construction of the Project. It is expected that the monitoring programs will focus on fish habitat and fish

health, growth and survival as detailed below. Proposed follow-up and monitoring plans relevant to changes in fish habitat include:

- Fish habitat monitoring in North Driftwood River and West Buskegau River locations with predicted flow reductions of greater than 10%. This monitoring program will be used to confirm hydraulic habitat modeling predictions and will help with quantification of the effect on fish habitat of areas of the North Driftwood River and West Buskegau River with predicted flow reductions of greater than 10%.
- Compliance and effectiveness monitoring of any offsetting habitats which are designed and built as part of the *Fisheries Act* Authorization process with Fisheries and Oceans Canada will be undertaken and will include Monitoring of physical habitat conditions (substrate, water depth flow, vegetation establishment) at locations where offsetting habitat has been constructed
- Monitoring of fish utilization of constructed offsetting habitat. If the monitoring program indicates that the constructed or restored habitats are not functioning, remedial actions or additional offsets would be considered and developed in consultation with Fisheries and Oceans Canada

Proposed monitoring plans relevant to changes in fish health, growth, or survival include:

- Implementation of environmental effects monitoring, which is required under the MDMER when there is discharge of mine water to the aquatic environment and includes monitoring of effluent and water quality, sediment quality, benthic invertebrate communities, and fish health (including tissue sampling) and population studies at reference sites and at site(s) downstream of the final discharge point(s)
- Fish tissue monitoring program to collect and analyze fish tissue samples from a variety of large and small bodied fish species from the North Driftwood River and West Buskegau River watersheds in locations to be selected through consultation with government agencies and potentially affected Indigenous nations to assess changes in fish health over time

If an unexpected deterioration of fish habitat and/or fish health, growth and survival is observed as part of follow-up and/or monitoring, intervention mechanisms will include the adaptive management process. This may include an investigation of the cause of the deterioration and identification of existing and/or new mitigation measures to be implemented to address it.

Fish tissue sampling will necessitate the extermination of a representative sample of fish from large and small bodied fish species. A License to Collect Fish for Scientific Purposes will be obtained under the *Fish and Wildlife Conservation Act* to authorize fish tissue sampling and sampling will be conducted in accordance with the conditions of the license. No other risks to the environment are associated with the fish and fish habitat follow-up monitoring.

34.2.9 Birds and Bird Habitat

The Project is predicted to result in direct and indirect loss of bird habitat and have the potential to contribute to a direct change in mortality.

Canada Nickel will develop a follow-up and monitoring program to confirm predicted changes to birds. The details of this follow-up program will be developed in consultation with government agencies and potentially affected Indigenous nations. Monitoring programs for birds could include:

- Breeding bird surveys conducted at varying distances from the mine infrastructure to determine accuracy of effects predictions on birds and bird habitat, including SAR. Surveys could include the use of autonomous recording units and point counts to monitor diversity and relative abundance of the bird community. Completing surveys at varying distances will allow comparisons between control and impact stations. Survey locations that were surveyed during baseline studies will be repeated to assess changes from the baseline condition (i.e., before and after effects). Surveys locations will be distributed among habitats used by bird species groups that were assessed in the VC Chapter (e.g., forest birds, waterbirds, marsh birds).
- Breeding bird surveys will be designed using a methodology that can assess the accuracy of effects predictions on SAR (e.g., Canada Warbler, Lesser Yellowlegs).
- Monitoring will occur during all Project phases, at an interval that will be confirmed through discussions with relevant regulatory authorities.

The results of the follow-up monitoring will be used to identify and implement adaptive management measures, as appropriate for the Project.

There are no risks to the environment associated with the bird and bird habitat follow-up monitoring.

34.2.10 Wildlife and Wildlife Habitat

The predicted effect on wildlife and wildlife habitat is driven by loss of habitat within the PA during construction. Changes in habitat will have a ripple effect influencing abundance and distribution through increased mortality risk, displacement of individuals who are forced to alter movement patterns and relocate outside the PA and changes in population dynamics in the LSA. Additionally, these effects may be compounded by sensory disturbances, such as noise, that may extend into the LSA and Regional Study Area (RSA) during construction and operations, resulting in degraded habitat quality and leading to habitat avoidance by sensitive species. Results of the Human Health and Ecological Risk Assessment (Appendix C.7 of the Impact Statement) suggests that the ecological health risks related to the Project are negligible and do not require additional follow-up and monitoring. However, emissions, discharges, and wastes generated by the Project (including contaminants of potential concern, where applicable) will be monitored in accordance with relevant regulatory guidelines.

Canada Nickel will develop a follow-up and monitoring program that includes:

- Assessing relative abundance and distribution of moose within the LSA through visual encounter surveys completed in late winter/early spring, similar to the baseline studies. Surveys will be completed prior to construction and extending throughout construction and year one, year five, and every ten years during operations.
- Monitoring requirements that may be established as per the Overall Benefit Permit under the *Endangered Species Act* (e.g., Blanding's turtle, bats).

The results of the follow-up monitoring will be used to identify and implement adaptive management measures, as appropriate for the Project.

There are no risks to the environment associated with the wildlife and wildlife habitat follow-up monitoring program.

34.2.11 Climate Change

Follow-up and monitoring programs are not anticipated to be required for climate change related to GHG emissions and sinks.

In terms of GHG emissions annual direct and indirect emissions will be quantified and reported under applicable federal and provincial regulatory programs. Quantified annual emissions based on actual operations data can be compared against predicted annual emissions in the impact statement and also be used to measure progress towards net zero emissions. Canada Nickel will review and update the net-zero plan as a mechanism to identify areas to improve and implement further GHG emissions mitigation throughout the life of the Project.

34.2.12 Health

Follow-up and monitoring relevant to health is presented in Sections 34.2.3, 34.2.4, 34.2.6 and 34.2.8. No other follow-up and monitoring plans specific to health are anticipated.

34.2.13 Social Conditions

Follow-up and monitoring are not anticipated to be required for social conditions. Government departments, public agencies, and private-sector companies that deliver services and infrastructure monitor the ongoing demand for such services as part of their normal planning practices. Project information and predicted demands on services and infrastructure will be communicated to responsible authorities to assist with their planning. A community feedback tool will also be developed and implemented to receive and address community suggestions, concerns, and complaints.

Land and resource use activities within the RSA are the subject of ongoing planning, management, regulatory enforcement, and monitoring by the federal, provincial, and municipal governments. This includes the monitoring and collection of information on, for example, municipal land use, hunting, trapping, and fishing activity and development for the purposes of licensing, enforcement, and resource management. Canada Nickel has provided, and will continue to provide, Project information to relevant agencies and organizations.

No additional follow-up programs are warranted.

34.2.14 Economic Conditions

Follow-up and monitoring are not anticipated to be required for economic conditions as effects to economic conditions will largely be positive. Canada Nickel will continue regular communication with

Indigenous nations, local training/education institutions, and other relevant entities regarding education, training opportunities and hiring, as applicable.

No additional follow-up programs are warranted.

34.2.15 Indigenous Interests

Canada Nickel's follow-up programs that relate to the Indigenous Interests of the Indigenous nations are described in Sections 34.2.1 through to 34.2.14 above. These programs will be prepared and implemented to monitor environmental protection and follow-up requirements for the Project and to identify opportunities for corrective actions and/or refinements to mitigation measures.

Canada Nickel recognizes the importance of working in partnership with the Indigenous nations to establish mutually beneficial, cooperative, and productive relationships centered around transparent information sharing, respectful engagement, open dialogue, and meaningful partnerships. Site access and continued engagement related to follow-up and monitoring programs are key elements currently being considered in the agreements under negotiation between Canada Nickel and the Indigenous nations.

As committed in Chapters 25 to 28 of the Impact Statement, Canada Nickel will engage with Indigenous nations in the design and implementation of the follow-up and monitoring programs, and evaluation of follow-up results and subsequent updates to the programs, as applicable. Canada Nickel will further engage with the Indigenous nations for various monitoring programs on a go-forward basis, where appropriate. Through ongoing engagement (i.e., throughout the life of the Project) Canada Nickel aims to maintain a positive long-term relationship with the Indigenous nations.

34.3 Compliance Monitoring

Compliance with all environmental approvals, permits and authorizations will be tracked by Canada Nickel and communicated to appropriate agencies, identifying whether required mitigation measures and commitments were implemented. Deviations or revisions to the mitigation measures resulting from follow-up and monitoring programs will be identified.

Canada Nickel personnel or contractors will monitor compliance with the applicable Environmental Management Plans and conditions of approval during all phases of the Project. Inspections will include observations and measurements for Project components or activities. The active work sites and components will be inspected for compliance with applicable permits or other approval terms and conditions, and adherence to general and specific mitigation measures. Incidents of non-compliance will be reported to Canada Nickel personnel or contractors, and as required the applicable regulatory authorities. The process of environmental inspection allows for making a quick response in the event of an incident or changing environmental conditions. Incidents, such as accidents and malfunctions (e.g., spills, fires, explosions, collisions) and environmental damage, will be reported immediately to the Environmental Department and applicable regulatory authorities when applicable. Incidents will be addressed immediately and followed up with inspection.

34.4 Environmental Management Plans

A series of environmental management plans are proposed to be prepared for the Project to address important management issues, regulatory requirements, and mitigation measures identified in the Impact Statement related to the Project generally, and to VCs. The plans will describe the management actions, roles and responsibilities, updating requirements, and reporting schedules. The environmental management plans that will be prepared prior to the start of Project construction and/or operations, as appropriate, are outlined in Table 34.6 below.

Table 34.6 Environmental Management Plans

Environmental Management Plan	Purpose
Construction Environmental Protection Plan	• Overarching plan that outlines the steps that will be taken to limit environmental impacts during mine construction • Summarize dust, noise/vibration, water, waste, wildlife, vegetation and sediment mitigation measures with reference to the appropriate management plan
Soil Management and Rehabilitation Plan	• Provide mitigation measures related to the handling and storage of soils including how suitable soil excavated at the Project will be used for progressive reclamation or stockpiled for later use in rehabilitation during decommissioning
Waste Management Plan	• Establish procedures to manage waste generated by the Project in accordance with applicable provincial legislation and guidelines and corporate policies
Air Quality Management Plan	• Manage the effects of the Project on ambient air quality in accordance with provincial regulatory requirements • Summarize regulatory reporting requirements
Explosives Management Plan	• Provide for the safe use and storage of explosives and explosive components at the Project site • List mitigation measures related to explosives
Vegetation Management Plan	• Outline mitigation approaches for reducing effects on vegetation • Summarize anticipated vegetation studies to be carried out through the closure plan
Erosion and Sediment Control Plan	• Provide measures and best management practices to protect the environment through reduction of site erosion and protection of nearby watercourses and/or waterbodies from sedimentation
Wildlife Management Plan	• Outline mitigation approaches for reducing effects on wildlife, including migratory birds, SAR, and their habitats • Describe Project-specific bird monitoring activities to outline how risk of harm will be managed in accordance with Environment and Climate Change Canada guidance • Identify sensitive timing windows for vegetation clearing and site preparation activities as specified under species-specific requirements or through permits or approvals

Environmental Management Plan	Purpose
	• Provide a protocol for management of wildlife encounters, including caribou and discovery of bird nests, and for handling wildlife during salvage and relocation efforts • Summarize anticipated wildlife studies to be carried out through the closure plan
Noise and Vibration Management Plan	• Describe requirements for the routine management/ maintenance of sources of noise and vibration during construction and operations • Identify communication protocol requirements and a procedure for verifying and addressing complaints
Spill Prevention and Contingency Plan	• Describe the means (internal corporate procedures) by which the spill contingency plan is activated and steps to be taken to report, contain, clean up and dispose of contaminants following a spill, including appropriate contacts for responding to spills • List of the proposed response and clean up equipment generally available on-site
Heritage Chance Find Protocol	• Process to be followed with the unexpected discovery of archaeological resources during construction activities. • Processes will be consulted upon with the Indigenous nations.
Archaeological Resources Protection Plan	• Outline measures for the identification, investigation, mitigation and management of archaeological resources. • Prepare and implement a worker education program for the recognition of archaeological artifacts (e.g., Indigenous material culture. • Prepare and implement a worker education program about appropriate protocols in case of accidental discoveries (i.e., Heritage Chance Find Protocol).
Acid Rock and Metal Leaching Management Plan	• Outline measures for the prevention, identification, mitigation, and management of metal leaching / acid rock drainage during and after excavating and extracting of the mined materials including overburden, waste rock, ore, and tailings.
Emergency Preparedness and Response Plan	• Provide emergency preparation, response and spill prevention and contingency planning in accordance with federal and provincial legislation and guidelines, and corporate policies and procedures • Outline responses for accidents involving hazardous substances, medical emergencies, explosion, and fire • Prescribe measures for the provision of emergency response planning, training, responsibilities, cleanup equipment and materials, and contact and reporting procedures
Site-Wide Water Management Plan	• Provide the water management strategy for all phases of the Project • List the specific design criteria for water management infrastructure
Traffic Management Plan	• Outline measures and strategies to reduce traffic delays associated with construction and enhance safety

Environmental Management Plan	Purpose
Accommodations Management Plan	• Detail workforce accommodation requirements, and actions to be taken by Canada Nickel to mitigate effects from the incremental housing needs related to the Project
Health and Medical Services Plan	• Describe a management approach for occupational and non-occupations injuries and illness • Outline procedures to manage communicable diseases and access to an Employee Family Assistance Program
Fish Salvage Plan	• Provide guidance for conducting fish salvages by a qualified aquatic biologist in accordance with permit conditions

34.5 References

Canadian Dam Association. 2013. *Dam Safety Guidelines.* https://cda.ca/publications/cda-guidance-documents/dam-safety-publications.

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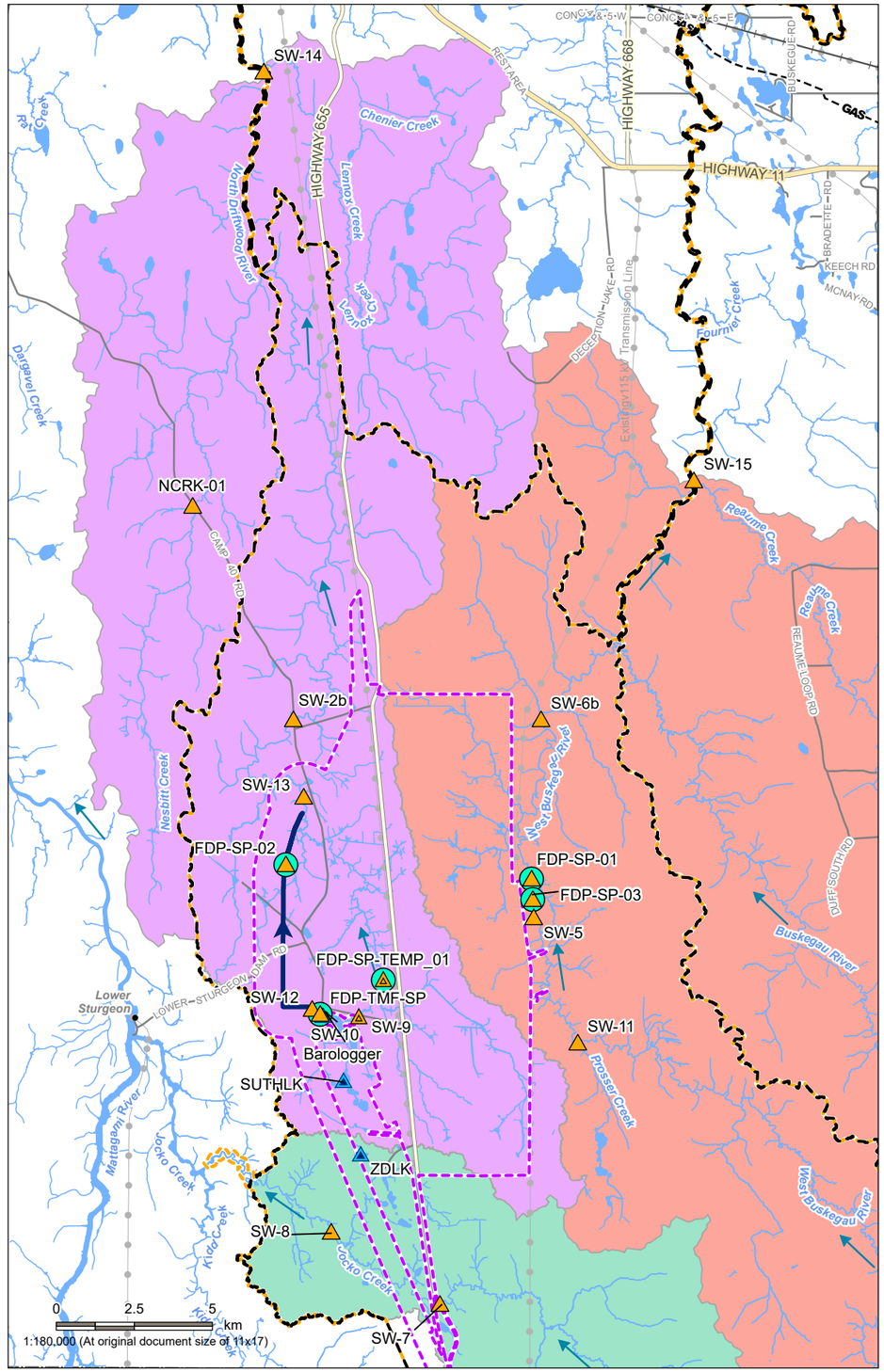
34.6 Figures



Stantec

CANADA NICKEL COMPANY

Legend

- Project Area
- Local Study Area
- Regional Study Area

Base Features

- Expressway / Highway
- Major Road
- Minor Road
- Railway
- Existing Transmission Line
- Submerged Communication Line
- Natural Gas Pipeline
- Watercourse
- Municipal Boundary - Lower Tier
- Waterbody
- Surface Water Flow Monitoring Station
- Surface Water Flow Monitoring Station (Operations Phase 1)
- Surface Water Level Monitoring Station
- Barologger
- Final Discharge Point (FDPs)
- North Driftwood Diversion Channel
- Watercourse Flow Direction
- Jocko Creek Watershed
- North Driftwood River Watershed
- West Buskegau River Watershed

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.

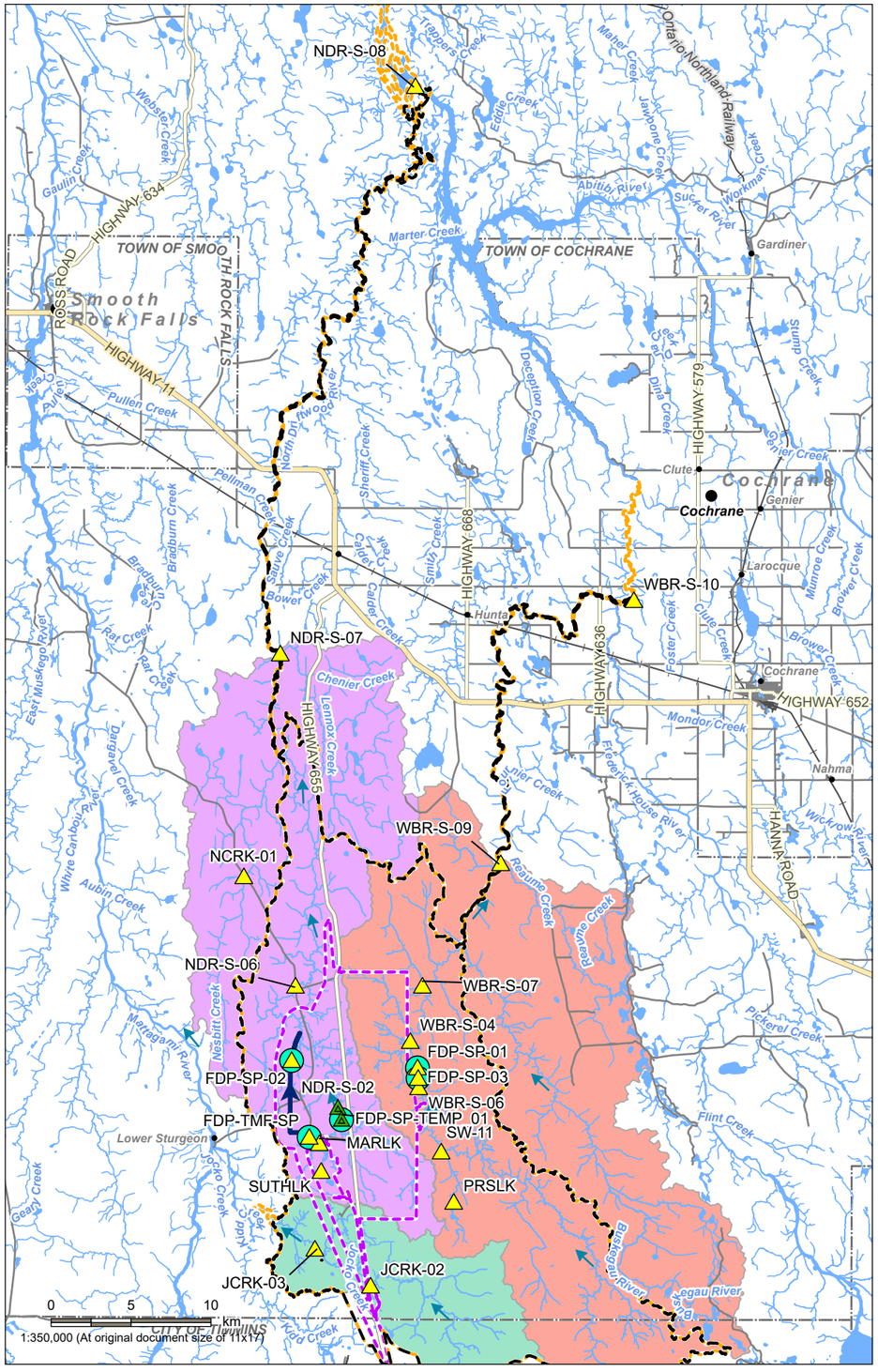
Project Location
Timmins, Ontario

160930456 REVA
Prepared by tcoghlan on 2024-10-09

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

Figure No.
34.1

Title
Hydrometric Monitoring Stations



Stantec

CANADA NICKEL COMPANY

Legend

- Project Area
- Local Study Area
- Regional Study Area

Base Features

- Expressway / Highway
- Major Road
- Minor Road
- Railway
- Watercourse
- Municipal Boundary - Lower Tier
- Waterbody
- Surface Water Quality Monitoring Station
- Surface Water Quality Monitoring Station (Operations Phase 1)
- Final Discharge Point (FDPs)
- North Driftwood Diversion Channel
- Watercourse Flow Direction
- Jocko Creek Watershed
- North Driftwood River Watershed
- West Buskegau River Watershed

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Project Location
Timmins, Ontario

160930456 REVA
Prepared by tcoghlan on 2024-10-09

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

Figure No.
34.2

Title
Surface Water Quality Monitoring Stations

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