Relations Couronne-Autochtones et Affaires du Nord Canada
Crown-Indigenous Relations and Northern Affairs Canada

GIANT MINE REMEDIATION PROJECT

ANNUAL REPORT 2019–20

Government of Northwest Territories
Gouvernement des Territoires du Nord-Ouest

Canada

ABOUT THIS REPORT

Welcome to the fifth annual report of the Giant Mine Remediation Project (GMRP). The report provides an overview of the GMRP's key activities and performance for the 2019-20 reporting year , focusing on environmental management, health and safety (H&S), and community involvement. The report's purpose is to verify that:

- defined project objectives are being met;
- the GMRP meets the requirements of the Environmental Agreement; and,
- interested rights holders and stakeholders, members of nearby communities, and the broader public have accurate and timely information on the GMRP.

The report is provided to the Giant Mine Oversight Board (GMOB), the independent oversight body established through the Environmental Agreement, which is then responsible for posting on their website (for additional information, see Environmental Agreement – Report Alignment (Appendix A)).

The report's content is largely shaped by the Environmental Agreement signed in June 2015, as well as GMOB's feedback on previous reports and input from the GMRP team. The report aligns with GMRP reporting obligations out of the Environmental Agreement.

For additional information on the GMRP, please visit: **giant.gc.ca.**

TABLE OF CONTENTS

TABLES

FIGURES

MESSAGE FROM THE CIRNAC PROJECT LEADER

ADM, Northern Affairs Organization

On behalf of the entire GMRP team, I am pleased to present the fifth Annual Progress Report to the GMOB. This report provides our stakeholders and the public with a transparent, comprehensive record of our progress over the last year as we work towards advancing the GMRP. We are committed to following the mandate given to us by the Government of Canada to create more economic opportunity and a higher quality of life in the North of Canada by using public investments to spur economic growth, job creation, and advancing policy and programs that support Northerners and Indigenous Peoples. We will also use this opportunity to support self determination, improving service delivery, advancing reconciliation and the renewed relationship between Canada and Indigenous Peoples based on recognition, rights, respect, co-operation, and partnership.

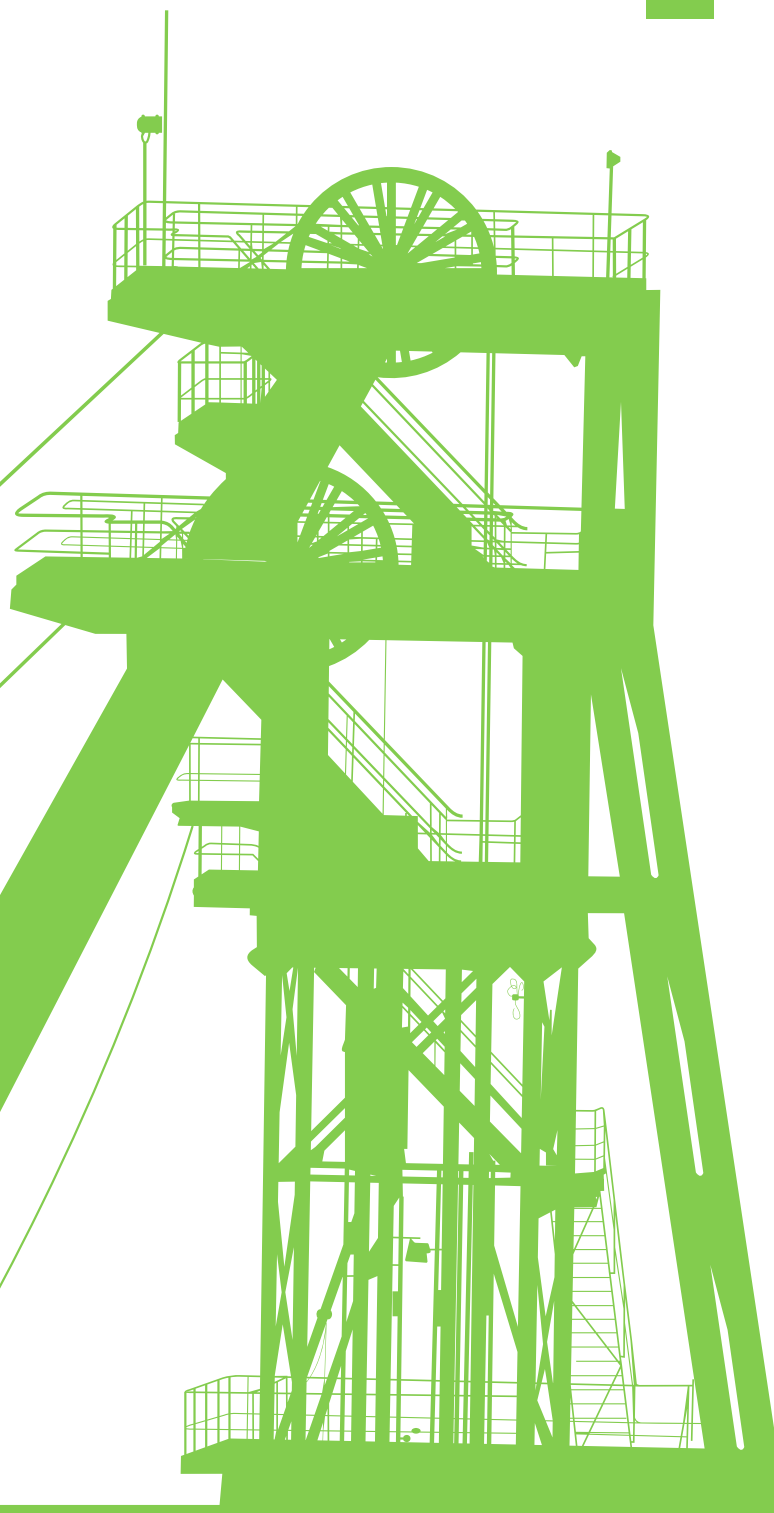
This fifth annual report builds on our prior submissions, with the benefit of input and advice from the GMOB and our other stakeholders.

We will continue to communicate our progress, improve our engagement with, and reporting to, the public, and welcome feedback on our planning and management of the GMRP. Our goal is to achieve an outcome we can all be proud of that addresses the legacy left behind by Giant Mine, and benefits Indigenous Peoples, Northerners, and all Canadians through collaboration, sincere dialogue, and learning from each other to continually improve.

The GMRP team looks forward to engaging with others throughout the project life cycle, seeking a collaborative approach that is inclusive and forward-looking. We hope our work, and the lessons we learn through it, will inform the management of other complex remediation

projects and will allow the Government of Canada to adapt and improve both its management practices and decision-making processes related to resource extraction and land use in the North.

Serge Beaudoin, B.SC., LL.L
Assistant Deputy Minister,
Northern Affairs Organization



ACRONYMS

ADM	Assistant Deputy Minister
AEMP	Aquatic Effects Monitoring Program
AQMP	Air Quality Monitoring Program
C&M	Care and Maintenance
CanNor	Canadian Northern Economic Development Agency
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada
CRP	Closure and Reclamation Plan
DG	Director General
DM	Deputy Minister
ECE	Education, Culture and Employment
ECCC	Environment and Climate Change Canada
EEM	Environmental Effects Monitoring
ENR	Environment and Natural Resources
EQC	Effluent Quality Criteria
ETP	Effluent Treatment Plant
GMAC	Giant Mine Advisory Committee
GMOB	Giant Mine Oversight Board
GMRP	Giant Mine Remediation Project
GNWT	Government of the Northwest Territories
HC	Health Canada
H&S	Health and Safety
ITI	Industry, Tourism and Investment
IOC	Indigenous Opportunities Considerations
LTMP	Long-term Monitoring Program
MCM	Main Construction Manager
MDMER	Metal and Diamond Mining Effluent Regulations
MVEIRB	Mackenzie Valley Environmental Impact Review Board
MVLWB	Mackenzie Valley Land and Water Board
NAO	Northern Affairs Organization
NCSP	Northern Contaminated Sites Program
NSMA	North Slave Métis Alliance
OMP	Operational Monitoring Program
PSPC	Public Services and Procurement Canada
QRA	Quantitative Risk Assessment
RD	Regional Director
RGD	Regional General Director
SNP	Surveillance Network Program
TCAs	Tailing Containment Areas
TK	Traditional Knowledge
WTP	Water Treatment Plant
YKDFN	Yellowknives Dene First Nation

SUMMARY OF PROGRESS IN 2019–20 & PLANS FOR 2020–21

The table below summarizes key activities planned for 2019-20 (as identified in the 2018-19 annual report), provides a brief description of progress made, and identifies activities planned for 2020-21. This summary enables readers to see whether the GMRP team achieved what it planned and, where it did not, to understand why not.

OPERATIONS

Component	Plans for 2019-20	Progress in 2019-20	Plans for 2020-21
Care and Maintenance (C&M)	Continue C&M in accordance with contract and regulatory requirements and site conditions.	**Advanced / Underway:** Sub-contracts were awarded under Parsons, the Main Construction Manager (MCM), to operate and maintain all C&M activities including: maintaining site infrastructure, ongoing dust management activities, operating the Effluent Treatment Plant (ETP), continuing water and effluent monitoring, providing site security 24/7, and completing underground repairs to existing chutes and head covers.	Continue C&M in accordance with contract and regulatory requirements and site conditions.

OPERATIONS			
Component	**Plans for 2019-20**	**Progress in 2019-20**	**Plans for 2020-21**
Immediate Risk Mitigation	Assess higher-risk category buildings.	**Completed:** Conducted a structural review of higher-risk category buildings.	Implement new recommendations from the 2019 review, as appropriate. The MCM will decontaminate and deconstruct site infrastructure in the next few years (schedule to be determined). No further assessment of site infrastructure will be completed by the GMRP.
	Commission and operate the new, dual submersible deep well pump system.	**Completed:** Began operation of the new dual submersible deep well pump system in April 2019, used to dewater during freshet.	Troubleshoot and either repair or replace deep well pumps during summer 2020.
	Conduct the annual dam inspection and implement new recommendations from the 2018-19 dam inspection, as appropriate.	**Completed:** Conducted the annual geotechnical inspection of the dams.	Conduct the annual geotechnical dam inspection and continue to enact recommendations put forth by the inspecting geotechnical engineers on site, as appropriate.
	Conduct the 10-year dam Safety review, as outlined in the Canadian Dam Association Guidelines for compliance.	**Advanced/Underway:** Completed the desktop study and field component of the 10-year dam safety review in 2019-20.	Complete the 10-yr dam safety review in 2020-21 (draft received in 2019-20). Install thermosyphons to ensure stability of Dam #1 primarily for the protection of the workers accessing the underground via B3 pit, but also for the longevity of the operations of the ETP. To be completed by end of November 2020.

DESIGN			
Component	**Plans for 2019-20**	**Progress in 2019-20**	**Plans for 2020-21**
Waste Disposal and Management	Re-evaluate the closure strategy for the deep contaminated materials.	**Completed:** Re-evaluated the closure strategy for areas of deep contaminated materials through an options analysis workshop and selected the preferred remedial/risk management option.	Incorporate findings into future decision making.
	Conduct further studies, including costs, to inform final waste disposal options and designs.	**Completed:** Completed historical studies for potential buried hazardous waste. Conducted a soil washing bench scale test to determine the ability and efficiency of reducing the amount of highly contaminated arsenic waste. Evaluated and selected remedial / risk management strategies associated with contaminated soil and sediment.	Conduct a field study to confirm location of potential buried hazardous waste. Complete the substantive design for the contaminated soils and sediments, disposal of arsenic impacted waste and the non-hazardous waste landfill.
Freeze Design	Incorporate recommendations based on updated climate change knowledge into future freezing designs.	**Advanced:** Initiated the substantive design of the freeze area within B1 pit, which will hold arsenic contaminated waste.	Complete the substantive design of the freeze area within B1 pit.
	Conduct additional studies of different freezing/ backfilling material options for B1 open pit.	**Advanced/Underway:** Initiated substantive design of the AR3 and AR4 Freeze Areas, which includes B1 pit.	Complete substantive design of the AR3 and AR4 Freeze areas, including material requirements for the B1 pit.

DESIGN			
Component	**Plans for 2019-20**	**Progress in 2019-20**	**Plans for 2020-21**
Water Treatment and Management	Summarize all activities and results from the pilot-scale passive treatment system testing program.	**Completed:** Completed a pilot-scale passive treatment system study to inform the full-scale system design.	Incorporate the findings into the Reclamation Research Plan submitted as part of its Water Licence Application.
	Advance the final design for the Water Treatment Plant (WTP).	**Advanced/Underway:** Finalized the preliminary design for the new WTP and explored ETP upgrade options aimed at improving the mine water effluent quality.	Advance the study's recommendations.
	Complete the Aquatic Effects Monitoring Program (AEMP) study design focussing on Baker Creek; submit as part of the application for the Type A Water Licence for Site.	**Advanced / Underway:** Submitted the AEMP study design for Baker Creek in April 2019 as part of the Type A Water Licence, along with a conceptual study design for the Yellowknife Bay AEMP.	Rights holders and stakeholders reviewed and commented upon the AEMP during the Water Licence and Land Use Permit process in 2019-2020. The Project Team will revise in 2020-21.
Tailings		**Advanced / Underway:** Conducted investigative drilling on the tailings area and the dams to support design plans for the tailings area.	Complete portions of the substantive design of the Tailings Containment Areas (TCAs), including the Dams, with the remaining completed in early 21/22.
Open Pits and Borrow	Conduct further studies on backfilling materials and potential impacts to support the final open pit closure design.	**Advanced / Underway:** The Project team identified potential options and suitable borrow material for pit fill with some recommendations for additional investigations (sampling, testing, and modeling) for consideration.	Complete the substantive design for the closure of open pits.
Underground	Implement a long-term monitoring plan to assess the integrity of the C5-09 backfill.	**Advanced/Underway** Continued quarterly inspections of C5-09 as part of the underground monitoring Program. Completed planning for placement of drill holes for long-term monitoring.	Drill for instrumentation equipment for long-term monitoring. Complete substantive design of the underground.

ENVIRONMENT			
Component	**Plans for 2019-20**	**Progress in 2019-20**	**Plans for 2020-21**
Long-term Monitoring Program (LTMP)	Continue monitoring treated effluent prior to and during discharge.	**Completed:** Continued monitoring activities to establish baseline conditions in Yellowknife Bay in 2019-2020. Continued monitoring during the annual bird activity survey.	Continue baseline monitoring (LTMP).
Air	Continue existing water quality monitoring [Surveillance Network Program (SNP), Metal and Diamond Mining Effluent Regulations (MDMER)/ Environmental Effects Monitoring (EEM), Operational Monitoring Program (OMP)].	**Completed:** Continued air quality monitoring activities in 2019-2020.	Continue air quality monitoring, including ongoing community monitoring and site perimeter monitoring, with activity-specific monitoring conducted as applicable.
	Continue to ensure there is a sufficient stockpile of dust suppressant on site, and that water trucks are available to wet drying areas that could generate dust.	**Completed:** Applied dust suppressant (SoilTac) on TCAs, ensuring there was a sufficient stockpile and that water trucks were available.	Continue to treat the TCAs and road network, as needed.
Water	Continue monitoring treated effluent prior to and during discharge.	**Completed:** Treated and discharged 362,632 m3 of effluent from the Giant Mine site between July 3 and September 19.	Continue monitoring treated effluent prior to and during discharge.
	Continue existing water quality monitoring [Surveillance Network Program (SNP), Metal and Diamond Mining Effluent Regulations (MDMER)/ Environmental Effects Monitoring (EEM), Operational Monitoring Program (OMP)].	**Completed:** Conducted monitoring of minewater, surface water and groundwater to meet regulatory and operational monitoring requirements, as well as to continue to collect baseline data to support ongoing modelling efforts and site characterization.	**Completed:** Conducted monitoring of minewater, surface water and groundwater to meet regulatory and operational monitoring requirements, as well as to continue to collect baseline data to support ongoing modelling efforts and site characterization.

ENVIRONMENT			
Component	**Plans for 2019-20**	**Progress in 2019-20**	**Plans for 2020-21**
Water	Submit an application to the Mackenzie Valley Land and Water Board (MVLWB) for a Type A Water Licence and Land Use Permit for the Site.	**Completed:** Submitted the Project's application for a Type A Water Licence and Land Use Permit to the MVLWB (April 1, 2019), which the MVLWB deemed to be complete and open for review.	The Project anticipates receiving the Water Licence and Land Use Permit approval in 2020 (approved September, 2020).
	Once the comprehensive effluent quality criteria modelling has been completed, complete substantive design for the outfall (a no-cooling option) at the selected location in the vicinity of Baker Creek.	**Completed**: Submitted the Effluent Quality Criteria (EQC) report in April 2019 as part of the overall application for a Type A Water Licence to the MVLWB.	Continue progress on substantive designs for the new Water Treatment Plant (WTP) and outfall.
	Field investigation to be completed in summer 2019 (starting in July) and reported by June 2020 to meet the Phase 6 EEM reporting requirements.	**Advanced/Underway:** Completed field investigations in summer and fall 2019 for the Phase 6 EEM requirements. Completed a draft Phase 6 EEM report in 2019-2020.	Finalize the Phase 6 EEM report and submit to Environment and Climate Change Canada in June 2020.
		Completed: Updated the fish and fish habitat studies of Baker Creek and Yellowknife Bay and completed a review of fish swim performance at the proposed treated effluent outfall in Yellowknife Bay.	Incorporate information into fish authorization application materials to Department of Fisheries and Oceans Canada.
Land	Safely manage waste material stored on-site until full remediation can begin.	**Completed:** Surface C&M continued to manage wastes on site (including monitoring and management of arsenic-impacted waste).	Continue managing wastes on site.
		Completed: Completed a small mammal and vegetation sampling field program, along with a draft summary report.	

HEALTH AND SAFETY			
Component	**Plans for 2019-20**	**Progress in 2019-20**	**Plans for 2020-21**
Occupational Health & Safety (H&S)	The GMRP will continue to track occupational H&S on a quarterly and annual basis and provide relevant H&S Training.	**Completed**: Continued to track occupational H&S through the Northern Contaminated Sites Program (CSP) internal management system on a quarterly and annual basis.	Continue to track and report on occupational H&S through tracking of training and incidents.
Public H&S	Report the community baseline results from the Health Effects Monitoring Program) and report all individual results to each participant with appropriate medical advice. Additional toenail sample analysis will be completed on individuals showing results in the top 5% of the population.	**Advanced/Underway:** The Health Effects Monitoring Program Research Team undertook public engagement in May 2019 to report back on the initial results of the study.	The HEMP Team is to publish the next report in the fall 2020 by the Health Effects Monitoring Program Team, including toenail sample analysis.
	Implement the Stress Study in 2019-2020 (now called the Hoèła Weteèts'eèdeè: Understanding Community Wellbeing Around Giant Mine).	**Advanced/Underway:** Established an Advisory Committee and Technical Committee, which provide direction and expertise on the continued development of the Study. The name of the study was changed to Hoèła Weteèts'eèdeè: Understanding Community Wellbeing Around Giant Mine to better reflect the holistic nature of the work and reduce potential bias.	The Research Team is working to further refine the plan for 2020-21 with implementation planned for the fall of 2020.

COMMUNITY			
Component	**Plans for 2019-20**	**Progress in 2019-20**	**Plans for 2020-21**
Engagement	Engagement will focus on the Quantitative Risk Assessment community and business outreach on procurement and contracting opportunities, socio-economic governance, Community-Based Monitoring, Baker Creek, Borrow sources, Perpetual Care Plan, and Stress Study.	**Completed:** Engagement sessions held throughout the year focused on the Quantitative Risk Assessment, the Water License, the Perpetual Care Plan, the Borrow Design, the Stress and Resilience Study, and the Socio-Economic Implementation Plan. The North Slave Metis Alliance (NSMA) completed a Traditional Knowledge (TK) study.	Engage on the following: Quantitative Risk, Management Plans, the Perpetual Care Plan, the Hoèła Weteèts'eèdeè: Understanding Community Wellbeing Around Giant Mine, Socio-Economic Implementation Plan, Baker Creek and Yellowknife Bay.
Employment and Training Socio-Economic)	The GMRP will continue to track employment as well as workforce training on a quarterly and annual basis, and will establish targets for employment and training, by engaging with the Socio-Economic Working Group, Socio-Economic Advisory Body, and the GMRP Working Group.	**Advanced/Underway:** Continued to track employment as well as workforce training on a quarterly and annual basis. Initiated development of targets and the development of an SE Implementation Plan for 2020-2022.	Finalize and communicate Socio-Economic targets; confirm 2020-21 and 2021-22 implementation activities and advance implementation. Track employment and training statistics.
Procurement (Socio-Economic)	The GMRP will continue to track the total number of suppliers, the total value of contracts and the number of suppliers and value of contracts by these categories.	**Completed:** Continued to track suppliers on a quarterly and annual basis. Initiated development of targets and the development of an SE Implementation Plan for 2020-2022.	Finalize and communicate SE targets; confirm 2020-21 and 2021-22 implementation activities and advance implementation. Continue to track the procurement statistics.

1.0 PROJECT OVERVIEW

The GMRP addresses the long-term containment and management of the arsenic trioxide waste, the demolition and removal of all surplus buildings on the surface, and the remediation or risk management of all impacted surface areas, such as soils and tailings ponds. It also includes water management and treatment.

OBJECTIVES & OUTCOMES

The overall objectives of the GMRP are to:

- minimize public and worker health and safety risks;
- minimize the release of contaminants from the site to the surrounding environment;
- remediate the site in a manner that instills public confidence; and,
- implement an approach that is cost-effective and robust over the long term.

The successful remediation of the Giant Mine will yield the following outcomes:

- safeguard of the health and safety of Northerners;
- protection of water, soils, flora and fauna at the Giant Mine site;
- reduced federal liability associated with the site by using industry best practices for remediation in a cost-effective manner;
- improved relationships with local Indigenous groups;
- demonstration of federal commitment, which illustrates how economic development can be carried out without adversely affecting the environment; and,
- demonstration of federal leadership in complying with all applicable environmental Acts, Regulations, and standards.

PHASES OF THE GMRP

Figure 1 illustrates the past, current and planned activities of the GMRP.

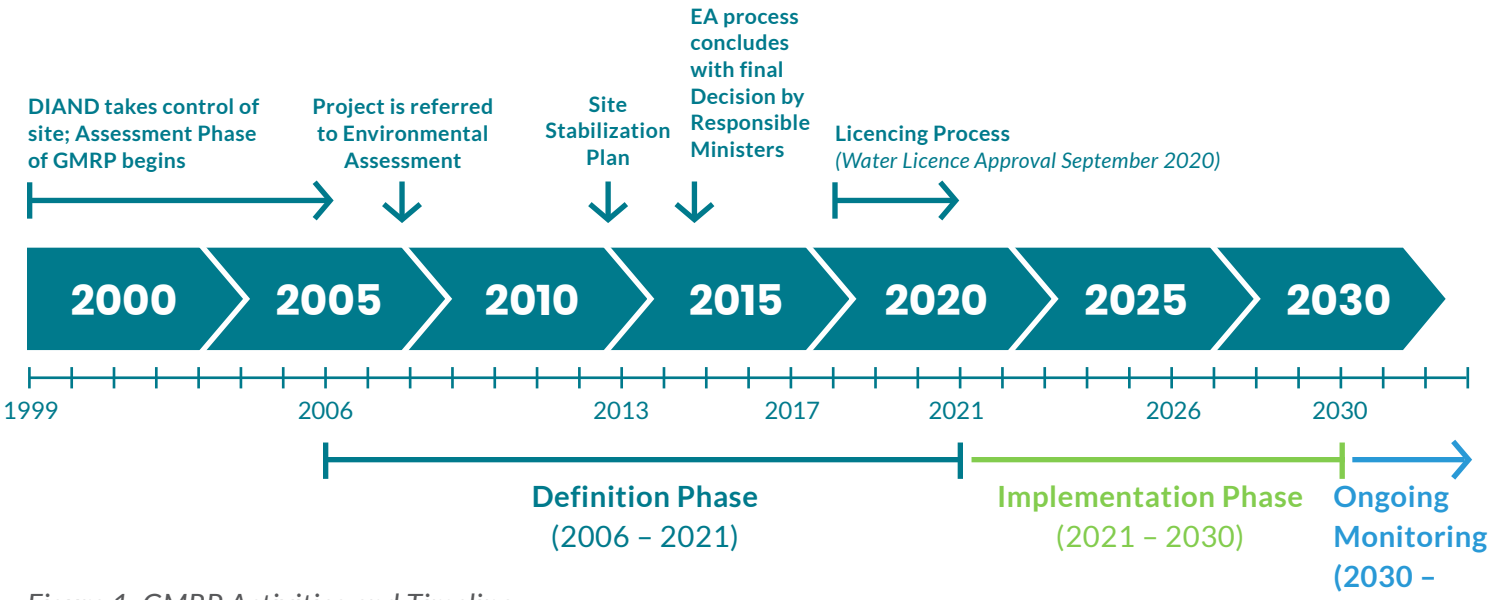


Figure 1: GMRP Activities and Timeline

GOVERNANCE OF THE GMRP

The governments of Canada and the Northwest Territories are co-proponents of the Project. Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) is Canada's lead on the Project while Environment and Natural Resources (ENR) represents the Government of Northwest Territories (GNWT) with Public Service and Procurement Canada (PSPC) playing an important support role.

A joint CIRNAC - PSPC project governance structure has been established to provide oversight, direction and advisory services to the Project team. The governance and management of the GMRP is also supported by external, independent and technical reviews provided by multiple groups, such as the GMOB, which was formed in 2015. Figure 2 shows the governance structure of the GMRP.

OTHER GOVERNANCE BODIES

Other governance bodies that provide advice and/or inputs to the GMRP on all topics include:

- Deputy Ministers (DM) Committee (DMs of PSPC and CIRNAC)
- Senior Project Advisory Committee (CIRNAC ADM NAO; PSPC ADM Real Property; PSPC ADM Acquisitions; PSPC RDG Western Region)
- Senior Project Committee (CIRNAC DG NCSP; GNWT ADM ENR)
- GMOB (CIRNAC, GNWT, YKDFN, NSMA, City of Yellowknife, Alternatives North)
- Giant Mine Working Group (CIRNAC, GNWT, NSMA, YKDFN, City of Yellowknife, Alternatives North, Environment and Climate Change Canada (ECCC), Department of Fisheries and Oceans Canada, Health Canada (HC))
- Giant Mine Advisory Committee (GMAC) (YKDFN representatives)

MANAGEMENT BOARD

(CIRNAC Director General (DG), Northern Contaminated Sites Program (NCSP); PSPC Regional Director General (RDG) Western Region, Regional Director (RD) Environmental Services, RD Acquisitions)

Provides oversight and issue resolution

PROJECT MANAGEMENT COMMITTEE

(CIRNAC Director General (DG), Northern Contaminated Sites Program (NCSP); PSPC Regional Director General (RDG) Western Region, Regional Director (RD) Environmental Services, RD Acquisitions)

Provides oversight and issue resolution

PROJECT MANAGEMENT TEAM

(CIRNAC GMRP Managers; PSPC GMRP Managers; GNWT Manager)

Manages GMRP Operations

PSPC NCSP SENIOR PROJECT MANAGER

Provides direction to and management of Parsons

MAIN CONSTRUCTION MANAGER

Contracts work packages for GMRP

SOCIO-ECONOMIC GOVERNANCE

SOCIO-ECONOMIC ADVISORY BODY

(CIRNAC; GNWT ENR, Industry, Tourism and Investment (ITI); PSPC; Canadian Northern Economic Development Agency (CanNor); Service Canada; City of Yellowknife; Yellowknives Dene First Nation (YKDFN); NSMA; Alternatives North)

SOCIO-ECONOMIC WORKING GROUP

(CIRNAC; GNWT ENR, ITI, Education, Culture and Employment (ECE), INF; PSPC; YDKFN; Parsons; CanNor; City of Yellowknife; GMOB as observers)

LEGEND

INFORMATION FLOWS

Figure 2: Governance Structure of the GMRP

2.0 2019–20 YEAR IN REVIEW

2.1 OVERVIEW

The Project team – which includes CIRNAC, PSPC, and GNWT personnel – focused their activities on six main project components over the 2019-20 year (April 1, 2019 – March 31, 2020):

1. Submitted the final Water Licence and Land Use Permit Application and Closure and Reclamation Plan (CRP) to meet the requirements defined by the MVLWB (Section 3);
2. Advanced substantive designs and cost estimates (Section 3);
3. Ensured ongoing C&M of the site (Section 4);
4. Undertook immediate risk mitigation activities (Section 4);
5. Undertook environmental and health monitoring studies / baseline assessments (Sections 5 and 6; Appendix B includes a comprehensive list of the studies conducted in 2019-20);
6. Advanced Socio-Economic Strategy implementation (Section 7).

Engagement is a core component of the Project and is described in more detail in Section 7.1. In addition, the GMRP team maintained an active risk identification and management program (described in Appendix C).

2.2 PROGRESS ON ENVIRONMENTAL ASSESSMENT MEASURES

The Report of Environmental Assessment and Reasons for Decision (Mackenzie Valley Review Board, 2013) listed 26 Measures that must be addressed, as well as 16 suggestions that may be implemented at the GMRP team's discretion. The Team's immediate focus is to address the Measures with set timelines, and those with the biggest impact on the project scope. Table 1 provides a brief summary of progress, while Appendix D provides a complete summary of progress against all Environmental Assessment Measures and Suggestions in 2019-20, as well as plans for the 2020-21 year.

STATUS	MEASURES	SUGGESTIONS
Completed	3, 4, 6, 7, 8, 11, 12, 13, 14, 15, 18, 19, 22, 23	8, 13
Underway	5, 9, 10, 16, 17, 25, 26	1, 2, 3, 4, 11, 16
Future Action Required	2, 20, 21, 24	9, 10, 14, 15
No Action Required / Outside Scope of Project	1	5, 6, 7, 12

Table 1: Status of Environmental Assessment Measures and Suggestions (as of March 2020)

In 2019-20, the Project focused on advancing the following measures:

- Measure 5: Quantitative Risk Assessment (Section 6)
- Measure 6: Long-Term Funding Options of ongoing maintenance and contingencies for the site
  - *A final report was released in summer 2019*
- Measure 9: Health Effects Monitoring Program (Section 6)
- Measure 10: Hoèła Weteèts'eèdeè: Understanding Community Wellbeing Around Giant Mine (previously called the Stress Study) (Section 6.2)
- Measure 18: Freeze Design Options (Section 3.2)

3.0 SUBMISSION OF WATER LICENCE PACKAGE & ADVANCEMENT OF SUBSTANTIVE DESIGN AND COST ESTIMATES

3.1 TYPE A WATER LICENCE PACKAGE SUBMISSION

In April 2019, the GMRP team submitted its application for a Type A Water Licence and Land Use Permit to the MVLWB, which the MVLWB deemed to be complete and open for review. The Project team participated in technical sessions in July and September 2019 and a public hearing in January 2020 to discuss the comments received (CIRNAC, 2019d). The Water Licence application can be found on the MVLWB's Public Registry (DIAND - GIANT - MV2019X0007).

3.1.1 Closure and Reclamation Plan (CRP)

The CRP for the Giant Mine site has been prepared in accordance with the submission requirements of the Water Licence and Land Use Permit Application, as defined by the MVLWB. The CRP is the culmination of engagement and design work the Team has been working on since the Report of Environmental Assessment. It provides a description of the closure and reclamation of the Giant Mine Site by identifying the activities proposed to remediate the site and presents actions for the ongoing management and mitigation of environmental effects.

In April 2019, the GMRP team submitted the CRP together with the Type A Water Licence and Land Use Permit applications to the MVLWB (Giant Mine Remediation Project, 2019a). Ongoing meaningful engagement with local Indigenous Governments and organizations and other affected parties has helped shape the final CRP. It is divided into ten major site components, and closure activities for each of the site components have been developed to meet closure objectives. Once these activities are completed, monitoring programs will be implemented to confirm the success in meeting closure objectives via closure criteria.

The GMRP team has continued to advance several work packages related to the CRP for the site, including undertaking studies to gather further information, engaging interested parties on the surface design, and advancing engineering design for the CRP.

3.2 ADVANCEMENT OF SUBSTANTIVE DESIGN & COST ESTIMATES

3.2.1 Waste Disposal and Management

3.2.1.1 Waste Disposal Options

Long-term management of arsenic trioxide waste is one of the key components of the Giant Mine CRP. During the life of the mine, mining operations produced approximately 237,000 tonnes of arsenic trioxide waste, which are currently stored in 14 chambers and stopes (Giant Mine Remediation Project, 2018a). Chamber 15 had not been commissioned by the time mining operations stopped and is currently empty. The chamber has been identified as a potential disposal site for arsenic waste related to clean-up activities (Giant Mine Remediation Project, 2007).

In 2018, the GMRP team conducted an updated assessment of the two preferable disposal of waste options – the use of drifts or drop raises – to deliver arsenic waste to Chamber 15 (Golder Associates Ltd., 2018). The report concluded that drop raises should be carried forward into the next stage of design as a positive and viable option.

In 2019-20, the recommended option of drop raises was further examined, since the schedule for the placing of arsenic waste will now occur within the first few years of remediation. In addition, a bench scale testing of soil washing was conducted in the summer of 2019 to determine if soil washing was both economically and technically feasible. Soil washing was found to be feasible and will be included in the remediation of the highly contaminated soils.

Next steps:

- Final selection of the preferred locations and methods of disposal for arsenic impacted waste, including a detailed constructability review by the Main Construction Manager (MCM).
- Conceptual and substantive design of the arsenic waste disposal preferred option for Chamber 15 and B1 pits.

3.2.1.2 Freeze Designs

In 2018, the GMRP team conducted a review of current climate change documentation to support the advanced design of freeze Areas 1 and 2. Climate change is a critical risk factor for ground freezing systems at the Giant Mine site. Since updated predictions indicate that the rate of warming in the Northwest Territories will be four to five times faster than the global rate with variable summer and winter offsets, the review provided the following recommendations (AECOM Canada Ltd., 2018):

- investigating mitigation options with additional near surface thermosyphons for shallow chambers;
- including seasonal variation in any future design modelling;
- completing modelling to 100 years, or the maximum available data relating to climate change predictions; and,
- using the most current maximum projections for all analysis, which refers to the worst-case scenario or highest greenhouse gas concentration prediction.

In 2019-20, the Project Team initiated the substantive freeze design for Areas 3 and 4. The current climate change projections were incorporated into the design. These freeze designs incorporate the freeze design of a portion of B1 pit as well.

Next steps:

- Complete the substantive design and cost estimate for all freeze areas (1 through 4).
- Complete both the Arsenic Trioxide Shell Monitoring and Management Plan and the Freeze Design Plan.
- Complete the detailed design for the AR1 freeze pad construction.

3.2.1.3 Remedial Strategy for Contaminated Soil and Sediment

In support of the CRP, the GMRP team evaluated and selected remedial / risk management strategies associated with contaminated soil and sediment at Giant Mine. In 2019-20, the Project summarized historical information regarding the Pond Water Impacted Areas (located down from Dam 3) in order to inform an options analysis workshop and help determine the most favorable closure scenario (AECOM Canada Ltd., 2020a). The Project also produced a report to address the information gaps on contaminated soil and sediment (Golder Associates Ltd., 2019a).

The Project re-evaluated the closure strategy for areas of deep contaminated materials through the options analysis workshop and selected preferred remedial/risk management options based on (i) technical feasibility, (ii) project objectives, and (iii) long term performance (Golder Associates Ltd., 2019j).

Recommendations / Next Steps:

- The study on Dam 3 proposed five potential remedial scenarios to move forward to evaluation and scoring.
- The contaminated soil and sediment report recommended that the project complete an updated material balance and a focused survey (i.e. EM61 survey).
- The options analysis workshop produced recommendations to support the development of engineering design reports.
- Next step: Complete the substantive design for the contaminated soils and sediments.

3.2.2 Water Treatment Projects

3.2.2.1 New Water Treatment Plant (WTP)

Management of contaminated water within the mine site is a key activity to reduce its impact on the environment. In 2019-20, the Project explored ETP upgrade options aimed at improving the mine water effluent quality and outlined maintenance and inspection recommendations deemed necessary to keep the ETP operational until the WTP is brought into operation (anticipated 2026) (AECOM Canada Ltd., 2019c). The Project team finalized the preliminary design for the new WTP, including WTP design basis, general design requirements and preliminary drawings. The design also specifies the capacity and water quality basis and treatment process selection (AECOM Canada Ltd., 2019b; AECOM Canada Ltd., 2020c). The Project team completed a siting assessment for the new WTP, including the development of a concept level design for the upstream WTP intake pumps and piping to the downstream treated water conveyance pipe with discharge to Yellowknife Bay (AECOM Canada Ltd., 2019d).

The Project team also developed an updated three-dimensional groundwater model for the Mine, building on the previous model. The updated model has been calibrated with additional hydrogeological data and incorporates refined assumptions for effluent quality criteria for current conditions as well as provides predictions for potential future conditions in the water license period from 2020 to 2040 (Golder Associates Ltd., 2020g).

Recommendations / Next Steps:

- Collect additional near surface data to verify groundwater flow predictions.
- The assessment recommendation that a new WTP be constructed with a firm capacity of 30 L/s and the treatment ability to process water with an arsenic concentration of 0.01 mg-As/L while receiving raw water with a maximum arsenic concentration of 100 mg-As/L.

3.2.2.2 Pumping System

The preliminary design of the new WTP includes the installation of mine water intake wells that will replace the current Northwest Pumping System, recently improved (discussed below in Section 4.1.2). This system is currently pumping contaminated water from the underground and collected from surface runoff, which is then stored in surface holding ponds throughout the year to await seasonal ETP treatment. A new system will be built in approximately 2025, near the former C-shaft area in the core area of the Project site, using a new submersible pumping system, similar to the existing Northwest Pumping System. This system will operate year-round and it is anticipated that no surface water storage will be required.

A recent report assessed underground water quality and quantity for the development of effluent quality criteria, the feasibility design of the mine water intake wells, and the identified risks associated with the design assumptions behind the water intake wells for the C-Shaft zone (Golder Associates Ltd., 2019g).

Recommendations:

- Refine the assessment of water level fluctuations due to seasonal variation in infiltration.
- Monitor refinements in the pit and tailings cover construction schedule and surface water diversion designs to determine if there will be effects on the predicted maximum and minimum pumping capacities.

3.2.2.3 Site-Specific Passive Treatment System

As part of the Giant Mine CRP, the GMRP team assessed the feasibility of treatment wetlands or other applicable passive and semi-passive surface water treatment technologies. At the Giant Mine site, a Passive Treatment System could remove arsenic as well as other parameters such as antimony, copper, lead, nickel, zinc, chloride, nitrate, and nitrite from the aquatic environment of Baker Creek.

In 2019, the GMRP completed a pilot-scale Passive Treatment System study to inform full-scale system design (Contango, 2019a). The study concluded that treatment of surface water at the site is possible through passive or semi-passive wetland applications. All parameters of potential concern exhibited some treatment. The study also identified potential risks for arsenic treatment, to be further assessed and addressed.

Next Steps:

- Continue studying Passive Treatment Systems as outlined in the Reclamation Research Plan submitted to the MVLWB.

3.2.3 Tailing Containment Areas (TCAs)

Over the operating life of the mine, most tailings were deposited into TCAs. In 2018-2019, a Tailing Management and Monitoring Plan was developed to define an approach to managing the TCAs after completion of closure activities (Giant Mine Remediation Project, 2019c).

In 2019, the Project team reviewed and updated the Operations, Maintenance and Surveillance Manual providing procedures for the operation, maintenance and surveillance of the TCAs and the existing water treatment system (Golder Associates Ltd., 2019i). Additionally, the Project team conducted investigative drilling on the tailings areas and the dams to help confirm design plans for the tailings areas (CIRNAC, 2019b).

Next steps:

- Complete the substantive design and cost estimate of the TCAs and post-closure dams.
- Complete conceptual and substantive design of the near shore sediment and foreshore tailings caps.
- Complete conceptual and substantive design of the potential boat launches and docks in the public boat launch area.

3.2.4 Open Pit Closure

Open pit closure is another component of the overall Giant Mine CRP. There are eight open pits on the Giant Mine site. These open pits pose potential risks to worker and public safety as well as to the environment, given the probability that Baker Creek may flood the area, affecting the underground. To address this risk, the Project has decided to fill or partially fill the pits.

In 2019-20, the Project identified information gaps important to the development of open pit closure options and design criteria as well as necessary integration of the open pit closure design process with other closure components (Golder Associates Ltd., 2019h). Over the course of two field visits (August 2018 and June 2019), they also completed a field site investigation of all openings to surface located outside of the pits in order to determine the most favorable closure option for each individual opening (Golder Associates Ltd., 2020c). This served as a reference for the options analysis meeting in January 2020. Additionally, the Project conducted site borrow[2] investigations. Investigations included borrow partial three-dimensional renderings (Giant Mine Remediation Project, 2020a), a fine-grained borrow characterization study (Golder Associates Ltd., 2020a), a geophysical investigation of the proposed fine-grained borrow sources (Golder Associates Ltd., 2020e), and a coarse-grained borrow characterization study (AECOM Canada Ltd., 2019a). These studies identified potential options and suitable borrow material for pit fill with some recommendations for additional investigations (sampling, testing, and modeling) for consideration.

Next steps:

- Complete the substantive design and cost estimate for the closure of the open pits. This includes covers where deemed necessary.
- Continue to obtain long-term testing data on material that will be selected to be placed in the pits and for cover material.

[2] borrow is material used to infill a pit

4.0 OPERATIONAL SUMMARY

4.1.1 Care and Maintenance (C&M)

Ongoing C&M at Giant Mine is critical to ensure current hazards at the site are managed to prevent harm to staff, surrounding communities, and the environment. In 2019-20, the Project continued care and maintenance activities to keep the site stable and safe until remediation can begin. These activities included:

- preparing for spring freshet; the 2019 spring freshet occurred without incident;
- discharging treated effluent (362,632 m3 of treated mine effluent discharged into the environment at Surveillance Network Program location 43-1 (SNP 43-1));
- conducting ongoing monitoring and sampling of water and effluent;
- conducting ongoing dust management activities including application of SoilTac on TCAs;
- maintaining site infrastructure and roads;
- maintaining the underground travel ways, including underground repairs to existing chutes and head covers to reduce hazards to workers;
- providing full time on-site emergency medical services;
- continuing site security activities including new signage and security fencing upgrades (CIRNAC, 2019a); and,
- conducting weekly inspections of the Material Storage Area.

4.1.2 Immediate Risk Mitigation

4.1.2.1 Infrastructure Review

The GMRP conducts an annual structural review of buildings at the Giant Mine site to assess risks and determine whether immediate action is required to mitigate those risks. In July 2019, a structural review was conducted on 28 buildings, using visual assessments to identify types of structural defects, signs of structural distress and deformations, and signs of material deterioration (AECOM Canada Ltd., 2020b). Table 2 provides a summary of the results of the infrastructure assessment.

RISK CATEGORY	DESCRIPTION	NUMBER OF BUILDINGS IN 2019
Black	Risk of immediate structural failure	0
Red	Risk of structural failure within 5 years	9
Yellow	Risk of structural failure between 5 – 10 years	14
Green	Expect to last beyond 10 years	4
Not Reviewed	Buildings remote and difficult to access, missing, or demolished	119

Table 2: Results of the 2019 Infrastructure Assessment

The assessors noted that several buildings on site remain unsecured. Several of the buildings that were classified as Black during the 2014 assessment have since been demolished. No buildings were classified as Black in this assessment, but one building was revised from a Black rating to a Red rating, as no further deterioration of the building condition was observed by the assessor.

Recommendations / Next steps:

- Restrict access of unauthorized personnel to the site ensure safety and welfare of the public and mine staff.
- Reassess buildings that show noticeable change in two years' time to determine the rate of deterioration (Note: the Project will not pursue further assessments since the MCM will undertake the decontamination and demolition of the infrastructure in the next few years. The schedule will be in the Project Implementation Plan.
- Routinely inspect and repair the safety perimeters erected following the 2014 reviews at least once a year (preferably after the spring melt)
- Review buildings rated Red at a minimum of every two years; review all buildings every four years (Note: the Project will not pursue further assessments since the MCM will undertake the demolition of the infrastructure in the next few years. The schedule will be in the Project Implementation Plan).
- Recommend repairs to the following buildings: the Bayview Sewage Pump House, the Guest House, and the 216A/B Residences.

4.1.2.2 Upgrades to the Northwest Deep Well Pumping Station (previously named the Akaitcho Deep Well Pump Station[3])

The existing dewatering system keeps the Giant Mine underground water levels within required limits. After four years of operation, it was observed that the existing dewatering system was discharging water at a decreased rate compared to when it was initially installed. This change could cause risks at the Site. The GMRP team assessed potential improvements to the dewatering system to increase its reliability. In 2017, the Project team decided to complete pumping station upgrades using two deep well submersible pumps located near the Northwest shaft (formerly called the Akaitcho shaft) (AECOM Canada Ltd., 2017).

In 2019-20, a new deep well pump station came into operation in April 2019 and was used to dewater during freshet. The new pumping system, the Northwest Deep Well Pumping System, consists of two Baker Hughes submersible pumps installed in steel-cased boreholes drilled from the surface into the mine pool. One pump stopped operating after a brown-out situation in August. The one operational deep well submersible pump sufficiently maintained water levels during 2020 freshet.

Next steps:

- Troubleshoot and repair or replace inoperable deep well pumps during summer 2020.

4.1.2.3 Geotechnical Inspection of Dams

At the Giant Mine, dams are used for mine water management, surface water management, and tailings solids retention. Dams are inspected annually to assess water level restrictions and geotechnical integrity.

In 2019-20, the Project conducted the annual geotechnical inspection of the dams through a scope of work that included visual inspections, reviews (survey data, pumping records, instrumentation, previous deliverables, dam consequence classifications), summaries and recommendations for immediate action related to maintenance, monitoring, operations, and studies (Golder Associates Ltd., 2019c; Golder Associates Ltd., 2019b).

The Project team also completed the desktop study and field component of the 10-year dam safety review in 2019-20; however, the report was expected in early 2020-21. Initial findings from the geotechnical engineering team prior to the draft being available indicated that stability work would be required on Dam #1 to mitigate risk to human health and safety and the Project team immediately began discussions on a path forward.

Next steps:

- Continue to enact recommendations put forth by the inspecting geotechnical engineers on site.
- Receive and act on 10-year dam safety report in 2020-21.
- Install thermosyphons to ensure stability of Dam #1 primarily for the protection of the workers accessing the underground via B3 pit, but also for the longevity of the operations of the ETP until such a time as the new Water Treatment Plant is commissioned.

[3] The Project Team changed the Akaitcho Deep Well Pump Station name at the request of the YKDFN; YKDFN requested the name Akaitcho not be used at the site, since Akaitcho was a former Chief and respected elder.

4.1.2.4 Hazard Mitigation of Openings

In 2019-20, the underground mining contractor bolted the rock and screened the main access travel ways as an additional safety precaution for all underground mine workers and personnel. Other safety hazards, such as old rock chutes above travel ways, were made safe, and old steel pipes replaced with new high-density polyethylene pipes.

4.2 AUDITS AND INSPECTIONS IN 2019–20

In 2019-20, there were 11 regulatory inspections of the GMRP. Additionally, contractors on-site conduct inspections to ensure workers maintain compliance with standard operating procedures, protocols, and standards. The GMRP continues to implement outstanding recommendations in response to the Environment, Health and Safety Compliance Audit conducted in 2016, including improved site signage and security and updating environmental response plans for arsenic trioxide (Giant Mine Remediation Project, 2018b).

In 2019-20, 11 inspections were conducted by external regulators – 5 by CIRNAC, 1 by ECCC, and 5 by the Workers' Safety & Compensation Commission. This compares to 16 inspections by external regulators in the previous two years, and five in 2017-18. The number of inspections per year is determined by the regulator based on a variety of factors including, but not limited to, the nature of work being undertaken at the site.

The 2019-20 regulatory inspections collectively identified 9 non-compliances, notably during the geotechnical drilling and mine health and safety inspections. The GMRP is committed to addressing any non-compliance as soon as possible and assigns responsibility and timelines for addressing identified issues. To this date, all non-compliance incidents have been addressed. Table 3 summarizes the inspections performed during 2019-2020 with non-compliances and the associated recommendations.

Table 3: Summary of Inspections with Non-compliances

Regulatory Body	Inspection Date	Inspection Type / Purpose	#of Non-Compliances	Findings / Recommendations
CIRNAC **(5 inspections; 2 with findings, 3 without)**	May 31, 2019	Inspection of geotechnical drill locations (Permit MV2016S0016)	2	• Drill cuttings around drill hole(s) to be removed. • Small hydrocarbon stains to be cleaned with contaminated material to be stored appropriately.
	September 6, 2019	Inspection of geotechnical drill locations (Permit MV2016S0016)	1	• Drill cuttings around drill hole(s) to be removed.

Regulatory Body	Inspection Date	Inspection Type / Purpose	#of Non-Compliances	Findings / Recommendations
ECCC (1 inspection, with recommentations)	September 10, 2019	Fuel storage tanks review and effluent sample collection from final discharge location (SNP 43-1)	N/A	• Recommendation: an enhanced Standard Operating Procedure for fuel transfer. • Recommendation: to include indoor holding tanks to the description of tanks system. • Recommendation: have a separate annual test for each substance subject to Environmental Emergency Regulations (E2 Regulations).
Workers' Safety & Compensation Commission (5 inspections; 2 with findings, 3 without)	July 19, 2019	Annual electrical review (Electrical substation, maintenance shop, boiler building, effluent treatment plan, Northwest sub and underground areas)	3	• Ensure a procedure is developed and implemented for work in confined spaces. • Workers shall inspect tools and equipment for defects and report defects to their supervisor or remove the equipment or tools from service. • Equipment shall be supplied that is safe to operate and properly maintained.
	September 5, 2019	Inspection of C Boiler house, electrical and maintenance shops and underground 575 Level	3	• Ensure directions for air flow and escape exits are posted at all junctions leading from work areas (underground). • Ensure all refuge stations are equipped with a first aid kit and maintained and inspected weekly. • Ensure a procedure for care, use, maintenance and storage of respirators is established and followed.

In addition to these external regulatory inspections, the C&M contractor, as well as all contractors and subcontractors, conduct their own internal inspections on a regular basis to ensure safe operation at the site. These internal inspections include daily site inspections by C&M staff and regular engineering inspections of major structures (e.g. dams, arsenic chamber bulkheads) and equipment. Only minor non-conformances were identified during internal inspections in 2019-20 and these were promptly corrected.

4.3 SUMMARY OF FISCAL YEAR 2019–2020 EXPENDITURES

Table 4 outlines the planned (i.e. expenditure totals by categories) versus actual expenditures for 2019-20 while Table 5 outlines the planned expenditures in 2020-21.

Table 4: Planned Versus Actual Expenditures

CATEGORY	PLANNED	ACTUALS	% DIFFERENCE
C&M	$18,972,562	$18,808,143	-0.87%
Regulatory	$830,000	$1,214,925	+46.38%
Consultation	$2,085,776	$1,747,380	-16.22%
Remediation	$11,064,932	$11,047,596	-0.16%
Monitoring	$2,783,245	$2,905,555	+4.39%
Program Management	$10,987,346	$ 10,697,479	-2.64%
Totals	**$46,723,860**	**$46,421,078**	**-0.65%**

Table 5: Planned Expenditures in 2020-21

CATEGORY	OPERATING EXPENDITURES	GRANTS AND CONTRIBUTIONS	SALARY AND EBP	TOTALS
C&M	$20,683,542	$-	$-	$20,683,542
Regulatory	$770,500	$-	$-	$770,500
Consultation	$457,716	$2,710,385	$-	$3,168,101
Remediation	$17,809,696	$1,624,536	$-	$19,434,232
Monitoring	$4,365,476	$-	$-	$4,365,476
Program Management	$8,872,494	$-	$3,880,780	$12,753,274
Totals	**$52,959,424**	**$4,334,921**	**$3,880,780**	**$61,175,125**

5.0 ENVIRONMENT

5.1 ENVIRONMENTAL MANAGEMENT

The following report sub-sections (Air, Water, and Land) describe key activities and results of existing environmental management programs, additional assessments and monitoring programs (as described in the LTMP summary below).

LONG-TERM MONITORING PROGRAM (LTMP)

The LTMP is a combination of all monitoring components currently ongoing or that will be required at Giant Mine. The Program includes environmental components and structural monitoring required on site. The LTMP is used to determine baseline conditions, monitor existing performance, and inform the design process for remediation activities.

ENVIRONMENTAL

- Surveillance Network Program (SNP), Metal and Diamond Mining Effluent Regulations (MDMER) including Environmental Effects Monitoring (EEM) Program
- Operational Monitoring Program (OMP) (Effluent Treatment Plant (ETP), underground, annual site-wide bird survey)
- AEMP
- Wildlife and Wildlife Habitat management and Monitoring Plan
- Air quality – site perimeter & community
- Noise

STRUCTURAL

- Freeze
- Dams and seeps
- Landfill
- Pit stability
- Tailings covers
- Underground Structures
- Baker Creek (icing)

LTMP is structured in three phases: pre-remediation, remediation, and post-remediation. The intent is for the LTMP to be operational for the lifetime of the project (100 years). Appendix E provides additional information on the individual components of the monitoring program. A new Type A Water **Licence includes conditions related to monitoring and reporting for many of the above components.**

SPILLS AND ENVIRONMENTAL TRAINING

- **Spills, Accidents, and Significant Malfunctions:** There were a total of 12 environmental incidents resulting in 176 L spilled in 2019-20 [spills consisted of mine water (approximately 100 L), hydraulic oil (approximately 40 L), and small amounts of diesel and brake fluid].
- **Environmental Training:** Employees received 581 hours of Environment, Health and Safety Awareness Training and 437 hours of Environment, Health and Safety Environmental Training which included spill response, mine rescue, and others.

5.2 AIR

Activities undertaken at the Giant Mine site have the potential to release contaminants from the site into the air. Of primary interest are particulates carrying arsenic, antimony, iron, lead, or nickel. If these contaminants become airborne, they may be transported off-site and deposited elsewhere. To monitor and minimize air quality impacts, the GMRP team has established an air quality monitoring program (AQMP) – including ongoing air quality monitoring on-site and in nearby communities – and actively manages air quality through dust suppression.

2019-20 HIGHLIGHTS

- Results of the ambient air quality monitoring indicated the air quality of the airshed encompassing the GMRP was representative of regional and local air quality.
- The GMRP team applied dust suppressant (SoilTac) on the TCAs twice and used spot treatment as needed.

5.2.1 Air Quality Monitoring

The GMRP team conducts real-time air quality monitoring of particulate matter (PM10, total suspended particulate, and PM 2.5) and laboratory analysis of arsenic, asbestos, iron, lead, and other contaminants in airborne dust. The monitoring stations provide data to monitor potential adverse effects to the local airshed during remediation activities. This data also helps the GMRP team to determine whether mitigation measures are required if air quality results exceed established Action Levels and criteria (summarized in Appendix D).

In 2019, additional monitoring locations for PM10 and arsenic were deployed in association with the Tailings Pond Drilling project and the Test Pitting work for soil washing bench scale tests. Similar to previous years, results of the ambient air quality monitoring indicated the quality of the local airshed was not significantly impacted by activities associated with the GMRP and was representative of regional and local air quality as per previous years (SLR Consulting (Canada) Ltd, 2020).

Next steps:

- The AQMP will continue, including ongoing community monitoring and site perimeter monitoring, with activity-specific monitoring conducted as applicable.

More details on the air monitoring program, including real-time data and weekly reports, are available on the NWT Air Quality Monitoring Network. You can also receive the weekly reports via email by requesting to be added to the distribution list by writing to aadnc.giantmine.aandc@canada.ca.

5.2.2 Dust Suppression

The GMRP team takes active measures to reduce dust from the site's tailings ponds and roads. These measures include communicating daily wind forecasts to GMRP team members each morning, applying dust control products to the tailings ponds and road network, and wetting the tailings ponds.

In 2019-20, the GMRP team applied dust suppressant (SoilTac) to the TCAs twice and used spot treatment as needed.

Next steps:

- In 2020-21, the GMRP team will continue bi-annual application and spot treatment of dust suppressant where needed.

5.3 WATER

To monitor and minimize water quality impacts, the GMRP undertakes ongoing effluent and water quality monitoring on-site.

2019-20 HIGHLIGHTS

- Minewater, surface water, and groundwater monitoring was conducted at Site in 2019-20 to meet regulatory and operational monitoring requirements, and to continue collecting baseline data in support of ongoing modelling efforts and site characterization.
- MDMER/EEM results were consistent with results from previous years.
- Completed the Phase 6 EEM field study and draft report. The final report will be submitted to ECCC in June 2020.
- Rights holders and stakeholders reviewed and commented on the AEMP during the Water Licence and Land Use Permit process in 2019-2020. The Project will revise the AEMP in 2020-21.

5.3.1 Effluent, Surface Water and Groundwater Quality Monitoring

To protect the heath and safety of workers, the public, and the environment, water from the Giant Mine site is treated at the on-site ETP before being seasonally discharged to the environment. The ETP system consists of various components including reaction tanks, a settling pond, and a polishing pond that are used – in this order – to treat the mine water. Discharged effluent water must meet standards set by the MDMER under the Fisheries Act and the GMRP has also committed to meeting the standards outlined in its former Water Licence. Part of the water quality monitoring program includes testing of effluent chemistry. If the level of arsenic in the water is near the maximum allowable limit, the Project team stops the release of effluent to Baker Creek and recycles it back through the treatment plant.

Contaminated water is generated throughout the year and stored on-site in the Northwest Pond. Treatment of this water typically begins in June of each year, with discharge to the environment typically occurring between July and September once the Arctic Grayling have left Baker Creek.

The Project team undertakes effluent and water quality monitoring in and around the Giant Mine site via different programs to report on surface water, groundwater and underground mine water. These programs track parameters such as the volume of water pumped or discharged, water quality and the performance of the ETP. The effluent and surface water quality monitoring encompass the programs outlined below. These programs are used to monitor existing performance and to inform the design process for remediation activities:

- Surveillance Network Program (SNP)
- Metal and Diamond Mining Effluent Regulations (MDMER) including the EEM Program
- Operational Monitoring Program (OMP)
- Supplemental surface water and groundwater baseline data collection

Parameters tested at all stations include standard general parameters (e.g., temperature, pH, conductivity, hardness), major ions, nutrients, and total and dissolved metals and metalloids. There are also specific station requirements for other tests such as total cyanide, sulphide, hydrocarbons, and radium-226. Samples collected at sampling location SNP 43-1 must meet federal

requirements under MDMER as well as the discharge criteria defined in the former Water Licence (N1L2-0043).

5.3.1.1 Annual Water Monitoring

The section below summarizes the monitoring activities conducted in 2019/20 (Table 6). Appendix E provides a detailed table of the monitoring stations (Table 20). The main objectives for water monitoring at the Site in 2019-20 were to conduct operational and regulatory sampling to support the GMRP as it transitions from the existing C&M phase into the active remediation/adaptive management phase (Golder Associates Ltd., 2020d).

In total, 362,632 m3 of treated effluent was discharged into the environment at Baker Pond. In addition, the GMRP team submitted the proposed revised SNP along with the Water Licence application in April 2019. It is anticipated that the SNP data files will be posted to the MVLWB in FY 2020-21 under the new Type A Water Licence. Until then, any document – including SNP data – is available by request to the Project team.

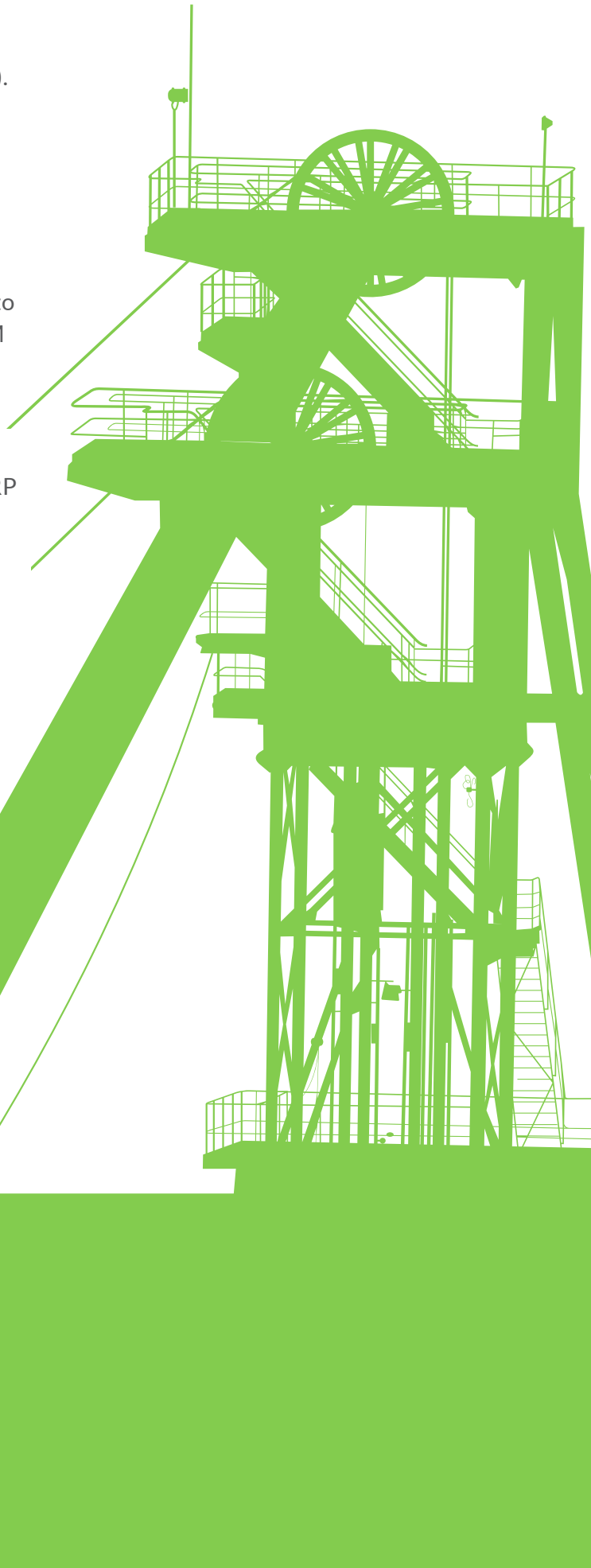


Table 6: Annual Water Quality Monitoring 2019

	ACTIVITIES	RESULTS	RECOMMENDATIONS / NEXT STEPS
Hydrology (water quantity)	Operation of hydrometric stations for continuous water level measurements from spring to fall Water level surveys and flow measurements to establish a time series of seasonal streamflow	All hydrology stations with outflow (except Mill Pond) now have a stage-streamflow rating curve, from which a continuous streamflow hydrograph was derived, and water yield was calculated	Continue additional site visits during the rising limb of the hydrograph in 2020 Establish a secondary Trapper Lake monitoring station at the ditch upstream of the Vee Lake Road at Trapper Creek to mitigate monitoring risks
Surface water and minewater quality	Underground minewater sampling as part of the OMP at sumps, mine pools, and bulkheads Minewater sampling from the Northwest wells and the C Shaft Void Surface water sampling to meet the requirements of regulatory and operational monitoring programs. Additional sampling for baseline data collection and site characterization. Under-ice and open water sampling in Yellowknife Bay for water quality, toxicity, sediment quality and plankton to provide supporting data for the AEMP.	Minewater samples were consistent with historical patterns Treated effluent quality was within all MDMER and Water Licence limits At lake and creek stations sampled under the SNP and OMP, parameters above the applicable Canadian Water Quality Guidelines were generally consistent with previous monitoring years at the Site At Baker Creek, total arsenic concentrations were above the Canadian Water Quality Guidelines in most samples at both upper and lower Baker Creek stations.	Additional sampling is recommended to support surface water design decisions An additional Yellowknife Bay water station will establish conditions near the foreshore The consistency of oil and grease and TPH in 2019 suggests oil and grease could be removed from the program
Groundwater	Hydraulic head measurements and groundwater sampling at a network of shallow monitoring wells and drive point locations to assess shallow groundwater conditions in the overburden and/or bedrock Hydraulic head measurements and groundwater sampling at selected well ports to assess groundwater conditions in the deeper bedrock flow system	Groundwater flow directions estimated from hydraulic head monitoring area consistent with previous interpretations	Review well labelling at S-DIAND-011A/B and S-DIAND-014A/B to minimize the potential of uncertainty in the data analysis Keep all the drive points as part of the monitoring program for 2020 and monitoring in the spring and fall for consistency with the shallow wells Reduce monitoring stations in the North, Central, and South ponds to wells NP-SD-04, NP-SD-08, CP-SD-04, CP-SD-07 and SP-SD-02 Further evaluate the hydraulic head increase and arsenic concentrations fluctuation at MW00-02

5.3.2 Metal and Diamond Minding Effluent Regulations (MDMER) /Environmental Effects Monitoring (EEM)

The MDMER under the Fisheries Act requires metal mines to conduct EEM. This includes monitoring of effluent and surface water quality, toxicological testing of the treated effluent, and biological monitoring. These results are used to assess and identify any effects that may be caused by the treated effluent. The overall objective of these studies is to protect fish and fish habitat in order to protect fisheries and maintain the safe use of fish by people. Effluent and water quality are monitored annually during periods of discharge and these data are used to help interpret the effects observed in the fish and benthic invertebrates from Baker Creek (i.e., the results from the biological program that is completed every three years).

Key activities in 2019-20 included:

- Effluent characterization and surface water quality monitoring on three occasions to fulfill regulatory requirements (Golder Associates Ltd., 2020b).
- Analysis of treated effluent and surface water samples for eight deleterious substances and pH as outlined in Schedules 3 and 4 of the MDMER, as well as the required parameters outlined in Schedule 5 (EEM) of the MDMER, and applicable site-specific parameters recommended by ECCC (2012).
- Testing of treated effluent for acute and sub-lethal toxicity as required by the MDMER (Government of Canada, 2002).
- Summary of the reference areas used in existing Baker Creek-related studies to inform the establishment of reference conditions for future monitoring, focused on biological monitoring programs (Golder Associates Ltd., 2019f).
- Phase 6 EEM field investigations conducted during the open water season with a draft report completed in early 2020.

The results of the MDMER report were broadly comparable with previous years; treated effluent was determined to be not acutely toxic as tested on samples, sub-lethal toxic effects were observed for some toxicity test endpoints in one sample (August 20, 2019), and treated effluent and surface water quality in the exposure and reference areas were tested with all scheduled parameters being below applicable MDMER requirements.

Next steps:

- Continue annual effluent and surface water quality monitoring for the MDMER/EEM in 2020-2021.
- Include weekly sampling for all deleterious substances (including cyanide) plus radium-226 at SNP 43-1 as a corrective action in 2020.
- Finalize and submit the Phase 6 EEM report to ECCC in June 2020.

5.3.3 Aquatic Effects Monitoring Plan (AEMP)

The GMRP submitted the completed Baker Creek AEMP Design Plan and the Draft Yellowknife Bay Conceptual AEMP Design Plan as part of the Water Licence application package. As described in the Guidelines for Designing and Implementing Aquatic Effects Monitoring Programs for Development in the NWT and the Draft Guidelines for Aquatic Effects Monitoring Program, four different types of documents are required under the AEMP: Design Plan, Annual Report, Re-evaluation Report, and Response Plan.

The GMRP is proposing to build a new WTP, which will discharge directly to Yellowknife Bay; however, until the new WTP is commissioned, the existing ETP will be used. The two different treatment plants discharge to different locations, with the AEMP shifting focus from the current discharge into Baker Creek to the future discharge location in Yellowknife Bay with the WTP.

Key activities in 2019-20 included:

- The AEMP was reviewed and commented upon by rights holders and stakeholders during the Water Licence and Land Use Permit process in 2019-2020 and will be revised in 2020-21.

Next steps:

- Undertake monitoring in Baker Creek according to the proposed AEMP Design Plan with Water Licence issuance.
- Continue to run an MDMER/EEM program concurrently until such time as the Site applies for, and receives, closed mine status.

5.3.4 Baker Creek and Yellowknife Bay Fish and Fish Habitat Assessment

In 2019, the Project updated the fish and fish habitat studies of Baker Creek and Yellowknife Bay (Golder Associates Ltd., 2019e). Following completion of this work, three tasks remain:

1. Update and finalize the Yellowknife Bay and Baker Creek habitat maps;
2. Develop a conceptual Offsetting Plan for initial Department of Fisheries and Oceans Canada review and feedback; and,
3. Develop and submit a formal application for Fisheries Act Authorization.

5.4 LAND

The GMRP team undertook several activities to monitor and minimize impacts to land and protect the health and safety of the public, on-site workers and wildlife. These activities included monitoring and management of arsenic impacted waste, and establishing and undertaking studies on animals, plants, and habitat, as described below.

2019-20 HIGHLIGHTS

- Continued monitoring and management of arsenic-impacted waste on site.
- Completed annual site-wide bird survey.
- Submitted a draft Wildlife and Wildlife Habitat Management and Monitoring Plan as part of the Type A Water Licence and Land Use Permit application process.
- Completed a field program on metals levels in small mammals, vegetation, and soils to provide a baseline prior to remediation.

5.4.1 Waste Management

In 2014, the decontamination and deconstruction of the Roaster Complex as part of the Site Stabilization Plan produced hazardous waste, primarily arsenic- and asbestos-containing materials. The wastes were safely packaged in lined Transportation of Dangerous Goods bags and stored on site, held in shipping containers within an area secured by a chain-link fence (Material Storage Area). Runoff water from the storage area is collected and treated in the GMRP's ETP. Until the material can be appropriately disposed, the safest place to store it is on an already contaminated site, away from water and people. The materials have therefore remained on-site and continued to be appropriately cared for during 2019-20.

5.4.2 Site-wide Bird Survey

The Project conducted the annual Bird Nesting survey during the migratory bird season in 2019-20. As well, wildlife sightings and interactions were logged by the MCM and reported, as required.

The purpose of the annual site-wide bird activity survey is to:

- identify nests or nesting potential in areas of active or upcoming closure activities;
- identify site features that represent notable risks to birds; and,
- provide recommendations to reduce risks to birds and comply with relevant legislation.

In May and June 2019, the Project conducted a total of ten visual surveys, accessing stations by foot or by truck, and timing these surveys to coincide with peak bird activity (Golder Associates Ltd., 2019d).

The survey identified several areas of nesting habitat (including Building 133, the Mill Site, and Mill Pond North and South).

Recommendations

- The study provided recommendations related to:
  - *Avoiding disturbance or demolition of buildings during nesting season, where possible.*
  - *Identifying options to protect or remove nesting habitat in Mill Pond, recognizing that activity or water level changes in these ponds during the nesting season will disturb the nests.*

5.4.3 Wildlife Monitoring

In 2019-20, Parsons and contractors logged and reported wildlife sightings and interactions, as required.

A draft Wildlife and Wildlife Habitat Management and Monitoring Plan was developed in 2017-18. It was completed in 2018-19 in consultation with GNWT Environment and Natural Resources and stakeholders and submitted as part of the Water Licence package in April 2019.

Next steps:

- Parsons will continue to log and report wildlife sightings and interactions.
- The Wildlife and Wildlife Habitat Management and Monitoring Plan will be updated in 2020-21 based on reviewer comments and Project commitments during the Water Licence and Land Use Permit process.

5.4.4 Wildlife Research

In 2019, the Project team launched a field program on metals levels in small mammals, vegetation, and soils to complete a baseline prior to remediation, with further sampling to be completed post-remediation. The results of the field program indicated that higher arsenic concentrations in small mammals and vegetation tended to correspond with higher arsenic concentrations in soil (Golder Associates Ltd., 2020f).

Next steps:

- To be outlined in the next version of the Wildlife and Wildlife Habitat Management and Monitoring Plan for sampling post-construction.

6.0 HEALTH & SAFETY

6.1 OCCUPATIONAL HEALTH AND SAFETY (H&S)

CIRNAC provides oversight for occupational H&S, while PSPC provides oversight and manages contractors to ensure that they have in place a H&S plan, H&S procedures, and emergency response plans, and that contractors follow the procedures and report any H&S incidents.

The Main Construction Manager maintains overall H&S responsibility as the prime contractor at the Giant Mine. To ensure that on-site safety plans are implemented, there is a designated occupational H&S manager who organizes ongoing training and occupational H&S support for managers, supervisors and other employees.

2019-20 HIGHLIGHTS

- There were no major safety incidents and 3 moderate safety incidents in 2019-20.
- The number of reported near misses decreased from 74 in 2018-19 to 41 in 2019-20.
- 2.2% of urinalysis samples were above the action level of 35 micrograms of arsenic per litre of urine (µg/L) in 2019-20.

6.1.1 Health & Safety Incidents

GMRP tracks the number of major incidents, moderate incidents, minor incidents, and near misses on a monthly basis, and reports the incidents to the GMRP Directors and GMRP team.

Based on both CIRNAC and MCM incidents reports, there were no major safety incidents, and 3 moderate incidents in 2019-20 (Table 7). This compares with 9 moderate incidents in 2018-19, and 1 moderate incident in 2017-18. The moderate incidents consisted of a hand injury and two sprained ankles.

The number of minor incidents in 2019-20 (5) decreased from 2018-19 (11), with 5 in 2017-18, and 2 in 2016-17.

The number of incidents is normalized by person-hours worked to enable comparison across years, when the amount of activity on site may differ. When considering these values (Figure 3), moderate and minor incidents are still lower than 2018-19, but there is no clear trend since 2016-17.

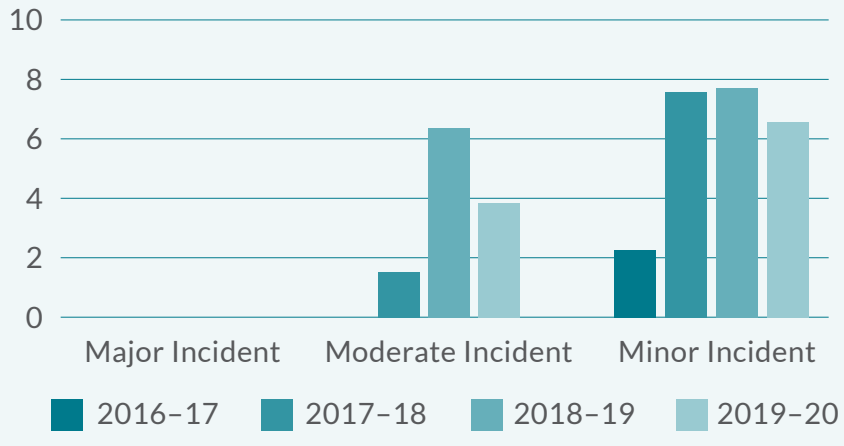
There has been a steady decline in the number of reported near misses, with 41 in 2019-20 and 74 in 2018-19, 99 in 2017-2018 and 179 in 2016-17. However, when normalized, near misses in 2019-20 were similar to 2018-19. The high number of near misses does not necessarily represent poor safety performance, but could represent a strong safety culture, demonstrating high awareness of H&S concerns and a willingness to report those concerns. Incidents and near misses are discussed at daily safety meetings to review lessons learned, root causes and corrective measures.

Table 7: H&S Incidents and Near Misses in 2019-20

INCIDENTS AND NEAR MISSES	2019-20 TOTAL
Major Incident: An incident resulting from activities performed at the site that results in a severe and irreversible disability, impairment, injury, illness or fatality to an individual or individuals.	0
Moderate Incident: An incident resulting from activities performed at the site that results in a reversible disability, impairment, injury or illness that temporarily alters the lives of an individual or individuals.	3
Minor Incident: An incident resulting from activities performed at the site that results in injury or illness that inconveniences an individual or individuals.	5
Near Misses: An unplanned incident resulting from activities performed at the site that did not result in any disability, impairment, injury, illness or fatality, but had the potential to do so.	41

Figure 3 highlights the number of H&S Incidents (normalized) from 2016-17 to 2019-20. The normalization does not account for differences in the nature of activities undertaken from one year to another.

Figure 3: H&S Incidents per 200,000 Person-hours Worked, by year (2016-17 to 2019-20)

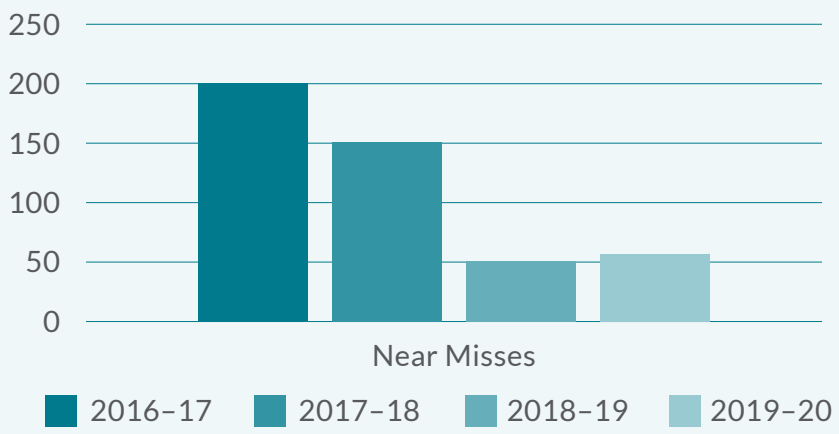


The number of Near Misses from 2016-17 to 2019-20 are presented in Figure 4 to facilitate the comparison per category across years, given the higher number of near misses in comparison with incidents.

Next steps:

- The GMRP team will continue to track and report H&S incidents.

Figure 4: H&S Near Misses per 200,000 Person-hours Worked from 2016-2017 to 2019-2020



6.1.2 Monitoring of Arsenic Levels in Workers

In the 2019-20 reporting year, the GMRP team monitored arsenic levels in the workers who spend time on-site by taking baseline urinalysis samples when workers start on site and then subsequent regular urinalysis samples (weekly samples if on-site full-time). Samples were compared against the Action Level of 35 micrograms of arsenic per litre of urine (µg/L) adopted by the Workers' Safety & Compensation Commission.

Table 8 below shows the total number of samples and the number of samples above the Action Level of 35 micrograms of arsenic per litre of blood. The percentage of samples above the action level (2.2%) is in line with previous years (3.25% in 2018-19, 1.8% in 2017-2018 and 2.6% in 2016-17).

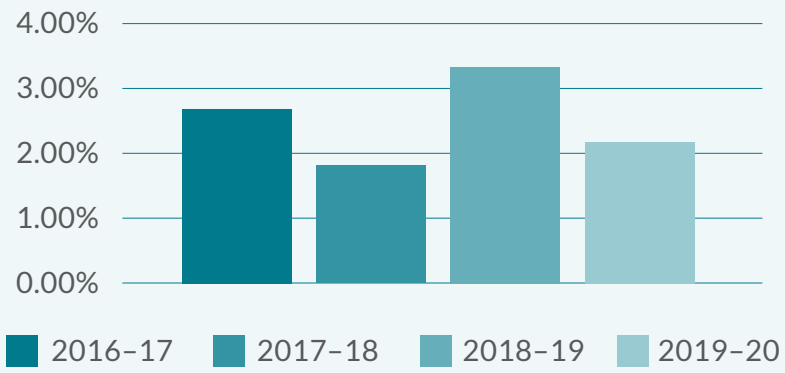
Table 8: Summary of Urinalysis Sampling and Results between 2016-17 and 2019-20

Year	Total samples	Number of samples above the action level (35 µg/l)	Percentage of samples above the action level (35 µg/l)
2019-20	682	15	2.2%
2018-19	1938	63	3.25%
2017-18	498*	9	1.8%
2016-17	686**	20**	2.6%

*This value includes 19 baseline samples and does not include invalid test results (45 samples).
**This value includes 125 baseline samples and does not include invalid test results (90 samples).
*** This value includes one baseline sample that exceeded the 35 µg/L action level.

Figure 5 below highlights the key trends in the percentage of samples above the action level from 2016-17 to 2019-20.

Figure 5. Percentage of samples above the Action Level (35 µg/L) from 2016-17 to 2019-20



For any urinalysis sample above the Action Level, the contractor notified Workers' Safety & Compensation Commission, CIRNAC, and PSPC and investigated the root cause (e.g. diet, poor hygiene practices, inadequate procedures). The contractor then took immediate actions to reduce exposure to workers, such as improvement of dust control measures, adoption of more rigorous Personal Protective Equipment procedures, re-training of staff on proper procedures, placing affected workers on limited duty to limit exposure to higher risk activities, or reassigning personnel to other duties (in the rare case of continued / recurring high levels of arsenic).

Tracking of results that are below but nearing the Action Level also allows for identification of those workers who could benefit from preventive interventions, to avoid reaching the Action Level.

Next steps:

- The GMRP team will continue to provide oversight for the H&S of its employees and contractors through the established management system and associated H&S procedures, including urinalysis for on-site workers.

6.1.3 Health and Safety Training

The MCM's Occupational H&S manager ensures that employees and sub-contractors receive relevant H&S training, including first aid, wildlife safety, water safety, and fire response, as required by applicable regulations. Each year, all new employees are assessed to ensure they have the required training to complete their jobs safely and effectively.

PSPC/CIRNAC and the MCM track the number of person-hours that employees and sub-contractors receive in training. In 2019-20, a total of 2268 H&S training hours were provided [including general Environment, Health and Safety awareness training (on policy and procedures)].

Next steps:

- The GMRP team will continue to track the type and amount of training received by employees and contractors to ensure that all employees receive the required training. The GMRP team also shares this information with interested parties and stakeholders – such as GMOB and the community – to assure them that on-site personnel are appropriately trained to do their job safely and effectively and are getting some training that is potentially transferable to other employment.

6.2 PUBLIC HEALTH & SAFETY

Since the Government of Canada took over responsibility in 1999, the GMRP team has monitored the site and ensured it is kept safe and secure through 24-hour-a-day C&M work. This work involves ensuring public safety through site security, dust suppression, and minewater and effluent management.

In response to Measure 9 of the Report of Environmental Assessment the GMRP commits to working with other federal and territorial departments to design and implement a broad Health Effects Monitoring Program.

In response to Measure 10 of the Environmental Assessment, the GMRP committed to evaluate the indirect effects of the project through a Stress Study, now called Hoèła Weteèts'eèdeè: Understanding Community Wellbeing Around Giant Mine.

2019-20 HIGHLIGHTS

- The Health Effects Monitoring Program communicated baseline results in May 2019 during community meetings with the YKDFN, NSMA and Yellowknife community.
- Established an Advisory Committee and Technical Committee for the Stress Assessment - Hoèła Weteèts'eèdeè.

6.2.1 Health Effects Monitoring Program

The Health Effects Monitoring Program in Ndilǫ, Dettah and Yellowknife focuses on effects in people related to arsenic and other contaminants[4] that might result from the GMRP. The monitoring includes studies of baseline health and ongoing periodic monitoring, in accordance with Measure

[4] Including antimony, cadmium, lead, manganese, and vanadium, which are being measured because other research and studies have shown that they are present at the Giant Mine site.

9 of The Report of Environmental Assessment and Reasons for Decision (Mackenzie Valley Review Board, 2013). Dr. Laurie Chan, based at the University of Ottawa, is leading the monitoring program. A Health Effects Monitoring Program Advisory Committee was established for the program with representatives from GNWT Health and Social Services, Health Canada, the City of Yellowknife, the YKDFN, the NSMA, GMOB and the Project team. The committee meets monthly and provides advice to the program.

The monitoring program completed its baseline sample collection in 2018. There was a total of 2037 participants between Fall 2017 and Spring 2018. Individual results were reported back to all the participants by mail, and a progress report summarized key results (Chan, et al., 2019). Public engagement was undertaken in May 2019 to report back on the initial results of the study. In general, the results from the first two waves of the study are similar to those in the Canadian Health Measures Survey, which is a representative of the Canadian population.

The next representative study with children will be starting in 2022 and with both children and adults in 2027, when the remediation is happening (CIRNAC, 2019a).

Next steps:

- The next report will be published in the fall of 2020. It will examine the relationships between diet and lifestyle variables, genetic information, the concentrations of metals in urine and the arsenic concentrations in the toenail, and results of the medical history and medical file analysis. All personal health information will be kept confidential.

The implementation schedule for the Health Study is as follows:

1. **2019-22:** Research Team and Health Effects Monitoring Program Advisory Committee will implement the follow-up plan to promote healthy living and a healthy community.
2. **2022:** The Health Study Team will carry out follow-up sampling for children participants.
3. **2027:** The Health Study Team will carry out follow-up sampling with both adults and children participants.

For additional details on the Health Effects Monitoring Program, please refer to the Frequently Asked Questions on the program's public-facing website: http://www.ykhemp.ca/faqs.php.

6.2.2 Hoèła Weteèts'eèdeè: Understanding Community Wellbeing Around Giant Mine

Measure 10 of the Environmental Assessment requires the Project team to also evaluate the indirect effects of potential exposures to arsenic on wellness, including stress. Dr. Ketan Shankardass is the principal investigator to complete the Stress Assessment which has been re-titled as Hoèla Weteèst'eèdeè: Understanding Community Wellbeing Around Giant Mine. An Advisory Committee and Technical Committee has been established and are carrying out their mandated duties to provide direction and expertise on the continued development of the Study. The Research Team is working to further refine the plan for the fiscal year 2020-21 with implementation planned for the fall of 2020.

Next steps:

- Submission of full design package to Ethics Review Board, and the NWT Aurora Research Institute in August/September 2020.
- Training of study personnel in September 2020 upon approval of the Ethics Permit.
- Data Collection to begin in October 2020.

7.0 COMMUNITY

This section provides an overview of the relevant management and performance information that applies to the community engagement and socio-economic elements of Giant Mine.

7.1 ENGAGEMENT

The overall GMRP engagement goals are:

1. Affected parties have increased trust in the project plan, the Project team, the overall project management, and are confident in the direction the project is taking moving forward.

2. The GMRP is operating in an open, inclusive and transparent manner.

3. Affected parties feel increased ownership and optimism with respect to the future remediation of the mine site, as a result of collaborative input into decision making with stakeholders/affected parties and the GMRP team.

The Project team assesses the effectiveness of its communications and engagements through various means, such as the engagement log, gathering feedback from the public and keeping a media log to track inquiries and topics. The team also tracks the number and type of engagement activities planned and achieved within their engagement log. An Engagement Plan was submitted as part of the Water Licence package in April 2019 and a revised version will be provided in December 2020.

2019-20 HIGHLIGHTS

- The GMRP team continued its engagement of key affected parties through the established working groups, including the GMOB, Giant Mine Advisory Committee, and GMRP Working Group.
- Specific engagement sessions in 2019-20 focused on the Quantitative Risk Assessment, the Draft Water Licence, Perpetual Care Plan, Borrow Design, and Socio-Economic Strategy Implementation.
- Key decisions made based on input from engagement sessions included the expansion of membership to the Socio-Economic Working Group, establishment of draft targets for Socio-Economic key performance indicators, creation of the Perpetual Care Plan Task Force, and the identification of additional locations for consideration of new Borrow locations.
- Regular communications continued (e.g. e-newsletter, website, Twitter account, public service announcements, media briefings and responses to inquiries, school presentations).

Working groups are an important way for the GMRP team to engage with key affected parties in a meaningful way, both to provide information and to solicit input. There are numerous working groups, with those focused on specific areas, such as socio-economic issues, to those focused on the Project as a whole (e.g. the Giant Mine Working Group). The full list of working groups is summarized in the Engagement Plan (MVLWB Public Registry link).

7.1.1 Engagement and Events

In 2019-20, the GMRP team undertook or participated in 67 engagement activities and events, aligned with and in support of the Project or related activities. This is up from 43 engagement events in 2018-19 and 50 in 2017-18.

KEY GMRP ENGAGEMENT ACTIVITIES IN 2019–20 INCLUDED:

Quantitative Risk Assessment (QRA) (Environmental Assessment)

The QRA engagement process has involved the Giant Mine Working Group, the Giant Mine Advisory Committee, the YKDFN, the NSMA, the City of Yellowknife, Alternatives North, and Yellowknife residents (CIRNAC, 2019c; CIRNAC, 2019a). Over the last fiscal year, the Project has completed a series of engagements that have included:

- Discussing and confirming the final list of failure scenarios (April 2019); and,
- Understanding potential impacts on 'Way of Life' (September – December 2019).

Final engagements are expected in 2020-21, to present and understand the results of the QRA, to receive input on the results, and to discuss and receive input on how the results can be used to improve the project.

Water Licence Sessions

The Water Licence Package engagement focused on the following:

- Two rounds of technical workshops with affected parties in July and September 2019;
- Closure Criteria Workshop in September 2019;
- Public Hearings in January 2020, with a pre-hearing conference held in October and GMRP responses to Interveners in November 2019; and,
- Circulation of draft Water Licence in March 2020.

Perpetual Care Plan

The GMRP hosted a two-day workshop and presented the Perpetual Care Plan Draft Framework in October 2019 for discussion and input into amendments to the draft framework. The workshop also included discussion of the planned procurement process for the first comprehensive draft of the Perpetual Care Plan. The workshop also realized the need for the establishment of a Perpetual Care Plan Task Force, with dedicated representatives from all six signatories to the Environmental Agreement.

Borrow Design

Workshops were held in December 2019 with the YDKFN, Giant Mine Working Group / general public, and the NSMA. The purpose was to discuss potential borrow locations on-site to help to drive the borrow design / selection of borrow areas and criteria for considerations (e.g. noise, disruption to public use areas). The site also hosted three site visits with a focus on borrow locations.

Hoèła Weteèts'eèdeè: Understanding Community Wellbeing Around Giant Mine

Several working group meetings were held in 2019-20 to present the progress on the overall design of the study (previously known as the Stress Study), specific survey questions and participant care protocol. Significant improvements in the development of the study have continued to be realized. The Project's health lead on the Independent Peer Review Panel provided a third-party review, as did a third-party reviewer on behalf of GMOB. The establishment of a technical committee with key community health experts and an Advisory Committee with representatives from the working group will be active early 2020-21.

Yellowknife Health Effects Monitoring Program

The University of Ottawa Health Effects Monitoring Program Team carried out public engagement sessions with the NSMA and Yellowknife residents in May of 2019, followed by sessions with the YKDFN community and Chief and Council in July 2019. These sessions presented the results of the study on a community level. Further communications are intended for 2020-21 to present linkages of results to diet and lifestyle.

Socio-Economic Strategy Implementation

The GMRP team held meetings with the Socio-Economic Working Group and Socio-Economic Advisory Body throughout 2019-20. The purpose, and outcomes of these meetings are further discussed in Section 7.2.

Other

In addition, since 2010-11, the GMRP team has held an annual public forum (held in March 2020) to discuss general project updates, and key studies or initiatives for that respective year (e.g. December 2019, Borrow Engagement Outcomes)

The GMRP team also participated in the following events:

- Roundup 2019, BC's annual mining conference
- Spring Trade Show – For the past several years, the GMRP team has held a booth at the Yellowknife Spring Trade Show in May.
- YKDFN Job Fair

In addition to the above regularly scheduled meetings, the Team provides updates on GMRP activities and progress through multiple communication techniques (Giant Mine Remediation Project, 2019b), including:

- e-newsletter: Sent regularly to more than 275 email addresses and posted on the GMRP website;
- website (www.giant.gc.ca);
- Twitter account (@GiantMine and @MineGiant);
- media briefings and responses to media requests
  - There were 36 media interactions, including interviews and requests for information, in 2019-20;
- responses to unforeseen events;
- topic-specific public service announcements, as required;
- school presentations; and,
- topic-specific engagements, as appropriate.

Key Stakeholder Concerns

The GMRP team captures stakeholder concerns through their meeting minutes, the GMRP's Consultation Log, emails, and other correspondence. The GMRP team endeavours to respond in a timely manner. Key concerns raised in 2019-20 were as follows:

Concern	GMRP Response
Measure 6 Report (GMOB - April 2019) GMOB was concerned that there are no assurances that sufficient funding will be available in the future to mitigate significant adverse environmental impacts. They also noted frustration from the Measure 6 Working Group that their input has not been adequately considered in the process. GMOB's concerns with the Measure 6 Report reflects concerns from other stakeholders.	Budget 2019 provided 2.2 billion of long-term funding over 15 years, starting in 2020-21, for the new Northern Abandoned Mine Reclamation Program, of which the GMRP is part. This funding is intended to cover the full implementation cost for the GMRP. Future funding for the site will be revisited once the remediation is nearing completion and a more accurate estimate of the long-term costs of site management and monitoring can be developed. The Measure 6 report was finalized in August 2019 and considered input from the Measure 6 Working Group.
Targets for Key Performance Indicators (various stakeholders – April 2019): After presenting the draft Key Performance Indicators, stakeholders raised a concern that there were no targets to measure the Project against.	The GMRP committed to develop targets for select Key Performance Indicators. The process has involved extensive engagement with the Socio-economic Advisory Body and the Socio-economic Working Group. Estimated completion date is Summer 2020. The targets will be shared publicly and revisited annually.

Concern	GMRP Response
Implementation of the Socio-economic Strategy (various stakeholders – September 2019): After updating and publicly releasing the Socio-economic Strategy, stakeholders requested concrete actions and details on progress.	The GMRP committed to collaboratively develop a comprehensive SE Implementation Plan that includes existing activities and new activities identified in a working session (additional details provided in Section 7.2). Estimated completion date is Summer 2020. The SE Implementation Plan will be shared publicly and revisited annually.
Borrow Locations (various stakeholders – December 2019) There was concern from affected parties regarding the footprint of the borrow locations; the project heard that it is important that the site not resemble a "moonscape" post-remediation.	The GMRP held separate engagement sessions with the NSMA, YKDFN, and the Working Group Plus (other interested stakeholders such as Yellowknife Historical Society, Back Bay Association) to hear concerns from each group; the Project prepared a summary report and shared with all groups as well as the MVLWB to post on the public registry. The Project reported back to the communities at the annual public forum and has committed to creating a response table, showing how it has addressed comments and concerns raised at the engagement sessions.
Stress Study Implementation (Working Group – January 2020): The Working Group was concerned with the length and title of the stress study, in addition to the validity of many questions proposed by the research team.	The research team has accepted written comments from members of the Giant Mine Working Group, third party reviewers (Independent Peer Review Panel Health Lead, GMOB Health Expert). The Project funded additional capacity support to allow the Yellowknives Dene First Nations to be heavily involved in planning and will potentially be implementing an additional third-party review.

Next steps:

Engagement activities in 2020-21 will focus on the Quantitative Risk Assessment (QRA), community and business outreach on procurement and contracting opportunities, Socio-economic Strategy implementation, closure criteria, pre-engagement on Management and Monitoring Plans, overall aquatics engagement (e.g. Baker Creek design, future conditions of Yellowknife Bay), and Community-Based Monitoring, if time and capacity permits. The GMRP will continue to host community forums for YKDFN, NMSA and residents of Yellowknife, to engage with the external advisory bodies, and to communicate in a frequent and transparent manner via the established channels (e.g. e-newsletter, website, Twitter, radio, school outreach).

7.1.2 Incorporation of Traditional Knowledge (TK)

The YKDFN and the NSMA have developed and shared extensive knowledge of the Giant Mine site and surrounding area. Engagement with Indigenous Organizations (rights holders) is part of the 26 measures listed in the Report of Environmental Assessment and Reasons for Decision (Mackenzie Valley Review Board, 2013) to mitigate negative environmental impacts, and address public concerns. As a result, incorporating TK into planning and work on site is a requirement for obtaining the Water Licence. While some TK has been incorporated in GMRP activities to date (e.g. to help determine the best time of year to deconstruct buildings), the Team acknowledges that there is always a need for continual improvement for the incorporation of TK and community perspectives within project initiatives.

- In 2018-19, YKDFN Lands and Environment completed TK Study, which aimed at documenting YKDFN knowledge, values, priorities, concerns, perceptions of risk, and understanding of impacts to past and current land use (Yellowknives Dene First Nation & Trailmark Systems, 2019).
- In 2019-20, the NSMA completed a TK study "Summary of Traditional Land-Use by the Indigenous Métis People in the Yellowknife Bay Area" (Shin Shiga Consulting, 2020)

Ultimately, the goal of this information is to:

- enable the inclusion of YKDFN/NSMA knowledge and perspectives into mine management and risk assessment in the GMRP;
- support YKDFN/NSMA values and future land use aspirations; and,
- recognize the history of the First Nations within project presentations and materials where relevant.

7.2 SOCIO-ECONOMIC STRATEGY IMPLEMENTATION

CIRNAC and the GNWT are committed to promoting socio-economic benefits and supporting reconciliation efforts with Indigenous peoples of Canada. To date, the GMRP has delivered economic benefits to the region through procurement, employment and training. In preparation for the Remediation Implementation Phase of the Project, the GMRP plans to be more deliberate and strategic in its approach to maximize economic benefits.

The Project team developed a Socio-Economic Strategy in 2016-17 and publicly released an updated version in September 2019 [Socio-Economic Approach link]. The overall aim of the Strategy is to maximize socio-economic benefits and deliver on the socio-economic commitments and requirements within guiding policies and other requirements. To accomplish this goal, the strategy involves three distinct streams of activity:

- providing access to employment and procurement opportunities;
- supporting capacity and skills development; and,
- anticipating, monitoring and mitigating negative impacts.

Potential barriers to strategy implementation include insufficient Northern and Indigenous workforce capacity and fluctuating Northern and Indigenous business/contracting capacity.

2019-20 HIGHLIGHTS

- Updated and publicly released the Project's Socio-Economic Strategy.
- The Socio-economic Working Group and the Socio-economic Advisory Body provided expertise and support to advance implementation of the Strategy.
- In 2019-20, Northern employment stayed consistent with 2018-19 but was lower than 2016-17 and 2017-18. Indigenous employment has stayed relatively consistent over the past four years, while Indigenous Opportunities Considerations (IOC) employment decreased compared to previous years. Female employment is consistent with 2018-19, and higher than the two previous years.
- The proportion of expenditures with Northern suppliers decreased in 2019-20 from the previous three years. The proportion spent with Indigenous suppliers increased in 2019-20 from 2018-19 but remains lower than 2016-17 and 2017-18 values. The proportion spent with IOC suppliers increased slightly in 2019-20 from previous years.
- In 2019-20, total workforce training increased significantly across the categories; all training is now included in calculations of training statistics (in the past, mandatory training (e.g. first aid, WHIMIS) were excluded from overall calculations of training statistics).
- The GMRP continued to fund the YKDFN Dechita Nàowo Giant Mine Remediation Training Program.

7.2.1 Socio-Economic Implementation

To enhance coordination and preparedness for socio-economic benefits, the Project team established the following advisory and coordinating bodies in 2018-19:

- **Socio-Economic Advisory Body:** The Socio-Economic Advisory Body provides strategic advice to the Socio-economic Working Group and acts as senior government champions for the implementation of the Socio-economic Working Group's approach. The Advisory Body is chaired by the Northern Contaminated Sites Program Executive Director and is comprised of senior level representatives from Alternatives North, CanNor, CIRNAC, City of Yellowknife, GNWT [ENR, Industry Tourism and Investment (ITI) and Education, Culture and Employment (ECE)], PSPC, Service Canada, YKDFN and NSMA.
- **Socio-Economic Working Group:** The Socio-Economic Working Group coordinates and integrates socio-economic activities for the Project. This working group shares information and seeks opportunities to improve collaboration, as well as reports to and seeks advice from the Senior Project Committee and the Socio-Economic Advisory Body on the implementation approach. It meets on a monthly basis, and is comprised of representatives of CanNor, CIRNAC, City of Yellowknife, GNWT (ENR, ITI, ECE and Infrastructure), Parsons (MCM), PSPC, YKDFN and NSMA. The Giant Mine Oversight Board now acts as an observer.

Both groups met throughout the year; the Working Group met monthly and the Advisory Body met quarterly.

7.2.1.1 Key Activities in 2019-20

The Project advanced two focus areas in 2019-20:

- actively engaging with the Socio-Economic Working Group and Advisory Body to establish targets for a select set of Key Performance Indicators (confirmed as of June 2020); and,
- actively engaging with the Socio-Economic Working Group and other interested parties to develop the SE Implementation Plan for 2020-22 (draft completed in May 2020, with additional focused discussions planned in Fall of 2020).

Targets

The Project finalized its Key Performance Indicators in March 2019. The Project led a series of engagements with the Socio-Economic Working Group and the Socio-Economic Advisory Body to advance the development of targets for a select set of Key Performance Indicators for the Implementation Phase of the Project. The Working Group and Advisory Body considered:

- GMRP employment and procurement results from 2015-2018;
- Mine commitments: Commitments made by private sector mines in NWT over the life of mine (construction, operation and closure phases); and,
- Mine actual results: For NWT private sector mines, from 1997 with a focus on 2016-2018.

Draft target ranges have been developed for the following Key Performance Indicators:

- Employment accounted by Northerners (combination of Northern Indigenous and Northern Non-Indigenous) (% person hours)
- Employment accounted by Northern Indigenous (% person hours)
- Employment accounted by Women (% person hours)
- Training:
  - Apprentice support during the full Implementation Phase (#)
  - Scholarship support (#, $)
- Expenditures accounted by Northern businesses (combination of Northern Indigenous and Northern Non-Indigenous) (%)

The targets will be finalized in 2020. The Project will begin reporting against the targets once data is available (i.e. several months into the Implementation Phase).

Implementation Plan

To ensure that the Project is well-positioned to maximize socio-economic opportunities for Northerners and Northern Indigenous peoples, GMRP's Socio-Economic Working Group was joined by other experts in early February 2020 to identify actions for successful implementation of the Socio-Economic Strategy over fiscal years 2020-21 and 2020-22. Participants worked in small groups and plenary to identify a set of actions related to Training, Employment, and Procurement, as well as other cross-cutting items.

The collaborative discussion resulted in a draft Socio-Economic Implementation Plan with identified actions and associated considerations, deliverables, timelines, status and leads. In 2020-21, the Project will continue to advance the evergreen document through the Socio-Economic Working Group meetings as well as focused discussions with key partners.

Contract Requirements for the Main Construction Manager and Status in 2019-20

There were several socio-economic-related requirements included in the Main Construction Manager's (Parson's) contract. A summary of the requirements and associated status is provided below. PSPC and the GMRP team meet regularly with Parsons to ensure the below requirements are fulfilled.

Requirement	Details	Status
Indigenous Benefits Plan	Develop an Indigenous Benefits Plan that includes the following: • Labour Capacity Study to understand skills and availability of the local workforce – to be updated at key milestones. • Procurement Plan that outlines how procurement tools (see text below), work packaging and sequencing will maximize socio-economic benefits.	Underway.
Yellowknife Storefront Office & Website	Establish a storefront office that is centrally located and accessible to the public and develop and maintain a website to: • share information about existing and upcoming contracts; • provide training on procurement and contract requirements; • post contractors' employment opportunities; and, • provide links to other relevant training and development programs.	Yellowknife office: Complete • Moved into the office and opened to the general public as of March 1, 2019. Website: Complete • Website went online July 3, 2018: http://giantminerp.ca/
Economic Development Officer	Economic Development Officer position based out of Yellowknife office is responsible for developing and carrying out the Indigenous Benefits Plan. Specific tasks include the following: • preparing a detailed database of Yellowknife area businesses; • working with local training providers (e.g. Aurora College) on student sponsorship and training opportunities; • working closely with the Tłı̨chǫ Investment Corporation, Denesoline Corporation, NSMA and the Det'on Cho Corporation to discuss upcoming procurement opportunities and needs; and. • reaching out to local businesses to notify them of available contracting opportunities associated with GMRP work packages.	• Database: Complete and regularly updated. • Parsons works closely with Indigenous corporations on an ongoing basis. • Parsons conducts outreach to local businesses to notify them of available contracting opportunities is happening on an ongoing basis.

Indigenous Community Database	In partnership with YKDFN, NSMA and Tłı̨chǫ, the MCM's Aboriginal Community Liaison will develop a database of local Indigenous persons that are interested in employment at the Giant Mine site. • Preparing for second round of door to door visits in Dettah and Ndilǫ communities, anticipated to begin in Q1 of 2019-20. First round of door to door visits in Dettah and Ndilǫ communities was complete in 2018. • Collaborating with YKDFN's Economic Development Officer and CIRNAC to develop a database workplan outlining the data collection process and purpose of this database. Workplan to be complete in Q1 of 2019-20.	• A decision was made between involved parties to not conduct a second round of door to door visits. Instead, a cooperative model was developed that draws on existing local human and employment support, resources and expertise. • Parsons is collaborating with the Yellowknives Dene employment and training experts to complete this task.
Reporting on Socio-economic Benefits	Reporting on Key Performance Indicators such as, among others: • Parsons and sub-contractors' Northern, Indigenous and female employment; • provisions for Northern and Indigenous employees and contractors; and, • value of contracts to Northern and Northern Indigenous suppliers.	Key Performance Indicators are being tracked and reported on monthly.

The GMRP planned to establish an **Indigenous Benefits Plan Monitoring and Advisory Committee.** This committee would review how Parsons implements its Indigenous Benefits Plan and would provide advice and guidance on how to address barriers to improve performance. In 2019-20, the Project assessed the need for such a committee, given the existing groups and committees that could play this function, namely the Socio-Economic Advisory Committee or the Giant Mine Oversight Body. The Project had not determined there is a need for a distinct group at the time of this report.

Next Steps for the Implementation of Socio-Economic Actions

GMRP and Parsons will continue to advance the socio-economic approach in 2020-21 by:

- Advancing the development of the evergreen SE Implementation Plan 2020-22 with the Socio-Economic Working Group and through focus groups with key partners.
- Implementing actions within the plan, including:
  - Holding a social impact session with social service providers to discuss potential social impacts of the Project and potential mitigation measures.
  - Holding Industry Day 2.0 with Indigenous governments and economic development corporations, Northern business organizations, and the City of Yellowknife, in collaboration with territorial and federal government partners.
  - Assisting GNWT's ECE and ITI with the establishment of the North Slave Training Coordination Partnership.

7.2.2 2019–20 Employment Results

The GMRP tracks the total employment and employment by certain categories, namely Northern, Indigenous, Indigenous Opportunities Considerations (IOC)[5], and Female employees.

Table 9 shows the employment statistics for Parsons and its contractors for 2019-20. Table 10 shows the employment statistics for CIRNAC contractors.

Table 9: Total Number of Persons and Total Person Hours (Parsons + Parsons' contractors) for 2019-20, by Category

Employee type[6]	Total # persons (incl. contractors)	Total person-hours	Persons as % of all employees	Person-hours as % of all person-hours
Total	**248**	**128,077**	**100%**	**100%**
Northern employees	144	80,005	58%	62%
Southern employees	104	48,072	42%	38%
Indigenous employees	69	37,739	28%	29%
IOC employees[7]	24	14,657	10%	11%
Female employees	59	18,073	24%	14%

Table 10: Total Number of Persons and Total Person Hours (CIRNAC contractors only) for 2019-20, by Category

Employee type[8]	Total # persons (incl. contractors)	Total person-hours	Persons as % of all employees	Person-hours as % of all person-hours
Total	**460**	**65,980**	**100%**	**100%**
Northern employees	22	5,300	5%	8%
Southern employees	439	60,681	95%	92%
Indigenous employees	3	580	1%	1%
IOC employees[9]	0	0	0%	0%
Female employees	205	24,394	45%	37%

*Note: 1 employee could not be categorized due to errors in reporting

[5] IOCs aim to maximize opportunities for Indigenous communities, businesses and individuals local to the Comprehensive Land Claim Agreement. If an IOC is a component of a Request for Proposal, bidders can earn technical points for guarantees to maximize local involvement from within the land claim area. Criteria may include Indigenous labour, subcontracting with Indigenous businesses, and providing training opportunities.

[6] Note that these categories may overlap (e.g. a single employee may simultaneously be counted as Northern, Indigenous, IOC, and female – or a combination or subset thereof) and that this information may not be available for all employees). For this reason, the totals indicated in the bottom row of the table do not represent the sum of the preceding rows.

[7] All IOC employees are Indigenous employees under Parsons data collection methodology.

[8] Note that these categories may overlap.

[9] Unlike Parsons' data, IOC employees were not consistently categorized as Indigenous employees in CIRNAC's data; therefore, there is a difference in statistics. However, it can be assumed that all IOC employees are also Indigenous (i.e. the values should be the same).

The following figures highlight key trends of the Total Number of Persons and Total Person Hours, by Category, for 2016-17 to 2019-20 (Figure 6 and Figure 7). These results represent the combined data reported by both CIRNAC and Parsons. When considering the percentage of person hours worked (Figure 7), Northern employment stayed consistent with 2018-19 (44%) but was lower than 2016-17 (63%) and 2017-18 (67%). Indigenous employment has stayed relatively consistent over the past four years (19-20%), while IOC employment decreased (8% in 2019-20, compared to 12-20% in previous years).[10] Female employment is consistent with 2018-19 (22%), and higher than the previous two years (16-17%).

Figure 6: Persons as % of all Employees by Category from 2016-17 to 2019-20

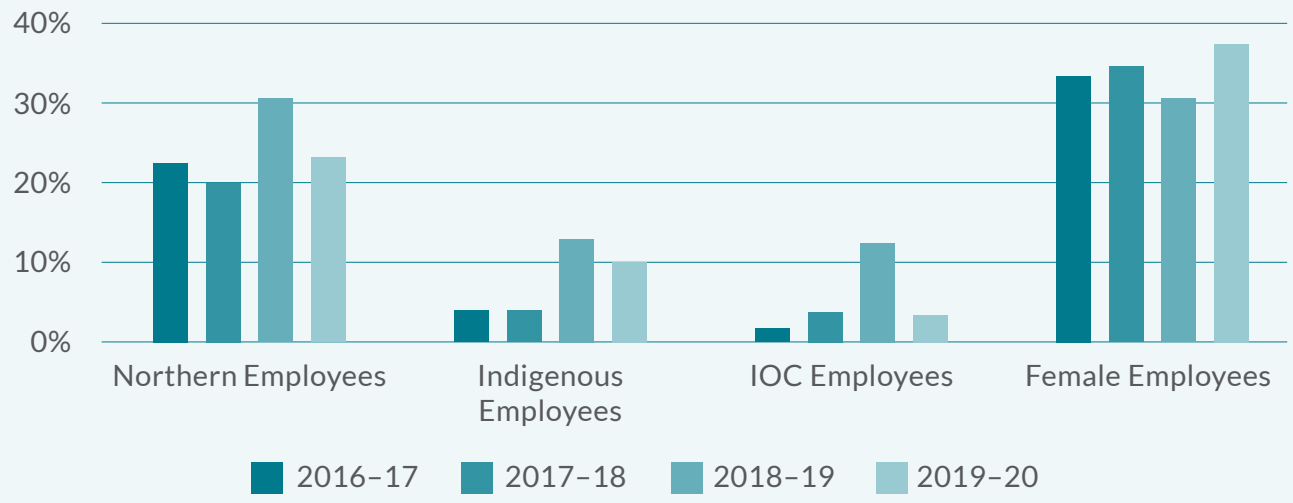
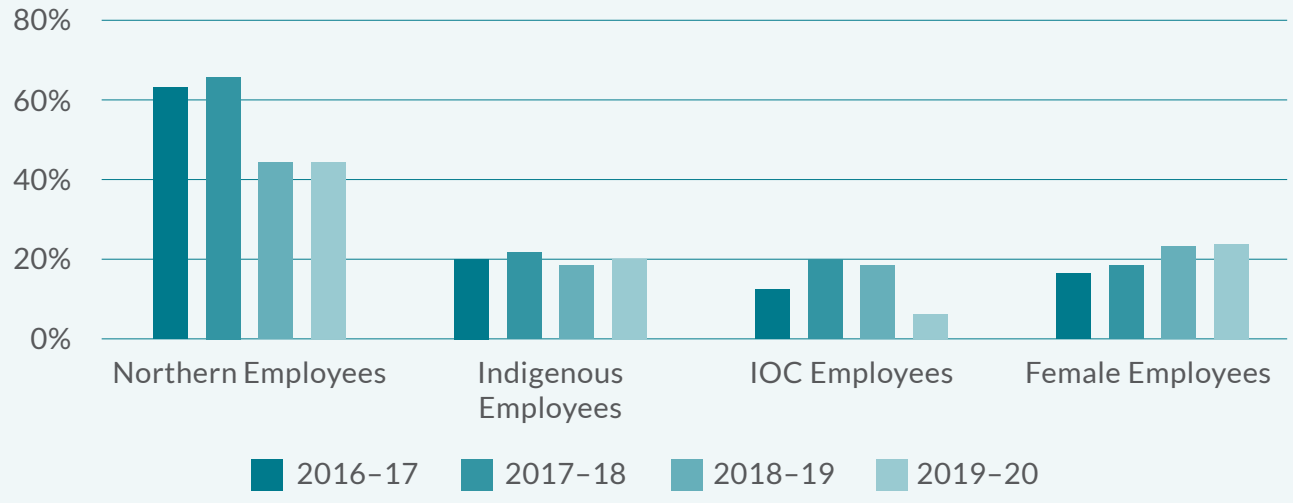


Figure 7: Percentage of Person Hours by Category from 2016-17 to 2019-20



*Note: In previous reports, 2017-18 and 2018-19 were miscalculated. These errors have been fixed in this report.

[10] In 2018-19, the MCM accounted for all Northern Indigenous employees as IOC employees, which accounts for the higher value compared to other years. Tracking was recorded properly in 2019-20.

7.2.2.1 Additional Employment Key Performance Indicators

As mentioned above, Key Performance Indicators were developed in March 2019. Trend information is not available for new indicators (i.e. data had not been previously tracked). Further reports will include trend information where available.

Additional employment data includes:

- Employment accounted by:
  - Northern Indigenous women (# of persons, p-hrs, %)
  - Northern Indigenous men (# of persons, p-hrs, %)
  - Northern non-Indigenous women (# of persons, p-hrs, %)
  - Northern non-Indigenous men (# of persons, p-hrs, %)
- Employee's resident status in the NWT (resident or non-resident) (#, %)
- Skill levels of Northern, Indigenous and Female employees
- Changes in the process to support Indigenous traditions (frequency and description)

In 2019-20, the CIRNAC contractors used an older reporting template and it is only possible to determine the Northern sub-categories of employment (Table 11). Therefore, Tables 12 (Resident Status) and Table 13 (Skill Levels) only include MCM information.

Table 11: Employment - total number of persons and person-hours, by Northern sub-category (Parsons and CIRNAC combined), in 2019-20

Employee type	Total # persons (incl. contractors)	Total person-hours	Persons as % of all employees	Person-hours as % of all person-hours
Northern Indigenous women	17	6,277	2%	3%
Northern non-Indigenous women	28	6,923	4%	4%
Northern Indigenous men	48	26,380	7%	14%
Northern non-Indigenous men	75	45,725	11%	24%

Table 12: NWT Resident status (total # and %) (Parsons and their contractors only) in 2019-20

Status	Total # persons	Persons as % of all employees
NWT Resident	154[11]	62%
Non-resident	94	38%

Table 13: Skill level of Northern, Indigenous and Female employees (Parsons and their contractors only) in 2019-20

Skill level	Total	Northern	Indigenous	Women
Entry-level	20	19	17	8
Semi-skilled	75	68	28	23
Skilled	71	33	16	5
Professional	82	24	8	23

Changes in the process to support Indigenous traditions

Prior to commencing work at the GMRP, all contractors and employees must receive a site orientation and safety briefing. The MCM has added an Indigenous cultural heritage component to the site orientation. The aim is to ensure all contractors and employees are aware of the local area's Indigenous cultural heritage. This includes an overview of this Akaitcho Drygeese Territory and Tłı̨chǫ Indigenous peoples and their historical and contemporary use of the area of the contract.

[11] The number of employees who selected NWT Resident (154) is higher than those who selected Northern resident (144). Individuals self-select their resident status and the Project does not follow-up to confirm accuracy.

7.2.3 2019–2020 Procurement Results

7.2.3.1 Suppliers Statistics

The GMRP tracks the total number of suppliers and the total value of contracts by four categories: Northern, Southern, Indigenous and IOC. Table 14 provides the supplier statistics for Parsons and Table 15 provides the supplier statistics for CIRNAC for 2019-20.

Table 14: Total Number of Suppliers and Total Value of Contracts (Parsons and its contractors), in 2019-20, by Category

Supplier type[12]	# suppliers	$ spent	% of total $ spent
Total	**241**	**$20,903,202.22**	**100%**
Northern suppliers	119	$13,398,284.92	64%
Southern suppliers	122	$7,504,917.30	36%
Indigenous suppliers	35	$11,614,354.79	55%
IOC suppliers	33	$11,319,614.97	54%

Table 15: Total Number of Suppliers and Total Value of Contracts (CIRNAC contractors), in 2019-20, by Category[13]

Supplier type[14]	# suppliers	$ spent	% of total $ spent
Total	**186**	**$11,462,392**	**100%**
Northern suppliers	54	$805,986	7%
Southern suppliers	132	$10,656,406	93%
Indigenous suppliers	3	$17,336	<1%
IOC suppliers	0	$0	0%

The following figures highlight the Total Number of Suppliers (Figure 8) and Percent of Total Value of Contracts (Figure 9), by Category, for 2016-17 to 2019-20. These results represent the combined data reported by both CIRNAC and the MCM. The proportion of expenditures with Northern suppliers decreased in 2019-20 (44%) from 2018-2019 (56%), 2017-18 (47%) and 2016-17 (64%). The proportion spent with Indigenous suppliers increased in 2019-20 (36%) from 2018-19 (28%) but remains lower than 2016-17 and 2017-18 values. The proportion spent with IOC suppliers increased slightly in 2019-20 (35%) from previous years (28% in 2018-19, 35% in 2017-18, 31% in 2016-17).

[12]Note that these categories may overlap (e.g. a single supplier may simultaneously be counted as Northern, Indigenous, and IOC – or a combination thereof) and that category information was not available for all suppliers. For these reasons, the totals indicated in the top row of the table do not represent the sum of the proceeding rows.

[13]The tracking of suppliers by CIRNAC sub-contractors was very detailed (e.g. taxi, meals, materials, airlines, hotels, etc.).

[14]Note that these categories may overlap.

Figure 8: Total Number of Suppliers from 2016-17 to 2019-20

*Note: In previous reports, 2018-19 values were miscalculated. These have been fixed in this report.

Figure 9: Percent of Total $ Value Spent from 2016-17 to 2019-20

*Note: In previous reports, 2018-19 values were miscalculated. These have been fixed in this report.

7.2.3.2 Major Procurements

The major procurements awarded between April 1, 2019 and March 31, 2020 are included in Table 16 below. Some of the values are contract extension amounts (i.e. a contract had been awarded previous to the 2019-20 fiscal year, and it includes the value and duration of extension), while others are for single or multi-year contracts starting in 2019-20.

Table 16: Major work packages awarded by Parsons in 2019-20

Value	Scope of work	Awarded to
$9,807,345*	Underground C&M: Extended to March 31, 2022	Det'on Cho Procon JV
$4,048,058*	Surface C&M: Extended to March 31, 2021	Det'on Cho Nuna JV
$2,173,452	Site Security from April 1, 2020 to March 31, 2022	Det'on Cho Scarlet Security Services JV
$1,705,937	ETP Operations from May 27, 2020 to October 31, 2020	BluMetric / Det'on Cho JV
$1,557,695*	Air Monitoring: extended to March 31, 2021	SLR Consulting (Canada) Ltd
$701,164*	Surface Water Ground Water: extended to March 31, 2021	Dillon Consulting
$645,331	Environmental surface water ground water management: subcontract end date is March 31, 2022	Dillon Consulting
$350,386*	EMS Medical: Extended to March 31, 2021	Det'on Cho Medic North JV
$303,187	Holographic Augmented Reality Visualization Support Services	BGC Engineering Inc
$295,200*	Laboratory Services (Medical) to March 31, 2022	ALS Environmental
$259,780	Site security upgrades	Paul Bros Nextreme Inc
$212,126*	Lab Testing (ETP & Pilot Plant) to March 31, 2022	Taiga Environmental Laboratory
$210,000	Strategic Communications	National Public Relations

*Note: contract extension value – not total work package value

7.2.3.3 Additional Procurement Key Performance Indicators

Additional procurement Key Performance Indicators include:

- Procurement accounted for by (Table 17):
  - — Northern Indigenous suppliers and amount spent (#, $, %)
  - — Northern Non-Indigenous suppliers and amount spent (#, $, %)
- Modifications to procurement procedures to increase Indigenous participation (e.g. advanced communications of procurement, set asides) (description and #) to be reported on in the following fiscal year.
- New joint ventures and partnerships established (#) to be reported on in the following fiscal year.
- New Northern Indigenous and Northern non-Indigenous contractors bidding (#) to be reported on in the following fiscal year.

Table 17: Procurement accounted for by Northern Indigenous and Northern Non-Indigenous suppliers (Total number, $ spent and % of total value spent) (Parsons + CIRNAC) for 2019-20

Supplier type[15]	# suppliers	$ spent	% of total $ spent
Northern Indigenous suppliers	37	$11,631,690	36%
Northern non-Indigenous suppliers	136	$2,572,581	8%

7.2.4 Training and Capacity Building

In addition to the occupational H&S training, GMRP contractors are required to ensure that employees are properly trained to perform their responsibilities. Contractors deliver workforce training, including site orientations. The inclusion of IOC in contracts ensures Indigenous employment and capacity building is considered and implemented where possible by all GMRP contractors.

The GMRP tracks its workforce training by number of people who have participated in training exercises, as well as the number of person hours. Based on statistics reported by both CIRNAC and the MCM, workforce training for 2019-20 is summarized in Table 18, organized by category of Northern, Indigenous, Women and Total.[16]

In 2019-20, workforce training provided to Northern employees (108) was within the range of values from previous years. Workforce training for IOC employees (24), decreased from the previous year. Workforce training for Indigenous employees (55) and female employees (63) increased from previous years. The total number of people trained decreased from 2018-19 (319) to 2019-20 (230). The overall decrease is likely due to the completion of a lot of construction and physical works occurring on the site in the previous years.

Table 18: Total Number of People trained and Total Person Hours of Training in 2019-20, by Category

Workforce training[17]	Total # persons	Total person-hours	Persons as % of all employees	Person-hours as % of all person-hours
Total	**230**	**8,547**	**100%**	**100%**
Northern employees	108	6,818	47%	80%
Southern employees	122	1,729	53%	20%
Indigenous employees	55	5,356	24%	63%
IOC employees	24	2,599	10%	30%
Female employees	63	1,617	27%	19%

[15]Note that these categories may overlap.

[16]The total does not reflect the sum of the other categories because there is overlap between the categories and the total includes all workforce training (e.g., non-Northern).

[17]Note that these categories may overlap.

Figure 10 highlights the percentage of people trained by employee category, from 2016-17 to 2019-20. The overall number of people trained for each employee group remained the same or increased since 2016 and the proportion of Indigenous employees, IOC employees, and female employees trained increased over the years, while there is no discernable trend for Northern employees due to high variability over the years.

Figure 10: Percentage of People Trained by Employee Group from 2016-2017 to 2019-2020

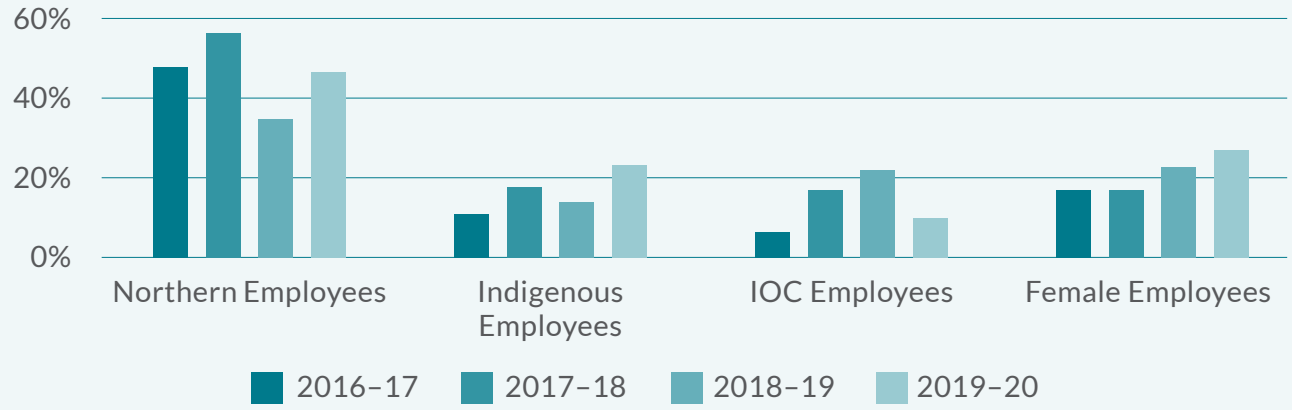
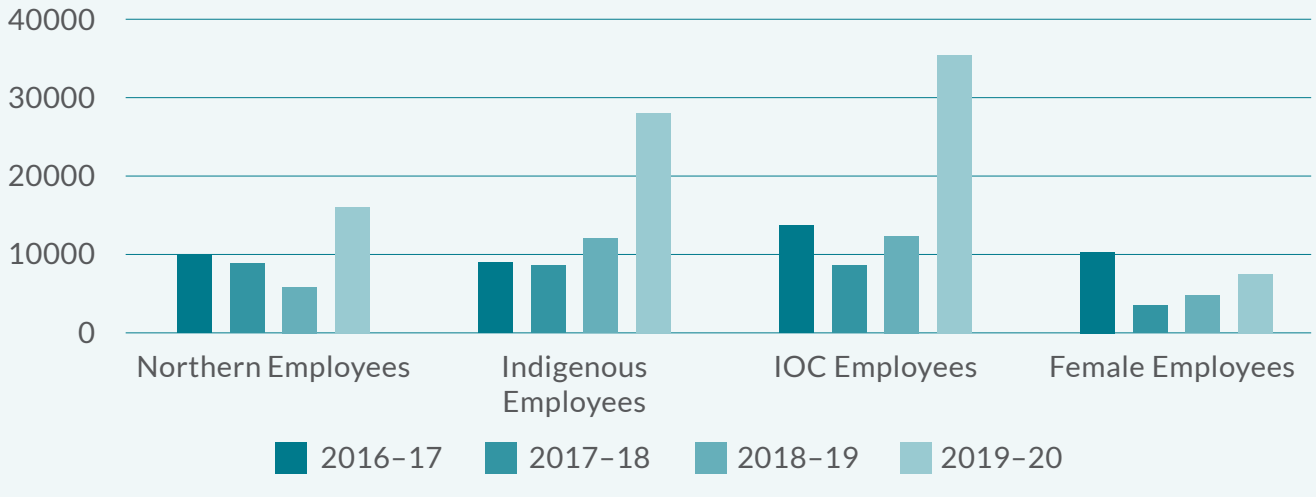


Figure 11 highlights the number of person-hours of training by employee group from 2016-17 to 2019-20. The number of person-hours of training is normalized by person-hours worked to enable comparison across years, since the total number of training hours may significantly differ over the years. In the past, mandatory training (e.g. first aid, WHIMIS) were excluded from overall calculations of training statistics. To streamline the process, as of 2019-20, all training is now included in calculations of training statistics. As a result, the number of person-hours of training for Northern, Indigenous, and IOC employees increased significantly since 2016 while the numbers for the female employees increased since 2017.

Figure 11: Number of Person Hours of Training per 200,000 Person-hours Worked by Employee Group from 2015-16 to 2019-20



7.2.4.1 Additional Training Key Performance Indicators

Additional training Key Performance Indicators include:

- Workforce training accounted for by (Table 19):
  - Northern Indigenous women (# of persons, p-hrs, %)
  - Northern Indigenous men (# of persons, p-hrs, %)
  - Northern non-Indigenous women (# of persons, p-hrs, %)
  - Northern non-Indigenous men (# of persons, p-hrs, %)
- Professional development scholarships funded (# of scholarships, $ amount of each, and # filled by priority groups): to be reported on during the Implementation Phase.
- Northern Indigenous and Northern Non-Indigenous apprentices supported (#, % out of total apprentices): to be reported on during the Implementation Phase.

Table 19: Total Number of People trained and Total Person Hours of Training, by Northern sub-category (Parsons and CIRNAC), in 2019-20

Employee type	Total # persons (incl. contractors)	Total person-hours	Persons as % of all employees	Person-hours as % of all person-hours
Northern Indigenous women	12	657	5%	8%
Northern non-Indigenous women	9	320	4%	4%
Northern Indigenous men	39	4219	17%	49%
Northern non-Indigenous men	48	1623	21%	19%

7.2.4.2 Dechita Nàowo

Through a Contribution Agreement, the GMRP funded the YKDFN Dechita Nàowo Training Program in 2019-20. The 2019-20 training programs and number of participants are summarized below:

- BEAHR Module 1 – Core Environmental Skills (12 participants)
- BEAHR Module 2 – Environmental Site Assessment (10 participants)
- BEAHR Module 3 – Environmental Remediation (9 participants)
- Safety Training – Wilderness First Aid, Firearms Licence, Transportation of Dangerous Goods, WHMIS, Pleasure Craft Operator Card, Fire Extinguisher Operations, Asbestos Hazard Awareness, Spill Response Level 1 and 2 (range of participants in each course, from 4 to 9)
- Heavy Equipment Operator Hands-on Training (10 participants)
- Predator Defense and Shotgun Handling (11 participants)
- Introduction to the Mining Industry (8 participants)

8.0 IN CLOSING

In 2019-20, the GMRP submitted the application package for a Water Licence, while continuing site operations (C&M), immediate risk mitigation activities, community engagement, and health studies.

The GMRP will continue to prepare annual reports that describe the progress and performance of the GMRP. In the spirit of continual improvement, we welcome your comments on this report and how it can be enhanced in the future.

For more information or to provide comments on the report, please contact:

Natalie Plato, GMRP Deputy Director
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867-669-2838

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APPENDICES

Appendix A: Environmental Agreement – Report Alignment

Appendix B: List of 2019-20 Studies / Reports

Appendix C: Project Risks

Appendix D: Progress on Environmental Assessment Measures and Suggestions

Appendix E: Additional Information on Monitoring Parameters

APPENDIX A – ENVIRONMENTAL AGREEMENT – REPORT ALIGNMENT

A significant driver for the development of the GMRP Annual Report is the Environmental Agreement, the signing of which is a mandatory requirement per Measure 7 of The Report of Environmental Assessment and Reasons for Decision (Mackenzie Valley Review Board, 2013). This agreement establishes an independent oversight body (i.e., GMOB) for the GMRP, and was signed in June 2015 by Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC; formerly Aboriginal Affairs and Northern Development Canada [AANDC]), the Government of the Northwest Territories (GNWT), the City of Yellowknife, the Yellowknives Dene First Nation (YKDFN), Alternatives North, and the North Slave Métis Alliance (NSMA).

Article 5 of the Environmental Agreement stipulates that "the Co-Proponents shall prepare, provide to GMOB and make available to the public an annual report on the Project each year," to be submitted to GMOB "no later than October 1 in each year," starting October 1, 2016 (the report addressing the 2015-16 fiscal year).

The Environmental Agreement specifies what content must be included in each annual report. The table below outlines each requirement and where the content can be found in this 2019-20 report.

Section of Report	Environmental Agreement Requirement
Operational Summary	A summary of the Project's key operational activities and associated expenditures
Advancing Design Environment Health and Safety Community	A summary of any other significant developments relating to the Project
Environment Health and Safety	A summary of the results or findings of all monitoring done for the Environmental Programs and Plans and a description of actions taken or planned to implement Adaptive Management
Environment: Air Environment: Water	An assessment of the effectiveness of actions already taken to address the results or findings of all monitoring completed for the Environmental Programs and Plans
Advancing Design Operational Summary Environment: Water; Land Appendix B: Studies	A summary of any environmental or engineering studies conducted by the Co-Proponents in relation to the Project
Not applicable for this reporting year	A summary of any changes to, or plans for changes to, the Environmental Program and Plans
Operational Summary	A summary of the environmental audits of the Project, and the Co-proponents' response to the audit
Operational Summary Environment	A summary of any reportable spills, accidents or significant malfunctions, and a summary of the Co-Proponents' responses
Operational Summary	A listing of regulatory inspections, reports or directions, and a summary of the Co-Proponents' response to any issues arising therefrom
Environment Health and Safety Community	An analysis of trends in environmental effects data over time
Community: Engagement	A summary of significant public engagement activities, or matters raised as public concerns, and the Co-Proponents' responses
Progress Update and Plans Operational Summary In Closing	A summary of the Project's planned key operational activities for the coming year and associated planned expenditures, subject to the need to protect commercially sensitive financial information
Progress on Environmental Assessment Commitments Appendix D	A summary of the progress of the Project, including with respect to the Mackenzie Valley Resource Management Act (MVRMA) Measures, MacKenzie Valley Environmental Impact Review Board (MVEIRB) Suggestions, and Co-Proponents' Commitments
References	References to all sources relied on by the Co-Proponents in coming to conclusions in the annual report
Plain Language Summary	A plain language summary of the annual report

APPENDIX B – LIST OF 2019–20 STUDIES

Table 20 lists environmental or engineering studies conducted in 2019-20 by the GMRP. It includes studies that were completed, as well as several that are still underway. Many of these studies are intended to provide information needed to inform closure design, while others are monitoring programs to ensure the safety of the surrounding communities during current site operations. Additional details on these studies can be found throughout the report.

Table 20: Studies Undertaken in 2019-20

Theme	Study / Report
Design	Open Pit Closure Design - Design Basis Technical Memorandum Giant Mine Openings to Surface: Site Investigation and Closure Design Options Report Borrow Partial 3D Renderings - Engagement Slides Fine Grained Borrow Characterization Report Potential Fine Grained Borrow Areas, Geophysical Investigation Coarse Grain Borrow Geochem Acid Rock Metal Leach Final Giant Mine Site-Wide Infrastructure Assessment 2019 Annual Geotechnical Inspection of Dams 2019 Annual Geotechnical Inspection – Site Visit Summary [Technical Memorandum] Giant Mine Remediation Project: New Water Treatment Plant –Substantive Design and Cost Estimate Process Selection Report Giant Pilot-Scale Passive Treatment System Study Report Operations, Maintenance and Surveillance (OMS) Manual and Emergency Preparedness and Response Plan (EPRP) For Giant Mine Dams Updated Hydrogeological Assessment – 3D Underground Model Water Treatment Plant – Preliminary Design Report Site Services – Identifying Requirements – Post Remediation General Design: Mine Water Intake Assessment Report Water Treatment Plant Location, Discharge Line and Outfall Assessment Report
Air	Ambient Air Quality Monitoring Program Annual Report – 2019
Water	Downgradient of Dam 3 Pond Water Impacted Area Background and Remedial Options Analysis Giant Pilot-Scale Passive Treatment System Study Report Baker Creek and Yellowknife Bay Fish and Fish Habitat Assessment – 2019 Field Work Summary Upgrade Options to Improve Mine Water Effluent Quality and Maintain Plant Reliability Giant Mine Aquatic Monitoring – Current Reference Areas – Final Review of Fish Swim Performance at Proposed Water Treatment Plant [Technical Memorandum] Water Elevation Management Program: Fugitive Arsenic Assessment Water Elevation Management Program: Wall Wash and Geochemical Analysis Giant Mine 2019 MDMER Annual Report Giant Mine Remediation Project – Annual Water Monitoring Report 2019
Land	2018 Contaminated Soil and Sediment Update Remedial Options/Scenarios for Deep Contaminated Materials 2019 Giant Mine Bird Activity Survey [Technical Memorandum] Small Mammal and Vegetation Sampling
Health & Safety	Health Effects Monitoring Program (Health Study - ongoing) Hoèła Weteèts'eèdeè: Understanding Community Wellbeing Around Giant Mine (Stress Study)
Community	Traditional Knowledge Study (NSMA) (GMRP-supported) Socio-Economic Key Performance Indicators and Targets

APPENDIX C – PROJECT RISKS AND MITIGATION

Risk management has been an important and ongoing management activity for the GMRP since 2002-03. Risk is about uncertainties, or unknowns, and how these could impact the objectives of the GMRP, such as the objective to minimize impacts to the environment. Risk management involves identifying and understanding risks, ranking them (which ones are low or high), and taking steps to prevent risk events from happening or to reduce their impact if they do happen. Organizations with strong risk management processes are better prepared to anticipate, avoid or reduce the impact and/or likelihood of risk events, should they occur.

The GMRP has a risk management procedure and process[18] which it uses to reduce risks to acceptable levels (e.g., legacy risks; see text box) and to manage risks which may increase with increased project activity (e.g., project activity risks; see text box).

Examples of GMRP Risks

- **Legacy Risks:** risks related to the infrastructure (e.g., dams) and environmental conditions (e.g., underground chambers) left by the former mining operation that could have human health and environmental impacts. Examples include: the release of arsenic trioxide from the underground chambers, or the injury or death of a trespasser from falling into a mine opening.
- **Activity Risks:** risks related to the remediation project and the activities involved in reducing the legacy risks. These risks include risks to scope, budget, schedule, health and safety of workers and the surrounding environment. Examples include: delays in advancing work (and associated cost impacts), health and safety impacts to workers while conducting remediation activities (e.g., moving earth), and air pollution due to dust from remediation work.

There are many examples of how risk management has informed project decision-making. When the risk management process was first implemented in 2002-03, the identification of various public access risks led to the implementation of a range of site security measures to prevent unauthorized entry to the Site. More recently, the identification of significant risks related to the Roaster Complex, Baker Creek, and underground chamber instability led to the development of a Site Stabilization Plan (SSP)– a set of remediation measures (including the demolition of the Roaster Complex) that were approved and implemented ahead of schedule to minimize impacts to human health and safety and the environment. An overview of current legacy and activity risks for the GMRP, and associated risk treatment activities, is presented below.

[15] GMRP's risk management procedure and process aligns with best practice and the international risk management standard CAN/CSA-ISO 31000-10 (R2015).

Risk Profile Summary – 2019-20

This section provides a summary of the GMRP 2019-20 risk profile. The information is from the GMRP Risk Register (a large excel file) and summarizes the number of risks by status (i.e. active, closed), number of risks by category (e.g. dams), the distribution of risks across levels (e.g. low, moderate), the distribution of risks across types (active vs legacy), the active risk drivers, and the historical profile since 2010.

A more detailed summary report is available under separate cover. The detailed summary report describes each active risk, its driver, level, and treatment.

Figure 12: GMRP Risk Profile Summary

NUMBER OF RISKS BY STATUS	
Total Active Risks	123
Total Closed Risks	132
Total Issues	2

NUMBER OF ACTIVE RISKS BY CATEGORY


25 BUILDINGS & ...


21 UNDERGROUND


12 DAMS


12 INFRASTRUCTURE


9 WATER TREATMENT


8 OPEN PITS


6 HUMAN RESOURCES

- **1** GENERAL H&S
- **1** CONTAMINATED SOIL
- **1** OTHER – TECHNICAL
- **1** GOVERNANCE
- **1** FUNDING


6 TAILINGS &


4 DIVERSIONS


4 ENGAGEMENT


3 PROCUREMENT


3 PLANNING & CONTROLS


3 REGULATORY


2 FUEL TANKS

- **0** WASTE ROCK
- **0** WASTE, BARRELS...
- **0** FRAUD
- **0** OTHER – MANAGEMENT

Figure 13: Active Risks by Level

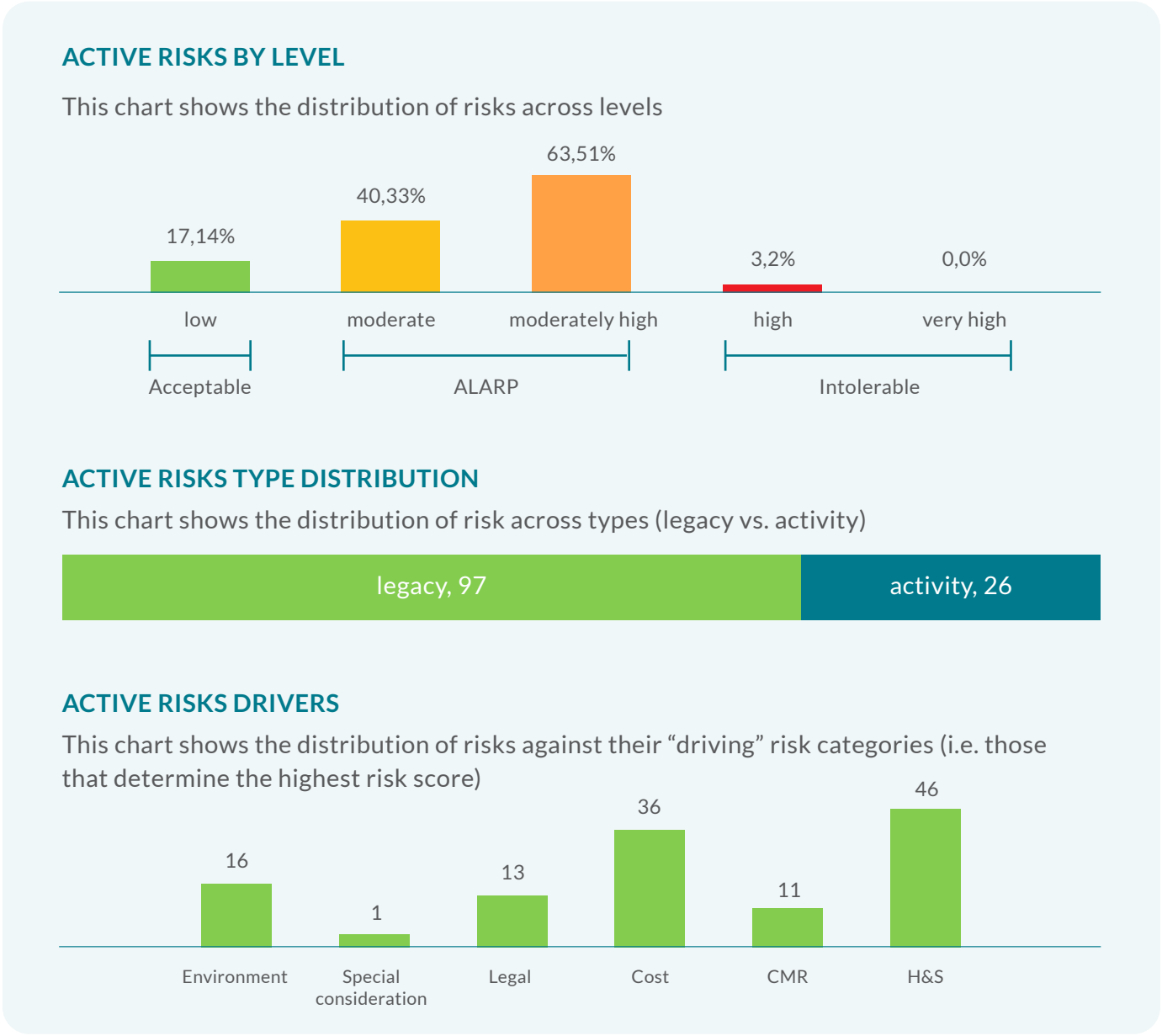
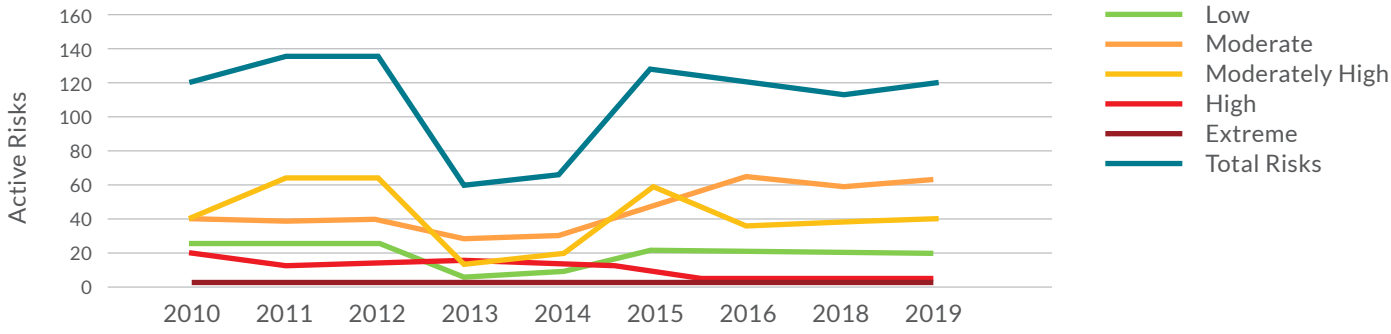


Figure 14: Historical Risk Profile

This chart graphs the historical risk numbers by level and type as entered on the Risk History Tab



The dip in risks reflects a change in how risks were captured in the risk categorization process

APPENDIX D – PROGRESS ON ENVIRONMENTAL ASSESSMENT MEASURES AND SUGGESTIONS – DETAILED TABLES

This appendix provides supplemental details about progress toward achieving the Measures stipulated via The Report of Environmental Assessment and Reasons for Decision (Mackenzie Valley Review Board, 2013), and plans for 2020-21. Throughout these tables, "the Project" refers to the GMRP. The language in the Measure column is drawn directly from The Report of Environmental Assessment and Reasons for Decision (Mackenzie Valley Review Board, 2013).

Table 21: Giant Mine EA Measures Tracking Table (as of March 2020)

#	Measure	Status	GMRP Comments on Status
1	To prevent the significant adverse impacts on environment and the significant public concern from the proposed perpetual timeframe, the Project will proceed only as an interim solution, for a maximum of 100 years.	No Action Required	The closure period is 100 years as outlined in the CRP.
2	Every 20 years after the beginning of Project implementation, the Developer will commission an independent review of the Project to evaluate its effectiveness to date, and to decide if a better approach can be identified. This will: 1. consider results of the ongoing research 2. be participatory in nature 3. follow the requirements of procedural fairness and be transparent in nature. If the periodic review identifies a better approach that is feasible and cost-effective, the Developer will further study it, and make the study and its results of the study public.	Future action required	Article 8 of the June 9, 2015 Environmental Agreement further formalized the process through which the future Independent Project Review will be conducted. The Agreement ensures the independent review of the Project is conducted in a manner that considers ongoing research results, is participatory and transparent in nature and follows the requirements of procedural fairness.
3	To facilitate active research in emerging technologies towards finding a permanent solution for dealing with arsenic at the Giant mine site, the Developer will fund research activity as advised by stakeholders and potentially affected Parties through the GMOB. The ongoing funding for this research activity, and additional resources required to manage its coordination, will be negotiated and included as part of the Environmental Agreement specified in Measure 7 and will make best use of existing research institutions and programs. The GMOB will ensure through the research activity that, on a periodic basis: 1. reports on relevant emerging technologies are produced; 2. research priorities are identified; 3. research funding is administered; 4. results of research are made public, and 5. results of each cycle are applied to the next cycle of these steps.	Complete	Articles 7 & 11 of the June 9, 2015 Environmental Agreement provide a commitment of funding for the Oversight Body (which will be known publicly as the Giant Mine Oversight Board, or GMOB) to manage a research program as required by Measure 3. Initial funding flowed for this Measure in 2016-17 and will be ongoing.

#	Measure	Status	GMRP Comments on Status
4	The GMOB will provide the results of the research funded by the Developer to the periodic reviews of the Project described in Measure 2. If better technological options are identified through the funded research in-between these periodic 20-year reviews, these will be reported publicly by the GMOB to the Parties, the Developer and the Canadian public. The Developer will consider these technologies and make decisions regarding their feasibility. The Developer will make any such decisions public.	Complete	The Giant Mine Oversight Board (GMOB) hosted a research workshop in March 2018 and negotiated an MOU with the University of Waterloo for TERRE-NET researchers to establish a formal research relationship with respect to alternate technological options for the permanent remediation solution for the arsenic trioxide dust stored at the Giant Mine site. Currently, the research focus is on stabilization of the dust; the safe extraction of the dust will be a future focus.
5	In order to mitigate significant adverse impacts that are otherwise likely, the Developer will commission an independent Quantitative Risk Assessment to be completed before the Project receives regulatory approvals. This will include: 1. explicit acceptability thresholds, determined in consultation with potentially affected communities 2. an examination of risks from a holistic perspective, integrating the combined environmental, social, health and financial consequences. 3. possible events of a worst-case/ low frequency high consequence nature 4. additional considerations specified in Appendix D of the Report of Environmental Assessment From this, the Developer will identify any appropriate Project improvements and identify management responses to avoid or reduce the severity of predicted unacceptable risks.	Underway	An independent consultant (Wood) was retained in 2018 to complete the Quantitative Risk Assessment. A separate consultant was retained to develop the engagement component (Stratos). The report and findings will be presented during engagement sessions in Spring / Summer 2020. Results will be carried forward in Design Plans submitted to the MVLWB and future versions of Management Plans and Design and Construction Plans as required.
6	The Developer will: • investigate long-term funding options for the ongoing maintenance of this Project and for contingencies, including a trust fund with multi-year up front funding, • involve stakeholders and the public in discussions on funding options; and, • make public a detailed report within three years that describes its consideration of funding options, providing stakeholders with the opportunity to comment on the report.	Complete	The Measure 6 report on long term funding options for Giant Mine was finalized in July 2019 (Deloitte LLP, 2019a).

#	Measure	Status	GMRP Comments on Status
7	The Developer will negotiate a legally-binding environmental agreement with, at a minimum, the members of the Oversight Working Group, and other appropriate representative organizations, to create an independent Oversight Body (GMOB) for the GMRP. These negotiations will build on the existing discussion paper and draft environmental agreement of the Giant Oversight Working group. This GMOB will exist for the life of the Project unless otherwise agreed by the Parties to the Environmental Agreement. Every effort will be made to have the GMOB in place as early as possible. The negotiations will make significant progress within six months of the Ministers' Environmental Assessment decision or proceed to mediation. The Developer will cover any mediation costs. The environmental agreement will include a dispute resolution mechanism to ensure compliance with the agreement and a stable funding mechanism for the GMOB.	Complete	Through negotiations with the six affected parties (GNWT, CIRNAC, Alternatives North, the NSMA, the YKDFN, the City of Yellowknife) an Environmental Agreement was signed in June 2015. This Agreement established the mandate for a GMOB. Details of the Board's mandate are included in the Giant Mine Environmental Agreement and Society's by-laws found on the GMOB's website.
8	The activities of the oversight body will include: • keeping track of monitoring activities by the Developer and the results of those activities, including water quality and aquatic effects monitoring, health monitoring and other monitoring; • considering the adequacy of funding for the Project and ongoing research; • providing advice to the Developer, regulators and government on ongoing improvements in monitoring and Project management to prevent risks and mitigate any potential impacts; • sharing the oversight body's conclusions with the general public and potentially affected communities in a culturally appropriate manner	Complete	The Environmental Agreement provides for the creation of the Oversight Board and funding to fulfill these obligations going forward. Article 3 of the Environmental Agreement outlines the mandate of the GMOB. The GMRP continues engaging with GMOB staff and directors through various engagement initiatives and venues, further described in the Engagement Plan.
9	The Developer will work with other federal and territorial departments as necessary to design and implement a broad health effects monitoring program in Ndilǫ, Dettah and Yellowknife focusing on arsenic and any other contaminants in people which might result from this Project. This will include studies of baseline health effects of these contaminants and ongoing periodic monitoring. This will be designed with input from: • Health Canada, GNWT Health and Social Services and the Yellowknife medical community; and • The Yellowknives Dene and other potentially affected communities. The organization conducting the monitoring will provide regular plain language explanations of the monitoring results in terms that are understandable to lay people, and communicate this to potentially affected communities in a culturally appropriate manner.	Underway	The Health Effects Monitoring Program was established in 2017. The Program is carried out by University of Ottawa's Dr. Laurie Chan and his team. It is a long-term monitoring program to establish levels of arsenic and other contaminants of concern in residents of Ndilo, Dettah and Yellowknife. The results of baseline data collection phase (two waves in 2018 and 2019) indicated: that overall arsenic levels in urine are similar between the overall Yellowknife population and the Canadian Health Measures Survey (CHMS) levels, which represent the general Canadian population. Additional public sessions are intended for May 2020 to communicate more details of the results with respect to additional sample analysis.

#	Measure	Status	GMRP Comments on Status
10	The Developer will commission a comprehensive quantitative human health risk assessment by an independent, qualified human health risk assessor selected in collaboration with Health Canada, the Yellowknives Dene, the City of Yellowknife, and the Developer. This human health risk assessment will be completed before the Project receives regulatory approvals. It will: 1. Include a critical review of the 2006 Tier II human health risk assessment and the previous screening reports; 2. Consider additional exposures and thresholds (as specified in Appendix F of the Report of Environmental Assessment); 3. Decide whether a Tier III risk assessment is appropriate; 4. Provide a plain language explanation of the results in terms that are understandable to the general public, and communicate this to potentially affected communities in a culturally appropriate manner; 5. Provide interpretation of results and related guidance; and 6. Inform the broad health effects monitoring program (described in Measure 9 above). The Developer may conduct the human health risk assessment concurrently with the Quantitative Risk Assessment described in Measure 5. Based on the results of this human health risk assessment, and on any existing results of the health effects monitoring program (described in Measure 9 above), the Developer will, if necessary in response to this information, identify, design and implement appropriate design improvements and identify appropriate management responses to avoid or reduce the severity of any predicted unacceptable health risks. Also, footnote #133 in the Report of Environmental Assessment (Appendix D) is revised to read, in its entirety, "Including inference of causality and pathologies deducted from any available health studies."	Underway	The Human Health Ecological Risk Assessment was completed by Canada North Environmental Services. The Human Health Ecological Risk Assessment was carried out with significant input from stakeholders, community members and traditional knowledge holders. This input included both the scope of the assessment and the implementation to better assess risks considering differences in traditional land use, food consumption, and lifestyles for residents living in Yellowknife, Ndilo and Dettah. The final report was released in January 2018. Additional considerations for communications are underway to ensure residents understand the outcomes which have informed public health advisories through the GNWT Department of Health and Social Services. The GMRP is currently developing a Wellness Study (formerly called the Stress Study) via an independent research team through the University of Wilfred Laurier. The requirement of this study was identified in Appendix F to the Report of Environmental Assessment noting the requirement to "evaluate indirect effects of potential exposures to arsenic on wellness, including stress effects." Preliminary scope discussions have occurred with affected parties. Implementation of the stress component will take place 2020-21.

#	Measure	Status	GMRP Comments on Status
11	The Developer, with meaningful participation from the Oversight Body and other parties, will thoroughly assess options for, and the environmental impacts of, diversion of Baker Creek to a north diversion route previously considered by the Developer or another route that avoids the mine site and is determined appropriate by the Developer. Within one year of the project receiving its water license, a report outlining a comparison of options including the current on-site realignment will be provided to the appropriate regulatory authorities, the Oversight Body and the public. Once informed by the advice of the Oversight Body and regulatory authorities, the Developer will determine and implement the preferred option. In doing so, the Developer will consider the advice of the Oversight Body, regulatory authorities, and the public, and will ensure that the primary considerations in selecting an option are to: a) minimize the likelihood of Baker Creek flooding and entering the arsenic chambers, stopes and underground workings, and b) minimize the exposure of fish in Baker Creek to arsenic from existing contaminated sediments on the mine site, surface drainage from the mine site or tailings runoff. If off-site diversion is selected, the Developer will seek required regulatory approvals to implement the diversion within five years of receiving its water license.	Complete	A comprehensive evaluation of diversion alternatives was undertaken and documented in the Baker Creek Diversion Alternatives Evaluation Report. The assessment included an evaluation of alignment options based on environment, society and feasibility. The Draft Report was engaged on with GMOB, the GMRP Working Group, and the YKDFN Giant Mine Advisory Committee. Engagement details are documented in the engagement log. Overall support for the recommendations provided for alignment option. The Final report was provided as Appendix 5.5A to the Closure and Reclamation Plan in the Water Licence Package. Actions taken as part of the Baker Creek design to address a) include: • providing Baker Creek with geomorphic channel including floodplain conveyance; • designing closure channel and floodplain conveyance for floods up to and including the Probable Maximum Flood (PMF), sealing underground mine openings to surface to mitigate potential for inundation and uncontrolled flow to the underground mine during extreme events and placing pit fills in a manner to provide additional flood protection. Actions taken as part of the Baker Creek design to further address b) include: removing tailings, where present from Baker Creek and removing fine sediments, where present, from Baker Creek.

#	Measure	Status	GMRP Comments on Status
12	To prevent significant adverse impacts on Great Slave Lake from contaminated surface waters in the existing or former channel of Baker Creek, should it be re-routed to avoid the mine site, the Developer will ensure that water quality at the outlet of Baker Creek channel will meet SSWQO based on the CCME *Guidance on the Site-Specific Application of Water Quality Guidelines in Canada*.	Complete	Water quality objectives specific to and protective of Yellowknife Bay were developed based on CCME Guidance and are presented in the EQC report. Extensive modelling including a site model in GoldSim, a near field model of the mixing zone (CORMIX) and a 3D Model of Yellowknife Bay (GEMSS) were developed to support the development of EQC and demonstrate the Project's ability to meet Water Quality Objectives. Modelling documentation is included in the EQC report along with prediction of future water quality in Yellowknife Bay. The Water Quality Objectives will be met upon completion of the GMRP active remediation phase and will be met in the vicinity of the outlet of Baker Creek (see Measure 13), at the edge of a 200 m mixing zone (see Measure 15) that includes the Project's new WTP outfall and the influence of Baker Creek. Site Specific Water Quality Objectives (WQO) were presented as part of pre-engagement and submitted in the Effluent Quality Criteria (EQC) Report to the MVLWB for approval in April 2019. These were discussed at the first technical session in July 2019, hosted by the MVLWB, in support of the Water Licence application process and approved by the MVLWB in July 2020.
13	The Developer will design and, with the applicable regulators, manage the Project to ensure that, with respect to arsenic and any other contaminants of potential concern, the following water quality objectives are achieved in the vicinity of the outlet of the existing or former channel of Baker Creek, should it be re-routed to avoid the mine, excluding Reach 0: a) Water quality changes due to discharge from the former channel of Baker Creek will not reduce benthic invertebrate and plankton abundance or diversity; b) Water quality changes due to discharge from the former channel of Baker Creek will not harm fish health, abundance or diversity; c) Water quality changes due to discharge from the former channel of Baker Creek will not adversely affect areas used as drinking water sources, d) Water quality changes due to discharge from the former channel of Baker Creek will not adversely affect any traditional or recreational users; and, a) There is no increase in arsenic levels in Great Slave Lake due to discharge from the former channel of Baker Creek beyond the parameters described in Measure 12.	Complete	Measure 13 a) through d) are satisfied by selecting Water Quality Objectives for Yellowknife Bay that are protective of aquatic life and drinking water. Arsenic concentrations in Great Slave Lake, beyond the edge of the mixing zone (200 m from breakwater), will not increase from present-day concentrations as demonstrated in the EQC report and supporting documentation (see Measure 12).

#	Measure	Status	GMRP Comments on Status
14	The Developer will add an ion exchange process to its proposed water treatment process to produce WTP effluent that at least meets Health Canada drinking water standards (containing no more than 10µg/L of arsenic), to be released using a near shore outfall immediately offshore of the Giant mine site instead of through the proposed diffuser. The Developer will achieve this concentration without adding lake water to dilute effluent in the treatment plant.	Complete	The new WTP will include ion-exchange technology as part of the treatment process and will discharge effluent meeting the criteria of 10 ug/L of Arsenic. The outfall location was identified through stakeholder engagement and options analysis and will be located nearshore of the Giant site in the vicinity of Baker Creek. No diffuser is proposed.
15	The Developer and regulators will design and manage the Project so that, with respect to arsenic and any other contaminants of potential concern: 1. Water quality at the outfall will meet the Health Canada Guidelines for Canadian Drinking Water Quality; and, 2. The following water quality objectives in the receiving environment are met: a) Water quality changes due to effluent discharge will not reduce benthic invertebrate and plankton abundance or diversity at 200 metres from the outfall; b) Water quality changes due to effluent discharge will not harm fish health, abundance or diversity; c) Water quality changes due to effluent discharge will not adversely affect areas used as drinking water sources; and, d) There is no increase in arsenic levels in Yellowknife Bay water at 200 metres from the outfall: and, e) There is no increase in arsenic levels in Yellowknife Bay sediments at 500 metres from the outfall	Complete	All parameters of potential concern (POPC) will meet relevant Canadian Drinking Water Guidelines (DWG) at the edge of the mixing zone. Water Quality Objectives specific to Yellowknife Bay have been developed to be protective of aquatic life and drinking water and all Water Quality Objectives will be met at the edge of the mixing zone. Arsenic concentrations in Great Slave Lake, beyond the edge of the mixing zone will not increase from present-day concentrations due to effluent discharge. See Measure 12 for more details on Water Quality Objectives and supporting evidence.
16	Before construction, the Developer will model re-suspension of arsenic from sediments and resulting bioavailability in the vicinity of the outfall. If the modeling results indicate that the outfall may re-suspend arsenic from sediments, the Developer will modify the outfall design until operation does not cause resuspension of arsenic from sediment.	Underway	The GMRP is taking a more protective approach and mitigating the potential of sediment resuspension through design of a sediment cover, rather than modelling. The design criteria for the outfall will include the requirement to avoid resuspension of arsenic from sediments.

#	Measure	Status	GMRP Comments on Status
17	Before operating the outfall, the Developer will design and implement a comprehensive aquatic effects monitoring program that is sufficient to determine if the water quality objectives listed in Measure 15 are being met. This program will: 1. at a minimum, be able to identify any accumulation of arsenic over time in the water, sediment or fish in the receiving environment; 2. include appropriate monitoring locations near N'dilo, in Back Bay and in Yellowknife Bay, with a focus on areas in the vicinity of the outfall and areas used by people; 3. include the establishment of a baseline for aquatic effects in Back Bay before beginning Project construction and installation of the outfall; 4. be developed according to AANDC *Guidelines for Designing and Implementing Aquatic Effects Monitoring Programs for Development Projects in the Northwest Territories, June 2009*, with corresponding action levels and management response framework.	Underway	A draft AEMP focusing on the early years of the remediation program (up to 2026) was developed, engaged upon and revised. A conceptual AEMP looking forward past 2026 was also developed, engaged upon and revised. A baseline field monitoring program began in 2018-19 to develop baselines for aquatic effects in Back Bay and further afield. Both documents (the Baker Creek AEMP Study Design and the Conceptual Study Design for Yellowknife Bay) were submitted to the MVLWB in April 2019 and approved by the MVLWB in August 2020. Details including Water Licence conditions were discussed in Technical Session 1 in July 2019, Technical Session 2 in September 2019 and the Public Hearings in January 2020.
18	Prior to preparing chambers and stopes for freezing, the Developer will conduct a comprehensive Quantitative Risk Assessment evaluating both wet and dry methods for the initial freezing design, with respect to current risks and implications for future removal. This will include an evaluation of potential effects of the proposed freezing and wetting method on the thawing or frozen excavations, and potential impacts of ongoing design changes prior to implementing the Project. The Developer will release a plain language report to the public describing its considerations and the resulting design.	Complete	The Freeze Design Basis Report was finalized in 2016 and included an evaluation of wet versus dry methods, resulting in the selection of the dry method. The plain language report was finalized and distributed to the Giant Mine Working Group, YKDFN Giant Mine Advisory Committee, and email distribution list (June 2019).
19	Considering the results of the risk assessment described in Measure 18, the Developer will not adopt any method of freezing that significantly reduces opportunities for future arsenic removal or other remediation by future technologies.	Complete	The Freeze Design Basis Report was finalized in 2016 and included an evaluation of wet vs dry. The Project is proceeding with the dry method, which combined with a passive freezing approach will allow for reversibility if needed. Closure Objective F2 and associated closure criteria address reversibility in the CRP.

#	Measure	Status	GMRP Comments on Status
20	The Developer will conduct all major demolition and construction activities with the potential to release large amounts of dust or contaminants into the air when wind directions will minimize the chances of dust and contaminants blowing into the City of Yellowknife, Dettah and N'dilo.	Future Action Required	The Dust Management and Monitoring Plan defines wind levels for carrying out site activities as well as requirements for timing of activities including demolition to be carried out during times of forecasted low winds and in a direction to minimize potential impacts to local communities. As well, the site wide Air Quality Monitoring Plan is an existing and ongoing program that was designed to adapt to changing activities on site, and will incorporate all suitable measures and activities to mitigate the risks of exposure to contaminated dust throughout the life of the project. The Air Quality Monitoring Plan is an appendix to the Dust Management and Monitoring Plan.
21	The Developer will collect dust and contaminant level data from soil and vegetation in the vicinity of major reclamation activities before and after major demolition or construction activities to serve as a baseline for any related adaptive management activities that may follow.	Future Action Required	As was conducted during the Roaster Complex deconstruction, air quality monitoring (including activity-specific) as per the AQMP will be conducted for all major reclamation activities (both before and after) with adaptive mitigative measures applied as required. WActivity specific monitoring such as dust and contaminant level data from soil and vegetation in the vicinity of major reclamation activities will be identified in future plans.
22	The Developer will conduct a study to determine appropriate depth of the tailings cap and B1 pit cover, in consultation with Environment Canada and responsible regulators, to verify that the depth proposed will ensure the tailings cap and B1 pit cover are not compromised by vegetation growth. The Developer will provide a report of this study to the MVLWB before it issues a water license for the Project.	Complete	During Surface Design Engagement some affected parties preferred the selection of a non-vegetated tailings cover. The selection of a rock cover as outlined in the CRP addresses the concern of the cover being compromised by vegetation growth. As a result of input received during engagement and the selection of a rock cover, this measure has been addressed.
23	The Developer will work cooperatively with responsible regulatory authorities and interested Parties in the development and submission of a Tailings Management and Monitoring Plan prior to receiving regulatory approvals. This plan will not only identify potential issues for the management of tailings but will also identify mitigation measures to prevent problems related to the tailings cap failure, and will include consideration of the B1 pit cover as applicable.	Complete	A Tailings Management and Monitoring Plan has been developed.
24	The Developer will physically prevent all-terrain vehicle access to the tailings cap and B1 pit cover to prevent the surface from being eroded or otherwise compromised. The Developer will monitor the effectiveness of this prevention, and will take any additional management measures as necessary to prevent all-terrain vehicle access.	Future Action Required	The selection of a coarse rock cover will prevent the surface from being eroded or comprised through ATV access. Closure objective T6 addresses this in the CRP.

#	Measure	Status	GMRP Comments on Status
25	The Developer will work cooperatively with responsible regulatory authorities and interested Parties in the development and submission of an Air Quality Management Plan which incorporates an ongoing air quality monitoring program. This ongoing monitoring program will include all previously identified on-site air quality monitoring stations and one off-site air quality monitoring station near Niven Lake. At a minimum, ambient concentrations of NO2 and PM2.5 will be monitored at the Niven lake site. Total suspended particulate and metal concentrations will be monitoring at the on-site locations. This AQMP will identify action levels and trigger additional management and mitigation activities, if required.	Underway	The AQMP comprises eight site perimeter stations and three community stations. The parameters NO2 and PM2.5 are included at the community stations, including Niven. The AQMP, in conjunction with the Dust Management and Monitoring Plan, identifies action levels which trigger additional management and mitigation measures as required.
26	In conjunction with Measure 10 above, the Developer will consider the results of the comprehensive human health risk assessment, and consult with the YKDFN and City of Yellowknife when determining suitable end uses of the site, to ensure that those proposed uses do not pose a health risk to people, including toddlers.	Underway	The Human Health Ecological Risk Assessment was completed in 2018 and results were presented to the YKDFN, the City of Yellowknife and other affected parties. The constraints to end land use are presented in the CRP. The Engagement Plan outlines the extensive number of engagement activities that have taken place on the Human Health Ecological Risk Assessment and the CRP. The Project team will continue to work with its municipal, territorial and federal counterparts to communicate site risks and end land use constraints.

Table 22: Giant Mine Environmental Assessment Suggestions Tracking Table (as of March 2020)

#	Suggestion	Status	GMRP Comments on Status
1	The Developer should consult with surrounding communities, including Dettah, Ndil? and the City of Yellowknife, prior to finalizing its Project design, so that design improvements may be incorporated to address any remaining concerns.	Underway	The extensive engagement completed since the EA is documented in the CRP, Engagement Plan and the Engagement Log. This includes the Surface Design Engagement process and regular ongoing engagement through the Giant Mine Working Group, the YKDFN GMAC and other engagement venues.
2	The Developer should create a monument as a memorial to the impacts of past contamination from Giant Mine on Indigenous communities and the environment.	Underway	The Project has committed to a monument as this was widely supported by affected parties during Surface Design Engagement, however the details of exactly what and where the monument would go were not discussed during Surface Design Engagement The Project will engage on this with affected parties prior to finalizing the details of the monument and communicate this decision to the public.

#	Suggestion	Status	GMRP Comments on Status
3	To encourage widespread learning from and remembering of the experiences of the Giant Mine, the Developer, in conjunction with the GNWT Department of Education, Culture and Employment, should: 1. develop an education resource unit on the impacts of Giant Mine on the land and on people, including impacts on Indigenous peoples, and 2. distribute this resource unit for use within the school curriculum across Canada.	Underway	GMRP is working with the YKDFN, NSMA, GMOB, and GNWT Education, Culture and Employment to develop a Giant Mine education resource for the Grade 10 Northern Studies curriculum.
4	The Federal Contaminated Sites Action Program should develop a policy framework and guidance for the perpetual care and management of remediated contaminated sites.	Underway	A Perpetual Care Plan is a requirement under the Environmental Agreement. Under the Agreement, a draft was to be available to GMOB by June 2020; however, GMRP requested a formal extension from GMOB until November 2020 to account for incorporating the results of the Quantitative Risk Assessment. A draft Perpetual Care Plan framework was submitted to the Giant Mine Working Group in August 2020 for feedback prior to the GMOB submission. The Project began engagement in 2019-20. *Please note: GMRP no longer falls under the Federal Contaminated Sites Action Program, but is under the Northern Abandoned Mine Reclamation (NAMR) program*
5	To ensure long-term funding throughout the life of the Project, the Developer should create an independently managed self-sustaining trust fund with multi-year up-front funding for the ongoing maintenance of this Project and for contingencies. A third-party expert should independently manage this trust fund. Annual reports on the condition of the fund should be provided to stakeholders and the public.	Outside of the Project scope	This suggestion is linked to the outcome of Measure 6. A final report as required under Measure 6 was completed in 2019/20. A response to this suggestion is outside the be mandate of the GMRP, however the Project team will ensure the report is provided to the relevant department(s) in the Government of Canada and continue to work with our counterparts in the federal system to ensure funding is in place throughout the life of the Project.
6	To reduce public concern about the multiple roles of AANDC in this Project and to increase public confidence, AANDC should produce guidelines to clarify reporting structures to ensure that Project inspectors, advisors and managers employed by the federal government can perform their duties objectively and without undue pressure from within the federal government. These should be made available to the public within six months of Ministerial acceptance of this Report of Environmental Assessment.	Outside of the Project scope	A response to this suggestion is outside the mandate of the GMRP, however the existing Treasury Board Values and Ethics Code for the Public Sector is available to the public at http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=25049

#	Suggestion	Status	GMRP Comments on Status
7	Based on the results of the health risk assessment described in Measure 10, the appropriate government authorities should remediate garden and playground soils where arsenic concentrations exceed current guidelines for urban soils in Canada.	Outside of the Project scope	The remediation of garden and playground soils is out of scope of the GMRP. The Project continues to cooperate with relevant federal and territorial agencies to share information.
8	The Developer should consider the Trail Human and Environmental Health Committee as a model for the development of the health program.	Complete	The Health Effects Monitoring Program has incorporated lessons learned and similar concepts from that of the Trail BC Monitoring Program.
9	During its review of the diversion of Baker Creek, the Department of Fisheries and Oceans should consider the habitat loss of the existing Baker Creek and decide on any habitat design requirements for the diversion to the extent it deems appropriate. Any resulting habitat compensation requirements should be applied on the new diversion.	Underway	The GMRP is working with the Department of Fisheries with respect to habitat loss and compensation. Discussions began in 2018 and continued in 2019-20. The GMRP, is committed to engage with the Working Group, GMAC, and the affected parties to determine the appropriate habitat design requirements are incorporated into the final design of Baker Creek.
10	The Developer should investigate the potential advantages and disadvantages of adding an engineered wetland to the Project to reduce arsenic in surface drainage. This investigation should include possible locations in the channel that formerly contained Baker Creek and in the Baker Creek diversion. On completion, the Developer should make a public report of the results of this investigation and of any resulting changes to Project design. This should be completed before a water license is issued for the Project.	Underway	A Research and Reclamation Plan entitled Passive and Semi Passive Treatment systems is an Appendix to the CRP. This plan outlines research undertaken to date on engineered wetlands and the proposed further steps to investigate the feasibility and potential effectiveness of applying passive and semi-passive treatment systems on the Giant site.
11	To manage the risks of airborne exposure of contaminated dust from deconstruction of buildings or other structures on site, the Developer should: • prepare a dispersion model of dust plume given typical wind direction and speed • define the meteorological window of opportunity to describe acceptable wind conditions to eliminate the potential for a dust cloud release and transport of surrounding communities. • consult a meteorologist to develop a sound model of weather conditions, to indicate when winds are steady and not gusting, blowing to the north • stop if winds change or any dust controlling equipment fails	Underway	The AQMP is an existing and ongoing program that was designed to adapt to changing activities on site, and will incorporate all suitable measures and activities to mitigate the risks of exposure to contaminated dust throughout the life of the project. Activity-specific monitoring and mitigations measures will be a part of specific Construction Plans, including deconstruction of buildings as required.

#	Suggestion	Status	GMRP Comments on Status
12	To prevent impacts on people from potentially harmful contaminant releases from deconstruction of buildings or other structures on site at the Giant Mine site, the Land and Water Board should specify allowable wind directions and wind speeds in degrees, to ensure that contaminated structures are not demolished during blustery multi-directional winds at ground level.	Outside the Project Scope	The Air Quality Monitoring Plan (AQMP) is an existing and ongoing program that was designed to adapt to changing activities on site, and will incorporate all suitable measures and activities to mitigate the risks of exposure to contaminated dust throughout the life of the project. Activity-specific monitoring and mitigations measures will be a part of specific Construction Plans, including deconstruction of buildings as required.
13	The Developer should investigate options for filling in the pits, in consultation with the City of Yellowknife and YKDFN.	Complete	The option to fill pits was investigated and outlined in the Open Pits Options Assessment Report. Pit filling options were evaluated and engaged on during the Surface Design Engagement, where there was support from most affected parties to fill pits. As outlined in the CRP, the pits will be filled or partially filled.
14	The Developer should consider the baseline conditions for existing fish habitat in Back Bay (including a fish habitat assessment in the area of the foreshore tailings and the aquatic effects baseline required in Measure 17) and develop a foreshore tailings cover design and foreshore tailings monitoring and mitigation plan for review by the Department of Fisheries and Oceans pursuant to habitat provisions of the *Fisheries Act*.	Underway	Fish Habitat surveys of the foreshore tailing areas, the near shore contaminated sediments and the outfall area in Yellowknife Bay began in 2018 and will continue in 2020/21. This work will inform and be presented in the Project's application for Department of Fisheries and Oceans Canada Authorization. A conceptual level AEMP for Yellowknife Bay has been developed.
15	The Developer should consult with the City of Yellowknife in the design of any landfill on the Giant Mine site.	Underway	Engagement sessions occurred with the City of Yellowknife through the Giant Mine Working Group and in the City-GMRP monthly meetings to present the proposed locations and other details of the on-site landfill, resulting in support of the proposed location in the CRP. Future design details will be made available for review by affected parties through construction plans.
16	The Developer should consult with Indigenous groups with respect to reduced traditional use cumulatively resulting from the proposed Project in combination with contamination from Giant Mine. This should occur prior to finalizing Project design, so that design improvements may be used to address any remaining concerns.	Underway	The extensive engagement completed by the project is documented in the CRP, Engagement Plan and Engagement Log. Traditional Knowledge Studies have been completed by both NSMA and YKDFN and the outcomes of that work will further inform future versions of Monitoring and Management Plans, Design Plans, and Construction Plans as required.

APPENDIX E – ADDITIONAL INFORMATION ON MONITORING PARAMETERS

C.1 Air Quality Monitoring Program

The GMRP team is committed to maintaining air quality parameters below the protective thresholds set by the AQMP and listed below.

Table 23: AQMP Air Quality Criteria (SLR Consulting (Canada) Ltd, 2020)

Analyte	Source[19]	Averaging Period	Guideline / Standard Concentration (µg / m3 unless wotherwise specified)
Total suspended particulates	[3]	24 hr	120
	[3]	Annual	60
Particular matter less than 10µm (PM_{10})	[1]	24 hr	50
Particular matter less than 2.5µm ($PM_{2.5}$)	[2]	24 hr	28
Nitrogen dioxide	[3]	1 hr	213 (ppb)
	[3]	24 hr	106 (ppb)
Arsenic (As)	[1]	24 hr	0.3
Iron (Fe)	[1]	24 hr	4
Lead (Pb)	[1]	24 hr	0.5
Nickel (Ni)	[1]	24 hr	0.2
Antimony (Sb)	[1]	24 hr	25
Asbestos as fibre > 5µm in length	[1]	24 hr	0.04 fibres/cm^3
Fence line – Total suspended particulates Risk Based Action Level*	[4]	15-minute	333
Fence line – PM10 Risk Based Action Level*	[4]	15-minute	159

* Derived from toxicological references for the hypothetical on-site worker/trespasser, chronic criterion based on protection against both an incremental carcinogenic risk of 1 x 10^{-5} (Health Canada, 2004) using the Health Canada Inhalation Unit Risk Factor.

C.2 Water Quality Monitoring

The GMRP team undertakes effluent and water quality monitoring in and around the Giant Mine site via different programs in order to report on surface water, groundwater and underground minewater. These programs track parameters such as the volume of water pumped or discharged, water quality, and the performance of the ETP.

Parameters tested at all stations include standard general parameters (e.g., temperature, pH, conductivity, hardness), major ions, nutrients, and total and dissolved metals and metalloids. There are also specific station requirements for other tests such as cyanide, sulphide, hydrocarbons, and radium-226. Samples collected at SNP 43-1 must meet federal requirements under MDMER as well as the discharge criteria defined in the former Water Licence (N1L2-0043).

The figures below highlight the locations of surface water quality monitoring stations as well as groundwater monitoring wells and well status.

[19] SOURCES: [1] Ontario Ambient Air Quality Criteria (December 2016), [2] Canadian Council for Ministers of the Environment (2015) Canadian Ambient Air Quality Standards, [3] Guideline for Ambient Air Quality Standards in the Northwest Territories (February 2014), [4] Health Canada 2004.

Figure 15: Surface Water Quality Monitoring Stations

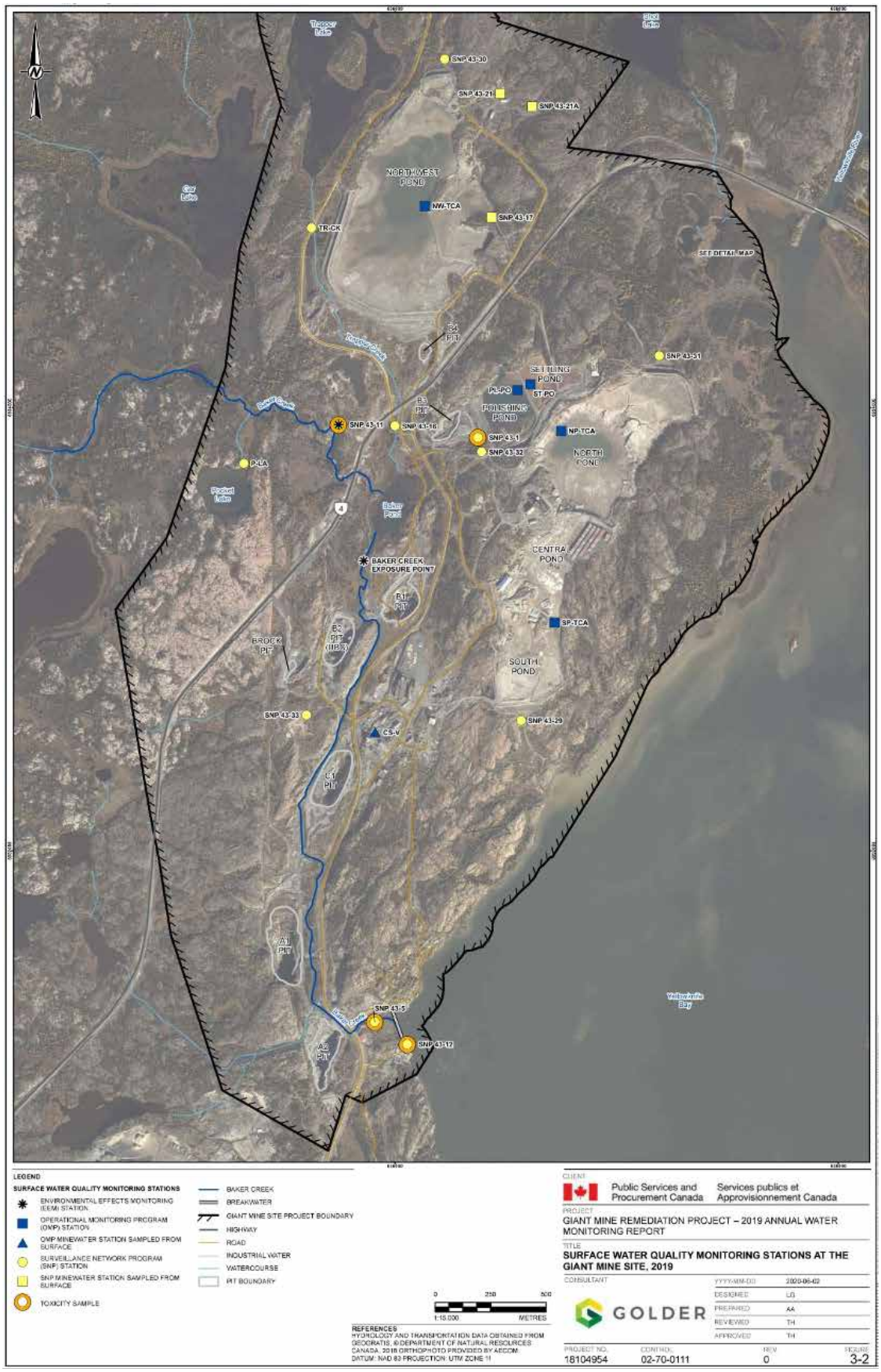
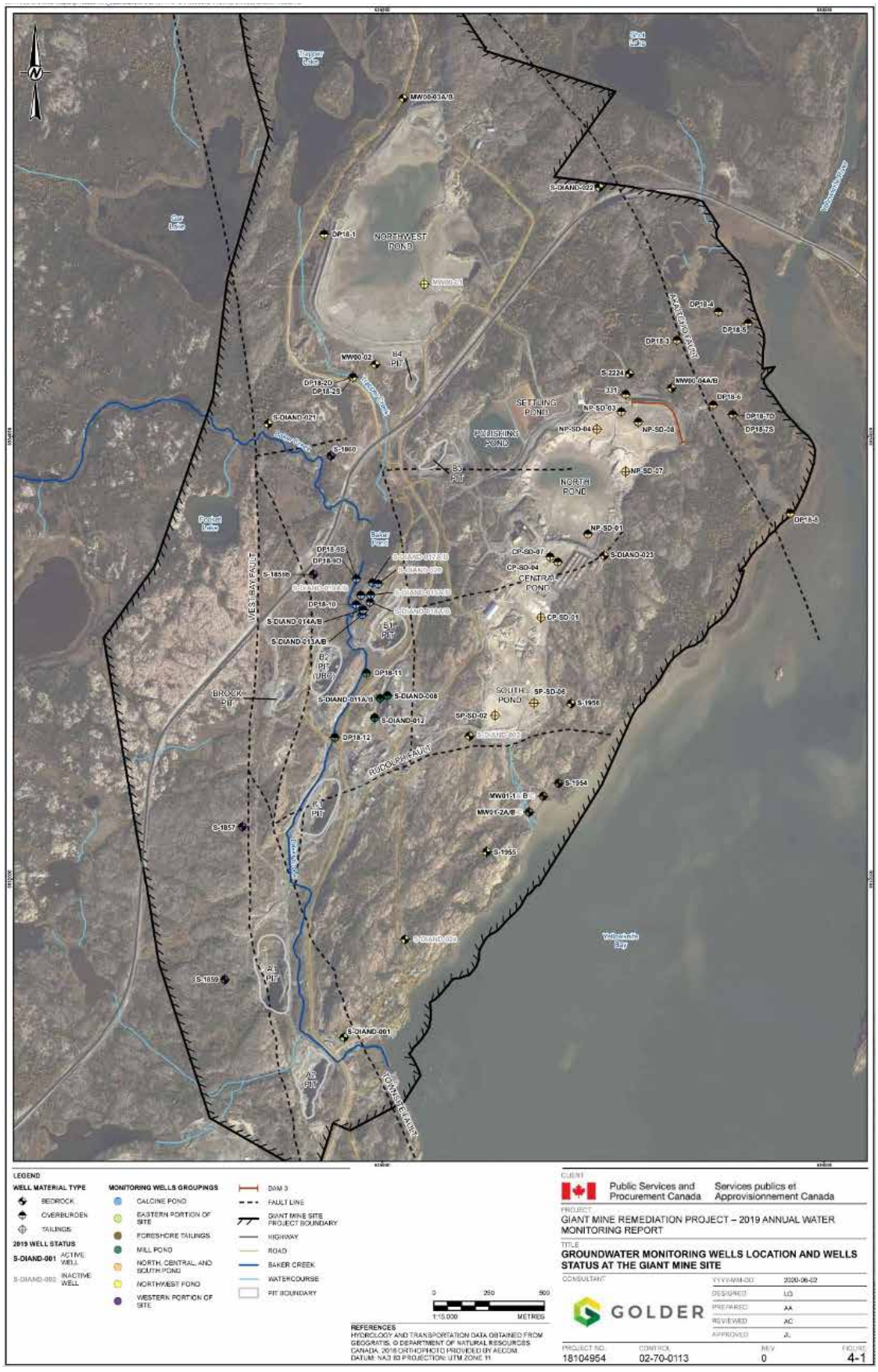


Figure 16: Groundwater Monitoring Wells and Well Status



ANNEXES

Annex A: Plain Language Summary

ANNEX A – PLAIN LANGUAGE SUMMARY

Introduction to the Giant Mine Remediation Project

The Giant Mine is a former gold mine located within Yellowknife, Northwest Territories city limits. It is about 5 km north of city centre. The site lies within the asserted traditional territory of Indigenous communities and groups.

- The site is within the Yellowknives Dene First Nation's traditional territory. As part of the Akaitcho Territory Dene First Nations, they are negotiating a land, resource, and governance agreement with the governments of the Northwest Territories and Canada.
- The Tłı̨chǫ have a recognized area of traditional land use known as Monfwì Gogha Dè Nı̨htł'è. In this area, members exercise rights set out in the Tłı̨chǫ Agreement. The Giant Mine site falls within this area's boundaries.
- The North Slave Métis Alliance represents Métis in Yellowknife. Members assert Indigenous rights in the area that includes the Giant Mine site.
- The Northwest Territories Métis Nation represents the Métis from the NWT's South Slave region. The Giant Mine site is next to Great Slave Lake, which is within the boundaries of the Land and Resources Final Agreement they are negotiating with the governments of Canada and the Northwest Territories.

The Giant Mine operated from 1948 to 2004. When the owners went bankrupt, Canada became responsible for the site and the contamination left behind. This includes 13.5 million tonnes of tailings and 237,000 tonnes of arsenic trioxide waste. The Giant Mine Remediation Project (the Project) is jointly managed by:

- the Government of Canada, represented by Crown-Indigenous Relations and Northern Affairs Canada, and
- the Government of the Northwest Territories, represented by the Environment and Natural Resources Department.

Together, they manage the site to protect human health and the environment while they plan how they will clean up the site.

About the Annual Report

The Project team is committed to informing interested parties about Project progress, activities, and plans. The team engages and shares information in several ways. One way is through submitting an Annual Report to the Giant Mine Oversight Board.

The report describes what has happened on the site and the activities in support of planning the clean up that took place over one federal fiscal year. A fiscal year is the budget year of the federal government, from April 1 to March 31.

In the annual report, the team provides a detailed explanation of its activities, important findings, and future plans. This is so interested parties can keep track of the Project's progress.

The Project team needs to prepare an annual report as part of the terms of the Giant Mine Remediation Project Environmental Agreement. The Agreement guides what information the Project must include in the report. The Giant Mine Oversight Board reviews and comments on the report each year. This process will continue to shape the report's format and content.

This document is a plain language version of the full annual report, which provides more details about progress in 2019-20. The 2019-20 Annual Report is the Giant Mine Remediation Project's fifth. It covers the period from April 1, 2019 to March 31, 2020. Activities and updates related to the Project after March 31 will be covered in next year's report.

Key Engagement

Engagement is an important and valued part of the Giant Mine remediation process. In 2019-20, the Project team continued its regular engagement with key affected parties through avenues such as:

- the Giant Mine Oversight Board;
- the Giant Mine Advisory Committee;
- the Giant Mine Working Group; and,
- the annual forums.

Specific engagement sessions were also held to focus on:

- the Quantitative Risk Assessment;
- the Water Licence application;
- the Perpetual Care Plan;
- borrow design;
- Socio-Economic Strategy implementation; and,
- the Stress and Resilience Study.

In 2020-21, engagement will focus on:

- the Quantitative Risk Assessment;
- procurement and contracting opportunities;
- carrying out the Socio-economic Strategy;
- extending the Site Stabilization Plan Water Licence;
- site closure criteria;
- Management and Monitoring Plans;
- open pits;
- Aquatics such as Baker Creek design and future conditions of Yellowknife Bay); and,
- Community-Based Monitoring.

Planning the Remediation of Giant Mine & Project Status

In 2007, the Giant Mine Remediation Project team submitted a Water Licence application to the Mackenzie Valley Land and Water Board. The application included a remediation plan for all aspects of underground and surface clean-up. The City of Yellowknife referred this plan to Environmental Assessment. The assessment was completed in 2014. It included a Report of Environment Assessment with 26 measures the Project team must complete. The Measures included developing a new clean-up plan, called a Closure and Reclamation Plan.

The Closure and Reclamation Plan is the result of extensive engagement and design work done by the Project team since the Report of Environmental Assessment. In 2017-18, the Project team discussed the draft Closure and Reclamation Plan with the Giant Mine Working Group and the Giant Mine Advisory Committee. High-level concepts were also presented at the Annual Public Forum in March 2018. The Project team used input from those engagement sessions to complete the plan.

In April 2019, the Project team submitted the new plan and supporting documents to the Mackenzie Valley Land and Water Board. These documents form the Project's Water Licence and Land Use Permit applications.

Progress on Environmental Assessment Measures

The Report of Environmental Assessment included 26 Measures. The team's immediate focus was Measures with set timelines and those with the biggest impact on project scope. Since the Report of Environmental Assessment, the Project has completed and advanced many Measures. The table below includes their status, as well as the status of Suggestions included in the Report of Environmental Assessment.

STATUS	MEASURES	SUGGESTIONS
Completed	3, 4, 6, 7, 8, 11, 12, 13, 14, 15, 18, 19, 22, 23	8, 13
Underway	5, 9, 10, 16, 17, 25, 26	1, 2, 3, 4, 11, 16
Future Action Required	2, 20, 21, 24	9, 10, 14, 15
No Action Required / Outside Scope of Project	1	5, 6, 7, 12

In 2019-20, the Project focused on the following Measures:

- **Measure 5 – Quantitative Risk Assessment**
  - The Project completed a series of engagements to discuss and confirm the final list of ways in which the project could go wrong in the future and potential impacts on 'Way of Life'. Final engagements are expected in 2020-21.
- **Measure 6 – Long-Term Funding Options**
  - A final report was released in summer 2019.
- **Measure 9 – Health Effects Monitoring Program**
  - Described in more detail below (see: Health and Safety).
- **Measure 10 –Hoèła Weteèts'eèdeè: Understanding Community Wellbeing Around Giant Mine (previously called the Stress Study)**
  - Described in more detail below (see: Health and Safety).
- **Measure 18 – Freeze Design Options**
  - Describe in more detail below.

Progress on Planning Clean-Up Activities

The Project team continues to plan the long-term clean-up of the Giant Mine. This work includes:

- engaging with stakeholders and interested parties;
- gathering information through various studies;
- doing more design work on different parts of the remediation plan; and,
- developing monitoring programs.

Progress in 2019-20 included:

- Determining options for closing the large open pits and other smaller openings to the surface. This included looking at the type of material ("borrow") to use to fill the pits.
- Updating options for placing arsenic waste in Chamber 15, which is currently empty. The Project identified Chamber 15 as a potential site for arsenic waste.
- Starting the freeze design for two areas on the site (of four planned freeze areas). Current climate change estimates were included in the design.
- Completing a small-scale study of a passive treatment system to remove contaminants from water (that is, an engineered wetland). A passive treatment system does not use power and is easier to maintain than an active treatment system.
- Completing the early design of the new Water Treatment Plant. This will replace the existing Effluent Treatment Plant. The new plant will keep mine water at a safe level and treat the contaminants in the water. The Project team also developed an updated three-dimensional (3D) groundwater model for the mine, to map where water travels underground.

Ongoing Site Management

While the Project plans the long-term cleanup of the Giant Mine, it also keeps the site safe and stable. This includes:

- maintaining the site;
- managing risks;
- conducting repairs;
- monitoring the environment;
- treating water;
- keeping dust levels down; and,
- planning for emergencies.

Key activities in 2019-20 included:

Care and Maintenance

Ongoing care and maintenance at Giant Mine is important to manage current risks and prevent harm to staff, area communities, and the environment. In 2019-20, the Project continued care and maintenance activities. These included:

- preparing for the spring freshet (that is, spring thaw);
- operating the Effluent Treatment Plant;
- monitoring and sampling water and effluent;
- reducing dust from roads and tailings;
- maintaining site infrastructure and roads;
- maintaining the underground travel ways (including underground repairs to chutes and head covers to reduce hazards to workers);
- providing full time on-site emergency medical services;
- providing site security at all times (including constructing temporary security fencing and installing signs on several areas identified as security risks); and,
- conducting weekly inspections of the Material Storage Area.

Infrastructure Review

Every few years, the Project examines buildings to see if they are putting people on site at risk. If they need to be addressed before cleanup takes place, the Project team takes action. In July 2019, a consulting firm examined 28 buildings on site for signs of distress, deformation, or deterioration. No buildings were at risk of immediate structural failure. However, nine buildings were at risk of structural failure within five years. They recommended those buildings be reviewed every two years. All other buildings will be reviewed every four years.

Northwest Deep Well Pumping Station Upgrade

The Northwest Deep Well Pumping Station was previously called the Akaitcho Deep Well Pump station. It pumps water out of the underground at the Giant Mine so water stays well below where the arsenic trioxide is stored. After operating for four years, the pump system was working at a slower rate. This could cause risks at the site. In 2017-18, the Project developed a plan to upgrade the Station. In 2018-19, the Project installed new pumps and an electrical building to power them. In 2019-20, a new deep well pump station began operating. It was used to pump out water during freshet.

Dam Inspections

Dams are used to manage mine and surface water on the site; they also keep solids out of the tailings. Every year, the dams are inspected for safety and to assess water levels. In 2019-20, the Project conducted the annual geotechnical inspection of the dams. This includes visual inspections and reviews (such as survey data, pumping records, and instrumentation). The inspections result in summaries and recommendations for immediate action related to maintenance, monitoring, operations, and studies. The Project continues to carry out all activities the inspector recommends.

Health and Safety: Occupational and Public

Occupational Health and Safety

Health and safety on site are very important to the Project team. The Project keeps track of how many incidents and near misses happen each month and reports this information to the Project Director. Workers discuss incidents and near misses in daily safety meetings so workers can review lessons learned, identify causes, and prevent future incidents.

The Table below shows the incidents and near misses in 2019-20.

INCIDENTS AND NEAR MISSES	2019-20 TOTAL
Major Incident: An incident resulting from activities performed at the site that results in a severe and irreversible disability, impairment, injury, illness or fatality to an individual or individuals.	0
Moderate Incident: An incident resulting from activities performed at the site that results in a reversible disability, impairment, injury or illness that temporarily alters the lives of an individual or individuals.	3
Minor Incident: An incident resulting from activities performed at the site that results in injury or illness that inconveniences an individual or individuals.	5
Near Misses: An unplanned incident resulting from activities performed at the site that did not result in any disability, impairment, injury, illness or fatality, but had the potential to do so.	41

The number of moderate and minor incidents have changed each year. The Project looks at the number of incidents compared to the number of hours worked. Moderate incidents were lower in 2019-20 than 2018-19, but higher than the previous two years. Minor incidents have stayed about the same since 2017-18, with a slight decrease in 2019-20. The number of reported near misses in 2019-20 are the same as 2018-19, and below 2016-17 and 2017-18.

The Care and Maintenance contractor ensures employees and subcontractors receive relevant health and safety training. This includes first aid, wildlife safety, water safety and fire response, as required by applicable regulations.

The Project also tracks arsenic levels in workers on site. In 2019-20, there were 15 urine samples that were above the accepted level, out of 682 samples taken (2.2%). This percentage was lower than the previous year (3.25%). It was similar to 2017-18 and 2016-17 levels. When a worker's sample is above the accepted level, the Project takes immediate action. This includes taking steps to reduce the worker's exposure, which may mean changing the type of work they do until their levels return to below the accepted level. The Project also investigates the cause of the exposure.

Health Effects Monitoring Program and Hoèła Weteèts'eèdeè

The **Health Effects Monitoring Program** will establish current levels of arsenic and other contaminants of concern in people's bodies. This means the study had to take place before the cleanup starts. During remediation, the participants will provide samples again. These new results will be compared to the current levels. This study will help make sure the remediation activities do not negatively impact people's health.

The monitoring program completed its baseline sample collection in 2018. Public engagement was held in May 2019 to report back on the initial results of the study. A study with children will start in 2022 and with both children and adults in 2027, when the remediation is happening.

The scope of the stress study (now called **Hoèła Weteèts'eèdeè: Understanding Community Wellbeing Around Giant Mine**) is still in development. However, the study will:

- evaluate indirect effects on health from stress related to the possibility of arsenic exposure; and,
- include engagement with affected community members.

Engagement participants will help develop a survey to measure and analyze stress effects. Wilfrid Laurier University's Dr. Ketan Shankardass is leading this study.

Environment

The Project has an Environmental Management Plan that guides how each major component of the site is managed. Currently, the Project has several active monitoring programs in place for key environmental issues. The Project's Long-Term Monitoring Program combines all current monitoring activities and those that will be required. This includes monitoring of the environment and structures/technology.

ENVIRONMENTAL	STRUCTURAL
• Surveillance Network Program • Metal and Diamond Mine Effluent Regulations, including Environmental Effects Monitoring Program • Operational Monitoring Program (Effluent Treatment Plant, underground, annual site-wide bird survey) • Aquatic Effects Monitoring Program • Wildlife and Wildlife Habitat management and Monitoring Plan • Air quality – fenceline & community • Noise • Cumulative effects	• Freeze • Dams and seeps • Landfill • Pit stability • Tailings covers • Underground Structures • Baker Creek (icing)

The Long-term Monitoring Program is used to:

- determine baseline conditions;
- monitor current conditions and performance of management programs; and
- inform the design process for remediation activities.

Air

The Project monitors air quality on a regular basis. In 2019-20, monitoring showed that the air quality where the Project's air emissions are located is similar to regional and local air quality. The Project also kept dust down so residents are not exposed to contaminants from activities occurring at the site.

Water

The Project continues to treat effluent (liquid waste) at the site's Effluent Treatment Plant. It is treated to meet the criteria in the former mine's Water Licence and criteria that meets relevant regulations. In 2019-20, 362,632 m3 of treated effluent was discharged into the environment. Tests showed the treated effluent met requirements before discharge. The Project conducted Environmental Effects Monitoring to see if the treated effluent caused negative effects on aquatic life. Results were similar to previous years' results: there were no significant concerns.

In 2019-20, other key Project activities included:

- submitting the Type A Water Licence application for the site to the Mackenzie Valley Land and Water Board;
- conducting open water season field investigations for the Environmental Effects Monitoring;
- reviewing the Baker Creek Aquatic Effects Monitoring Program with rights holders and stakeholders; and,
- updating the fish and fish habitat studies of Baker Creek and Yellowknife Bay, including reviewing fish swim performance at the proposed treated effluent outfall in Yellowknife Bay.

Land

The Project monitors and manages arsenic-impacted waste on site, as well as other hazardous and non-hazardous waste. Monitoring and reducing impacts on wildlife are other important activities on site. In 2019-20, key activities included:

- completing the annual site-wide bird survey;
- submitting a draft Wildlife and Wildlife Habitat Management and Monitoring Plan as part of the Water Licence application; and,
- completing a field program on metal levels in small mammals, plants, and soils to provide a baseline prior to remediation.

Socio-economic

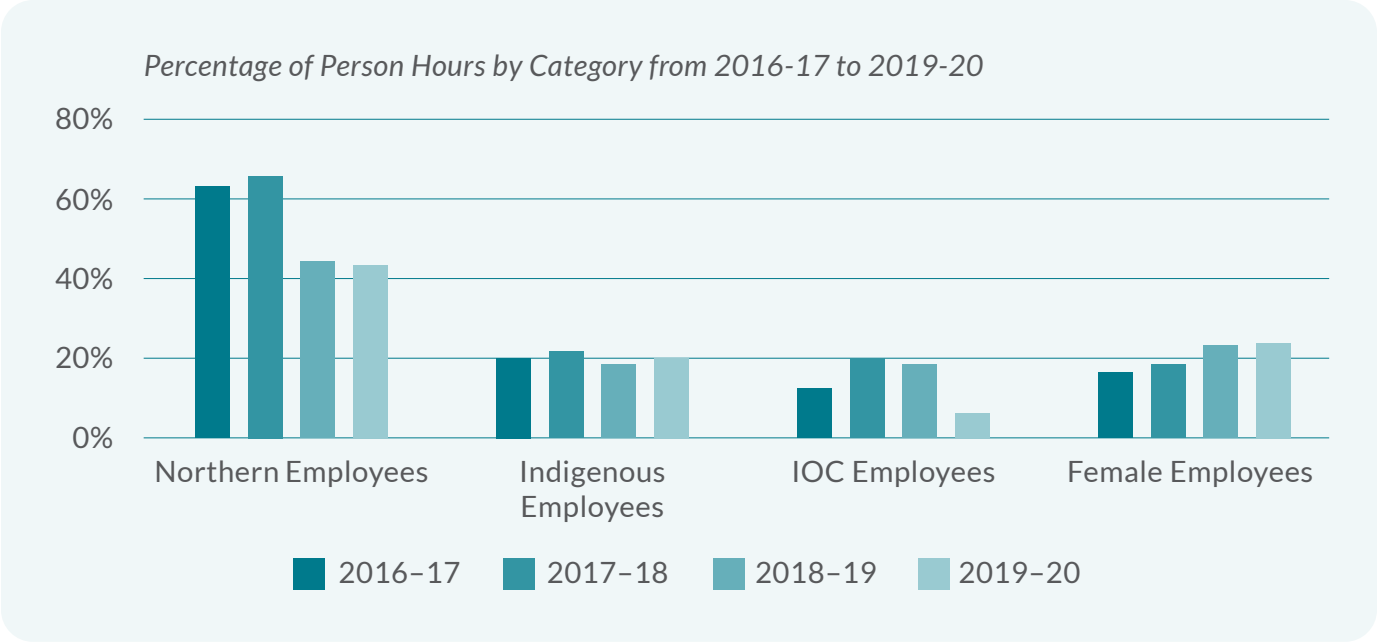
The Giant Mine Remediation Project works to deliver social and economic benefits to Indigenous and Northern communities while protecting the environment and people's health. Parsons, the Main Construction Manager, uses several tools to help the Project team achieve their socio-economic goals. This includes subcontracting to Indigenous and Northern businesses and incorporating criteria into all tenders that encourage employment, training, and apprenticeships for Indigenous workers.

The Project tracks total employment and employment by certain categories. This includes:

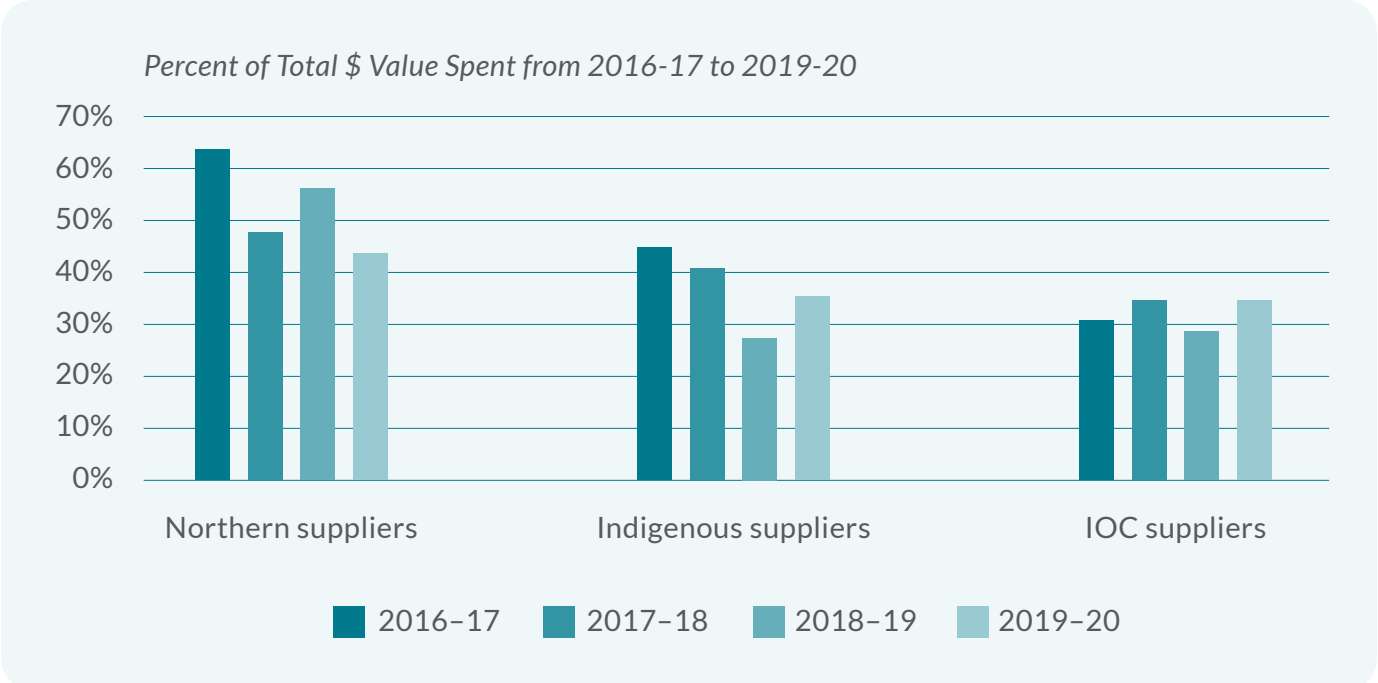
- Northern workers;
- Indigenous workers,
- how Indigenous Opportunities Considerations[20] (IOC) commitments are met during procurement; and,
- Female workers.

In terms of hours worked, Northern employment stayed consistent with 2018-19 but was lower than 2016-17 and 2017-18. Indigenous employment has stayed relatively consistent over the past four years, while IOC employment decreased compared to previous years. Female employment is consistent with 2018-19, and higher than 2016-17 and 2017-18.

[20] IOC is used by procurement officers to review proposals and evaluate the commitments made by firms, such as the percentage (%) of labour force that is local Indigenous peoples. Incentives and penalties are applied to encourage firms to meet or exceed commitments outlined in their proposal.



The Project also tracks suppliers by type, specifically Northern, Indigenous and Indigenous Opportunity Considerations (IOC). In 2019-20, the proportion of money spent on contracts decreased for Northern suppliers compared to previous years. Of approximately $31 M spent on suppliers, 44% went to Northern businesses. The proportion spent with Indigenous suppliers increased in 2019-20 from 2018-19 but remains lower than 2016-17 and 2017-18 values. The proportion spent with IOC suppliers increased slightly in 2019-20 from previous years.



Two new governance bodies continued to meet in 2019: the Socio-Economic Working Group and the Socio-Economic Advisory Body. The Socio-economic Working Group has team members from federal, territorial and municipal governments. It shares information and works to advance socio-economic activities for the Project. The Socio-economic Advisory Body provides advice to the Socio-economic Working Group and acts as senior government champions. Its members include senior level representatives from federal, territorial, municipal, and Indigenous partner organizations.

In September 2019, the Project team released an updated Socio-Economic Strategy (link) for the Project. The Strategy's goal is to maximize socio-economic benefits to Indigenous peoples and Northerners during remediation. With the governance bodies, in 2019-20, the Project team advanced two focus areas:

- establish targets for a select set of Key Performance Indicators (confirmed as of June 2020)
- develop the Socio-economic Implementation Plan for 2020-21 (full draft completed May 2020, with additional focused discussions planned in 2020)

In 2019-20, in support of meeting Project socio-economic goals, Parsons opened its Yellowknife office to the public in March 2019. Parsons continued to reach out to local businesses to inform them of contracting opportunities. It will continue to work on establishing relationships with local Northern and Indigenous businesses, working closely with partners to communicate contracting opportunities.

In Closing

In 2019-20, the Project made important strides by submitting the application package for a Water Licence while continuing to keep the site safe and stable to protect human health and safety and the environment. It also continued to engage with stakeholders and partners on the Project.

The Project will continue to prepare annual reports about its progress and performance, and to develop a plain language summary of its annual reports.

For more information or to provide comments, please contact:

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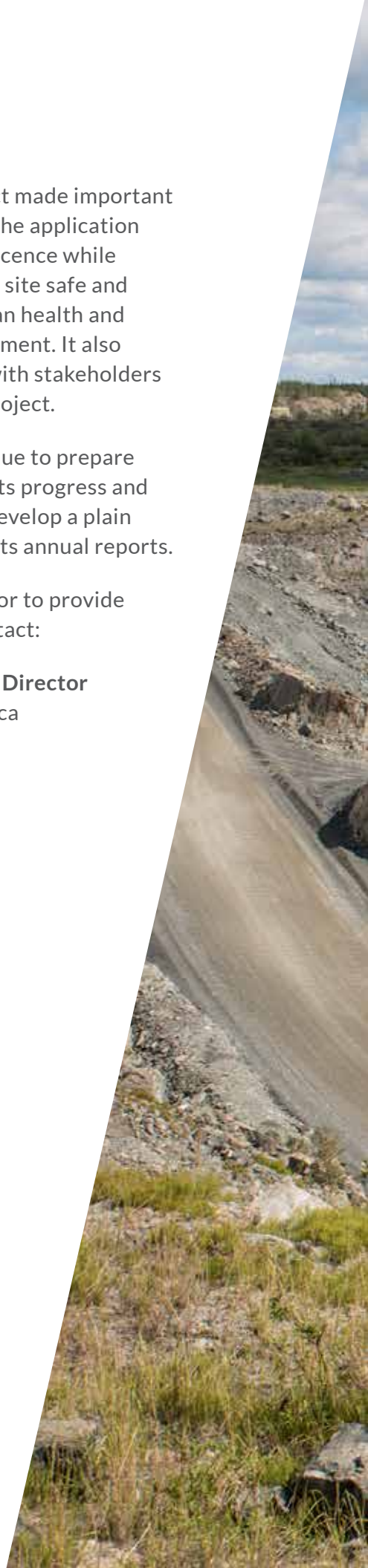

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