2.4.8 Bulk Materials, Fuel and Explosives Management

2.4.8.1 Bulk Materials

The Project will order a year's supply of bulk materials from suppliers each spring. Total tonnage may be of the order of 7,000 tonnes per year. These materials will be assembled at ports, typically Montreal or Churchill and then shipped to Rankin Inlet during the ice-free period.

Bulk materials, other than diesel fuel, will typically include mill reagents, grinding balls, drill steel, rock support materials, fabrication steel, explosives, lubricants, tires and non-perishable foods. Upon arrival in Rankin Inlet, these materials will be staged through the laydown area and secure storage before being trucked to the mine site.

2.4.8.2 Fuel

Current estimates suggest the proposed Meliadine mine would use a total of approximately 25 million litres of fuel annually (mining operations will require about 14 million litres of diesel fuel, with an additional 11 M litres used for power generation). Fuel will be shipped to Rankin Inlet in barges and/or ships, transferred to the tank farm, and trucked to the mine site on a year round basis.

2.4.8.3 Explosives

The annual consumption of explosives is estimated to be in the order of 740 tonnes of which two thirds will be Ammonium Nitrate - Fuel Oil (ANFO). This will be shipped in as bulk ammonium nitrate prills. Bulk ammonium nitrate is inert and will not require special handling or storage during transit.

A secure fenced and guarded storage facility may be required on the outskirts of Rankin Inlet to store explosives in the event weather does not allow the immediate movement of these materials to site. Such a facility would be located away from town as mandated by applicable laws and codes.

An ammonium nitrate storage building and one to manufacture explosives will be built on site. A potential location is shown in Figure 2-4. The buildings would be built to the specifications dictated by applicable laws and regulations.

The balance of the explosives and blasting accessories will be staged through a secure magazine, see Section 2.2.1. These explosives will be cartridged slurries (Hazard Classes 1.1D and 1.5D), detonating cord, and detonators. All explosive handling, transport, storage, manufacture and use will be subject to federal approval under the Explosives Act, and subject to Nunavut Mine Health and Safety Act requirements.

2.4.9 Safety

Comaplex recognizes that the Meliadine Gold Project involves activities that may pose a hazard and places the utmost priority on safety. If local services are used at the mine, their safety requirements will match those of the mine. All individuals will be trained so they:

- understand their job responsibilities,
- understand the hazards of their jobs and how to safeguard against them,

- know how to use safety equipment,
- know how to respond to emergency situations, and
- wear appropriate personal protective equipment[5].

Emergency supplies and equipment will be kept at the work place and select members of each work crew will be trained in first aid.

The contractor for the underground exploration programme, J. S. Redpath Ltd., developed a Mine Rescue Plan. This plan is currently inactive as no underground work is currently in progress on the site. Comaplex purchased the mine rescue equipment from J. S. Redpath in the fall of 2008. This equipment is still on the site. A comprehensive mine rescue plan will be developed and submitted to comply with Nunavut Mine Safety legislation and regulations before additional underground exploration or underground mining operations resume.

Public access to the mine and related facilities will be restricted to authorized personnel. Unauthorized visitors will be escorted off the site. When members of the public are authorized by the company to come to the site, they will be given a safety orientation and personal protective equipment. During their visit they will be accompanied by site personnel at all times. Signs at the entrance restricting access to the site will be posted in English and Inuktitut. Signs will indicate parking and reception for visitors. Safety policies and procedures will be further developed in the draft Environmental Impact Statement.

2.5 Project Closure and Reclamation

2.5.1 General Approach

The Meliadine Gold Project's reclamation objective is to minimize negative environmental effects of mining wherever practicable, practice progressive reclamation, and upon closure, return negatively impacted areas to productive and lasting use by wildlife and humans. Reclaimed areas will be chemically and physically stable, and should ultimately support the same functions as the surrounding, undisturbed land. Because of the proximity of the mine site to Rankin Inlet, particular attention will be paid to ensuring that reclaimed areas are safe for future traditional use.

A practical, cost-effective approach will be central to reclamation and closure. The intent is to pursue reclamation and closure keeping climate change in mind and also so there are no long-term care and maintenance requirements. A Reclamation and Closure Plan will be developed, updated, and revised on a regular basis, ultimately evolving into an interim plan during mining, and ending with a final plan upon closure. Each iteration of the plan will provide more detail and greater certainty regarding the sequence of events in reclamation and closure. The Reclamation and Closure Plan will address both final closure and temporary shutdown where the mine is placed in care and maintenance. This plan will be presented in its initial form in the draft Environmental Impact Statement.

Progressive reclamation will be used throughout the mine life to reclaim areas no longer needed for mining by stabilizing disturbed land surfaces and promoting revegetation. This approach will employ

[5] Personal Protective Equipment includes but is not limited to safety glasses, safety vest or reflective clothing, hard hat, safety boots and heavy duty work gloves. Specific tasks may require additional, special-purpose equipment, such as face masks or safety lanyards and harnesses.

best practices and will ultimately advance the return of areas to natural conditions while reducing the overall cost of reclamation. In a similar manner, obsolete equipment, surplus chemicals, and buildings will be removed as soon as they are no longer needed.

Hazardous waste and contaminated soil will be managed on an ongoing basis; consequently, there will be little to no accumulation of such wastes during the operation of the mine, subject to seasonal shipping considerations.

A site monitoring program will continue beyond closure of the mine, with emphasis shifting from monitoring the operations of the mine to monitoring the success of reclamation activities and the recovery of impacted areas.

2.5.2 Quarries, Waste Rock and Overburden Reclamation

The Meliadine Gold Project will largely be an underground mine and this alone substantially reduces its overall footprint.

Preliminary geochemical study of the waste rock from all three pit areas by the company's independent consultant, Golder Associates, indicates that there is little to no likelihood of acid rock drainage. Kinetic testing now underway will demonstrate the potential of the waste rock for leaching of trace metals. Studies at the diamond mines in the Northwest Territories indicate that waste rock management areas freeze quickly upon placement and, because of their elevation above the general terrain, become super-cooled well below the prevailing temperature in the near-surface permafrost. Precipitation and melting snow is captured in the waste rock management areas with little leachate evidenced at the toes. The lack of runoff and super-cooling results in only a shallow active layer during the summer period and results in the larger part of the waste rock and overburden remaining physically and chemically stable.

The overburden removed from the open pits will either be progressively reclaimed or stored for eventual use in reclamation. At the Tiriganiaq site, overburden consisting of glacial till can be used in covering the tailings impoundment area. Some of the overlying esker material can be used for construction purposes. At F Zone and Discovery, the overburden will be reclaimed in a similar way as the waste rock. The overburden management areas will be re-vegetated to reduce the possibility of dust. Contouring of the waste rock and overburden areas will increase their stability, reduce their visibility and control runoff erosion. Sumps will be removed and dykes breeched to allow natural drainage. Diverted water courses will be re-established, and roads to be reclaimed will be removed where they pass over streams frequented by fish.

Following the completion of mining on the Project, the open pits will be allowed to fill with water. At F Zone the possibility of back filling mined out open pits with overburden and waste rock is being investigated as the pits are to be mined in sequence.

A number of aggregate and rock quarries will be established during the construction of the road from Rankin Inlet to the mine site and to the two satellite deposits. Potential quarry and borrow sites along the road alignment are being tested for acid rock drainage and metal leaching before final selection. The quarries will have gently sloping walls and will be designed for positive drainage wherever possible. With prudent initial design, the quarries should require little reclamation following completion of the road and at closure of the mine.

Preliminary plans suggest no need for a separate landfill at the site as the intent is to continue using the Rankin Inlet municipal landfill. If a landfill is established on site, non-hazardous materials would be deposited in a designated location in the tailings or waste rock management area. Materials not suitable for deposition in the landfill would be handled in the waste management building.

Based on the experience of similar mine roads in Nunavut, particularly the Meadowbank access road, the all-season road between Rankin Inlet and the Meliadine Project site will remain in place to service future mineral exploration needs in the area as well as to provide access for residents of Rankin Inlet to cabins and other traditional pursuits in and around Meliadine Lake. The spur roads to the two satellite deposits would be reclaimed as required.

2.5.3 Tailings Impoundment Area Reclamation

The tailings impoundment area will be in use until the end of mine production. The facility is designed such that the dykes can be progressively raised, likely once or twice over the mine life, to accommodate all the tailings.

The tailings mass will ultimately freeze. Assuming that Lake B7 basin is used for tailings deposition, removal of the lake will cause the existing talik to freeze as the lake bed will be exposed to the air. The tailings will be covered by overburden and/or waste rock of sufficient thickness such that the active layer will remain in the cover, thereby ensuring that the tailings mass remains permanently frozen.

Reclamation of the tailings facility will be timed to coincide with the final shut-down of the mill. As mining nears completion, the progressive reclamation of the tailings will be timed so that as much of the impoundment area as possible will be covered by the time the last of the tailings are delivered to the site. Monitoring will also be undertaken to document the efficacy of the progressive reclamation.

The tailings pipeline will be removed. The tailings pipeline service road, however, will remain in place to allow for monitoring water quality as part of the Aquatic Environmental Effects Monitoring Program. A spillway will be installed through the dykes to allow for water drainage once it is shown the water meets receiving water standards.

2.5.4 Mine Site Reclamation

Reclamation of the mine infrastructure will begin shortly after production commences with the removal of the exploration and construction camps, following completion of construction of the accommodations complex, the mill and other infrastructure. This will include the re-vegetation of impacted areas and decommissioning of the wetlands presently receiving grey water.

On the completion of milling and ore processing, the mill and all processing circuits will be dismantled and scrubbed to recover all remaining gold which will be smelted as the final gold produced at the Meliadine Gold Project. All wash-down water will be directed through the cyanide destruction plant prior to discharge to the tailings area.

Site buildings will be cleaned, dismantled to the extent possible, and because of the proximity to Rankin Inlet, offered for sale to the community. The last building to be reclaimed will be the waste management building. All foundations will be leveled and along with concrete floors will be covered with waste rock or overburden.

Specialized mining and milling equipment with residual value will be sold and removed though Rankin Inlet by sea lift. General equipment such as graders, dozers and loaders required for reclamation will be last to go and will be offered to the community for purchase or salvage at the end of reclamation. Maximum use will be made of the underground to dispose of all inert, non-salvageable equipment and materials. These will be cleaned of any hazardous materials such as oil and grease before being moved underground for final disposal. The ventilation shafts and the portal opening to the underground will be permanently sealed and made inaccessible.

Any fuel remaining in the tank farm will be pumped out and moved to the fuel tank in Rankin Inlet. The tanks will be disassembled for movement to Rankin Inlet for re-assembly or placed in the open pits and underground workings. If spilled fuel is present within the lined and bermed tank farm area, it will be collected from the sumps and burned in the incinerator. Once the soil within the tank farm meets soil quality requirements it will be reclaimed, with the berms being leveled and the area re-vegetated.

All chemicals, mill reagents, explosives and hazardous materials still in unopened packages at closure will be shipped south for re-sale. Unpackaged or waste materials will be shipped for recycling or disposal in a licensed landfill. Ongoing operation of a waste management building, together with the annual removal of surplus chemicals and hazardous waste and the immediate clean-up of spilled fluids, will minimize the quantity of material requiring handling, packaging and removal upon closure.

Pilings supporting the accommodation complex will be cut off at or below ground level. All water and tailings pipelines will be removed and service roads scarified following closure.

2.5.5 Off-Site Reclamation

The lay-down area, secure storage building at the port, the explosives storage site, and the fuel storage in Rankin Inlet will be offered for sale to the town, local businesses, or the government agencies. No reclamation is expected for these facilities, but if required, would be conducted as for the main site.

SECTION 3 EXISTING ENVIRONMENT AND BASELINE STUDIES

3.1 Overview of Project Environmental, Socio-Economic, and Traditional Knowledge Studies

The Meliadine Gold Project will interact with the natural and human environment of the area in both time and space. The natural and human environment has been extensively studied since 1997 and an overview of this work is provided here. The years when studies were carried out are noted in Table 3-1. No substantial work was done on the property between 2002 and 2004.

Table 3-1: Environmental, Socioeconomic and Traditional Knowledge Studies

Baseline Studies	1997	1998	1999	2000	2001	2005	2008	2009
Aquatic Invertebrates & Algae	√	√						
Water Quality	√	√	√	√			√	√
Sediment Quality		√		√				
Hydrology[1]	√	√	√	√			√	√
Geochemistry - Acid Base Accounting[2]		√			√	√	√	√
Fisheries	√	√	√	√	√		√	√
Wildlife	√	√	√	√			√	√
Vegetation & Soil		√					√	√
Climate[3]	√	√	√	√	√	√	√	√
Traditional Knowledge	√		√					
Heritage Resources		√					√	
Socio-economic	√		√					
Public Consultation	√	√	√	√			√	√

[1] Regional hydrology by Water Survey of Canada carried out from 1989 - 1995

[2] Geochemistry studies in 1998, 2001 and 2005 were not as extensive as studies in 2008 and 2009.

[3] Regional Climate by Environment Canada from 1981 to present

In Table 3-1**,** it should be noted that baseline air quality and noise data were not collected. Prior to exploration by the Meliadine Gold Project, the area was only subject to air emissions from Rankin Inlet and from normal global atmospheric pollutants. The air quality and noise baseline will therefore reflect scientific data collected elsewhere under similar conditions. For the baseline studies where data were collected, an overview of the natural and human environment follows. Greater detail and a synthesis of all the data collected over the years will be presented in the draft Environmental Impact Statement, as will the identification of valued environmental components and valued socio-economic components. These components will be selected through the review of baseline studies, NIRB scoping, on-going consultation, input from various agencies, and the work of focus groups.

The environmental, socio-economic and traditional knowledge information collected to date will be used in preparing the draft Environmental Impact Statement. However, further baseline studies are planned to gather more socioeconomic information and Inuit Qaujimajatuqangit beforehand. Following the environmental assessment and regulatory permitting processes, it is expected that effects monitoring will measure and interpret changes to environmental and socio-economic valued components identified with the Project, and be reported on a regular basis. Additionally, compliance monitoring will be undertaken to ensure all regulatory limits are being met and commitments made by Comaplex are fulfilled.

3.2 Physical Environment

3.2.1 Geology and Mineralization

Three different deposits are being considered for mining: Tiriganiaq, F Zone and Discovery. The present understanding of the Tiriganiaq ore deposit indicates a series of mineralized sheets or lodes of varying thicknesses with a strike length of about 1.5 km dipping north at about 60 degrees. The true width of the sheared package of rock that hosts all the mineralized sheets or lodes is variable up to 100 metres. Diamond drilling to date indicates that the mineralized zone extends to a depth of at least 625 vertical metres from surface and is open to depth. Gold mineralization in all three deposits is directly associated with quartz veins of various thickness hosted in structural shear zones.

Gold mineralization in the Tiriganiaq deposit has a very strong correlation to shearing and quartz veining. Ore lodes are hosted in quartz-vein stockworks, laminated veins and variably sulphidized iron formation in complexly folded and sheared iron formation rocks, sedimentary rocks and volcanic rocks at or near the volcanic-sedimentary contact.

The F Zone deposit is hosted in sheared, quartz vein bearing portions of a lean (less iron) iron formation hosted entirely in mafic volcanics. At present, the deposit exists as a series of mineralized pods of pyrrhotite and arsenopyrite bearing iron formation that extend over a distance of just over 1 km in length. These pods extend to the bedrock surface and are the target of the several shallow open pits proposed for the Project. Underground potential also exists with gold mineralization present at depths of approximately 250 metres below surface.

The Discovery deposit is concentrated in, and proximal to, a tight “Z” fold in the same oxide iron formation that is present in the Tiriganiaq deposit. The gold bearing portion of the deposit is approximately 300 metres in length. The gold mineralization is hosted within silicified arsenopyrite and/or pyrrhotite bearing oxide iron formation. Underground mining potential may exist at Discovery as mineralization is present to depths of over 500 metres, but additional surface drilling will be required to develop this possibility.

3.2.2 Permafrost

Permafrost underlies all the land and most of the shallow lakes in the mine area. Alterations to the active layer and the permafrost will occur because of quarries for granular material and rock, building of roads, dykes and pads, waste rock and overburden storage, and possibly from any ground disturbance.

Granular material quarries are normally in eskers or other glacial deposits. The removal of granular material causes a shift in the active layer and can result in the melting of ground ice and thaw settlement. This can result in erosion, slumping of side slopes in summer and an altered landscape that extends beyond the quarry. Rock quarries can also change the active layer but without the same consequences that are possible in granular material quarries.

The construction of roads, dykes and pads can result in the permafrost moving up into the structure. This has the positive effect of increasing their stability. In the case of dykes, it has the desirable effect of reducing their permeability. However, as permafrost moves up into the base of pads and roads, it forms a dam and can result in water ponding against the structure and subsequent changes in vegetation. The same also applies for waste rock and overburden storage areas where ponding of water can again result.

The surface active layer of annual freeze / thaw is 1 to 2 metres thick in the project area depending on cover type. It is believed that a through talik underlies Meliadine Lake and possibly some of the medium-sized lakes, such as Lakes B6, B7 and A8. However, all of the small lakes and ponds directly overlying or immediately proximal to the F Zone, Discovery, and Tiriganiaq deposits all freeze to the bottom and will not have a through talik.

A sealed sensor cable for determining the annual soil temperature profile from the surface through the zone of permafrost was placed into drill hole Mel 98-195 in June 1998. This drill hole is close to Lake A54. Permafrost in the area extends to a depth of 450 metres from surface with minimum temperatures of -6 to -8 ^{o}C at approximately 10 metres depth. Permafrost below depths of 10 metres from surface did not show seasonal temperature variation. Additional thermistors were installed in 2007, 2008, and 2009 at the locations of the proposed tailings dykes, the areas of the proposed waste rock and management areas, and the area of the proposed mill/camp site.

Diamond drilling on the Meliadine property over the years has confirmed that permafrost in the area of the three deposits extends to between 350 and 450 metres vertically below the surface. Drill holes passing through the base of the permafrost have noted a minor amount of free water entering the drill stem in the permafrost transitional zone.

In the summer of 2009, Comaplex consultant, Golder Associate, carried out hydraulic conductivity testing of the bedrock beneath the base of the permafrost. They also obtained a water sample for water quality testing from a depth of 200 metres within the talik beneath Lake B7. The results of this testing will be provided in the draft Environmental Impact Statement.

3.2.3 Air Quality and Noise

Studies will be undertaken to monitor the noise and air quality conditions at the Meliadine Project as part of a comprehensive monitoring program following construction of the mine. Baseline air quality data will be obtained from existing air databases for areas not directly impacted by industrial or community influences that presently exist in the Arctic. This will serve for comparisons to data collected on site following commissioning of the mine.

3.2.4 Climate

The climate of the Project area is characterised by short cool summers and long cold winters. Brisk wind is a common feature in all seasons of the year. Precipitation is roughly divided evenly between rain during a short summer and fall, predominantly in late summer, and snow, which can fall in any month, but is most common between October and April. Surface waters are usually frozen by early October and remain frozen until early June. The land is usually snow-free by late June.

An automatic weather station operated at the Meliadine Gold Project camp from May 1997 through June 2002. It recorded data on the following climate parameters:

- air temperature,
- ground temperature at -5 centimetres,
- relative humidity,
- precipitation (summer only),
- wind speed and direction, and
- net radiation.

Historic climate data sets are available for Chesterfield Inlet, 80 km northeast of the camp and Rankin Inlet, 25 km to the south. Due to the proximity of the Project to Rankin Inlet, climatic data collected in the hamlet is directly applicable to the Project. Mean wind speeds and direction are an important consideration in the positioning of various components in the mine/mill complex. Comaplex considers the climate data from Rankin Inlet to be sufficient and representative for the Meliadine property. Figure 3-1 presents a wind rose diagram for Rankin Inlet.

3.2.5 Terrain

The terrain in the area of the Meliadine Project is of glacial and marine origins, with post-glacial uplift still ongoing. The landscape is shaped by drumlinoid relief on a till plain of low relief, resulting in numerous shallow ponds and lakes connected by intermittent streams. Soils are generally sandy and silty clay intermixed with unsorted aggregate materials.

Aerial photography necessary to prepare a digital terrain model was flown in July 1997. Maps of the Project area at a 1:5000 scale, with a 1-metre contour interval, have been prepared and are used as topographic control for the Project.

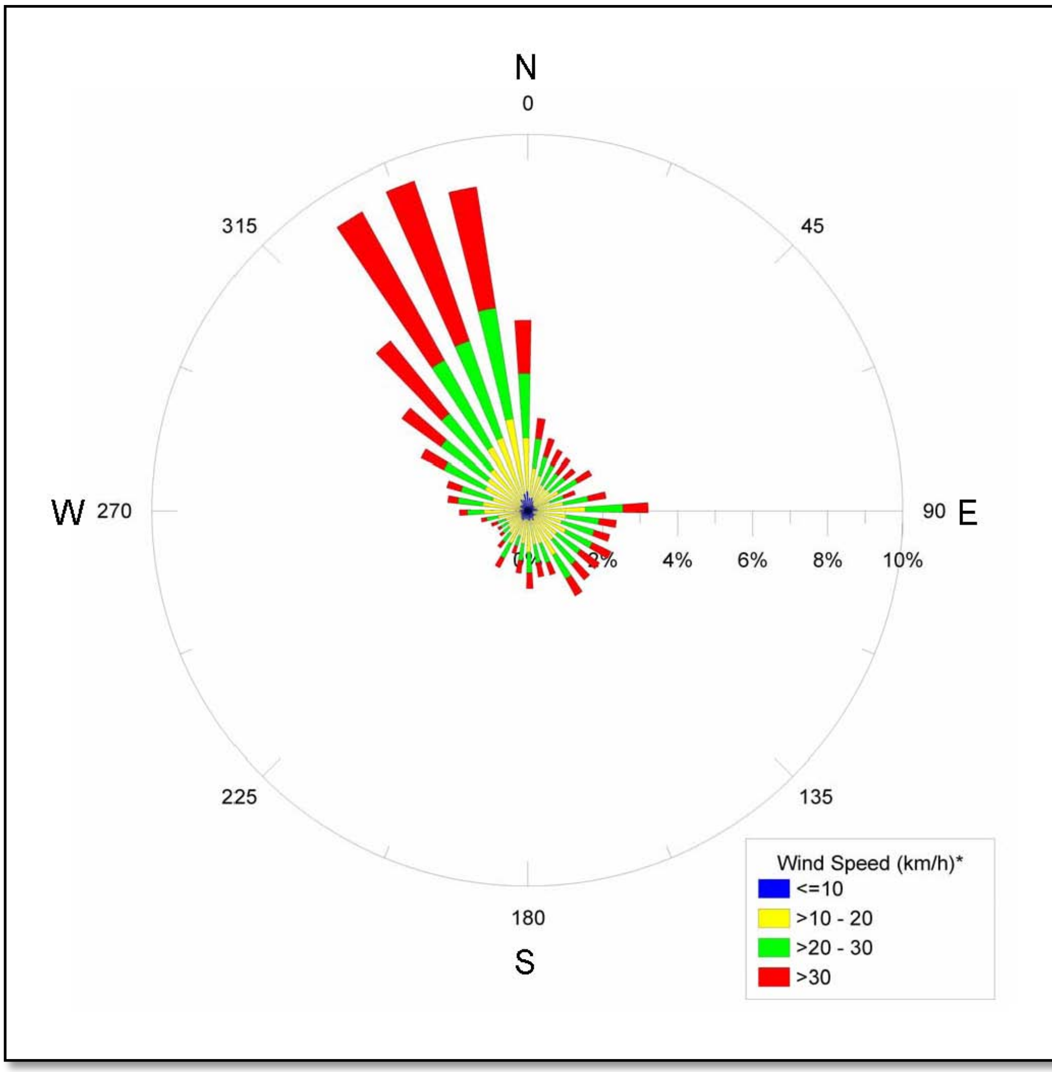
3.2.6 Hydrology

The Meliadine Lake watershed covers 586 km^2. The southeast basin of Meliadine Lake, from which water for this mining Project would be drawn, is assumed for planning purposes to be isolated from the main lake in late winter due to freezing to the bottom across the shallow narrows between the basins. The residual water volume of the basin, not including the 2 metre thick ice, has been calculated to be 63.66 million m^3.

Hydrometric studies at Meliadine Gold Project established water level and flow monitoring stations to document the annual hydrologic regime in the Project area. Results of these studies, 1997 to 2000 and 2008, include both “dry” and “wet” years and show precipitation and run-off patterns similar to those described for other tundra watersheds that have been monitored for many years.

Meliadine Lake has two outlets; the Meliadine River carries about 80% of the flow, and an outlet to Peter Lake on the Diana River takes the balance. The domestic water supply of Rankin Inlet is not situated on either of these watersheds. The water balance studies on the Meliadine system show that the long-term average annual precipitation at Rankin Inlet was 297 mm. In a hydrologic year of historic low precipitation, 172 mm in 1996-97, the yield was 78 mm or 45% of the annual precipitation; whereas in a hydrologic year with historic high precipitation, 385 mm in 1998-99, the yield was 239 mm or 62% of the annual precipitation. An evaporation pan showed that summer evaporation was roughly equivalent to summer precipitation with little if any net input from summer rain. The net input to the annual water balance of the Meliadine River watershed comes from spring run-off which recharges the lakes and ponds in the sub-basins above Meliadine Lake. The streams draining these water bodies usually run dry after the spring run-off before the late summer rains. The water basins close to the mine and their directions of flow are shown in Figure 3-2 below.

Figure 3-1: Wind Rose Diagram for Rankin Inlet



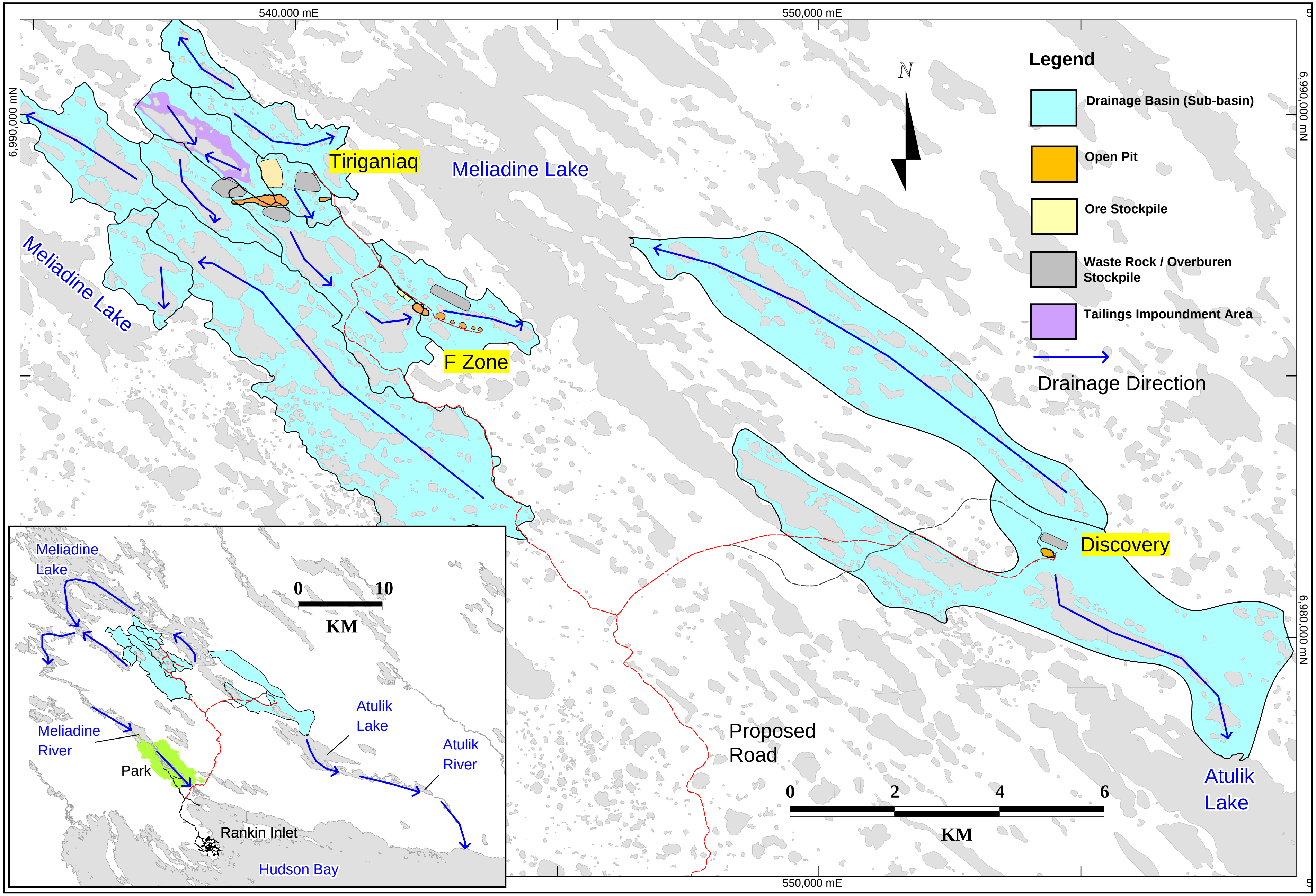


Figure 3-2: Water Basins and Drainage, Proposed Infrastructure

3.2.7 Potential for Acid Generation / Metal Leaching

Limited static testing[6] was carried out in 1998 and 2001 as part of metallurgical assessments taking place at the time. In 2005, further static testing was carried out, which added to the basic understanding of the acid generating potential and the leaching of trace metals from the gold bearing ore and surrounding waste rock. Generally, the results of the testing were conclusive in showing the host rock types were non acid generating and this has been corroborated by more recent testing. The neutralizing potential / acid potential ratios varied from 1.1 to 6.3 with the lower values coming from the testing of ore having high sulphide content. The sulphide portion of the ore is acid generating and how this will be handled will be detailed in the draft Environmental Impact Statement. Shake flask tests completed to investigate the chemical leaching potential of the waste rock and mineralized rock indicated some trace metals, in particular arsenic, slightly exceeded the CCME guidelines for freshwater aquatic life. Background arsenic levels (1996) are anomalously high on a regional level in soil and water samples collected in the Meliadine region and this is shown on figure 3-3.

In 2008 a detailed geochemical study was initiated using recommended guidelines to characterise the geochemistry of the three deposits with a completion date of December 2009. This study will test a number of waste rock, overburden and ore samples from each deposit based on the tonnage of each rock type mined. Static tests and a representative number of kinetic tests[7] will be run. Concentrates from large samples of the ore derived from the 2007-2008 bulk sampling program are also being tested. It is expected that this work will have a bearing on the design of the tailings impoundment area and mill processes. The results of this work will be presented in the draft Environmental Impact Study.

3.3 Aquatic Environment

3.3.1 Water Quality

The Meliadine River watershed did not host commercial or industrial activity prior to this Project. The water quality should therefore be close to pristine, factoring in normal global atmospheric pollutants. Aquatic environment studies for the Meliadine West area have established a comprehensive baseline on water quality conditions in the Project area. Parameters for analyses included metals, simple hydrocarbons and levels of exotic airborne pollutants deposited by long-range atmospheric transport. Analytical data include water samples from winter, spring, and summer collections. Data for dissolved oxygen under ice were also collected and in some cases the dissolved oxygen concentrations was found to be naturally low. The sampling network also established a “control” area outside the basins of active exploration and future operations.

The analytical results of all water and sediment sample testing are reported in appendices to the annual reports provided to the Nunavut Water Board and other agencies.

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[6]Static Tests indicate the total potential capacity of the tailings to release metals and acid by assessing acid generating and acid neutralizing minerals, sulphur and carbon concentrations. Static tests cannot be directly correlated to the natural environment but give clues on potential behaviour.

[7] Kinetic Tests aim to determine the rates of acid generation and neutralization together with the drainage chemistry over a period of time, usually 20 weeks.

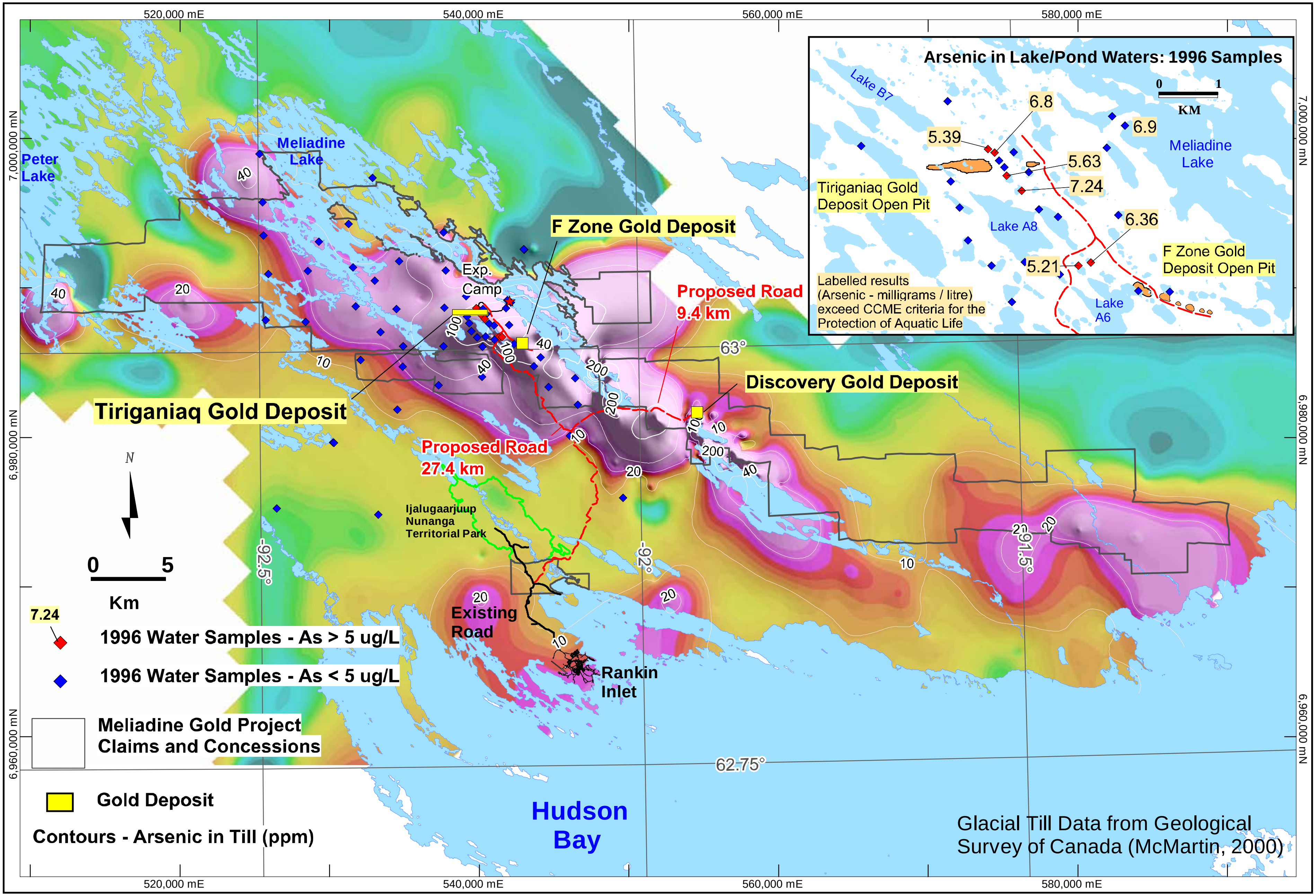

Figure 3-3: Regional Arsenic in Glacial Till and 1996 Lake Water

3.3.2 Fish

Fish populations were studied, in Meliadine Lake, the Meliadine River and specific ponds and lakes on the peninsula above Meliadine Lake. Nine fish species were identified: lake trout, Arctic char, round whitefish, Arctic grayling, cisco, three and nine-spine stickleback, burbot, and sculpin. Seasonal distribution of fish was studied by deploying various sampling techniques, including gill nets, seines, backpack electrofishing, minnow traps as well as a fish fence and fyke nets which allowed live capture and release of tagged fish. Radio telemetry monitored the distribution and movement of lake trout and Arctic char. Arctic char and lake trout are important resources for local fishermen. A significant stratification of species was noted between Meliadine Lake and the peninsula water bodies above it. The distribution of lake trout (all cohorts) was generally restricted to Meliadine Lake with occasional individuals captured in the first stream or lake above Meliadine Lake. Round whitefish, like trout, were generally restricted to Meliadine Lake. The remaining species, with the exception of Arctic char, were generally found throughout the basins above Meliadine Lake.

Arctic char are typically anadromous within the study area and their distribution and movements were documented by live capture and tagging with both floy tags and telemetry radios. Like lake trout, they were rarely found beyond the first lake above Meliadine.

A fish fence was set up near the mouth of the Meliadine River in 1997, 1998 and 1999 to capture, measure and tag Arctic char returning from the ocean. A reward program offered $5 per floy tag and $25 per telemetry radio to provide local incentive for returning tags collected from fish harvested. This program was initiated in the fall of 1997 and was terminated at the end of December 2001. A total of 2,543 Arctic char were tagged; more than 850 tags were recovered from local fishers and 656 tagged Arctic char were recaptured either at the Meliadine fish fence or by net during the normal course of the study. The distribution of Arctic char as shown by telemetry data suggest that Arctic char may spawn at numerous locations in Meliadine Lake. Also, telemetry data show that the migration of Arctic char from Meliadine Lake to Hudson Bay is via the Meliadine River and the Peter Lake / Diana River.

Fish population studies also included developing a baseline on fish tissue quality. Samples of Arctic char and lake trout were collected to assay metal and organic contaminant levels. Due to lake trout longevity, a data set for lake trout tissue quality was also taken from Parallel Lake that is intended to serve as a “control” for fisheries studies. Figure 3-4 shows where fish studies have been carried out from 1997 to 2009. To date, no species of fish at risk was found in the Project area.

3.3.3 Fish Habitat

Fish habitat studies focussed on physical and biological parameters of the lakes and streams in the Project area. Physical parameter studies documented the shorelines and stream habitats that may be at risk of alteration during the construction and operations of a gold mine, including the water crossings that would be required by an all-season road from Rankin Inlet to the proposed mine site. The bathymetric profiles of numerous lakes and ponds, including parts of Meliadine Lake, were mapped. Biological parameter studies documented winter oxygen levels in several ponds and lakes, as well as the relative abundance of primary and secondary producers in the aquatic ecosystem of the Project area. Although winter oxygen levels in the lakes above Meliadine were very low, several species of fish were found to over-winter there, including Arctic grayling. The diversity of primary and secondary producers found was typical for sub-arctic aquatic systems.

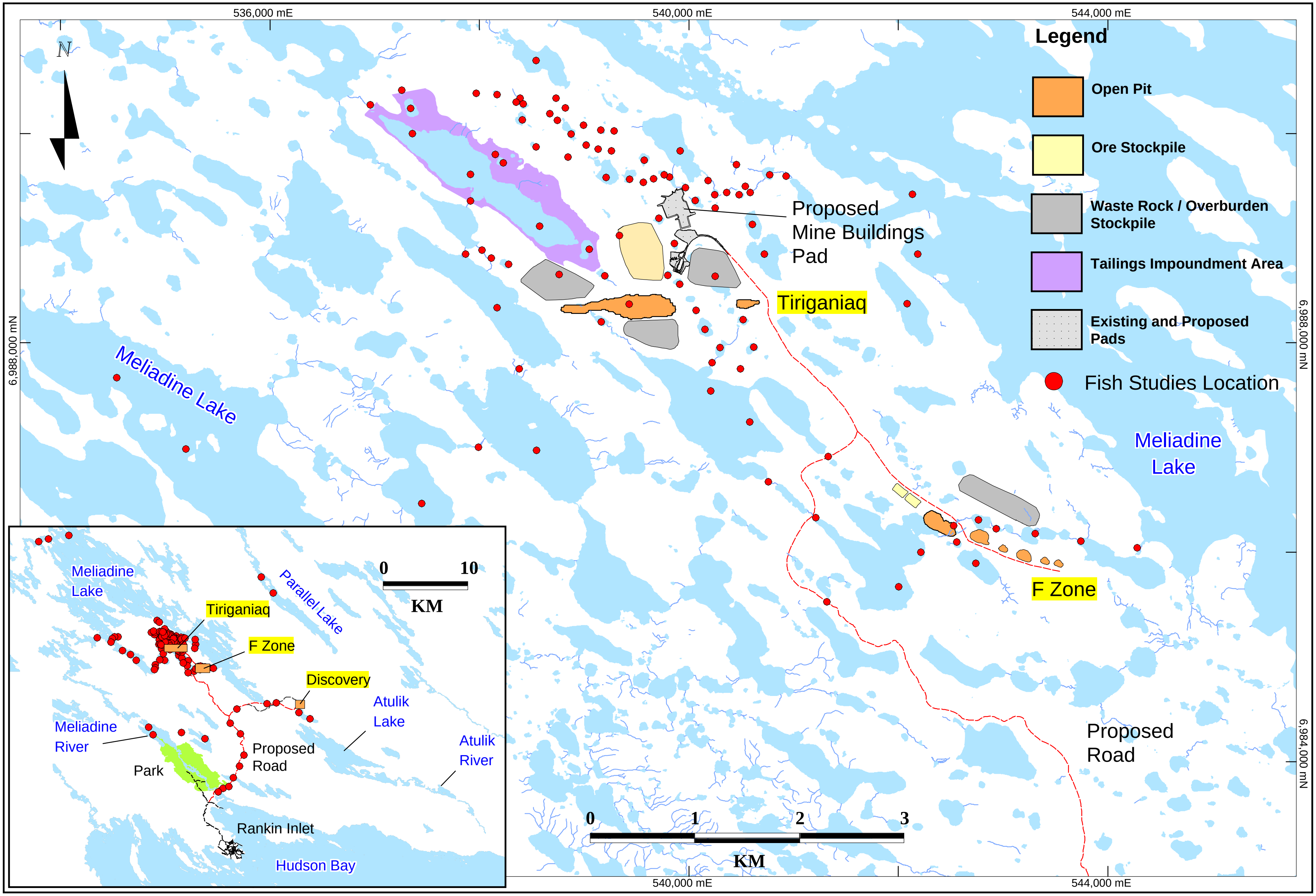

Figure 3-4: Regional Fish Studies