SECTION 2 • PROJECT DESCRIPTION

2.1 PROJECT LOCATION

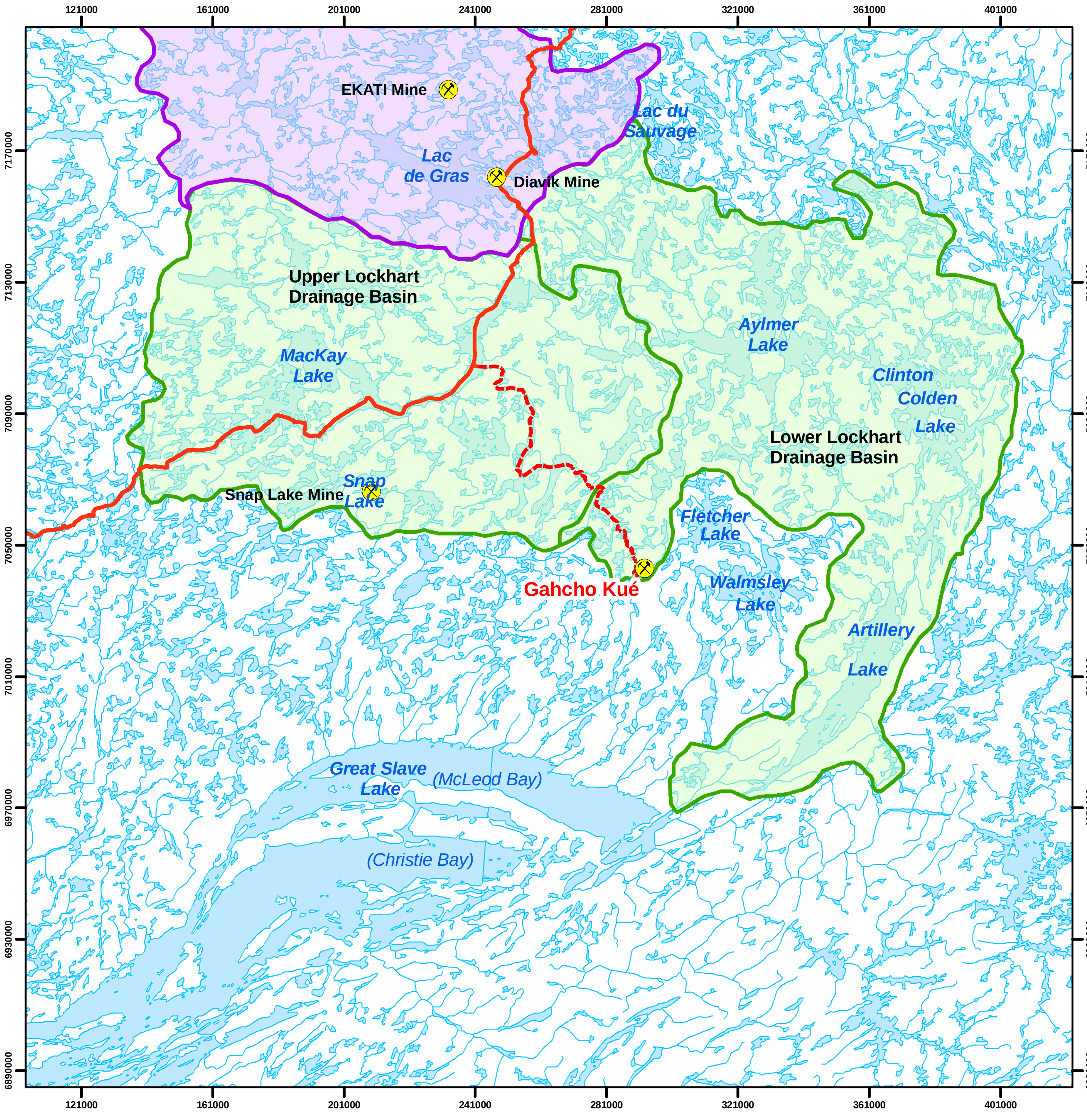
As shown in Photo 1, the Gahcho Kué project site is located in a remote area of Canada's Northwest Territories. The project area lies within the Lockhart Watershed, in Ecodistrict 258 of the Coppermine River Upland Ecoregion within the Taiga Shield Ecozone.

Photo 1: Aerial Shot of Kennady Lake June 2005 looking Northeast

Two location maps, one showing the project within the Lockhart Watershed and one illustrating the ecological setting of the project, are provided in Figures 2.1 and 2.2, respectively.

To provide seasonal overland access, a winter access road will be constructed from site to Mackay Lake to intersect with the Tibbitt-Contwoyto Winter Road that is established annually between Yellowknife and Lac de Gras (for more information on winter road access, see Section 2.13.8).

An overall site plan of the proposed project is shown in Figure 2.3.



Legend

- Lockhart River Drainage
- Coppermine River Drainage
- Winter Access Road
- Tibbitt-to-Contwoyto Winter Road
- Mine

Scale 1:1,700,000

0 5 10 20 30 Kilometres

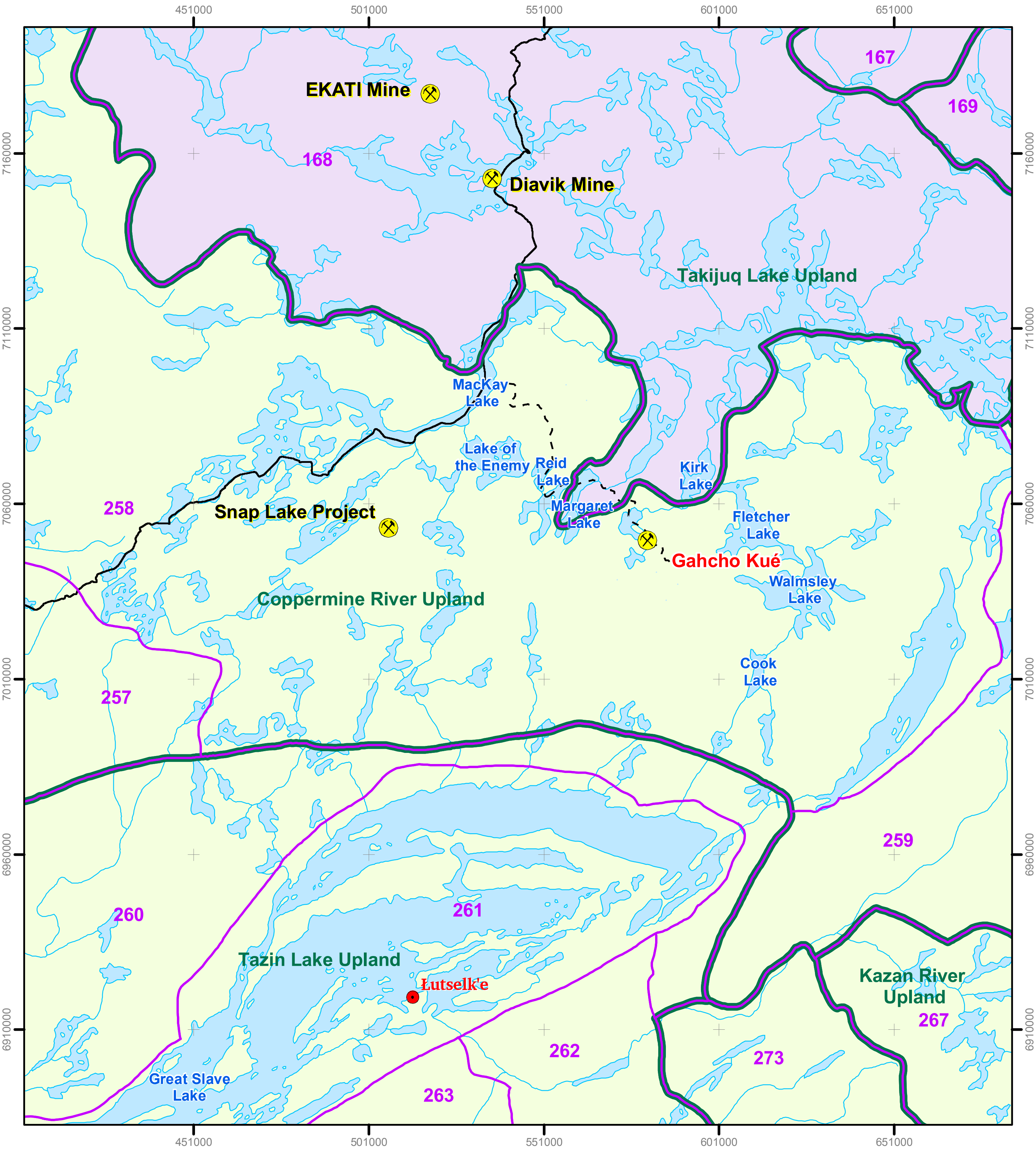
Source: Canada Land Inventory
Level 1 Digital Data

GAHCHO KUÉ PROJECT

REGIONAL DRAINAGE

DE BEERS CANADA | October 2005 | Figure 2.1

1740071_Figure2-1_Regional_drainage.mxd



Source: National Ecological Framework for Canada (Environment Canada)

Legend

Waterbody	263 Ecodistrict Boundary
Tibbitt to Contwoyto Winter Road	Ecoregion Boundary
Winter Access Road	**ECOZONE**
Mines	Southern Arctic Ecozone
Community	Western Taiga Shield Ecozone

Scale 1:1,500,000
0 5 10 20 30 Kilometres

UTM Zone 12, NAD83
Source: NWT WWF Data

GAHCHO KUÉ PROJECT

REGIONAL ECOLOGICAL SETTING OF THE GAHCHO KUÉ AREA

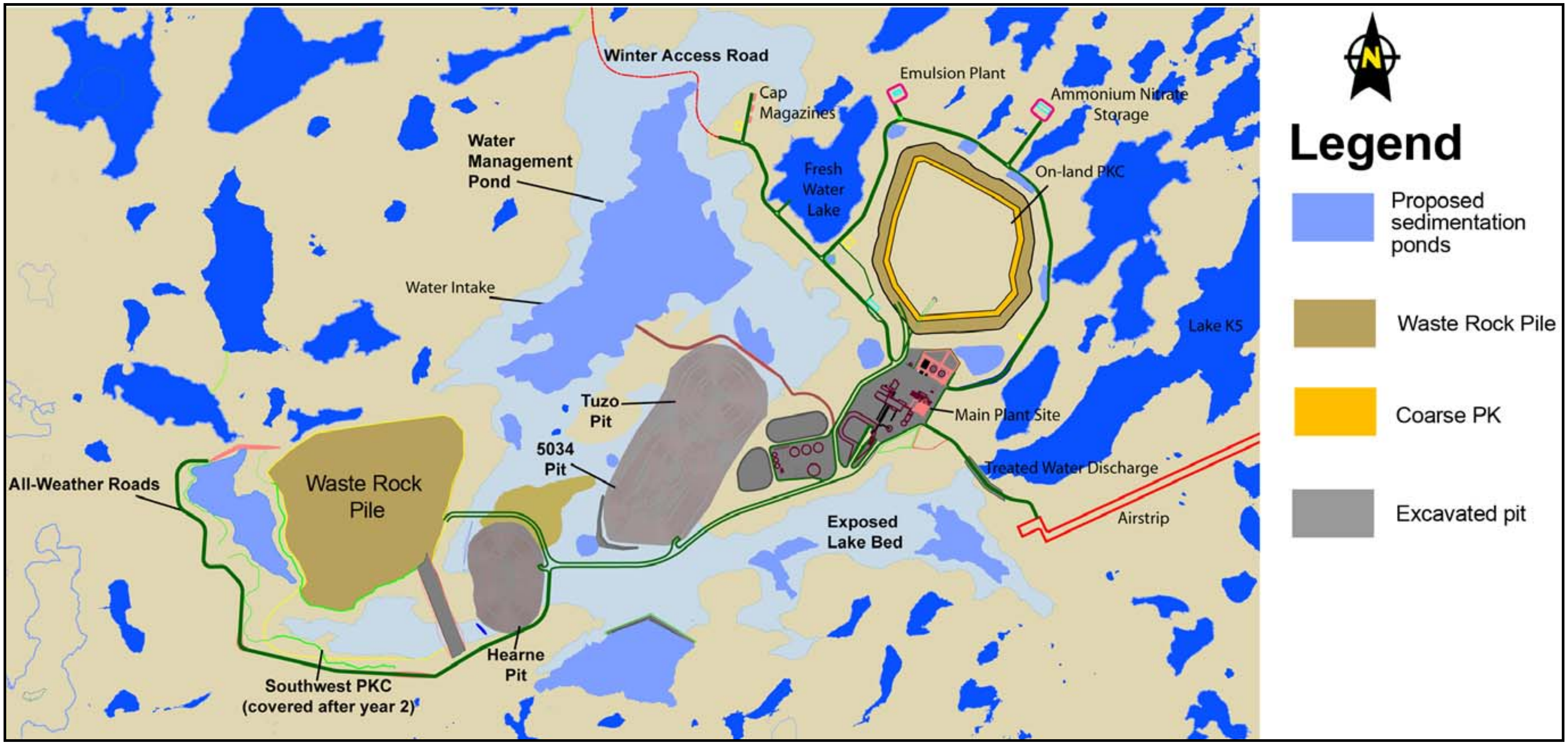
De Beers Canada

October, 2005

Figure 2.2

1740071_Figure2-2_Ecological-Setting.mxd

Figure 2.3: Overall Site Plan



2.2 PROJECT PURPOSE AND RATIONALE

De Beers believes in the economic viability and potential of the project, in that it will bring training, employment opportunities, and increased investment in services to the local population and all of NWT. On a national level, this project is timely given current diamond prices.

Development of the Gahcho Kué project will contribute to Canada's role as a major producer of diamonds in the world economy, and will help sustain Canada as a major diamond producer. This purpose is consistent with Canada's overall strategy of encouraging private corporations to generate national export commodities and tax revenues from natural resource development.

2.3 PROJECT HISTORY

Exploration for diamonds in the Gahcho Kué area began in 1990. The property was held by a number of junior exploration companies. The first kimberlite deposit, discovered in 1995, was 5034.

In March 1997, Monopros, which was a wholly owned Canadian subsidiary of De Beers, entered into a Joint Venture agreement with Mountain Province. The agreement followed a due diligence study undertaken by Monopros that concluded that the single kimberlite pipe (5034) known to occur on the Mountain Province properties was not viable on its own, but that there was potential for additional discoveries. The Tesla kimberlite pipe was subsequently discovered in May 1997, and exploratory boreholes intersected the Tuzo and Hearne kimberlites in August 1997.

During 1998, Monopros carried out a small delineation drilling program followed by extraction of a 200-tonne test sample using 6" drills. The concentrate was shipped to the Geological Sample Processing Service in Johannesburg for final diamond recovery.

Apart from several kimberlite dyke intersections and a probable subsurface extension of the 5034 body, no new kimberlites were located. Heavy mineral distributions located in the glacial till indicated that other occurrences must be present in the area.

The results from the 1998 work were encouraging, and a scoping study carried out by MRDI Canada (a subsidiary of AMEC plc.) confirmed this view. The project was re-named "Gahcho Kué," a traditional name for the area.

A bulk sampling program initiated in early 1999 was completed by mid-1999. Bulk samples were obtained using 12¼" diameter drills with the objective of recovering 1,000 carats from the 5034, Hearne, and Tuzo kimberlite pipes to establish the grade of the deposit and provide additional diamonds for valuation purposes. A limited amount of further delineation drilling and some geotechnical work was completed during this drilling campaign.

In 2000, these data were used as the basis for a conceptual engineering design of the property that provided order-of-magnitude capital and operating costs and some resource information. A further bulk sample program using 24" drills was undertaken in 2001/2002. The results of this program were used to update the conceptual engineering design in 2002/2003.

In August 2003, AMEC (Vancouver, BC) was contracted to manage the ongoing study project to update desktop level mine planning and engineering studies and conduct environmental baseline programs. An action plan for the Gahcho Kué project was developed in October 2003 to support a Class "A" Water Licence Application and to collect environmental baseline information to support future environmental assessment initiatives for construction, operation, and closure activities.

During January to August 2004, a core drilling program was conducted at Gahcho Kué to collect detailed geotechnical and geo-hydrological information, as well as additional geology, resource, and process information. Geotechnical, geo-hydrological, and resource drilling in 2004 recovered about 9,440 m of core from 111 boreholes that encompassed the following five drilling programs:

- pit geotechnical core drilling
- geo-hydrological and geothermal core drilling
- lake drawdown containment dykes core drilling (including GPR and seismic refraction surveys across lake and shoreline abutments for sediment and overburden thickness)
- ore dressing studies core drilling
- civil engineering core drilling.

From July to September 2005, a geo-hydrological core drilling program of four boreholes totalling 1,270 m was carried out, and semi-permanent monitoring wells were installed to collect deep formation water. Sampling of the deep sub-permafrost zone was needed to re-establish permeability and water composition.

Throughout 2004 and 2005, site upgrades included electrical rewiring; new power generators; new heavy equipment; and erection of a Quonset building housing a new workshop and emergency first aid station. Photo 2 (overleaf) shows the existing infrastructure at the Gahcho Kué project site.

2.4 GEOLOGY

2.4.1 Regional and Local Geology

The Gahcho Kué area lies on the Slave Craton of the Canadian Precambrian Shield. The Slave Craton is one of the world's best-exposed Archean cratons, and consists of a composite granite-greenstone terrane comprised of volcano-sedimentary successions overlying older sialic basement and juvenile basement rocks. Syn- to late-kinematic granitoid rocks are widespread across the Slave Craton and represent about 50% of the exposed rock. These granitoids are largely related to Slave-wide plutonism that occurred between ca. 2.63 and 2.58 Ga. The Gahcho Kué area is largely underlain by medium, coarse-grained granite to highly foliated granitic gneiss.

Structural analysis indicates a tight fold to the northeast around an ultramafic intrusive body west of the kimberlite cluster. Immediately surrounding the kimberlite cluster there is a dominant northeast trending fabric. The kimberlite placement appears to be controlled by discrete primary and secondary brittle structures.

Photo 2: Gahcho Kué Project Infrastructure July 2005 looking Northeast

Geological hazards are considered to be mainly related to the potential for slides and flows of material subsequent to thawing of permafrost. The dominantly granite rock in the area is generally competent, and rockfalls in areas of rock exposures in steep terrain are likely rare.

2.4.2 Kimberlite Occurrences

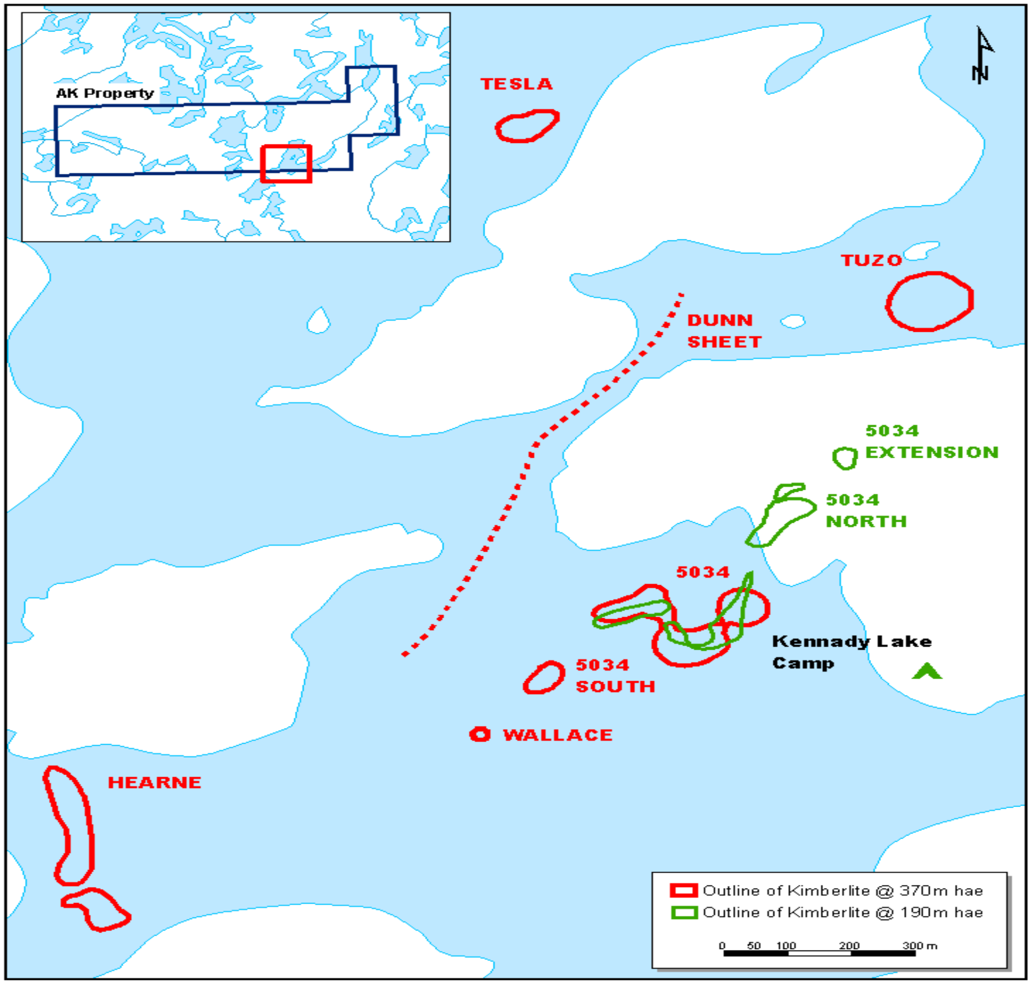
Four main pipes comprise the Gahcho Kué kimberlite cluster: 5034, Hearne, Tuzo, and Tesla (see Figure 2.4 for the locations of each kimberlite deposit). The kimberlites are characterized by contrasting external pipe shapes and infill. The 5034 kimberlite is an irregular hypabyssal root zone; Hearne and Tesla are transitional diatremes and root zones; Tuzo is the deeper part of a diatreme zone.

Tesla is not included in the Gahcho Kué project description, as its small size and low grade preclude it from economic development.

The three resource kimberlites—5034, Hearne, and Tuzo—have contrasting pipe shapes. As shown on Figure 2.4, the 5034 kimberlite has a very complex plan view shape and sub-surface structure with irregular pipe walls. Three lobes are exposed at the present surface, and the fourth lobe, the northern lobe, is overlain by approximately 80 m of in-situ country rock. The total surface area of 5034 is about 1.7 ha.

Tuzo has a circular plan view shape and a surface area of about 1.2 ha. Tuzo appears to expand at depth.

Figure 2.4: Kimberlite Deposit Locations



Hearne consists of two bodies that recent drilling indicates may be connected. Hearne South, the smaller of the two, is a roughly circular pipe, while Hearne North is a narrow elongate pipe. The total surface area for the two bodies is about 1.3 ha. Both pipes have steep smooth sidewalls.

There are other kimberlite occurrences that have been discovered around the Gahcho Kué kimberlite cluster, as listed below. None of these occurrences is included in the mine plans for the Gahcho Kué project.

- Faraday, a small pipe or a blow off a dyke system, located about 12 km to the northeast.
- Kelvin-Hobbes, small pipes or blows off a dyke system; located about 9 km northeast.
- The MZ sill group, located about 20 km northwest.
- The Doyle sill, located about 10 km southwest.

2.4.3 Resource Estimate

The 5034 kimberlite is a complex, irregular, hypabyssal root zone that has been subdivided into lobes based on location and local changes in pipe morphology. The 5034 kimberlite has an indicated resource of 8.7 Mt at an average grade of 160 cpht and an inferred resource of 4.9 Mt at an average grade of 170 cpht. These grades are at a bottom cutoff diamond size of 1.5 mm and to an elevation of approximately 121 masl. The estimated average value of the diamonds at 5034 is US$85/ct, based on a 1.5 mm bottom cutoff and the Diamond Trading Company price book at June 2005.

The Hearne kimberlite is a transitional diatreme and hypabyssal root zone. Hearne has an indicated resource of 5.7 Mt at an average grade of 170 cpht and an inferred resource of 1.5 Mt at an average grade of 153 cpht. These grades are at a bottom cutoff of 1.5 mm and to an elevation of approximately 121 masl. The estimated average value of the diamonds at Hearne is US$70/ct, based on a 1.5 mm bottom screen cutoff and the Diamond Trading Company price book at June 2005.

The Tuzo kimberlite is a diatreme that remains open at depth. Tuzo has an inferred resource of 10.5 Mt at an average grade of 115 cpht. These grades are at a bottom cutoff of 1.5 mm and to an elevation of approximately 121 masl. The estimated average value of the diamonds at Tuzo is US$56/ct, based on a 1.5 mm bottom screen cutoff and the Diamond Trading Company price book at June 2005.

An advanced evaluation program is planned in 2006 to further refine the resource model.

2.4.4 Exploration Potential

De Beers ceased exploration activities in the Gahcho Kué area in 2004, having exhausted its search to locate kimberlites of sufficient potential within 25,528 ha. De Beers retains three mining claims over 3,147 ha adjacent to the Gahcho Kué kimberlite cluster, and eight mining claims (pending) over

7,371 ha to the south, covering esker resources and site infrastructure (for more information on mining leases and claims held by De Beers in the Gahcho Kué area, see Section 1.5).

The De Beers Joint Venture partner, Mountain Province, retained six mining claims (6,205 ha in total) over areas adjacent to the proposed mine site and to the northeast over the Kelvin-Hobbes and Faraday kimberlites.

Gerle Gold Ltd., a junior explorer, has retained 15,099 ha of ground to the immediate south centred over the Doyle sill, and has assumed the option of 21 mining claims (20,647 ha) released by De Beers and Mountain Province in 2005.

2.4.5 Seismicity

No major earthquake has occurred in the past century near the Gahcho Kué area, and no significant seismic activity has ever been recorded within a 500 km radius of the proposed project site.

2.5 PROJECT ALTERNATIVES

Project alternatives have been considered during all stages of project design. Decisions were made based on environmental considerations, good engineering practice, project economics, and traditional knowledge. Below is a brief description of alternatives considered for dyke construction, waste rock pile locations, processed kimberlite management, and the drawdown of Kennady Lake.

2.5.1 Dyke Construction

The conceptual design included the construction of six dykes, two of which would be significant structures. However, an economic analysis of this scenario showed it to be unfeasible due to the high cost of construction in water and the additional complexity of constructing dykes that are large in size. Construction of an on-land water management pond also had environmental ramifications, as the size of the project footprint would be greater.

Alternatives considered for dyke construction included:

- Construction of six water retaining dykes (five during pre-production, and one during mine operation) to isolate the mining area from the northern and eastern basins of Kennady Lake, which would be maintained at the baseline lake level. Two of the dykes would be significant structures (approximately the same scale as the Diavik dykes).

- Construction of two water retaining dykes (one during pre-production, and one during operation) only a few meters in height, combined with additional drawdown of the lake. These dykes would be minor structures.

The construction of two modest dykes was selected as the best option for the following reasons: (1) substantial reduction in risk from dam safety and environmental perspectives; (2) substantial improvement in project economics; and (3) opportunity for reduced complexity of mine construction.

2.5.2 Waste Rock Pile Locations

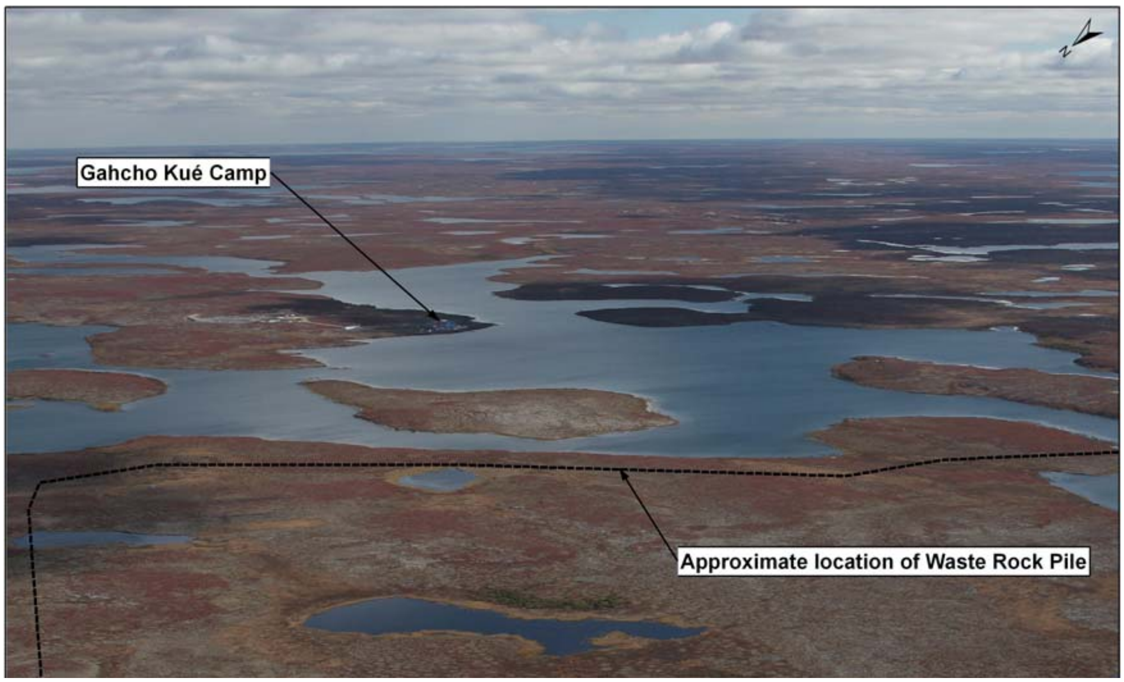
Alternatives considered for waste rock pile locations included:

- Two on-land waste rock piles to the west side of Kennady Lake, up to 100 m in height, with no backfilling of mined-out open pits.
- A single waste rock pile to the southwest of Kennady Lake, in concert with backfilling of the 5034 and Hearne pits as they become depleted.

For both alternatives, additional waste rock storage would be achieved by using this rock for construction and capping of the on-land PKC facility.

The second alternative was selected, as it offers many advantages in terms of reduced environmental impact, greater physical and geochemical stability, and project economics. Photo 3 shows the location of the proposed waste rock pile.

Photo 3: Kennady Lake Location of the Waste Rock Pile



2.5.3 Processed Kimberlite Management

Alternatives considered for the management of processed kimberlite (PK), in terms of technology and containment, included the following:

- Transport of fine processed kimberlite in slurry form or thickened slurry (paste) form using a pump, or dewater (filtration) the fine PK to an extent suitable for truck transport of the material.
- Storage of all PK within an on-land containment facility to the northeast of the plant site.
- Storage of all PK through Year 9 of the mine life in the on-land PKC facility to the northeast of the plant site, followed by placement in the mined-out 5034 and Hearne pits for the remainder of the mine life.
- Storage of the first year of fine PK in a small arm at the southwest limit of Kennady Lake, followed by storage in the on-land facility over the ensuing eight years, after which all remaining PK would be placed in the mined-out open pits.

Coarse PK can be dewatered and trucked; however, fine PK must be transported in slurry form, as testwork demonstrates it cannot be effectively dewatered. In terms of storage options, the last alternative was selected, as it offers the optimal tradeoff between storage security, progressive closure and reclamation, restoration of Kennady Lake, and project economics. The small portion of Kennady Lake used for PK storage will be more than compensated for by the creation of additional lake area and volume via the mining of the three open pits.

2.5.4 Kennady Lake Drawdown

The following alternatives were considered for the drawdown of Kennady Lake, which is required to allow mine development to proceed:

- Drawing down the central portion of the lake (and constructing six water retaining dykes as required) vs. drawing down the north and central portions of the lake.
- Discharging all water to the eastern portion of Kennady Lake vs. discharging it to multiple locations, including adjoining watersheds.

Drawdown of the north and central portions of the lake requires the construction of only one dyke in the pre-production phase, and was therefore selected as the preferred option based on reduced dyke construction requirements and greater water management flexibility during operations.

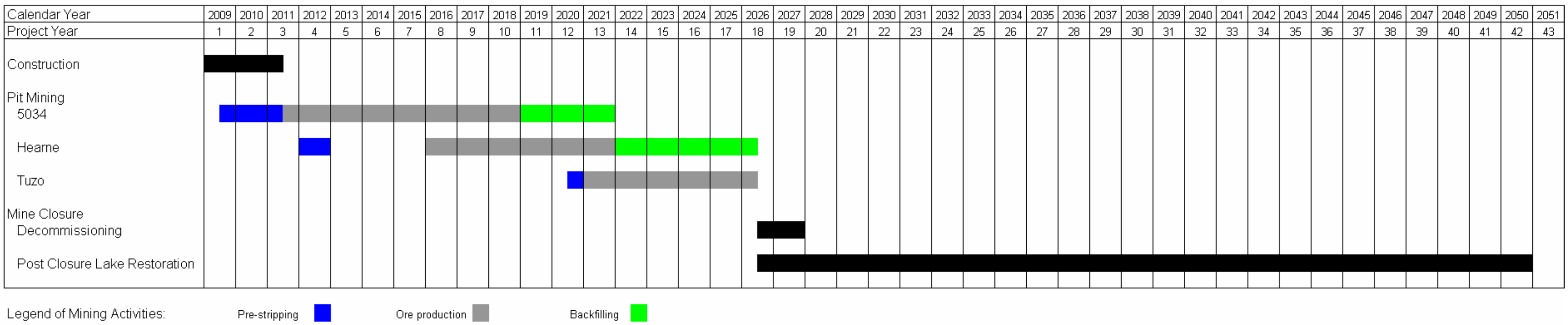
Direct (untreated) water discharge during drawdown will be routed to the eastern basin of Kennady Lake and to the adjoining northern watershed to diffuse the large flows and minimize impacts to fish and fish habitat.

2.6 PROJECT SCHEDULE

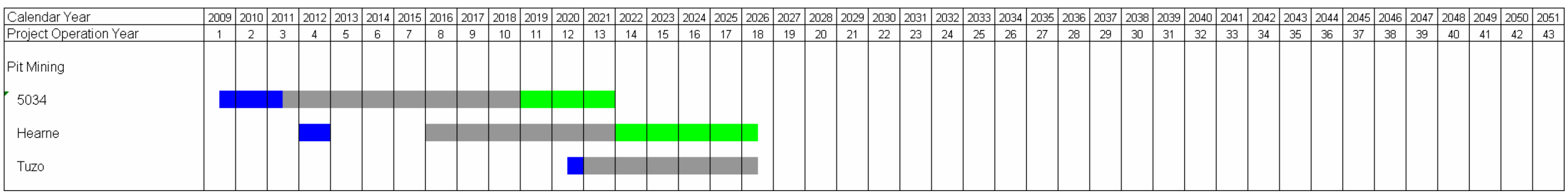
A schedule for the proposed project is shown in Figure 2.5.

Figure 2.5: Project Schedule

Project Lifecycle from Start of Construction:



Mining Schedule:



2.7 SITE PREPARATION AND CONSTRUCTION MATERIALS

Site preparation will consist of upgrading the access roads within the property to all-weather roads, with culverts installed where appropriate. Roads will be constructed to the waste disposal areas, process plant site, explosives magazines, and the airstrip. All roads will be dressed with crushed rock and/or gravel as required.

Surface buildings will be placed on concrete foundations or piled, and all buildings will be prefabricated to facilitate installation at site. Site topography will be optimized for building locations to minimize excavation requirements.

Construction materials will be sourced from on-site quarries wherever possible. Additional material may be accessed from eskers located in the project area. If local sources are not sufficient to meet specific requirements, material sources from outside the project area may be transported to site as needed. Cement requirements for concrete will be transported to the site with other construction equipment via the winter road.

A site layout is provided in Figure 2.3.

2.8 MINE PLAN AND OPERATION

2.8.1 Pit Design and Quantities

A production rate of 2.1 Mt/a will be maintained throughout the staged development of three deposits (in the following order): 5034, Hearne, and Tuzo. To ensure a continuous supply of ore to the plant, it is planned to expose ore in Hearne while 5034 is being mined, and to similarly expose ore in Tuzo while Hearne is being mined. Details and quantities regarding the anticipated final pit design are shown in Table 2.1.

Table 2.1: Anticipated Final Pit Design Quantities

	Ore (Mt)			Waste Tonnes (Mt)		
	Indicated	**Inferred**	**Total**	**Overburden**	**Granite**	**Total**
5034	8.5	4.7	13.2	2.8	140.8	143.6
Hearne	5.7	1.0	6.7	2.6	70.9	73.5
Tuzo	0.0	10.1	10.1	3.0	97.2	100.2
Total	**14.2**	**15.8**	**30.0**	**8.4**	**308.9**	**317.3**

When the 5034 and Hearne pits have been depleted, they will be used to store waste rock and processed kimberlite to reduce the size of the on-land waste facilities and assist in lake refilling at the end of mine life. The final pit designs will be concentric single ramp configurations. Because of the distance separating 5034 and Hearne, the two pits will remain separate. However, Tuzo and

5034 will be joined to form one large surface pit, which will then separate into two pits with increasing depth after bench 5. Site plans for key project years are provided in Appendix A.

2.8.2 Dilution

Dilution is defined most simply as waste material that is removed in the process of ore extraction. For economic purposes, it is important to minimize dilution as much as possible.

There are two types of dilution:

- Internal dilution – Waste material so ingrained within the ore that physical separation is impractical.
- External dilution – Low-grade material taken unintentionally during mining.

Internal dilution can only be prevented by having a thorough understanding of the nature of the internal grade variation within the mineralized areas. This type of dilution must be resolved at the modelling stage. However, external dilution can be controlled through the use of multiple types of loading equipment supported by tracked and rubber-tired dozers, along with a smaller backhoe for cleaning the kimberlite granite contacts. This is the approach proposed for the Gahcho Kué project.

Mine planning will account for dilution on a bench-by-bench basis, and will also report on a dry tonne basis. Dilution reduction strategies will also be further planned and developed. Potential control techniques include effective drill-and-blast management programs, such as:

- bench contact delineation
- buffer blasting along ore/waste perimeters
- controlled loading along contact areas.

2.8.3 Underground Mining

Underground mining offers the potential opportunity for economic recovery of ore that may exist below the current resource model at depths greater than about 280 m (or >121 masl). Because the Tuzo resource appears to be extensively open at depth, the possibility exists for substantial underground mining of this resource towards the end of the mine life if the viability of such mining has been demonstrated. At this stage, details on an underground mining program are not yet known.

2.8.4 Use of Explosives

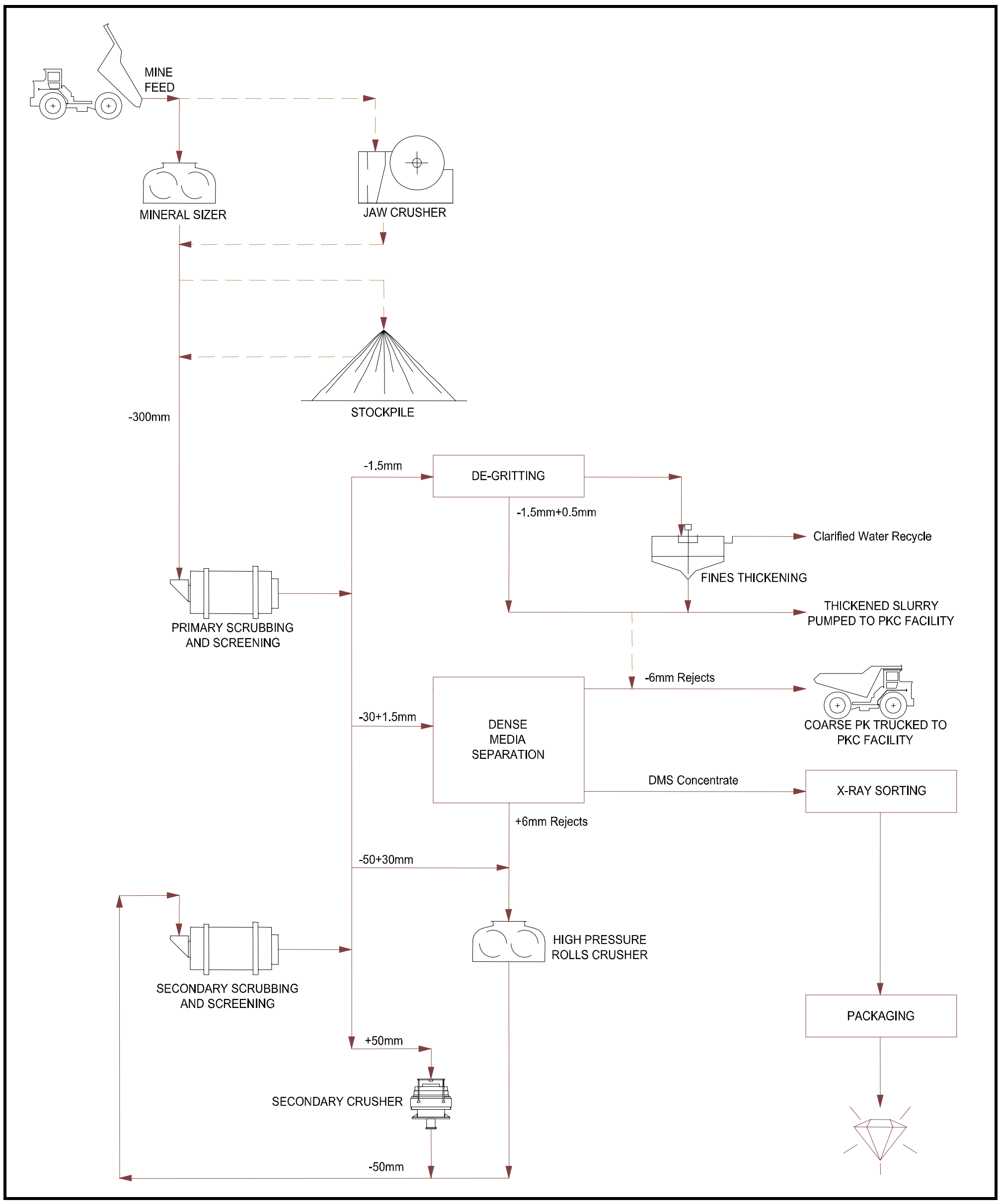
Explosives will be supplied by a contracted provider in the form of a 70/30 mixture of ammonium nitrate fuel oil (ANFO) to emulsion. Mixing and delivering explosives to the hole will be the responsibility of the supplier; Gahcho Kué personnel will be responsible for the blasting pattern design and for tie-ins. Overall, this program will be similar to the one currently practiced at the Diavik and Ekati mines.

All explosives and hazardous materials required for operations will be transported, stored, used, and disposed of in accordance with De Beers' policies and all applicable regulations.

2.9 PROCESSING

Kimberlite extracted from the mine will be processed on site through crushing, washing, screening, conveying, pumping, cycloning (using centrifugal force), and sorting. A simplified process flowsheet is shown in Figure 2.6.

Figure 2.6: Process Flowsheet



Diamonds will be liberated by crushing the kimberlite, and fine material will be removed by washing and screening. The crushed, washed, and screened product will then be processed through a dense media separation (DMS) circuit, in which cyclones will be used to produce a concentrate of diamonds and other heavy minerals. The DMS concentrate will then be passed through x-ray and laser sorters to recover the diamonds.

The process plant will produce three sizes of processed kimberlite:

- coarse processed kimberlite (1.5 to 6 mm)
- processed kimberlite grits, a sand-sized (0.5 to 1.5 mm) product
- processed kimberlite fines, a silt-sized (<0. 5 mm) thickened product.

The coarse processed kimberlite, processed kimberlite grits, and processed kimberlite fines will comprise an average of approximately 35%, 44%, and 21%, respectively, of the total weight of all processed kimberlite produced. Coarse processed kimberlite will be drained and trucked to the PKC facility; processed kimberlite grits and fines will be pumped as a thickened slurry to the PKC facility or to the backfilled pits.

The primary material used in kimberlite processing is ferrosilicon powder, which consists of the following: iron (79%), silicon (15%), titanium (5%), and aluminum (1%). This material will be used in the DMS circuit to make a dense separation medium, and will be recovered in the plant for re-use. The use of approximately 340 tonnes of ferrosilicon powder will be required each year due to typical losses of 160 g/t of plant feed. The ferrosilicon losses will be deposited with the processed kimberlite. This material is non-toxic, non-flammable, and chemically stable.

In addition to ferrosilicon, flocculant will be used in the high capacity thickeners to thicken fine processed kimberlite and clarify process water for re-use in the plant. The total usage of flocculant will be approximately 20 t/a. Re-use of clarified water from the thickeners and reclaim water from the PKC facility will be maximized within the process plant. Water requirements will be sourced from the water management pond.

2.10 DIAMOND SORTING, VALUATION, AND MARKETING

Production from Gahcho Kué will be sent to the Yellowknife diamond sorting facility established for the Snap Lake project, where it will be combined with Snap Lake production. The combined material will be cleaned and sorted (for valuation purposes in the NWT), and shipped to the Diamond Trading Company in London, England. At the Diamond Trading Company, Gahcho Kué and Snap Lake production will be incorporated with the production from other diamond mines for sale to clients.

2.11 WASTE MANAGEMENT

There are four major types of waste that will be produced and managed at Gahcho Kué, as defined below:

Waste Rock – This rock does not contain diamonds, but must be mined to extract the diamond-bearing kimberlite. Waste rock forms the majority of waste produced at an open pit diamond mine.

Processed Kimberlite – This is the second most prevalent waste at a diamond mine. PK is the result of the processing of kimberlite for diamonds and is formed of several different size fractions of kimberlite, water, and very small amounts of ferrosilicon.

Solid Waste – includes all domestic waste and hazardous materials.

Sewage – refers to human waste but also includes grey water from showers, kitchens etc.

A brief description of waste management for each type is provided in the following subsections.

2.11.1 Waste Rock

The waste rock storage plan for proposed project is based on storage of waste rock in the following areas: waste rock pile, 5034 pit, and Hearne pit. An estimated 309 Mt of waste rock and 8 Mt of overburden will be produced throughout the 17-year mine life. Approximately 188 Mt of waste rock will be produced to the end of Year 9, with 50 Mt directed to the waste rock pile and the remainder used for PKC facility construction. Between 7 and 14 Mt of waste rock from the Hearne pit will be stockpiled for subsequent use as PKC facility cover.

Based on extensive ABA testing, about 12% of the country rock samples are classified as having uncertain acid rock drainage (ARD) potential. Ongoing kinetic (humidity cell) testing will define whether this rock needs to be treated as potentially reactive or not. A compilation of these data will be prepared and submitted in support of a future environmental assessment.

Mine waters, any barren kimberlite, and country rock defined as being potentially reactive will be co-disposed and effectively encapsulated within the waste rock pile in a location that will freeze and remain frozen. The only other locations where potentially reactive rock will be placed are into the depleted 5034 and Hearne pits after Year 10.

This plan is driven by the potential environmental impacts of the project. By diverting mine waters to mined-out pits starting in Year 10, the potential for chloride and TDS levels to accumulate in pit inflow water into Kennady Lake—which could result in potential damage to aquatic life and the environment—is prevented. Additional environmental benefits realized by the proposed plan include improvements to fisheries habitat, reclamation timing, liabilities, and costs.

Site plans for key project years are provided in Appendix A.

2.11.2 Processed Kimberlite

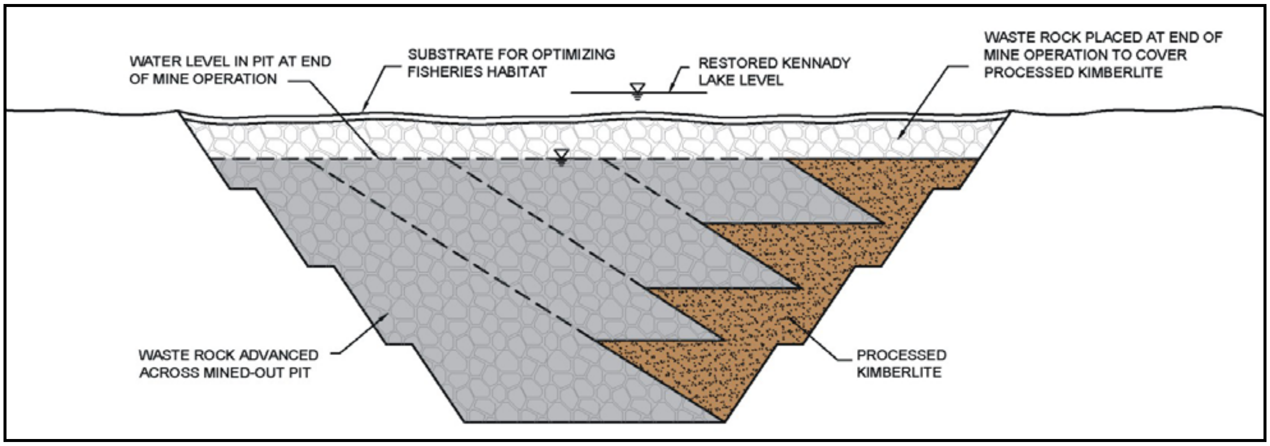
Until Year 9 of project life, processed kimberlite will be stored in two facilities as follows:

- Southwest PKC facility – fine processed kimberlite produced in Year 1
- On-land PKC facility – all processed kimberlite from Years 2 through 9.

Beginning in Year 10, all fine processed kimberlite discharge will be directed to the mined-out pits, where it will be disposed of in conjunction with waste rock. The Tuzo pit will not be backfilled; post-operation backfilling of Tuzo is a potential opportunity to be considered when the resource has been better defined.

An illustration showing the proposed encapsulation of processed kimberlite in the backfilled pits is provided in Figure 2.7.

Figure 2.7: Illustration of Backfilled Pits



2.11.3 Solid Waste

Solid waste management at Gahcho Kué will follow standard best practices established at operating Arctic diamond mines, specifically those that are in place at De Beers' Snap Lake diamond mine. The Snap Lake domestic waste and sewage management plan and the hazardous materials management plan were developed as requirements of the project water licence issued by the Mackenzie Valley Land and Water Board.

As an ongoing corporate goal, De Beers follows the four "R's" of waste management: reduce, recycle, reuse, and re-think. Packaging to be used in shipping and storing consumables on site will be removed where possible to reduce the need for use of solid waste sites and/or burning. In particular, plastic packaging will be avoided where possible.

Waste will be sorted at source before disposal or transportation to a designated area. Separate bins will be strategically located throughout the site to facilitate the immediate sorting of domestic waste; steel bins and dumpsters will be located at each major facility to collect burnable and non-burnable materials and recyclable wastes such as scrap metal, timber, tires, and unsalvageable equipment.

Food wastes and non-toxic combustible wastes will be burned in approved oil-fired incinerators. Clean, combustible materials (e.g., wood) that are too bulky for the incinerators will be burned in a designated burning area.

Recyclable waste will be hauled to the Yellowknife Solid Waste site. Materials such as waste oil, glycol, and batteries will be transported to suitable recycling facilities outside of the NWT—the Yellowknife facility currently accepts used oil from residential customers only.

Toxic materials will be stored in sealed steel or plastic drums in the waste transfer area prior to shipping to an approved off-site hazardous waste disposal location. Waste oil will be collected in sealed drums, stored in the waste transfer area, and subsequently incinerated (if not shipped off site for recycling).

2.11.4 Sewage

A modular sewage treatment system sized to handle a peak camp capacity of 500 people will be installed as part of the initial construction infrastructure. The treatment technology will be either a sequential batch reactor or a membrane biological reactor.

Treated effluent will be discharged to Kennady Lake via the water treatment plant discharge line during construction and will be directed to the diamond process plant during normal operations. Sewage sludge will be dewatered and either incinerated on site or landfilled. Biodegradable organic components removed from the sewage treatment plant will be temporarily stored in a closed-steel shipping container and subsequently incinerated.

2.12 WATER MANAGEMENT

2.12.1 Objectives

The goal of water management is to minimize the impact of the project on the aquatic ecosystem of Kennady Lake and downstream environments. Based on this goal, the following objectives and strategies have guided the development of the water management plan:

- minimize the impacts of the project on the quantity of surface water through the following actions:
  - reduce the intake of fresh water from Kennady Lake by recycling and reusing water to the greatest extent possible
  - reduce inflows to the open pits from Kennady Lake to the greatest extent practical

- minimize the impacts of the project on the quality of surface water through the following actions:
  - collect, transport, and treat camp sewage, surface runoff from site infrastructure, and all water coming into contact with core project facilities
  - manage acid-generating and potentially acid-generating materials with regard to acid rock drainage and metal leaching.
- monitor the quality of all discharges
- adjust water collection, transfer, treatment, and/or disposal practices through an adaptive management program if monitoring results indicate discharge quality is not meeting regulatory and design criteria.

2.12.2 Key Facilities

To achieve the objectives of the water management plan, the following key facilities are required:

- diversion structures for catchments A, B, and D
- two small water retaining dykes
- a water management pond
- runoff collection ditches and pond
- a water treatment plant
- a sewage treatment plant
- PKC facilities.

2.12.3 Water Management Plan

Lowering of the Lake

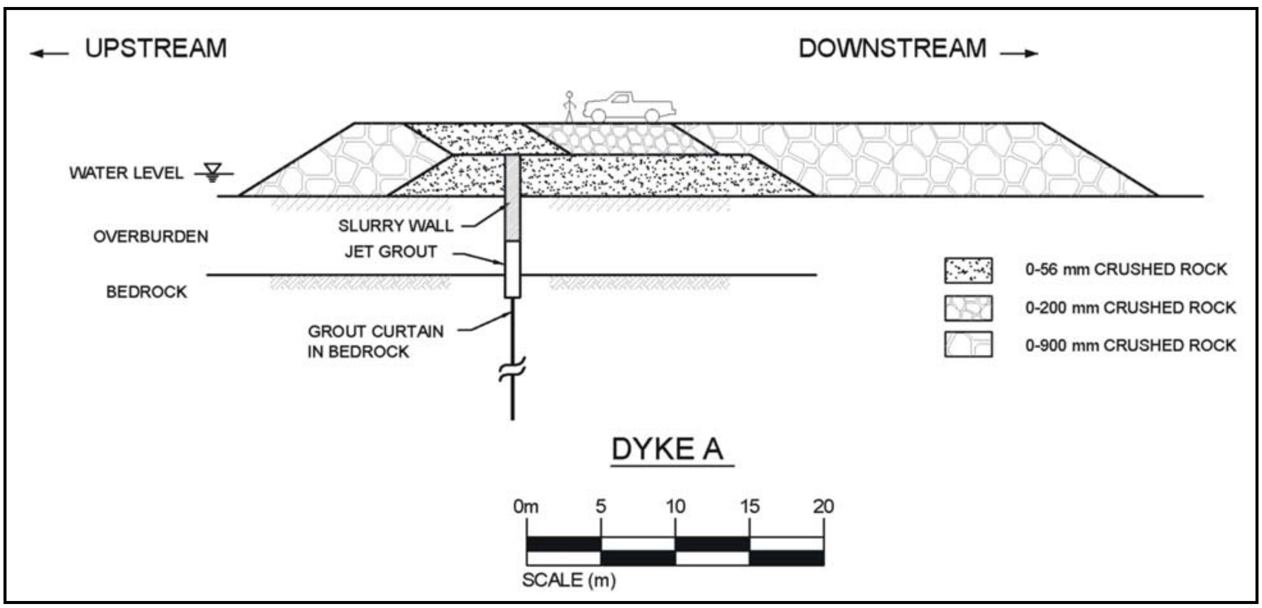
To construct the mine, the water in a portion of Kennady Lake will need to be lowered by up to 16 m in the area of the 5034 pit. In the northern basin of Kennady Lake, it will be lowered by between 7 and 12 m. The eastern basin of Kennady Lake will not be lowered.

Lowering of the lake will be achieved by constructing a small water retaining dyke, designated “dyke A,” across a section of the lake during the mine construction phase to isolate basins 1 through 4 of Kennady Lake. Once completed, this dyke will temporarily separate Kennady Lake into two lakes. The eastern portion will remain at its natural level and discharge via the natural Kennady Lake outlet, while the western portion will be lowered as required to allow development of the mine.

Photo 4 shows the location of the dyke on Kennady Lake. A dyke cross-section is provided in Figure 2.8. The average thickness of the soft lake bottom sediments along the alignment of Dyke A is 1 m, with a range of 0 to 3 m.

Photo 4: Kennady Lake Location of Dyke A

Figure 2.8: Typical Cross-Section of Dyke A



Once dyke A is completed, two floating pump barges will begin to lower the water level of Kennady Lake. One of these barges will discharge water to the eastern portion of Kennady Lake, while the other will discharge water to the watershed immediately to the north. The water discharged during the first phase of the lowering of Kennady Lake will not require treatment.

Only when the lake level has been substantially lowered and sediment from the lake bottom becomes mixed with the water—thereby creating water that is too cloudy for direct discharge—will treatment be required. Prior to that point in the process, shallow areas that separate the northern and southern portions of Kennady Lake will be exposed, creating natural dykes that effectively separate Kennady Lake into three basins: the east basin (where no lowering is to take place), south basin, and north basin.

When the lake water becomes cloudy, the rate of discharge will be reduced, as all water will have to be routed through the water treatment plant for removal of suspended solids to levels acceptable for discharge. This treated water will then be discharged to the eastern portion of Kennady Lake, and discharge to the adjoining northern watershed will be terminated. Lowering of the lake will then be concentrated on the southern basin where mining of the 5034 pit (and later, Hearne) will take place.

Based on recent discussions with DFO and ongoing environmental planning, De Beers is currently investigating the possibility of discharging through other nearby outlets, including adjacent watersheds (e.g., to the west and south of Kennady Lake).

Partial Diversion of Kennady Lake Watershed

During mining, a key water management objective is to reduce the volume of water coming into contact with the mine area, as this water must be routed through the water treatment plant for removal of total suspended solids prior to discharge to the eastern basin of Kennady Lake. To do this, a series of diversion berms and ditches will be constructed to divert runoff from those portions of the Kennady Lake watershed that can practically be diverted into adjoining watersheds. These diversions will be created during mine construction, and will remain functional throughout the operating life of the mine. Once reclamation begins, these diversions will be dismantled to restore the baseline watershed boundary of Kennady Lake.

Managing Site Runoff

During mine operation, runoff from the plant site area, roads, waste rock piles, and undisturbed terrain will be routed, via gravity flow or via sumps and pumps, to the northern portion of Kennady Lake. The water level in this portion of the lake will be controlled by pumping water to the water treatment plant, upon which, after being treated for total suspended solids, the water will be discharged into the eastern portion of Kennady Lake via a diffuser. The water level of the northern basin of Kennady Lake will fluctuate seasonally.

A second water retaining dyke, designated “dyke B,” will be constructed in the early years of mine operation to separate the northern basin of Kennady Lake from the area of the future Tuzo pit, which will be mined in the second half of the mine life. Dyke B will be constructed in the dry, most likely in Year 2 when the water management pond is sufficiently lowered to permit construction.

The location of dyke B on Kennady Lake is shown in Photo 5. A cross-section of dyke B is provided in Figure 2.9.

Photo 5: Kennady Lake Location of Dyke B

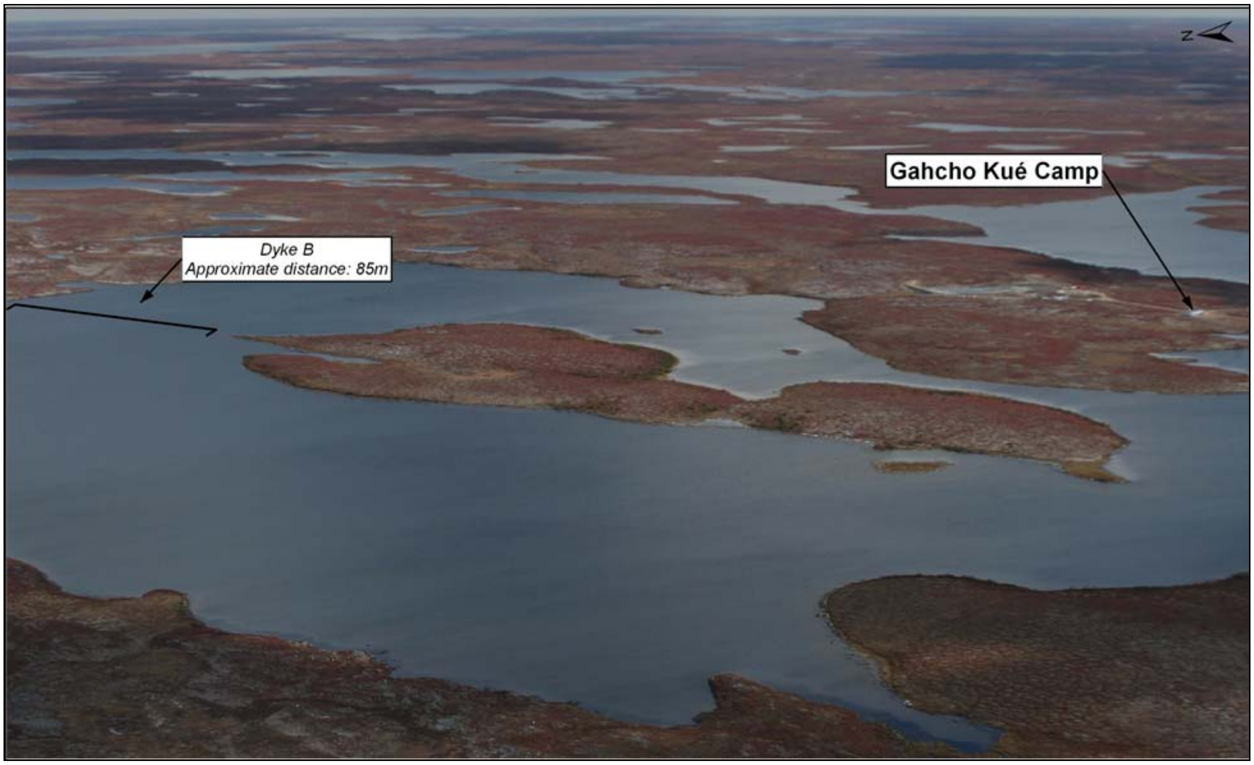
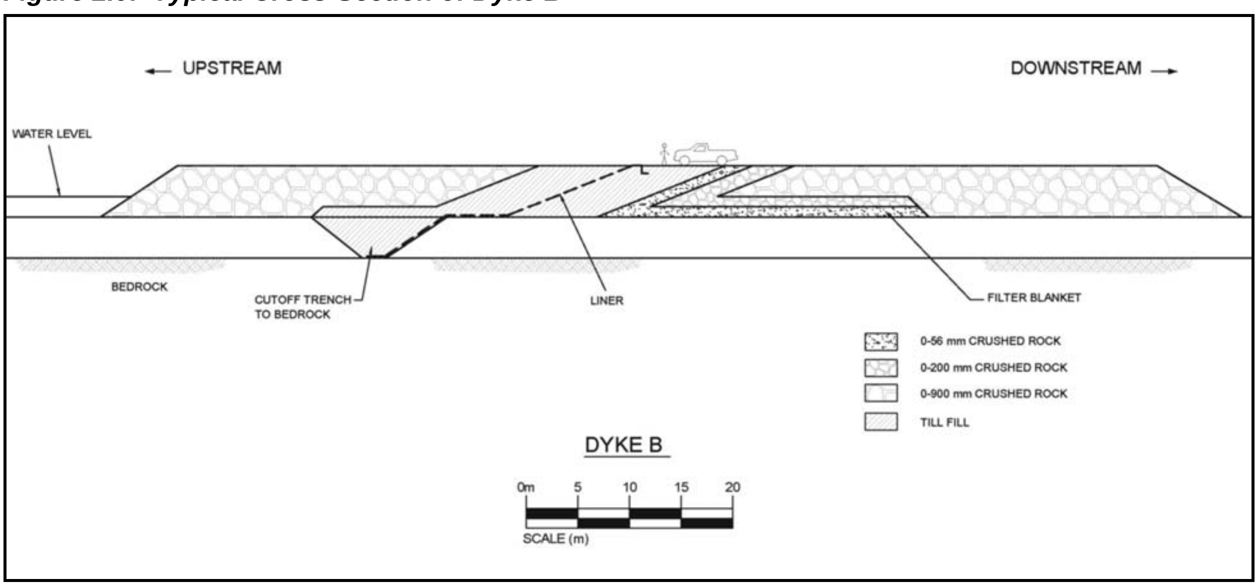


Figure 2.9: Typical Cross-Section of Dyke B



Management of Mine Water Inflows

Groundwater will seep into the open pits. As the pits progressively deepen, the inflow waters are expected to have increasingly high concentrations of total dissolved solids, particularly chlorides. Because the water treatment plant is not designed to treat for these parameters, groundwater inflows to the open pits during the first half of mine life will be pumped to the PKC storage facilities. The PKC facilities will require a supply of makeup water to replace the water being reclaimed for process plant operation. Mine water inflows will serve this makeup water requirement, and will therefore effectively be recirculated between the plant site and the PKC facilities. This will prevent discharge of these waters to the receiving environment.

During the second half of mine life, when the PKC facilities are closed and processed kimberlite is being stored within the mined-out open pits, groundwater inflows to active pits will be pumped into pits that are being backfilled. Again, this will avoid any need to discharge these waters to the environment, and will have the further advantage of effectively accelerating the refilling of Kennady Lake by re-watering the mined-out pits. In effect, containment of pit inflows within the mined-out pits will represent a form of progressive reclamation.

Once processed kimberlite is being directed to the mined-out open pits, the plant site will draw process water from the northern portion of Kennady Lake. Process water will not generally be reclaimed from the mined-out pits that are in the process of being backfilled and rewatered.

Restoration of Kennady Lake

Once mine operation ceases, restoration of Kennady Lake will continue. As discussed above, this process will already have been accelerated by backfilling and rewatering the two mined-out open pits. The runoff diversions constructed to reduce the effective catchment of the western portion of Kennady Lake will be removed, restoring the baseline watershed boundary of Kennady Lake and yielding a larger runoff area to facilitate Kennady Lake's restoration. Due to natural attenuation, ammonia (NH^3) is not expected to be present in the mined-out pits by the end of the pit lake re-filling process.

During the initial phase of rewatering, all water entering the northern and southern basins of Kennady Lake will be directed into the mined-out Tuzo pit. The water level in that pit will gradually rise to a point where it will begin infilling the portion of the 5034 pit not backfilled during operations.

The latter portion of the restoration of Kennady Lake will involve restoring the lake back to its original level. Based on average annual hydrologic conditions, baseline lake levels are expected to be achieved 24 years after the end of mining operations. To minimize the duration of the restoration period, runoff to the north and south basins of Kennady Lake will not be treated or discharged, but will be left to fill the basins.

2.12.4 Water Balance

To estimate the amount of makeup water required for the process in an average year, a water balance was prepared based on average climatic and hydrologic conditions.

Inflows to the system would consist of the following:

- groundwater
- direct precipitation that reports to the open pits
- surface runoff from various sources such as the plant site, airstrip, roads, drawdown basins of Kennady Lake, waste rock pile, and the southwest and on-land PKC facilities
- makeup water for the process plant from the water management pond
- reclaim water for the process plant from the southwest and on-land PKC facilities
- freshwater intake from Lake A1.

Outflows and losses would include:

- the treated contact water and treated sewage discharged to basin 5
- evaporation from open waterbodies and from water used for dust control
- evapotranspiration from naturally vegetated surfaces within the site facility catchments
- permanent storage in the pore spaces within the PKC facilities
- water used to refill pore spaces in mined-out open pits backfilled with waste rock and processed kimberlite
- water used to refill any open pits and drawdown basins remaining at site closure in Year 16 (2026).

The water balance will change over time, particularly with regard to outflows and losses. Groundwater inflows to the open pits and surface runoff will be proportionally the largest inputs to the water management system.

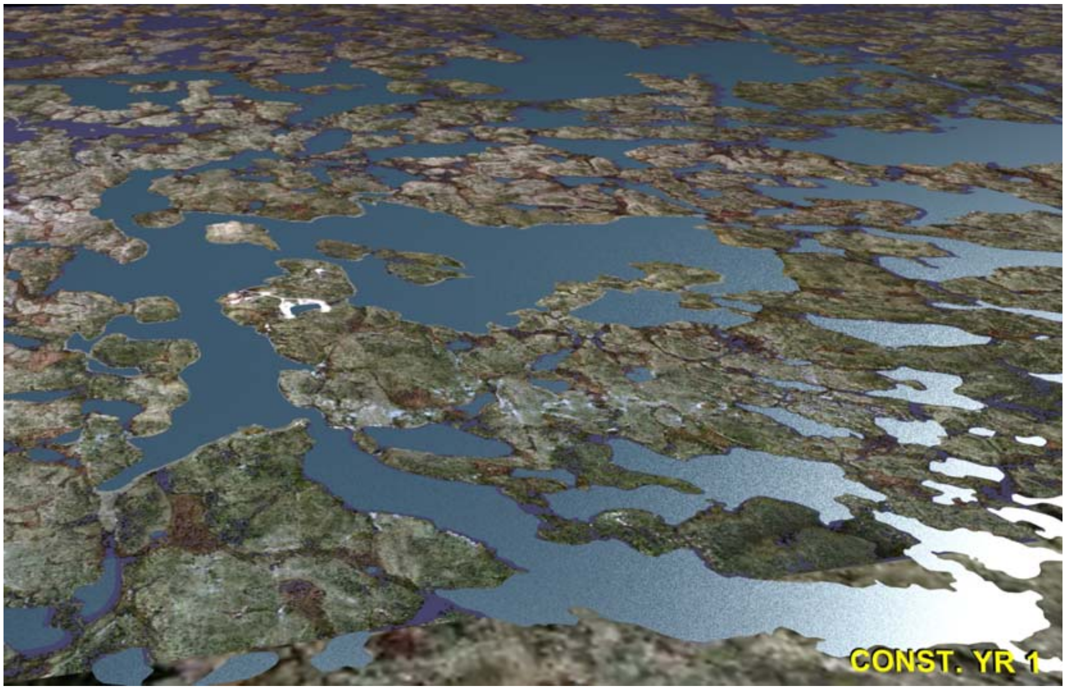
Alternative options (such as the use of waters from adjacent basins) to the drawdown and refilling of Kennady Lake are being considered. Decisions will be made based on best engineering judgment, environmental considerations, and discussions with regulatory authorities.

A chronological series of images showing water movement within the site over the life of mine is provided in Figures 2.10 (a) to (f).

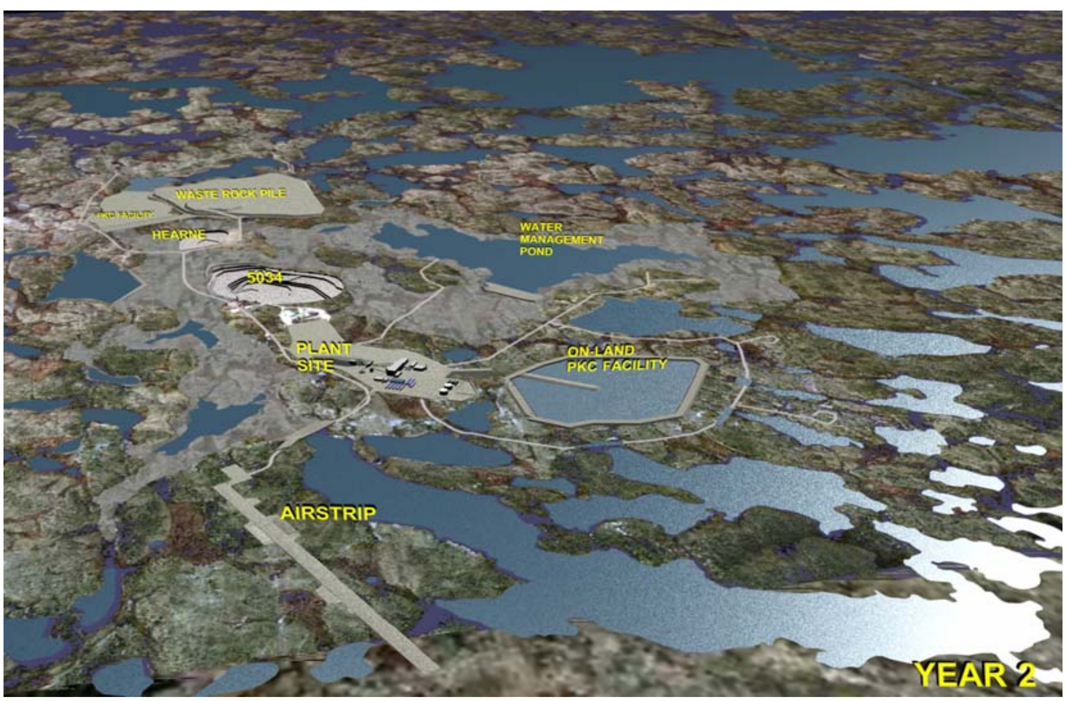
Detailed drawings of the proposed water management system are provided in Appendix B.

Figure 2.10: Water Balance Illustration

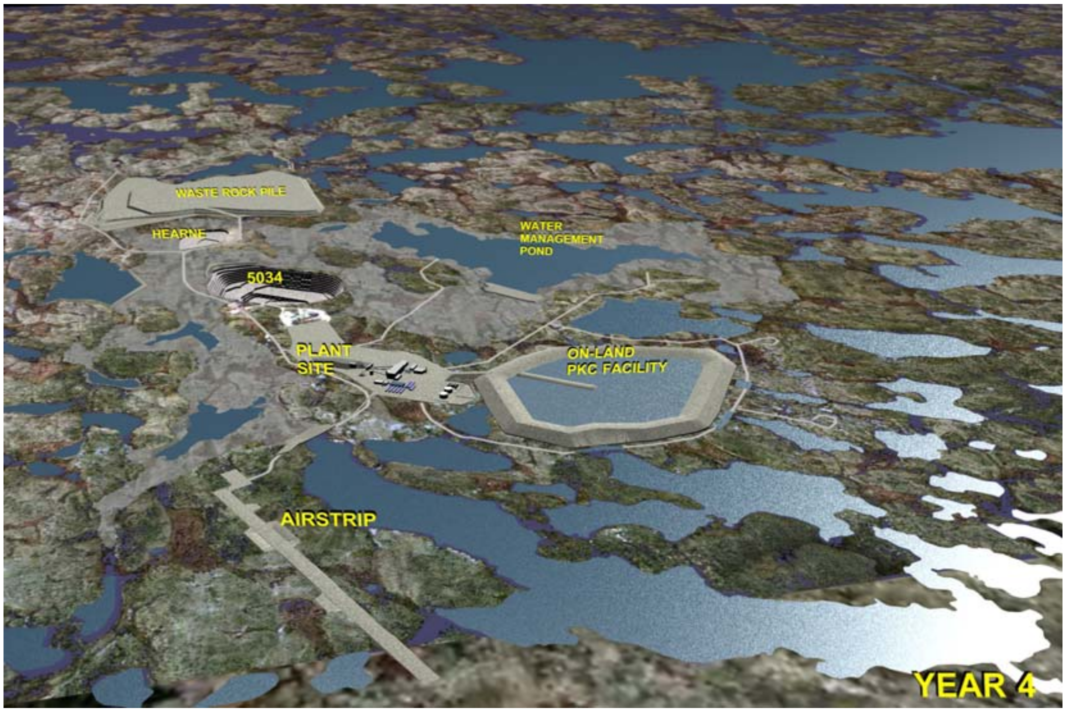
(a) Kennady Lake at onset of drawdown process



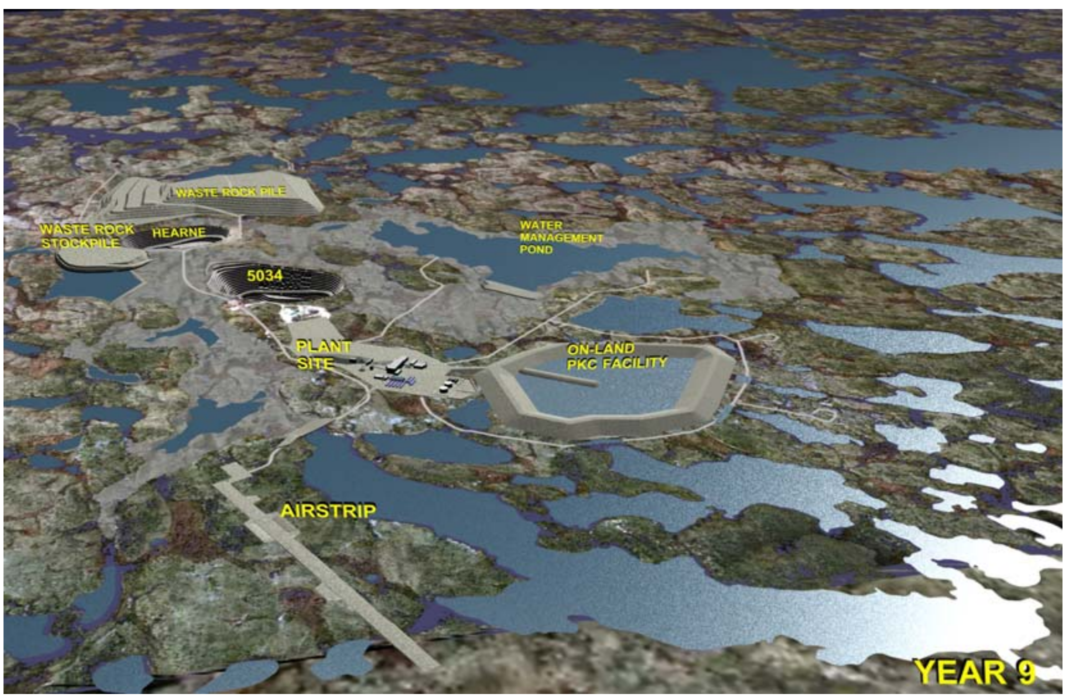
(b) Fine PK to Southwest PKC facility; on-land PKC starter facility construction complete; waste rock to waste rock pile



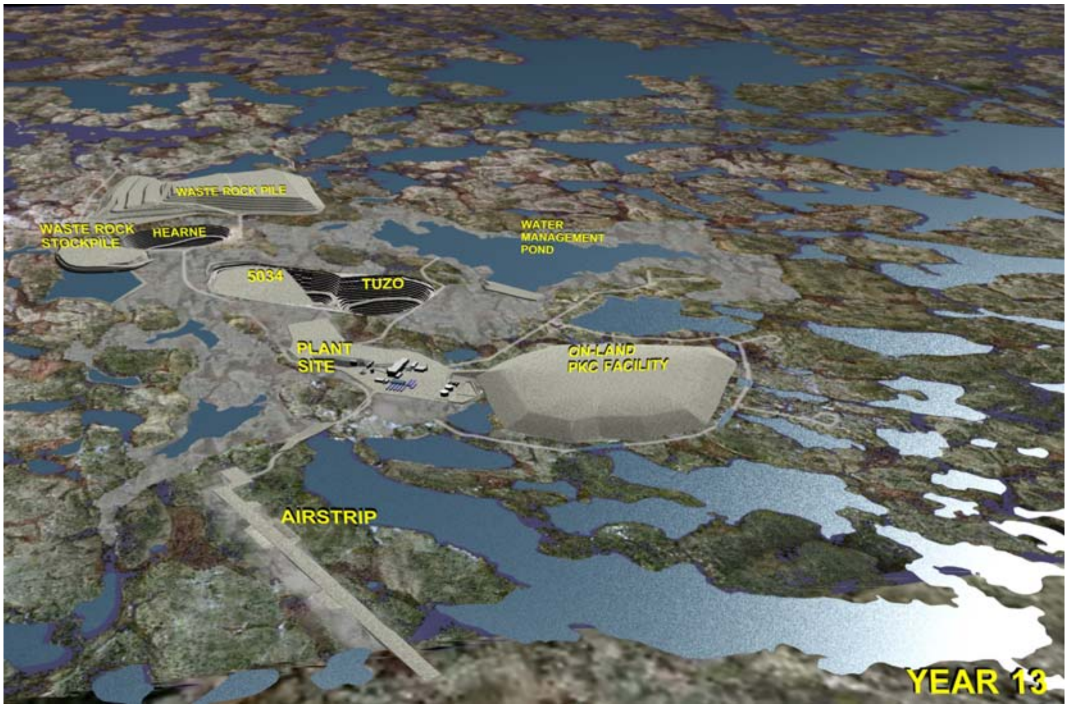
(c) Fine and coarse PK to on-land PKC facility; waste rock to waste rock pile; covering of Southwest PKC facility complete; pit inflow waters to on-land PKC facility



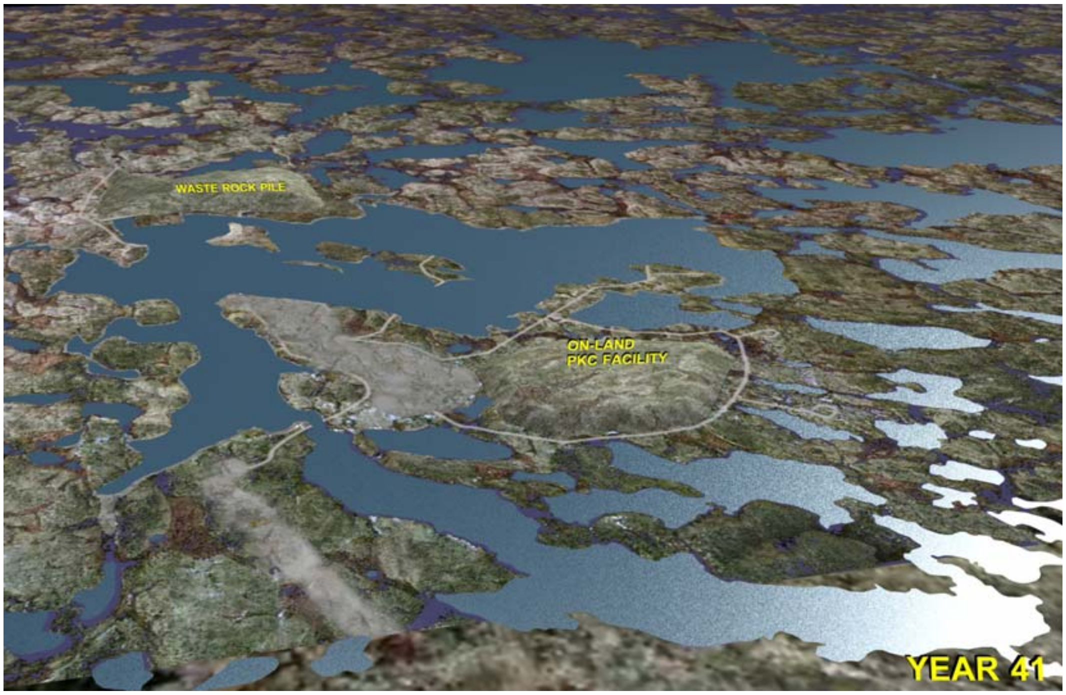
(d) Last year of fine PK into on-land PKC facility; 5034 and Hearne pit inflows to on-land PKC facility; beginning in Year 10, waste rock and fine PK to mined-out 5034 pit



(e) PK and waste rock into Hearne pit; Tuzo pit inflow waters to 5034 and Hearne; on-land PKC facility reclamation complete



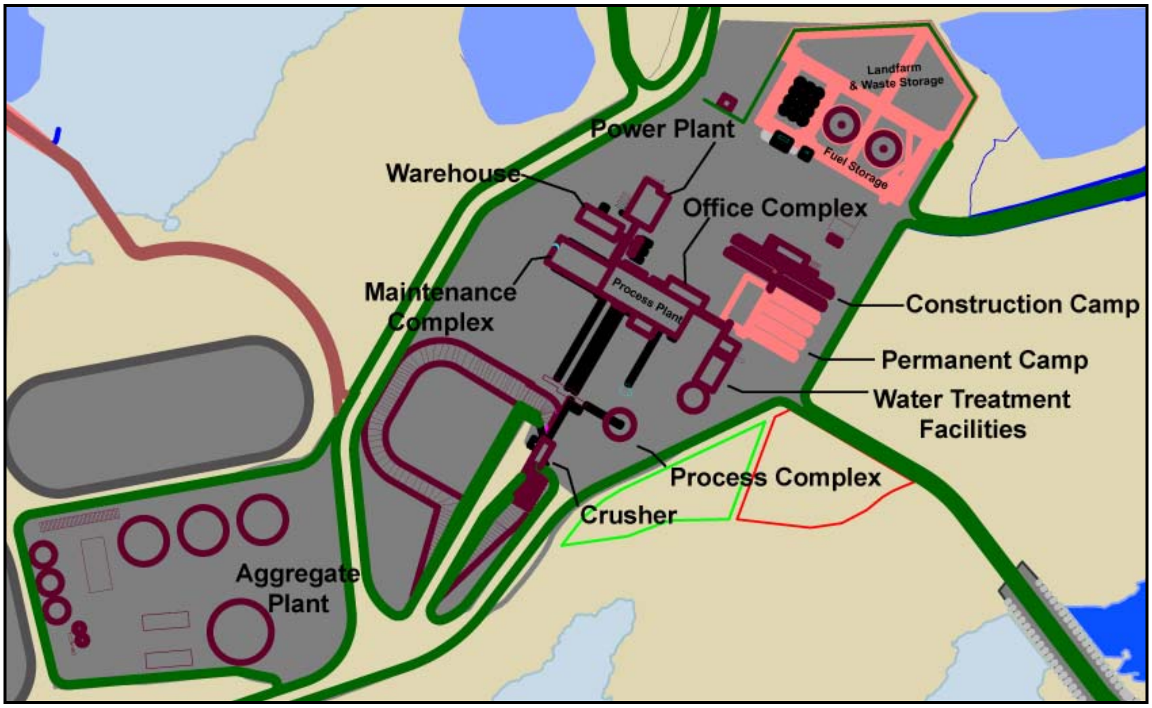
(f) Restoration of Kennady Lake complete; dyke A removed; Kennady Lake flow to natural outlet restored; site reclamation complete



2.13 SUPPORT INFRASTRUCTURE

The plant site layout is shown in Figure 2.11.

Figure 2.11: Plant Site Layout



2.13.1 Power Plant

The power generation system will consist of two plants: a main building that houses the larger, medium-speed (900 rpm) diesel generating sets, and an adjacent facility for smaller, high-speed (1,800 rpm), emergency diesel generating sets. Under normal operating conditions, the main power plant will supply the required load; the emergency generators will be used as needed.

2.13.2 Workshop / Warehouse Complex

The maintenance workshop area of the complex will be a self-contained service building on the ground floor. The workshop will be designed to meet the servicing and maintenance needs of the mining equipment, as well as the mine and plant support equipment fleet.

The shops area, which provides for repairs, preventative maintenance, and component change-outs, will be designed based on the mine equipment list and plant support equipment list. A 50-tonne overhead crane will be installed to service heavy vehicles. A 10-tonne overhead crane will service the plate shop, machine shop, and light vehicle service area.

The warehouse will be a pre-engineered building connected to the maintenance complex by Arctic corridor. The building will have 1,100 m^2 of floor space, with 750 m^2 dedicated to warehouse storage. The remainder of the space will be allocated to offices, lunchroom, and men's and women's dries. Forklifts, pallet racking, bins, and carousels will be provided for handling materials. Flammable products such as solvents and paints will be stored separately.

2.13.3 Administration Complex

A two-storey administration complex will be attached to the process building. The facility will be of modular construction, with the exception of the emergency vehicle storage area, which will be a pre-engineered building. The ground floor of the complex will house protective services and security, first aid, men's and women's dries, emergency response, electrical/mechanical room, and process plant restricted secure area facilities. The second floor will house offices and process plant restricted secure area facilities.

2.13.4 Energy Requirements

At this stage of project development, diesel fuel is identified as the primary energy source for the Gahcho Kué mine as a base case scenario. However, De Beers is interested in opportunities to reduce fossil fuel consumption. The possible use of other fuel sources, including hydroelectricity, solar, and wind power, will continue to be explored and may be incorporated into project design. Evaluation criteria would include energy efficiency, proven performance in a northern setting, environmental cost/benefit, and cost effectiveness.

De Beers considers cost-effective hydroelectricity favourable; however, no concrete proposals for the supply of hydroelectricity for either the Snap Lake or Gahcho Kué projects have been provided to date. De Beers will also further investigate the use of wind power.

Fuel Use

Four fuel types will be stored and used on site. Diesel fuel, which will be the primary source of power, will be used to operate electrical generators and mobile equipment, and to provide supplementary heating. Gasoline will be used for operation of snowmobiles and other small equipment. Jet-B fuel will be used for helicopters, and as an emergency source for fixed-wing aircraft. Propane will be used in small quantities for tiger torches and other incidental uses.

Approximately 50 ML of diesel fuel will be consumed annually. This estimate takes into consideration a 5 ML annual savings in fuel consumption through heat recovery from the main electrical generators.

Diesel fuel will be stored in diesel storage tanks within a containment area lined with impermeable high-density polyethylene. Two tanks with 20 ML capacity and 12 tanks with 0.5 ML capacity will provide a total storage volume of 46 ML.

A breakdown of diesel usage on an annual basis is shown in Table 2.2.

Table 2.2: Estimated Greenhouse Gas Emissions

Service	Fuel Usage (L/a)	Fuel	Estimated GHG Emissions (t/a)			
			CO_2	N_2O	CH_4	Total Equiv. CO_2
Mining Equipment	20,000,000	Diesel	54,200	1.5	2.7	54,700
Power Generation	22,000,000	Diesel	59,600	1.7	2.9	60,200
HVAC/Water Heating	5,000,000	Diesel	13,400	0.2	0.1	13,400
Surface Mobile Equipment	2,000,000	Diesel	5,400	0.0	0.2	5,400
Incinerators/Portable Equipment	1,000,000	Diesel	2,700	0.0	0.0	2,700
Helicopters	100,000	Jet-B	300	0.0	0.0	300
Gasoline	10,000	Gasoline	25	0.0	0.0	25
Total			**135,600**	**3.5**	**6.0**	**136,700**

Note: Propane GHG emissions are negligible.

Approximately 100,000 L of Jet-B fuel will be consumed annually, essentially all of which will be used for helicopter operation. Jet-B fuel will be transported to site in drums and ISO containers. Fuel used by helicopters will be stored in drums inside a lined containment area at the airstrip. In addition, a 5,000 L double-walled tank will store jet fuel for emergency use by fixed-wing aircraft.

Annual gasoline usage will be approximately 10,000 L. Gasoline will be stored in 205 L drums within the diesel fuel storage containment area.

Propane will be trucked to site and stored in an approved tank.

2.13.5 Explosives Storage

Ammonium nitrate will be delivered to the site in bags to meet a demand of approximately 8,000 t/a. An unheated building will store 60% of the annual ammonium nitrate requirement, while the remainder will be stored outdoors on a level pad. The ammonium nitrate storage facility, emulsion plant, and explosives storage magazine are sited in accordance with the guidelines set out in the Quantity-Distance Principles User's Manual published by the Explosives Regulatory Division of NRCan.

Mine blasting will utilize a blend of emulsion and ammonium nitrate / fuel oil. Emulsion will be produced in a plant located to the north of the on-land PKC facility.

Storage magazines will contain boosters, delays, detonating cords, detonating caps, and other explosives accessories. Design of these magazines will be in accordance with the requirements of the Explosives Regulatory Division of NRCan.

2.13.6 Fire Protection Systems

The design of the fire protection system is based on typical practices at northern Canadian mining operations and applicable codes and regulations. Designs are consistent with those of the Snap Lake and Victor diamond projects.

The process plant, service complex, accommodations complex, power plant, water treatment plant, and utilidors will be equipped with a pressurized, wet fire suppression system. In addition, a wet/foam system will be provided for the fuel storage facility. Conveyor galleries exposed to sub-zero temperatures will be protected with dry sprinkler systems. The firewater loop around the fuel tanks will be re-circulating for added protection against freezing.

Fire suppression water will be stored in the freshwater storage tank adjacent to the water treatment plant. A modular, pre-fabricated firewater pumphouse, including electric and diesel-fired pumps, will be located adjacent to the plant to provide fire suppression water to the facilities identified above. The enclosure will also include storage for auxiliary firefighting equipment.

2.13.7 Site Roads

Site roads for construction and operations vehicles will be constructed of compacted granular fill material over general fill. Mining vehicles will normally operate on dedicated roads between the open pits, waste rock pile, and PKC facility.

Road grades will generally be limited to 8%. The plant site roads will be two lanes, each 4 m wide with 1 m shoulders for a total width of 10 m. Where suitable (e.g., for service roads), roads will be single lane, 4 m wide with 0.5 m shoulders for a total width of 5 m. Road sections will have a 2% crown slope. Turning radii will be a minimum of 15 m.

Laydown areas will be provided for both construction and operations use. The areas will be levelled and topped with 600 mm of granular material.

Site roads are shown on the plant site layout (Figure 2.11) in green.

2.13.8 Winter Road

Similar to other mining operations in the region, the Gahcho Kué site will be accessed on an annual basis via winter road. This road will be in operation typically from late January or early February through March and, under favourable conditions, into early April.

The trucking route will follow the Tibbitt-to-Contwoyto Winter Road north from the end of the Ingraham Trail (Km 0), east of Yellowknife. A 120-km long winter access road spur off the north end of Mackay Lake will be constructed each year to connect the Gahcho Kué site to the Winter Road at Km 271, just north of Lake of the Enemy. The Tibbitt-to-Contwoyto Winter Road is operated under a Licence of Occupation by the Joint Venture Partners who operate the Ekati, Diavik, and Lupin mines.

The Gahcho Kué spur road will be constructed and operated in accordance with practices outlined in the licence, with appropriate plans for updates and improvements.

As shown on Figure 2.3, the main access to the site from the winter road spur will be at a point on the northeast shoreline of the West arm of Kennady Lake. The access road will continue on land from this point to the plant site. Located along this stretch of road will be the truck staging area, where the trucks will be dispatched to the appropriate unloading area on site. This will help minimize congestion between unloading activities and regular site operations during the winter road access period.

Figure 2.12 shows the winter road access for the proposed project. The annual Tibbitt-to-Contwoyto Winter Road is demarcated, as is the new winter access road spur that will be constructed between the junction at Lake Mackay and the Gahcho Kué site. Figure 2.13 shows the winter access routes to local eskers.

2.13.9 Airstrip

The site can be accessed year-round by aircraft, except when the lake is freezing or thawing. A 45 m wide x 1,620 m long airstrip will be constructed to accommodate C-130 Hercules and 737-200C aircraft with payload restrictions, plus other smaller aircraft that service the area.

2.13.10 Camp / Accommodations

Construction Camp

The construction camp will have a dormitory capacity for up to 400 persons, and a kitchen and recreational facilities for up to 650 persons. Both the dormitory and core facilities will be of fully modular construction.

The permanent incinerator, potable water, firewater, and sewage treatment modules will be utilized to service the construction camp. Electrical power to the construction camp will be provided from the standby generators.

Office trailers will be located next to the construction camp core facility for use as part of the Owner's construction office.

Accommodations Complex

The accommodations complex design will be similar to that of Snap Lake, with three dormitory wings attached to a central core complex. The entire complex will be supported on steel pipe piles, and will be connected to other buildings by means of heated and insulated utilidors. An incinerator will be attached to the complex so that food waste does not have to be taken outside.

Figure 2.12: Gahcho Kué Project – Winter Road Route

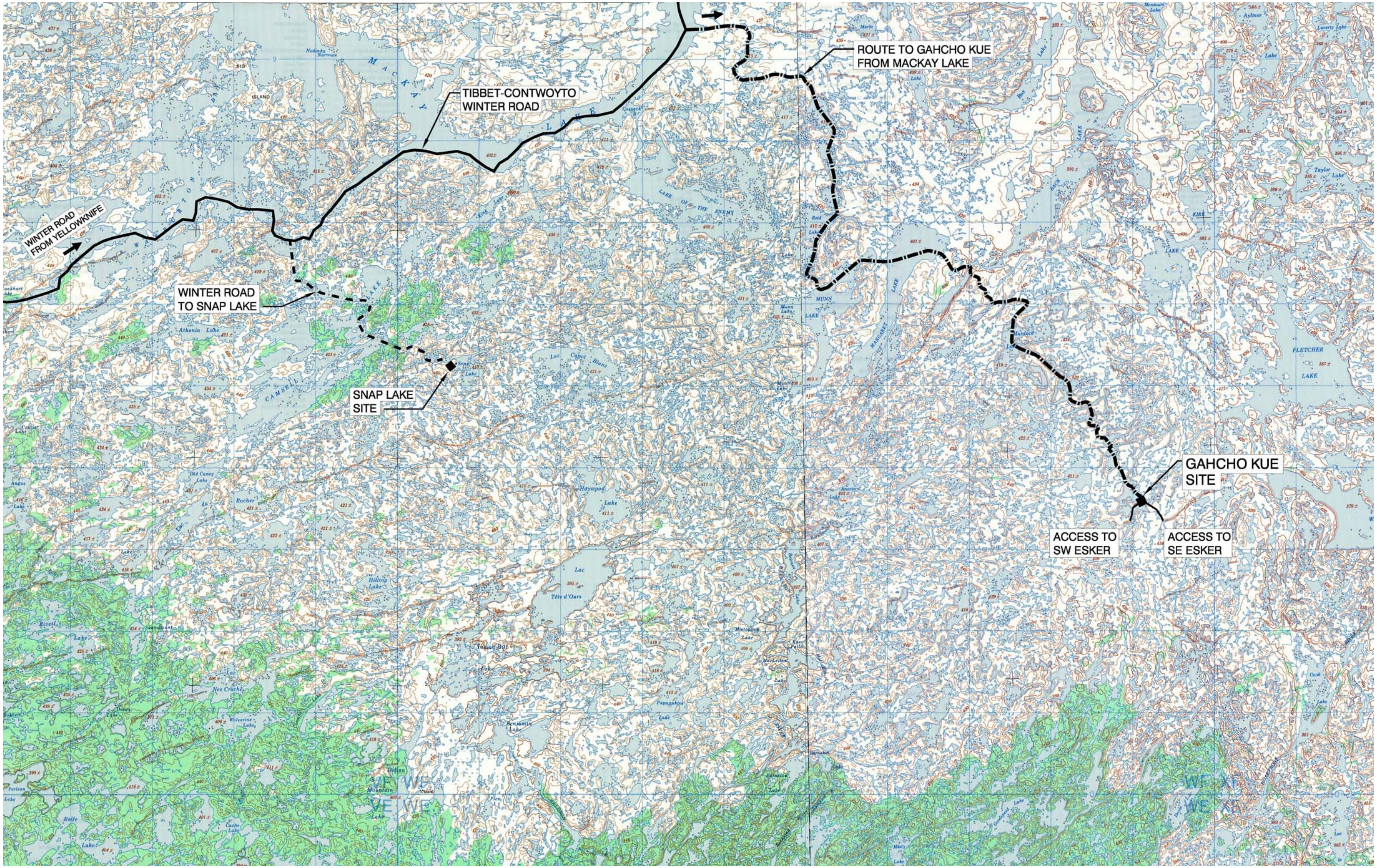
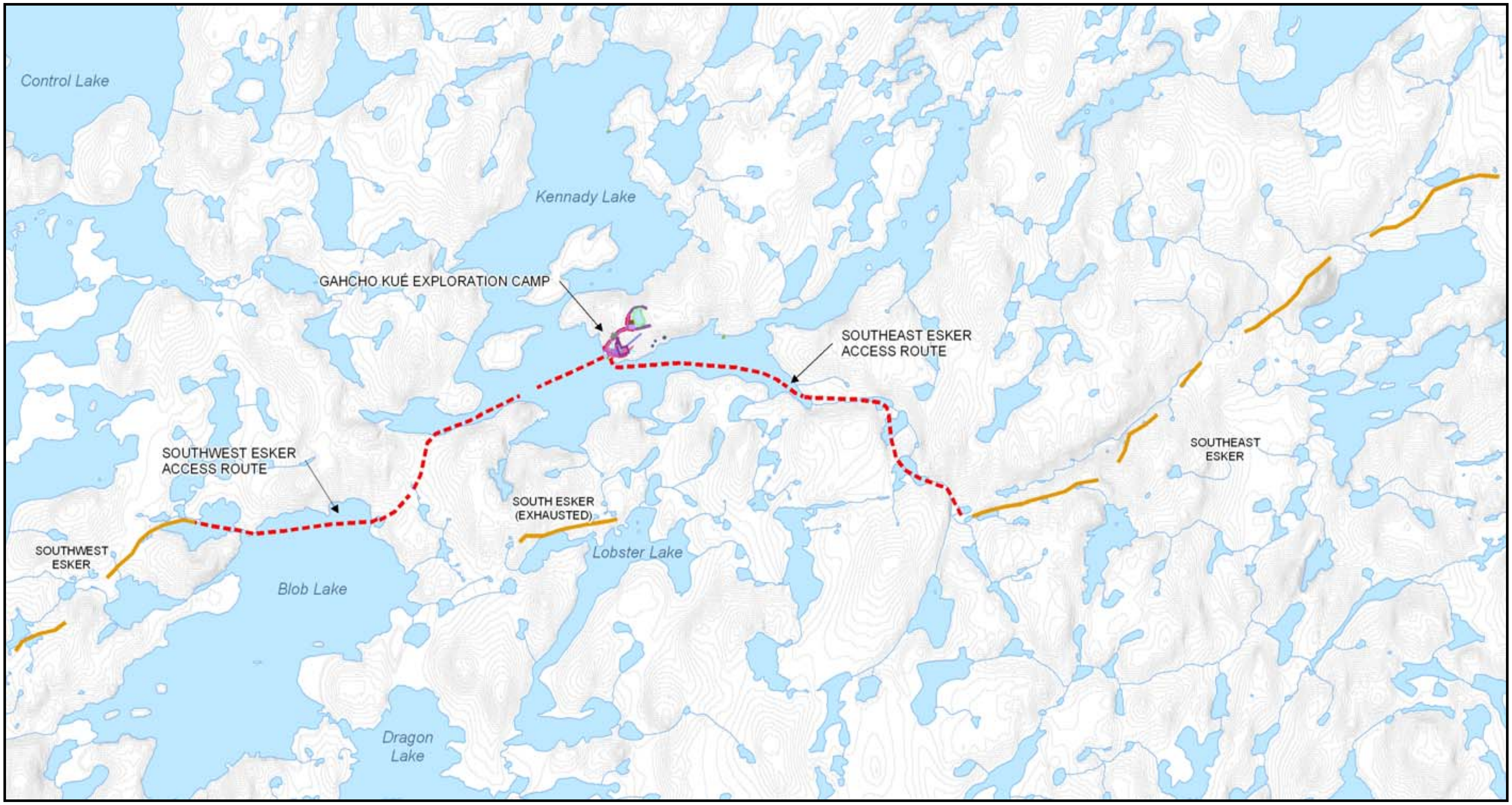


Figure 2.13: Esker Locations and Access Routes



2.14 HUMAN RESOURCES

Up to 600 people may be employed (direct and contractor) during construction of the Gahcho Kué mine. The peak total number of persons employed full-time at the site and in Yellowknife will be in the range of 350 to 400. The work force will include the following main functions:

- *Management* – Gahcho Kué and Snap Lake will be managed as a mining unit, with a common general manager and Yellowknife-based support team. Where possible, work and management will be shared in areas such as human resources, public relations, logistics, purchasing, finance, administration, and environmental issues, as well as office and off-site support costs.
- *Mineral Resource Management (MRM)* – This group is responsible for continuous evaluation of the mining plan in terms of mining blocks, ore depletion, and pit design. They are also responsible for developing the long-term mining plan, as well as determining the day-to day activities of the mining team.
- *Mining* – The mining department mines the orebody according to the plan provided by MRM. Each day's production will be delivered to the processing plant. To achieve the required daily call, the mining department must ensure that vehicles and equipment are serviced and maintained in the following areas:
  - drilling, charging, and blasting
  - loading ore into trucks
  - trucking the ore to the plant primary section
  - delivering ore that is within the size specifications for the primary crusher
  - maintaining site mobile equipment, including both heavy equipment and light vehicles.
- *Processing* – The process group is responsible for day-to-day plant operations, and for maintaining the plant to the design availability and utilization (or better). From a maintenance perspective, the process group must deal with breakdowns, planned maintenance, and routine calibration and testing of equipment.
- *Site Services* – The site services group is responsible for ensuring that structures are physically sound, and that related functions, such as air conditioning, water supply, and plumbing, are working properly. This responsibility extends to office and residential quarters required for mine personnel. Implementation of the catering contract will be through this department. The maintenance group also oversees fuel and equipment stores and waste disposal. They maintain roads and buildings and operate and maintain the following ancillary facilities:
  - powerhouse
  - water, fuel, and lubricant handling
  - water and sewage treatment
  - airstrip
  - accommodations.

- *Safety Health and Environment* – The primary responsibility of the Safety, Health and Environment group is the proper implementation of the safety, health, and environmental management system. This ensures the compliance with regulations, the implementation of best practices and required monitoring, and auditing to ensure plans are implemented accordingly and opportunities for improvement are acted upon. A key activity is the education and training of all site workers regarding the SHEMS, and informing them of their responsibilities as individuals to ensure high safety, health and environmental performance. All environmental monitoring commitments are conducted under their supervision.
- *Protective Services* – The primary responsibility of protective services is to control and monitor access to the various areas of the mine according to security risk levels. Protective services are responsible for ensuring the integrity of the security systems.

2.14.1 Shift Schedule

The proposed shift schedules for the mine, which are outlined below, will be flexible and will follow general practice for diamond mines in the NWT:

- a three-week-in / one-week-out schedule for construction personnel
- a two-week-in / two-week-out schedule for operations personnel (two 12-hour shifts per day)
- some site management and supervisory positions will work four days on / three days off.

Yellowknife-based employees will work five days per week for a weekly total of 40 hours. Contractor work schedules may vary within the limitations of NWT labour requirements.

2.14.2 Training Program

Training programs provided at Gahcho Kué will be consistent with those at Snap Lake and will include the following key areas:

- literacy programs
- on-site learning centre to encourage and facilitate employees to further their educational background and skills development
- partnered long-term employment training programs (with the Government of the Northwest Territories (GNWT), the Federal government, local learning institutions such as Aurora College, and potentially other mining companies)
- pre-employment upgrading in cooperation with appropriate agencies in primary communities
- active support for the existing GNWT mining job apprenticeships training programs
- on-site and community job-specific training.

When the Snap Lake and Victor mines reach full operating capacity, they will be used to train key staff for Gahcho Kué. A progression plan will be used to identify personnel from Snap Lake and Victor who can be transferred to Gahcho Kué or can be advanced to fill vacated positions at the Snap Lake and Victor mines. This plan will ensure that adequate training is provided in a timely manner to existing personnel.

2.15 SAFETY, HEALTH, AND ENVIRONMENTAL MANAGEMENT

De Beers will ensure that the highest practicable standards of safety, health, and environmental management are applied during all phases of the Gahcho Kué project. High standards will be achieved by implementing a rigorous management system that integrates a safety and health component with an environmental component.

The integrated system is referred to as the Safety, Health, and Environmental Management System (SHEMS); individual components are the Safety and Health Management System (SHMS) and the Environmental Management System (EMS).

De Beers has chosen an integrated system because of inherent overlap (i.e., actions taken to protect workers' safety and health often protect the environment as well). For example, the specific instructions of a vehicle refuelling procedure contain elements that protect both the environment (e.g., prevents a spill), as well as worker health and safety (e.g., reduces exposure of skin to fuel).

2.15.1 The Safety and Health Management System

De Beers strives for excellence in safety and health management at all mines, projects, offices, and sites. To achieve this goal, De Beers will develop and implement a Safety and Health Management System for the Gahcho Kué project that conforms to the OHSAS 18001 standard. The Safety and Health Management System is a formal mechanism to achieve high standards in safety and health management and defines specific procedures and instructions that will be followed when performing certain tasks.

Appropriate training and other resources will be available to ensure that workers at Gahcho Kué are properly equipped to perform their work. The system will be audited regularly to ensure compliance and continual improvement.

2.15.2 The Environmental Management System

As part of its corporate policy, De Beers will continue to maintain certification in the internationally recognized ISO 14001 environmental management standards for all of its operations. This policy applies to the Gahcho Kué project. Snap Lake was the first mine in the NWT to be ISO 14001 registered and will be the first project to be constructed under an ISO 14001 registered EMS. The EMS for Gahcho Kué will be based on the Snap Lake EMS, with appropriate site-specific differences. The lessons learned at Snap Lake will be incorporated into environmental management practices.

There are three key elements of the ISO 14001 standard that must be met to maintain registration:

- legal compliance (i.e., obey all legal instruments, including the Water Licence)
- pollution prevention
- continual improvement of the management system to achieve better environmental performance.

The environmental management system provides the methods through which these objectives are achieved.

The Gahcho Kué project presently maintains and implements an ISO 14001 EMS that was developed for the Exploration Division. A project-specific EMS will be developed prior to construction in conjunction with the environmental assessment and permitting process. The EMS will outline how the project will be managed to minimize its impact on the biophysical environment and to continually improve its environmental performance. The EMS will also set out management and emergency plans for all key areas of the environment, and will be updated to reflect the level of activities being undertaken during construction, operations, and closure.

The EMS will include a variety of programs that have a specific area of focus (e.g., energy use), as well as procedures that provide specific instructions on how an activity is to be carried out (e.g., vehicle refuelling). Regular internal and external audits will be undertaken to ensure that the management system is being implemented, that opportunities for improvement are being acted upon, and that the ISO 14001 standard is being met.

Environmental Management

De Beers anticipates that regulatory approvals will include a variety of environmental management plans that must be implemented. In general, these plans will be implemented through the EMS. De Beers will use their experience and track record gained from the Snap Lake project to assist in ensuring the Gahcho Kué project meets similar high standards. Where possible, synergies will be developed between both projects to rationalize management and standards. Examples of management plans include:

- Spill Contingency Management Plan
- Emergency Response Management Plan
- Domestic Waste and Sewage Management Plan
- Hazardous Materials Management Plan
- Water Management Plan
- Quarry Management Plan
- Mine Closure and Reclamation Plan
- Wildlife Management Plan
- Quality Control/Quality Assurance Plan.

Environmental Monitoring

De Beers anticipates that the environmental assessment and regulatory process will determine the need for a variety of environmental monitoring plans. In general, these plans will be implemented through the EMS. Examples of monitoring plans that could be required and would be included in the EMS are as follows:

- Surveillance Network Program (a monitoring component of the Water Licence)
- Aquatic Effects
- Wildlife Effects.

Contingency Planning

It is De Beers' policy that appropriate safety, health, and environment policies and programs are developed, implemented, and monitored by management. Management is also responsible for preparing and updating plans for managing potential emergencies.

Contingency planning is inherently a component of a management system in that risks are assessed and regularly reviewed on an ongoing basis, and plans and procedures are revised accordingly. All of the management plans listed above include a component of contingency. Specific contingency plans include a Spill Contingency Plan and an Emergency Response Plan.

Emergency response plans will include the following:

- Site Emergency Response Plan
- Emergency and Fire Evacuation Procedures for all site facilities
- Fire Procedure Management duties for site facilities
- Underground Mine Emergency Response Procedure (in the event that one or more pits are mined underground at the end of pit life)

In addition, the most recent version of the Tibbitt-Contwoyto Joint Venture Winter Road Contingency Plan would be adopted for the winter access road that will be constructed from the junction at Mackay Lake to the Gahcho Kué site.

2.16 RECLAMATION AND CLOSURE

2.16.1 Objectives

The proposed development plan for the Gahcho Kué project evolved through a number of iterations, all of which included final closure and reclamation as an integral part of the planning process. The primary objective was to ensure that the project can be closed and reclaimed using available technology in order to minimize its lasting environmental impact and allow disturbed areas to return to productive fish and wildlife habitat as quickly as possible. Key factors taken into consideration include: (1) minimizing the footprint of the project to reduce the amount of land and water disturbed that will require reclamation; (2) reclaiming disturbances as soon as possible so that as much of the site as practical can be reclaimed during the operational mine life; and (3) designing, operating, and closing out the project facilities in a manner that eliminates, where practical, the need for long-term active care outside of performance monitoring.

A conceptual reclamation plan was developed to meet the following short- and long-term objectives. Short-term objectives include:

- progressively reclaim disturbed areas as soon as they are no longer active
- minimize the risk and impact of water erosion and sediment transport
- create physically and chemically stable slopes
- restore natural drainage pathways as soon as practical
- cover disturbed ground to prevent soil erosion and dust.

Long-term objectives include:

- minimize the amount of care and maintenance required on site once reclamation is complete (i.e., strive to achieve a site that requires no ongoing active management outside of monitoring)
- restore productive fish habitat to equal or better quality than its pre-mining condition
- maintain or improve the level of wildlife habitat
- to the extent practical, create an aesthetically pleasing environment
- monitor the reclamation plan for effectiveness and make revisions as necessary.

The reclamation and closure schedule is based on a 17-year mine life. Table 2.3 lists the significant reclamation and closure activities by year, assuming start-up in 2011 and cessation of mining in 2026. Further planning and modelling will determine the best way to reclaim the PKC impoundment and minimize the re-handling of waste rock at the end of mine life.

Table 2.3: Conceptual Reclamation and Closure Schedule

Activity	Date
Progressive reclamation of 5034 open pit commences	2020
Closure and progressive reclamation of the PKC facility commences	2020
Progressive reclamation of Hearne open pit commences	2022
Last year of active mining	2nd Q 2026
Remove explosives storage and manufacturing facilities	2026
Remove process plant and service shop	2026-27
Remove main power plant	2027
Demobilize main fuel storage tanks	est. 2027
Remove permanent accommodation complex	2027
Reclaim airstrip and site roads	2027
Reclaim quarries	2026
Breach dyke A	est. 2047
Final demobilization from site	est. 2047

2.16.2 Closure and Reclamation

Over the mine life, the project will produce the following mine wastes:

- waste rock: projected total of 308 Mt
- waste overburden: till and lake bottom sediments, projected total of 8 Mt (wet)
- processed kimberlite: projected total of 30.1 Mt, of which 65.6% on average will be fine processed kimberlite and 34.4% coarse processed kimberlite.

Mine waste structures developed on land will include a single waste rock pile to the west of Kennady Lake near the Hearne pit, and the on-land PKC facility northeast of the plant site. These facilities will receive all waste rock and processed kimberlite for the first nine years of mine life except for the first year of fine processed kimberlite, which will be stored in the Southwest PKC facility. During the ensuing seven years, all waste rock will either be used to close out the on-land PKC facility or to backfill the mined-out open pits. Processed kimberlite generated during this period will be co-disposed with waste rock in the mined-out open pits.

Final closure and reclamation will begin with mobilization of contractor forces and equipment on the next available winter road following permanent shutdown of site operations. The mine life is expected to be approximately 15 years, with mining operations ceasing in 2026. The decommissioning phase (removal of the site buildings) will then take place over the next two years (2026 and 2027). Re-flooding of the drawdown portion of Kennady Lake is estimated to take 21 years (through 2047), after which it is expected that no further site reclamation activity will be required. Post-closure environmental performance monitoring will likely continue for an estimated 26 years after the cessation of mining (through 2052), with the actual timing being a function of when it can be demonstrated that all reclamation objectives have been achieved.

Open Pits and Waste Rock Pile

Processed kimberlite and waste rock will be backfilled in mined-out pits as they become available. This will allow for progressive reclamation and closure of the on-land PKC facility and waste rock pile starting in Year 10 (2020). Closure of the on-land waste pile will involve contouring and regrading to 22°, with construction of caribou access ramps.

Overburden directed to the waste pile will be used to encapsulate potentially acid-generating rock and/or barren kimberlite. Overburden will also be used to construct berms for the runoff collection ponds within the exposed lakebed, and to regrade the lakebed to manage runoff.

Starting in Year 10 (2020), processed kimberlite will be placed into the pits along with backfilled waste rock. Fine processed kimberlite will be pumped in slurry form, and coarse processed kimberlite will be transported by truck and dumped. Water will not be reclaimed from the pits to the plant during this phase. Instead, the slurry water discharged with the processed kimberlite will accelerate the refilling of Kennady Lake, and so represents a form of progressive reclamation.

Process water will be drawn from other contact water sources on site. The Hearne and 5034 open pits will be backfilled during the mine life.

Kennady Lake

At closure, catchments A, B, and D of Kennady Lake will be re-flooded by allowing the natural drainages to return flow into these drawdown basins. During this period of re-flooding, the eastern basin (basin 5) will receive only its own natural catchment outflow, approximately 25% of base outflow rates and volumes. The time required to refill Kennady Lake back to its pre-development lake level is estimated at 21.4 years, at which point dyke A will be breached. If some site runoff has to be directed to basin 5 to supplement fisheries flows, the time needed to refill and restore Kennady Lake will be extended.

Based on recent discussions with DFO and ongoing environmental planning, we are currently investigating the possibility of refilling Kennady Lake by pumping from other nearby watersheds. This includes watersheds to the west and south of Kennady Lake.

Detailed drawings of the proposed water management system are provided in Appendix B.

Southwest PKC Facility

The Southwest PKC facility will be operated only during the first year of mine life (2011) while the on-land PKC facility is being constructed. The Southwest PKC facility will be closed out and reclaimed by the end of 2016 by extending the on-land waste rock pile over top of the Southwest PKC facility. Through this action, a layer of 5 to 20 m of waste rock will be placed over the fine processed kimberlite. This cap is expected to freeze over the long term, confining the active layer to the cap. There will be significant and uneven settlement of the waste rock cover following its placement; however, as the cover will be placed early in the mine life, there will be ample time to monitor and regrade any particularly low spots that develop due to differential settlement.

On-Land PKC Facility

Reclamation of the on-land PKC facility will begin in Year 10 (2021) when coarse processed kimberlite production will be used to cover the exposed fine processed kimberlite surface, followed by a 5 to 20 m thick waste rock layer from the Tuzo pit. Reclamation of the on-land PKC facility will be completed by about the end of 2024 (Year 13), when the processed kimberlite will be entirely encapsulated in waste rock. Once the waste rock cap is complete, the surface will be regraded and contoured to achieve drainage and aesthetic objectives.

Revegetation Considerations

It is anticipated that there will not be sufficient quantity of soil from pre-production stripping to cover the on-land waste rock pile and PKC facility. At present, it is planned to leave the capped, on-land waste rock pile and PKC facility in an unvegetated state, so that migrating caribou and other wildlife are not attracted to these areas.

Removal and Disposal of Buildings, Machinery, Equipment, and Infrastructure

Prior to demolition, all buildings and equipment will be inspected to ensure that potentially hazardous materials have been identified correctly and flagged for appropriate removal and handling. All equipment will be drained of fluids and cleaned to ensure that potentially hazardous materials are not placed within the inert demolition landfill site.

Non-salvageable and non-hazardous components from demolition of the site buildings, structures, and equipment will be dismantled, washed if necessary, and deposited in an inert materials landfill in a depression left for this purpose within the waste rock pile. The deposited materials will be covered with a layer of non-reactive waste rock that is sufficiently thick to prevent frost from heaving these materials to surface in the future.

At demolition, salvageable equipment and hazardous materials will be dismantled and demobilized from site. Equipment will be cleaned, drained, and degreased as required before transport. Any hazardous materials stored within equipment or facilities will be removed and prepared for off-site transport to a licensed disposal facility in accordance with NWT and Federal regulations and guidance.

Transportation Corridors and Airstrip

All site roads not required for post-closure maintenance and monitoring will be decommissioned and reclaimed at the end of the decommissioning phase; the rest will be reclaimed at the end of post-closure monitoring. Post-closure access to the site will be primarily by aircraft.

The airstrip will be reclaimed near the end of the decommissioning phase of the project. Lighting, navigation equipment, and culverts will be removed, and contouring will be done to eliminate potential hazards to wildlife. Reclamation will involve scarifying and loosening the surface to encourage natural revegetation. Where erosion or sedimentation is a concern, the surface will be recontoured. Culverts or stream crossing structures will be removed and natural drainage re-established.

Waste Petroleum Products, Chemicals, and Explosives

Fuel Storage Tanks – Before dismantling the permanent tanks, all remaining inventory will be withdrawn. Steel plate sections and distribution system components will be washed and disposed of in the inert demolition landfill, pursuant to regulatory approval. Sludge from the cleaning process will be incinerated on site or moved off site for disposal through a licensed disposal facility. The containment berm and liner materials will be removed and the area will be regraded. Any fuel required for power generation, demobilization activities, and post-closure monitoring will be drawn from portable Envirotanks.

Explosives – All explosives will be removed from the site by qualified contractors and handled only by certified employees in compliance with the Federal *Explosives Act* and the NWT *Mine Health and*

Safety Act and Regulations. Once infrastructure and explosives have been removed, the sites will be cleaned and reclaimed as described above for other buildings.

Ammonium Nitrate Storage – Any remaining ammonium nitrate at the end of mining will either be returned to the supplier or transferred to another licensed user. The ammonium nitrate storage facilities will be pressure-washed and inspected. Potentially hazardous materials will be removed and packaged for safe, off-site disposal. Salvageable equipment and material will be removed, and the remaining equipment and buildings will be dismantled, demolished, and disposed of in the inert demolition landfill.

Emulsion Plant – The emulsion plant will be decommissioned, cleaned, and demolished in the same way as the ammonium nitrate storage building.

Cap Magazines – The remaining inventory of explosives caps will be returned to the supplier or transferred to another licensed user. The cap magazines will be decommissioned, cleaned, and either removed from site for salvage or demolished in the same way as the ammonium nitrate storage building.

Water Treatment Plant

The water treatment plant will continue to operate until the combined contact water directed to basin 1 meets water licence standards for discharge without further treatment. Given the planned progressive reclamation of the waste rock pile and PKC facility, this is expected to occur within one year of the end of mining. Once the water treatment plant is no longer required, it will be cleaned and demolished using the same procedures described for the process plant.

Testing and Disposal of Contaminated Soil

The potential for ground contamination at various facility sites will be assessed. This will include the airstrip de-icing area and fuel storage pad, fuel tankfarm, process plant, power plant, accommodations complex, service complex, waste management facilities, and storage facilities. Soils in these areas will be sampled during decommissioning and analyzed for contaminants such as hydrocarbons and glycol. Any contaminated soils will be excavated and either encapsulated permanently in a secure area, treated on site to an acceptable standard, or stored in appropriate sealed containers for off-site shipment and disposal.

Basin 1 of Kennady Lake

Dyke A will be breached once lake levels are restored and all water meets the discharge criteria set out in the water licence. With reclamation of the waste rock pile and PKC facility occurring well before the end of mining, basin 1 is expected to need treatment for only one year after major demolition and removal of the site buildings.

All ditches, except those in bedrock, will be removed. Ditches in bedrock will be stable for the long term, and removal would cause additional disturbance. As required, ditches will be blocked or breached to assure that water courses become re-established in their pre-mining patterns.

2.16.3 Post-Closure Monitoring

Closure and reclamation of the project buildings is expected to be complete by the end of the second year after the shutdown of mining and processing. The Kennady Lake dykes cannot be removed until the open pits and the drawdown part of the lake have been re-flooded to pre-disturbance levels. This is expected to take approximately 21 years. There will be no regular activity and no full-time staff on site during this time; however, environmental monitoring will continue.

The level of monitoring required will be a function of environmental performance at the site. At present, it has been assumed that post-closure environmental monitoring will continue for approximately 26 years.

Figure 2.14 shows a computer-generated rendering of project site after reclamation and late restoration.

Figure 2.14: Gahcho Kué Site after Lake Restoration