

**Draft Terms of Reference for the
Environmental Assessment of
Dominion Diamond Ekati Corporation's
Jay – Cardinal Project**

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1. Introduction

1.1 Overview

This document outlines the information required for the environmental assessment of the Jay – Cardinal Project (also referred to as the “Project”), specifically the initial open pit mining and subsequent underground development by Dominion Diamond Ekati Corporation (DDEC or “the developer”) of the Jay and Cardinal kimberlite pipes. The proposed Project is an extension project to the existing Ekati Mine and the development of these pipes will rely on the mining infrastructure located at the existing Misery site and will provide feed to the processing plant at the Ekati mine site. These facilities are within the Wek’eezhii Settlement Area and the project is anticipated to provide an additional 10 to 20 years of mine life. This document is divided into the following sections:

- Section 1 – Introduction, including the reasons for environmental assessment referral, the legal context, and the *Terms of Reference* development process;
- Section 2 – Description of the scope of the development and the scope of the assessment, including minimum geographic and temporal boundaries for consideration of impacts¹ of the proposed development on valued components of the biophysical and human environments;
- Section 3 – The *Terms of Reference* that will direct the production of a *Developer’s Assessment Report*; and,
- Appendices (Appendix A: Scope of Development and Appendix B: Guidelines for Monitoring and Management Programs).

The *Terms of Reference* will direct the developer to organize existing material, and conduct additional study and analysis as appropriate, in order to submit a “stand-alone” *Developer’s Assessment Report*. That report will then be used to inform all interested parties concerning the proposed development during the analytical phase of the environmental assessment².

1.2 Referral to Environmental Assessment

DDEC has applied to develop two open pit mines in order to extract the Jay and Cardinal kimberlite pipes, noting the possibility of further mining underground later in the mine life. The pipes are located within Lac du Sauvage in the southeastern portion of the Ekati mine block. The kimberlite would be processed at the existing Ekati processing plant, which is approximately 25 km north of the proposed Project site and approximately 150 km east of the community of Wekweéti.

In October 2013 the Wek’eezhii Land and Water Board received applications for a Type A Land Use Permit (_____) and a Type A Water Licence (_____) for the Jay–Cardinal Project. A Project Description of the proposed development extension was submitted by the developer as part of its application. The Wek’eezhii Land and Water Board initiated a preliminary screening

¹ Any reference to “impact(s)”, “change(s)”, “effect(s)” and similar words in this document refers to “projected-related deviations from baseline conditions for a valued component”.

² The role of the Developer’s Assessment Report and associated next steps in the environmental assessment are identified in the Work Plan issued by the Review Board as a companion document to the Terms of Reference.

of the Jay–Cardinal Project according to Section 124 of the Mackenzie Valley Resource Management Act (MVRMA).

On _____, the Mackenzie Valley Land and Water Board referred the project application to _____ under paragraph 125(1)(b) of the MVRMA. The Mackenzie Valley Land and Water Board referred the project to environmental assessment

_____. Key areas identified where impacts may occur were: _____

The Review Board notified DDEC on _____, that the development had been referred to _____.

1.3 Legal Context and the *Terms of Reference* Development Process

This environmental assessment is subject to the requirements of Part 5 of the *Mackenzie Valley Resource Management Act (MVRMA)*. Section 3 of the Review Board’s *Environmental Impact Assessment Guidelines* describes the environmental assessment process in detail. That document, as well as the Review Board’s *Rules of Procedure*, other guidelines, reference bulletins, and relevant policies applicable to this assessment are available online (www.reviewboard.ca) or by contacting the Review Board staff.

In accordance with Section 115 of the *MVRMA*, the Review Board must conduct an environmental assessment of the proposed development with regard for the protection of the environment from significant adverse impacts, and the protection of the social, cultural and economic well-being of Mackenzie Valley residents and communities. Subsection 114(c) of the *MVRMA* further requires the Review Board to ensure that concerns of the Aboriginal peoples and the general public are taken into account. Accordingly, the Review Board has developed these *Terms of Reference* based on an examination of information from the following sources:

- _____;
- All information on the public registry in relation to the Jay–Cardinal Project;
- _____;
- _____;
- _____;
- _____: and,
- Review Board experience in the conduct of environmental assessment.

2. Scope Considerations

2.1 Scope of Development

Under Subsection 117(1) of the *MVRMA*, the Review Board determines the scope of development for every environmental assessment it conducts. The scope of development consists of all the physical works and activities required for the Project to proceed. Appendix A outlines a minimum listing of project components for the scope of development for this environmental assessment.

Within this document the term “Jay–Cardinal Project”, “Project”, “development”, or all other related words collectively represent the project components, activities, or structures that are required to undertake the development of the Jay and Cardinal kimberlite pipes that have not been previously assessed as part of the *NWT Diamond Project Report of the Environmental Assessment Panel dated June 1996 or the Report of Environmental Assessment on the Proposed Development of Sable, Pigeon, and Beartooth Kimberlite Pipes February 2001*. Where this document refers to the “Jay – Cardinal site”, that means the area covered by Ekati’s mineral claims and mining leases at, adjacent to, or near Lac du Sauvage.

In the *Developer’s Assessment Report* (see Section 3.2.5) the developer is required to fully describe all required facilities and activities for the development, including any not listed in Appendix A. The new facilities, infrastructure, and activities proposed as part of the Ekati Diamond Mine extension must be described for all phases of the Project: construction, operation, and closure. Details on changes, if any, to existing facilities, infrastructure, or activities to accommodate the Project must also be provided. The Review Board may amend the scope of development at any time during the environmental assessment if the proposed development changes.

2.2 Scope of Assessment

The scope of assessment defines which issues will be examined in the environmental assessment. The scope of assessment includes all potential impacts on valued components of the biophysical and human environment (for example, wildlife species or heritage resources) from the development, by itself and in combination with other past, present and reasonably foreseeable future developments (see Section 3.3.4 for details).

To determine the scope of assessment, the Review Board considered the Jay–Cardinal Project Description and the public registry documents from _____, and _____.

The Review Board also hosted scoping sessions in _____.

2.3 Geographic Scope

The geographic scope will include all areas that may be affected by activities within the Jay–Cardinal Project scope of development. The geographic scope for each valued component must be appropriate for the characteristics of the component, or the impact and nature of the impact source. For example, consideration of impacts on air should reflect the airshed, wind patterns and

mobility of airborne contaminants, while the habitat ranges of wildlife using the area may be relevant from a project specific and cumulative effects perspective. All of these areas together will be considered in the environmental assessment study area, which will be further defined by the developer in its Developer's Assessment Report (see Section 3.2.3). The developer will provide rationale for the spatial boundaries it selects for the assessment of potential mine-related impacts on each valued component.

The minimum geographic scope will include the following areas:

1. The Ekati mine's mineral and surface leases and mining claims in the area of the Jay – Cardinal site, sub-surface working, and reasonable impact footprint radius centered on the site;
2. The Jay – Cardinal site access road connecting the site to the Misery Haul Road and the Jay-Cardinal site roads, as well as a reasonable impact footprint corridor, including any portions of watercourses that may be affected;
3. The Paul Lake watershed, the drainage area of Lac du Sauvage, the outflow from Lac du Sauvage to Lac de Gras, and to the point where reasonably foreseeable Project-related impacts cease to occur;
4. Any watershed into which discharge water will be released and downstream to the point where reasonable foreseeable Project-related impacts cease to occur, including those on water quality, fisheries, and the human environment;
5. Any underground aquifers leading to Lac du Gras from the Jay–Cardinal mine; and,
6. The habitat of any potentially affected species, including species-at-risk and migratory species, possibly affected by the Project.

The geographic scope of assessing impacts to the human environment includes the First Nations, Métis, and Inuit organizations in the communities of Gameti, Wekweeti, Behchoko (formerly Rae-Edzo), Yellowknife, Dettah, N'idilo, and Lutsel K'e, and the Wek'eezhii Settlement Area as a whole and those residents in or making traditional use of any part of the environmental assessment study area. This also included the community of Kugluktuk, Nunavut. Together, these groups are described in this document as "potentially-affected communities".

In its response to Section 3.2.3 the developer is required to define and provide rational for the specific spatial boundaries it used to examine the potential impacts on each of the valued components in its impact assessment.

2.4 Temporal Scope

The developer will use temporal boundaries for this environmental assessment according to potential long-term impacts on valued components, rather than on a single generic timeline. In all cases, the temporal boundary may not end with the duration of the operating phase of the Jay–Cardinal Project.

For project-specific (that is, non-cumulative) impacts, the temporal scope will include all phases of the Jay–Cardinal Project lifespan including construction, operation, closure and reclamation, and extends until no potentially significant adverse impacts are predicted. For cumulative impacts, the temporal scope includes the period of the effects of past, present and reasonably

foreseeable future projects that are predicted to combine with the impacts of the Jay – Cardinal Project.

The developer will place special focus on the consideration of time during the development when activities are particularly intense (such as during the initial construction phase) or when valued components are particularly sensitive to potential impacts (such as during wildlife migration periods, or spawning and incubation periods for fish, key harvesting periods, and annual cultural gatherings). The developer will also give special attention to appropriate temporal boundaries for considering any impacts that may require long-term monitoring and management after closure, such as mine water release into the environment (see Section 3.3.2 for details on the subject).

In its response to Section 3.2.3 the developer is required to define and provide rationale for the specific spatial boundaries, it used to examine the potential impacts on each of the valued components in its impact assessment.

2.5 Other Scope of Assessment Considerations

The scope of assessment set out in these Terms of Reference may be re-examined at any time by the Review Board if new information emerges.

The scope of assessment will include an examination of cumulative effects. This will involve considering impacts from other past, present, and reasonably foreseeable future developments or human activities that combine with the impacts of the Jay–Cardinal Project to affect the same valued components. Such cumulative effects will be assessed at a spatial and temporal scale appropriate to the particular effect or valued component under consideration.

For example, road traffic in the area that is not part of the Project is excluded from the scope of the development. However, where the impacts and continuing effects of past activities may combine with the potential impacts of the Project, they must be considered in the cumulative effects assessment (see Section 3.3.4 for more detail).

Section 3.1 indicates the level of effort required in considering specific issues.

3. Terms of Reference

3.1 Considerations

The developer should consider the following when developing the specific material the Review Board requests in Sections 3.2 to 3.4 and related Appendices. The developer is encouraged to seek clarification from the Review Board in writing if specific requirements in the *Terms of Reference* are unclear. If the developer finds that an item cannot be addressed, the developer should provide a rationale.

3.1.1 Issues Prioritization

The purpose of scoping is not only to identify issues, but also to prioritize them and if possible focus required additional work on the most important issues. DDEC will consider all the items described in Section 3.3 because every issue identified in this *Terms of Reference* requires serious consideration and substantive analysis to demonstrate whether the development is likely to be the cause of – or contribute to – a significant adverse impacts.

Data collection and analyses for each discipline-specific assessment presented in the Developer's Assessment Report should be at a level of detail appropriate for other interested parties to understand the technical material prior to any technical sessions on these topics.

3.1.2 Incorporation of Traditional Knowledge

The Review Board values and considers both traditional knowledge and scientific knowledge in its deliberation. In addition, subsection 115(c) of the *MVRMA* provides as a guiding principle for the Review Board the importance of conservation to the well-being and way of life of the Aboriginal peoples of Canada to whom Section 35 of the *Constitution Act* 1982, applies and who use an area of the Mackenzie Valley. DDEC will make all reasonable efforts to assist in the collection and consideration of traditional knowledge relevant to the Jay–Cardinal Project. Where possible, DDEC will make all reasonable effort to incorporate traditional knowledge from Aboriginal culture holders as a tool to collect information on and evaluate the specific impacts required in this *Terms of Reference*. The developer should refer to the Review Board's *Guidelines for Incorporating Traditional Knowledge into the Environmental Impact Assessment Process*³ and community/culture group-specific traditional knowledge protocols.

3.1.3 Assessing the Impacts of the Environment on the Development

Potential impacts of the physical environment on the development, such as changes in permafrost regime, other climate change impacts, seasonal flooding and melt patterns, seismic events, geological instability, and extreme precipitation must be considered in each of the applicable items of this *Terms of Reference*. Any changes to the design or management of the Jay–Cardinal

³ Available at

http://www.reviewboard.ca/upload/ref_library/1247177561_MVReviewBoard_Traditional_Knowledge_Guidelines.pdf

Project as a result of considering potential impacts to the environment should be noted in the relevant sections.

3.1.4 Use of Appropriate Media

The Review Board encourages the developer to present information in user-friendly ways. The use of maps, aerial photographs, development component/valued component interaction matrices, full explanation of figures and table, and an overall commitment to plain language is encouraged. When it is necessary to present complex or lengthy documentation to satisfy the requirement of the *Terms of Reference*, the developer should make every effort to simplify its response in the main body of the text and place supporting materials in appendices. DDEC will also produce all electronic documents in *Adobe portable document format*.

The *Developer's Assessment Report* will be submitted as a stand-alone document. Relevant information and analyses from any previous project description should be incorporated into the *Developer's Assessment Report* and combined with the supplementary material and analyses required by this *Terms of Reference*. Further, any information referenced will be made accessible.

3.2 General Information Requirements

The *Final Terms of Reference* document describes the general information required on a subject-by-subject basis. The developer is encouraged to consider the information gaps identified and questions raised by interested parties on the public record in scoping submissions and comments on the *draft Terms of Reference* when determining the level of detail required in its *Developer's Assessment Report* for specific issues covered in this *Final Terms of Reference*.

3.2.1 Summary Materials

The following summary materials are required:

1. Plain language, non-technical summaries of the Developer's Assessment Report in English, Chipewyan, , Inuvialuktun, and Tlicho;
2. A concordance table that cross references the items in the *Terms of Reference* with relevant sections of the *Developer's Assessment Report*; and,
3. A commitments table listing all mitigation measures the developer will undertake, including but not limited to those described in the Project application. These should be organized by subject (e.g., water quality, wildlife) for ease of reference.

3.2.2 Developer

The following information is required regarding DDEC as well as its subsidiary companies, related corporations and joint venture partners:

1. A summary of the corporate history and operational experience in Canada and the Northwest Territories;
2. How the developer will ensure that its contractors and subcontractors honour commitments made by DDEC;
3. Environmental performance records for DDEC and its partners during prior exploration and development work in support of the Jay-Cardinal Project and any other projects in the

- Northwest Territories. This will include discussion of regulatory compliance (for example, regarding land use permits and water licences); and,
4. A description of any corporate policies, codes of practice, programs or plans concerning DDEC's environmental, sustainable development, community engagement, and workplace health and safety commitments or policies.

3.2.3 Developer's Assessment Boundaries

The developer will provide a description, map, and rationale for all of the chosen geographical and temporal boundaries used during its impact assessment. Certain minimum requirements and other instructions to assist in the determination of appropriate boundaries are discussed in Section 2.2 of the *Terms of Reference*. Separate boundaries may be required for cumulative effects assessment (see Section 3.3.3).

The developer will describe and provide rationale for:

- An overall environmental assessment study area and the rationale for its boundaries;
- DDEC's chosen spatial boundaries for the assessment of potential impacts for each of the valued components considered; and,
- The temporal boundaries chosen for the assessment of impacts on each valued component.

3.2.4 Description of the Existing Environment

A detailed description of the existing environment is required, including current status and trends for all valued components. Wherever possible, the developer is responsible for providing a clear picture of what typical environmental conditions currently exist in the environmental assessment study area prior to the start of this environmental assessment. This will include relevant data collected as part of the existing monitoring programs at the Ekati site, including the Surveillance Network Program, the Aquatic Effects Monitoring Program and the Wildlife Effects Monitoring Program. The data presentation must consider baseline/background conditions, the natural variability of background conditions, and to the extent possible differentiate between natural background conditions, current environmental conditions, and effects from past development activities, such as exploration, the existing Ekati mine operation, or the existing Diavik mine operation.

In addition, the developer must provide a description of the methods used to acquire the information used to describe baseline/background conditions. This description will distinguish between techniques used to measure parameters in the field from information derived from the utilization of models. DDEC will provide complete references for historical data and indicate how and when historical data were used as a basis for conclusion(s).

The following description should be at a level of detail sufficient to allow for a thorough assessment of Project effects. Describe the biophysical environment within the relevant environmental assessment study areas:

Biophysical Environment

1. The physical location of the proposed development (with maps), including ecozone(s) and ecoregions(s);
2. Ambient air quality, including baseline concentrations of criteria air contaminants (total suspended particulates, particulate matter [PM₁₀, PM_{2.5}], nitrogen oxides, sulphur dioxide and carbon monoxide) including dioxins and furans;
3. Baseline ambient noise levels, differentiating between those associated with DDEC's current activities at the Project site, including exploration activities, and background noise.
4. Climatic conditions, including but not limited to climate trends and extremes in temperature, precipitation, and wind patterns;
5. Current and historical data on surface water and groundwater quality for the Jay – Cardinal Project site, and downstream, including a reasonable neighbouring area of Lac de Gras. DDEC will include the overall range of natural variability of background conditions. DDEC will also include reference waterbodies in the analysis and a rationale for their selection. While describing baseline conditions for water quality, DDEC will include but not be limited to reporting on the following parameters:
 - metals of concern (including but not limited to those commonly listed in *Metal Mining Effluent Regulations [MMER]* and *Canadian Council of Ministers for the Environment [CCME] guidelines*);
 - petroleum products,
 - pH,
 - salinity,
 - sulphate,
 - ammonia,
 - chloride,
 - nitrate,
 - phosphorus,
 - total suspended solids,
 - total dissolved solids,
 - dissolved oxygen,
 - turbidity,
 - nitrite, and,
 - any other commonly listed *CCME MMER* constituents;
6. Hydrology and hydrogeology, including surface water and groundwater amounts, directions of flow, likely surface points/discharge area (for groundwater), and maps and descriptions of associated watersheds, both in the local area of the Project site as well as downstream, including a reasonable neighbouring area of Lac de Gras. Discussion should focus in particular on:
 - a. water quantity, with sufficient data to capture spatial and temporal variation. To this end provide watershed boundaries, including groundwater and surface drainage patterns,
 - b. seasonal and annual variation in groundwater and surface water quantity, including trends over time and extreme events (e.g., high flows),
 - c. the relative contribution of water from the Jay – Cardinal site to the volume of the surrounding watershed and the downstream environment,
 - d. surface water and groundwater flow regimes associated with the Jay – Cardinal Project site, and,

- e. relationship between the groundwater regime and permafrost and active layer conditions, including a characterization of those conditions, and how permafrost and active layer changes influence hydrogeology.
6. Aquatic habitat and aquatic organisms in the environmental assessment study area. Include water bodies on the site, and downstream to the extent of predicted impacts. Describe the following key aquatic species:
 - a. fish bearing water bodies that the Project may affect, including downstream to the extent of potential impacts including a reasonable neighboring area of Lac de Gras;
 - b. seasonal and life cycle movements;
 - c. local and regional abundance and distribution;
 - d. key riparian habitat, particularly for any proposed areas for water intake or outfall;
 - e. known or suspected sensitive habitat areas for different development stages and times of year;
 - f. the food chain that supports the species, and that the species supports;
 - g. identification of key species that would serve as biological indicators for change before change reached higher trophic levels; and,
 - h. any known issues currently affecting fish and other aquatic life forms in the area;
7. Describe any, and all, connectivity – temporary or continuous – between the various water bodies at the Jay-Cardinal Project site;
8. Wildlife (including resident and migratory bird species), wildlife habitat and migration corridors. Special emphasis will be placed on key harvested species including caribou and furbearers. Where available, the following information is required for each species:
 - a. population trends, including abundance, distribution and demographic structures for the local population(s) with the potential to be impacted,
 - b. habitat requirement, including identification of local areas of important habitat, attributes of the seasonal habitats that relate to how the species use them (e.g., travel routes, forage) and sensitive time periods,
 - c. migration routes, patterns, and timing including typical patterns and the range of known variation,
 - d. factors known or suspected to be currently affecting the species in the environmental assessment study area (e.g., harvesting, disease),
 - e. known or suspected sensitivities to human activities, and,
 - f. gaps in current knowledge of the species such as the impacts of disturbance on behaviour or abundance;
9. Wildlife at risk occurring in the environmental assessment study area. The developer will:
 - a. identify any species present or potentially present in the environmental assessment study area that are listed under Schedule 1 of the federal *Species at Risk Act* (SARA), including but not limited to peregrine falcon, grizzly bear, and aquatic species,
 - b. identify any species present or potentially present in the Project area assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and,
 - c. describe each species in terms of the requirements listed in item #10 above;
10. Vegetation and plant communities, including identification of any areas where rare plants are known or suspected to be present;
11. Terrain, surficial geology, structural geology, mineralogy, bedrock geology (type, depth, composition, and permeability), seismic activity records and risk factors, permafrost locations and types within the environmental assessment study area. In particular:

- a. describe the structure, permeability, stability, and other relevant characteristics of the area,
 - b. describe the permafrost conditions at the site, including thermal conditions and ground ice/moisture contents of underlying material, particularly if maintenance of frozen conditions is required,
 - c. identify the chemical composition of host rock and kimberlite pipes at the site including potential for acid rock drainage;
 - d. describe and map the ground composition underlying the proposed site,
 - e. identify the location, amounts, and type of granular material deposits including information on ground ice,
 - f. describe existing fractures and faults at the Project site,
 - g. describe the ground conditions under and around the access road proposed, with emphasis on identifying areas susceptible to erosion, and permafrost instability, and,
 - h. include maps, cross-section and figures to illustrate geological features, where appropriate;
12. Physical and chemical makeup of:
- a. soils, within a reasonable established radius around the site, and at reasonably established far-field points with the intention of establishing a baseline to track potential impacts from mine-related emissions, and,
 - b. water body sediments in potentially affected water bodies (i.e., from direct or indirect [e.g., aerial] deposition), including baseline concentrations.

Human Environment

13. Physical infrastructure present in the environmental assessment study area, including habitations, roads, buildings, quarries, power lines, and industrial works;
14. Available information pertaining to the Project area from land use planning in the region of potentially affected communities;
15. The availability and average training or skill levels of people in the region of potentially affected communities and other Aboriginal and Northern resident regional labour pool;
16. The local and regional business capacity available to support the Project;
17. Current socio-economic conditions and relevant trends in the potentially-affected communities and in the region of potentially affected communities as a whole, using appropriate indicators of well-being and quality of life;
18. Description of current community wellbeing including information about the capacity, availability, and affordability, where relevant, of local services and infrastructure (i.e., housing, training, education, day care services, health care, etc.).
19. A summary of historic and present land use in the study area, including identification of traditional land use groups, areas used, and traditional travel routes and timings. This summary will include a description of the current use of Lac du Sauvage for traditional, commercial, or recreational pursuits;
20. Traditional harvesting activities, relevant species (wildlife, fish and plants), observed trends, and any traditional values expressed about harvested species;
21. Changes in the traditional way of life and household function due to employment at the mine;
22. Description of impact on cultural and traditional values, traditional lifestyles, in affected communities;

23. Known physical heritage resource locations, areas of high potential for undiscovered physical heritage resources and cultural values associated with the environmental assessment study area;
24. Other current economic activities in the environmental assessment study area; and,
25. The number of full-time job equivalents and person years of work associated with the Jay-Cardinal Project, broken down by life cycle phase.

3.2.5 Development Description

The Jay-Cardinal Project is an extension project to the existing Ekati Mine. DDEC will ensure that a description of all its planned facilities and activities is included in the *Developer's Assessment Report*, including any proposed new facilities or activities not listed in Section 2.1 of the *Terms of Reference*. Further, the developer will provide a description of all existing facilities that will be used as part of this project, specifically details of any modification required to accommodate the Project or refurbishing required to extend the life of the facilities. In this section, DDEC is only asked to provide details on the Jay-Cardinal Project itself, not to comment on potential impacts from the development. For the purpose of an efficient and effective environmental assessment, the Review Board requires the developer to present the project description in its final configuration in the Developer's Assessment Report, or to apply this *Terms of Reference* to all alternatives under consideration.

Overall, DDEC must describe the proposed Jay-Cardinal Project, providing details of all works and activities throughout construction, operation, closure and reclamation, and long-term monitoring phases, with a description of major activities by phase. This level of description is required for all project components that are considered to be part of the proposed extension, including:

New Infrastructure, Facilities, and Management Plans Proposed as Part of the Project

1. The estimated lifespan of the Jay-Cardinal Project broken down into construction, operation, closure and reclamation, and long-term monitoring phases, with a description of major activities by phase;
2. The direct physical footprint of the Project, with locations and descriptions of all structures and all above-ground and underground infrastructure to be constructed;
3. A list of all regulatory permits, licences and other authorizations required to carry out the development;
4. Land tenure and any existing or anticipated agreements related to access to facilitate the proposed development;
5. A list of any other required development that needs to be constructed in order for the Project to proceed;
6. All open pit mining facilities required including: ramps, portals, declines, infrastructure (and the locations), machinery requirements, and water management facilities and methods;
7. All underground mining facilities including: ramps, ventilation system, underground infrastructure, and surface support infrastructure;
8. The mining, crushing, (if applicable) and kimberlite transportation methods used;
9. A description of the expected spatial volume of the mine;
10. Mine rock management areas including location, underlying ground conditions and volume of waste rock over the life of the mine;

11. The proposed new site access roads, including construction (width of right-of-way, road bed type) and maintenance schedule, required construction material, techniques to minimize erosion and bank instability and the expected number of trips on the road, water crossings, as well as the type and weight of loads, any related storage, transfer and handling, etc;
12. Estimated processed kimberlite volumes over the life-of-Project, as well as supernatant volume;
13. A description of the proposed minewater management facilities, including storage capacity, operational life, distance to groundwater table, rock types, presence of faults, and any containment dams or dikes;
14. The total amount of water in cubic meters estimated to be collected from all water sources and eventually released into local watercourses, with consideration of changes during the life of the Jay–Cardinal Project and the range of seasonal fluctuations;
15. A description of the construction material required for the entire life-of-Project and the expected source(s);
16. A comprehensive water balance for the site, include a reference to total and available volumes of water sources, and description of the time of year the water will be withdrawn;
17. The types and estimated amounts of explosives to be used, their storage, handling and application;
18. The location, contents, and estimated amounts of mined material, soil, and overburden at all surface storage facilities, along with estimated storage requirements, storage capacity limits, separation of material, and maintenance of materials to facilitate reclamation;
19. Location(s) of proposed activities of aggregate production and storage, with an estimate of the amount of aggregate that will be produced per year over the life of the mine, by location;
20. Energy requirements and generation sources;
21. Fuel storage facilities including a justification for the fuel storage container type selected, on-site fuel transport and handling procedures;
22. All other infrastructure and activities, including intensity and type of on-site vehicle traffic required; and,
23. The number of full-time job equivalents and person years of work associated with the Jay–Cardinal Project, broken down by life cycle phase.
24. Contracting and procurement information including, if known, a breakdown of the number and types of jobs that will be done by contractors.

For previously assessed, existing, and approved facilities that are to be used as part of the Project, DDEC must provide a full description of the project component, how it will be used in the context of the proposed Project, and any changes to the existing infrastructure or facilities that will occur as a result of the proposed development.

Existing Infrastructure, Facilities, and Management Plans Potential Relevant to the Proposed Extension Project

25. Operation of the airstrip, frequency of use, type of aircraft, and estimated number of passengers and volume of material;
26. Operation of the kimberlite processing plant, including any required modifications or refurbishing to accommodate the Project;
27. A description of the relevant processed kimberlite management facilities;
28. A description of the relevant mine water management existing facilities;

29. Water intake locations, withdrawal methods, and estimated amounts of water required for all water sources for all on-site activities;
30. A description of waste disposal facilities (including landfills, landfarms, oil treatment facilities, incineration facilities, other temporary waste management facilities) and management of all waste generated including storage and disposal plans;
31. A description of the type, volume, storage (location and method), handling, transport and disposal of all waste, as well as fuel, reagents and hazardous materials used on-site;
32. The storage location of processing reagents, including maximum volumes and concentrations to be stored on-site;
33. The water collection, management, and treatment systems and all their component parts and reagents, including drainage and other control structures, water and sewage treatment facilities, water storage facilities, and water transport components;
34. Worker transportation, especially those who live in communities without direct air transportation from their community and proposed work scheduling; and,
35. Workforce requirements to accommodate the Project.

3.2.6 Public Engagement

Engagement with potentially-affected communities (i.e., Ekati Mine IBA groups), governments, and the Independent Environmental Monitoring Agency should be considered in this section. Aboriginal groups, government agencies, and other interested parties may have information useful to the conduct of this impact assessment and all reasonable efforts should be made to engage with them. The Review Board encourages the developer to continue to meet with these groups outside the environmental assessment process, and to place any information from those discussions they consider may be relevant to the Review Board's decision on the public record. The following items are required for consideration of public engagement:

- An updated engagement log describing dates, individuals, and organizations engaged with, the mode of communication, discussion topics, and positions taken by participants, including:
- All commitments and agreements made in response to issues raised by the public and Aboriginal groups during these discussions, and how these commitments altered the planning of the proposed Jay–Cardinal Project, and,
- All issues that remain unresolved, documenting any further efforts envisioned by the parties to resolve them;
- Description of all methods used to identify, inform, and solicit input from potentially-interested parties, and any plans DDEC has to keep engagement moving forward;
- Discussion of the implications for environmental monitoring and management of any relevant agreement between the developer and other interested parties; and,
- How DDEC has engaged or intends to engage, traditional knowledge holders in order to collect relevant information for establishing baseline conditions and assessing the effects of potential impacts, as well as a summary table indicating where and how in subsequent sections (3.3 to 3.7) traditional knowledge was incorporated, and who was consulted (see Review Board's *Guidelines for incorporating Traditional Knowledge in Environmental Impact Assessment*).

3.3 Impact assessment steps and significance determination factors

In order to facilitate the consideration of the specific questions posed in this section, the developer is required to address the following impact assessment steps. In assessing impacts on the biophysical environment, the Developer's Assessment Report will for each subsection:

- Identify any valued components used and how they were determined;
- Identify the natural range of background conditions (where historic data are available), and current baseline conditions, and analyze for discernible trends over time in each valued component, where appropriate, in light of the natural or existing variability for each;
- Identify any potential direct and indirect impacts on the valued components that may occur as a result of the proposed development, identifying all analytical assumptions;
- Predict the likelihood of each impact occurring after mitigation measures are implemented, providing a rationale for the confidence held in the prediction. The developer must also present the predictions in a manner that facilitates the formulation of testable questions for future follow-up programs, as well as textually and schematically indicate the pathways of predicted impacts;
- Compare the predicted impacts to pre-development conditions. Include a description of any plans, strategies or commitments to avoid, reduce or otherwise manage and mitigate the identified potential adverse impacts, with consideration of best management practices in relation to the valued component or development component in question;
- Describe techniques such as models utilized in impact prediction including techniques used where any uncertainty in impact prediction was identified;
- Identify, and provide an opinion on the significance of any residual adverse impacts predicted to remain after any mitigation measures and indicate the methodologies for reaching such conclusions; and,
- Identify any monitoring, evaluation, and adaptive management plans required to detect potential unexpected changes as well as to ensure that predictions are accurate, and if not, to proactively manage against developing adverse impacts when they (or unexpected changes) are encountered.

The developer will describe how the predicted impacts are expected to arise from the proposed development. This will include describing the mechanisms for cause and effect and providing supporting references (including where Traditional Knowledge was used). Where professional judgement has been used in determining impacts, this must be made clear. DDEC will also provide a discussion on the uncertainty involved with each prediction. For each predicted impact, the developer will also describe:

- the nature or type of the impact;
- the geographical range of the impact;
- the timing of the impact (including duration, frequency and extent);
- the magnitude of the impact (what degree of change is expected);
- the reversibility of the impact; and,
- the likelihood and certainty of the impact.

The above will be used by the developer as a basis for its justification of significance for potential impacts from this Project. The Review Board will make ultimate determinations of

significance after considering all the evidence on the public record later in the environmental assessment. For more information on the above required descriptions refer to Section 3.11 of the Review Board's *Environmental Impact Assessment Guidelines* available on the Review Board's public registry.

3.3.1 Impacts on the Biophysical Environment

DDEC proposes to develop the Jay and Cardinal kimberlite pipes as an extension to the existing Ekati Mine, this Project will use the existing mining infrastructure present at the Misery site. The development entails two open pit mines within Lac du Sauvage in an area where water will be diverted and lake levels will be drawn down. Also proposed is the bypassing of the flows of water that report to the drainage area of Lac du Sauvage around the dewatered area through Paul Lake and eventually back into Lac de Gras. This water management system and any potential impact(s) that may result deserve a thorough analysis in this environmental assessment. Further, although, the Project has been laid out in a manner to minimize the physical footprint, to the extent feasible, to avoid sensitive areas and valued resource areas, and will be conducted in accordance with existing site heritage resource and species-at-risk management strategies; concerns have been raised regarding the proximity of the development to the Lac du Sauvage outlet into Lac de Gras. This area and along the esker to the west side of Lac du Sauvage are known to be important traditional use, cultural, and caribou movement sites. In addition to these project-specific concerns, DDEC proposes, in accordance with existing activities at site, to store waste rock on surface; to exploit local aggregate sources; to construct site access roads, and, site support infrastructure such as roads, cause ways, laydown areas, and power line.

3.3.1.1 Key Lines of Inquiry

Key Lines of Inquiry are areas of the concern that have been identified as requiring the most attention during the environmental impact review and the most rigorous analysis and detail in the *Developer's Assessment Report*. Key Lines of Inquiry are identified to ensure a comprehensive, detailed analysis of the issues that were identified as bringing about potential significant public concern regarding the proposed development. The developer will provide a standalone assessment to facilitate public evaluation for all identified Key Lines of Inquiry. Assessment work will encompass project-specific effects, potential additive effects considering potential accidents and malfunctions, and potential cumulative effects.

Three Key Lines of Inquiry pertaining to the biophysical environment were identified for the Ekati Mine extension:

- Key Line of Inquiry 1: Impacts to Water Quantity
- Key Line of Inquiry 2: Impacts to Water Quality; and
- Key Line of Inquiry 3: Impacts to Caribou.

KLI-1 Impacts to water quantity from project components

For the locally impacted watershed and downstream water bodies (the extent of potential impacts and including a reasonable neighboring area within Lac de Gras) DDEC must provide a comparison of predicted water quantities to baseline conditions and describe the impacts to surface water and groundwater from the following sources, both in isolation and collectively:

- the diversion of water around the dewatered portion of Lac du Sauvage;
- the management of drawdown water from Lac du Sauvage;
- the management of mine water from the open pits;
- accidents and malfunctions; and,
- the predicted long-term effect(s).

KLI-2 Impacts to water quality from project components

For the locally impacted watershed(s) and downstream water bodies (the extent of potential impacts and a reasonable neighboring area) DDEC must provide a comparison of predicted contaminant levels to baseline conditions and relevant water quality guidelines and describe the impact to water quality from the following sources, both in isolation and collectively:

- construction activities including lake drawdown and water diversion
- the mine water release to the receiving environment;
- operational water diversions and water management activities;
- the waste rock management area runoff;
- the aggregate management area runoff;
- accidents and malfunctions; and,
- the predicted long-term effect(s).
-

KLI-3 Impacts to caribou from project components

All required assessment information, should be provide in the context of baseline conditions and for all relevant life stages. Further, the predicted project-related long-term effect(s) to potentially impacted populations(s) should be discussed. DDEC must describe the impacts to local caribou population(s) from the following Project sources, both in isolation and collectively:

- For the locally impacted caribou population(s) DDEC must identify potential sources for increased caribou mortality, including any potential change to the predator-prey relationship of any potentially affected population.
- DDEC must describe the direct physical loss of available habitat as a result of proposed project activities. Further, DDEC must quantify the non-direct disturbance effects to available habitat through lowered habitat suitability due to the following:
 - fugitive dust and air emissions;
 - site water release, water management, dewatering, and diversion;
 - noise pollution,
 - light pollution,

- vehicle traffic on the site access roads and Misery Road, and
- the Power line along the Misery Road.
- DDEC must also provide an estimate of the existing habitat fragmentation at the regional and local scale, the expected increase, and its possible effects on this species.
- DDEC must identify possible pathways for caribou exposure to contaminants, assess exposure risk, and provide discussion of any potential population health effects.

3.3.1.2 Subjects of Note

Subjects of Note require a thorough analysis including a cumulative effects assessment, but do not require the same level of detail and are not required to be presented in a standalone format. The Review Board's Report of Environmental Assessment defined the following Subjects of Note based on concerns expressed by the various interest parties and the general public during the scoping exercise. Five Subjects of Note were identified for the Jay-Cardinal Project.

SoN-1 Impacts to air quality from project components

The developer is encouraged to pursue dialogue with Environment Canada and the Government of the Northwest Territories about appropriate methods for modeling air quality and analysis to ensure compatibility between these programs and the assessment. For the locally impacted air shed DDEC must provide a comparison of predicted contaminant levels to baseline conditions and relevant air quality guidelines and describe the impact to air quality from the following sources (defining both dispersion and deposition areas), both in isolation and collectively:

- the exposed lakebed fugitive dust emissions;
- the waste rock management area fugitive dust emissions;
- the aggregate management area fugitive dust emissions;
- equipment and traffic air emissions and fugitive dust emissions;
- accidents and malfunctions; and
- the predicted long-term effect(s) to air quality.

SoN-2 Impacts to the landscape from project components

DDEC proposes to divert water around Lac du Sauvage and drawdown the water level with the main body of the lake for the duration of mining. Further, water dikes and diversions, a power line and substation, waste rock piles, and site roads are to be constructed. For the locally impacted landscape DDEC must describe physical disturbance from project activities to the following resources (broken down into habitat types to a reasonable and relevant level):

- aquatic habitat; and,
- terrestrial habitat (include: total amount of land to be disturbed, estimate losses of vegetation [particularly, rare plants and those of cultural or economic significance], and description of the soil to be removed, conserved, or stored).

Further, DDEC must describe the non-direct disturbance of these resources from the project activities as a result of the following:

- dust deposition;
- air emissions;
- site water release, water management, dewatering, and diversion;
- noise pollution,
- light pollution, and,
- viewshed (i.e., reduced aesthetics of the landscape).

SoN-3 Impacts to fish and fish habitat from project components

For the following analysis, the developer will include at minimum Lac du Sauvage, Paul Lake, Duchess Lake, and all other reasonably relevant water bodies in the vicinity of the site (to the extent of predicted effects and a reasonable neighboring area of Lac de Gras). Effects/impacts to habitat are changes up to and including loss of habitat during all phases of the project. The developer will also consider the potential for fish to migrate into or out of these water bodies.

The developer must describe (incorporating seasonal variation and the sensitivities of specific life cycle stages) the impacts to fish, aquatic life, species-at-risk, and respective habitats from project-related changes to:

- water quantity (water discharge, water diversion, and winter withdrawal from surface water bodies) and water quality (including, suspended solids, dissolved oxygen content, pH, and the concentrations of metals, ammonia, and nutrients);
- the introduction of contaminants to aquatic food chains from water released from the site;
- direct disturbance of riparian areas and other aquatic habitats; and,
- changes to flow volumes, velocities, or patterns and subsequent indirect alterations to banks, shores, and riparian areas.

SoN-4 Impacts to wildlife and wildlife habitat from project components

In addition to the standalone assessment to be provided for potential impacts to Caribou from project components (KLI-3), an assessment encompassing all other wildlife valued components is required.

For the following analysis, the developer will include at minimum the footprint of the project and a reasonable neighboring area to capture the extent of the predicted effects. Effects/impacts to habitat are changes up to and including loss of habitat during all phases of the project. The developer will also consider the potential for wildlife migration through the area.

The developer must describe (incorporating seasonal variation and the sensitivities of specific life cycle stages) the impacts to all wildlife value components, species-at-risk, and respective habitats from project-related changes to:

- habitat degradation and fragmentation;
- direct and indirect sources of mortality (e.g., vehicle-wildlife collisions, human interactions);

- increased attraction to the project;
- potential for sensory disturbance to reduce habitat suitability;
- potential for disruption of animal movements and migration patterns; and,
- potential for bioaccumulation of contaminants from all sources within the food chain (including, vegetation quality, water quality, sediment quality, waterfowl quality, etc, as relevant).

SoN-5 Impacts to terrain from potential project components

When assessing the impacts and risk related to terrain the developer will:

- describe the existing geotechnical stability of the area proposed for the mine rock management areas including:
 - soil and hydrological conditions,
 - permafrost, ground thermal conditions, and ground ice conditions,
 - description of the physical and chemical characteristics of mine rock and tailings, and,
 - topography and slope stability.
- Describe how the geotechnical stability of all engineered structures will be ensured against a range of climate, seismic, and precipitation scenarios.
- Identify any plans to mitigate and monitor against impacts on terrain, including
 - erosion control measures,
 - prevention of permafrost degradation or growth encouragement, and,
 - how the geotechnical stability of the mine rock management area, and the system of dikes and dams will be monitored, and for what extent of time.

3.3.1.3 Biophysical Environmental Monitoring and Management Plans

Monitoring is an action that the developer can take in order to recognize a potentially significant adverse impact as it develops. From there, monitoring information can direct preventive measure to ensure that significant adverse impacts do not develop any further. In line with its duties to prevent significant adverse impacts on the environment, as well as in the spirit of integrated resource management in the Mackenzie Valley, the Review Board will analyze the adequacy of monitoring programs towards the end of detecting and preventing potential significant adverse impacts from developing. As part of the environmental assessment, DDEC will demonstrate that the monitoring and management plans have representative near-field and far-field baseline information, consider the natural range of variability, and will detect and mitigate any relevant changes – expected or unexpected – before they become significant adverse impacts. Extensive monitoring programs are established for the Ekati Mine that should be used as the basis for monitoring of new project components. A Response Framework is required under the Ekati Mine Water Licence and should be used as the basis for new project components. Further, the developer will describe the framework for proposed monitoring plans or amendments to existing plans that will guide their evaluation of and adaptive management for impacts to water quality. Specifying:

- which phase of the development the plan is for;
- the framework for surface water and ground water monitoring;
- which parameters the plan monitors for changes in, and how this related to detection of a significant adverse impact to water quality;

- how monitoring data will be used to determine if action is required such as definition of any methodologies used, critical values, and threshold conditions;
- how the proposed mitigation fits into adaptive management plans, including how project management will be adapted if necessary to prevent significant adverse impacts, including but not limited to:
 - unexpected deviations from environmental assessment predictions for any substance of concern,
 - contingency plans in case metals leaching or acid rock drainage occurs, and,
 - contingency plans for unacceptable treated-water quality.

For all other valued components⁴, describe the framework for proposed monitoring plans or amendments to existing plans that will guide DDEC's evaluation of and adaptive management for impacts to valued components. Specify:

- which phase of the development the plan is for;
- what parameters (measurement endpoints) the plan monitors for changes and how this related to detection of a significant adverse impact to a valued component;
- how monitoring data will be used to determine if action is required such as definition of any methodologies used, critical valued, and threshold conditions;
- how DDEC's proposed mitigation fits into adaptive management plans, including how project management will be adapted if necessary to prevent significant adverse impacts, including but not limited to:
 - unexpected deviation from environmental assessment predictions for any substance of concern that may impact the valued component, and,
 - provide a summary table listing all biophysical environmental monitoring and management systems, where they are described in the Developer's Assessment Report, the length of time the monitoring is proposed for, and rationale for each timeline; and,
- The framework for any new plans or amendments to existing plans related to overall incineration and waste management Plan(s), including commitments for management of solid, liquid, hazardous, and airborne wastes, and associated monitoring programs.

See Appendix B for additional information on monitoring and management plans.

3.3.2 Impacts on the human environment

The *MVRMA* lists social impacts, cultural impacts, impacts on heritage resources, and impacts on wildlife harvesting in the definition of impacts on the environment. In addition, the Guiding Principles of Part 5 of the *MVRMA* requires the consideration of the social, economic, and cultural well-being of residents and communities of the Mackenzie Valley during every environmental assessment. The Review Board's *Socio-economic Assessment Guidelines* provide a context for assessing impacts on the human environment.

The developer is encouraged to work with communities and responsible government authorities to identify valued components of the human environment, appropriate indicators and sources of

⁴ Due to complexity of cultural and socio-economic impact assessment, the line items for human environment monitoring and management will appear in the human environment section.

information to measure change, pathways by which change may likely occur, and mitigation and monitoring strategies that may be required to maximize benefits and minimize adverse impacts. Mitigation may not be entirely the responsibility of the developer, as governments and communities have social, economic, and cultural protection mandates. However, it is primarily the responsibility of the proponent of the project to initially document these issue in its *Developer's Assessment Report*.

3.3.2.1 Key Lines of Inquiry

No Key Lines of Inquiry were identified for the Jay-Cardinal Project pertaining to the human environment, this was anticipated as the Project is an extension of an existing operation. Operating staff at the Ekati Mine will have the opportunity for long-term extended employment; direct business spend will be extended through the Jay-Cardinal Project; and established funding, training, preferential hiring, business opportunities, and communication requirements will continue. However, it is likely that no additional personnel will be needed and no new business or contract opportunities will be created.

3.3.2.2 Subjects of Note

Two Subjects of Note pertaining to the human environment were identified, however, for the Jay-Cardinal Project.

SoN-6 Impacts to cultural aspects from project components

The analysis of heritage resources is inclusive and cultural impacts include both tangible and intangible aspects of culture.

When assessing the impacts and risk related to cultural aspects the developer will:

- Describe engagement with traditional knowledge holders, archaeologists, anthropologists, and the Prince of Wales Northern Heritage Centre and how such interactions influenced:
 - heritage resource surveys locations;
 - heritage resource management plans; and
 - programs related to community capacity and sustainability.
- Identify all known archaeological and heritage resources, sites or areas of cultural significance;
- All recommended mitigation measures for the protection of local known and high potential areas of physical heritage resources and associated developer's commitments;
- Describe any potential impacts from the Jay-Cardinal Project on physical heritage within the geographical scope of the development.
- Describe any potential impacts of the project on traditional harvesting activities for Aboriginal residents of potentially-affected communities, including changes from impacts to wildlife, changes in all-season access, and any changes in access by non-resident hunters;
- Provide a prediction of the total impact of the project on traditional activities, and on the potential for increased or reduced harvesting success. For visual and audible changes:

SoN-7 Impacts to employment and business opportunities

The Jay-Cardinal Project is anticipated to provide an additional 10 to 20 years of mine life to the Ekati mining operation. DDEC must describe the following:

- workforce resource requirements;
- contracting and business resource requirements; and,
- anticipated revenue generation, as practical specific to the Northwest Territories.

The developer will assess the potential impacts of the Jay-Cardinal Project on the economy of the Mackenzie Valley.

In assessing access to employment and business opportunities, the developer will provide the following:

- An description of employment and associated training opportunities by phase and category
The developer should present this information in the context of existing conditions;
- An assessment of the likely percentage of direct employment for Northwest Territories Aboriginal residents at the project for the extent of the life of the mine and for each phase of the project. The developer should present this information in the context of existing conditions;
- Taking into consideration existing monitoring program, a qualitative description of any barriers to direct or contract employment, advancement and retention for Mackenzie Valley residents;
- The developer's existing, including any anticipated modification of, plans, strategies, and commitments for maximizing direct employment, advancement and retention of residents from potentially-affected communities, other Aboriginal and Northwest Territories residents;
- Discussion of the potential for longer term community capacity building, if any have been planned and are to be implemented throughout the Project's lifetime, regarding how mine training plans can enhance the transferability of skills after the mine closure (i.e., management and human resource skills, computers skills, heavy equipment skills).
- An estimate of contractor and subcontractor goods and services that the project will require, by project phase, as well and an estimate of what percentage of required goods and services can feasibly be sourced by local and regional businesses;
- The developer's existing policies, plans, and commitments associated with maximizing contracting to Aboriginal and Northwest Territories owned and operated businesses, with emphasis on assisting business development initiatives and joint ventures with; and,
- The developer's future commitments for any training, education, or other improvements necessary to maximize local and regional business capacity to benefit from the project.

3.3.2.3 Human environment monitoring and management plans

The developer will describe any commitments, plans, and strategies to engage with responsible authorities and potentially-affected communities in continuing and improving monitoring impacts on the human environment. Such as the success of:

- local and regional residents and Aboriginal people in gaining employment at the Jay-Cardinal Project;

- training initiatives;
- employee retention;
- worker and family wellness; and,
- impacts on wildlife harvesting and practice of traditional culture on the land.

3.3.3 Cumulative Effects

Pursuant to paragraph 117(2)(a) of the *MVRMA*, the Review Board considers cumulative effects in its determination. Cumulative effects are the combined effects of the development in combination with other past, present, or reasonably foreseeable future developments and human activities. The Jay-Cardinal Project site would sit in an area that has been impacted by past development. In addressing cumulative effects, the developer is encouraged to refer to the Review Board's *Environmental Impact Assessment Guidelines*. The following items are required for consideration of cumulative effects:

- water quantity;
- water quality;
- air quality;
- the local landscape;
- Northern employment, business opportunities, and revenues; and,
- impacts on Barren-ground caribou.

Consideration should also be given to identifying means for DDEC, either on its own or cooperatively with others, to reduce or avoid any predicted cumulative effects.

3.4 Accidents and Malfunctions

For this section, the developer will first discuss impacts in relation to all Key Lines of Inquiry from an accident or malfunction as though it has happened, then discuss the associated probability of the event. The assessment would then be carried forward to describe the potential impacts to all relevant valued components. This analysis will include:

1. Describe consequences of accidents, malfunctions, or "impacts of the environment on the development" that may affect water quantity and quality and the ability of the water management system to function. Such as:
 - a. extreme short-term precipitation events, snowpack buildup, or other factors leading to flooding events;
 - b. geological instability or seismic activity causing slope failures at or near the project site, including impacts on the site workings, or of the tailings management facilities. Consider:
 - geotechnical instability, especially of the mine rock management area, and the system of dikes and dams on site,
 - change to ground thermal conditions and permafrost failure from project-related activities and/or climate change, and,
 - impacts to permafrost and ground thermal conditions from vegetation removal;
 - c. freezing effects on pipelines or other water transportation systems;
 - d. how mine water will be managed if the water management system malfunctions, with a focus on retention capacity timelines for water storage facilities and contingency water management plans; and,

- e. potential impacts to water from accidents in transport of processing chemicals or other dangerous good.
- f.
2. Describe the impacts of any other potential accidents or malfunctions on valued components;
3. Describe contingency plans for accidents, malfunction, or unforeseen impacts including emergency response plans that will be in place by project phase. This discussion should include the required circumstances for a failure to occur, and what monitoring, evaluation, and adaptive management system will be in place to identify, proactively avoid, and rectify any failure; and,
4. Describe the likelihood that invasive species will be introduced, by what means, the potential impacts, and any mitigation practices to be implemented to reduce the likelihood.

3.5 Alternative Means to Carrying Out the Project

The MVRMA requires the Review Board to consider the potential impacts from alternatives to a proposed development. Accordingly, the developer may present the most probable alternatives to the proposed development description and potential impacts stemming from their potential adoption, and suggested mitigation. Examples of alternatives presented by DDEC in their Project Description Report include:

- Alternative drawdown and pumping scenarios; and,
- Alternative waste rock storage areas.

3.6 Closure and Reclamation

DDEC will present its framework for the conceptual closure and reclamation plan for any aspects of the Jay-Cardinal Project that are not currently provided for in the Interim Reclamation and Closure Plan in the Developer's Assessment Report. The developer should consider existing guidance, such as Indian and Northern Affairs Canada's mine closure and reclamation policy and guidelines for the Northwest Territories when developing its reclamation plan for the Jay-Cardinal Project (<http://www.aadnc-aandc.gc.ca/eng/1100100024558/1100100024569>). In the *Developer's Assessment Report* the developer will:

1. Discuss the existing Interim Reclamation and Closure Plan as it related to any existing facilities that will be used as a part of the Jay-Cardinal Project;
2. Illustrate how project components will be encompassed within the Interim Reclamation and Closure Plan;
3. Provide a framework for DDEC's Closure and Reclamation Plan, in respect to any "new" facilities or activities to the Ekati mine operation, which will include:
 - a. identification of the overall reclamation objectives, standards, and criteria the Closure and Reclamation Plan is designed to achieve and over what time period, and,
 - b. a conceptual program and schedule for any progressive reclamation envisioned;
4. In the Conceptual Closure and Reclamation Plan, discuss management and monitoring programs for any materials/locations that may cause acid rock drainage or metal leaching;
5. Discuss the long-term physical integrity of any permanent features;
6. Discuss monitoring coverage required to track for any reasonably foreseeable post-closure contamination pathways;

7. Describe how closure and reclamation activities and monitoring will ensure long-term suitability of all fish-bearing waters potentially affected by the Project in terms of fish and fish habitat; and,
8. Describe how reclamation will provide for safe wildlife use of and movement through the reclaimed area.

4. Conclusion

The Review Board anticipates that the requirements described in this document will help DDEC produce a *Developer's Assessment Report* that clearly describes DDEC's predictions of impacts from the Jay-Cardinal Project while providing sufficient basis for the Review Board and parties to analyze and evaluate those predictions.

Appendix A: Scope of Development

Construction	Construction of dikes and a water diversions structures to divert water from main body of Lac du Sauvage
	Construction of site access roads (spur roads from Misery Haul Road to project components at Lac du Sauvage)
	Production of borrow sources/ aggregate quarries to obtain construction material for the roads, dikes, and water diversion
	Power line to supply site with electricity
	Construction of water management facilities to accommodate drawdown volumes and mine water
	Diversion and drawdown of water from the isolated portion of Lac du Sauvage and fish-out of this area of the lake
	Construction of two open pits and associated support infrastructure
Mining Operations	Establishment of two waste rock storage areas
	Removal of waste rock, kimberlite, and mine water from the open pits, including the use of explosives
	Storage and handling of waste rock
	Management of mine water,
	Surface water management
	Use of Tibbitt-Contwoyto winter road
Closure and Reclamation	Removal (decommissioning) of all temporary structures and equipment
	Reclamation of open pits and the main body of Lac de Sauvage
	Reclamation of all permanent structures (e.g., waste rock piles, road)
	Long-term monitoring and water management

Appendix B: Guidelines for Monitoring and Management Programs

In the interest of fair, efficient, and effective environmental assessment that successfully meshes with integrated resource management in the Mackenzie Valley, the Review Board encourages the developer to review the following non-comprehensive list of documents while assessing potential impacts from the development, as well as in creating and presenting monitoring and mitigation programs for the project. The document include but are not limited to:

Mackenzie Valley Environmental Impact Review Board

Environmental Impact Assessment Guidelines (2004);
Socio-Economic Impact Assessment Guidelines (2007); and,
Guidelines for Incorporating Traditional Knowledge in Environmental Impact Assessment (2005).

Mackenzie Valley Land and Water Board

Any relevant guidelines published by the Mackenzie Valley Land and Water Board:

- The Mackenzie Valley Land and Water Board Document Submission Standards (2012);
- Standards for Geographical Information Systems Submissions (2012);
- Guide to Completing Land Use Permit Applications (2013);
- Guide to Completing Water Licence Applications (2003);
- Engagement and Consultation Policy (2013);
- Engagement Guidelines for Applicants and Holders of Water Licences and Land Use Permits (2013);
- Water and Effluent Quality Management Policy (2011);
- Guidelines for Developing a Waste Management Plan (2011); and,
- Draft Guidelines for Adaptive Management (2010).

Natural Resource Canada

- Dam Safety guidelines (Canadian Dam Association 2007)

Department of Fisheries and Oceans

- Freshwater Intake End-of-Pipe Fish Screen Guideline (1995);
- Protocols for Winter Water Withdrawal in the Northwest Territories (2005); and,
- Fish Screen Design Criteria for Flood and Water Truck Pumps (2011).

Indian and Northern Affairs Canada

- Guidelines for Designing and Implementing Aquatic Effects Monitoring Programs for Development Projects in the Northwest Territories (2009);
- Mine Site Reclamation Guidelines (2007);
- Mine Site Reclamation Policy for the Northwest Territories (2002);
- Northwest Territories Cumulative Impact Monitoring Program; and,
- Guidelines for Spill Contingency Planning (2007).

Canadian Council of Ministers for the Environment

- Canadian Environmental Quality Guidelines for the Protection of Aquatic Life

Government of the Northwest Territories

- Guideline for Ambient Air Quality Standards in the Northwest Territories` Government of the Northwest Territories Guideline for Dust Suppression (2004)