



SECTION 15

CULTURAL ASPECTS

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Section 15 Abbreviations

Abbreviation	Definition
AEMP	Aquatic Effects Monitoring Program
AIA	Archaeological Impact Assessment
AOA	Archaeological Overview Assessment
AQMP	Air Quality Monitoring Program
BHP	BHP Billiton
BP	Before Present
BSA	baseline study area
DAR	Developer's Assessment Report
DFO	Fisheries and Oceans Canada
Diavik Mine	Diavik Diamond Mine
DKFN	Deninu K'ue First Nation
Dominion Diamond	Dominion Diamond Ekati Corporation
e.g.	for example
EA	environmental assessment
Ekati Mine	Ekati Diamond Mine
ESA	effects study area
et al.	and more than one additional author
GNWT	Government of the Northwest Territories
Golder	Golder Associates Ltd.
GPS	Global Positioning System
i.e.	that is
IBA	Impact Benefit Agreement
KIA	Kitikmeot Inuit Association
KLOI	Key Line of Inquiry
LKDFN	Lutselk'e Dene First Nation
MVRB	Mackenzie Valley Review Board
Narrows	Lac du Sauvage - Lac de Gras Narrows
NIA	Noise Impact Assessment
NSMA	North Slave Métis Alliance
NWT	Northwest Territories
Project	Jay Project
PWNHC	Prince of Wales Northern Heritage Centre
RSA	regional study area
SON	Subject of Note
TCWR	Tibbitt to Contwoyto Winter Road
TG	Tłı̨chǫ Government
TK	Traditional Knowledge
TLU	Traditional Land Use
TOR	Terms of Reference
VC	valued component

Abbreviation	Definition
WEMP	Wildlife Effects Monitoring Program
WLWB	Wek'èezhii Land and Water Board
WRSA	waste rock storage area
YKDFN	Yellowknives Dene First Nation

Section 15 Units of Measure

Unit	Definition
%	percent
ha	hectare
m	metre
km	kilometre
km ²	square kilometre

15 CULTURAL ASPECTS

15.1 Introduction

The following Subject of Note (SON) addresses the *Impacts to Cultural Aspects from Project Components*. Included in this SON are impacts on heritage resources and on traditional activities of Aboriginal residents of potentially affected communities. In this SON, traditional activities are considered to be represented by the term Traditional Land Use (TLU). The SON first provides the methods used to assess potential effects, followed by an analysis of pathways by which an effect may occur, and a discussion and classification of residual effects. Generally, in this SON, heritage resources and TLU are discussed separately, with the exception of pathway analysis methods that apply to both sections.

15.1.1 Background

The existing Dominion Diamond Ekati Corporation (Dominion Diamond) Ekati Diamond Mine (Ekati Mine) and its surrounding claim block are located approximately 300 kilometres (km) northeast of Yellowknife in the Northwest Territories (NWT). Dominion Diamond proposes to develop the Jay Pit, with associated mining and transportation infrastructure to add 10 or more years of mine life to the Ekati Mine.

The majority of the facilities required to support the Jay Pit and process the kimberlite already exist at the Ekati Mine, including:

- Misery Pit mining infrastructure (e.g., fuel facility, explosives magazines);
- primary roads and transportation infrastructure (e.g., Ekati airstrip, Misery Haul Road);
- Ekati main camp and supporting infrastructure;
- Ekati processing plant; and,
- fine processed kimberlite management facilities.

The Jay kimberlite pipe (Jay pipe) is located beneath Lac du Sauvage in the southeastern portion of the Ekati Mine property approximately 25 km from the main facilities and approximately 7 km to the northeast of the Misery Pit. A horseshoe shaped dike will be constructed to isolate the portion of Lac du Sauvage overlying the Jay kimberlite pipe. The isolated portion will be dewatered to allow for open-pit mining of the kimberlite pipe. The Jay Project (Project) will also require an access road, pipelines, and power lines to the Jay Pit from the Misery Pit.

15.1.2 Purpose and Scope

This section of the Developer's Assessment Report (DAR) for the Project addresses the SON: Impacts to Cultural Aspects from Project Components identified in the Terms of Reference (TOR) issued by the Mackenzie Valley Review Board (MVRB) (Appendix 1A). The entire TOR document is included in Appendix 1A, and the Table of Concordance for the DAR is in Appendix 1D.

The SONs are areas of concern identified by the MVRB based on comments expressed during community scoping sessions in Behchokò, Yellowknife, and Łutsel K'e, and a technical scoping session in Yellowknife. The SON requires a thorough analysis of effects including a cumulative effects assessment, but does not require as much detail as a Key Line of Inquiry (KLOI) (Appendix 1A).

The purpose of this section is to meet the TOR issued by MVRB (Appendix 1A) and, specifically, to assess how the Project may affect cultural aspects of the human environment.

15.2 Cultural Aspects Methods

15.2.1 Community Engagement and Integration of Local and Traditional Knowledge

As described in Section 4, Community, Regulatory, and Public Engagement Summary, comprehensive community engagement has been undertaken by Ekati Mine operators on a continual basis since 1994 when engagement on the initial mine concept began. Dominion Diamond is building on and advancing past engagement practices by undertaking regular engagement meetings between Dominion Diamond senior management and community leadership.

Project-specific community engagement methods included scoping sessions, workshops, and site visits. Information gathered from these sessions informed the selection of valued components (VCs), measurement indicators, effects pathways, and mitigation. Similarly, information included within the Traditional Land Use and Traditional Knowledge Baseline Report (Annex XVII) was also considered in the Cultural Aspects SON assessment methodology. The following sections provide an overview of the results of Project-specific community engagement that informed portions of the cultural aspects SON. A summary of the approach undertaken in the preparation of Annex XVII has also been included. Further information about community engagement that was undertaken for the Project is provided in Section 4.

15.2.1.1 Scoping Sessions

Public scoping sessions to inform the Environmental Assessment (EA) process were held on January 7 and 8, 2014 in Yellowknife, NWT, and hosted by MVRB. These sessions included members of the North Slave Métis Alliance (NSMA), Tłı̄ch̄ Government (TG), and Yellowknives Dene First Nation (YKDFN). Additional scoping sessions were held in Behchok̄ on January 14, 2014, and in Łutsel K'e (Łutselk'e Dene First Nation [LKDFN]) on January 16, 2014. Scoping sessions were intended to help determine the TOR for the Jay Project.

Several concerns that are relevant to the cultural aspects of the human environment were expressed by participants during the scoping sessions. These concerns included potential changes in water quantity and flow levels, effects on fish, caribou, and medicinal plants, effects on human health, and the resulting changes that these effects may have on TLU. Concerns regarding rising water levels in Lac du Sauvage affecting archaeological resources were also noted. The information that was gathered during the scoping sessions is detailed further in Section 4.

15.2.1.2 Community Engagement Workshops

Community Engagement Workshops were hosted by Dominion Diamond from March 10 to 13, 2014, with NSMA, YKDFN, LKDFN, TG, and the Kitikmeot Inuit Association (KIA). These workshops were intended to provide a focused discussion about key issues related to the Jay Project, particularly for fish and wildlife, and to assist Dominion Diamond in meaningfully incorporating Traditional Knowledge (TK) into the Jay Project plan.

After undertaking a full review of the Project, Dominion Diamond decided to mine the Jay pipe only and remove the Cardinal pipe from the Project. In making this change, Dominion Diamond responded to the feedback it received from Dominion Diamond's engagement meetings with communities and stakeholders.

Additional workshops in communities were held on the Jay Project following the release of the revised TOR:

- Lutsel K'e (12 participants on June 17, 2014);
- Lutsel K'e (11 participants on July 15, 2014);
- Tłı̄ch̄q̄ (16 participants in Behchok̄q̄ on June 24, 2014);
- Yellowknives Dene First Nation (9 participants on June 25, 2014);
- North Slave Métis Alliance (7 participants on June 26, 2014); and,
- Kugluktuk (7 participants on June 27, 2014).

During the community workshops, concerns were expressed by participants that are relevant to the cultural aspects of the human environment. These concerns included effects on caribou that may alter caribou movement and migration patterns, their food supply, and population numbers. Specific concerns about caribou included the effects of road construction and traffic, interaction between caribou and humans, sensory disturbances, climate change, and mine blasting. Other concerns were expressed about the fish-out, dewatering and back-flooding of Lac du Sauvage, particularly referencing water quality, fish wastage, and fish health. Additional expressed concerns included impacts to gravesites, effects on the health and abundance of traditionally harvested species in the area, and effects resulting from dust production. The information that was shared during the workshops is detailed further in Section 4.

15.2.1.3 Community Site Visits

From June 2 to June 5, 2014, Dominion Diamond hosted community site visits at the Ekati Mine site for representatives of the communities of Wekweètì, Gamètì, Whatì, and the YKDFN. Site visits were also held on June 10 and 17, 2014 with representatives of the community of Behchoko and the LKDFN. The purpose of the site visits were to provide tours of the existing facilities and operations, and to provide an update on the Jay Project. Throughout these tours, community members commented on the traditional use of the Ekati area, and expressed concerns and recommendations on the development of the Jay Project.

During the site visits, several concerns were raised by participants that are relevant to the cultural aspects of the human environment, including effects on ecological health, invasive species, water quality due to the back-flooding of Lac du Sauvage, and effects on caribou as a result of creating the Jay access road. Additional concerns were noted about the impacts on the Lac du Sauvage esker. The information that was provided during the community site visits is detailed further in Section 4.

Dominion Diamond also funded two community-led activities to identify TK related to the Project:

- The activities with the Yellowknives Dene First Nation included a site visit with an archaeologist to provide advice on locations of cultural significance around Lac du Sauvage, and to provide advice on the crossing of the esker for the Project (August 11 to 12, 2014). This project also includes funding for a workshop with Elders to provide additional TK on the Project and to enter relevant TK data for the Ekati area into the YKDFN's Community Knowledge Keeper (CKK) database.
- The What'aa Project with the Tłìchq involves the study by Tłìchq Elders of varying properties of natural eskers close to Mesa Lake, NWT, to identify community-based concepts that may be useful in planning, construction, and reclamation of mine waste rock piles. Dominion's activities included arranging a site visit for TG representatives and Elders with an engineer to provide advice on the crossing of the esker for the Project (July 16, 2014).

From September 3 to 8, 2014, site visits were held with representatives of the community of Whatì, and YKDFN. The purpose of the site visits related to the Tlichò- Whatì and YKDFN Community Caribou Engagement Programs.

15.2.1.4 Community Engagement and Integration of Local and Traditional Knowledge with Heritage Resources¹

During the archaeological permit application process, the YKDFN, the NSMA, the TG, and the LKDFN were consulted by the Government of the Northwest Territories (GNWT) through the Prince of Wales Northern Heritage Centre (PWNHC) Cultural Places Program. This process allows stakeholders to provide input and express concerns about each year's archaeological programs.

An Archaeological Overview Assessment (AOA) was prepared for the Project. The AOA included TK that was available from a literature review, and was used to guide field assessments.

¹ Heritage resources are defined as archaeological or historic sites, burial sites, artifacts and other objects of historical, cultural or religious significance, and historical or cultural records.

Community consultation identified that possible burials located along eskers were a concern, and that a few additional locations such as the Lac du Sauvage - Lac de Gras Narrows (Narrows) would require special attention if they were included in Project areas.

Six areas of concern were identified by YKDFN Elders during a 2014 Elder tour held August 11 and 12, 2014, and these areas were visited by Elders and the archaeology team. The six areas visited were: the Narrows; the area associated with the JP4 south dike; the location where the Jay Road intersects the esker; heritage sites LeNs-8 and LeNs-11, which are located along the north arm of Lac du Sauvage; LdNs-52, a site that was recorded in 2014 within the proposed Jay waste rock storage area (WRSA); and LeNs-4, a site north of Paul Lake. While at LeNs-11, which is outside the Heritage baseline study area (BSA), the Elders agreed with the identification of a feature as a possible grave.

15.2.1.5 Baseline Approaches

15.2.1.5.1 Traditional Land Use

Baseline information on TLU and TK is provided in Annex XVII. The baseline report was compiled through a review of existing sources of information containing TLU and TK information relevant to potentially affected communities in the BSA. The results of past engagement activities between Aboriginal groups and Ekati Mine operators were included within the sources reviewed. Information presented in the baseline report informed aspects of the Cultural Aspects SON methodology, including identification of effects pathways and measurement indicators. Information included in the baseline report also informed the existing environment sections of the TLU residual effects analysis (Section 15.4.1)

Several limitations were acknowledged in reference to the baseline report. For example, TK is not easily translated or communicated in written format; therefore, limitations in the representation of the information exist. In addition, questions, concerns, and restrictions regarding the ownership, use, and access to TLU and TK documentation make it difficult to present a complete summary of TLU and TK within the study area. In an attempt to minimize these limitations, an effort was made to present the TK in a manner consistent with its original context. However, observations gathered from existing reports were paraphrased and artificially divided by topic in an effort to organize and present the data in a way that can be more easily understood by reviewers.

15.2.1.5.2 Heritage

Baseline information on heritage resources has been compiled from published and unpublished archaeological and cultural reports. Archaeological site data were obtained from the PWNHC Archaeological Site Database in July 2013 (GNWT n.d.). The data requested extended beyond the proposed Project area so that site locations and types, typical of a larger area could be established. Archaeological site data include the location of currently recorded sites, along with data and details such as site type, features present, and cultural affiliation. The unpublished permit reports summarizing past field work were also reviewed. Archaeological data pertinent to the proposed development is summarized in the Archaeology Baseline Report (Annex XVI).

Two seasons² of archaeological field work were completed for the Project. Areas assessed as having moderate to high potential for archaeological resources were surveyed using helicopter and pedestrian reconnaissance. These areas are often associated with elevated, and well-drained areas near waterbodies or eskers. Helicopter reconnaissance was used to refine predictions made during pre-field assessments of archaeological potential. Pedestrian reconnaissance was undertaken at locations with moderate to high potential, which intersected with the Project.

The pedestrian reconnaissance was conducted by a crew of 3 to 4 people (two Golder Associates Ltd. [Golder] staff and 1 or 2 local assistants) walking transects placed between 5 and 10 metres (m) apart, or as appropriate for the terrain. Local field assistance contributed to site identification, assessment, and interpretation. In areas of high archaeological potential systematic judgemental shovel testing was undertaken in areas that could not be visually examined. Previously unrecorded sites were mapped (Global Positioning System [GPS] location and features sketched) and photographed. The previously recorded sites were mapped and photographed as required to establish up-to-date baseline data.

15.2.2 Valued Components, Assessment Endpoints, and Measurement Indicators

The TOR identified heritage resources and TLU (representing traditional activities) as VCs to be included in the assessment of the effects on the cultural aspects of the human environment. The identification of VCs and assessment endpoints was determined, in part, from input from potentially affected communities, including traditional and local knowledge, public comment, and the regulatory engagement process (Section 4). In this SON, cultural VCs include heritage resources, and TLU (Table 15.2-1). The TLU VC was selected because of the documented importance that traditional harvesting and land use activities have for the maintenance of TK and for Aboriginal cultural identity.

Assessment endpoints are qualitative expressions used to assess the significance of effects to a VC and represent the key properties of the VC that should be protected for future human generations.

Assessment endpoints are general statements about what is to be protected. The assessment endpoint for the heritage resources VC is the continued protection of archaeological or historic sites, burial sites, artifacts, and other objects of historical, cultural, or religious significance. The assessment endpoints for the TLU VC centre on the protection of continued opportunities to participate in culturally important uses of the land, such as traditional harvesting activities. Each of the TLU assessment endpoints have several measurement indicators (Table 15.2-1).

Measurement indicators represent properties of the environment that when changed, could result in, or contribute to, an effect on an assessment endpoint. For example, a change in access to a preferred harvesting area may affect the opportunity to participate in traditional harvesting. Various measurement indicators for the TLU assessment endpoints rely on and include the results from other disciplines such as wildlife, fish, vegetation, and socio-economics. Many of the measurement endpoints for the TLU VC act as indicators for multiple assessment endpoints.

² The 2014 field season and related results are included in the DAR but not the Archaeology Baseline Report because the baseline report was prepared before the 2014 field season.

Table 15.2-1 Summary of Valued Components, Assessment Endpoints, and Measurement Indicators

Valued Component	Assessment Endpoints	Measurement Indicators
Traditional Land Use	Continued opportunities to participate in traditional wildlife harvesting	<ul style="list-style-type: none"> • availability^(a) of traditionally harvested wildlife resources; • disturbance to preferred wildlife harvesting areas • physical access to preferred land use areas; • sensory disturbances (i.e., viewscape, light, and noise); • social and economic factors affecting participation in TLU; • Aboriginal land users' intangible relationship with the land; and, • concerns regarding ecological and human health.
	Continued opportunities to participate in traditional fish harvesting	<ul style="list-style-type: none"> • availability of fish; • disturbance of preferred fishing areas; • physical access to preferred fishing areas; • sensory disturbances (i.e., viewscape, light, and noise); • social and economic factors affecting participation in TLU; • Aboriginal land users' intangible relationship with the land; and, • concerns regarding ecological and human health.
	Continued opportunities to participate in traditional plant harvesting	<ul style="list-style-type: none"> • availability of traditionally used plant species; • disturbance to preferred plant harvesting areas; • physical access to preferred land use areas; • sensory disturbances (i.e., viewscape, light, and noise); • social and economic factors affecting participation in TLU; • Aboriginal land users' intangible relationship with the land; and, • concerns regarding ecological and human health.
	Continued opportunities to participate in other culturally important uses of the land	<ul style="list-style-type: none"> • disturbance to preferred use or culturally important areas; • physical access to preferred use or culturally important areas; • sensory disturbances (i.e., viewscape, light, and noise); • social and economic factors affecting participation in TLU; • Aboriginal land user's intangible relationship to the land; and, • concerns regarding ecological and human health.
Heritage Resources	Continued protection or presence of archaeological or historic sites, burial sites, artifacts and other objects of historical, cultural, or religious significance, and their presence on landscape	<ul style="list-style-type: none"> • intact/undisturbed heritage resources

a) Availability is defined as the abundance and distribution of the resource base.

TLU = traditional land use.

15.2.3 Spatial Boundaries

15.2.3.1 *Traditional Land Use*

The TLU BSA was selected to encompass the existing mine site, the area that contains the potential new development, the entire Ekati claim block, and the lands, waterbodies, and communities beyond the Ekati claim block that include the Akaitcho Dene Asserted Territory, the Tłı̄chǫ Land Claim, and the portion of the Nunavut Kitikmeot Region, in particular, the communities of Kugluktuk, Bathurst Inlet, and Umingmaktok (Map 15.2-1). This boundary was defined to provide an in-depth picture of baseline information. In addition to the identified potentially affected communities, the TLU BSA also included the Wek'èezhii area as a whole, and those residents in or making traditional use of any part of the study area.

The TLU effects study area (ESA) is the same as the TLU BSA. The TLU ESA is used for discussing most effects on traditional land users and traditional harvesting. However, effects on TLU must consider the effects on underlying traditionally used resources, which are discussed in other sections of the DAR (e.g., caribou KLOI, vegetation SON), as they relate to traditional harvesting. Therefore, when discussing effects on an underlying resource that is used for traditional harvesting, the ESA utilized within the assessment on that underlying resource is considered. For example, when discussing effects on caribou as it relates to traditional wildlife harvesting, the effects on caribou are discussed within the context of the caribou ESA(s).

Seven culturally distinct communities that could potentially be affected by the Project were identified within the TLU ESA. The term 'community' refers to the specified Dene and Métis groups within the Tłı̄chǫ and Akaitcho regions, which includes the Tłı̄chǫ communities of Behchokò, Whatì, Gamètì, and Wekweètì, and the Akaitcho communities of Yellowknife, Dettah, N'Dilo, Lutsel K'e, and Fort Resolution. Also included are the Inuit of the Kitikmeot region, including the communities/settlements of Kugluktuk, Bathurst Inlet, and Umingmaktok. Dominion met with the following communities and/or organizations:

- the Yellowknives Dene First Nation, largely of Yellowknife, Dettah, and N'Dilo;
- the Lutsel K'e Dene First Nation, largely of Lutsel K'e;
- the Deninu K'ue First Nation, largely of Fort Resolution;
- the Fort Resolution Métis Council, largely of Fort Resolution;
- the North Slave Metis Alliance, largely of Yellowknife;
- the Tłı̄chǫ Government (TG), representing Behchokò, Whatì, Gamètì, and Wekweètì; and,
- the Kitikmeot Inuit Association (KIA), including the communities and settlements of Kugluktuk, Bathurst Inlet, and Umingmaktok (EAP 1996) and the Hamlet of Kugluktuk.



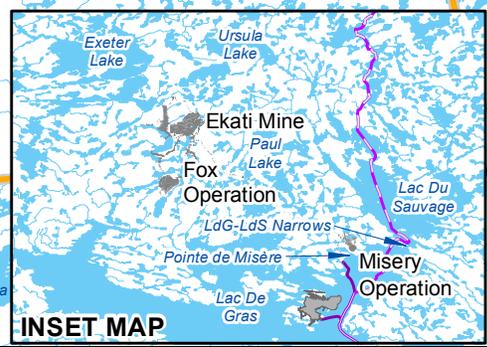
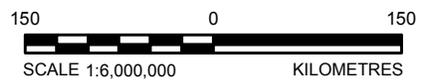
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LEGEND

- JAY PROJECT
- EXISTING MINE OR PROJECT
- TERRITORIAL CAPITAL
- POPULATED PLACE
- HIGHWAY
- ALL-SEASON ROAD
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- TERRITORIAL/PROVINCIAL BOUNDARY
- TREELINE
- WATERCOURSE
- WATERBODY
- TRADITIONAL LAND USE BASELINE AND EFFECTS STUDY AREA

REFERENCE

NATURAL RESOURCES CANADA, CENTRE FOR TOPOGRAPHIC INFORMATION, 2012 ATLAS OF CANADA; AANDC; PROJECTION: CANADA LAMBERT CONFORMAL CONIC DOCUMENT DEVELOPER'S ASSESSMENT REPORT



PROJECT	DOMINION DIAMOND			JAY PROJECT NORTHWEST TERRITORIES, CANADA	
TITLE	TRADITIONAL LAND USE BASELINE AND EFFECTS STUDY AREA				
PROJECT	13-1328-0041		FILE No. DAR_TK_001_GIS		
DESIGN	AB	05/09/14	SCALE AS SHOWN	REV. 0	
GIS	LMR	05/09/14			
CHECK	AB	06/10/14			
REVIEW	MG	06/10/14			
Golder Associates			MAP 15.2-1		

15.2.3.2 Heritage

A heritage regional study area (RSA) was selected to encompass all existing and proposed developments in the Lac de Gras region and an approximate 20 km buffer. The RSA covers approximately 5,933 square kilometres (km²), and includes areas that will be influenced by the Project and areas that will remain unaffected.

To quantify baseline conditions, a heritage BSA was defined for heritage resources. The BSA was defined as encompassing the Project footprint with a buffer of 500 m. The BSA is approximately 31 km² in area. It is located primarily in the Lac du Sauvage basin, which is the largest tributary into Lac de Gras. The heritage BSA was selected to encompass the existing Misery Mine site and the proposed Project area. The Archaeology Baseline Report (Annex XVI) contains maps of the Heritage RSA and BSA (Map 1.3-1).

15.2.4 Temporal Boundaries

15.2.4.1 Project Phases

Project phases include construction, operations, and closure. Final closure of the Project generally occurs after the completion of reclamation. Many effects of the Project will end when operations cease or at closure, although effects on TLU may continue after Project closure.

The effects analysis considers the following Project phase timelines:

- construction (2016 to 2019);
- operations (2019 to 2029); and,
- closure (2030 to 2033).

Effects on cultural aspects are expected to occur during the construction phase with the removal of available land base for TLU and impacts to heritage resources. Effects to TLU continue through the operations phase and may persist after the closure phase. Therefore, effects to TLU are analyzed and assessed throughout all Project phases. This approach generates the maximum potential spatial and temporal extent of effects on continued opportunities for TLU, to allow for a conservative and precautionary assessment of effects.

15.2.5 Pathway Analysis Methods

Pathway analysis identifies and assesses the linkages between Project components or activities, and assessment endpoints. These linkages provide the basis for the assessment of residual effects (after mitigation) on the cultural aspects of the human environment. The first part of the analysis is to identify all potential effects pathways for the Project. Each pathway is initially considered to have a linkage to potential effects on the VC. Potential pathways through which the Project could affect cultural aspects were identified from multiple sources including the following:

- a review of the Project Description and scoping of potential effects by the environmental and engineering teams for the Project;



- traditional and local knowledge obtained from community scoping sessions in Behchokò, Yellowknife, and Lutsel K'e, and a technical scoping session in Yellowknife (Section 4);
- traditional and local knowledge obtained from Annex XVII and additional engagement activities, including community site visits and community engagement workshops (Section 4);
- professional expertise and experience with other mines in the NWT; and,
- consideration of potential effects identified from the TOR.

For an effect to occur there must be a source (Project component or activity) that results in a detectable change to a measurement indicator and a corresponding effect on the VC.



Generally, potential effects on the TLU VC are caused by one or both of the following mechanisms:

- Direct effects related to loss of lands or changes in access to lands or resources.
- Indirect effects through residual adverse effects on other aspects of the environment, such as aquatic ecology, hydrology, socio-economic factors affecting Aboriginal communities, terrestrial vegetation, terrestrial wildlife, and visual, light, and noise impacts.

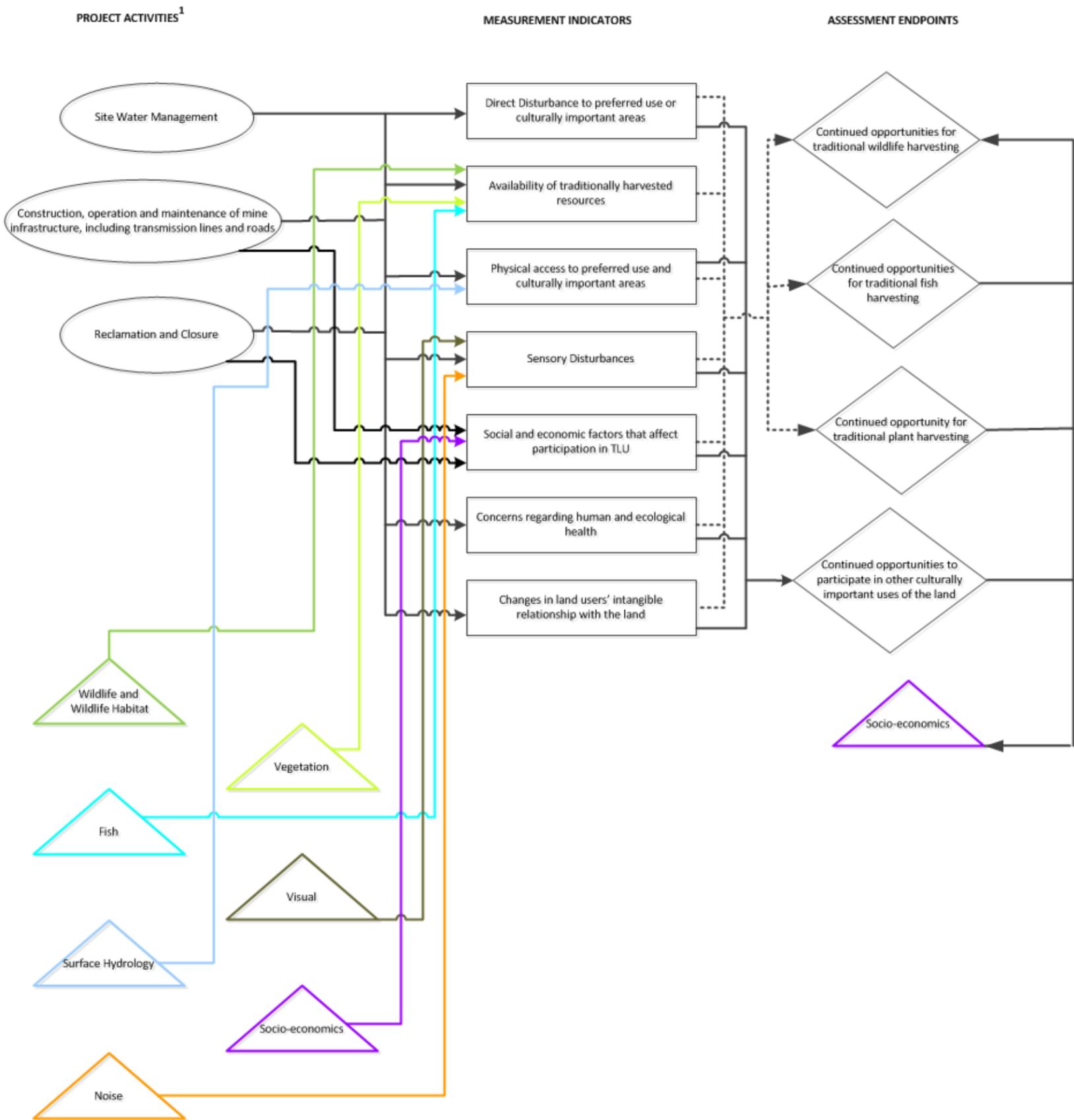
Generally, potential effects on the heritage resources VC are caused by one or both of the following mechanisms:

- Direct effects related to disturbance to lands.
- Indirect effects involving unintentional impacts to sites surrounding areas of primary impact. For example, erosion of sloping terrain due to alterations in the vegetation and soils composition around the area of development may affect sites. In addition, the support services or additional access required by development can adversely affect heritage resources outside the primary target areas. Changes in demography and land use patterns can indirectly impact heritage resources.

Potential effects from Project components or activities on the assessment TLU and heritage resources before mitigation are shown in Figures 15.2-1 and 15.2-2. Pathways or lines in the diagrams are initially considered to have a linkage to their corresponding VC.

Project components and activities that are linked to changes in assessment endpoints are illustrated as ovals. Effects from the Project on other disciplines that influence changes in assessment endpoints for the TLU VC are shown as triangles on the left side of Figure 15.2-1 (e.g., wildlife, vegetation, and hydrology).

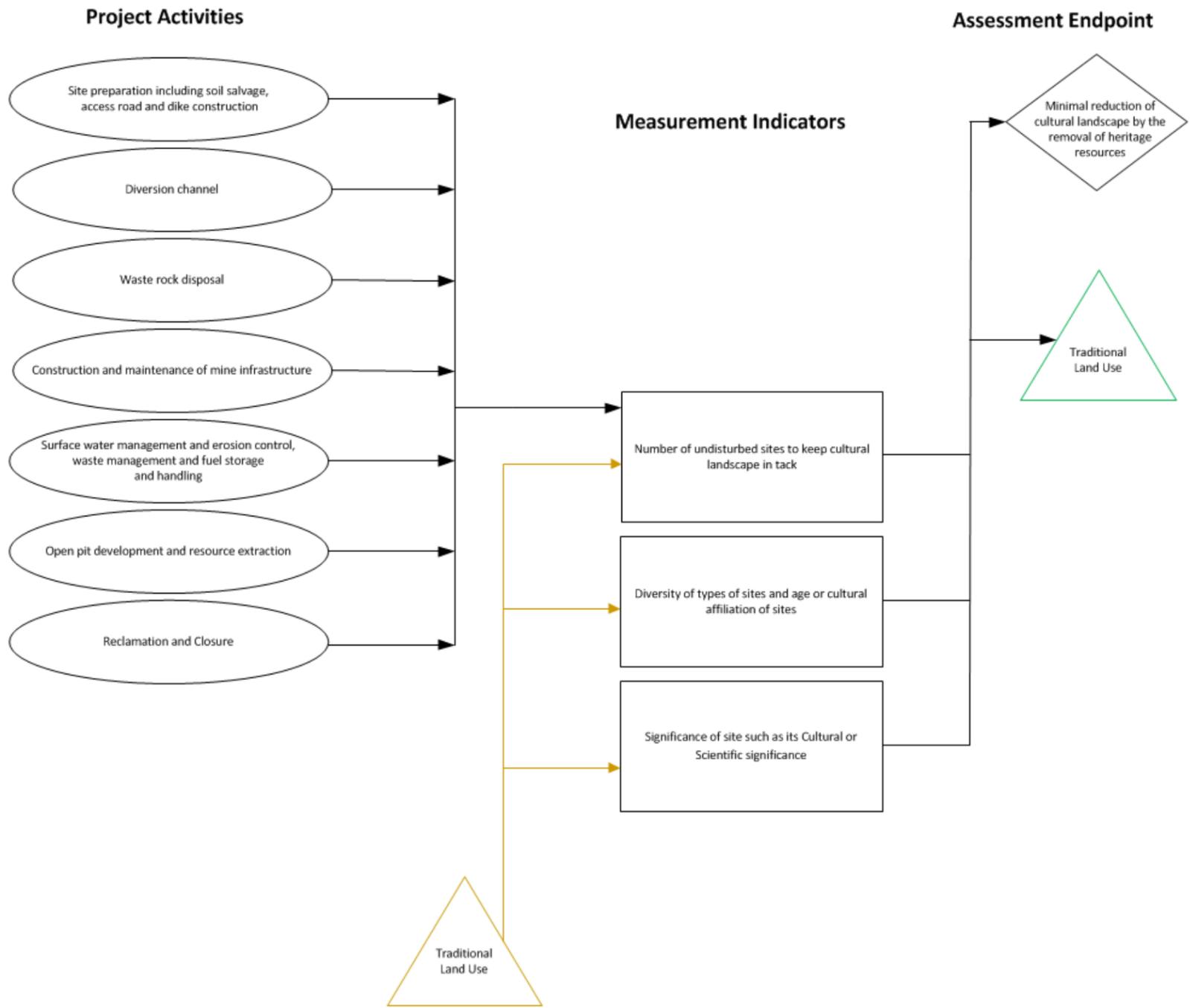
Figure 15.2-1 Linkage Diagram Identifying Potential Effects on Traditional Land Use



¹Linkage diagrams for cultural effects are often highly complex. Therefore, in order to reduce complexity and allow for ease of interpretation Project effects headings have been condensed compared with those used for biological and physical effects diagrams.

Note: Ovals represent Project activities; rectangles represent measurement indicators; triangles represent connections to and from other disciplines; and the diamond represents the assessment endpoint.

Figure 15.2-2 Linkage Diagram Identifying Potential Effects on Heritage Resources



Note: Ovals represent Project activities; rectangles represent measurement indicators; triangles represent connections to and from other disciplines; and the diamond represents the assessment endpoint.

A key aspect of the pathway analysis is to identify environmental design features and mitigation that might reduce or eliminate potential effects of the Project on cultural aspects of the human environment, and includes application of the precautionary principle (Section 6.1.2). Environmental design features include engineering design elements, environmental best practices, management policies and procedures, and spill response and emergency contingency plans. Environmental design features and mitigation were developed as an integral part of the Project's design through an iterative process between the Project's engineering and environmental teams to avoid or mitigate adverse effects identified by the pathways analysis.

After applying environmental design features and mitigation, a screening-level analysis is used to determine the existence of linkages from the initial list of potential effects pathways for the Project. This screening step is largely a qualitative assessment and is intended to focus the effects analysis on pathways that require a more comprehensive assessment of effects. Pathways are determined to be primary, secondary, or as having no linkage, using scientific, traditional, and local knowledge, logic, and experience with similar developments and environmental design features and mitigation. Each potential pathway is assessed, and then described as follows:

- **no linkage** – analysis of the potential pathway reveals that there is no linkage or the pathway is removed by environmental design features or mitigation such that the Project would not be expected to result in a measurable change, and would therefore have no residual effect on cultural aspects of the human environment relative to the Base Case or guideline values; or,
- **secondary** – pathway could result in a measurable minor environmental change, but would have a negligible residual effect on VCs relative to the Base Case and is not expected to contribute to effects of other existing, approved, or reasonably foreseeable projects that would result in anything above a low magnitude of change on the VC; or,
- **primary** – pathway is likely to result in environmental change that could contribute to residual effects on cultural aspects of the human environment relative to the Base Case or guideline values.

Pathways with no linkage to cultural aspects are not assessed further because environmental design features or mitigation will remove the pathway.

Secondary pathways with minor environmental change to cultural aspects are not assessed further because they are not expected to contribute to effects of other existing, approved, or reasonably foreseeable projects that would result in anything beyond a low magnitude of change on the VC.

Primary pathways require further evaluation through more detailed quantitative and qualitative effects analysis (Section 15.4).

15.2.6 Residual Effects Analysis Methods

15.2.6.1 *Traditional Land Use*

For the purposes of this assessment, the effects on the TLU VC are considered to be a combination of various changes to assessment endpoints. These assessment endpoints are the changes in traditional hunting, trapping, fishing, and plant harvesting opportunities, and the change in the opportunity to participate in other cultural uses of the land. Each of these assessment endpoints may be influenced by

several and sometimes the same measurement indicator and effects pathway (Table 15.2-1). Therefore, a discussion of potential effects on measurement indicators that apply to multiple assessment endpoints is first provided to limit redundancy within the assessment.

The mechanisms by which an effect on a TLU assessment endpoint may occur are discussed with consideration of Project design and mitigation measures. Resulting residual effects are characterized in the residual impact classification, which is determined qualitatively.

15.2.6.1.1 *Residual Impact Classification*

The purpose of the residual impact classification is to describe the residual cumulative effects from previous and existing developments, the Project, and reasonable future developments (if applicable) on assessment endpoints using a scale of common words rather than numbers and units. The use of common words or criteria is accepted practice in environmental assessment. The classification of residual impacts from associated assessment endpoints and the determination of environmental significance are only completed for those VCs that have measurement endpoints. The criteria for assessing potential effects on TLU are broadly comparable to those used for biophysical effects. There are, however, some differences in the choice and/or the definition of criteria.

Direction indicates whether an effect is considered positive (a benefit) or negative. Effects on TLU are not neutral, although some effects may have both positive and negative dimensions (or are positive for some people and negative for others). For example, the creation of a new road that provides access to a harvesting area may result in a reduction in the cost and time needed by harvesters to access that area, which would be considered a positive effect for those harvesters. However, a new road may also result in an increase in the number of harvesters (Aboriginal and non-Aboriginal) accessing this harvesting area, additional competition on the resources being harvested, and a reduction in harvesting success, which could be considered a negative effect on TLU.

Magnitude refers to the degree of change in a VC that an effect has the potential to produce. Magnitude may be negligible, low, moderate, or high, and is usually (but not always) qualitatively assigned.

- Negligible magnitude indicates no discernible effect.
- Low magnitude indicates a discernible effect, but one that has only minor effects on continued opportunities for TLU. Land use can continue to occur in preferred areas.
- Moderate magnitude indicates a noticeable and potentially detrimental change to continued opportunities for TLU. Traditional use of land and resources is impeded in some preferred areas. Other preferred areas of land and resource use are still available and unaffected.
- High magnitude indicates that the effect is expected to substantially interfere with continued opportunities for TLU. Traditional use of land and resources is impeded in all preferred areas.

Geographic extent relates to the spatial scale of an expected effect. For TLU, local effects are expected to affect only the Project footprint area, while regional effects are expected to move beyond this area and into the TLU ESA. Beyond regional effects are those that extend beyond the effects study area.

Duration refers to the length of time over which an effect occurs. For TLU, thresholds are established based on the period in which it can be reasonably expected that a project will affect the ability to practice TLU. For the purposes of this assessment, short term has been defined as a period of one year or less (i.e., a temporary nuisance not affecting the long-term activities of traditional land users). Medium-term duration has been defined as a period of 1 to 5 years (i.e., a period where TLU activities may be temporarily altered or suspended, after which time regular activity is likely to be re-instated). Long-term has been defined as effects that are expected to persist for longer than five years (i.e., after which time, TLU activity may resume, but, at a potentially different level or quality). For example, an effect on TLU that persists throughout the Project's operations phase (10 to 13 years) would be considered long-term.

Reversibility is not achievable for many cultural aspects and is inherently tied to an effects duration (unlike many physical and biological effects). Cultural effects are part of an ongoing process of interdependent social and cultural change, and individual responses to that change that generally cannot be reversed to return to one or all of pre-project development conditions. In this sense, most cultural effects are cumulative, because they are products not only of a given project, but of the interaction of that project and its effects with the broader, continuously evolving, economic, social, and cultural environment. For example, while land may be reclaimed after Project closure, knowledge of, familiarity with, or preferred use of that portion of the landscape may be lost due to the interruption in the continued use of that area. Therefore, while Aboriginal land users may return to that portion of the landscape after reclamation, the relationship with the area may be permanently altered. Thus, the reversibility criterion is only used by exception.

Frequency is often not a useful criterion for the assessment of cultural aspects of the human environment. Although there are isolated exceptions, most cultural effects are experienced continuously by people.

Likelihood can be problematic to assign for TLU. With some exceptions, most effects on the cultural aspects of the human environment are considered likely (almost certainly) to affect at least some individuals.

Definitions of the TLU assessment criteria are presented in Table 15.2-2.

Table 15.2-2 Definitions of Residual Impact Criteria Used to Evaluate Significance for Traditional Land Use

Direction	Magnitude	Geographic Extent	Duration	Reversibility	Frequency
Negative: Adverse effect on a VC Positive: Beneficial effect on a VC	Negligible: No discernable effect Low: Minor effects on continued opportunities for TLU Moderate: Noticeable and potentially detrimental change to continued opportunities for TLU High: Effects will substantially interfere with continued opportunities for TLU	Local: Direct and indirect effects are limited to the Project footprint Regional: Effects move beyond the Project footprint and into the TLU ESA Beyond Regional: Effects that extend beyond the TLU ESA	Short: less than one year Medium: 1 to 5 years Long: 5 to 20 or more years	Most effects are considered to be irreversible By exception: effects of short or medium duration that are identified by potentially affected groups as unlikely to affect a VC	Most effects are considered to be continuous

VC = valued component; TLU = Traditional Land Use; ESA = effects study area.

15.2.6.1.2 *Determination of Significance*

The methods that are used to determine significance and the prediction of confidence for the TLU assessment have important differences when compared with biophysical assessments.

First, the significance of effects on TLU must often be determined qualitatively or intuitively. For example, it may be straightforward to conclude that an effect is not significant if it is very small, is of short duration, and affects almost no one; or to conclude that an effect is significant if it is very large, of long duration, and affects most people. However, assigning significance in cases that are less well defined necessarily depends on:

- qualitative data and interpretation, and observations of patterns of traditional use of land; and,
- lessons learned from other experiences.

As a result, professional judgement (as opposed to the use of quantitative tools such as decision trees or valued matrices) is often used in reaching conclusions on the significance for effects on traditional use of land and resources.

Furthermore, there are no established thresholds or standards for assessing effects on TLU. Although it may be possible to set thresholds for purposes of an environmental impact assessment, it often cannot be demonstrated that there is any consensus on a specific threshold value or what such a threshold means in terms of significance of an effect.

Additionally, many effects on TLU may not lend themselves to the assignment of criteria or determination of significance except in terms of potential, thus introducing a larger element of uncertainty into the effects assessment. There is generally the expectation that an effect brought forward for assessment will occur, at least to some degree. However, it is extremely difficult to predict whether some effects will be positive, negative or both, and in what ways or for whom. For example, improved access may provide a benefit for Aboriginal harvesters by reducing time and costs to access a preferred harvesting area, but in doing so may simultaneously increase the level of competition for resources or land base with other Aboriginal and non-Aboriginal harvesters or recreational users.

For the purposes of the TLU assessment, the overall effects on TLU assessment endpoints were determined to be either significant or not significant based on the expected result on the continued practice of a traditional land use activity, or a cultural activity tied to TLU. While effects on a TLU activity may only affect a small number of Aboriginal land users, if the actions of these land users allow for a cultural practice within their community to continue (such as the sharing of a traditional food or medicine), effects may extend throughout the community.

- **Not Significant:** the effects are not expected to result in a substantial reduction or alteration in the overall patterns of a TLU activity and associated traditional lifestyle and culture.
- **Significant:** the effects are expected to result in a substantial reduction or alteration in the overall patterns of a TLU activity and associated traditional lifestyle and culture.

15.2.6.2 *Heritage Resources*

For the purposes of this assessment, the effects on heritage resources VC are considered a combination of various changes to assessment endpoints. These assessment endpoints are the changes in the heritage resources, heritage resource record, or the cultural landscape. Each of these endpoints may be influenced by several and sometimes the same measurement indicator and effects pathway (Table 15.2-3). Therefore, a discussion of potential effects on each measurement indicator is first provided to limit redundancy within the assessment.

After each measurement indicator has been discussed, an analysis of how each of the valid measurement indicators interacts to cause an effect on the key indicator is provided.

The mechanisms by which an effect to a heritage resources assessment endpoint may occur are discussed first with consideration of Project design and mitigation measures. Any residual effect is characterized in the residual impact classification, which, in most cases, is determined qualitatively.



Table 15.2-3 Definitions of Residual Impact Criteria Used to Evaluate Significance for Heritage Resources

Direction	Magnitude	Geographic Extent	Duration	Reversibility	Frequency
Negative: Adverse effect on a VC Positive: Beneficial effect on a VC	Negligible: No discernable effect Low: Minor effects on heritage resources Moderate: Noticeable and potentially detrimental change to heritage resources High: Effects will substantially change heritage resources	Local: Direct and indirect effects are limited to the Project footprint Regional: No direct effect on heritage resources	Permanent	not used	not used

VC = valued component.

15.2.6.2.1 *Residual Impact Classification*

The purpose of the residual impact classification is to describe the residual incremental and cumulative adverse effects from the Project on assessment endpoints using a scale of common words rather than numbers and units. The use of common words or criteria is accepted practice in environmental assessment. The classification of residual impacts from associated assessment endpoints and the determination of environmental significance are only completed for those VCs that have measurement endpoints. The criteria for assessing potential effects to heritage resources are broadly comparable to those used for biophysical effects. There are, however, some differences in the choice and/or the definition of criteria.

Direction indicates whether an effect is considered positive (a benefit) or negative. Effects to heritage resources are not neutral, although some effects may have both positive and negative dimensions (or are positive for some people and negative for others).

Magnitude refers to the degree of change in a VC that an effect has the potential to produce. Magnitude for individual heritage resources are typically either negligible or high. However, magnitude for the heritage resources record and the cultural landscape it represents may be negligible, low, moderate, or high, and is qualitatively assigned.

- Negligible magnitude indicates no discernible effect on the heritage resources site or the heritage resources record.
- Low magnitude indicates a discernible effect, but one that has only minor effects on the heritage resources record and the cultural landscape it represents. The heritage resources record is predominately intact on the landscape.
- Moderate magnitude indicates a noticeable and potentially detrimental change on the heritage resources record and the cultural landscape it represents. The heritage resources record is partially intact on the landscape.

- High magnitude indicates that the effect is expected to substantially change the heritage resources record and the cultural landscape it represents, or an individual heritage resources site. The heritage resources site is removed from the landscape.

Geographic extent relates to the spatial scale of an expected effect. For heritage resources, only local effects are expected to impact specific heritage resources sites within the Project footprint.

Duration refers to the length of time over which an effect occurs. For heritage resources, effects are either permanent, a heritage site is removed from the landscape, or not a factor since the heritage resources will not be impacted.

Reversibility is not achievable. Heritage resources as sites cannot be repaired. However, sites may be mitigated before removal from the landscape to preserve the details of the heritage resource in the form of detailed recording and reporting. The reversibility criterion is not used.

Frequency is not a useful criterion for the assessment of heritage resources. Disturbance of a heritage resources site, once or many times permanently impacts the heritage resources site.

Likelihood that a heritage resource will be impacted is connected with distance of a heritage resources site from the Project footprint. The policy of avoiding heritage resources when possible reduces the likelihood of impact.

Definitions of the heritage assessment criteria are presented in Table 15.2-3.

15.2.6.2.2 *Determination of Significance*

Heritage resources significance can be related to the historic, scientific, ethnic, public, and economic value of a site (Appland and Kenny 1989):

- Historic significance might relate to sites or locations where known historic events took place, or even locations, such as Pointe de Misère, which is known for its traditional use and presence of archaeological sites.
- Sites that are assigned scientific significance are those that have the perceived potential to answer specific academic research questions. Scientific significance designation can change during excavation depending on results obtained from the site.
- Ethnic significance relates to if a given site or location is of importance to a specific ethnic group.
- Sites of significance to the public are often those accessible to the public for education or recreation purposes.
- Economic significance often overlaps with other classifications of significance, but is associated with sites that will assist an organization (local, territorial, or federal) to accumulate revenue.

Heritage resources site significance is not equivalent to significance as addressed in a pathways analysis.

15.3 Pathway Analysis

15.3.1 Review of Mitigation Measures

Measures that mitigate the potential effects of the Project on traditional activities and use of the land include measures that mitigate the effects of the Project on resources used for harvesting, measures that mitigate limitations on access to resources or use areas, and measures that help to mitigate the Project's effects on traditional lifestyles. These mitigation measures are found in the following sections of the DAR:

- Water Quality and Quantity KLOI (Section 8);
- Fish and Fish Habitat KLOI (Section 9);
- Vegetation SON (Section 11);
- Caribou KLOI (Section 12);
- Wildlife and Wildlife Habitat SON (Section 13);
- Maximizing Benefits and Minimizing Impacts KLOI (Section 14); and,
- Noise Impact Assessment (Appendix 13B).

In addition, Dominion Diamond has developed an Ekati Mine Engagement Plan (Appendix 4B) to guide engagement activities for mine development and operations with affected Aboriginal groups. Examples of engagement for ongoing operations include the following:

- quarterly meetings between Dominion Diamond senior management and community leadership and members;
- community presentations, workshops and site visits on specific projects (such as the Jay Project);
- annual community presentations of environmental monitoring information;
- annual community presentations of socio-economic monitoring information; and,
- Elder/youth site visits for environmental monitoring programs (typically annual).

This engagement facilitates the incorporation of TK into environmental monitoring and management plans, which may assist in mitigating effects to TLU. Dominion Diamond currently has the following monitoring plans and programs, which will be extended to include the Project:

- Wildlife Effects Monitoring Program (WEMP);
- Air Quality Management and Monitoring Program (AQMP); and,
- Aquatic Effects Monitoring Program (AEMP).

Mitigation measures for heritage resources vary depending on how close the resources are to the Project and heritage significance. The preferred mitigation method is to avoid impacting a heritage resources site. Avoidance of heritage resources sites by 150 m is the PWNHC policy, and this policy is reinforced by Wek'èezhii Land and Water Board (WLWB) conditions. Variances to the 150 m buffer between heritage resources sites and developments can be requested if heritage resources are well defined with accurate geographic site delineation. Often if a heritage resource site is to be avoided by less than 150 m, a visual barrier such as stakes marked in a distinctive manner are placed 30 m from the boundaries of the heritage resources site.

If avoidance of a heritage resources site is not feasible, mitigation is undertaken. The amount of data collected is dependent on the significance of the heritage resources site. Basic data includes geographic location, site type, size and significance assessment, photographic documentation, surface collection of artifacts, feature sketches, shovel testing, and proportional excavation of sites. Details of the mitigation and results are submitted to and reviewed by the PWNHC; after the review the PWNHC either accepts the report and field work done in support of it; or requires additional information of field assessments.

15.3.2 Pathway Screening

15.3.2.1 *Traditional Land Use*

Project components and activities, effects pathways, and environmental design features and mitigation on the TLU VC are summarized in Table 15.3-1. Classification of effects pathways (no linkage and primary) is also summarized in Table 15.3-1, and descriptions of potential pathways are provided in the subsequent section.

Table 15.3-1 Potential Pathways for Effects on Traditional Land Use

Project Component / Activity	Effects Pathway	Environmental Design Features and Mitigation	Pathway Assessment
<ul style="list-style-type: none"> Physical Disturbance from Project Footprint <ul style="list-style-type: none"> Construction or development of site access roads, pits, waste rock storage areas (WRSA), quarries, support buildings. 	<ul style="list-style-type: none"> The Project footprint may directly impact preferred use or culturally important sites and areas. 	<ul style="list-style-type: none"> The Project footprint disturbance will be limited to the extent possible, while maintaining safe construction and operation practices. The site access road route will follow existing roads and/or trails to the extent possible, to limit land clearing. The new access road will be as narrow as possible, while maintaining safe construction and operation practices. 	Primary
	<ul style="list-style-type: none"> The Project footprint may affect the abundance or distribution of wildlife used for traditional harvesting. 	<ul style="list-style-type: none"> The Project maximizes the use of the existing infrastructure to reduce the environmental footprint as much as possible. The esker will be sloped to allow for continued use by caribou. Siting and construction of the Project will be planned to avoid environmentally sensitive areas (e.g., critical wildlife habitat, rare plants and wildlife species, and wetlands) as much as possible. Vegetation clearing will take place outside of the migratory bird season, as practical. If site clearing activities are completed during the migratory bird breeding season, then vegetation removal will be completed before nesting season, or nest searches will be completed before construction. If nests are found during nest searches, mitigation will be applied to avoid incidental take of nesting individuals. Wildlife will be actively deterred from areas of risk. The WEMP implemented at the Ekati Mine will include the Jay Project. Animals will be deterred from entering the diked area where most fly rock will occur (until pit is too deep for escape of fly rock). Additional mitigation measures as described in the Caribou KLOI and Wildlife Habitat SON (Sections 12 and 13). 	Primary
<ul style="list-style-type: none"> Physical Disturbance from Project Footprint <ul style="list-style-type: none"> Construction or development of site access roads, pits, WRSA, quarries, support buildings. 	<ul style="list-style-type: none"> The Project footprint may affect the abundance or distribution of fish for traditional harvesting. 	<ul style="list-style-type: none"> The Project footprint disturbance area will be limited to the extent practical. A diversion channel will be constructed to maintain habitat corridors between Lac du Sauvage and waterbodies in the small contributing sub-basins around the diked area. A fish-out will occur according to Fisheries and Oceans Canada (DFO) guidance, and with engagement of the Ekati Mine Impact Benefit Agreement (IBA) groups. An offsetting plan will be developed with DFO and with engagement of the Ekati Mine IBA groups. The dike and dewatering area will be positioned away from known spawning locations. The road route alignment will minimize stream crossings and avoid sensitive habitat as feasible. Culverts will be designed to allow for fish passage where appropriate. Additional mitigation measures as described in the Fish and Fish Habitat KLOI (Section 9). 	Primary
	<ul style="list-style-type: none"> The Project footprint may affect the abundance and distribution of traditionally used plants. 	<ul style="list-style-type: none"> The Project footprint disturbance will be limited to the extent possible, while maintaining safe construction and operation practices. The site access road route will follow existing roads and/or trails to the extent possible, to limit land clearing. Banks and vegetated areas will be stabilized, if disturbed. Where possible, construction will take place during the winter to minimize disturbance to soils and vegetation, and runoff to local waterbodies. Progressive reclamation will begin as early as possible, starting with areas that are no longer needed for mine operations. Reclamation activities will continue throughout the life of the mine. Additional mitigation measures as described in the Vegetation SON (Section 11). 	Primary
	<ul style="list-style-type: none"> The Project footprint may affect access to preferred use and culturally important areas. 	<ul style="list-style-type: none"> The site access road will not be available to the public. 	
<ul style="list-style-type: none"> Physical Disturbance from Project Footprint <ul style="list-style-type: none"> Construction or development of site access roads, pits, WRSA, quarries, support buildings. 	<ul style="list-style-type: none"> The Project may result in increased concerns regarding human or ecological health. 	<ul style="list-style-type: none"> Regular involvement with, meetings, updating, and communication of the results of monitoring programs to potentially affected Aboriginal communities. 	Primary
	<ul style="list-style-type: none"> The Project may affect the intangible relationship Aboriginal communities have with the land. 	<ul style="list-style-type: none"> No mitigations identified. 	Primary
<ul style="list-style-type: none"> Site Water Management <ul style="list-style-type: none"> dewatering of Lac du Sauvage; and, diversions. 	<ul style="list-style-type: none"> Changes in water levels in surrounding waterbodies and from dewatering Lac du Sauvage or diversions may result in direct disturbance to preferred use or culturally important areas. 	<ul style="list-style-type: none"> Mitigations as described in the Water Quality and Quantity KLOI (Section 8). 	Primary
	<ul style="list-style-type: none"> Changes in water quality or quantity may affect the abundance or distribution of fish for traditional harvesting. 	<ul style="list-style-type: none"> The AEMP implemented at the Ekati Mine will include the Jay Project. Diversions will be designed to take into account fish movement. A Lac du Sauvage Dewatering Plan will be prepared for the WLWB that will include flow rates and locations. Direct discharge flow rates will be developed and maintained such that there are no measurable changes to fish habitat. During pumping of water from areas that contain fish, appropriately sized fish screens that meet DFO guidelines will be fitted to pumps to limit fish impingement and entrainment. A Fish-Out Plan will be developed and the fish-out will occur according to DFO guidance and with engagement of the Ekati Mine IBA groups. Other mitigations as described in the Fish and Fish habitat KLOI (Section 9). 	Primary
	<ul style="list-style-type: none"> Changes in water levels and flow may affect the navigability of water access routes to preferred use or culturally important areas. 	<ul style="list-style-type: none"> A Lac du Sauvage Dewatering Plan will be prepared for the WLWB that will include flow rates and locations. Reduced pumping rates will be implemented during low-flow periods to preserve downstream flow levels. Other mitigations as described in the Water Quantity and Quantity KLOI (Section 8). 	Primary

Table 15.3-1 Potential Pathways for Effects on Traditional Land Use

Project Component / Activity	Effects Pathway	Environmental Design Features and Mitigation	Pathway Assessment
<ul style="list-style-type: none"> Site Water Management <ul style="list-style-type: none"> dewatering of Lac du Sauvage; and, diversions. 	<ul style="list-style-type: none"> Changes in water levels in surrounding waterbodies and from drawing down Lac du Sauvage or diversions may affect the abundance or distribution of wildlife used for traditional harvesting. 	<ul style="list-style-type: none"> The WEMP implemented at the Ekati Mine will include the Jay Project. Project activities will be completed in accordance with the <i>Migratory Bird Convention Act</i>. If lake water level increases are to occur during migratory bird breeding season, then vegetation removal will be completed before nesting season, or nest searches will be completed before construction. If nests are found during nest searches, mitigation will be applied to avoid incidental take of nesting individuals. Habitat changes will be monitored as part of the WEMP. Additional mitigations as described in the Caribou KLOI and Wildlife and Wildlife Habitat SON (Sections 12 and 13). 	Primary
	<ul style="list-style-type: none"> Changes in surface flows, water levels, and water quality may affect the abundance or distribution of traditionally used vegetation. 	<ul style="list-style-type: none"> Lake shorelines will be assessed for erosion potential, and mitigation will be applied for areas identified with high potential for erosion/generation of suspended sediments/contaminant release. The AEMP implemented at the Ekati Mine will include the Jay Project. Additional mitigations as described in the Vegetation SON (Section 11). 	Primary
	<ul style="list-style-type: none"> Water quality changes may result in increased concerns regarding human or ecological health. 	<ul style="list-style-type: none"> Operational discharge will meet the discharge criteria for water quality. Discharge water will be regularly sampled and monitored as part of the Water Licence Surveillance Network Program. The AEMP implemented at the Ekati Mine will include the Jay Project. Regular involvement with, meetings, updating, and communication of the results of the AEMP to potentially affected Aboriginal communities. 	Primary
	<ul style="list-style-type: none"> Changes in surface flows, water levels, and water quality may affect the intangible relationship that Aboriginal communities have with the land. 	<ul style="list-style-type: none"> No mitigations identified. 	Primary
<ul style="list-style-type: none"> General Construction and Operation Activities <ul style="list-style-type: none"> mining of the kimberlite pipes (pit development); operation of surface infrastructure and support facilities; storage of industrial, domestic, hazardous, and contaminated waste; and, vehicle traffic along the access road. 	<ul style="list-style-type: none"> Project construction and operations may affect the abundance or distribution of wildlife for traditional harvesting. 	<ul style="list-style-type: none"> The WEMP implemented at the Ekati Mine will include the Jay Project. Periodic review of the WEMP and engagement with potentially affected Aboriginal groups. Construction of caribou ramps and crossings at strategic points along the Misery Road. Road closures during peak caribou migration throughout the Ekati Mine site. Use of truck convoys with wildlife monitor escorts to reduce periods of traffic along the roads. Vehicles will be restricted to designated roads and prepared work areas (recreational use of off-road vehicles is prohibited). Hazards will be fenced to prevent wildlife interaction. Continued use of measures currently in place to minimize human-wildlife interactions. Wildlife will be actively deterred from areas of risk. Additional mitigation measures as described in the Caribou KLOI and Wildlife and Wildlife Habitat SON (Sections 12 and 13). 	Primary
	<ul style="list-style-type: none"> Project construction and operations may affect the abundance or distribution of fish for harvesting. 	<ul style="list-style-type: none"> The AEMP implemented at the Ekati Mine will include the Jay Project. In-stream works will either be avoided or limited to when watercourses are not flowing, where possible. Where possible, construction will take place during the winter to minimize disturbance to soils and vegetation, and runoff to local waterbodies. Additional mitigation measures as described in the Fish and Fish Habitat KLOI (Section 9). 	Primary
	<ul style="list-style-type: none"> Project construction and operations may affect the abundance or distribution of traditionally used vegetation. 	<ul style="list-style-type: none"> Dust suppression will be applied as appropriate to roads, the airstrip, and laydown areas. Additional mitigation measures as described in the Vegetation SON (Section 11). 	Primary
<ul style="list-style-type: none"> General Construction and Operation Activities <ul style="list-style-type: none"> mining of the kimberlite pipes (pit development); operation of surface infrastructure and support facilities; storage of industrial, domestic, hazardous, and contaminated waste; and, vehicle traffic along the access road. 	<ul style="list-style-type: none"> Project constructions and operations may result in sensory disturbances for Aboriginal land users. 	<ul style="list-style-type: none"> The AQMP implemented at the Ekati Mine will include the Jay Project. Dust suppression measures will be applied to haulage roads, the airstrip, and laydown areas, as appropriate. Speed limits will be established and enforced on all roads to reduce the production of dust. Equipment will be regularly maintained. 	Primary
	<ul style="list-style-type: none"> The Project may result in changes to social and economic factors that affect the continued participation in TLU activities. 	<ul style="list-style-type: none"> Mitigation measures as described in the Maximizing Benefits and Minimizing Impacts KLOI (Section 14). 	Primary
	<ul style="list-style-type: none"> The Project may result in increased concerns regarding human or ecological health. 	<ul style="list-style-type: none"> Regular involvement with, meetings, updating, and communication of the results of monitoring programs to potentially affected Aboriginal communities. 	Primary
	<ul style="list-style-type: none"> The Project may affect the intangible relationship that Aboriginal communities have with the land. 	<ul style="list-style-type: none"> No mitigations identified. 	Primary
<ul style="list-style-type: none"> General Closure and Decommissioning Activities <ul style="list-style-type: none"> removal of Project infrastructure; and, removal of dikes and diversions. 	<ul style="list-style-type: none"> Closure and reclamation may result in direct disturbance to preferred use or culturally important areas. 	<ul style="list-style-type: none"> Disturbed areas will be reclaimed and the surface stabilized. 	Primary
	<ul style="list-style-type: none"> Closure and reclamation may result in changes to the abundance or distribution of wildlife used for traditional harvesting. 	<ul style="list-style-type: none"> Final reclamation will be completed so that the landscape is safe for wildlife use. Additional mitigation measures as described in the Caribou KLOI and Wildlife and Wildlife Habitat SON (Sections 12 and 13). 	No linkage

Table 15.3-1 Potential Pathways for Effects on Traditional Land Use

Project Component / Activity	Effects Pathway	Environmental Design Features and Mitigation	Pathway Assessment
<ul style="list-style-type: none"> General Closure and Decommissioning Activities <ul style="list-style-type: none"> removal of Project infrastructure; and, removal of dikes and diversions. 	<ul style="list-style-type: none"> Closure and decommissioning may result in changes to the abundance or distribution of fish for harvesting. 	<ul style="list-style-type: none"> A closure plan for back-flooding dewatering areas will be developed. Natural, local water will be used to back-flood dewatering areas. Water quality will be monitored during the back-flooding period. Back-flooding will be managed so that there will be no measurable effects to fish habitat at downstream locations in the Coppermine River. Surface water will be diverted to the pit and dewatered area at a rate that does not significantly alter downstream flow rates. During pumping of water from areas that contain fish, appropriately sized fish screens that meet DFO guidelines will be fitted to pumps to limit fish impingement and entrainment. Additional mitigation measures as described in the Fish and Fish Habitat KLOI (Section 9). 	Primary
	<ul style="list-style-type: none"> Closure and reclamation may result in changes to the abundance or distribution of traditionally used vegetation. 	<ul style="list-style-type: none"> Reclamation objectives will reflect the local native vegetation communities. Additional mitigation measures as described in the Vegetation SON (Section 11). 	Primary
	<ul style="list-style-type: none"> Closure may result in changes to access of preferred use or culturally important areas. 	<ul style="list-style-type: none"> At closure, natural water levels in Lac du Sauvage will be re-established. Additional mitigation measures as described in the Water Quality and Quantity KLOI (Section 8). 	Primary
	<ul style="list-style-type: none"> Closure and reclamation may result in increased concerns regarding human or ecological health. 	<ul style="list-style-type: none"> Water quality in the back-flooded area will meet discharge criteria before the dike is breached to allow a reconnection with the main Lac du Sauvage basin. Regular involvement in, meetings, updating, and communication of the results of monitoring programs to potentially affected Aboriginal communities. 	Primary
	<ul style="list-style-type: none"> The Project may result in changes to social and economic factors that affect the continued participation in TLU activities. 	<ul style="list-style-type: none"> Mitigation measures as described in the Maximizing Benefits and Minimizing Impacts KLOI (Section 14). 	Primary
<ul style="list-style-type: none"> General Closure and Decommissioning Activities <ul style="list-style-type: none"> removal of Project infrastructure; and, removal of dikes and diversions. 	<ul style="list-style-type: none"> Closure may affect the intangible relationship that Aboriginal communities have with the land. 	<ul style="list-style-type: none"> Involvement of potentially affected Aboriginal groups in monitoring programs. Regular involvement with, meetings, updating, and communication of the results of monitoring plans to potentially affected Aboriginal groups. 	Primary
<ul style="list-style-type: none"> Accidents and Malfunctions 	<ul style="list-style-type: none"> Spills may affect traditionally used wildlife, fish, or vegetation. 	<ul style="list-style-type: none"> A Spill Contingency Plan is in place for the Ekati Mine and will be expanded to include the Jay Project. Equipment will be regularly maintained. Drip trays and/or absorbent pads will be used during servicing and refuelling of equipment. Hazardous substances will be stored and handled on site in accordance with applicable regulations. Fuel will be stored at central bulk fuel farms and fuel tanks will be housed within bermed areas. The Project will follow the Ekati Mine's standard policies in the event of a spill; spill response training is provided and updated. Hydrocarbon-impacted material will continue to be handled in accordance with the approved management plan. 	No linkage
	<ul style="list-style-type: none"> Spills may result in increased concerns regarding human or ecological health. 	<ul style="list-style-type: none"> A Spill Contingency Plan is in place for the Ekati Mine. Regular involvement with, meetings, updating, and communication of the results of monitoring plans to potential affected Aboriginal groups. 	Primary

TLU = traditional land use; WRSA = waste rock storage area; WEMP = Wildlife Effects Monitoring Program; KLOI = Key Line of Inquiry; AEMP = Aquatic Effects Monitoring Program; WLWB = Wek'èezhii Land and Water Board; DFO = Fisheries and Oceans Canada; IBA = Impact Benefits Agreement; SON = Subject of Note; AQMP = Air Quality Monitoring Program

15.3.2.1.1 Pathways with No Linkage

A pathway may have no linkage to environmental effects if the activity does not occur, or if the pathway is removed by mitigation or environmental design features so that the Project results in no detectable change in measurement indicators. Subsequently, no residual effect is expected. The pathways described in the following bullets have no linkage to the cultural aspects of the human environment, and are not carried forward in the assessment.

- Spills may affect traditionally used resources including wildlife, fish, and vegetation.

No linkages were identified between Project spills and effects on wildlife, fish, or vegetation in the Caribou KLOI (Section 12), Fish and Fish Habitat KLOI (Section 9), Wildlife and Wildlife Habitat SON (Section 13), or Vegetation SON (Section 11). Therefore, there is no linkage between spills and effects on traditionally harvested resources.

15.3.2.1.2 Primary Pathways

The following primary pathways are discussed in detail in the residual effects analysis; several pathways are valid for one or more Project component or activities:

- direct disturbance to preferred use or culturally important sites and areas;
- changes to the abundance or distribution of traditionally harvested wildlife;
- changes to the abundance or distribution of fish for traditional harvesting;
- changes to the abundance or distribution of traditionally harvested plants;
- disturbance to traditional use of the land resulting from sensory changes;
- changes in access to preferred use or culturally important areas;
- changes to social and economic factors that may affect participation in TLU;
- changes to Aboriginal land users' intangible relationship with the land; and,
- increased concerns regarding human or ecological health.

15.3.2.2 Heritage Resources

Project components and activities, effects pathways, and environmental design features and mitigation on the heritage resources VC are summarized in Table 15.3-2. Classification of effects pathways (no linkage and secondary) is also summarized in Table 15.3-2, and detailed descriptions of potential pathways are provided in the subsequent section.

The distance between Project components or activities and known heritage resources sites within the heritage BSA, and the pathway assessment for each site, is described in Table 15.3-3. Of the eight heritage resources sites that have been recorded within the heritage BSA, only two will be impacted by the Project.

Table 15.3-2 Potential Pathways for Effects on Heritage Resources

Project Component / Activity	Effects Pathway	Environmental Design Features and Mitigation	Pathway Assessment
<ul style="list-style-type: none"> Physical Disturbance from Project Footprint <ul style="list-style-type: none"> Construction or development of Project access roads, pits, waste rock storage areas (WRSA), quarries, support buildings 	<ul style="list-style-type: none"> Construction of the Project may cause disturbance or destruction of heritage resources. 	<ul style="list-style-type: none"> Archaeology assessments have been completed at the proposed Project site and documentation is ongoing. Management practices for the avoidance or preservation of archaeological and/or heritage materials discovered during mine activities are in place at the Ekati Mine. Engagement of the Ekati Mine IBA groups. Provide awareness training and a manual for recognizing heritage resources to all staff and contractors. Monitor condition of known heritage resource sites near the Project footprint. Complete more in-depth mitigation strategies if an avoidance mitigation strategy cannot be implemented. 	Secondary
<ul style="list-style-type: none"> Site Water Management <ul style="list-style-type: none"> Dewatering of Lac du Sauvage Diversions 	<ul style="list-style-type: none"> Changes in water levels may affect physical heritage resources. 	<ul style="list-style-type: none"> Archaeology assessments have been completed at the proposed Project site and documentation is ongoing. Management practices for the avoidance or preservation of archaeological and/or heritage materials discovered during mine activities are in place at the Ekati Mine. Engagement of the Ekati Mine IBA groups. Provide awareness training and a manual for recognizing heritage resources to all staff and contractors. Monitor condition of known heritage resource sites near the Project footprint. Complete more in-depth mitigation strategies if an avoidance mitigation strategy cannot be implemented. 	No linkage
<ul style="list-style-type: none"> General Construction and Operation Activities <ul style="list-style-type: none"> Mining of the kimberlite pipes (pit development) Operation of surface infrastructure and support facilities Storage of industrial, domestic, hazardous, and, contaminated waste Vehicle traffic along the access road 	<ul style="list-style-type: none"> Activities such as embankments, shoulder stabilization on eskers, or new borrow sources if required may affect physical heritage resources. 	<ul style="list-style-type: none"> Archaeology assessments have been completed at the proposed Project site and documentation is ongoing. Management practices for the avoidance or preservation of archaeological and/or heritage materials discovered during mine activities are in place at the Ekati Mine. Engagement of the Ekati Mine IBA groups. Provide awareness training and a manual for recognizing heritage resources to all staff and contractors. Monitor condition of known heritage resource sites near the Project footprint. Complete more in-depth mitigation strategies if an avoidance mitigation strategy cannot be implemented. 	No linkage
<ul style="list-style-type: none"> General Closure and Decommissioning Activities <ul style="list-style-type: none"> Removal of Project infrastructure Removal of dikes and diversions 	<ul style="list-style-type: none"> Closure and Reclamation and post-closure activities such as scarifying roads, breaching of dikes, removal buildings and monitoring access that affects physical heritage resources. 	<ul style="list-style-type: none"> Archaeology assessments have been completed at the proposed Project site and documentation is ongoing. Management practices for the avoidance or preservation of archaeological and/or heritage materials discovered during mine activities are in place at the Ekati Mine. Engagement of the Ekati Mine IBA groups. Provide awareness training and a manual for recognizing heritage resources to all staff and contractors. Monitor condition of known heritage resource sites near the Project footprint. Complete more in-depth mitigation strategies if an avoidance mitigation strategy cannot be implemented. 	No linkage
Accidents and Malfunctions	<ul style="list-style-type: none"> Accidents and malfunctions may have the potential to affect physical heritage resources. 	<ul style="list-style-type: none"> Archaeology assessments have been completed at the proposed Project site and documentation is ongoing. Management practices for the avoidance or preservation of archaeological and/or heritage materials discovered during mine activities are in place at the Ekati Mine. Engagement of the Ekati Mine IBA groups. Provide awareness training and a manual for recognizing heritage resources to all staff and contractors. Monitor condition of known heritage resource sites near the Project footprint. Complete more in-depth mitigation strategies if an avoidance mitigation strategy cannot be implemented. 	No linkage

IBA = Impact Benefits Agreement.

Table 15.3-3 Distance of Heritage Resources Sites From Project Development

Site	Project Component / Activity	Distance Between Project Component and Heritage Resources (m)	Pathway Assessment	Mitigation
LdNs-2	Proposed Jay Pipeline Road	350	No linkage	Avoid (2014) Mitigated (1995)
LdNs-3	Proposed Jay Pipeline Road	25	No linkage	Mitigated (1995)
LdNs-4	Proposed Jay Road esker crossing	240	No linkage	Avoid (2014) Mitigated (1994)
LdNs-5	Proposed Jay Road esker crossing	400	No linkage	Avoid (2014)
LdNs-7	Proposed Jay WRSA	375	No linkage	Avoid (2014)
LdNs-16	Proposed Jay Pipeline Road	290	No linkage	Avoid (2014) Mitigated (1997)
LdNs-52	Proposed Jay WRSA	0	Secondary Linkage	Requires mitigation before development
LdNs-53	Proposed Jay WRSA	0	Secondary Linkage	Requires mitigation before development

WRSA = waste rock storage area; m = metre.

15.3.2.2.1 Pathways with No Linkage

A pathway may have no linkage to environmental effects if the activity does not occur, or if the pathway is removed by mitigation or environmental design features so that the Project results in no measurable change in measurement indicators. Subsequently, no residual effect is expected. The pathways described have no linkage to the heritage resources are not carried forward in the assessment (Table 15.3-2).

There is no linkage between heritage resources and the following proposed Project developments: the Jay explosives magazine; dewatering and diversion channels associated with the water management of the Jay Pit; the road to the Misery esker crossing area; the Jay road and power lines; the Misery laydown expansion area; the crusher and stockpile area; and the Lynx WRSA.

15.3.2.2.2 Secondary Pathways

A secondary pathway could result in a measurable minor environmental change, but would have a negligible residual effect on VCs relative to the Base Case and is not expected to contribute to effects of other existing, approved, or reasonably foreseeable projects to cause a significant effect. The pathways described as having a secondary linkage to the heritage resources are not carried forward in the assessment (Table 5.3-2).

The construction of the Project has a secondary linkage for heritage resources. The proposed Jay WRSA will impact heritage resources sites LdNs-52 and LdNs-53. These sites are currently assessed as having low archaeological significance, and the sites will be mitigated using the appropriate level of scientific data recovery.

15.4 Residual Effects Analysis

15.4.1 Traditional Land Use

The following provides the residual effects analysis for the TLU VC. Effects descriptions are provided for measurement indicators that are considered within multiple endpoint analysis. The descriptions are followed by the analysis and classification of residual effects on the assessment endpoints for the TLU VC.

15.4.1.1 *Effects Descriptions*

Several components of the residual effects analysis on TLU consider the same effects on measurement indicators. For example, changes in access may affect all TLU activities (e.g., traditional hunting and trapping). Therefore, a description of each of these effects is provided in the following sections to limit repetition within the assessment.

15.4.1.1.1 *Changes in Access to Preferred Land Use or Culturally Important Sites and Areas*

Travel and access in the barrenlands is provided by overland trails and waterways. For example, the Lutsel K'e Dene travelled to and from the barrenlands by dog team, canoe, and on foot, using several different routes (LKDFN et al. 2001). Travel routes in the TLU BSA are described in detail in Annex XVII.

Reported traditional trails that are in the immediate area to the Jay Project include two trails that connect the Ekati area with MacKay Lake. One trail is used to access the Narrows, while the other is used to access Lac de Gras.

The Tibbitt to Contwoyto Winter Road (TCWR) also provides access for traditional harvesters. Portions of the winter road, including a segment that connects MacKay Lake to Contwoyto Lake, also follow traditional trails. The Deninu K'ue First Nation (DKFN) have noted that travel by snowmobile and vehicle on the TCWR and other winter access roads has largely replaced dog teams for short, winter hunting trips. No effects on access to the Narrows from the winter road are expected because the Jay Project footprint is located west of the Narrows.

Potentially affected Aboriginal communities have indicated concerns that increased access into the region could increase harvesting competition. The only new access route associated with the Jay Project will be the Jay Access Road. This road will not be available for use by the public, and will not allow for any increased access into the area for harvesting.

The preliminary results of the navigability assessment (Section 8.5.3) indicated that a negligible reduction in water flows to the Narrows and Lac de Gras is expected to result from the Project during the construction, dewatering, and operations phases. During the dewatering phase, increased flows are expected at the Narrows and Lac de Gras, but these flows are not expected to reduce or affect navigability.

Low to moderate magnitude effects could occur during the closure phase due to the back-flooding of previously dewatered areas. These effects to flows are expected to last no longer than four years (the closure phase), and will be monitored. Pumping rates from Lac du Sauvage are scheduled to be reduced during periods of low flow (November to May) when the lakes are iced over. This reduction will assist in reducing potential impacts to navigability during winter periods. During other periods of low flow reduced pumping rates will be enacted to mitigate effects.

In addition to the Project's effects, water flow and levels also have the potential to be affected by the Diavik Diamond Mine (Diavik Mine). Back-flooding of dewatered areas at the Diavik Mine is scheduled to occur during the Project's operations phase, and may result in adverse changes in navigability in the Narrows. These effects are expected to be of limited duration.

While effects to flow are expected to Lac de Gras, these effects are not expected to affect navigability in Lac de Gras. Traditional land users accessing the Narrows during the closure period and the Diavik Mine back-flooding period may potentially experience periods of adverse changes in navigability during low flow periods (October to May).

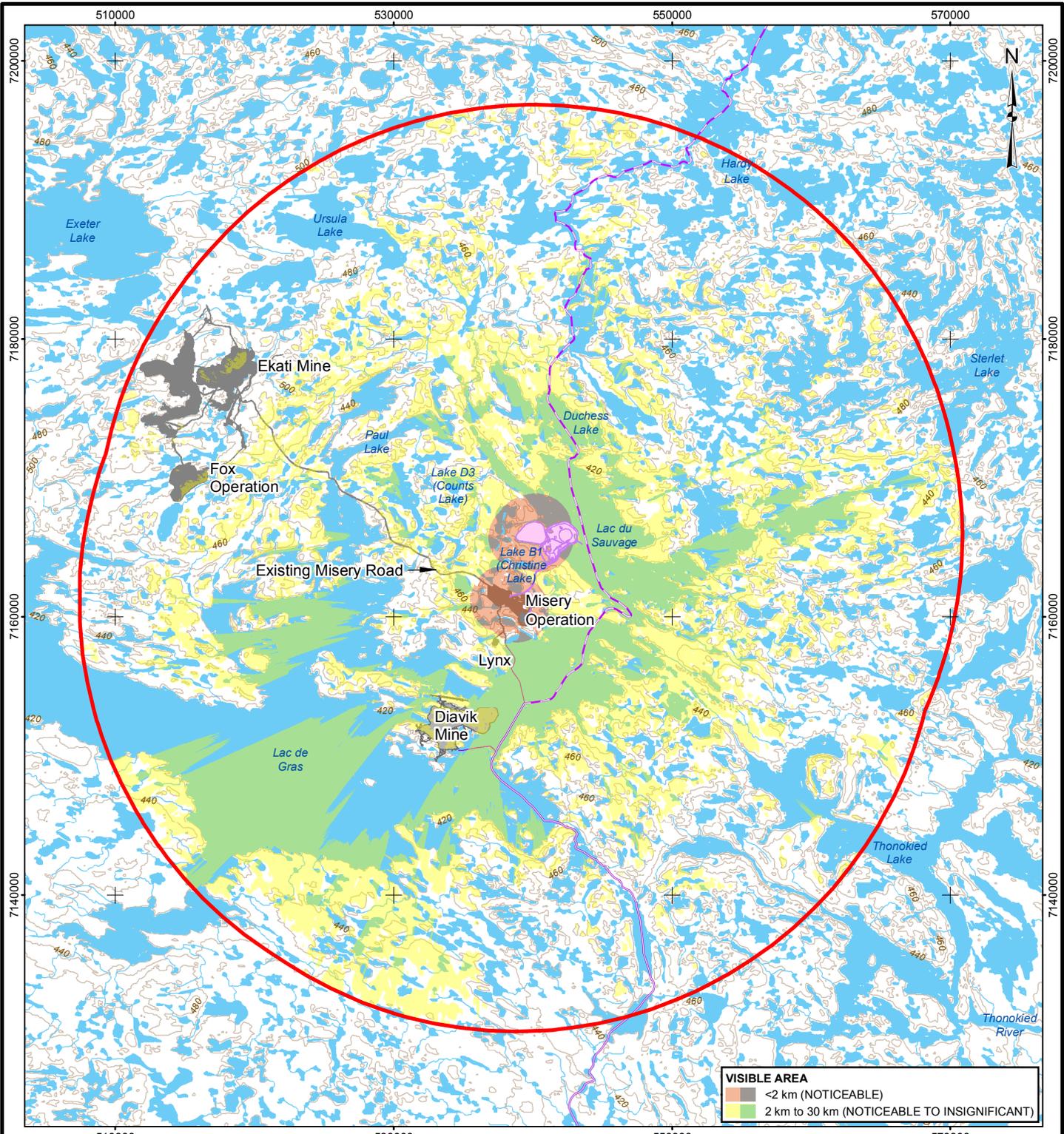
15.4.1.1.2 *Changes in Viewscape and Light*

A viewscape analysis was completed to assist in the determination of visual disturbance to traditional land users. A visual representation of areas from where Jay Project features may be visible to land users is presented in Map 15.4-1. Visibility of the Jay Project was based on the tallest and largest WRSA, and did not include any vegetation or building features. It is expected that by using the most visible of Project features the analysis will also capture the visibility of smaller Project components.

The viewscape analysis indicated that the land users located within a 2 km area surrounding the WRSA would likely be able to notice the visual disturbance. Noticeability of the WRSA is expected to diminish outwards within an area of 30 km.

In addition to the visual disturbance of the Project, additional light disturbance could result from Project operations. The Project is an extension of the existing Ekati Mine. Therefore, current light disturbance exists in the area. The Jay Project is likely to expand the area of light disturbance northeast of the existing Misery Project facilities.

Disturbance resulting from viewscape and light may influence individual land users in variable ways. There are no threshold limits to determine the level at which visual or light disturbance will discourage or prevent land users from undertaking TLU activities. Therefore, the potential for visual and light disturbance from the Project to affect the continuance of TLU activities exists, but the extent of this effect is unknown.



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LEGEND

- EKATI MINE FOOTPRINT
- DIAVIK MINE FOOTPRINT
- PROPOSED JAY FOOTPRINT
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- ELEVATION CONTOUR (20 m INTERVAL)
- WATERCOURSE
- WATERBODY
- STUDY AREA

NOTES

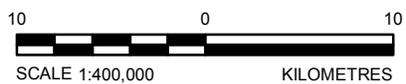
1. THE STUDY AREA WAS DETERMINED THROUGH A VISUAL PROMINENCE CALCULATION MADE WITH THE TALLEST AND LARGEST WASTE ROCK PILE OF THE PROJECT AND THE ANGULAR RESOLUTION. THE VISIBILITY ANALYSIS IS DERIVED FROM THE DEM ONLY AND DOESN'T INCLUDE ANY VEGETATION, BUILDING OR UNDERGROUND FEATURES.

REFERENCE

NATIONAL TOPOGRAPHIC BASE DATA (NTDB) 1:250,000
 CANVEC © NATURAL RESOURCES CANADA, 2012
 NATURAL RESOURCES CANADA, CENTRE FOR TOPOGRAPHIC INFORMATION, 2012
 DATUM: NAD83 PROJECTION: UTM ZONE 12N

DOCUMENT

DEVELOPER'S ASSESSMENT REPORT



PROJECT **DOMINION DIAMOND** JAY PROJECT NORTHWEST TERRITORIES, CANADA

TITLE **JAY PROJECT VIEWSCAPE**

	PROJECT	13-1328-0041	FILE No. DAR_SocioEc_004_GIS
	DESIGN	AB 01/08/14	SCALE AS SHOWN REV. 0
	GIS	SB/JE 14/10/14	
	CHECK	AB 14/10/14	
	REVIEW	MG 14/10/14	

MAP 15.4-1

15.4.1.1.3 Noise Disturbance

An assessment of the effects of potential noise emissions and resulting changes in ambient noise levels associated with the Project is provided in the Noise Impact Assessment (NIA) Report (Appendix 13B). The NIA focused on Project-related noise sources (e.g., stationary and mobile equipment) and activities (e.g., haul road and winter road traffic, blasting, material extraction and processing). The following section provides a summary of noise effects as it pertains to effects on traditional land users. The NIA assessed noise emissions for Jay Project operations using guidance by the Alberta Energy Regulator's *Directive 038: Noise Control* (EUB 2007) and Health Canada (Health Canada 2010).

The NIA concluded that the highest noise emissions and greatest potential noise impacts associated with Jay Project construction activities will occur during summer 2017. The NIA assessed Project construction noise (A-weighted decibel) along a 1.5-km buffer surrounding the Jay Project boundary, with four receptors along the buffer, roughly at the four cardinal directions. These receptor sites are utilized in assessing noise effects on traditional land users.

Based on the results of the NIA, the total noise from the Project construction phase will not exceed Health Canada thresholds for noise-induced hearing loss, sleep disturbance, interference with speech comprehension, complaints, or change in percentage "highly annoyed"³ at any of the four boundary receptor sites. Results obtained for the assessment of noise emissions from the TCWR usage during Project construction indicate that the increase in truck traffic required to accommodate construction demand will not cause a quantifiable increase in noise levels along its length.

During Project operations, the NIA focused on the first year of operations when in-pit equipment will be closest to the surface and thus the potential for noise effects is greatest. In subsequent years, as pit depth increases, pit wall screening effects will reduce the noise from sources. Project operations are expected to comply with Directive 038 permissible sound level values at all receptors located along the 1.5-km buffer. Tibbitt to Contwoyto Winter Road traffic required for Project operations is expected to be the same as the TCWR traffic associated with operation of the current Ekati Mine. As such, the noise level predictions are consistent with current noise levels associated with the TCWR.

The NIA is assessed against regulatory thresholds for human receptors, which do not guarantee that someone engaged in TLU activities will not hear noise from a facility. Audibility of noise is dependent on many factors, including the varying ambient noise that may be affected by factors such as wind, landscape, and an individual land user's ability to hear and distinguish noise. In addition, the response to audible noises by land users varies by individual. As a result, there is no set established tolerance threshold at which noise disturbance will prevent a land user from undertaking TLU activities. Responses to noise and noise levels is highly individual. Therefore, it is expected that noise resulting from the Project in combination with the existing ambient sound levels could influence traditional land user's experience at locations within the 1.5-km Project buffer, with disturbance lessening as proximity to Project infrastructure decreases. Due to the variables in assessing audibility described above, at locations beyond the 1.5-km buffer the potential for noise disturbance from the Project to affect the continuance of TLU activities exists, but the extent of this effect is unknown as well as the land users reaction to it.

³ Health Canada defines 'annoyance' as a state of being annoyed, disturbed or bothered, evoking upset of a person's composure, which can include some degree of wearing on the nerves, anger, or anxiety, difficulty enduring the source of annoyance and ensuing weariness or impatience of spirit, or interference with comfort or peace of mind. With 'high annoyance' as an degree of annoyance based on the top two categories of annoyance (very or extremely) of an adjectival scale.

15.4.1.1.4 *Social and Economic Factors Affecting Participation in Traditional Land Use, and Associated Traditional Lifestyle and Culture*

Various social and economic factors may affect participation in TLU activities, traditional lifestyles, and Aboriginal culture. These factors may include income, work schedules, and the use of Aboriginal language. The assessment of socio-economic effects is provided in the Maximizing Benefits and Minimizing Impacts KLOI (Section 14).

The Communities and Diamonds 2013 Report (GNWT 2014) indicates that traditional lifestyle activities could be positively and negatively influenced by mine development. Potential negative effects include a division between Elders and younger generations, where younger generations may emphasize wage employment over traditional practices (such as trapping). Mining employment may also reduce the amount of time that land users have to pursue traditional activities, particularly joint activities with other members of their community or family. However, the two-week rotational schedule for workers that was implemented at the Ekati Mine and will be extended to the Jay Project, has been noted as “minimiz[ing] the disruption of traditional lifestyles among Aboriginal workers” (BHP 1995a: 62-63).

Employment at the mine may also provide potential positive benefits to traditional harvesting. An increase in income resulting from mine employment may have the indirect effect of making harvesting equipment, such as snowmobiles, more affordable. This equipment in turn, can result in more efficient harvesting practices, or the ability to access additional harvesting locations, which may result in increased harvesting success (GNWT 2014).

The knowledge and use of Aboriginal language may allow for a continued connection with a TLU landscape, through the continuance of local place names and vocabulary. Language also provides an avenue for the transfer of TK between generations and therefore, may affect the continuance of TLU activities. The use of Aboriginal language in the NWT was declining before the development of diamond mines, and may reflect a larger cultural change that is occurring within the region. The Project is not expected to result in a change to the use of Aboriginal language.

Because other mines such as the Ekati Mine and Diavik Mine are already operating in the region, the effects described above are considered to already exist. The beginning of Project operations coincides with the closure of other Ekati Mine operations. Current Ekati Mine employees will be moved to staff the Project operations, thereby extending the existing employment conditions from 2019 to 2029. A small increase in job development will be associated with Project construction.

The closure of the Diavik Mine, and the opening and closure of the DeBeers Gahcho Kué Mine occur during the operations phase of the Project, which will result in a reduction of jobs to Aboriginal communities. This reduction of employment may result in an outmigration of skilled Aboriginal workers and their families into other areas, and this outmigration could result in a reduction of the collective TK within a community. To help mitigate this effect, Dominion Diamond intends to provide retrenchment programs to employees to provide training and to support employees who are transitioning out of Project employment into other opportunities within the NWT.

15.4.1.1.5 Increased Concerns Regarding Human or Ecological Health

During community engagement sessions, several comments were made by Aboriginal members about how the Project, and other developments in the region, were affecting the health of the environment, traditionally used resources, and the members' communities. Concerns about human and ecological health resulting from a decreased confidence in the quality of traditional harvested resources may result in a reduction in the quantity of traditional harvesting and associated traditional lifestyles.

These concerns were indicated for all Project components, and particularly for the closure and reclamation stage. For example, during the March (2014) Tłjchq workshop, a harvester expressed that concerns about contamination would result in the avoidance of Lac du Sauvage as a fishing location after the closure of the Project. Similarly, participants on the Wekweèti site visit expressed concern that back-flooding the mine pit may allow mining residues to negatively impact water quality and possibly fish health. They strongly supported the need for ongoing monitoring to check that the mineral and seepage from rocks does not contaminate the undisturbed portions of Lac du Sauvage.

Dominion Diamond intends to mitigate this concern through the involvement of potentially affected Aboriginal groups in their monitoring programs (i.e., WEMP, AEMP, AQMP) and through the communication of the results of these monitoring programs to each community through meetings and other engagement opportunities. However, concerns may remain for at least some land users. Therefore, as a result of the concerns brought forward by Aboriginal members, effects resulting from increased concerns about human and ecological health are considered to potentially affect the continuance of TLU activities throughout Project construction and operations and beyond the closure phase. The level of concern and confidence in the health of the environment and traditionally used resources are expected to vary by individual, as will the resulting response in changes to TLU practices.

15.4.1.1.6 Aboriginal Land Users' Intangible Relationship with the Land

Aboriginal communities that may be potentially affected by the Project have indicated that their relationship to the land goes beyond the physical act of procuring resources and extends to intangible aspects. Intangible aspects of culture or 'intangible heritage' generally allow for the connection between people and things and involve:

...non-material aspects of social life that relate to aspects of tradition and the past. These might include such things as spoken language, song, dance, cuisine, types of craft and forms of artistic expression. It might also be seen to include people's sense of 'attachment' to a place, building or object...Intangible heritage can be thought of as the non-material aspects of culture that help societies to remember their past and their traditions, to build a sense of identity, community and locality in the present (Harrison and Rose 2010: 240).

To the Dene, the land is full of history. Every feature of the landscape has a name and tells a story. The Dene have indicated that this connection with the land is important for survival and should be preserved for the future. The Dene identify with all the land as part of their home:

Our life is part of the land. We live on the land and are satisfied with what we get from it. No one person owns the land, it belongs to all of us. We choose where we want to go and our choice is respected by others whether in the settlement or in the bush. We have no word in our language that means wilderness, as anywhere we go is our home (Sadownik and Harris 1995: 4).

Similarly, a DKFN member has stated:

I still have a feeling when I go there [the barrenlands], it's like I'm back – it's like I'm home. I don't know if it's a spiritual feeling, but I have a connection with that area (DKFN 2012: 53).

The LKDFN have expressed how the strength of their cultural connection with the land provides a measure for community health. To the LKDFN, the land itself is an important source of spiritual, emotional, physical, and mental healing. They believe that respectful communication with the land and the Creator is an important aspect of healing (Parlee and Marlowe 1997).

The Tłı̄ch̄q see themselves, and all parts of the land, as physically and spiritually connected. The activities and the stories that are associated with the land holds, maintains, connects, and communicates TK for the Tłı̄ch̄q people, and is important for maintaining a spiritual connection with the land. The Tłı̄ch̄q term ndè represents the spiritual and physical aspects and relationship of the land, people, animals, and habitat. It represents the idea that everything in the environment has life and spirit (DCI 1995). The Tłı̄ch̄q give their respect to the land in many ways. Prayers and payment to the land are important for safe travel and successful hunts. Large lakes, boulders, graves, unfamiliar areas, and other important features on the land are important places to provide offerings. Everything on the land has a purpose and should be respected (Dominion Diamond 2013).

Representatives from the Kitikmeot Inuit Association who were involved in the Naonayaotit Traditional Knowledge Study were reluctant to talk about spiritual places or supernatural events. However, in Banci et al. (2006), all places on the land are said to be special. Place names, songs, and stories are all ways in which the Inuit transmit their history and share information about certain areas and landscape features (Sadownik and Harris 1995).

While a discussion of Aboriginal land users' intangible relationship with the land is provided within this section for context, it will not be considered in the residual effects analysis or residual impact classification. While the possibility between the Project and effects on this relationship exists, due to the personal, dynamic, and intangible nature of this relationship a discussion of the extent or degree of such a change is both inappropriate within this assessment and, likely, impossible to achieve.

15.4.1.2 Effects Analysis

15.4.1.2.1 Effects on Traditional Wildlife Harvesting

Existing Environment

Traditional wildlife harvesting occurs for a variety of species on the barrenlands. However, caribou is of primary importance, and the movement of caribou heavily influenced the movements of Dene hunters on the landscape (LKDFN et al. 2001). The following discussion about the existing environment has been divided between caribou, large game, furbearers, and birds. Additional information about the existing environment of wildlife harvesting and wildlife TK is included within Annex XVII.

The YKDFN have indicated that the existing winter road from Tibbitt Lake to Contwoyto Lake has already affected important hunting and trapping areas.



Caribou

Traditionally, caribou have provided the Dene people with food, shelter, and clothing. Almost all parts of the caribou were used in the construction of tools and materials such as awls, scrapers, needles, toboggans, tents, ropes, clothing, and floor mats. The fat and muscle of the caribou were eaten, or prepared and stored for travelling through the barrenlands in the winter. Caribou teeth and gums were also used for medicinal purposes to treat toothaches or other ailments (Weledeh Yellowknives Dene 1997). While Métis were, generally, more sedentary than their Dene counterparts, caribou was and continues to be an important part of Métis culture and diet. Like the Dene and Métis, the Inuit respect the caribou they depend on for their survival, and when preparing and processing animals, all work areas are kept clean. Caribou are also never hunted on the calving grounds or processed along traditional migration paths. Today, caribou continue to provide a primary food source for all potentially affected Aboriginal groups, and provide hides used in clothing (DKFN 2012).

Caribou are important not only for the sustenance and materials they provide, but also for their cultural and spiritual importance to Aboriginal groups. For example, in the *Traditional Knowledge Study of Ek'ati* (Weledeh Yellowknives Dene 1997), the YKDFN state the Elders' insistence that caribou are the most important animal to the Dene; that they cannot survive without caribou. Similarly, The Tłı̄ch̄o identify the caribou as individuals with the power to make decisions based on their relationships with humans, while the Métis consider caribou harvesting as a main catalyst for social interactions between friends and generations.

The fall caribou hunt was exceptionally important to Aboriginal land users because it provided an important source of fat and the thick, warm furs needed for winter survival. For the YKDFN, this vital hunt traditionally occurred in the larger areas surrounding the Project, including Contwoyto Lake, Yamba Lake, Courageous Lake, MacKay Lake, Lac du Sauvage, and the Coppermine River (Weledeh Yellowknives Dene 1997). The LKDFN have indicated that some members would hunt caribou further south, in the vicinity of McLeod Bay (in the east arm of Great Slave Lake) (Parlee and Marlowe 1997).

Lac de Gras was also identified as a central and important location for caribou and caribou harvesting. For the YKDFN, the 'Gras' in Lac de Gras refers to caribou fat (Weledeh Yellowknives Dene 1997). The Tłı̄ch̄o and Inuit similarly have indicated that Lac de Gras is an important harvesting location for caribou and other plants and animals.

The Inuit also indicated Contwoyto Lake as a base for caribou hunting. This lake is strategically placed between boreal forest and caribou calving grounds, a location that almost guaranteed the presence of caribou for most of the year. In the Dene language, the name for Contwoyto Lake means 'lake with many camps' and this is where many traditional YKDFN winter hunting camps were established. The Deninu K'ue hunted caribou at the same water crossings as other Dene groups, and have expressed knowledge of the barrenlands as far north as the Coppermine River.

Caribou harvesting was indicated on the island where the Diavik Mine is now located and another island to the west (together known as Ek'ati Ndi). The shores of Long Lake are also remembered as an important hunting and camping location in the Ekati area (Weledeh Yellowknives Dene 1997).

During Project site visits and workshops, Aboriginal land users noted that the Narrows is where the caribou cross Lac du Sauvage and Lac de Gras, and as a result, it is a good place for hunting and trapping. Similarly, a participant from the YKDFN and LKDFN community workshop indicated that the Narrows and the islands on Lac du Sauvage are historic caribou crossing areas. Caribou have been noted to move along the eskers on the west shore of Lac du Sauvage to access the crossing at the Narrows. The YKDFN also identified the Narrows and the Lac du Sauvage esker as critical caribou migration routes. They also indicated that they expect the use of this area to increase as the caribou attempt to avoid active mining operations. Caribou migration through the Narrows was also noted by the Tłı̄chǫ, as was the importance of the Narrows as part of the Tłı̄chǫ traditional hunting territory (DCI 1995).

Elders from Whati, Gamèti, Wekweèti and Behchokǫ have travelled by boat, dog team and snow machine to Akaitcho Territory. We went there to hunt for caribou (TG 2012: 26).

More recently, Tłı̄chǫ Elders have said that they do not see the caribou come through the Lac de Gras area anymore (TG 2012). Members from the community of Whati indicated that they no longer travel as far as Lac de Gras or Lac du Sauvage to hunt or trap, but that members from other communities continue to do so.

North Slave Métis have indicated that the islands of Lac de Gras are important resting and grazing areas for migrating caribou. Other North Slave Métis believe that the caribou migration has already altered around the Lac de Gras area, and that it no longer offers successful harvesting of caribou (BHP 1995a; Stevenson 1999). The Métis from Fort Resolution also rely heavily on caribou for sustenance, although few specific locations for harvesting were noted in the literature reviewed.

The Inuit identified Lac de Gras (Tahikpak) as a good spring hunting area. Caribou could always be found on the islands, especially in the summer, at Tahikpak (Lac de Gras), Tahikyoak (Contwoyto Lake), and Nonatoklik (Pellatt Lake) (Banci et al. 2006). During open-water periods, caribou could be hunted using the long thin kayaks, characteristic of the Inuit, made from a willow frame covered in caribou or seal skin. The Inuit have indicated that they do not hunt caribou at the Narrows because they do not hunt caribou along their traditional migration paths.

Large Game

The YKDFN have indicated that until recently, moose were common in the vicinity of Great Slave Lake (Weledeh Yellowknives Dene 1997). In general, moose and caribou do not share the same space since they prefer different foods, and moose tend to be disturbed by the presence of caribou.

Grizzly bear are not often hunted on the barrenlands. They are a respected animal and may provide medicine to address ailments (Weledeh Yellowknives Dene 1997). The Inuit suggested that they hunt bears for their furs. The Narrows has been identified as a location for grizzly bears. Métis have also indicated that grizzly bears den in the eskers near Lac de Gras (BHP 1995a). In 2011, community participants in the WEMP Community Engagement Program utilized their TK to assist Ekati staff in identifying 23 grizzly bear habitat locations around the Ekati Mine. These habitat locations were then used for establishing plots for the grizzly bear DNA program.

The Dene hunted muskoxen before the government placed a ban on muskoxen hunting in 1917. Members from LKDFN would hunt muskoxen in the eastern lands around Alymer Lake, Artillery Lake, and along the Thelon River. Since the ban, the population of muskoxen has rebounded and the hunting of muskoxen has been reinstated. Today, the DKFN travel to the Thelon River basin to hunt muskoxen. Similarly, Métis from Fort Resolution and the NSMA hunted muskoxen on the barrenlands. The Inuit have noted that they, historically, would hunt muskoxen mostly when caribou were unavailable, or for dog food, although muskoxen horns were used to make hunting bows (Banci et al. 2006).

Members from DKFN have indicated that today, moose is consumed on an almost equal level with caribou, and bison is used to supplement their traditional summer diet (Dezé 2009). Moose also play an important part in the Métis diet and as part of Métis culture. Muskoxen are found exclusively out on the barrenlands, while bison and moose are found almost exclusively south of the treeline (DKFN 2012).

Furbearers

Furbearing animals that historically have been harvested on the barrenlands include wolf, wolverine, fox, Arctic hare, lynx muskrat, marten, ground squirrel, and beavers. Furbearing animals were caught largely for their furs, but the meat was also often used for food or bait (Weledeh Yellowknives Dene 1997). Small animals also provided usable materials beyond food and fur, for example, muskrat teeth could be used to fashion fish hooks and attached to winter nets set under the ice (Weledeh Yellowknives Dene 1997). The hunting of small game also allowed children to gain experience in hunting, before moving on to large animals (DKFN 2012). The Métis, due to their close affiliation with the fur trade, have always relied heavily on the trapping of furbearers for food, furs, and as an economic base.

Wolf packs on the barrenlands were a good sign for the YKDFN hunters, often signalling the upcoming arrival of a migrating caribou herd. Wherever wolves might be, the YKDFN would expect to find other scavengers such as fox, weasel, and ravens, waiting to take advantage of wolf kills. As a result, the benefits of wolves were two-fold; providing information on the caribou whereabouts and as a source of furs themselves. Small game furs were used to make clothing and blankets, and after the arrival of the trading companies these furs were collected for trade (Weledeh Yellowknives Dene 1997). Members of the DKFN and NSMA continue to hunt wolves for their fur, and they often find wolves following the caribou. The Tłjchq have identified the importance of the Lac de Gras areas for wolf and fox denning (DCI 1995).

Wolverines were primarily harvested for their fur, but were also killed as an emergency food source, although this practice is no longer common. The LKDFN describe wolverines as thieves that are mischievous, strong, and slow. According to the DKFN, wolverines can be found throughout most of the NWT and despite their highly valued fur, most are taken opportunistically (DKFN 2012). The Métis believe that wolverines have defined territories, some of which are around Lac de Gras. This belief is supported by the Naonayaotit TK Project, where Lac de Gras was referred to as wolverine country (Banci et al. 2006).

The Narrows has been identified as a location for foxes, wolves, wolverine, weasels, and Arctic hares. Arctic hares are found exclusively on the barrenlands. According to the Tłjchq, the eskers on the Ekati claim block represent good trapping territory for furbearers (DCI 1995).



Birds

Birds, such as ptarmigan and grouse, provided additional food for the Dene in winter (DCI 1995; Weledeh Yellowknives Dene 1997; Dezé 2009). In springtime, waterfowl including ducks, swans, and geese were hunted (Dezé 2009). In addition to food, birds also provided other materials such as feathers used for arrow shafts or for blankets and pillows. Children were also given protection charms made from ptarmigan feet. The LKDFN have also expressed the spiritual and cultural importance of eagles (LKDFN et al. 2001). Ravens, while no longer observed in the barrenlands, were important to the Dene, because they provided important information to hunters about the location of other animals (Shadownik and Harris 1995; Weledeh Yellowknives Dene 1997).

Regarding preferred bird harvesting areas, the Narrows has been noted as an area that is abundant in birds.

Incremental Effects on Traditional Wildlife Harvesting

The Project's incremental effects on traditional wildlife harvesting are considered to be a combination of effects on the abundance and distribution of wildlife species, direct disturbance to preferred harvesting locations, changes in physical access to preferred harvesting areas, sensory disturbances experienced by land users, social and economic factors affecting participation in TLU, and concerns regarding human and ecological health.

The Project's effects on wildlife are discussed within the Caribou KLOI (Section 12), and Wildlife and Wildlife Habitat SON (Section 13). The Caribou KLOI indicated that the direct incremental habitat loss is expected to be less than 0.07 percent (%) of any habitat type in any seasonal range, relative to the 2014 baseline conditions. The Project footprint does not intersect with the caribou winter range and therefore, there was no change in the winter range disturbance area. Most of the effects of development on caribou habitat within the barren-ground caribou ESA are changes in habitat quality from indirect effects (i.e., sensory disturbances, dust deposition) that are expected to be continuous through all phases of the developments, and reversible when the developments are completed.

An important aspect of disturbance is that when human activities are present, caribou are known to alter their behaviour to avoid disturbed landscapes. The response of caribou to roads is initially avoidance, although in time they may become habituated to the presence of roads and traffic (Haskell and Ballard 2008; Johnson and Russell 2014).

The Wildlife and Wildlife Habitat SON identified six Wildlife VCs: wolverine, grizzly bear, gray wolf, upland birds, waterbirds, and raptors. The effects on wolverine, grizzly bear, and waterbirds were brought forward into the analysis of effects on traditional wildlife harvesting because each of these species or groups have been noted as traditionally used wildlife resources. While gray wolf and upland birds have been noted as traditionally harvested species, effects on gray wolf and uplands birds were not considered a primary pathway in the Wildlife and Wildlife Habitat SON, and therefore they were not assessed in the residual effects analysis. Therefore, effects on gray wolf and upland birds are not considered within the analysis of effects on traditional harvesting. Similarly, while raptors have been noted as a valued species, no indication was given that they were harvested, and therefore raptors are not considered in the following assessment.

Effects on the abundance and distribution of wolverine were assessed in the Wildlife and Wildlife Habitat SON (Section 13.4.5), while the effects on the abundance and distribution of grizzly bear were assessed in Section 13.4.6. A joint effects study area was utilized in the assessment of effects on wolverine and grizzly bear (i.e., the grizzly bear and wolverine ESA).

The Project is predicted to result in changes of less than 0.1% in the grizzly bear and wolverine ESA, relative to the 2014 baseline condition. The Project is predicted to result in a 0.1% reduction in high and good quality wolverine habitat, while a reduction of less than or equal to 0.1% in high and good quality grizzly habitat is predicated, relative to the 2014 baseline condition. The duration of the effects on wolverine and grizzly bear populations from changes in habitat quality and altered movement and behaviour are expected to be reversed within 5 to 10 years following final closure.

Effects on the abundance and distribution of waterbirds were assessed in the Wildlife and Wildlife Habitat SON (Section 13.4.2), and may result from direct changes in habitat quantity and fragmentation, and indirect changes in habitat quality, behaviour, and movement. Effects on waterbirds were assessed in the birds ESA. The birds ESA provides breeding and/or staging habitat for a variety of dabbling ducks, diving ducks, sea ducks, loons, gulls, terns, and waders comprising approximately 40 waterbird species. These species occupy a wide variety of habitats, but all share strong associations to aquatic habitat.

The results of the Wildlife and Wildlife Habitat SON indicated that incremental changes resulting from loss of habitat, and decreases in high suitability habitat are expected to be small, relative to the 2014 baseline conditions. Relative to the 2014 baseline condition, direct and sensory disturbance from the Project is anticipated to reduce the amount of suitable (high and good) staging and breeding waterbird habitat in the ESA by 1,583 hectares (ha) (0.6%) and 669 ha (0.4%), respectively. The duration of the effects on waterbird populations from changes in habitat quality and altered movement and behaviour should be reversed within 5 to 10 years following final closure.

Wildlife harvesting, generally, occurs on a regional scale, and is dictated by the location of preferred resource species. The Project will directly disturb some preferred use areas, particularly for the harvesting of caribou in and around Lac du Sauvage. While there may be a direct impact to a portion of a preferred area, this effect will be limited to the local scale. Alternative areas within the immediate region, including the Narrows, will continue to be undisturbed from direct Project development.

Indirect sensory disturbances will extend beyond the local scale and into the regional scale. Changes in viewscape will result in the Project components being noticeable within a 2-km buffer of the Project (Section 15.4.1.1.2), with noticeability lessening with increased distance away within a 30-km buffer. Noise from the Project will also extend beyond the local scale and into the regional scale. Noise will comply with the regulatory thresholds at a 1.5-km buffer from the Project, although some land users may be able to distinguish Project noise beyond this boundary (Section 15.4.1.1.3).

Project effects on physical access have been discussed in Section 15.4.1.1.1. No change in road access is expected due to the Project, because the Jay Access road will not be accessible to the public. Some changes in the navigability of the Narrows are expected, although these are predicted to occur during low flow winter periods when boat use of the waterways is less likely. While water flow may be altered for Lac de Gras, no changes in navigability are expected.

The social and economic factors that may affect participation in TLU are discussed in Section 15.4.1.1.4. For Aboriginal harvesters employed at the mine, their income may provide them with funds to allow them to harvest more frequently or efficiently. It is expected that Aboriginal employees who are currently employed at the Ekati Mine may have their employment period extended as workers are transferred from closing operations to the Jay Project. The two-week rotational schedule for workers has been identified as allowing Aboriginal harvesters an appropriate period of time in which they can undertake traditional harvesting activities, thereby strengthening ties to traditional lifestyles. However, the focus on wage employment can reduce the emphasis placed on traditional skill sets.

In addition to the factors already discussed, increased concerns about ecological and human health resulting from Project development may affect TLU activities. For example, Métis have expressed concern about the presence of the large open pits, increased traffic, increased competition for traditionally harvested resources, and the effects of dust on caribou food sources affecting caribou health and populations (Stevenson 1999). Concern about the effects of dust and contaminant spills on the health of other animals, including furbearers and birds, were also noted. Additional concerns were noted about how potential health effects may rise through the food chain, affecting a greater number of animals (BHP 1995b).

In summary, incremental effects on traditional wildlife harvesting are considered to be a combination of the effects on the following:

- the abundance and distribution of traditionally harvested wildlife species (i.e., caribou, waterbirds, wolverine, and grizzly bear);
- direct disturbance to preferred wildlife harvesting areas;
- changes in access to preferred wildlife harvesting areas;
- sensory disturbances (e.g., noise and viewscape);
- social and economic factors affecting the participation in TLU; and,
- increased concerns regarding human or ecological health.

Changes in Aboriginal land users' intangible relationship with the land, discussed in Section 15.4.1.1.6, also have the potential to affect TLU. However, because no mechanism exists with which to measure the extent of the effect, it has not been evaluated in this analysis.

Cumulative Effects on Traditional Wildlife Harvesting

Cumulative effects consider previous and existing projects, the incremental effects of the Project, and the effects of applicable reasonably foreseeable projects. The Caribou KLOI (Section 12) noted that barren-ground caribou populations have natural cycles of high and low numbers, and their distributions change through time (Adamczewski et al. 2009; Tyler 2010). The cumulative effects from previous and existing developments, the Project, and reasonably foreseeable developments are predicted to have no significant adverse impact on the ability of barren-ground caribou to be self-sustaining and ecologically effective.

Direct losses of caribou habitat from all developments, including reasonably foreseeable development, are expected to be irreversible, but will be confined to the physical footprints of the development (less than 0.6% of each of the Bathurst caribou herd seasonal ranges). Most of the effects of development on caribou within the seasonal ranges are related to modelled changes in habitat quality from the combined influences of sensory disturbance mechanisms (e.g., dust, noise, lights, and general human activity). In the analysis of habitat quality, conservative assumptions and conditions were applied to developments, zones of influence, and habitat modifiers so that the predicted effects on caribou would not be underestimated.

When human activities are present, caribou are known to alter their behaviour to avoid disturbed landscapes. The response of caribou to roads is initially avoidance, although in time they may become habituated to the presence of roads and traffic (Haskell and Ballard 2008; ERM Rescan 2014a,b; Johnson and Russell 2014). Tłjchq and KIA members have expressed concerns about mining developments disrupting timing and routes of caribou migrations. Future development of the Bathurst Inlet Port Road and the Izok Corridor may result in barriers within the northern portion of the Bathurst caribou range. If developed, these all-season roads will be within the spring, post-calving, and autumn migration ranges of the Bathurst caribou herd, including the calving grounds.

Barrier effects related to animal behavioural changes from increased traffic on the Misery Road could influence migratory behaviour and connectivity of the Bathurst caribou herd. The expansion of Bathurst herd monitoring programs during migration periods are expected to identify concentrations and movements of animals that may interact with the road. Stockpiling of ore and the use of road trains and road closures will provide opportunities for migration across the road as needed to reduce the barrier effect and prevent a decrease in connectivity of the herd.

Climate change can also influence the seasonal distribution of caribou by modifying insect levels, food abundance (primary productivity), snow depth and hardness, predator numbers (and alternative prey), and burns (Sharma et al. 2009; Vors and Boyce 2009). If climate change results in more frequent and severe fires on the winter range, forage availability may decline and lead to declines in recruitment (Barrier and Johnson 2012). Inuit identified an increase in freezing rains in winter as an important factor limiting caribou access to food (Section 12.2.3.6; Banci et al. 2007). Traditional knowledge also suggests that fire frequency and intensity affect caribou numbers, distribution (Kendrick et al. 2005), and behaviour (WKSS 2001). Tłjchq Elders have reported changes to climate that have decreased lichen availability, and changes to the timing and nature of caribou migration. They report southward migration later in the year and northward migration earlier in the spring, and a greater dispersal of caribou than in the past (Section 12.2.3.6).

Adamczewski et al. (2009) reviewed the current decline of the Bathurst caribou herd and indicated that effects from the mines are limited and unlikely to be a major contributing factor in the decline. Boulanger et al. (2011) modelled the Bathurst caribou population for the period 1985 to 2009, and observed that the demographic trends could be explained by reduced recruitment and a constant harvest rate; recovery from the low point in the cycle was thought to be dependent on high calf survival rates and reduced harvest rates for breeding females. Currently, the Bathurst herd may be nearing the end of the decline phase of the population cycle, which is attributed in large part to the limited harvest strategy since 2009 (Boulanger et al. 2014).

Non-Aboriginal harvest of caribou is regulated by Environment and Natural Resources, GNWT. Historically, resident hunters were allowed to harvest up to five barren-ground caribou, each year. The resident harvest occurred in two peaks: one in the fall when the caribou are near the treeline (August 15 to November 15), and another in winter when the herd is accessible by ice road for part of the section (November 15 to April 30). Non-resident hunters could harvest a maximum of two caribou per year (August 15 to November 30 in the North Slave region), and would require the services of a licensed outfitter.

Beginning January 1, 2010, barren-ground caribou commercial/meat tag, resident, and non-resident harvesting was closed in the North Slave and South Slave regions, and all hunting was closed in a new no-hunting conservation zone established north of Yellowknife where the Bathurst herd winters. The new zone included the TCWR, the Winter Access Road, and all diamond mines in the NWT, including the Project. Before these emergency measures, tags for sport hunters had been reduced, and tags for resident hunters had been reduced from five tags per resident hunter to two, with a preference for bulls.

Harvest restrictions as recommended by the Wek'èezhii Renewable Resources Board remain in effect from the 2010 to 2014 harvest seasons. Harvest restrictions provide 150 hunting tags for the Tłı̄chǫ people and 150 for the YKDFN (GNWT 2012). A joint proposal is being developed collaboratively with the Tłı̄chǫ Government on management actions for the herd for 2012 to 2016 and beyond (GNWT 2013).

The Caribou SON (Section 12.6.2) classified the residual cumulative effects on caribou as low to moderate in magnitude, regional in geographic extent, long-term to permanent in duration, reversible (sensory disturbance and traffic) to irreversible (loss and fragmentation of habitat), likely (traffic) to highly likely. The residual cumulative effects on caribou were considered not significant to the assessment endpoint of maintaining self-sustaining and ecologically effective caribou populations.

The Wildlife and Wildlife Habitat SON (Section 13) classified the residual impacts of cumulative effects on the abundance and distribution of waterbirds as low in magnitude, regional in extent, long-term to permanent in duration, isolated or periodic in frequency, reversible to irreversible, and highly likely. The residual impacts of cumulative effects on waterbirds were considered not significant to the assessment endpoint of preserving self-sustaining and ecologically effective wildlife populations.

The cumulative effects on the abundance and distribution of wolverine and grizzly bear were classified as low (direct loss and fragmentation of habitat) to moderate (sensory disturbance and traffic) in magnitude, regional in extent, long-term to permanent, isolated or periodic to continuous, reversible to irreversible, and highly likely. The cumulative effects on wolverine and grizzly bear were considered not significant to the assessment endpoint of preserving self-sustaining and ecologically effective wildlife populations.

Regarding cumulative direct disturbance to preferred wildlife harvesting areas, previous and existing development has been noted as disturbing preferred wildlife harvesting areas. The winter road, which is built annually to access the mines from Tibbitt Lake to Contwoyto Lake, is built along some of the traditional trails of the YKDFN and as a result has impacted some important hunting and trapping areas (Weledeh Yellowknives Dene 1997). The island where the Diavik Mine is now located was indicated as a preferred caribou harvesting location that is no longer available. The area around the Ekati Long Lake Containment Facility is remembered as an important hunting and camping location that is no longer available due to development. Tłjchq Elders have noted that they no longer see caribou migrating through the Lac de Gras area as they once did (TG 2012). The Métis have observed how previous and existing gold mining activities in the Yellowknife area have affected the caribou migrations, and are concerned that diamond mining development will push the caribou migration further east, causing harvesters to travel further distances to hunt. As of 2007, some Inuit participants in the Caribou and Roads Workshop recognized that the wolf population around Ekati was beginning to decline. They noted that wolf and caribou have been living together for thousands of years, and that wolves will decline in concert with the caribou (Banci et al. 2007).

Cumulative sensory disturbances may exist between the existing Ekati Mine, the Diavik Mine, and the Jay Project. A cumulative viewscape analysis was not completed. However, the potential for cumulative visual disturbance exists. No reasonably foreseeable developments are expected to interact with the noise of the Project, and noise emissions from existing development were captured in baseline values.

The development of the TCWR has been noted as already affecting access both positively and negatively. Most notably, the winter road has increased the ease of access into the barrenlands for Aboriginal harvesters, but has also allowed for additional competition for resources (DKFN 2012).

The preliminary navigability assessment indicated that in addition to the incremental effects of the Project, the back-flooding of dewatered areas of the Diavik Mine may result in changes to water flows and levels in Lac du Sauvage, Lac de Gras and the Narrows. During this back-flooding period, which occurs during Project operations, the navigability of the Narrows may be further affected.

Negative and positive effects on the social and economic factors affecting participation in TLU, are also expected at the cumulative level.

Concerns about the effects on human and ecological health, previously discussed for incremental effects, are not unique to the Project. Previous, existing and reasonably foreseeable development have, or are likely to, result in similar concerns.

Residual Effects Summary for Effects on Traditional Wildlife Harvesting

The effects on traditional wildlife harvesting consider a multitude of factors at the incremental and cumulative levels. At the core of this effects analysis are the effects on the abundance and distribution of traditionally harvested wildlife, direct disturbance to preferred harvesting areas, and changes in access to preferred harvesting areas. Additional effects include sensory disturbances, social and economic factors affecting participation in TLU, and concerns about ecological and human health.

Cumulatively, (i.e., previous and existing developments, the Project, and reasonably foreseeable developments), the magnitude of effects on the abundance and distribution of traditionally harvested wildlife ranged from low to moderate. Direct disturbance to preferred harvesting areas has occurred from previous and existing developments, and the Project will increase this area of disturbance. However, alternative preferred areas remain available. The potential for adverse effects on the navigability of the Narrows exists due to existing development and the Project; however, this is not expected to cause substantial effects on access for traditional land users.

Sensory disturbances, including visual and noise changes, are also expected due to the Project in combination with existing developments. Cumulatively, positive and negative effects on social and economic factors affecting participation in TLU are expected. An increased concern in ecological and human health is considered existing for previous and existing developments, and will continue for the Project and reasonably foreseeable developments. Each of these effects have the potential to alter TLU practices for affected Aboriginal groups. However, the extent to which Aboriginal harvesters will alter their harvesting practices due to these effects is unknown.

As a result of the above factors, negative cumulative effects are predicted for effects on traditional wildlife harvesting that will impede the ability to harvest wildlife in some preferred areas. However, alternative preferred areas and resources are expected to continue to be available and unaffected. The incremental effects of the Project alone are expected to result in only minor effects on the continued opportunity to participate in traditional wildlife harvesting.

15.4.1.2.2 *Effects on Traditional Fishing*

Existing Environment

Fishing provides important sustenance for Aboriginal groups during periods when caribou are scarce or unavailable, such as spring and summer. Many groups have indicated that fish are only second to caribou in importance. Historically, fish provided food for dog teams and people. Whitefish, trout, pike, cone, loche, inconnu, and sucker are the main species that people catch.

The LKDFN have indicated that fish are found in most lakes throughout their territory. One Elder noted that it is possible to find fish in some small lakes on top of eskers (LKDFN et al. 2001). Several specific areas have also been noted for fish harvesting. For example, in spring, the Dene would often establish large fishing camps around Great Slave Lake to take advantage of fish movement into shallower, warmer water. Several Dene groups indicated fishing camps around Great Slave Lake.

Other traditional fishing areas noted include Ekati's tailings pond (Long Lake Containment Facility), which was known to the YKDFN as "Fish Lake." During the public hearing for the original water licence at Ekati, the YKDFN spoke of how plentiful the fish were in Long Lake (Weledeh Yellowknives Dene 1997). The Narrows has also been identified as an important fishing location by the YKDFN and NSMA. The YKDFN indicated that the Narrows are one of two spots near Ekati where the swift currents keep the water open during winter to allow for the setting of nets (Weledeh Yellowknives Dene 1997). A participant involved in the June 2014 Wekweëti site visit to the Ekati Mine indicated that they, their father, and other community members all travelled in the area, in part, because of the reliability of successful fish harvesting at the Narrows. A similar channel that allowed for winter fishing has also been indicated at Mackay Lake (Weledeh Yellowknives Dene 1997).

Lac de Gras was also identified as a primary fishing location by several Aboriginal groups. The island where the Diavik Mine is now located and another island to the west of it are together known as Ek'ati Ndi, and were traditional fishing, camping, hunting, and cache locations. Lac de Gras has also been noted as containing very old, large fish, and many other fish migrate, particularly to spawn, from the Coppermine River. One Inuit Elder, interviewed for the Naonayaotit Traditional Knowledge Project, specifically identified Tahikpak (Lac de Gras) as a lake with many fish:

We travelled many times, Tahikaffaloknahik (Itchen Lake), Yamba, Lac de Gras, yes, we know that area, and we also travelled there. I tried hard to keep that lake [Lac de Gras] [as part of Nunavut]...because that lake contains a lot of fish. That is why I fought hard to keep that area. (Banci et al. 2006: 68).

Though the majority of Métis do not use the Lac de Gras area to fish today, they expressed the desire to preserve the right and ability to fish there for the future: "...it's a resource that you're taking away, that I always had there, my children, relatives, friends, have always had, I mean it's a resource that's there..." (Stevenson 1999: 135).

In addition to fishing locations, the Narrows, and areas in Lac de Gras and Lac du Sauvage were also identified as fish spawning locations. Spawning general occurs in bays, around islands, and in channels within lakes and rivers (Weledeh Yellowknives Dene 1997).

Incremental Effects on Traditional Fishing

The Project's incremental effects on traditional fish harvesting are considered to be a combination of effects on the abundance and distribution of fish, direct disturbance to preferred fishing locations, changes in physical access to preferred fishing areas, sensory disturbances experienced by land users, social and economic factors affecting participation in TLU, and concerns regarding human and ecological health.

A full discussion of the Project's effects on fish and fish habitat is provided in the Fish and Fish Habitat SON (Section 9). Preliminary results on effects on fish and fish habitat indicate that changes in fish habitat are expected to occur in Lac du Sauvage. The predicted direct loss of fish habitat will result from the Project footprint, which overlaps portions of Lac du Sauvage.

Fish located within the diked and dewatered area will be removed through a fish-out program, which will be organized and carried out with the involvement of the potentially affected Aboriginal groups. This program is intended to minimize the wastage of fish caused by the dewatering of isolated portions of Lac du Sauvage.

Where the Project footprint results in habitat loss, offsetting measures will be developed to counterbalance for losses in fish habitat productivity. Project water diversions, and changes in water levels and flows may also impact fish habitat or fish populations in Lac du Sauvage, the Narrows, and Lac de Gras. At closure, the dewatered portion of Lac du Sauvage will be back-flooded. Once the back-flooded water within the diked area meets water quality acceptability criteria, the dikes, diversion channels, and other associated infrastructure will be decommissioned and the back-flooded section will be reconnected to the undisturbed portions of Lac du Sauvage.

Project effects on physical access have been discussed in Section 15.4.1.1.1. No change in road access is expected due to the Project, because the Jay Access road will not be accessible to the public. Some changes in the navigability of the Narrows are expected, and these changes have the potential to affect winter fishing at the Narrows. No change in navigability of Lac de Gras is expected, although water flows may be altered.

Responses to sensory disturbances vary by individuals, and therefore, sensory disturbances are difficult to assess because no universal thresholds exist at which disturbance will prevent land users from continuing to participate in TLU activities. For the purposes of this assessment, sensory disturbances resulting from the Jay Project are expected to occur for traditional land users and may contribute additional effects beyond those on the availability of fish.

Other factors affecting participation in TLU activities, such as social and economic factors, and an increase in concerns regarding ecological or human health, may also influence the effects on traditional fishing. Section 15.4.1.1.4 discussed the social and economic factors affecting participation in TLU activities. Both positive and negative effects on participation in TLU opportunities due to social and economic factors have been identified as resulting from the Project.

Regarding the potential for increased concerns about ecological and human health resulting from the Project, Aboriginal members have identified the effects of back-flooding dewatered areas of Lac du Sauvage and reconnection with undisturbed portions of Lac du Sauvage as a primary concern. This concern may result in avoidance of the entirety of Lac du Sauvage after closure. Therefore, there is the potential for the Project to result in increased concerns regarding ecological and human health.

In summary, incremental effects on traditional fishing are considered to be a combination of the effects on the following:

- the abundance and distribution of fish;
- direct disturbance to preferred fishing areas;
- changes in access to preferred fishing areas;
- sensory disturbances (e.g., noise and viewscape);
- social and economic factors affecting participation in TLU; and,
- increased concerns regarding human or ecological health.

Changes in Aboriginal land users' intangible relationship with the land, discussed in Section 15.4.1.1.6, also have the potential to affect traditional fish harvesting activities, but because no mechanism exists with which to measure the extent of the effect, it has not been evaluated in this analysis.

Cumulative Effects on Traditional Fishing

The residual cumulative impact classification of effects on fish and fish habitat are assessed within the Fish and Fish Habitat KLOI (Section 11). Cumulative effects consider the Project in combination with previous and existing developments, and applicable reasonably foreseeable developments. Preliminary results indicate that residual cumulative effects on fish and fish habitat are expected to be low in magnitude. The residual cumulative effects on fish and fish habitat were considered not significant to the assessment endpoint of maintaining self-sustaining and ecologically effective fish populations.

A cumulative viewscape analysis was not completed, although the potential for visual disturbance of the Project along with existing projects exists. No reasonably foreseeable developments are expected to interact with the noise of the Project, and noise emissions from existing development were captured in baseline values.

The TCWR has increased the ease of access into the barrenlands for Aboriginal harvesters but also allowed for additional competition for resources from non-Aboriginal harvesters (DKFN 2012). The preliminary navigability assessment indicated that in addition to incremental effects, the backflooding of dewatered areas of the Diavik Mine may result in changes in water levels and flows at Lac du Sauvage, Lac de Gras and the Narrows. This backflooding occurs during the Project operations phase and may extend periods of reduced navigability in the Narrows.

Positive and negative effects on the factors that affect participation in TLU activities are expected at the cumulative level. Concerns about the effects on human and ecological health, previously discussed for incremental effects, are not unique to the Project. Previous, existing, and reasonably foreseeable development have, or are likely to, result in similar concerns.

Residual Effects Summary for Effects on Traditional Fishing

The residual effects on traditional fishing consider a multitude of factors including the effects on the abundance and distribution of fish, direct disturbance to preferred fishing areas, and changes in access to preferred fishing areas, sensory disturbances, social and economic factors affecting the participation in TLU, and concerns about ecological and human health. The preliminary cumulative magnitude of effects on the abundance and distribution of fish are expected to be low. Direct disturbance to preferred fishing areas has occurred from previous and existing developments, and the Project will increase this area of disturbance. However, alternative preferred areas, such as Lac de Gras, remain available. The potential for adverse effects on the navigability of the Narrows exists due to existing development and the Project.

Sensory disturbances, including visual and noise changes, are also expected due to the Project in combination with existing developments. Cumulatively, positive and negative effects on social and economic factors affecting participation in TLU are expected. An increased concern in ecological and human health is considered existing for previous and existing developments, and will continue for the Project and reasonably foreseeable developments. Each of these effects have the potential to alter TLU practices for affected Aboriginal groups. However, the extent to which Aboriginal harvesters will alter their harvesting practices due to these effects is unknown.

As a result of the above factors, negative residual effects, after the consideration of mitigation measures, on traditional fishing, are expected at the cumulative level. Due particularly to effects occurring in the Narrows, minor and potentially detrimental effects are predicted for continued opportunities to participate in traditional fishing activities.

15.4.1.2.3 *Effects on the Traditional Plant Harvesting*

Existing Environment

Various vegetation types were used by Aboriginal groups for food, medicine, and as source materials for other uses. For the Dene and Métis, wood was perhaps the most important vegetation source. Wood was collected to fuel fires and for use in the construction of sleds, tents, spears, arrows, caribou ropes, drying racks, baskets, storage and food containers, canoes, paddles, and snowshoes. In the winter, boughs were used to insulate the ground and exterior of hide tents (Weledeh Yellowknives Dene 1997). Places where wood was available were named so that the information and significance of those places for survival were remembered (Weledeh Yellowknives Dene 1997). Other important plants gathered to provide source building materials included red willow, spruce gum, peat moss, dwarf birch. The Inuit would occasionally carry moss, plants, and willows for starting fires. Other plants used included heather and blackberry bushes, which were used to smoke and cure meat.

In the summer and fall, berries were collected in abundance by the YKDFN and LKDFN. Commonly harvested berries included blackberries, raspberries, blueberries, cranberries, and cloudberries. Many berries were dried; while travelling in the winter, dried berries rolled into caribou fat and frozen were an easy meal and easy to carry (Weledeh Yellowknives Dene 1997). Lichen was sometimes used by the YKDFN to flavor fish soup. The collection of berries was also important for the Métis. The Métis collected berries to eat on their own or to use in the preparation of pemmican. Pemmican, made from dried buffalo, deer, caribou, or moose meat and pounded with fat and berries, was usually saved for people travelling long distances to hunt or trade. The Tłı̄chq̄ also collected and consumed berries as part of their diet and for medicinal purposes, including alpine berries, blueberries, gooseberries, cranberries, cloudberries, and whiskey jack berries.

Medicinal plants are still collected from the barrenlands, particularly since plants from other areas such as Dettah, N'Dilo, Yellowknife, and other parts of Great Slave Lake are no longer trusted. Some examples of medicinal vegetation used by the YKDFN include fireweed, cloudberries, crowberries, dwarf birch, black rock lichen, blueberry bush, and moss (Dominion Diamond 2013). Medicinal plants such as Labrador tea, club lichen, juniper berries, crowberries, spiny wood fern, black rock lichen, blueberry bush, moss, northern bog laurel, and cranberry have all been identified as medicinal plants harvested by the LKDFN throughout their traditional territory (LKDFN et al. 1999). The Métis, Inuit, and Tłı̄chq̄ harvest similar medicinal plants as the YKDFN, including cranberry bush, blueberry bush, spruce gum, moss, and black lichen, jack pine, and cottongrass seed heads. Some Inuit have also identified mushrooms as particularly powerful for medicinal and spiritual uses (Dominion Diamond 2013).

Additional information about the existing environment of plant harvesting is included in Annex XVII.

Incremental Effects on Traditional Plant Harvesting

The Project's incremental effects on traditional plant harvesting are considered to be a combination of effects on the abundance and distribution of traditionally used plant species, effects on preferred plant harvesting areas, changes in physical access to preferred plant harvesting areas, sensory disturbances experienced by land users, social and economic factors affecting participation in TLU, and concerns about human and ecological health.

Baseline information did not indicate any specific areas of preferred plant harvesting locations within the TLU ESA, and plant harvesting likely occurs opportunistically by land users while undertaking other TLU activities. However, TLU Baseline information referenced several preferred plant species and the Vegetation SON (Section 11) noted that traditional plant species occur within the vegetation ESA. Therefore, direct disturbance to preferred plant harvesting areas is represented by the direct disturbance to areas with high and moderate traditional use plant habitat potential, assessed in the Vegetation SON (Section 11).

The Vegetation SON (Section 11) indicated that 507 ha of Ecological Landscape Classification units with high traditional use plant habitat potential will be disturbed by the Project, resulting in a decrease of 0.2% relative to baseline conditions. Habitat units with moderate traditional plant potential will decrease by approximately 177 ha (0.3%). Project-related disturbances are expected to occur once, and although the effect is long-term, the net incremental change in traditional use plants and traditional use plant habitat in the ESA will be confined to the Project footprint (local scale).

Most of the area disturbed by the Project is expected to be reclaimed. It is not known what the landscape will look like in the future once re-vegetated. However, the reclamation goal is to return the Ekati Mine site to self-sustaining ecosystems that are compatible with a healthy environment, human activities, and the surrounding environment. Overall, changes to vegetation in the ESA from direct loss, alteration, and fragmentation from the Project footprint are predicted to be within or slightly exceed baseline condition values. The Project's effects on traditional use plant species is discussed further in the Vegetation SON (Section 11.4.2.2.3)

Project effects on physical access have been discussed in Section 15.4.1.1.1. No change in road access is expected due to the Project because the Jay Access road will not be accessible to the public. Some changes in the navigability of the Narrows are expected, although these are predicted to occur during low flow winter periods when boat use of the waterways is less likely. While water flow may be altered for Lac de Gras, no changes in navigability are to be expected.

Sensory disturbances are difficult to assess because no universal thresholds exist at which disturbance will prevent land users from continuing to participate in TLU activities. In addition, the response to sensory disturbances varies by individual. Therefore, for the purpose of this assessment, sensory disturbances resulting from the Jay Project are expected to exist for traditional plant harvesters, and may contribute additional effects beyond those to the traditional plant availability.

Other factors, social and economic, affecting TLU participation and an increase in concerns ecological or human health may also influence the effects on traditional plant harvesting. Section 15.4.1.1.4 discussed social and economic factors affecting participation in TLU opportunities. Both positive and negative effects on the access to TLU opportunities have been identified as resulting from the Project. Regarding the potential for increased concerns about ecological and human health resulting from the Project, the effects of dust directly on vegetation, and indirectly through accumulation within the food change were expressed in reference to Ekati Mine developments. Therefore, the potential for the Project to result in increased concerns about ecological and human health is considered to be valid.

Incremental effects on traditional plant harvesting are considered to be a combination of the effects on the following:

- the abundance and distribution of traditionally harvested plants (represented by effects on traditional plant potential);
- direct disturbance to preferred plant harvesting areas (represented by disturbance to areas of high and moderate traditional use plant habitat potential);
- changes in access to preferred plant harvesting areas;
- sensory disturbances (e.g., noise and viewscape);
- social and economic factors affecting participation in TLU; and,
- increased concerns regarding human or ecological health.

Changes in Aboriginal land users' intangible relationship with the land, discussed in Section 15.4.1.1.6, also have the potential to affect traditional plant harvesting activities. However, because no mechanism by which to measure the extent of the effect exists, it has not been evaluated in this analysis.

Cumulative Effects on Traditional Plant Harvesting

Cumulative effects consider the effects of the Project in combination with previous, existing, and reasonably foreseeable developments. No reasonably foreseeable developments were located within the Vegetation ESA; therefore, the cumulative assessment of traditional plant habitat potential reflects previous and existing Projects in conjunction with the Project.

The cumulative reduction in vegetation through application of the Project and previous and existing developments is predicted to remove 6,048 ha or approximately 1.2% of the mapped units in the vegetation ESA. Cumulative changes to high and moderate traditional use plant habitat potential will be 1.0% and 1.1%, respectively, relative to the reference condition in the vegetation ESA. The cumulative effects of the Project and previous and existing disturbances on the relative abundance and quality of traditional use plant species and traditional use plant habitat is negative, but small. The cumulative effects from the direct loss, alteration, and fragmentation of traditional use plant habitat from the Project and from previous and existing developments are expected to be low in magnitude.

The residual cumulative impact classification of effects on traditionally used plant species are assessed within the Vegetation SON (Section 11) as low in magnitude, local in geographic extent, long-term and permanent in duration, continuous in frequency, partially reversible, and highly likely. The residual cumulative effects on traditionally used plant species were considered not significant to the assessment endpoint of maintaining self-sustaining and ecologically effective plant populations and communities.

Cumulative sensory disturbances may exist between the existing Ekati Mine, the Diavik Mine, and the Jay Project. A cumulative viewscape analysis was not completed. However, no reasonably foreseeable developments are expected to interact with the noise of the Project, and noise emissions from existing development were captured in baseline values.

The development of the TCWR has been noted as already affecting access both positively and negatively. Most notably, the winter road has increased the ease of access into the barrenlands for Aboriginal harvesters, but also allowed for additional competition for resources from non-Aboriginal harvesters (DKFN 2012).

The preliminary results of the navigability assessment considered the effects that the back-flooding of dewatered areas of the Diavik Mine may have on Lac du Sauvage, Lac de Gras and the Narrows. During this back-flooding period, the navigability of the Narrows may be affected.

Positive and negative effects on the social and economic factors affecting participation in TLU are expected at the cumulative level. Concerns about the effects on human and ecological health, previously discussed for incremental effects, are not unique to the Project. Previous, existing and reasonably foreseeable development have, or are likely to, result in similar concerns.

Residual Effects Summary for Effects on Traditional Plant Harvesting

The effects on traditional plant harvesting consider the effects on the abundance and disturbance of traditionally harvested plant species (which also represent the direct disturbance to preferred plant harvesting areas), changes in access to preferred plant harvesting areas, sensory disturbances, social and economic participation in TLU opportunities, and concerns about ecological and human health. The magnitude of cumulative residual effects on the abundance and distribution of traditionally harvested plant species was assessed as low in the Vegetation SON. Some adverse effects on the navigability of the Narrows are expected due to cumulative development. However, this effect is not expected to cause discernable effects on access for traditional plant harvesters.

Sensory disturbances, including visual and noise changes, are also expected due to the Project in combination with existing developments. Cumulatively, positive and negative effects on social and economic factors affecting participation in TLU are expected. An increased concern about ecological and human health is considered existing for previous and existing developments, and will continue for the Project and reasonably foreseeable developments. Each of these effects have the potential to alter TLU practices for affected Aboriginal groups. However, the extent to which Aboriginal harvesters will alter their harvesting practices due to these effects is unknown.

As a result of the above factors, and with consideration of mitigation measures, minor negative residual cumulative effects are expected on traditional plant harvesting. These effects are not expected to materially affect the continued ability to participate in traditional plant harvesting.

15.4.1.2.4 *Effects on Opportunities to Participate in Other Cultural Uses of the Land*

In addition to traditional harvesting activities, the land was used in other ways by Aboriginal people. This use includes physical sites of importance such as burial sites, camps, and markers that are often associated with harvesting and culturally important locations on the landscape.

Existing Environment

Camps

People camped near areas where caribou, fish, and water were available. Islands were and are a preferred camp location because they offer protection against insects and predators, especially bears, and are a good location to hunt migrating caribou. Elders discourage families from setting up camp in areas that animals actively use so as not to discourage the animals from returning. Therefore, while the Narrows have been identified as a preferred land use area, camps would not be located there. Likewise, Elders also discourage the use of eskers for camping and recommend places behind high points that provide protection from the wind. Instead, camps were set up on nearby islands and on the surrounding mainland (Weledeh Yellowknives Dene 1997). An old camp location that was immediately south of the proposed JP4 south dike location was mapped during the YKDFN and LKDFN March 2014 scoping session.

The bay near the traditional trail ending at the southern part of Lac de Gras (where the winter road now makes land) is a traditional camping area that is named after a hunter who stayed there. In the same vicinity, on Pointe de Misère, the YKDFN have identified a tent ring, fire pit, and “a rock that still glistens with the fat from meat pounded on it by generations of people” (Weledeh Yellowknives Dene 1997: 42). The island where the Diavik Mine is now located and another island to the west of it are together known as Ek’ati Ndi, and was traditionally used to camp, hunt caribou, fish, and cache meat and furs. The shores around Long Lake, now the Long Lake Containment Facility, are also remembered as an important hunting and camping location in the Ekati area, and Elders know about camps and caches along the former shores of this Lake (Weledeh Yellowknives Dene 1997). The Tłı̄ch̄ camped all around Contwoyto Lake, Lac de Gras, and Great Slave during early winter.

The Métis were more sedentary than their Dene counterparts, establishing homes near trading posts. Métis families were often issued supplies or housing from trading posts as conditions of their service (Stevenson 1999).

The Inuit established major wintering areas along caribou migration routes, including Kaomaogaktok (Rockinghorse Lake), Kingalhoak (Nose Lake), Tahikaffaloknahik (Itchen Lake), Hanigakhik and Hanigayok (James River), and Tahikpak (Lac de Gras). The Inuit stayed at the islands, bays, and nadlok (narrows) of lakes. As children, Kitikmeot Inuit remember meeting Dene while hunting and trapping at large winter camps, such as at Tahikyoak (Contwoyto Lake), Kaomaogaktok (Rockinghorse Lake), and Tahikpak (Lac de Gras) (Banci et al. 2006).

In 1958, in an effort to conserve the caribou and improve the welfare of the Kitikmeot Inuit, the Canadian government supported the development of a domestic fishing camp, the first one at Tahikyoak (Contwoyto Lake) and then one at Nonatoklik (Pellat Lake). The Pellat Lake camp consisted of six frame cabins and continued with government support. Throughout the mid-1900s, camps of Inuit families could be found throughout the Kitikmeot region from Berkeley Point in the north to Nonatoklik (Pellatt Lake) in the south. Tahikyoak (Contwoyto Lake) was an especially important location because of the caribou migration. For centuries, the Kitikmeot Inuit could rely on the caribou being at traditional crossing points. Since the 1920s, some Inuit lived year-round in the Contwoyto Lake area.

Burials

The YKDFN have indicated burial markers within the TLU ESA. One graveyard location and one potential graveyard location were mapped in the immediate vicinity of the Project during the YKDFN and LKDFN March 2014 scoping session. The graveyard location was indicated on the eastern side of the Narrows, while the potential graveyard was indicated at the southern end of the JP4 south dike. Eskers are also known to have been used as gravesites (Weledeh Yellowknives Dene 1997). The Tłı̄chǫ have also indicated that burials are located on the barrenlands (DCI 1995).

Often, Inuit left their dead on high ground (i.e., eskers) with some personal belongings, covered in caribou skins, where the bodies would eventually be eaten (Banci et al. 2006). Later, Inuit were buried more often, on the land near where they died.

There are burial sites everywhere at Tahikyoak (Contwoyto), at Nakyoknakyok and at Tahikyum (bay, north Contwoyto Lake). We found a grave site at Lac de Gras (southeast shore). One person had been buried, covered with rocks. It was a grave from long ago (Banci et al. 2006: 236).

Other Cultural Sites

Any rocks piled along a trail, such as caches, burial cairns, trap markers, or trail markers, could help guide travelers. The markers were a form of communication, for example, to inform young, new travelers that someone has travelled that way before and that it is a safe way to go, or to relay messages between groups travelling in teams. Oftentimes, it would be important to remain along a marked trail so that caches, or food that is stored and shared on the land, could be visited if required (Weledeh Yellowknives Dene 1997).

Ts'ankui Theda (the Old Lady of the Falls), on the Lockhart River is an important place to the LKDFN and DKFN. It is a place of healing, a place of creation and a source of life, and every year there is a spiritual gathering at the falls and at Fort Reliance. During the Traditional Knowledge on Community Health Project completed in 1997 (Parlee and Marlowe 1997), LKDFN Elders expressed fear about the impacts that development might have on Ts'ankui Theda and the Lockhart River. They warned that if all the lands around them are destroyed "we will be sad people, we will suffer" (Parlee and Marlowe 1997: 36).

Based on available literature, no Métis sites of cultural, historical, or spiritual significance were identified within the Project footprint. Métis cultural sites are more likely to be located near Fort Rae (including Old Fort Rae), Yellowknife, Fort Resolution, and Fort Providence. According to Stevenson (1999), it is not common to find Métis graves in the barrenlands because if a Métis person passed away, the body was typically returned home. Métis today believe that their ancestors hunted and trapped as far north as Lac de Gras, and they have indicated that they possibly would want to utilize these areas again.

Incremental Effects on Opportunities to Participate in Other Cultural Uses of the Land

Project effects on continued opportunities to participate in other cultural uses of the land is considered to be a combination of effects on cultural sites, including camps and burials, changes in access to preferred use areas, sensory disturbances experienced by land users, social and economic factors that affect participation in land use, and concerns about human and ecological health.

One campsite, which was mapped during the YKDFN and LKDFN scoping sessions, is located at the southern end of the proposed JP4 south dike, and will likely be affected by dike construction. A potential graveyard has been reported at this same location, although no indication of this use was noted during the 2014 Heritage Resources field survey.

Project effects on physical access have been discussed in Section 15.4.1.1.1. No change in road access is expected due to the Project because the Jay Access road will not be accessible to the public. Some changes in the navigability of the Narrows are expected, although these changes are predicted to occur during low flow winter periods when boat use of the waterways is less likely. While water flow may be altered for Lac de Gras, no changes in navigability are to be expected. Sensory disturbances resulting from the Jay Project are expected to exist for traditional land users within the vicinity of the Project.

Other factors, such as having the knowledge and financial resources to participate in TLU opportunities, and an increase in concerns about ecological or human health may also influence effects on other cultural uses of the land. Positive and negative effects on continued TLU activities due to social and economic factors have been identified as resulting from the Project. There is potential for concerns about human or ecological health to influence traditional land users' activities on the land.

Incremental effects on other culturally important uses of the land are considered to be a combination of the effects on the following:

- direct disturbance to preferred use or culturally important sites and areas;
- changes in access to use or culturally important sites and areas;
- sensory disturbances (e.g., noise and viewscape);
- social and economic factors that affect participation in TLU; and,
- increased concerns regarding human or ecological health.

Changes in Aboriginal land users' intangible relationship with the land, discussed in Section 15.4.1.1.6, also have the potential to affect other cultural uses of the land. However, because there is no mechanism by which to measure the extent of the effect, it has not been evaluated in this analysis.

Cumulative Effects on Opportunities to Participate in Other Cultural Uses of the Land

Cumulative effects include those from previous and existing developments in conjunction with the Project and reasonably foreseeable developments. Effects to culturally important sites have occurred by previous and existing developments, particularly the Diavik Mine and the Ekati Mine Long Lake Containment Facility, which overlapped camping and cache locations. While the exact distribution of culturally important sites throughout the TLU ESA is not known, it is assumed that similar effects have occurred for other previous and existing developments, and will likely occur, for at least some of the reasonably foreseeable developments.

As with effects on other TLU activities, cumulative sensory disturbances may exist between the existing Ekati Mine, the Diavik Mine, and the Jay Project. A cumulative viewscape analysis was not completed. However, cumulative visual disturbance is likely from some locations surrounding the Project. No reasonably foreseeable developments are expected to interact with the noise of the Project, and noise emissions from existing development were captured in baseline values.

The development of the TCWR has been noted as already affecting access both positively and negatively. Most notably, the winter road has increased the ease of access into the barrenlands for Aboriginal harvesters but also allowed for additional competition for resources (DKFN 2012). The navigability assessment indicated that backflooding of dewatered areas of the Diavik Mine may result in changes in water flows and levels for Lac du Sauvage, Lac de Gras, and the Narrows. Changes in water flows have the potential to extend navigability changes at the Narrows beyond those resulting from the Project alone.

Positive and negative effects on the social and economic factors that affect participation in TLU are expected at the cumulative level. Concerns about the effects on human and ecological health, previously discussed for incremental effects, are not unique to the Project. Previous, existing and reasonably foreseeable development have, or are likely to, result in similar concerns.

Residual Effects Summary for Effects on Opportunities to Participate in Other Uses of the Land for Cultural Purposes

The effects on opportunities to participate in other cultural uses of the land consider the direct disturbance to preferred use and culturally important sites and areas, changes in access to these sites and areas, sensory disturbances, social and economic factors that affect participation in TLU activities, and concerns about ecological and human health. Cumulative disturbance has been indicated as affecting culturally important sites in the TLU ESA. Adverse effects on the navigability of the Narrows are expected due to existing development and the Project.

Sensory disturbances, including visual and noise changes, are also expected due to the Project in combination with existing developments. Cumulatively, positive and negative effects are expected on the social and economic factors that affect TLU. An increased concern about ecological and human health is considered existing for previous and existing developments, and will continue for the Project and reasonably foreseeable developments. Each of these effects have the potential to alter TLU practices for affected Aboriginal groups. However, the extent to which Aboriginal land users will alter their land use activities due to these effects is unknown.

As a result of the above factors, cumulatively, residual effects are not expected to materially influence the ability to continue participating in uses of the land for cultural purposes. It is expected that cultural use of the land will be able to continue in preferred areas.

15.4.1.3 *Traditional Land Use Residual Impact Classification Summary and Determination of Significance*

15.4.1.3.1 *Residual Impact Classification Summary and Determination of Significance*

Assessment endpoints related to traditional wildlife harvesting, fishing, and plant harvesting, along with other cultural uses of the land were included in the TLU VC. The residual impact classification of effects on traditional wildlife harvesting, traditional fish harvesting, and traditional plant harvesting consider the cumulative effects on the abundance and distribution of their respective underlying resource base(s), direct disturbance to preferred harvesting areas, and effects on the access to preferred harvesting areas. Additional effects, which may not lend themselves to an assessment of extent, are also considered and include sensory disturbances (e.g., noise and viewscape), social and economic factors that affect participation in TLU opportunities, and an increase in the concern about human or ecological health.

These effects do not have agreed upon thresholds for establishing the extent to which they may affect TLU, and are often dependant on the individual responses of land users. Therefore, these effects are assessed for direction and whether or not they are existing at the cumulative level. These effects are considered to affect each of the assessment endpoints in a similar manner, and thus are presented first to avoid repetition. All effects are considered for their cumulative effects (i.e., previous and existing developments, the Project's incremental effects, and applicable reasonably foreseeable developments), and with the application of mitigation measures.

Sensory effects and increased concerns about human and ecological health are assessed as negative in direction and existing at the cumulative level. Social and economic factors affecting participation in TLU are assessed as both positive and negative in direction and existing. Each of these effects may result in additional effects on all TLU assessment endpoints.

Regarding the effects on traditional wildlife harvesting, the Caribou KLOI (Section 12) assessed the residual cumulative effects on caribou as low to moderate in magnitude. The Wildlife and Wildlife Habitat SON (Section 13) assessed the residual cumulative effects on waterbirds, and wolverine and grizzly bear as low and low to moderate in magnitude, respectively. Noticeable and detrimental effects resulting from cumulative development have already affected preferred wildlife harvesting areas, although other preferred harvesting areas remain available for use. Access to preferred wildlife harvesting has experienced positive and negative effects. The creation of the TCWR allows for easier access during winter months, although this access also has the potential to increase the competition for traditional wildlife harvesting by non-Aboriginal harvesters. The navigability at the Narrows is expected to experience cumulative changes, which may result in minor effects on continued opportunities for wildlife harvesting.

As a result of the above factors with consideration of the additional effects of sensory disturbances, social and economic factors, and human or ecological health concerns, effects on traditional wildlife harvesting are assessed as negative in direction, moderate in magnitude, regional in geographic extent, long term, and irreversible. Cumulative effects are not expected to significantly affect the assessment endpoint of maintaining continued opportunities to participate in traditional wildlife harvesting.

Regarding effects on traditional fishing, preliminary results of the assessment on fish and fish habitat indicate that cumulative effects are expected to be low in magnitude. Lac du Sauvage, a noted fish spawning ground, will be directly impacted due to the Project, and changes in water levels may alter fishing at the Narrows, which is a preferred fishing location. Navigability at the Narrows will experience cumulative changes, which may result in minor effects on continued opportunities for traditional fishing.

As a result of the above factors, and with consideration of additional effects, effects on traditional fishing are assessed as negative in direction, low to moderate in magnitude, regional in geographic extent, long term, and irreversible. Cumulative effects are not expected to significantly affect the assessment endpoint of maintaining continued opportunities to participate in traditional fishing.

Regarding effects on traditional plant harvesting, the Vegetation SON (Section 11) assessed the residual cumulative impacts to traditionally used plant species as negative in direction and low in magnitude. No specific areas of preferred plant harvesting were indicated within the TLU ESA or Vegetation ESA; therefore, direct disturbance to preferred plant harvesting is represented by the direct disturbance to traditionally used plant species. Because no specific preferred plant harvesting locations were identified in the literature, changes in access are assessed generally. Cumulative impacts to access have included positive and negative effects, such as the existing TCWR, which provides access but also has the potential to result in additional competition for resources. Navigability changes are not expected to discernibly affect traditional plant harvesting.

As a result of the above factors and with consideration of additional effects, effects on traditional plant harvesting are assessed as negative in direction, low in magnitude, regional in extent, long-term in duration, continuous, and irreversible. Cumulative effects are not expected to significantly affect the assessment endpoint of maintaining continued opportunities to participate in traditional plant harvesting.

Effects on other cultural uses of the land considered impacts to preferred use or culturally important sites and areas, changes in access to preferred use or culturally important sites, and the additional effects of sensory disturbances, social and economic factors that affect participation in TLU opportunities, and concerns about ecological and human health. Previous and existing development has resulted in minor effects on cultural use sites within the TLU ESA. The Project and reasonably foreseeable developments may contribute a small additive effect to existing effects. Minor positive and negative cumulative effects on access are similarly expected for developments.

As a result of the above factors, and with consideration of additional effects, effects on opportunities to participate in other culturally important uses of the land are assessed as negative in direction, low in magnitude, regional in extent, long-term in duration, continuous, and irreversible. However, cumulative effects are not expected to significantly affect the assessment endpoint of maintaining continued opportunities to participate in other culturally important uses of the land.

The results of the TLU residual impact classification and determination of significance assessment are summarized in Table 15.4-1.

Table 15.4-1 Summary of Residual Impact Classification of Primary Pathways and Predicted Significance of Cumulative Effects on Traditional Land Use

Valued Component	Assessment Endpoint	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Significance for Assessment Endpoint
Traditional Land Use	continued opportunities to participate in traditional wildlife harvesting	negative	moderate	regional	long-term	continuous	irreversible	not significant
	continued opportunities to participate in traditional fishing	negative	low to moderate	regional	long-term	continuous	irreversible	not significant
	continued opportunities to participate in traditional plant harvesting	negative	low	regional	long-term	continuous	irreversible	not significant
	continued opportunities to participate in other cultural uses on the land	negative	low	regional	long-term	continuous	irreversible	not significant

15.4.1.3.2 Prediction Confidence and Uncertainty

Many of the effects on the TLU VC rely upon the assessments conducted for other disciplines; therefore, any limits in predication confidence and uncertainties indicated in those assessments may be carried forward into the assessment on Aboriginal traditional use of land and resources. For Aboriginal traditional use of land and resources, there are no established thresholds or standards for most measurement indicators. Although it may be possible to set thresholds for purposes of an EA, it often cannot be demonstrated that there is any consensus on a specific threshold value where an effect on TLU occurs or what such a threshold means in terms of significance of an effect. As a result, professional judgment (as opposed to the use of quantitative tools such as decision trees or valued matrices) is often used in reaching conclusions on significance for effects on Aboriginal traditional use of land and resources.

The effects on Aboriginal traditional use of land and resources may not lend themselves to the assignment of criteria or determination of significance except in terms of potential, thus introducing a larger element of uncertainty into the Aboriginal TLU assessment. There generally is the expectation that an effect brought forward for assessment will in fact occur, at least to some degree. However, it is difficult to predict, for example, whether some effects will be positive, negative or both, and in what ways.

Limitations were acknowledged regarding the Traditional Land Use and Traditional Knowledge Baseline Report, particularly regarding providing a complete overview of existing TLU and TK information. Because the assessment on the TLU VC relies upon using preferred use areas and culturally important sites as identified in the Traditional Land Use and Traditional Knowledge Baseline Report, gaps in data may result in a under representation of effects. To offset this limitation, TLU was aggregated among all potentially affected Aboriginal groups. This approach was intended to identify the greatest extent of known preferred use areas against which to compare disturbance.

Additional limitations include the assignation of significance for effects on traditional lifestyle and culture. Traditional land and resource use is a conduit for the continued maintenance of TK, traditional lifestyles, and associated cultural practices. Therefore, a reduction in amount of traditional land and resource use may have indirect effects on traditional lifestyles and culture. The level of resiliency among the potentially affected Aboriginal communities to withstand such effects is unknown. For example, if there is only one harvester remaining with a particular form of knowledge, a minor effect to them may have significant implications for the community as a whole. Alternatively, if a community has multiple harvesters with similar knowledge, the same minor effect to one may not result in significant effects to the community. However, this data is currently unavailable and therefore, this limitation introduces a level of uncertainty to the determination of significance in the TLU assessment.

15.4.2 Heritage Resources

15.4.2.1 *Effects Analysis*

People have lived in and travelled across portions of the NWT since the end of the last ice age, approximately 10,000 years Before Present (BP). The earliest known inhabitants of the central District of the Mackenzie have been dated to 7,000 BP to until 3,500 BP, and are known as Paleoindians or Northern Plano tradition. The earliest cultural remains identified on the Ekati claim block are from the Palaeoeskimo or Arctic Small Tool tradition. Most Palaeoeskimo sites in the barrenlands date from between 3,500 to 2,600 BP (Gordon 1996). The Taltheilei tool tradition, found throughout the Athabasca, Great Slave Lake, and north to the Lac de Gras regions for over the past 2,000 years, is representative of early use and occupation of the land by the ancestral Athapascan or sub-Arctic Dene (Noble 1981).

Previous archaeological work in the Ekati claim block has been conducted over several years by Bussey (1994, 1995, 1997, 2007, 2008). Fedirchuk (1996, 2000) and Unfreed (1997) have carried out related work for the development of the neighboring Diavik Mine. The results of these investigations are presented in several archaeological reports and summaries that are on file with the PWNHC.

Based on TK studies, the Narrows was an important site. (Annex XVII). Investigations at the Narrows have confirmed the importance of the area for fishing and hunting caribou. Many large archaeological sites have been recorded on both sides of the Narrows (Bussey 2000, 2001, 2002, 2003, 2004, 2005, 2007, 2008), and the potential for more sites in the vicinity is considered high (EAP 1996).

Based on the previous research, 444 sites have been recorded in the Heritage RSA, and six of these sites are within the Heritage BSA. Golder conducted two field programs to assess the Project area and recorded a further seven sites in the Heritage RSA, two of the newly recorded sites are within the Heritage BSA (Section 15.4.3.3; Ross 2014a,b).

15.4.3 Heritage Management Plan

A Heritage Resources Management Plan highlights the key information that a developer needs to meet their responsibilities of protecting NWT heritage resources records within their Project footprint. The Plan is divided into the following components:

- a review of the regulations and guidelines relating to archaeological work in the Northwest Territories (Section 15.4.3.1);
- a description of Dominion Diamond's Heritage Resources Policies and Procedures (Section 15.4.3.2); and,
- a summary of the heritage resource site inventory in the Project area (Section 15.4.3.3).

This Plan has been prepared to a level appropriate for inclusion in the Project Environmental Assessment. The Plan will be reviewed and updated regularly as the Project proceeds into detailed design, construction, operations, and closure.

15.4.3.1 Regulations and Guidelines Pertaining to Heritage Resources

The heritage resources of the NWT are unique and non-renewable resources that provide information about the NWT's human past. These resources are public property and are held in trust by the GNWT. Heritage resources under the *Mackenzie Valley Resource Management Act* are defined as "archaeological or historical sites, burial sites, artifacts and other objects of historical cultural religious significance, and historical or cultural records".

The main legal documents relating to archaeological resources in the NWT and the Project include *Northwest Territories Archaeological Sites Regulations* pursuant to *Northwest Territories Act*, *Mackenzie Valley Resource Management Act*, *Mackenzie Valley Land Use Regulations*, and the *Access to Information and Protection of Privacy Act*. Associated policy documents are the *Guidelines for Archaeologist Permit Holders* and *Guidelines for Developers* (PWNHC n.d.a,b).

These documents:

- define NWT heritage;
- outline Government bodies responsible for protection of NWT heritage;
- restrict activities that can take place within specific distances of heritage resources;
- outline permission required to search for, or disturb archaeological sites;
- outline legal consequences for failing to obtain permits before site disturbance or investigation;
- outline reporting requirements related to archaeological investigations;
- restrict the distribution of geographic locations of heritage resources;
- require land use activities be stopped should archaeological sites be encountered;
- require artifacts to be returned to designated agencies for storage; and,
- provide guidance to developers to protect heritage resources.

The *Guidelines for Developers* describes five types of studies that can be conducted to protect heritage resources: overviews, reconnaissance, inventory, assessment, and mitigation. Overviews involve the collection of existing archaeological data that allows recommendations for future studies to be made. Reconnaissance involves fieldwork to verify the potential presence of heritage resources.

Archaeological Impact Assessment (AIA) involves an inventory and an assessment. Inventory involves intensive fieldwork which systematically records heritage resources. Assessment involves the collection of detailed information, such as size, volume, complexity, and content of heritage resources (PWNHC n.d.a). Mitigation limits adverse impacts to heritage resources. Mitigation strategies are developed in consultation with and must be approved by the PWNHC.

Preferred mitigation strategies include avoidance (i.e., relocate Project component), and protection (erection of barrier) of heritage resources. If neither strategy can be implemented, scientific documentation of heritage resources can be implemented. Scientific documentation may include recording locations, mapping or measuring features, taking photographs, describing, and excavating. Surveillance and monitoring may be applied as part of a mitigation strategy.

As a result of the 1996 Environmental Assessment Review Panel hearings associated with Environmental Management for the Ekati Mine, an Archaeological Sites Management Plan was added to the Construction and Operations Phase Environmental Management Plans (BHP 2000). In addition, an Environmental Agreement signed by BHP Billiton (BHP) with the Governments of Canada and the Northwest Territories enhanced the environmental protection and specific section related to archaeology. At the request of Akaitcho Treaty 8 and Dogrib Treaty 11, additional protection for "heritage sites" was provided in the Impact Benefit Agreement (IBA) that was signed with BHP Diamonds in November of 1996. As a result of the documents associated with the Environmental Agreement, the Akaitcho Treaty 8, and Dogrib Treaty 11 IBAs, BHP agreed to a level of protection for archaeological sites and heritage sites that exceeds that of the GNWT. Details of these agreements can be found in the Ekati Mine BHP 2000 Archaeological Management Plan (BHP 2000). Critical points which surpassed the standards of the legislation of the Governments of Canada and the Northwest Territories are summarized as follows:

- BHP shall carry out the Project to minimize the impacts on archaeological sites.
- In the continuing exploration and development of the Project site BHP shall conduct archaeological surveys.
- Archaeological surveys of new archaeological sites must be done to the highest standards of the day and must respect places of significance to Aboriginal Peoples.
- Archaeological surveys shall to the greatest extent possible, be designed and carried out and identified in partnership with the affected Aboriginal Peoples and communities or if not possible, in consultation with the affected Aboriginal Peoples and communities.
- BHP shall consult with affected Aboriginal Peoples and communities so that traditional knowledge is incorporated into the archaeological surveys and so that burial sites are identified.
- If an archaeological site is discovered while carrying out the Project, BHP shall immediately notify the Minister, the GNWT and affected Aboriginal Peoples of the presence of the archaeological site and, BHP shall take all reasonable precautions necessary to protect the archaeological site.
- In conducting archaeological surveys and if it becomes necessary to disturb an archaeological site and collect the artifacts, BHP shall consult with affected Aboriginal Peoples and obtain all necessary authorizations and comply with all applicable laws.
- Heritage sites in addition to the *Mackenzie Valley Resource Management Act* definition include historic places and sacred sites of the Akaitcho Treaty 8 or other Aboriginal peoples.

15.4.3.2 *Dominion Diamonds Heritage Resources Policies and Procedures*

The Heritage Resources Policies and Procedures section contains three key elements:

- heritage awareness training for staff, contractors, and subcontractors;
- overview assessments of developments associated with possible location alternatives (e.g., tailings and waste rock storage facilities, exploration targets); and,
- Archaeological Impact Assessments of proposed development areas with moderate to high archaeological potential including mitigation and monitoring strategies.

Awareness training will be completed by staff and contractors involved with Project construction, operations, and exploration, or field programs that are off the mine site. The training will include basic information about what archaeological resources in the Heritage BSA look like, that these resources are protected by law, and what actions need to be taken should Project activities come into conflict with a heritage site. The actions to be taken include immediately contacting Supervisors, who will immediately stop work located near the possible heritage site until the situation is clarified by the Project archaeologist in consultation with the PWNHC, GNWT. Previous IBA agreements identify that should an archaeological site be verified, notification would be sent to the Minister, the GNWT and affected Aboriginal Peoples of the presence of the archaeological site (Bussey 2000).

Overview assessments will be completed to assist in the early planning stages of infrastructure, and AIAs will be conducted for all identified locations with moderate to high archaeological potential that are located within the proposed footprint of mine infrastructure. Depending on the results of the AIA, mitigation of archaeological sites may be completed. Mitigation in archaeological terms includes avoiding sites or scientific documentation of sites. Where possible, mine infrastructure will be placed to avoid known archaeological sites. Where avoidance or protection is not possible, scientific documentation of heritage resources will be implemented. The scientific documentation of sites will vary based on the heritage significance assigned to the sites, and may include photographic documentation, recording of the site location, and/or excavation of artifacts and features.

Heritage resource sites will be monitored when Project activities occur near heritage resources either during or after Project activities have taken place. A valid NWT Archaeologists Permit must be held to monitor archaeological sites. Monitoring activities are reported to the PWNHC as part of the archaeological permitting system. The Project archaeologist, in consultation with PWNHC, will determine if heritage avoidance strategies are working. If avoidance strategies are not working as evidenced by Project activities infringing on the 150-m buffer, or damage to a heritage site, the heritage sites may be mitigated using scientific documentation.

15.4.3.3 *Heritage Site Inventory*

Based on the previous research, 444 sites have been recorded in the Heritage RSA that include six sites that were recorded in the Heritage BSA. Golder conducted two field programs focusing on the Project, which resulted in seven additional sites being identified in the Heritage RSA, and two additional sites which were identified in the Heritage BSA. The heritage sites are detailed further in Annex XVI and in relevant permit reports on file with the PWNHC. Heritage resource site locations are protected by the *Access to Information and Protection of Privacy Act*, and agreements signed by Golder and the PWNHC. However, Dominion Diamond staff requires knowledge of site location to assist with the heritage protection, and shapefile with heritage data are on file with Dominion Diamond and the PWNHC. In addition to the location of key heritage resources, attributes required for their protection include:

- unique identifier, Borden Number;
- site type;
- generalized site location;
- year site was reported on to the PWNHC;
- current mitigation status; and,
- recommendations regarding further investigation (Table 15.4-2).

Table 15.4-2 Summary of Heritage Resources Within the Heritage Baseline Study Area and Mitigation Status and Recommendations

Site	Site Type	Location	Years	Current Mitigation	Recommendations
LdNs-2	lithic scatter	approximately 3 km north of the northwest of Pointe de Misère, Lac de Gras, on a well-drained landform next to the unnamed lake	1994 1995 1996 1997 2014	mitigated	no further work
LdNs-3	lithic scatter	west of the main esker located to the west of Lac du Sauvage and the unnamed lake	1994 1995 1996 1997 2014	mitigated	no further work
LdNs-4	isolated find	on game trail at the north end of Thinner Lake, approximately 4 km northwest of Pointe de Misère, Lac de Gras	1994 1995 1998	mitigated (1994) surface flakes identified in 2014	avoid
LdNs-5	lithic scatter	west side of the large esker approximately 4 km west of Lac du Sauvage	1994 1996 1997	avoid	avoid
LdNs-7	isolated find	esker chain which runs along the west side of the North Arm of Lac du Sauvage, approximately 2.5 km west of Lac du Sauvage	1994 1996 1997	avoid	avoid

Table 15.4-2 Summary of Heritage Resources Within the Heritage Baseline Study Area and Mitigation Status and Recommendations

Site	Site Type	Location	Years	Current Mitigation	Recommendations
LdNs-16	lithic scatter	approximately 3 km north of the northwest of Pointe de Misère, Lac de Gras; it is on the south end of a crested section of esker that broadens to the south	1995 1996 1997 1999 2014	mitigated (1997) surface flakes identified in 2014	avoid
LdNs-52	cache/ stone feature	on the south edge of a boulder field and approximately 400 m west of the shore of Lac du Sauvage	2014	documented	no further work ^(a)
LdNs-53	lithic scatter/camp	the south edge of a boulder field on a flat section of bedrock which juts out from the boulder field and approximately 900 m west of the shore of Lac du Sauvage	2014	documented	mitigate before development ^(a)

a) Mitigation recommendations for sites recorded in 2014 are awaiting Prince of Wales Northern Heritage Centre review.
 km = kilometre; m = metre.

15.4.4 Heritage Resources Impact Classification Summary and Determination of Significance

The eight heritage resources sites within the heritage BSA have low to moderate cultural and scientific significance. Cultural significance was assessed with the help of local field assistance and Elder tours. Scientific significance is based on the likelihood of an individual heritage resources site contributing to the greater understanding of past lifeways. The Project has the potential to impact the locations of three heritage resources sites. There are three sites (LdNs-3, LdNs-52 and LdNs-53) where the impact classification is likely to be changed from the classification identified in the Base Case. Each of these sites have been, or will be, mitigated using scientific data collection; therefore the impact to the heritage resources records is assessed as having low significance.

15.4.4.1 Residual Impact Classification Summary

The Project will have a positive residual impact to heritage resources (Table 15.4-3). The Project resulted in an additional seven heritage resource sites being added to the heritage resources record. The Project will either have no linkage or secondary linkages to heritage resources. The mitigation measures applied, either avoidance or scientific data recovery, mitigate the impacts so that there will be a negligible residual effect on VCs relative to the Base Case. Further, it is not expected that these impacts would contribute to effects of other existing, approved, or reasonably foreseeable projects that would result in anything beyond a low magnitude of change on the VC.

15.4.4.2 *Determination of Significance*

The heritage resource significance of the sites in the Heritage BSA is low for the individual sites and the heritage resource record as a whole (Table 15.4-3). The sites are limited in number and have limited historic, scientific, ethnic, public, and economic value beyond their intrinsic value of proof of land occupation.

15.4.4.3 *Predication Confidence and Uncertainty*

Eighteen AIAs have been conducted within the Heritage RSA; sixteen of these relate to previous developments and two relate specifically to the Project development. As a result, eight heritage resources sites have been reported within 500 metres of the Project footprint. Dominion Diamond compliance with the Heritage Resource Management Plan (Section 15.4.3) will result in mitigated impacts to the heritage resources. Information concerning the potential effects of construction and operation of the Project on recorded sites allows a high confidence in the predictions concerning effects on the heritage resources.

Table 15.4-3 Summary of Residual Impact Classification of Primary Pathways and Predicted Significance of Cumulative Effects on Heritage Resources

Valued Component	Assessment Endpoint	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Likelihood	Significance for Assessment Endpoint
Heritage Resources	continued protection of archaeological or historic sites, burial sites, artifacts and other objects of historical, cultural or religious significance,	positive	high	local	permanent	n/a	n/a	high	low
	Heritage Resource Record	positive	low	regional	permanent	n/a	n/a	n/a	low

n/a – not available.

15.5 Follow-up and Monitoring

The TLU assessment included various measurement indicators to which no agreed upon thresholds exist to assist in determining the level at which they will prevent or discourage traditional use of the land. Therefore, the extent to which they may influence continued opportunities for TLU is difficult to measure. As a result, Dominion Diamond will meet with potentially affected Aboriginal groups about establishing a monitoring program that tracks the avoidance by traditional land users of the Ekati area. A potential goal of such a program, dependent upon the engagement with potentially affected Aboriginal communities, would be to track the existing TLU of the general Ekati area, any changes resulting from the Project development, and the underlying reasons behind any changes observed.

Dominion Diamond currently has existing monitoring programs in place to track effects to wildlife, aquatics, and air quality. Dominion Diamond will discuss with potentially affected Aboriginal groups ways for community members to be involved in these programs. The goal of this involvement is intended to assist in mitigating residual concerns about effects on traditionally harvested resources, and human and ecological health effects in the general Ekati area.

Aboriginal land users' intangible relationship with the land, while discussed with the assessment, was not considered in classifying residual impacts due in part to the personal and dynamic nature of this relationship that does not lend itself to measurement. For this reason, Dominion Diamond will support potentially affected Aboriginal communities' participation in meaningful programs designed to assist in the retention of their cultural connection to the land. Examples of potential programs include the following:

- collaboration between Dominion Diamond and potentially affected Aboriginal groups in reclamation design and implementation so that reclamation occurs in a way that is consistent with the needs of potentially affected Aboriginal groups;
- community ceremonies at Project milestones, such as initiation and decommissioning; and,
- cultural gatherings and camps in the general Ekati area.

15.5.1 Heritage Resources Follow-up and Monitoring

The monitoring requirements associated with heritage resources are outlined in the Heritage Management Plan. Heritage resources sites will be monitored when Project activities occur in close proximity (within/adjacent to a 150-m buffer around heritage sites). Monitoring occurs either during or after Project activities have taken place; yearly during Project construction, and less frequently during operations. A valid NWT Archaeologists Permit must be held to monitor archaeological sites. Monitoring activities are reported to the PWNHC as part of the archaeological permitting system. The Project archaeologist, in consultation with PWNHC, will determine if heritage avoidance strategies are working. If avoidance strategies are not working as evidenced by Project activities infringing on the 150-m buffer, or damage to a heritage site, the heritage sites will be mitigated using scientific documentation.

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15.7 Glossary

Term	Definition
Archaeology	The study of past cultures through the scientific investigation of their material remains.
Archaeological site	A site where an archaeological artifact is found. A site or work within the Nunavut Settlement Area of archaeological, ethnological, or historical importance, interest or significance or a place where an archaeological specimen is found, and includes explorers' cairns.
All-season road	An all-season road is a road that is motorable all year by the prevailing means of rural transport.
Aquatic Effects Monitoring Program	A monitoring program designed to determine the short- and long-term effects in the aquatic receiving environment resulting from the mine operations, to evaluate the accuracy of predictions, to assess the effectiveness of planned impact mitigation measures, and to identify additional mitigation measures to reduce or eliminate environmental effects.
Artifact	Any tangible evidence of human activity that is more than 50 years old and in respect of which an unbroken chain of possession or regular pattern of usage cannot be demonstrated.
Assessment Endpoints	Qualitative expressions used to assess the significance of effects to a valued component and represent the key properties of the valued component that should be protected for future human generations. Assessment endpoints are general statements about what is to be protected.
Awl	Small pointed tool used for piercing holes.
Barrenlands	The area of the Northwest Territories east of the Mackenzie River valley and north and east of the tree line characterized by a low rolling tundra landscape, continuous permafrost, and low densities of human settlement.
Baseline	Background or reference; conditions before Project development.
Baseline Study Area	The project area that forms the basis of the geochemical assessment, which includes the Project and the Ekati Mine.
Basin	A large area that is lower in elevation than surrounding areas and contains water. Basins are separated by land or shallow channels.
Bedrock	The solid rock (harder than 3 on Moh's scale of hardness) underlying soils and the regolith in depths ranging from zero (where exposed to erosion) to several hundred metres.
Biophysical	The biological (e.g., plants, animals) and physical (e.g., air, water, soil) components of the natural environment.
Boreal Forest	The northern hemisphere, circumpolar, tundra forest type consisting primarily of black spruce and white spruce with balsam fir, birch and aspen.
BP	Archaeologists use this term to refer to dates that were obtained through the radiocarbon method; it means "years Before the Present." As the present year is a moving target, 1950 is considered the origin of the age scale and reflects the fact that radiocarbon dating became practicable in the 1950s. For example, 1,000 BP = 1,000 years before 1950 AD or approximately 1,000 AD.
Cache	A stone feature used to store meat, carcasses, or equipment.
Cairn	A man-made pile or stack of stones.
Cumulative effects	Those effects that result from a combination of the Project with other past, present, and reasonably foreseeable future developments (MVRB 2004).
Developer's Assessment Report	A stand-alone report that describes the development, the environmental setting, predicts impacts and proposes mitigations. The report is submitted to the MVRB for the purpose of an environmental assessment.
Dewatering	Removal of water from a natural waterbody by pumping or draining.
Dike	A natural or artificial slope or wall to regulate water levels.
Ecosystem	Ecological system consisting of all the organisms in an area and the physical environment with which they interact.

Term	Definition
Effects Study Area	The area where direct effects from the Project are expected to occur; selection of the boundary for ESAs was based on the physical and biological properties of VCs.
Ek'ati	Yellowknives Dene First Nation name for Lac de Gras referring to "ek'a", meaning "fat" (Weledeh Yellowknives Dene 1997).
Ekati Mine	Ekati Diamond Mine, Canada's first diamond mine.
Erosion	The process by which material, such as rock or soil, is worn away or removed by wind or water.
Esker	A long, winding ridge of stratified sand and gravel believed to form in ice-walled tunnels by streams, which flowed within and under glaciers. After the retaining ice walls melt away, stream deposits remain as long winding ridges.
Feature	Evidence of human activity which is non-portable (cannot be removed from a site without disturbing it), such as a tent ring or hearth.
Fish habitat	Fish habitat, as defined in the Fisheries Act, includes the spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly to carry out their life processes.
Fish-out	Activity conducted to remove fish from an area resulting in the direct mortality of fish.
Flake	A stone fragment intentionally detached from a source rock during tool manufacture.
Footprint	The proposed development area that directly affects the components of the landscape.
Furbearer	Mammals that have traditionally been trapped or hunted for their fur.
Global Positioning System	A system of satellites, computers and receivers that is able to determine the latitude and longitude of a receiver on Earth by calculating the time difference for signals from different satellites to reach the receiver.
Graves	Graves in the region typically date to the 20th century and can include a ring of rocks or cairn of rocks on the surface covering a wooden plywood "casket" or human remains. Bones may be visible on the surface.
Habitat	The physical space within which an organism lives, and the abiotic and biotic entities (e.g., resources) it uses and selects in that space.
Heritage resources	Includes, but not limited to, archaeological and historical sites, burial grounds, palaeontological sites, historic buildings, and cairns.
Hide	An animal skin treated for human use.
Historic	Refers to the period after European contact.
Key Line of Inquiry (KLOI)	Areas of the greatest concern that require the most attention during the environmental impact review and the most rigorous analysis and detail in the Developer's Assessment Report. Their purpose is to ensure a comprehensive analysis of the issues that resulted in significant public concern about the proposed development.
Kimberlite	Igneous rocks that originate deep in the mantle, and intrude the earth's crust. These rocks typically form narrow pipe-like deposits that sometimes contain diamonds.
Kimberlite pipe	Vertical structures on which kimberlites occur in the Earth's crust.
Landscape	A heterogeneous land area with interacting ecosystems that are repeated in similar form throughout. From a wildlife perspective, a landscape is an area of land containing a mosaic of habitat patches within which a particular "focal" or "target" habitat patch is embedded.
Laydown areas	An area that has been cleared for the temporary storage of equipment and supplies.
Lichen	A simple slow-growing plant that typically forms a low crust-like, leaf-like, or branching growth on rocks, walls, and trees.
Lithic scatter	A concentration of stone flakes resulting from the production or rejuvenation of stone tools.
Measurement indicators	Properties of the environment that when changed, could result in, or contribute to, an effect on an assessment endpoint.
Métis	People of mixed North American Indian-European descent.

Term	Definition
Palaeoeskimo	Palaeo, meaning old, referring to archaeological material deposited by people assumed to be of Eskimo ancestry, typically associated with the time frame between 5000 BP and 2500 BP.
Pemmican	A paste of dried and pounded meat mixed with melted fat and other ingredients such as berries, originally made by North American Indians and later adapted by Arctic explorers.
Rare Plants	A native plant species found in restricted areas, at the edge of its range or in low numbers within a province, state, territory or country.
Reclamation	The process of reconverting disturbed land to its former or other productive uses.
Regional Study Area	Represents the area of study for the assessment of cumulative (combined) effects of the Project and other past, existing or planned developments.
Runoff	The portion of water from rain and snow that flows over land to streams, ponds or other surface waterbodies. It is the portion of water from precipitation that does not infiltrate into the ground, or evaporate.
Sediment	Solid material that is transported by, suspended in, or deposited from water. It originates mostly from disintegrated rocks; it also includes chemical and biochemical precipitates and decomposed organic material, such as humus. The quantity, characteristics and cause of the occurrence of sediment in streams are influenced by environmental factors. Major factors are degree of slope, length of slope soil characteristics, land usage, and quantity and intensity of precipitation.
Sensory disturbance	Visual, auditory, or olfactory stimulus that creates a negative response in wildlife species.
Shovel test	A 50 cm by 50 cm subsurface test excavated to determine the presence or absence of buried cultural materials.
Stakeholder	Members of the public and special interest groups, federal authorities, provincial or municipal government, landowners or other parties who have an interest in the proposed project.
Subject of Note (SON)	Areas of concern identified by the Mackenzie Valley Review Board based on comments expressed during community scoping sessions in Behchokǫ, Yellowknife, and Łutsel K'e, and a technical scoping session in Yellowknife. The Subject of Note requires a thorough analysis of effects including a cumulative effects assessment, but does not require as much detail as a Key Line of Inquiry.
Tailings	A by-product of oil sands extraction typically comprised of water, sands and clays, with minor amounts of residual bitumen.
Tailings pond	Constructed impoundment structures required to contain tailings. Tailings ponds are enclosed dikes made with tailings and/or overburden materials to stringent geotechnical standards.
Tent ring	A formation of rocks used to anchor tents and usually associated with summer encampments.
Terms of Reference (TOR)	Written requirements governing Environmental Assessment (EA) implementation, consultations to be held, data to be produced and form/contents of the environmental impact assessment report.
Terrain	The landscape or lay of the land. This term is considered to comprise specific aspects of the landscape, namely genetic material, material composition, landform (or surface expression), active and inactive processes that modify material and form, slope, aspect, and drainage conditions. Terrain analysis is the identification of the above land surface features, to a more or less defined depth and determining their areal extent. The identification of special features such as permafrost, erosion, and landforms indicating subsurface structures is included in such analyses.
Traditional Knowledge (TK)	Knowledge systems embedded in the cultural traditions of regional, indigenous, or local communities. It includes types of knowledge about traditional technologies, the environment and ecology.
Traditional Land Use (TLU)	Use of the land by Aboriginal groups for harvesting traditional resources such as wildlife, fish or plants, or for cultural purposes such as ceremonies or camping.

Term	Definition
Treaty 8	The first of the northern treaties covering what is now the northern half of Alberta, the northeast quarter of British Columbia, the northwest corner of Saskatchewan, and the area south of Great Slave Lake in the Northwest Territories.
Treeline	The point (or imaginary line) beyond which tree growth dwindles.
Tributary	A stream that flows into a larger stream or lake.
Valued Components	Valued components represent physical, biological, cultural, social, and economic properties of the environment that are considered to be important by society.
Vegetation	A term to describe all of the plants or plant life of an area.
Viewscape	The area of the landscape that can be seen from one or more source points.
Waste rock	Rock moved and discarded to access resources.
Waterbody	A general term that refers to rivers, streams, and lakes
Watercourse	Riverine systems such as creeks, brooks, streams and rivers
Wetlands	An area of land where the water table is at or above the mineral soil for the entire year.
Wildlife	A term to describe all undomesticated animals living in the wild.
Wildlife Effects Monitoring Program (WEMP)	A program established to investigate and monitor for the potential effects of mining activities on wildlife within the Ekati Mine study boundaries.
Winter road	Roads which are built over frozen lakes and tundra. Compacted snow and/or ice is used for embankment construction.