

9. ASSESSMENT OF POTENTIAL HERITAGE EFFECTS

As described in the Application Information Requirements/Environmental Impact Statement Guidelines (AIR/EIS Guidelines) for the Project, potential heritage effects are divided into an assessment of archaeological sites protected under the *Heritage Conservation Act* (HCA; 1996) and Aboriginal and non-Aboriginal heritage sites that are not automatically protected under the HCA including paleontological sites and considering baseline data, consultation activities, and any shared and relevant community knowledge. As exploration activities are on-going, if necessary, additional archaeological sites located following submission of this Effects Assessment will be provided as an addendum.

9.1 ARCHAEOLOGICAL SITES

9.1.1 Rationale

This section includes a description of the scoping process used to identify Archaeological Sites for inclusion in the assessment. Scoping is fundamental to focusing the Application/EIS on those issues where there is the greatest potential to cause significant adverse effects. Valued components (VCs) are components of the natural and human environment that are considered to be of scientific, ecological, economic, social, cultural, or heritage importance (CEAA 2006; EAO 2013). To be included in the EA, there must be a perceived likelihood that the VC will be affected by the proposed Project. Valued components are scoped into the environmental assessment based on issues raised during consultation with all stakeholders including Aboriginal communities, government agencies and the public. Consideration of certain VCs may also be a legislated requirement, or known to be a concern because of previous project experience.

Archaeological sites are considered a VC as they are protected by legislation and:

- there are occurrences of spatial and temporal overlap between the Project and the VC such that interactions are possible;
- there is available and adequate data and analytical tools to measure an effect; and
- there is a perceived, reasonable likelihood that the VC will be affected by the Project.

The British Columbia (BC) *Environmental Assessment Act* (EAA; 2002) considers effects of a proposed project on heritage resources, including archaeological sites¹. As such, heritage resources are typically included as Valued Components in environmental assessment (EA) reviews.

In BC, the primary legislation protecting archaeological resources (both recorded and unrecorded) is the HCA (1996), which protects all sites predating 1846 Common Era (CE) on Crown and private land. Sites such as burials and Aboriginal rock art are protected regardless of age. The Archaeology

¹ Effects of the Project on other heritage sites not automatically protected under the HCA are discussed in Section 9.2.

Branch of the Ministry of Forests, Lands and Natural Resource Operations (Archaeology Branch) is the provincial ministry responsible for the administration of the HCA (1996), including issuing permits for heritage inspection and site alterations, and maintaining a database of known archaeological sites. Burials and gravesites are also protected in BC by the *Cremation, Interment, and Funeral Services Act* (2004).

9.1.2 Background

This section of the Application/EIS provides a general description of the local and regional archaeological environment and the source of the information. Background information includes information obtained from an archaeological assessment and, where available, traditional or community knowledge relating to the VC.

The archaeological effects assessment includes the results of Archaeological Impact Assessments (AIAs) conducted for the Project. The AIAs included surface examination and subsurface testing conducted under the authority of HCA Inspection Permits for the purpose of identifying previously unrecorded archaeological sites or reassessing known sites within the Project footprint. The assessment of anticipated project impacts and management measures are based on the results and recommendations presented in the AIAs summarized in Appendix 9.1-A.

9.1.2.1 Regional Overview

Archaeological research has been undertaken around Kamloops, BC since the late 19th century when Harlan I. Smith visited the area as part of the Jesup North Pacific Expedition (Smith 1900, 1901). Other regional studies included two Archaeological Overview Assessments (AOAs) carried out in the 1990s: *AOA of the Kamloops Forest District* (Arcas 1994) and *AOA of the Northern Secwepemc Traditional Territory* (I.R. Wilson Consultants 1998). Aboriginal Groups land use and knowledge reports were also reviewed, including the *SSN Cultural Heritage Study* and the *SSN Preliminary Mitigation Report* (Ignace et al. 2014; SSN 2014).

Based on a review of the Remote Access to Archaeological Data (RAAD) system maintained by the Archaeology Branch there are 167 known archaeological sites within the Regional Study Area (RSA). Of the 167 sites 138 are prehistoric, 24 are historic, 4 have both prehistoric and historic components, and for one no information is currently available. Of the 138 prehistoric sites the majority (n = 112) consist of lithic scatters, isolated finds, or firebroken rock, at four human remains were identified, five contain housepits, four have petroforms, six have pictographs, five are cultural depressions, one had a hearth associated with a lithic scatter, and one was a modified tooth from a large ungulate. Of the 24 historic sites 17 are buildings, four are cemeteries, one is a monument, one is the site of a church (no longer present) and cemetery, and one is a traditional use culturally modified tree site. The four sites with both prehistoric and historic components include a lithic scatter near metal debris, a lithic scatter in association with a bark stripped lodgepole pine with tobacco ties, lithic material in association with a rock cairn, a hearth and post-1846 culturally modified tree (CMT), and lithic material associated with a cache pit and a rectangular historic depression.

The first archaeological study carried out within the Local Study Area (LSA) was undertaken in 1971 during an archaeological resources inventory for proposed Provincial Parks and Reserves in

south-central BC (Condrashoff 1971; permit 1971-0030). No further archaeological work under permit was conducted within or adjacent to the LSA until the 1980s, despite the construction of the Historic Afton Mine which went into operations in the mid-1970s. Archaeological work near the Project area began again with a study conducted for the expansion of the Coquihalla Highway (Highway 5a; Brolly and Calancie 1982; permit 1982-0017). Subsequent studies for expansions of the Historic Afton Mine and the proposed Ajax Pit were carried out in the late 1980s (Bussey 1988a, 1988b; permit 1988-0028). Other work conducted in the immediate area included work around Jacko Lake and the Afton Mine Parcels (Rousseau and Kaltenrieder 2002; permit 2002-0114), and work carried out for the New Afton Mine Project (Seip et al. 2008; permit 2007-0045). The vast majority of the sites found during these studies consist of small lithic scatters (both surface and subsurface), some with small faunal assemblages (archaeologically recovered animal bones), typically located on flat terraces or knolls in proximity to existing or relict water sources.

9.1.2.2 *Historical Activities*

The importance of hunting in upland areas like the Project area has been documented ethnographically as important for Aboriginal Groups and was primarily focused on large game such as elk, moose, and deer, although small species such as grouse, hare, and marmot would also be taken (Ignace et al. 2014). Late summer and early fall were the primary times of the year when large game hunting would be conducted. Trapping of bear, beaver, and other fur-bearing mammals was also undertaken to provide material for clothing. Fishing was an important activity and took advantage of the numerous fish species and locations through the region. Jacko Lake provided an important spring trout fishery, and salmon harvested in the late fall from the Thompson Rivers system were a crucial foodstuff. Plants were harvested during the spring, summer, and fall, adding nuts, roots, and berries to the diet, and were also used medicinally. They were also harvested for creating functional items such as tools and dwellings. Starting in the early 1800s trading furs for goods at the trading post in Kamloops became increasingly important. For additional information on Aboriginal interests related to the Project refer to Section 12 of the Application/EIS.

European exploration of the region began in the early 1800s. David Stuart of the Pacific Fur Company visited the Kamloops area in 1811 and established the first trading post in 1812 at the confluence of the North and South Thompson rivers on its south side. That same year the North West Company established their Thompson River Post, located on the east bank of the North Thompson River just north of its confluence with the South Thompson River. The presence of the Pacific Fur Company didn't last long, however, being purchased by the North West Company in 1813. The North West Company and the Hudson's Bay Company (HBC) amalgamated in 1821; the fort was later renamed Fort Kamloops (Wade 1912; Carlson 2006). By 1841 it had fallen into disrepair and rather than being rebuilt, a new fort was built on the west bank of the North Thompson River. In 1862 the post was moved south of the Thompson River to take advantage of the trade with the miners and cattle drivers who travelled the trails south of the river (Carlson 2006).

The start of European settlement in the area was brought about in the 1840s to 1850s when gold was discovered in the Thompson River Valley. The discovery brought gold seekers as well as settlers and cattle herders. The well-established fur brigade trails were used as primary travel routes by those moving into the area. The first cattle drive into the region took place in 1846 when cattle were

moved along the Brigade Trail from Oregon to Fort Vancouver, then on to Fort Kamloops and Fort Alexandria. Small herds were kept for beef and dairy at Fort Kamloops (McLean 1982). In 1858 the HBC's exclusive licence to trade with Aboriginal Groups was cancelled and some company men took up lands in the area (Weir 1955). The population in the area continued to increase, railways arrived in the city in the 1880s, and the city of Kamloops was incorporated in 1893. By this time there was an established Main Street, grist and saw mills, a brickyard, blacksmith shops, as well as several stores and residences (Favrholdt 1983; Hagan 1882).

Early travel routes through the area affected the trend of later settlement, including the Brigade Trail, a branch of which ran south from Fort Kamloops past Stump and Nicola lakes. During the early years of settlement, individual ranches and settlements were distributed along the few roads and trails that passed through the region which could serve the needs of passing miners and packers heading to the goldfields. Later settlement patterns conformed less to the established travel routes with a focus more toward choice grazing lands (Weir 1955).

With the establishment of the *Dominion Homestead Act* of 1892, surveys of potential agricultural lands began in earnest across Canada. While Kamloops was not ideally suited to agriculture, early surveys treated the area as prairie lands with 160-acre parcels of land being surveyed. Several townships were established south of Kamloops to Stump Lake, stretching from northwest to southeast across the rolling landscape. In all, approximately 334 quarter-sections were homesteaded in the Railway Belt south of Kamloops up to the year 1915 (Favrholdt 1999). The LSA was one of the earliest areas of south-central BC to be pre-empted and fenced and saw intensive farming operations and cattle ranching take place in the early 1860s (Ignace et al. 2014).

Hudson's Bay Company (HBC) employee Alexander Jacko took up residence and homesteaded in the area in the early 1850s. Of Métis decent, he came into the area in the 1830s working as a packer for HBC and died in 1862. Historic records indicate that he kept horses around Jacko Lake; the lake and creek were subsequently named after him (Balf 1969; Ignace et al. 2014). The homestead was taken over by his son Philip Jacko who pre-empted the family horse range in 1866 extending to Jacko Lake and built a house near the mouth of Jacko Creek. Philip Jacko is listed as Tk'emlups Indian in documents from this time period. He was born in 1840, and passed away between 1881 and 1884. He was married to Melvina, also a Tk'emlupsemc. (Balf 1969; Ignace et al. 2014).

John Peterson moved to the area in 1862 and began a pack train operation between Lillooet and the Cariboo. When the Canadian Pacific Railway (CPR) Survey started up in the area in 1871, Peterson sold his pack train to the government and continued on as the survey's boss packer. In 1868 he settled in Kamloops, pre-empting land near Jacko Creek; a portion of the drainage, Peterson Creek, carries his name. Peterson built a large house and stables, purchasing more land from Philip Jacko at the creek mouth and from William Jones, making him the owner of much of the present area of Kamloops (Balf n.d.).

There is a long history of mineral exploration and mining within the RSA starting with the Cariboo gold rush of the 1850s. By the late 1800s, there were over 200 mineral claims documented in the Kamloops area. It wasn't until the late 1890s that larger operations began to appear including the Iron Mask Mine which was first staked in 1869, located approximately 8 km from Kamloops, immediately northwest of the current Ajax Mine. The Iron Mask Mine was later operated under the

names Kamloops Mines Ltd. and the Kamloops Copper Company with mining operations sporadically starting and stopping between 1920 and 1928. It is likely that properties related to the current LSA were situated within these early mineral claim areas (Bond 1988).

Work within the Ajax claim area was reported in 1898 by the Wheal Tamar claim group. Between 1904 and 1910 trenching was carried out and additional underground extraction occurred through the 1920s. In 1928, the Consolidated Mining and Smelting Company of Canada Ltd. (Cominco) optioned thirteen claims within and adjacent to the current LSA. Further exploration and mining continued through the 1970s and 1980s by Afton Mines Ltd. and Cominco. Within the central part of the current Project, the East and West Ajax open pits were being developed by 1988 along with the construction of a haul road to the Afton Mill. By 1997, production had ceased for both the east and west Ajax pits of the Afton mine (Bond 1988). There are currently approximately 160 ha of disturbance within the LSA relating to these developments from the two open pits and three waste rock storage facilities. In addition to these large disturbed areas there are disturbances from access roads and exploration activities associated with these prior developments.

9.1.2.3 Baseline Studies

Baseline studies conducted for the Archaeological Sites VC include AIAs conducted under HCA Heritage Inspection Permits 2009-0349 and 2014-0171. The AIA field studies, which included members of the Tk'emlúps te Secwepemc and the Skeetchestn Indian Band, were designed to identify previously unrecorded archaeological sites within the Project footprint and if necessary reassess any previously recorded archaeological sites. The AIAs include descriptions of the archaeological sites recorded and provide significance evaluations determined using the criteria for site evaluation outlined in the *British Columbia Archaeological Impact Assessment Guidelines, Appendix D* (Archaeology Branch 1998). The scientific, public, ethnic, economic, and historic (if applicable) significance of each identified site was addressed when possible. The results of the AIAs are summarized in the *Ajax Project: Archaeological Baseline Report* (ERM 2015; Appendix 9.1-A).

Data Sources

A review of published information for the Project and surrounding region was conducted prior to conducting baseline fieldwork. The review included ethnographic, historic, archaeological, and environmental literature. In addition, a search of the BC Archaeological Site Inventory database using the Remote Access to Archaeological Data (RAAD) application was carried out and relevant reports available on the Provincial Archaeological Report Library (PARL) were reviewed. Aboriginal Groups land use and knowledge reports were reviewed, including the *SSN Cultural Heritage Study* and the *SSN Preliminary Mitigation Report* (Ignace et al. 2014; SSN 2014). Available environmental baseline studies carried out for the Project were also reviewed.

Methods

The assessment of archaeological potential was based primarily on the following factors: proximity to water sources or relict water courses, level to gentle slopes, aspect, food resource values, forest cover, proximity to previously recorded archaeological sites, the potential of an area to be used as a travel corridor, the presence of microenvironmental features that are often associated with

archaeological sites (such as terraces, knolls, and breaks-in-slope), and proximity to known traditional land use sites, or other local and traditional knowledge (when available). Factors thought to constrain archaeological potential include unbroken slope, steep or rough terrain, poorly-drained ground, and areas where the soils have been previously disturbed. Prior to fieldwork LiDAR mapping and orthophotos were reviewed, and proximity to hydrological features and slope class were modeled for the LSA to aide in planning the AIA and prioritize the assessment; however, all portions of the Project footprint were subject to in field assessment and this was not relied upon exclusively (Appendix 9.1-A).

Based on a review of VRI Forest Class Data the potential for pre-1846 CE CMTs in the LSA was assessed as very low, however, when present, standing trees, fallen logs, and stumps were visually examined for cultural modification.

The entire Project area was subject to pedestrian survey (see Figure 9.1-1 and Archaeological Baseline Report for details). Examination consisted of a combination of systematic and/or judgmentally selected pedestrian survey traverses. Crew spacing during the pedestrian survey was determined based on terrain and visibility constraints, as well as the assessed archaeological potential of the area being examined, but spacing was generally between 5 and 20 m. When considered appropriate, additional judgmentally selected survey routes followed spatially restricted topographic features.

Ground surfaces were visually examined for trails, structures, artifacts, depressions, and other evidence of past human settlement or land use. Tree throws were examined for exposed cultural materials. Standing trees, fallen logs, and stumps were visually examined for cultural modification. Bedrock exposures and boulders were inspected for pictographs and petroglyphs, as well as for the possible presence of seams of flakable lithic raw materials. Artifacts identified on the surface during pedestrian surveys were recorded, photographed and collected. In the case of extensive surface lithic scatters, only diagnostic artifacts and formed tools were recorded in reference to a local datum and collected.

Characterization of Archaeological Sites Baseline Condition

The entire Project footprint was assessed during the AIAs for the Project and 28,662 shovel tests were conducted at 506 locations and 41 previously unknown archaeological sites were recorded (Appendix 9.1-A). As the proposed Project footprint changed in spring 2014, some of the baseline work conducted prior to this period fell outside of the current Project footprint. Based on the results of the AIAs and the current Project footprint there are 45 recorded archaeological sites within the LSA that could be directly or indirectly impacted by the Project (Section 9.1.4).

9.1.3 Assessment Boundaries

Assessment boundaries define the maximum limit within which the effects assessment is conducted. They encompass the areas within, and times during which, the Project is expected to interact with the VCs, as well as the constraints that may be placed on the assessment of those interactions due to political, social, and economic realities (administrative boundaries), and limitations in predicting or measuring changes (technical boundaries). The definition of these assessment boundaries is an integral

part in scoping for archaeological sites, and encompasses possible direct, indirect, and induced effects of the Project on archaeological sites, as well as the trends in processes that may be relevant.

9.1.3.1 *Spatial Boundaries*

The spatial boundaries for the assessment of potential archaeological effects include a Local Study Area and a Regional Study Area defined below (Figures 9.1-1 and 9.1-2).

Local Study Area

The LSA incorporates the Project footprint within which direct effects can occur and a 500 metre buffer within which indirect effects can occur (Figure 9.1-1). The LSA does not include the existing waterline on New Gold Inc.'s New Afton Mine property as there will be no additional effects.

Regional Study Area

The RSA is based on the Terrestrial Biophysical Effects study area for consistency of reporting. This large area provides a sample of archaeological sites within the region and allows the effects on archaeological sites within the LSA to be placed in a larger context (Figure 9.1-2).

9.1.3.2 *Temporal Boundaries*

The temporal phases of the Project are:

- **Construction:** 2 years;
- **Operation:** 23 years;
- **Decommissioning and Closure:** 5 years (includes project decommissioning, abandonment and reclamation activities, as well as temporary closure, and care and maintenance); and
- **Post Closure:** 5+ years (includes ongoing reclamation activities and post-closure monitoring).

9.1.3.3 *Administrative Boundaries*

Due to the sensitive nature of archaeological sites, locational information protected under the HCA is not shown in the Application/EIS. Archaeological site locational information is available to KGHM Ajax Mining Inc. (KAM), affected Aboriginal Groups, and the Ministry of Forests, Lands and Natural Resource Operations (MFLNRO).

9.1.4 **Potential Effects of the Project and Proposed Mitigation for Archaeological Sites**

9.1.4.1 *Identifying Potential Effects on Archaeological Sites*

The purpose of the archaeology effects assessment is to evaluate effects on archaeological sites due to development of the Project. An evaluation by Project temporal phase was undertaken to determine if there is an interaction between Project components and the archaeology VC. Interactions between protected archaeological sites and Project components and activities were identified as requiring assessment based on:

- legislative protection under the HCA;
- being finite in number; and
- being vulnerable to disturbance.

The potential effects from Project-heritage VC interactions have been split into known and as-yet unknown archaeological sites and are evaluated in Table 9.1-1.

9.1.4.2 *Effects on Archaeological Sites*

Project effects considered in the assessment include potential effects on known archaeological sites and as-yet unknown archaeological sites. Both of these effects may occur within the Construction phase of the Project due to activities associated with the movement, excavation, or disturbance of soil, and clearing and grubbing of vegetation. These activities have the highest potential for interactions between the Project and archaeological sites, if present. During the Operation, Decommissioning and Closure, and Post Closure phases there is a potential for effects to archaeological sites due to increased human presence.

Disturbance of Known Archaeological Sites

The AIA studies identified 168 archaeological sites within the RSA. Of the 168 archaeological sites within the RSA, 45 are located within the LSA. Of the 46 archaeological sites within the LSA 28 are in, or within 50 m of, the Project footprint where direct effects are anticipated to occur (Table 9.1-2) and 18 archaeological sites that may be indirectly affected by Project activities.

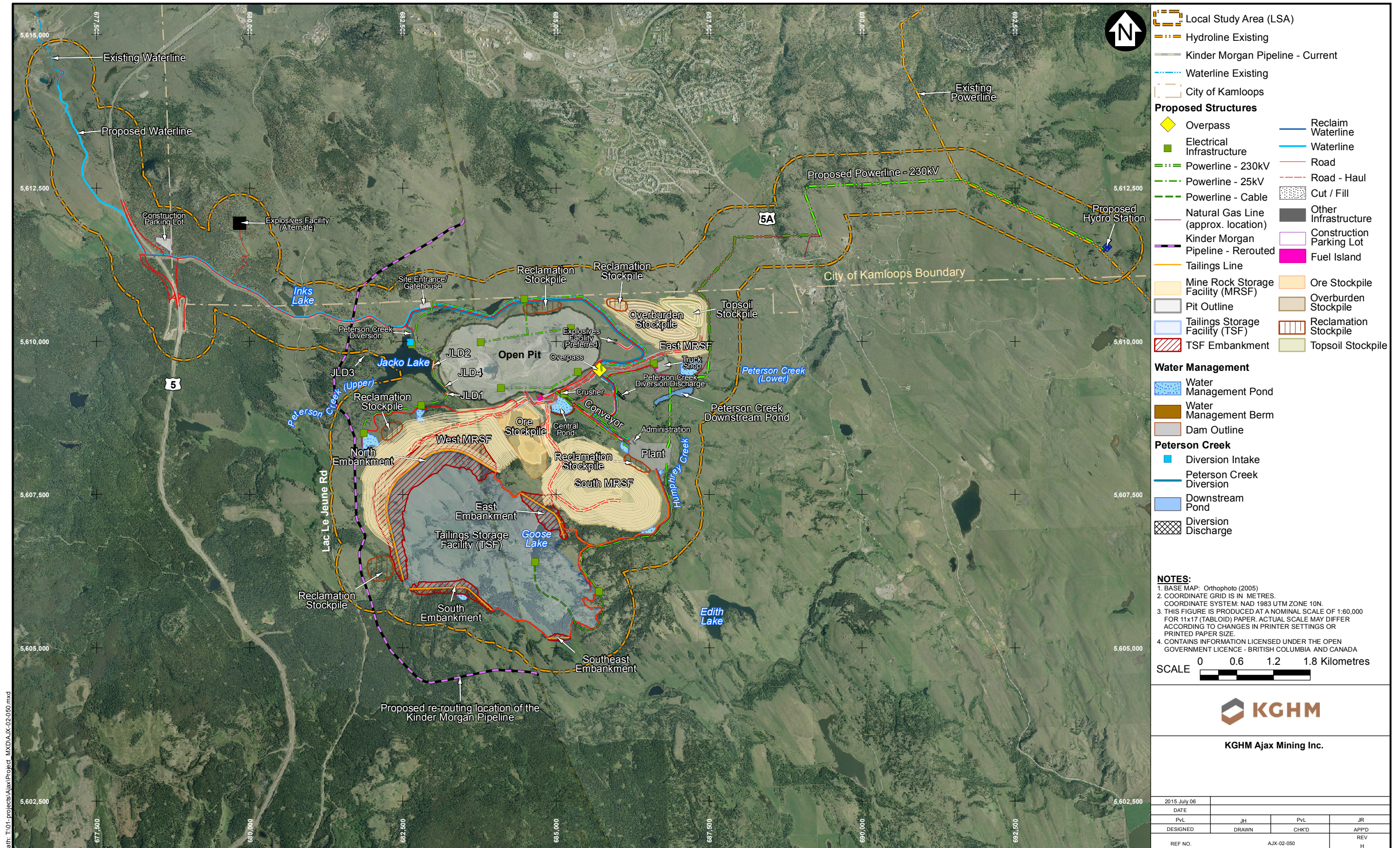
Direct Effects

Direct effects to archaeological sites will occur during the Construction phase of the Project. The majority of the archaeological sites (n = 25) that will be directly affected by the Project are lithic scatters or single lithic finds with a low overall significance rating. The archaeological sites with a higher significance include: EdRc-34, a lithic scatter that includes a Shuswap Horizon point with a moderate significance; EdRc-25, a possible hunting blind site with a significance rating of moderate-high; EdRc-61, the location where the St. Peter's Anglican Church and cemetery was situated with a significance rating of high; and EdRc-62, a modified ungulate tooth recovered from a shovel test with a significance rating of moderate. Archaeological sites EdRc-5, EdRc-6, EdRc-7, and EdRc-8 are located along the shores of Jacko Lake.

Indirect Effects

Indirect effects to known archaeological sites located between 50 and 500 metres from Project components can occur through all Project phases due to increased human presence. There are 18 known archaeological sites within the LSA where indirect effects could occur (Table 9.1-3). Archaeological site EdRc-21 is located along the shores of Jacko Lake.

Figure 9.1-1
Archaeological Sites Effects Assessment Local Study Area



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Figure 9.1-2
Archaeological Sites Effects Assessment Regional and Local Study Areas

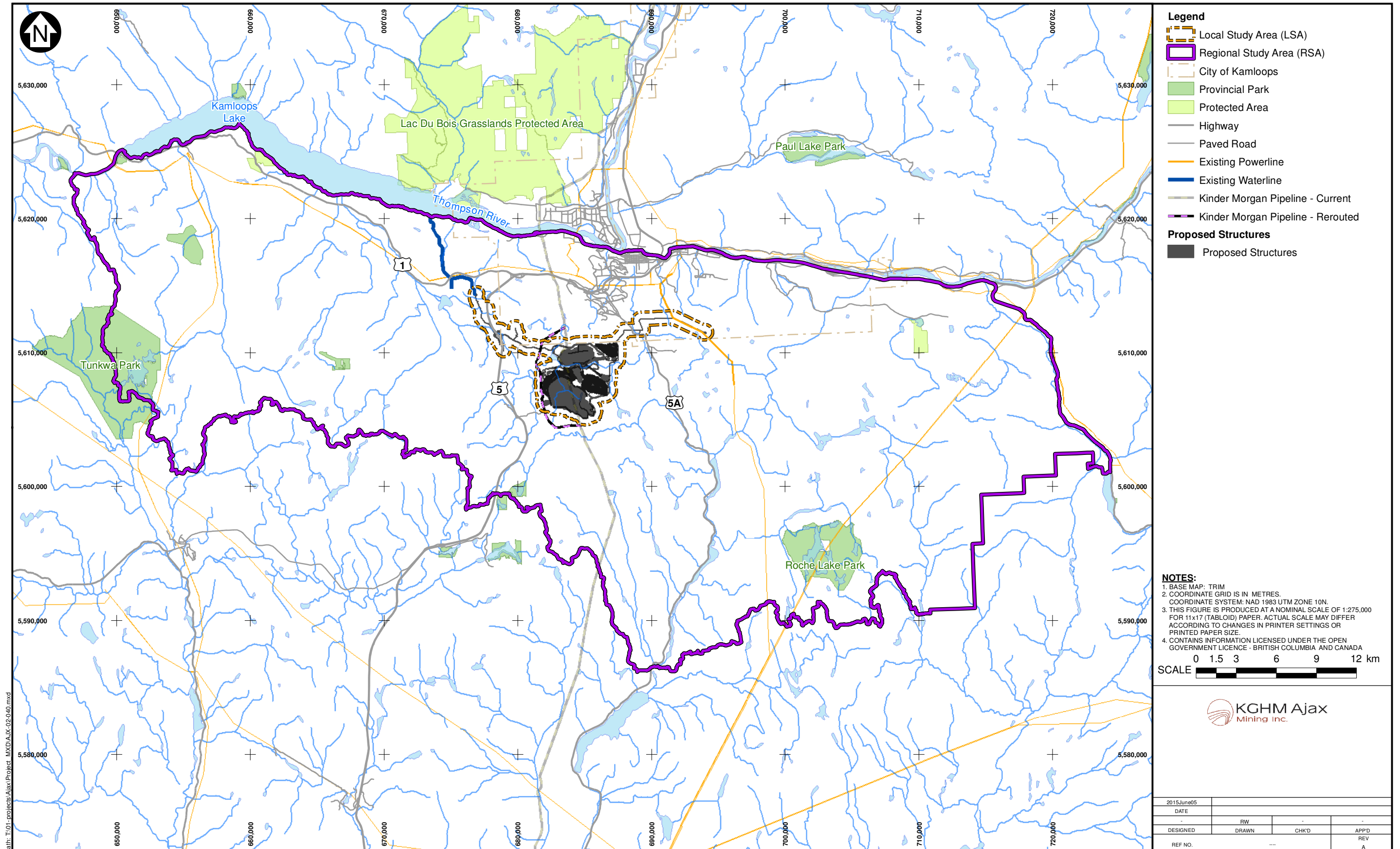


Table 9.1-1. Identifying Potential Project Interactions and Effects on Archaeological Sites

Project Activities		Potential Effects on Archaeological Sites	
		Disturbance of Known Archaeological Sites	Disturbance of As-yet Unknown Archaeological Sites
Construction	Clearing and Grubbing	M	L
	Earthworks	M	L
	Overburden/Topsoil Stockpile	M	L
	Laydown Areas and Storage Yards	L	L
	Project Lighting	O	O
	Site Security and Fencing	O	O
	Fuel Storage and Filling Area	L	L
	Hazardous Wastes Transport, Storage, and Disposal	O	O
	Construction Wastes Transport, Storage, and Disposal	O	O
	Sewage Infrastructure and Disposal	L	L
	Public Road Realignment, Use, and Maintenance	L	L
	Site Road Construction, Use and Maintenance	M	L
	Haul Road Overpass Construction, Use, and Maintenance	M	L
	Site Buildings and Process Plant	L	L
	Explosives Magazine and Storage Facilities	L	L
	Open Pit Development	M	L
	Drilling and Blasting	M	L
	Crushing Mine Rock	O	O
	Loading, Hauling, and Deposition of Mine Rock	M	L
	Temporary Ore Stockpile	M	L
	Tailing Storage Facility Development	M	L
	Power Transmission, Distribution	M	L
	Natural Gas Line	L	L
	Pipeline Utility Corridor (Potable Water, Sewage, and Site Water)	M	L
	Water Intake from Kamloops Lake	M	L
	Fire Suppression Infrastructure	L	L
	Contact Water	O	O
	Non-contact Water	O	O
	Peterson Creek Diversion	M	L
	Water Management Dams	M	L
	Mine Staffing (Direct Employment)	L	L
	Contracted Employment	L	L
	Taxation	O	O

(continued)

Table 9.1-1. Identifying Potential Project Interactions and Effects on Archaeological Sites (continued)

Project Activities		Potential Effects on Archaeological Sites	
		Disturbance of Known Archaeological Sites	Disturbance of As-yet Unknown Archaeological Sites
Operation	Open Pit Development	L	L
	Drilling and Blasting	L	L
	Hauling Mine Rock and Ore from Pit	L	L
	Crushing and Conveying Ore	L	L
	Temporary Ore Stockpile	L	L
	Development of Mine Rock Management Facilities	L	L
	Stripping, Loading, Hauling, Deposition, and Contouring of Topsoil and Overburden	L	L
	Revegetation through Progressive Reclamation	L	L
	Process Plant Operation	L	L
	Deposition to Tailing Storage Facility	O	O
	Site Road Use and Maintenance (Materials, Personnel, Supplies)	L	L
	Concentrate Transport and Storage	O	O
	Explosives Magazine and Storage Facilities	O	O
	Fire Suppression Infrastructure	O	O
	Fuel Storage and Filling Area	L	L
	Hazardous Wastes Transport, Storage, and Disposal	L	L
	General Wastes Transport, Storage, and Disposal	O	O
	Sewage Infrastructure and Disposal	O	O
	Laydown Areas and Storage Yards	O	O
	Power Transmission, Distribution	O	O
	Project Lighting	O	O
	Site Access, Security and Fencing	O	O
	Water Intake from Kamloops Lake	L	L
	Contact Water	O	O
	Non-contact Water	O	O
	Potable Water Treatment and Use	O	O
	Peterson Creek Diversion	O	O
	Mine Staffing (Direct Employment)	L	L
	Contracted Employment	L	L
	Taxation	O	O

(continued)

Table 9.1-1. Identifying Potential Project Interactions and Effects on Archaeological Sites (completed)

Project Activities		Potential Effects on Archaeological Sites	
		Disturbance of Known Archaeological Sites	Disturbance of As-yet Unknown Archaeological Sites
Decommissioning and Closure	Dismantling of Ancillary Buildings	O	O
	Pit Lake Planning	O	O
	Site Road/Bridge Decommissioning	O	O
	Tailing Storage Facility Decommissioning and Reclamation	O	O
	Mine Rock Management Facilities Reclamation	O	O
	Fuel Storage and Filling Area	O	O
	Hazardous Wastes Transport, Storage, and Disposal	O	O
	General Wastes Transport, Storage, and Disposal	O	O
	Sewage Infrastructure and Disposal	O	O
	Laydown Areas and Storage Yards	O	O
	Power Transmission, Distribution	O	O
	Project Lighting	O	O
	Site Access, Security and Fencing	O	O
	Contact Water	O	O
	Non-contact Water	O	O
	Potable Water Treatment and Use	O	O
	Peterson Creek Diversion	O	O
	Road use to the Project (Materials, Personnel, Supplies)	O	O
	Mine Staffing (Direct Employment)	O	O
	Contracted Employment	O	O
Taxation	O	O	
Post Closure	General Site Inspections and Maintenance	O	O
	Contact Water	O	O
	Non-contact Water	O	O
	Road use to the Project (Materials, Personnel, Supplies)	O	O
	Mine Staffing (Direct Employment)	O	O
	Contracted Employment	O	O

Notes:

- O No interaction anticipated.
- L Negligible to minor interaction expected; implementation of best practices, standard mitigation and management measures; no monitoring required, no further consideration warranted.
- M Potential moderate interaction requiring unique active management/monitoring/mitigation; warrants further consideration.
- H Key interaction; warrants further consideration.

Disturbance of As-yet Unknown Archaeological Sites

Though AIAs were conducted for the Project; there is always a possibility that currently unrecorded archaeological sites may be identified during ground altering activity. However, as the effort expended during the AIAs for the Project met the expectations of the Archaeology Branch, there is a high level of confidence that any disturbance to unknown archaeological sites within the currently assessed areas is a low probability.

9.1.4.3 *Mitigation Measures for Archaeological Sites*

Mitigation measures are provided below for known and as-yet unknown archaeological sites.

Known Archaeological Sites

Direct Effects

While avoidance is always the preferred recommendation, for the 28 archaeological sites located in, or within 50 metres of, Project developments, where avoidance is not feasible, mitigation measures, determined in consultation with the Archaeology Branch and Aboriginal Groups, will be used to reduce residual effects to not significant (minor). It is anticipated that mitigation measures at these sites will include systematic data recovery or preservation through site capping. Due to the stated importance of cultural features associated with Jacko Lake and the Hunting Blind Complex to the SSN archaeological sites EdRc-5, EdRc-6, EdRc-7, EdRc-8, and EdRc-25 and the potential for a burial at EdRc-61, the St. Peter's Church location, additional mitigation measures are provided for these sites and residual effects are anticipated based on the significance of these sites.

Archaeological sites EdRc-5, EdRc-6, EdRc-7, and EdRc-8 are located along the shores of Jacko (Pipsell) Lake which is associated with the Trout Children Story (CEAA 2015). These sites consist of lithic scatters. If avoidance of these sites is not feasible additional investigation of these sites is recommended, focusing on determining the antiquity and function of the sites, understanding the cultural values associated with the sites and how these could be related to possible mitigation options. A final mitigation strategy for these sites will be determined through discussion between KAM, SSN, and the Archaeology Branch.

Archaeological site EdRc-25 consists of three semicircular petroforms within a series of rock outcrops north of Peterson Creek. Extensive subsurface testing (n = 688) and a survey was conducted at the site; however, no prehistoric cultural material was identified at the site (Morin 2014). Based on the available information the antiquity and function of site EdRc-25 cannot be confirmed (Morin 2014); however, the *SSN Cultural Heritage Study* describe these as hunting blind features with "extremely high interest and irreplaceable value" (Ignace 2014:135).

As EdRc-25 is within the mine pit, avoidance of the site is not feasible. Additional investigation of this site is recommended, focusing on determining the antiquity and function of the site, understanding the cultural values associated with the site and how these could be related to possible mitigation options. The SSN Preliminary Mitigation Report states that removal and reconstruction of the petroforms is not an acceptable solution (SSN 2014). In addition to systematic data recovery of the archaeological data mitigation measures for the cultural effects will be determined through consultation between KAM, SSN and the Archaeology Branch.

Table 9.1-2. Archaeological Sites that will be Directly Affected by the Ajax Project

Borden Number	Site Type	Nearest Project Component	Distance to Nearest Project Component (m)	Antiquity	Description	Permit #
EdRc-5	Lithic Scatter	Mine Pit	0	Prehistoric	This site consists of two grey chert flakes and small faunal fragments. Approximately 10 flakes observed on the surface were left in situ. After 1988, the site was destroyed during construction of the Mine Haul Road.	1988-0028
EdRc-6	Lithic Scatter	Mine Pit, Powerline (25 kV)	35	Prehistoric	This site consists of a little scatter of one basalt flake and one green chert flake. Five chert flakes were also observed on the surface and left in situ. After 1988, the eastern portion of the site was impacted by construction of the existing Trans Mountain pipeline.	1988-0028
EdRc-7	Lithic Scatter	Mine Pit, Powerline (25 kV)	0	Prehistoric	This site consists of two chert flakes and two basalt core fragments. All were observed on the surface and left in situ.	1988-0028
EdRc-8	Lithic Scatter	Powerline (25 kV)	25	Prehistoric	This site consists of four chert flakes, one of which was utilized. All were observed on the surface and left in situ. The site is now flooded due to damming on Peterson Creek.	1988-0028
EdRc-10	Lithic Scatter	MRSF, Road	0	Prehistoric	This site consists of material recovered in 1988 and 2013. Material recovered in 1988 consist of two basalt flakes, one chert flake, and a small calcined bone fragment. In addition, eight chert and basalt flakes were observed on the surface and left in situ. Additional material recovered in 2013 consists of three basalt flakes (two of which were collected from the surface). This site was also given Borden Number EdRc-18; this duplicate designation has now been legacied.	1988-0028
EdRc-21	Lithic Scatter	Mine Pit	0	Prehistoric	The site consists of a quartzite core and two pieces of quartzite block shatter collected from a single surface find located on a steep slope east of site EdRc-25.	2009-0349
EdRc-22	Lithic Scatter	Peterson Creek Diversion	15 (40 to centerline)	Prehistoric	This site consists of one basalt biface base fragment and one piece of basalt debitage.	2009-0349
EdRc-23	Lithic Scatter	Haul Road	11	Prehistoric	This site consists of one piece of basalt debitage.	2009-0349
EdRc-25	Petroform	Mine Pit	0	Prehistoric	Three semi-circular petroforms, constructed using cobbles, were identified along a series of gently sloping rocky outcrops. This site has been identified by the SSN as a Hunting Blind Complex	2009-0349
EdRc-27	Lithic Scatter	Peterson Creek Diversion, Road	0	Prehistoric	This site consists of five pieces of basalt debitage.	2009-0349
EdRc-30	Lithic Scatter	East MRSF, Topsoil Stockpile	0	Prehistoric	This site consists of one basalt flake, one mudstone flake, one piece of chert debitage, and one piece of chalcedony debitage.	2009-0349
EdRc-34	Lithic Scatter	Peterson Creek Diversion, Powerline (230 kV)	0	Prehistoric	This site consists of one basalt Shuswap Horizon projectile point, one basalt flake, and one chert flake.	2009-0349
EdRc-40	Lithic Scatter	Mine Pit	0	Prehistoric	This site consists of a basalt biface collected from the surface.	2009-0349
EdRc-41	Lithic Scatter	Peterson Creek Diversion, Powerline (25kV), Road	49	Prehistoric	This site consists of one basalt retouched flake and 14 basalt and three chert flakes.	2009-0349
EdRc-44	Lithic Scatter	Trans Mountain Pipeline - Existing	0	Prehistoric	This site consists of a single utilized basalt flake.	2009-0349
EdRc-48	Lithic Scatter	WMRSF	0	Prehistoric	The site consists of a basalt non-diagnostic biface fragment.	2009-0349
EdRc-49	Lithic Scatter	TSF	0	Prehistoric	The site consists of a non-diagnostic basalt biface and 21 pieces of basalt debitage.	2009-0349
EdRc-50	Lithic Find	Ore Stockpile	0	Prehistoric	The site consists of an isolated lithic find located on the surface of a prominent bedrock ridge.	2014-0171
EdRc-51	Lithic Scatter	TSF	0	Prehistoric	The site consists a small subsurface lithic scatter (one pink quartzite flake and one white chert flake) located on a bench overlooking Goose Lake	2014-0171
EdRc-52	Lithic Find	Mine Pit	0	Prehistoric	The site consists of an isolated lithic find (one dark grey basalt flake) located on the surface of a ridge of exposed bedrock	2014-0171
EdRc-53	Lithic Find	TSF	0	Prehistoric	The site consists of a single black basalt flake recovered from a shovel test on a low terrace overlooking a slough.	2014-0171
EdRc-54	Lithic Find	Water Management Dam/ Embankment	0	Prehistoric	The site consists of one green chert flake collected from a shovel test at the edge of a terrace overlooking Peterson Creek to the north	2014-0171

(continued)

Table 9.1-2. Archaeological Sites that will be Directly Affected by the Ajax Project (completed)

Borden Number	Site Type	Nearest Project Component	Distance to Nearest Project Component (m)	Antiquity	Description	Permit #
EdRc-55	Lithic Scatter	Powerline (25kV), Water Management Dam/ Embankment	0	Prehistoric	The site consists of two black basalt flakes, two rose quartzite flakes, and one beige tuff flake, all recovered from a single shovel test on a narrow ridge overlooking Peterson Creek to the east and south	2014-0171
EdRc-56	Lithic Find	South MRSF	0	Prehistoric	The site consists of one red chert flake from a shovel test on a terrace above a dry gully to the south.	2014-0171
EdRc-59	Lithic Find	Waterline	0	Prehistoric	The site consists of one cream-coloured tuff side-scraper recovered from the gravel roadbed at the junction of Sugarloaf Road and a New Gold Inc. mine site road	2014-0171
EdRc-61	Church and Cemetery	TSF	0	Historic	The site is location of St. Peter's Anglican Church and its associated cemetery, which was constructed in 1915 and dismantled in the late 1920s.	2014-0171
EdRc-62	Modified ungulate tooth	Tailings Pipeline, Reclaim Water Pipeline Road	0	Prehistoric	The site consists of a modified right first incisor of a large ungulate recovered from a shovel test on a gently sloping terrace immediately west of Humphrey Creek. Modifications to the tooth include a groove on the mesial surface at the cemento-enamel junction, where the crown meets the root, and the remnants of a drilled hole visible at the base of the broken root on the distal surface, perpendicular to the long axis of the tooth.	2014-0171
EdRc-63	Lithic Scatter	TSF	0	Prehistoric	This site consists of eight basalt flakes.	

Table 9.1-3. Archaeological Sites that may be Indirectly Affected by the Ajax Project

Borden Number	Site Type	Nearest Project Component	Distance to Nearest Project Component (m)	Antiquity	Description	Permit #
EdRc-9	Lithic Scatter	Open Pit	78	Prehistoric	This site consists of five chert flakes. All were observed on the surface and left in situ. The site is now flooded due to damming on Peterson Creek.	1988-0028
EdRc-19	Lithic Scatter	Peterson Creek Diversion	62	Prehistoric	This site consists of an Early Nesikep basalt, projectile point fragment, a basalt projectile point fragment (non-diagnostic), a basalt distal point fragment, a basalt distal point fragment, two basalt unformed unifaces, a chert unformed uniface, and debitage. This site is situated on the shore of Jacko Lake.	2002-0114
EdRc-24	Lithic Scatter	Water Pipeline	323	Prehistoric	This site consists of 1 distal portion of a basal biface fragment.	2011-0128
EdRc-26	Lithic Scatter	Water Pipeline	457	Prehistoric	This site consists of 2 chert flakes and 1 basalt flake.	2009-0349
EdRc-28	Lithic Scatter	Fortis Gas Line	60	Prehistoric	This site consists of four basalt flakes.	2009-0349
EdRc-31	Lithic Scatter	Road	75	Prehistoric	This site consists of one banded chert flake.	2009-0349
EdRc-32	Lithic Scatter	Powerline (230 kV)	67	Prehistoric	This site consists of three pieces of chert debitage, and a red-banded chert flake.	2009-0349
EdRc-35	Lithic Scatter	Powerline (25kV)	272	Prehistoric	This site consists of 2 banded chert flakes.	2009-0349
EdRc-36	Lithic Scatter	Powerline (25kV)	230	Prehistoric	This site consists of 1 chert flake.	2009-0349
EdRc-38	Lithic Scatter	Access Road	175	Prehistoric	This site consists of 1 basalt flake.	2009-0349
EdRc-39	Lithic Find	Water Pipeline	190	Prehistoric	This site consists of 1 chert biface fragment, 3 retouched basalt flakes, 4 utilized basalt flakes, 64 pieces of basalt debitage, 1 chert flake, 2 pieces of chert debitage, 1 chalcedony flake, and 91 pieces of calcined bone.	2009-0349
EdRc-42	Lithic Scatter	Water Pipeline	88	Prehistoric	This site consists of 1 non-diagnostic basalt biface.	2009-0349
EdRc-43	Lithic Find	Water Pipeline	224	Prehistoric	This site consists of 1 basalt flake.	2009-0349
EdRc-45	Lithic Find	Water Pipeline	429	Prehistoric	This site consists of 1 basalt Plateau Horizon base, 1 basalt non-diagnostic biface fragment, 2 basalt scraper fragments, 57 pieces of basalt debitage, and 1 piece of chert debitage.	2009-0349
EdRc-47	Lithic Find	Powerline (25kV)	166	Prehistoric	This site consists of 1 basalt flake.	2009-0349
EdRc-57	Lithic Scatter	Access Road	357	Prehistoric	This site consists of 1 red chert flake, 1 orange chert core fragment, and 1 dark grey basalt flake.	2014-0171
EdRc-58	Lithic Find	Peterson Creek Downstream	84	Prehistoric	The site consists of dark grey basalt end-scraper that was identified from a surface exposure on a terrace on the northern side of Peterson Creek.	2014-0171
EdRc-60	Lithic Find	Powerline (25kV)	416	Prehistoric	This site consists of 1 red chert flake, 1 orange chert core fragment, and 1 dark grey basalt flake.	2014-0171

Archaeological site EdRc-61 is the former site of St. Peter's Anglican Church and associated cemetery. Avoidance of EdRc-61 through Project redesign is the preferred management recommendation. As avoidance is not feasible (Section 17.4.9) mitigation measures determined in consultation with the Archaeology Branch, the Anglican Church, and potentially other affected stakeholders (e.g., next of kin) are recommended. The Anglican Church has contacted the next of kin of Beatrix May Smith-Osborne, the one individual known to be buried at this site, and they expressed their desire to have the burial moved if this site is to be disturbed.

As-yet Unknown Archaeological Sites

Any revisions to the currently proposed Project footprint will be reviewed by a qualified professional archaeologist. The Chance Find Procedure for the Project will be used to provide a framework for the avoidance or mitigation of archaeological sites, if present, that were not identified during the AIA. To protect archaeological sites within the LSA, mine employees and contractors will be educated about the Chance Find Procedure. Where avoidance is not possible, any alteration to an archaeological site protected under the HCA (1996) will require a Section 12 Site Alteration Permit from the Archaeology Branch. Additional mitigation measures may be required. These measures will be determined in consultation with local Aboriginal Groups and the Archaeology Branch.

9.1.5 Residual Effects and their Significance

Based on the mitigation measures provided above it is assumed that, with the exception of archaeological site EdRc-25, the effects from the Project will be reduced to not significant. The determination of the significance of residual effects on the VC archaeological sites is based on the descriptors in Appendix F of the *Archaeological Impact Assessment Guidelines* (Archaeology Branch 1998). These are used to describe aspects of potential residual effects resulting from the disturbance of archaeological sites.

9.1.5.1 Summary of Residual Effects

With proposed mitigation measures no significant effects are anticipated to the VC archaeological sites (Table 9.1-4).

9.1.5.2 Criteria for Characterization of Residual Effects

Residual effects are characterized using standard criteria (Table 9.1-5).

9.1.5.3 Characterization of Residual Effects

The characterization of the Residual Effects for the VC Archaeological Sites is described below and summarized in Table 9.1-6.

Table 9.1-4. Summary of Residual Effects on Archaeological Sites

Potential Effect	Project Phase (timing of effect)	Project Component/ Physical Activity	Description of Cause-Effect	Description of Mitigation Measure(s)	Description of Residual Effect
Disturbance of Known Archaeological Sites	Construction	Ground disturbance	Impact to archaeological sites.	Avoidance or systematic data recovery.	Disturbance of 44 Known Archaeological Sites
Disturbance of Unknown Archaeological Sites	All	Ground disturbance	Impact to archaeological sites.	Avoidance or systematic data recovery.	Disturbance of Unknown Archaeological Sites
Disturbance of Known Archaeological Site EdRc-25	Construction	Ground disturbance	Impact to an archaeological site with culturally significant features.	Avoidance or systematic data recovery. Reconstruction of the petroforms at another location to be determined during consultation with the SSN and other stakeholders.	Disturbance of Known Archaeological Site EdRc-25

Disturbance of Known Archaeological Sites

The magnitude of change to known archaeological sites was assessed to be medium, as the 45 archaeological sites within the LSA will be potentially impacted during construction. Of the 45 sites potentially directly or indirectly affected by the Project the adverse effects to the majority can be (n = 44) reduced to not significant minor through standard mitigation measures. For these sites prior to disturbance mitigation measures including data recovery will acceptably offset any potential loss of archaeological data and result in low magnitude of change. The geographic extent of the effect was determined to be local as the disturbance of an archaeological site has no effect on other archaeological sites in the area. The duration and frequency and reversibility of the effect is considered to be future, one time, and irreversible, as once the sites have been mitigated, they will have been effectively curated, and there will be no additional effects to the site through Project activity, and they cannot be rebuilt or reconstituted. The context or resiliency of the environment or population has been determined to be neutral as the disturbance to the site will be offset by the data collected during mitigation. Disturbance to archaeological sites is highly likely to occur as there are 33 archaeological sites in direct conflict with the proposed developments, and it is anticipated that impacts to these archaeological sites cannot be avoided.

Table 9.1-5. Definitions of Characterization Criteria for Residual Effects on Archaeological Sites

Magnitude	Duration	Frequency	Geographic Extent (Physical/Biophysical)	Reversibility	Resiliency	Context	Likelihood of Effects	
							Probability	Confidence Level
<i>The amount of physical alteration or destruction which can be expected.</i>	<i>How long will the effect last?</i>	<i>How often will the effect occur?</i>	<i>The spatial distribution, whether widespread or site-specific, of an adverse impact.</i>	<i>To what degree is the effect reversible?</i>	<i>How resilient is the receiving environment or population?</i>	<i>What is the current condition of the site and how commonly is it represented?</i>	<i>How likely is the effect to occur?</i>	<i>How certain is this analysis?</i>
<p>Negligible: No or very little detectable change from baseline conditions.</p> <p>Minor: Differs from the average value for baseline conditions to a small degree.</p> <p>Medium: Differs substantially from the average value for baseline conditions and approaches the limits of natural variation.</p> <p>Major: Differs substantially from baseline conditions, resulting in a detectable change beyond the range of natural variation.</p>	<p>Short-term: Effect lasts 1 to 5 years.</p> <p>Medium-term: Effect lasts 6 to 25 years.</p> <p>Long-term: Effect lasts between 26 and 50 years.</p> <p>Far Future: Effect lasts more than 50 years.</p>	<p>Once: Effect is confined to one discrete period in time during the life of the Project.</p> <p>Sporadic: Effect an effect that occurs at sporadic or intermittent intervals during any phase of the Project.</p> <p>Regular: Effect occurs on a regular basis during the life span of the Project.</p> <p>Continuous: Effect occurs constantly during the life of the Project.</p>	<p>Local: Effect extends less than 500 m from infrastructure or activity.</p> <p>Landscape: Effect is limited to the LSA or one watershed (i.e., Sub-area).</p> <p>Regional: Effect extends across the broader region (e.g., RSA, multiple watersheds, etc.).</p> <p>Beyond Regional: Effect extends beyond the regional scale, and may extend across or beyond the province.</p>	<p>Reversible Short-term: Effect can be reversed relatively quickly.</p> <p>Reversible Long-term: Effect can be reversed within 20 years of Post Closure.</p> <p>Irreversible: Effect cannot be reversed (i.e., is permanent).</p>	<p>Low: The receiving environment or population has a low resilience to imposed stresses, and will not easily adapt to the effect.</p> <p>Neutral: The receiving environment or population has a neutral resilience to imposed stresses and may be able to respond and adapt to the effect.</p> <p>High: The receiving environment or population has a high natural resilience to imposed stresses, and can respond and adapt to the effect.</p>	<p>Low: The receptor is considered to have little to no unique attributes.</p> <p>Neutral: The receptor is considered to have some unique attributes.</p> <p>High: The receptor is uncommon and has unique attributes.</p>	<p>High: It is highly likely that this effect will occur.</p> <p>Medium: This effect is likely, but may not occur.</p> <p>Low: This effect is unlikely but could occur.</p>	<p>High: < 80% confidence. There is a good understanding of the cause-effect relationship and all necessary data are available for the Project area. There is a low degree of uncertainty and variation from the predicted effect is expected to be low.</p> <p>Medium: 50 to 80% confidence. The cause-effect relationships are not fully understood, there are a number of unknown external variables, or data for the Project area are incomplete. There is a moderate degree of uncertainty; while results may vary, predictions are relatively confident.</p> <p>Low: < 50% confidence. The cause-effect relationships are poorly understood, there are a number of unknown external variables, and data for the Project area are incomplete. High degree of uncertainty and final results may vary considerably.</p>

Table 9.1-6. Characterization of Residual Effects, Significance, Likelihood and Confidence on Archaeological Sites

Residual Effect	Residual Effects Characterization Criteria							Significance of Adverse Residual Effects	Likelihood and Confidence	
	Magnitude	Duration	Frequency	Geographic Extent	Reversibility	Resiliency	Context		Probability	Confidence
Disturbance of Known Archaeological Sites	Medium	Far Future	Once	Local	Irreversible	Neutral	Neutral	Not Significant (minor)	High	High
Disturbance of Unknown Archaeological Sites	Minor	Far Future	Once	Local	Irreversible	Neutral	Neutral	Not Significant (minor)	Low	Medium
Disturbance of Known Archaeological Site EdRc-25	Major	Far Future	Once	Local	Irreversible	Neutral	High	Not Significant (moderate)	High	Medium

Disturbance of Archaeological Site EdRc-25

For archaeological site EdRc-25, the Hunting Blind Complex, mitigation measures including data recovery undertaken prior to disturbance will acceptably offset any potential loss of archaeological data. However, as the *SSN Cultural Heritage Study* states:

“if this complex cannot be avoided during construction of the proposed mine a highly significant, unique and irreplaceable cultural resource, ideal as a demonstration and teaching aid in understanding the resourcefulness and ingenuity of the Stk’emlups people and their long term, intimate connection to their lands and the natural world, will be lost forever” (Ignace 2014:137).

The SSN has also stated that the Hunting Blind Complex is associated with the Trout Children Story and Jacko (Pipsell) Lake (CEAA 2015). Therefore, based on the stated importance of this site as a cultural resource the magnitude of change to the site was assessed to be major. The geographic extent of the effect was determined to be local as the disturbance of an archaeological site has no effect on other archaeological sites in the area. The duration and frequency and reversibility of the effect is considered to be future, one time, and irreversible, as once the site has been mitigated, they will have been effectively curated, and there will be no additional effects to the site through Project activity, and they cannot be completely rebuilt or reconstituted. The context or resiliency of the environment or population has been determined to be high as the disturbance to the site will be not be offset by systematic data collection during mitigation due to the stated high cultural significance. KAM will continue to work with the SSN, the Archaeology Branch, and other Aboriginal Groups to develop an additional mitigation strategy that will reduce the cultural effect.

Disturbance of Unknown Archaeological Sites

The magnitude of change to unknown sites was assessed to be minor as the AIAs conducted for the Project were exhaustive and effectively covered area within the Project Site and any currently unknown sites in direct conflict with the Project are expected to be small, low-density lithic scatters in unstratified deposits. The processes outlined in a Chance Find Procedure for dealing with any site not discovered during the AIAs, including mitigation, will acceptably offset any potential loss of archaeological data.

The geographic extent of the effect to unknown archaeological sites was determined to be local as the disturbance of an archaeological site has no effect on other archaeological sites in the area. The duration, frequency, and reversibility of the effect is considered to be far future, one time, and irreversible, as once the site has been mitigated it has been effectively curated, there are no additional effects to the site through Project activity, and it cannot be rebuilt or reconstituted. The context or resiliency of heritage valued components has been determined to be neutral as the disturbance to the site will be offset by the data and knowledge collected during mitigation.

The probability of disturbance to unknown archaeological sites is low as an AIA has been conducted for the mine site developments. However, there is always a possibility that currently unrecorded archaeological sites may be discovered during ground altering activity. As the effort expended during the AIA for the Project met the expectations of the Archaeology Branch, there is a high level of confidence that there is low probability of any disturbance to unknown archaeological sites.

9.1.5.4 *Significance of Residual Effects*

By committing to site avoidance or mitigation through data recovery under HCA permits archaeological sites will be avoided or adequately curated from a scientific standpoint. The cultural effects from disturbance of the EdRc-25 will require additional mitigation measures developed in consultation with the SSN prior to construction. KAM will continue to work with the SSN, the Archaeology Branch, and other Aboriginal Groups to develop a mitigation strategy for the cultural effects resulting from the disturbance of Ed Rc-25. It is anticipated that these effects can be mitigated in accordance with the cultural practices of the effected community. Residual effects of the Project on heritage VCs are therefore anticipated to be moderate but not significant following the appropriate mitigation measures to be carried out prior to construction.

9.1.5.5 *Characterization of Likelihood and Confidence*

The confidence level in the assessment is moderate as the requirements of the HCA (1996) to conduct site investigations provides a rigorous approach to understanding the effect of the Project on archaeological sites. This would result in a confidence level of high. However, consultation regarding mitigation measures for cultural effects due to impacts to archaeological site EdRc-25 is on-going. This uncertainty results in a reduced confidence in the determination of significance to moderate.

9.1.5.6 *Summary of Residual Effects Assessment and Significance*

Residual effects and their Project phase, mitigation measures, and significance determination, are summarized in Table 9.1-7.

Table 9.1-7. Summary of Residual Effects, Mitigation, and Significance on Archaeological Sites

Residual Effects	Project Phase	Mitigation Measures	Significance
Disturbance of Known Archaeological Sites	Construction	Avoidance or mitigation measures approved by the Archaeology Branch and, if necessary affected Aboriginal Groups community(s).	Not Significant (Minor)
Disturbance of Unknown Archaeological Sites	All	Chance find procedure and avoidance or mitigation measures approved by the Archaeology Branch and, if necessary affected Aboriginal Groups community(s).	Not Significant (Minor)
Disturbance of Known Archaeological Site EdRc-25	Construction	Avoidance or mitigation measures approved by the Archaeology Branch and, if necessary affected Aboriginal Groups community(s).	Not Significant (Moderate)

9.1.6 **Cumulative Effects**

9.1.6.1 *Introduction*

The residual effects assessment of the VC archaeological sites determined that the effect would be not significant (minor) with the exception of EdRc-25 with an effect of Not Significant (Moderate). The potential for cumulative effects is discussed below.

9.1.6.2 Identification of Other Actions that May Affect Archaeological Sites

Disturbance of the archaeological sites that will be impacted by the Project are a spatially localized event that will not result in a negative effect on the condition of other archaeological sites in the region (Table 9.1-8). Further, due to the legal requirements of the HCA (1996), it is assumed that residual effects from other projects in the area will also be reduced to not significant through appropriated mitigation measures. Mitigation measures developed in consultation with the Archaeology Branch and affected Aboriginal Groups are designed to offset the disturbance of the archaeological sites through the recovery of scientific data that may not otherwise have been gathered. For EdRc-25 additional consultation is assumed to result in mitigation measures to reduce the cultural effects to not significant. Therefore, no cumulative effects are anticipated due to disturbance of the VC archaeological sites by the Project or others in the area.

Table 9.1-8. Screening of Other Actions for Inclusion in the CEA for Archaeological Site

Description	Status or Likelihood	Geographic Boundaries (Proximity to Project)	Temporal Boundaries	Common Resources and VCs Affected	Include in CEA (Y/N)
Industry					
Vidette Lake Mine	Decommissioned 1939	34 km northwest	n/a	None	N
Afton Mine	Decommissioned 1997	Within Project site	n/a	None	N
New Afton Mine (New Gold)	Active	9 km northwest	n/a	None	N
Highland Valley Copper Mine (Teck)	Active	31 km southwest	n/a	None	N
Domtar Kamloops Pulp Mill	Active	9 km north	n/a	None	N
Tolko-Hefley Creek Plywood and Veneer	Active	19 km north	n/a	None	N
LaFarge Cement plant	Active	14 km northeast	n/a	None	N
Trans Mountain Pipeline System (Kinder Morgan)	Active	Within Project site	n/a	None	N
Trans Mountain Pipeline System - Expansion (Kinder Morgan)	Future - Certain	Within Project site	n/a	None	N
Harper Creek	Future	110 km northeast	n/a	None	N
Highland Valley Copper - Bethlehem Expansion	Future	31 km southwest	n/a	None	N
Natural Resources and Land Use					
Kamloops Forest District	Active	Within 4 km	n/a	None	N
Agriculture	Active	Immediately adjacent	n/a	None	N
Ranching	Active	Within Project site	n/a	None	N

(continued)

Table 9.1-8. Screening of Other Actions for Inclusion in the CEA for Archaeological Site (completed)

Description	Status or Likelihood	Geographic Boundaries (Proximity to Project)	Temporal Boundaries	Common Resources and VCs Affected	Include in CEA (Y/N)
Tourism and Commercial Recreation Activities					
Tranquille on the Lake	Future (multi-phase)	15 km northwest	n/a	None	N
Lac Le Jeune Resort	Active	19 km south	n/a	None	N
Tobiano Golf Course	Active	22 km northwest	n/a	None	N
Recreational Hunting, Fishing, Foraging	Active	Immediately adjacent	n/a	None	N
Recreational Trails	Active and Future	Immediately adjacent	n/a	None	N
Community Infrastructure					
City of Kamloops Wastewater Management	Active	9 km north	n/a	None	N
Water Treatment Centre	Active	9 km northeast	n/a	None	N
City expansion and growth	Active and Future	<1 to 4 km north	n/a	None	N
Transportation					
Lac le Jeune Road	Active	3 km west	n/a	None	N
Highway 5 (Coquihalla Highway)	Active	5 km west	n/a	None	N
Kamloops airport	Active	10 km north	n/a	None	N
Rail yards and lines (CP and CN)	Active	9 and 14 km north	n/a	None	N

9.1.6.3 Interactions between Residual Project Effects and Other Project or Activity Effects

No interactions between residual Project effects and other Projects or activities have been identified as the effects to archaeological sites are local in nature and the HCA requires that other projects or activities will also mitigate effects to archaeological sites based on consultation with the Archaeology Branch and affected Aboriginal Groups, therefore no cumulative effects assessment was conducted.

9.1.7 Conclusion

Heritage resources are non-renewable, can be very susceptible to disturbance, and are finite in number. They are considered to be important resources that are protected for their historical, cultural, scientific, and educational value to the general public, local communities, and Aboriginal Groups. In BC, both recorded and as-yet unrecorded archaeological sites are protected by the HCA (1996), and such sites will be affected by the Project.

Potential effects of the Project on known protected archaeological resources will be managed through site avoidance or mitigation measures determined in consultation with the Archaeology Branch and affected Aboriginal Groups communities. With the application of mitigation and management measures prior to Project impacts, residual effects on known protected archaeological resources are not anticipated and as a result will be not significant. Similarly, implementation of the Project's Archaeology and Heritage Management Plan and Chance Find Procedure will facilitate the protection of any as-yet unknown protected heritage resources within the LSA, which may be identified during Construction and/or Operation. Therefore, as-yet undiscovered protected heritage resources will be avoided and/or properly mitigated and managed, and residual effects are not anticipated. As residual effects to protected archaeological sites are not anticipated, cumulative effects to protected archaeological sites are also not anticipated.

9.2 ABORIGINAL AND NON-ABORIGINAL HERITAGE SITES

9.2.1 Rationale

As described in the AIR/EISG for the Project potential heritage effects are divided into to an assessment of archaeological sites (Section 9.1) protected under the *Heritage Conservation Act* (HCA; 1996) and Aboriginal and non-Aboriginal sites including paleontological sites considering baseline data, consultation activities, and any shared and relevant community knowledge. As exploration activities are on-going, if necessary, additional heritage sites identified following submission of this Effects Assessment will be provided as an addendum.

This section includes a description of the scoping process used to identify Aboriginal and Non-Aboriginal Heritage Sites (Heritage Sites) for inclusion in the effects assessment. Scoping is fundamental to focusing the Application/EIS on those issues where there is the greatest potential to cause significant adverse effects. Valued components (VCs) are components of the natural and human environment that are considered to be of scientific, ecological, economic, social, cultural, or heritage importance (CEAA 2006; BC EAO 2013). To be included in the EA, there must be a perceived likelihood that the VC will be affected by the proposed Project. Valued components are scoped into the environmental assessment based on issues raised during consultation with Aboriginal communities, government agencies, the public and stakeholders. Consideration of certain VCs may also be a legislated requirement, or known to be a concern because of previous project experience.

The Stk'emlupsemc te Secwepemc Nation (SSN) have defined cultural heritage to include a both tangible and intangible cultural heritage concerns including those summarized below:

- material sites objects and features from the past;
- named landscape features;
- places in the landscape associated with spiritually powerful beings;
- important dwelling and living places remembered by past generations;
- known powerful and spiritually associated places in the landscape;
- places that were/are known and used because of valued plant and animal resources; and
- cultural and linguistic knowledge that underlies connections to place (SSN 2014).

There are several provincial acts that manage paleontological resources in British Columbia; these include the *Heritage Conservation Act* (1996), *Land Act* (1996), *Park Act* (1996), *Ecological Reserve Act* (1996), *Mineral Tenure Act* (1996), *Ecological Reserve Act* (1996), *Protected Areas of British Columbia Act* (2000), *Wildlife Act* (1996), and *Environmental and Land Use Act* (1996). The Land Tenures Branch of the British Columbia Ministry of Forests, Lands and Natural Resource Operations has implemented a fossil management framework in the province with fossil management principles that recognize the importance of fossils as heritage resources and that makes their scientific value the most important factor when making management decisions about fossils (Deputy Ministers' Committee on Environment and Resource Development 2004). The province has several mechanisms under these acts through which it can protect fossil sites.

In 2007, under the provincial *Local Government Act* (1996), the city of Kamloops created a *Community Heritage Register* (Donald Luxton and Associates Inc. 2008). The *Community Heritage Register* is a planning tool to facilitate management of the city's historic sites.

Heritage sites are considered a VC as they have been identified by regulators, Aboriginal Groups, and the local community an important consideration and:

- there are occurrences of spatial and temporal overlap between the Project and the VC such that interactions are possible;
- there is available and adequate data and analytical tools to measure an effect; and
- there is a perceived, reasonable likelihood that the VC will be affected by the Project.

The British Columbia (BC) *Environmental Assessment Act* (EAA; 2002) considers effects of a proposed project on heritage resources. As such, heritage resources are typically included as Valued Components in environmental assessment (EA) reviews.

9.2.2 Background

This section of the Application/EIS provides a general description of the local and regional Heritage environment and the source of the information. Background information was obtained from an archaeological assessment, a heritage baseline and, where available, traditional or community knowledge relating to the VC.

9.2.2.1 Regional Overview

The Project lies within the Intermontane Belt, a morphogeological belt characterized by volcanic and sedimentary rocks with abundant igneous intrusive areas. The age of the Intermontane Belt rocks span from the upper Paleozoic (370 million years ago) to Recent, with the oldest rocks having accreted onto the North American continent in the middle Jurassic approximately 170 million years ago. Volcanic activity and complex faulting in the Eocene produced a series of depositional basins characterized by rapid accumulation of volcanic materials and sediments in lacustrine and subareal environments that reached from central Idaho in the U.S. to north-central British Columbia. Igneous intrusions ranging in age from the late Paleozoic to Cenozoic are scattered throughout the region.

Rocks within the Project area are primarily Nicola Group intrusive igneous rocks with some Nicola Group volcanic rocks. The intrusive igneous rocks that underlie most of the project area do not have potential to contain fossils, except for a very small and unconfirmed potential for fossils to be preserved within xenoliths of country rock included in the intrusions. Fossils have been identified in Nicola Group and Ashcroft Formation volcanoclastic and marine sedimentary rocks, within lacustrine sediments in the Kamloops Group, and within Quaternary sediments in the project vicinity. Some small areas of Kamloops Group rocks are present in the Project area.

The Project is situated within the asserted territories of the Adams Lake Indian Band, Ashcroft Indian Band, Boston Bar Indian Band, Coldwater Indian Band, Cook's Ferry Indian Band, Esh-kn-am Cultural Resources Management Services, Neskonlith Indian Band, Nooaitch Indian Band,

Skeetchestn Indian Band, Tk'emlúps te Secwépemc (Kamloops Indian Band), Nicola Tribal Association, Nlaka'pamux Nation Tribal Council, Lower Nicola Indian Band, Lytton Aboriginal Group, and Oregon Jack Creek Band. For information on Aboriginal interests in the Project area refer to Section 12 of the EA Application.

European exploration of the region began in the early 1800s. David Stuart of the Pacific Fur Company visited the Kamloops area in 1811 and established the first trading post in 1812 at the confluence of the North and South Thompson rivers on its south side. That same year the North West Company established their Thompson River Post, located on the east bank of the North Thompson River just north of its confluence with the South Thompson River. The presence of the Pacific Fur Company didn't last long, however, as it was purchased by the North West Company in 1813. The North West Company and the Hudson's Bay Company (HBC) amalgamated in 1821; the fort was later renamed Fort Kamloops (Wade 1912; Carlson 2006). By 1841 it had fallen into disrepair and rather than being rebuilt, a new fort was built on the west bank of the North Thompson River. In 1862 the post was moved south of the Thompson River to take advantage of the trade with the miners and cattle drivers who travelled the trails to the south of the river (Carlson 2006).

The start of European settlement in the area was brought about in the 1840s to 1850s when gold was discovered in the Thompson River Valley. The discovery brought gold seekers as well as settlers and cattle herders. The well-established fur brigade trails were used as primary travel routes by those moving into the area. The first cattle drive into the region took place in 1846 when cattle were moved along the Brigade Trail from Oregon to Fort Vancouver, then on to Fort Kamloops and Fort Alexandria. Small herds were kept for beef and dairy at Fort Kamloops (McLean 1982). In 1858 the HBC's exclusive licence to trade with Aboriginal Groups was cancelled and some company men took up lands in the area (Weir 1955). The population in the area continued to increase, railways arrived in the city in the 1880s, and the city of Kamloops was incorporated in 1893. By this time there was an established Main Street, grist and saw mills, a brickyard, blacksmith shops, as well as several stores and residences (Favrholdt 1983; Hagan 1882).

Early travel routes through the area affected the trend of later settlement, including the Brigade Trail, a branch of which ran south from Fort Kamloops past Stump and Nicola lakes. During the early years of settlement, individual ranches and settlements were distributed along the few roads and trails that passed through the region which could serve the needs of passing miners and packers heading to the goldfields. Later settlement patterns conformed less to the established travel routes with a focus more toward choice grazing lands (Weir 1955).

With the establishment of the *Dominion Homestead Act* of 1892, surveys of potential agricultural lands began in earnest across Canada. While Kamloops was not ideally suited to agriculture, early surveys treated the area as prairie lands with 160-acre parcels of land being surveyed. Several townships were established south of Kamloops to Stump Lake, stretching from northwest to southeast across the rolling landscape. In all, approximately 334 quarter-sections were homesteaded in the Railway Belt south of Kamloops up to the year 1915 (Favrholdt 1999).

9.2.2.2 *Historical Activities*

The importance of hunting in upland areas like the Project area has been documented ethnographically as important for Aboriginal Groups and was primarily focused on large game such as elk, moose, and deer, although small species such as grouse, hare, and marmot would also be taken (Ignace et al. 2014). Late summer and early fall were the primary times of the year when large game hunting would be conducted. Trapping of bear, beaver, and other fur-bearing mammals was also undertaken to provide material for clothing. Fishing was an important activity and took advantage of the numerous fish species and locations through the region. Jacko Lake provided an important spring trout fishery, and salmon harvested in the late fall from the Thompson Rivers system were a crucial foodstuff. Plants were harvested during the spring, summer, and fall, adding nuts, roots, and berries to the diet, and were also used medicinally. They were also harvested for creating functional items such as tools and dwellings. Starting in the early 1800s trading furs for goods at the trading post in Kamloops became increasingly important.

During consultation with KAM the SSN have stated that seasonal rounds are about more than simply fishing or gathering activities but rather encompass the travel, the activity, the story telling, the culture, and the language associated with a particular location, and the overall landscape. The seasonal rounds therefore encompass the SSNs connectedness to the landscape. The SSN have also pointed out that they are losing more and more of their territory and each loss takes away from their relationship with the land, and creates breaks in the rounds that characterized their culture. These breaks weaken the story telling and weaken the spiritual wellbeing of the people. However, the *SSN Cultural Heritage Report* (Ignace 2014) states that:

“the area of the proposed Ajax Mine was one of the earliest areas in the south central part of British Columbia to be pre-empted, fenced off, subject to intensive cattle ranging and farming operation which began in the early 1860s. As of 1866 the Colonial and subsequently (1871) Provincial British Columbia Colonial Land Ordinances enabled settler land pre-emptions at the explicit exclusion of “Indians” including Secwepemc people. Aside from the exclusion of Secwepemc by legal means, the study area has been subjected to enormous environmental change since the middle of the nineteenth century. This includes the disappearance of the elk herds following cattle drives into the area, and the subsequent intensive over-grazing by cattle. Other invasive settler activities have included settlement, non-indigenous mining activity, road construction and recreational uses by non-Secwepemc. These activities have severely impacted the ability of the Secwepemc, specifically Stk’emlupsemc, to use and manage traditional resources within the study area, and to continue the use of the area in appreciation of its historical, cultural, and spiritual significance.”

These prior impacts are briefly summarized below.

The Project area was one of the earliest areas of south-central BC to be pre-empted and fenced and saw intensive farming operations and cattle ranching take place in the early 1860s (Ignace et al. 2014).

HBC employee Alexander Jacko took up residence and homesteaded in the area in the early 1850s. Of Metis decent, he came into the area in the 1830s working as a packer for HBC and died in 1862. Historic records indicate that he kept horses around Jacko Lake; the lake and creek were subsequently named after him (Balf 1969; Ignace et al. 2014). The homestead was taken over by his

son Philip Jacko who pre-empted the family horse range in 1866 extending to Jacko Lake and built a house near the mouth of Jacko Creek (Balf 1969; Ignace et al. 2014).

John Peterson moved to the area in 1862 and began a pack train operation between Lillooet and the Cariboo. When the CPR Survey started up in the area in 1871, Peterson sold his pack train to the government and continued on as the survey's boss packer. In 1868 he settled in Kamloops, pre-empting land near Jacko Creek; a portion of the drainage, Peterson Creek, carries his name. Peterson built a large house and stables, purchasing more land from Philip Jacko at the creek mouth and from William Jones, making him the owner of much of the present area of Kamloops (Balf n.d.).

There is a long history of mineral exploration and mining within the RSA starting with the Cariboo gold rush of the 1850s. By the late 1800s, there were over 200 mineral claims documented in the Kamloops area. It wasn't until the late 1890s that larger operations began to appear including the Iron Mask Mine which was first staked in 1869, located approximately 8 km from Kamloops, immediately northwest of the current Ajax Mine. The Iron Mask Mine was later operated under the names Kamloops Mines Ltd. and the Kamloops Copper Company with mining operations sporadically starting and stopping between 1920 and 1928. It is likely that properties related to the current Project are situated within these early mineral claim areas (Bond 1988).

Work within the Ajax claim area was reported in 1898 by the Wheal Tamar claim group. Between 1904 and 1910 trenching was carried out and additional underground extraction occurred through the 1920s. In 1928, the Consolidated Mining and Smelting Company of Canada Ltd. (Cominco) optioned thirteen claims within and adjacent to the current Project area. Further exploration and mining continued through the 1970s and 1980s by Afton Mines Ltd. and Cominco. Within the central part of the current Project, the East and West open pits were being developed by 1988 along with the construction of a haul road to the Afton Mill. By 1997, production had ceased for both the east and west pits of the Ajax mine (Bond 1988). There are currently approximately 160 ha of disturbance within the LSA relating to these developments from the two open pits and three rock storage facilities. In addition to these large disturbed areas there are disturbances from access roads and exploration activities associated with these prior developments.

9.2.2.3 Baseline Studies

Baseline studies conducted for the Project for the Heritage Sites VC include the *Ajax Project: Heritage Baseline* (Appendix 9.2-A), the *Ajax Project: Paleontological Baseline* (Appendix 9.2-B) and the Archaeological Impact Assessments (AIAs) conducted under HCA Heritage Inspection Permits 2009-0349 and 2014-0171, which are summarized in the *Ajax Project: Archaeological Baseline Report* (Appendix 9.1-A). Information is also included from the *SSN Cultural Heritage Study* and the *SSN Mitigation Report* (Ignace et al. 2014; SSN 2014). The *Reference Guide on Physical and Cultural Heritage Resources* (CEAA; 1996) was considered when cultural heritage resources were assessed.

Data Sources

A review of published information for the LSA and RSA was conducted prior to AIA fieldwork. The review included ethnographic, historic, archaeological, and environmental literature. The *Kamloops Community Heritage Register* (Donald Luxton and Associates Inc. 2008) was reviewed

as was the *Canadian Register of Historic Places* (Parks Canada 2015). In addition, a search of the BC Archaeological Site Inventory database using the Remote Access to Archaeological Data application was carried out. Aboriginal Groups land use and knowledge reports were also reviewed, including the *SSN Cultural Heritage Study* (Ignace et al. 2014). Local history for the area is based largely on *Bunch Grass to Barbed Wire* (Heritage Committee 1984). A separate archaeological baseline study has also been conducted for the Project, *Ajax Project: Archaeological Baseline Report* (Appendix 9.1-A).

KAM has commissioned the *SSN Cultural Heritage Study* for the Project within which the SSN have raised several topics of cultural heritage importance including archaeological site EdRc-25 (possible hunting blind complex), Jacko Lake, Goose Lake, and Peterson Creek (Ignace et al. 2014). The SSN has indicated that sites around Jacko Lake, the Hunting Blind Complex, and a Prayer Tree are associated with the Trout Children Story (Ignace 2014 and CEAA 2015). The possible use of rock piles as burial cairns has also been raised as a concern.

Methods

The Project footprint was subject to AIAs under Heritage Inspection Permits 2009-0349 and 2014-0171. Taken together, the results of the AIAs form the basis of the effects assessment. Additional assessments undertaken include interviews and site visits carried out with local landowners and members of the Anglican Church including Bishop Andrews and Dwight Oatway. A desk-based paleontological assessment was also conducted.

Prior to fieldwork LiDAR mapping and orthophotos were reviewed, and proximity to hydrological features and slope class were modeled for the Project area to aide in planning and prioritizing the assessment; however, all portions of the Project footprint were subject to in field assessment and this was not relied upon exclusively. During pedestrian survey of the Project area ground surfaces were visually examined for trails, structures, rock piles, ground disturbances, and other evidence of past human settlement or land use. Members of the Tk'emlúps te Secwépemc (Kamloops Indian Band) and the Skeetchestn Indian Band were included in the AIA fieldwork.

Characterization of Heritage Sites Baseline Condition

During the field programs undertaken for the Ajax Project 14 historic built heritage sites were located with structures that may relate to early homesteading and settlement within the LSA. These sites are not designated under the HCA or *Local Government Act*. Other features related to historic era land use within the LSA identified during the field surveys include three wooden traps, four historic ground disturbances, and a corral.

The SSN are concerned that rock piles within the RSA, to the north of the LSA, may have been used to cover and protect burials. As rock piles to the north of the LSA are of concern to the SSN the 92 rock piles identified within the LSA have been mapped in relation to Project developments. There are currently 64 rock piles located in, or within 50 metres of, Project developments; all of these appear to be related to historic activities (land clearing, mineral exploration, and fence lines/posts). The SSN have also identified as heritage concerns about potential effects on Jacko Lake (Pipsell) which is considered an important cultural landscape and place with spiritual value and the petroforms at EdRc-25, a possible hunting blind, which have value their potential to be used to promote cultural and linguistic knowledge that can establish connections to the past.

9.2.3 Assessment Boundaries

Assessment boundaries define the maximum limit within which the effects assessment is conducted. They encompass the areas within, and times during which, the Project is expected to interact with the VCs, as well as the constraints that may be placed on the assessment of those interactions due to political, social, and economic realities (administrative boundaries), and limitations in predicting or measuring changes (technical boundaries). The definition of these assessment boundaries is an integral part in scoping for Heritage sites, and encompasses possible direct, indirect, and induced effects of the Project on Heritage sites, as well as the trends in processes that may be relevant.

9.2.3.1 Spatial Boundaries

The spatial boundaries for the assessment of potential Heritage effects include a Local Study Area and a Regional Study Area defined below (Figure 9.2-1).

Local Study Area

The LSA incorporates the Project footprint within which direct effects can occur and a 500 m buffer within which indirect effects can occur. The LSA does not include the existing waterline on New Gold Inc.'s New Afton Mine property as there will be no additional effects.

Regional Study Area

The RSA is based on the Terrestrial Biophysical Effects study area for consistency of reporting. This large area provides a sample of Heritage sites within the region and allows the effects on Heritage sites within the Project area to be placed in a larger context.

9.2.3.2 Temporal Boundaries

The temporal phases of the Project are:

- **Construction:** 2 years;
- **Operation:** 23 years;
- **Decommissioning and Closure:** 5 years (includes project decommissioning, abandonment and reclamation activities, as well as temporary closure, and care and maintenance); and
- **Post-Closure:** 5+ years (includes ongoing reclamation activities and post-closure monitoring).

9.2.4 Potential Effects of the Project and Proposed Mitigation for Heritage Sites

9.2.4.1 Identifying Potential Effects on Heritage Sites

The purpose of the Heritage effects assessment is to evaluate effects on Heritage sites not automatically protected under the *Heritage Conservation Act* (1996) due to development of the Project. An evaluation by Project temporal phase was undertaken to determine if there is an interaction between Project components and the heritage VC. Interactions between Heritage sites and Project components and activities were identified as requiring assessment based on: 1) being finite in number, and 2) being vulnerable to disturbance.

The potential effects from Project-Heritage VC interactions have been split into the following Key Indicators: Paleontological sites, Aboriginal Heritage Site, and Non-Aboriginal Heritage Sites. These are evaluated for potential Project Interactions in Table 9.2-1.

9.2.4.2 *Effects on Heritage Sites*

Project effects considered in the assessment include potential effects on Heritage sites including paleontological sites, built heritage sites, and sites identified as concerns by Aboriginal Groups.

Disturbance of Paleontological Sites

Based on the results of the *Ajax Project: Paleontological Baseline* (Appendix 9.2-B) no fossil localities have been reported in the LSA, and the potential for fossil finds are limited because most of the LSA is composed of rock types in which fossils are typically not present (intrusive igneous rocks). There is, however, one small area of rocks of the Kamloops Group that may have fossil potential within the LSA. This small area is located along the power transmission corridor (Figure 9.2-2).

Disturbance of Aboriginal Heritage Sites

The SSN have defined cultural heritage to include a both tangible and intangible cultural heritage concerns. Within the Project area the SSN have identified the following concerns around impacts to heritage sites including effects to features associated with the Trout Children Story.

Based on the results of the *Ajax Project: Heritage Baseline* (Appendix 9.2-A) Aboriginal heritage sites including a hunting blind complex and archaeological sites around Jacko (Pipsell) Lake are located within the LSA and will be impacted by the construction of Project infrastructure. The Project effects and mitigation measures for these archaeological sites are discussed in Section 9.1. A Prayer Tree located in the vicinity of Jacko Lake is outside the current Project footprint and direct effects are not anticipated.

Within the LSA there are currently 92 identified rock piles and 64 of these are located in, or within 50 metres of, Project developments (Figure 9.2-3). The SSN have indicated that some of the rock piles identified within the RSA may mark prehistoric or historic burial locations. KAM is aware of two locations to the north of the LSA at which the SSN have undertaken GPR studies in an attempt to verify this assertion. As the SSN have indicated that these heritage features may have significance they have been included in this assessment as Aboriginal Heritage Sites. During the AIAs for the Project these rock piles were interpreted to be historic features associated with ranching and farming activities (Morin 2014).

Jacko Lake has been identified as an important area for traditional and current practices of the Secwepmec people (Ignace et al. 2014). It is within the Project Heritage LSA and adjacent to the proposed open pit. The *SSN Cultural Heritage Study* notes that Jacko Lake was fished for trout and the area was used to harvest roots and to hunt deer and elk (Ignace et al. 2014).

Figure 9.2-1
Heritage Sites Effects Assessment Regional and Local Study Areas

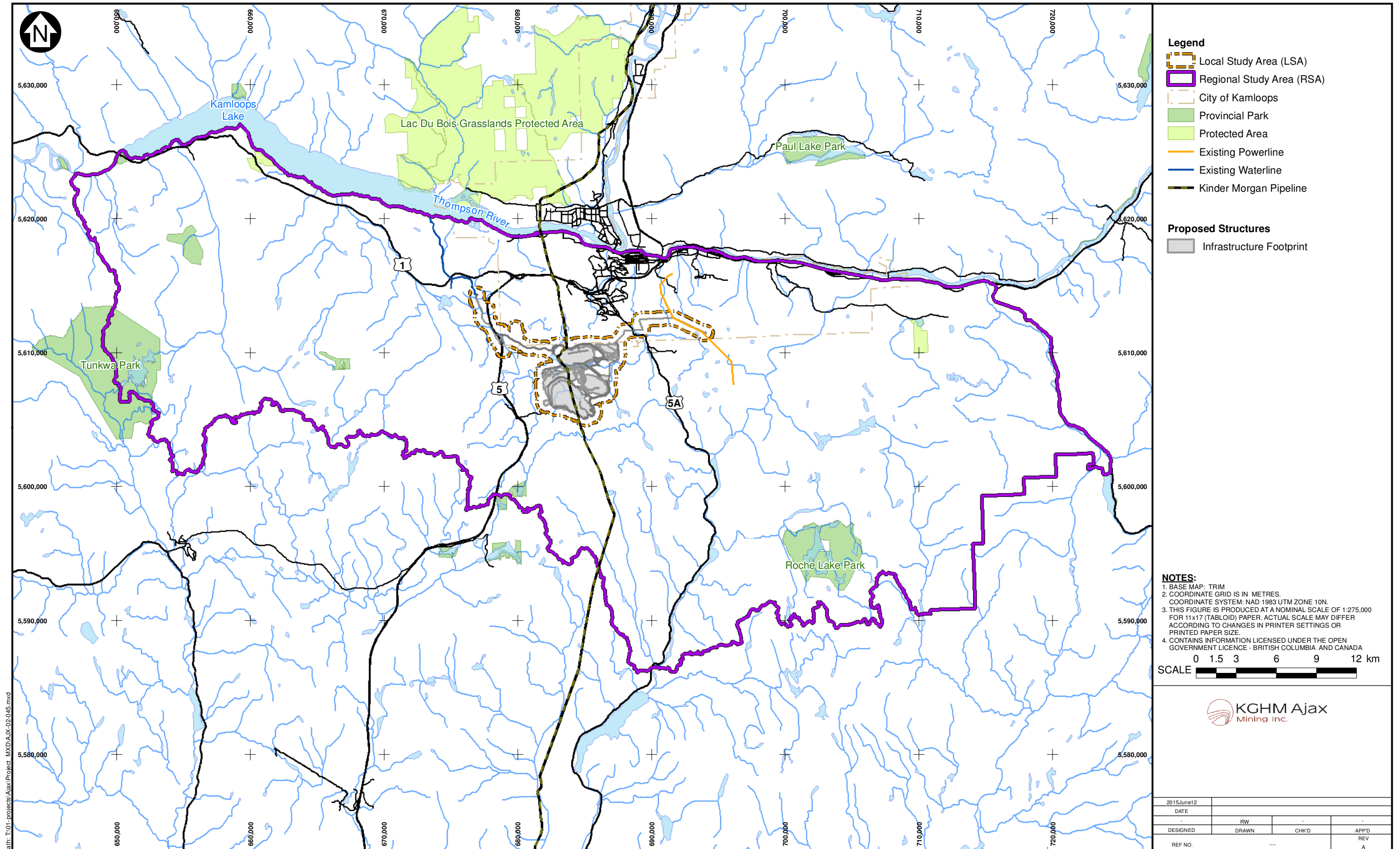


Figure 9.2-2
Geologic Detail of Local Study Area

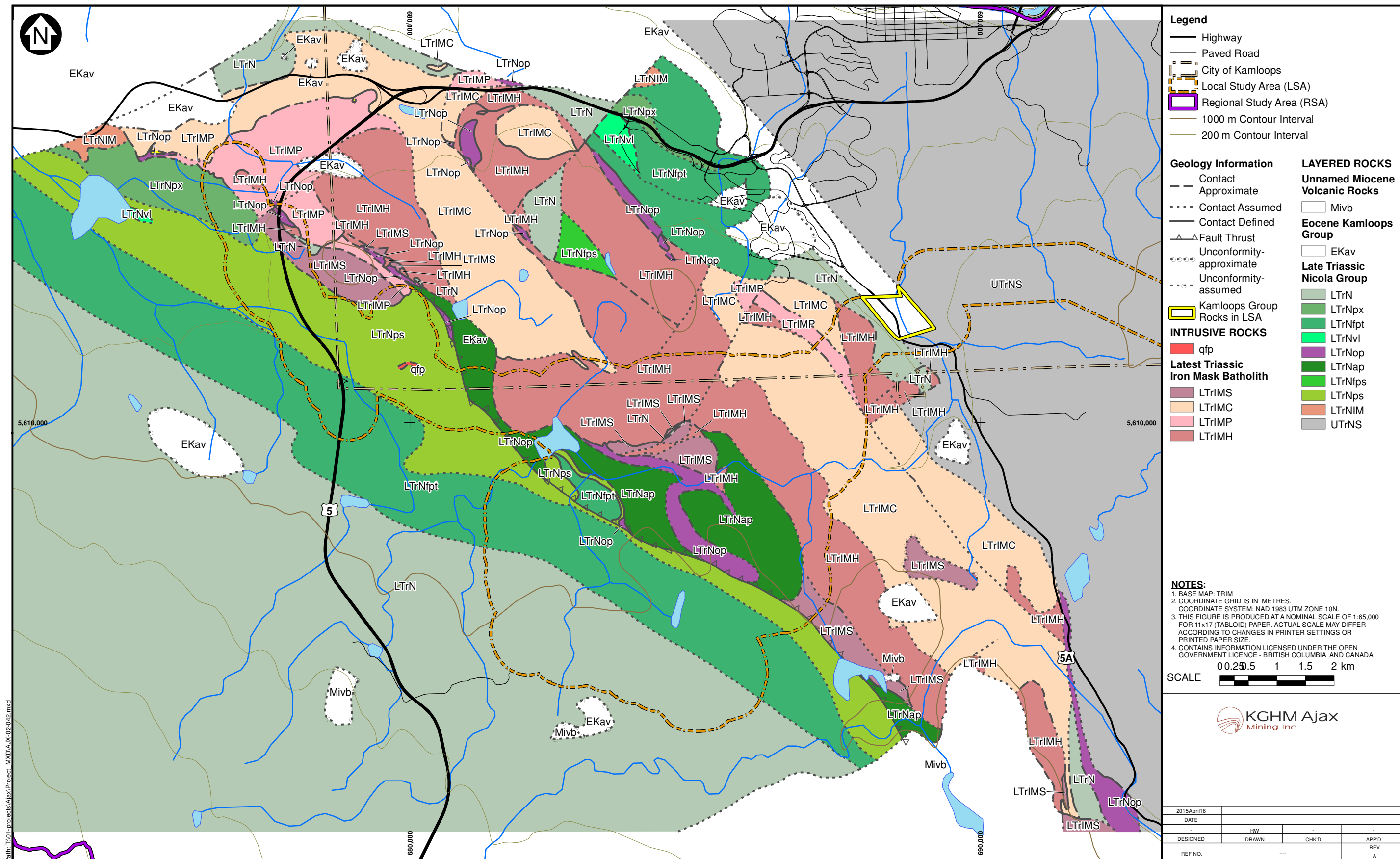


Figure 9.2-3
Petroforms within the Ajax Project Area

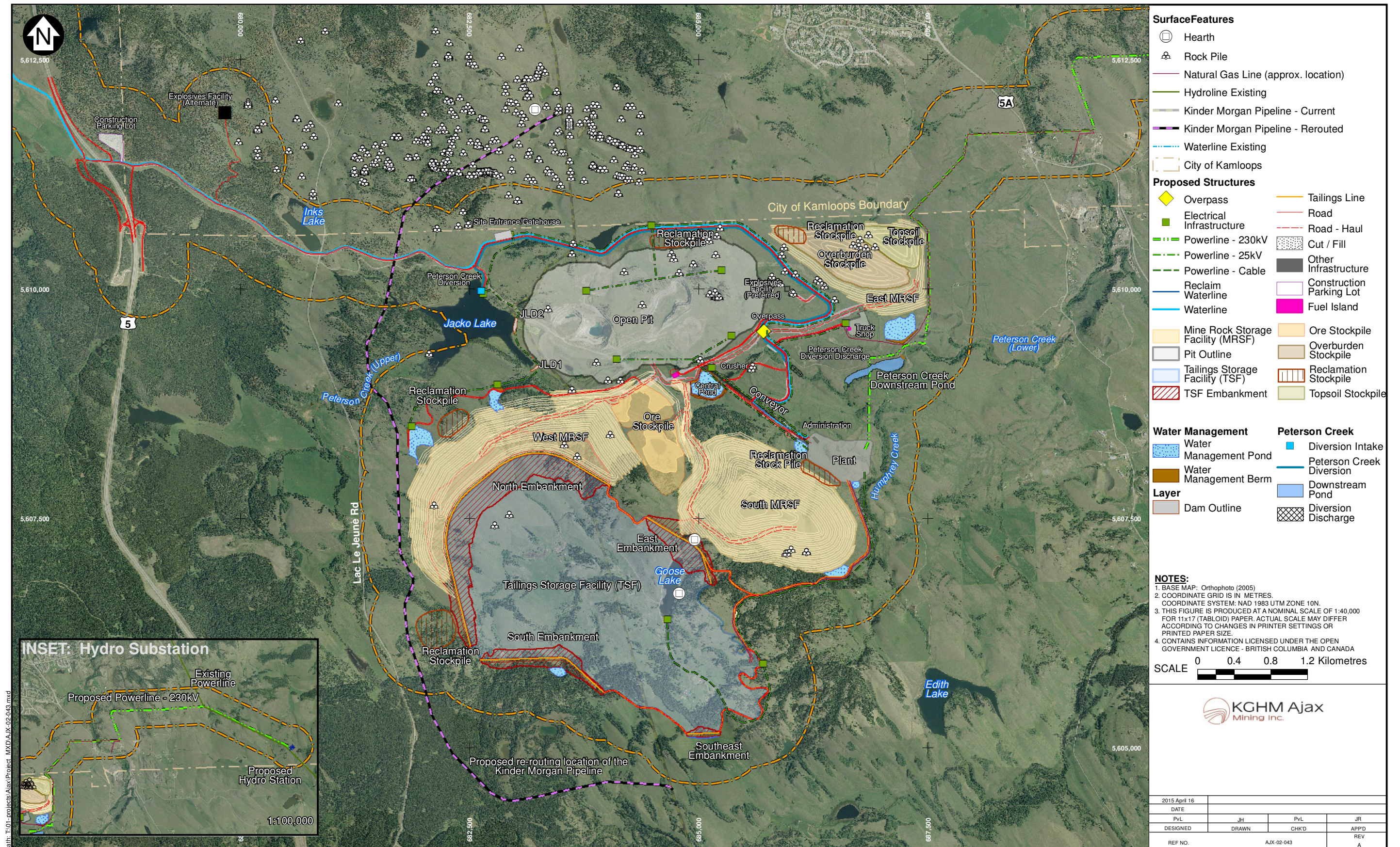


Table 9.2-1. Identifying Potential Project Interactions and Effects on Heritage Sites

Project Activities		Potential Effects on Heritage Sites		
		Disturbance of Paleontological Sites	Disturbance of Aboriginal Heritage Sites	Disturbance of Non-Aboriginal Heritage Sites
Construction	Clearing and Grubbing	O	L	L
	Earthworks	O	L	L
	Overburden/Topsoil Stockpile	O	L	L
	Laydown Areas and Storage Yards	O	L	L
	Project Lighting	O	O	O
	Site Security and Fencing	O	O	O
	Fuel Storage and Filling Area	O	L	L
	Hazardous Wastes Transport, Storage, and Disposal	O	O	O
	Construction Wastes Transport, Storage, and Disposal	O	O	O
	Sewage Infrastructure and Disposal	O	L	L
	Public Road Realignment, Use, and Maintenance	O	L	L
	Site Road Construction, Use and Maintenance	O	L	L
	Peterson Creek Overpass Construction, Use, and Maintenance	O	L	L
	Site Buildings and Process Plant	O	L	L
	Explosives Magazine and Storage Facilities	O	L	L
	Open Pit Development	O	L	L
	Drilling and Blasting	O	L	L
	Crushing Mine Rock	O	O	O
	Loading, Hauling, and Deposition of Mine Rock	O	L	L
	Temporary Ore Stockpile	O	L	L
	Tailing Storage Facility Development	O	L	L
	Power Transmission, Distribution	L	L	L
	Natural Gas Line	O	L	L
	Pipeline Utility Corridor (Potable Water, Sewage, and Site Water)	O	L	L
	Water Intake from Kamloops Lake	O	L	L
	Fire Suppression Infrastructure	O	L	L
	Contact Water	O	O	O
	Non-contact Water	O	O	O
	Peterson Creek Diversion	O	L	L
	Water Management Dams	O	L	L
	Mine Staffing (Direct Employment)	O	O	O
	Contracted Employment	O	O	O
	Taxation	O	O	O

(continued)

Table 9.2-1. Identifying Potential Project Interactions and Effects on Heritage Sites (continued)

Project Activities		Potential Effects on Heritage Sites		
		Disturbance of Paleontological Sites	Disturbance of Aboriginal Heritage Sites	Disturbance of Non-Aboriginal Heritage Sites
Operation	Open Pit Development	O	L	L
	Drilling and Blasting	O	L	L
	Hauling Mine Rock and Ore from Pit	O	O	O
	Crushing and Conveying Ore	O	O	O
	Temporary Ore Stockpile	O	L	L
	Development of Mine Rock Management Facilities	O	L	L
	Stripping, Loading, Hauling, Deposition, and Contouring of Topsoil and Overburden	O	L	L
	Revegetation through Progressive Reclamation	O	O	O
	Process Plant Operation	O	O	O
	Deposition to Tailing Storage Facility	O	L	L
	Site Road Use and Maintenance (Materials, Personnel, Supplies)	O	O	O
	Concentrate Transport and Storage	O	O	O
	Explosives Magazine and Storage Facilities	O	O	O
	Fire Suppression Infrastructure	O	O	O
	Fuel Storage and Filling Area	O	O	O
	Hazardous Wastes Transport, Storage, and Disposal	O	O	O
	General Wastes Transport, Storage, and Disposal	O	O	O
	Sewage Infrastructure and Disposal	O	O	O
	Laydown Areas and Storage Yards	O	O	O
	Power Transmission, Distribution	O	O	O
	Project Lighting	O	O	O
	Site Access, Security and Fencing	O	O	O
	Water Intake from Kamloops Lake	O	O	O
	Contact Water	O	O	O
	Non-contact Water	O	O	O
	Potable Water Treatment and Use	O	O	O
	Peterson Creek Diversion	O	L	L
	Mine Staffing (Direct Employment)	O	O	O
	Contracted Employment	O	O	O
	Taxation	O	O	O

(continued)

Table 9.2-1. Identifying Potential Project Interactions and Effects on Heritage Sites (completed)

Project Activities		Potential Effects on Heritage Sites		
		Disturbance of Paleontological Sites	Disturbance of Aboriginal Heritage Sites	Disturbance of Non-Aboriginal Heritage Sites
Decommissioning and Closure	Dismantling of Ancillary Buildings	O	O	O
	Pit Lake Planning	O	O	O
	Site Road/Bridge Decommissioning	O	O	O
	Tailing Storage Facility Decommissioning and Reclamation	O	O	O
	Mine Rock Management Facilities Reclamation	O	O	O
	Fuel Storage and Filling Area	O	O	O
	Hazardous Wastes Transport, Storage, and Disposal	O	O	O
	General Wastes Transport, Storage, and Disposal	O	O	O
	Sewage Infrastructure and Disposal	O	O	O
	Laydown Areas and Storage Yards	O	O	O
	Power Transmission, Distribution	O	O	O
	Project Lighting	O	O	O
	Site Access, Security and Fencing	O	O	O
	Contact Water	O	O	O
	Non-contact Water	O	O	O
	Potable Water Treatment and Use	O	O	O
	Peterson Creek Diversion	O	O	O
	Road use to the Project (Materials, Personnel, Supplies)	O	O	O
	Mine Staffing (Direct Employment)	O	O	O
	Contracted Employment	O	O	O
Taxation	O	O	O	
Post-Closure	General Site Inspections and Maintenance	O	O	O
	Contact Water	O	O	O
	Non-contact Water	O	O	O
	Road use to the Project (Materials, Personnel, Supplies)	O	O	O
	Mine Staffing (Direct Employment)	O	O	O
Contracted Employment	O	O	O	

Notes:

- O No interaction anticipated.
- L Negligible to minor interaction expected; implementation of best practices, standard mitigation and management measures; no monitoring required, no further consideration warranted.
- M Potential moderate interaction requiring unique active management/monitoring/mitigation; warrants further consideration.
- H Key interaction; warrants further consideration.

There are currently six archaeological sites near the shore of Jacko Lake (EdRc-1, EdRc-5, EdRc-6, EdRc-7, EdRc-8, and EdRc-19). All six sites are classified as lithic sites and will require additional mitigation prior to disturbance. Based on the current Project footprint impacts are anticipated at four of the six sites (EdRc-5, EdRc-6, EdRc-7, and EdRc-8). Mitigation measures for these sites are presented in Section 9.1. Effects to visual quality, fish, wildlife, and plants are detailed in Sections 8.3, 8.5 and 8.7.

There are no direct effects to Cherry Creek under the current Project design. The location of the Prayer Tree associated with the Trout Children Story not been provided and therefore effects have not been determined.

Disturbance of Non-Aboriginal Heritage Sites

Based on the results of the *Ajax Project: Heritage Baseline* (Appendix 9.2-A) non-Aboriginal heritage sites, including the location of the St. Peter's Church and built heritage associated with early settlement of the area, are located within the LSA and will be impacted by the construction of Project infrastructure. The St. Peter's Church site has been protected as archaeological site EdRc-61 and therefore Project effects and mitigation measures are discussed in Section 9.1.

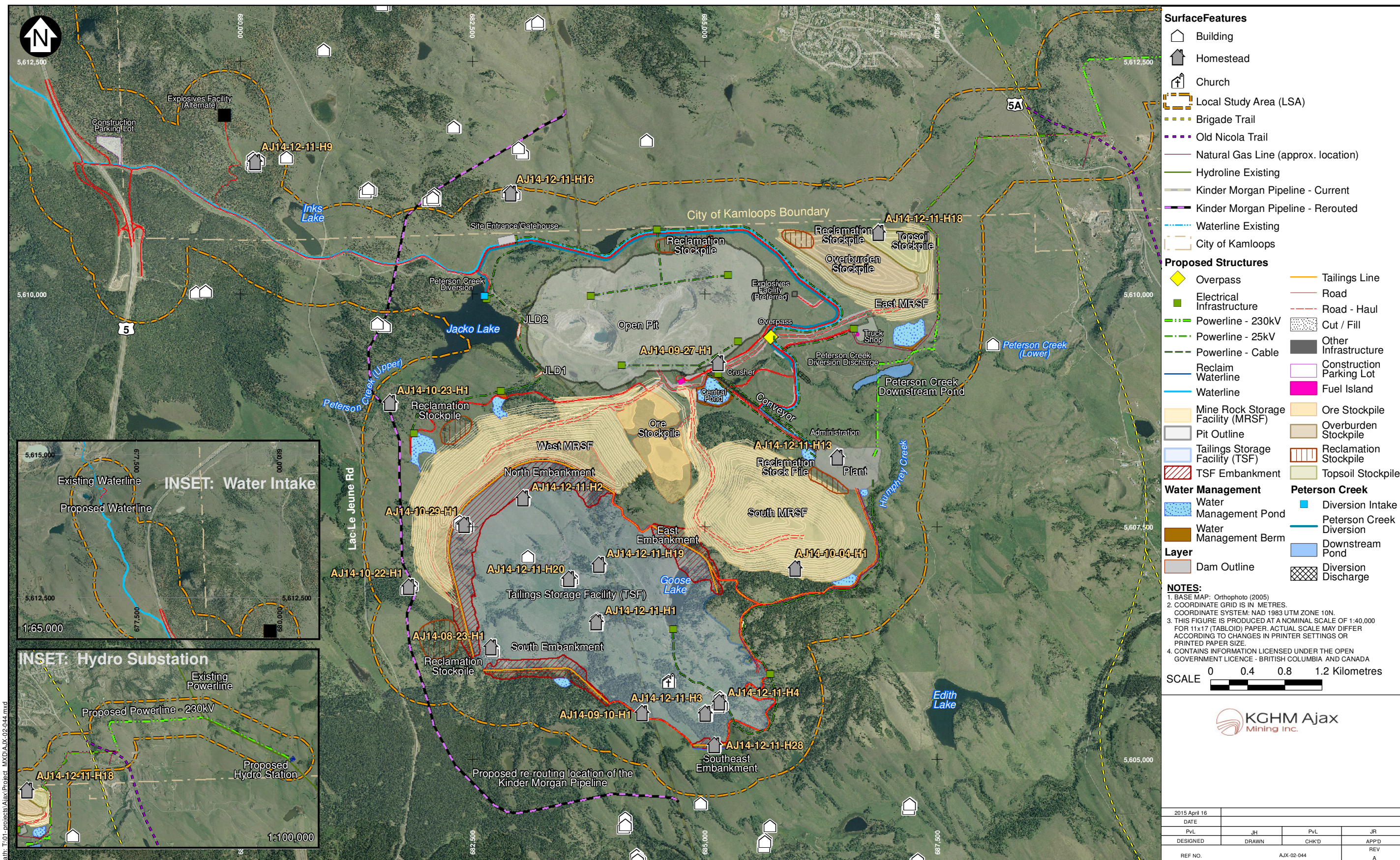
During the field programs undertaken for the Ajax Project fourteen sites were located with structures that relate to early homesteading and settlement within the LSA. Additionally, two historic hearth-campfire features associated with historic debris were located. These sites are not currently designated under the HCA or *Local Government Act* but may be of interest to the local community (Table 9.2-2; Figure 9.2-4). The location of the Nicola Lake to Kamloops Brigade Trail crosses through the LSA to the east of the mine site infrastructure along the Transmission Line. It is likely that this trail was located along the route of the current Highway 5A.

9.2.4.3 *Mitigation Measures for Heritage Sites*

Avoidance is always the preferred mitigation measure. To facilitate the avoidance of heritage sites KAM will arrange for site orientation and training of all employees and on-site personnel/contractors with regards to compliance with the *Heritage Conservation Act* (1996) and the use of the Project's Heritage Chance Find Procedure. Training and site orientation will be provided for all new employees during their induction. This training will focus on not disturbing known heritage sites, the procedure in place for responding to newly identified sites, as outlined in the Project's Heritage Chance Find Procedure, and how to report these sites or observed site impacts. Copies of the Project's Chance Find Procedure will be kept on-site for reference and on file by KAM. In general, if personnel suspect archaeological, historic, or paleontological materials or human remains have been discovered they will:

- stop all work in the area to reduce/minimize impacts to the site;
- leave the material in place and protect and/or mark the area around the site;
- do not disturb or collect any heritage material or human remains; and
- report the discovery to their supervisor. The supervisor will inform the Environmental Manager and Mine Manager. The Mine Manager and Project Archaeologist will inform the Archaeology Branch and local Aboriginal organizations of the discovery.

Figure 9.2-4
Homesteads and early Historic Trails within the Ajax Project Area



Path: T:\01-projects\Ajax\Project_MXD\AJX-02-044.mxd

Table 9.2-2. Built Heritage Sites within the Local Study Area

Designation	Attribution	Description	Development
AJ14-12-11-H1	Gainer Homestead	There are two existing buildings at this location. The first is a two storey log cabin with saddle-notched corner joints, second storey shingle-siding, and a collapsed roof. The second building is a log outbuilding with only three low walls with saddle-notched corner joints remaining. The cabin was occupied from 1912 to 1918 (G. Little, pers. comm.).	TSF
AJ14-12-11-H2	Bentley Homestead	The remains of the small shed are the only feature in the area. This may once have been part of the Bentley homestead (G. Little, pers. comm.).	TSF
AJ14-12-11-H3	Swanton Homestead	Standing structures at this location include a cabin, barns, and other outbuildings. The cabin is a two-storey log construction with shingle siding and a gable roof. Swanton sold the property to John 'Little Jack' Little in 1922 and it was inherited by George Little, the son of his friend John 'Big Jack' Little, upon his death. The property is currently occupied by George Little.	TSF
AJ14-12-11-H4	Haverfield Homestead	There are six structures still standing at this location including a bungalow-style cabin with a gable roof and weatherboard siding, a chicken coup of log construction with saddle-notched joints and a board-and-batten front, and two other outbuildings (both of log construction with saddle-notched joints and cement chinking). The cabin appears in fair condition. The chicken coup is in good condition. The other outbuildings are in poor condition with missing roofs. It is currently part of George Little's farm though originally the land belonged to Brook Haverfield. The house built in 1908 was originally inhabited by the Haverfields (Heritage Committee 1984).	TSF
AJ14-12-11-H13	J. Humphrey Homestead	At present only a cabin remains at this location. Based on a map of the original homesteads it is possibly part of the J. Humphrey homestead (Heritage Committee 1984).	Plant Site
AJ14-12-11-H18	Leiper Homestead	The site contains only the remains of a historic cabin. Based on a map of the original homesteads in the area this building is possibly from the Leiper homestead (Heritage Committee 1984).	East MRSF
AJ14-12-11-H19	F.C. Humphrey Homestead	A building currently used as a granary. Based on a map of the original homesteads this building is possibly from the F.C. Humphrey homestead (Heritage Committee 1984).	TSF
AJ14-12-11-H20	Osborne-Smith Homestead	There are six existing features in the area including a one-and-a-half-storey log cabin with square-notched corner joints and shingle siding on the second floor has a more modern addition built out of milled flat timber, a horse barn with square-notched log construction, a chicken coup of log construction with square-notched joints, a log building with saddle-notched joints, and two outbuildings of milled flat timber. These buildings are likely associated with Arthur D. Osborne-Smith and his family. Osborne-Smith moved to the Goose Lake Road area in 1903 to raise Clydesdale horses. He was married in 1906 and had three children in 1910, 1913, and 1915. The youngest, Beatrix May, died shortly after birth and was buried on the 11th of August 1915 beside St. Peter's Anglican Church (Heritage Committee 1984).	TSF
AJ14-10-29-H1	Vic Homestead	There are three existing features in the area including a standing barn and cabin of log construction with V-notched corners and no existing roof, and a collapsed shed. They have been identifies as the remains of the Vic homestead (G. Little, pers. comm.).	North Embankment of the TSF
AJ14-12-11-H16	Heck Homestead	There are two existing features include the remains of a cabin and the remains of a root cellar. Only the walls of the structures remain. remains of the Vic homestead (G. Little, pers. comm.).	LSA
AJ14-12-11-H9	Unknown	There are six existing features in the area including the remains of five log cabins (or possible cabins) and one outhouse. Only the walls of the structures remain.	LSA
AJ14-10-22-H1	Unknown	There are two existing features in the area including the remains of a "hill house" type log cabin with saddle notched corners and some concrete used for the chimney and a stove/oven inside and a root cellar located about 66 metres to the northeast of the cabin.	LSA
AJ14-10-23-H1	Unknown	The cabin remains are the only feature in the area. The cabin is of log construction, has dovetail-notched corners, cement and straw chinking and no remaining roof (only the walls are still standing).	LSA
AJ14-08-23-H1	Unknown	There are two log structures without roofs and one root cellar at this location.	TSF

Additional mitigation measures for Heritage Sites are provided below.

Paleontological Sites

There is a low potential for impacts to paleontological sites. If rocks are disturbed during construction of the power transmission line within the area with potential for fossil remains, a cursory examination should be made to evaluate whether the rock contains fossils. If fossils are identified the Project Chance Find Procedure will be followed.

Aboriginal Heritage Sites

Mitigation measures for archaeological sites also considered in this section, EdRc-1, EdRc-5, EdRc-6, EdRc-7, EdRc-8, and EdRc-19 around Jacko Lake and the petroforms at EdRc-25 are detailed in Section 9.1. No impacts are anticipated to EdRc-1. Indirect impact due to increased human presence is possible at EdRc-19 and will be marked as “No Work Zone” on development maps. An environmental staff member will be present during construction activities near the site and site boundaries will be flagged or fenced to limit any indirect impacts.

For the remaining archaeological sites mitigation will be determined in consultation with the Archaeology Branch and Aboriginal Groups, and may include systematic data recovery, construction monitoring, and/or site capping. Any alteration to these sites will require a Section 12 Site Alteration permit, issued by the Archaeology Branch.

During the AIAs undertaken for the Project the rock piles within the LSA were identified as historic features related to non-Aboriginal land use. However, rock piles to the north of the LSA have been identified by the SSN as having potential cultural significance. No impacts to the rock piles north of the LSA are anticipated.

Non-Aboriginal Heritage Sites

Prior to disturbance of identified built heritage sites that will be directly impacted by the Project (in or within 50 metres of the Project footprint) consultation with community stakeholders will take place. The consultation will determine the relative significance of the sites and whether additional mitigation measures to record and/or preserve the sites are desired. No evidence of the Nicola Brigade Trail was located during the AIAs. If evidence of the trail is encountered during construction of the Transmission Line it will be dealt with under the Heritage Chance Find Procedure.

9.2.5 Residual Effects and Their Significance

The significance of impacts on heritage sites, following the implementation on mitigation measures outlined in Section 9.2.4, has been assessed in relation to their heritage value, as defined under the *Heritage Conservation Act* and based on consultation with affected Aboriginal groups.

Mitigations and management measures include site avoidance, Project personnel education, and implementation of the Heritage Management Plan and Chance Find Procedure. If personnel suspect archaeological, historic, or paleontological materials or human remains have been discovered they will:

- stop all work in the area to reduce/minimize impacts to the site;
- leave the material in place and protect and/or mark the area around the site; do not disturb or collect any heritage material or human remains; and
- report the discovery to their supervisor. The supervisor will inform the Environmental Manager and Mine Manager. The Mine Manager and Project Archaeologist will inform the Archaeology Branch and local Aboriginal organizations of the discovery.

Once mitigation and management measures have been conducted and/or established prior to anticipated Project effects, the potential for residual effects on heritage resources are not anticipated and as a result will be reduced to minor and not significant. Therefore residual effects on heritage resources are not discussed further.

9.2.6 Cumulative Effects

9.2.6.1 Introduction

The residual effects assessment of the VC Heritage sites determined that the effect would be not significant (minor).

9.2.6.2 Identification of Other Actions that May Affect Heritage Sites

Disturbance of the Heritage sites that will be impacted by the Project are a spatially localized event that will not result in a negative effect on the condition of other Heritage sites in the region (Table 9.2-3). Mitigation measures are designed to offset the disturbance of the Heritage sites. Therefore, no cumulative effects are anticipated due to disturbance of the VC Heritage sites by the Project or others in the area.

Table 9.2-3. Screening of Other Actions for Inclusion in the CEA for Heritage Site

Description	Status or Likelihood	Geographic Boundaries (proximity to Project)	Temporal Boundaries	Common Resources and VCs Affected	Include in CEA (Y/N)
Industry					
Vidette Lake Mine	Decommissioned 1939	34 km northwest	n/a	None	N
Afton Mine	Decommissioned 1997	Within Project site	n/a	None	N
New Afton Mine (New Gold)	Active	9 km northwest	n/a	None	N
Highland Valley Copper Mine (Teck)	Active	31 km southwest	n/a	None	N
Domtar Kamloops Pulp Mill	Active	9 km north	n/a	None	N
Tolko-Hefley Creek Plywood and Veneer	Active	19 km north	n/a	None	N
LaFarge Cement plant	Active	14 km northeast	n/a	None	N

(continued)

Table 9.2-3. Screening of Other Actions for Inclusion in the CEA for Heritage Site (completed)

Description	Status or Likelihood	Geographic Boundaries (proximity to Project)	Temporal Boundaries	Common Resources and VCs Affected	Include in CEA (Y/N)
Industry (cont'd)					
Trans Mountain Pipeline System (Kinder Morgan)	Active	Within Project site	n/a	None	N
Trans Mountain Pipeline System - Expansion (Kinder Morgan)	Future - Certain	Within Project site	n/a	None	N
Harper Creek	Future	110 km northeast	n/a	None	N
Highland Valley Copper - Bethlehem Expansion	Future	31 km southwest	n/a	None	N
Natural Resources and Land Use					
Kamloops Forest District	Active	Within 4 km	n/a	None	N
Agriculture	Active	Immediately adjacent	n/a	None	N
Ranching	Active	Within Project site	n/a	None	N
Tourism and Commercial Recreation Activities					
Tranquille on the Lake	Future (multi-phase)	15 km northwest	n/a	None	N
Lac Le Jeune Resort	Active	19 km south	n/a	None	N
Tobiano Golf Course	Active	22 km northwest	n/a	None	N
Recreational Hunting, Fishing, Foraging	Active	Immediately adjacent	n/a	None	N
Recreational Trails	Active and Future	Immediately adjacent	n/a	None	N
Transportation					
Lac le Jeune Road	Active	3 km west	n/a	None	N
Highway 5 (Coquihalla Highway)	Active	5 km west	n/a	None	N
Kamloops airport	Active	10 km north	n/a	None	N
Rail yards and lines (CP and CN)	Active	9 and 14 km north	n/a	None	N

9.2.6.3 Interactions between Residual Project Effects and Other Project or Activity Effects

No interactions between residual Project effects and other Projects or activities have been identified as the effects to Heritage sites are local in nature and there are no residual effects once the required mitigation measures have been completed.

9.2.7 Conclusion

Heritage resources are non-renewable, can be very susceptible to disturbance, and are finite in number and such sites may be affected by the Project.

Potential effects of the Project on known protected Heritage resources will be managed through site avoidance or mitigation measures determined through consultation with the Archaeology Branch, Aboriginal Groups, and the local community. If Heritage sites are determined to be protected under the HCA then the mitigation measures will follow those outlined in Section 9.1. With the application of mitigation and management measures prior to Project impacts, residual effects on known Heritage resources are not anticipated and as a result will be not significant. Similarly, implementation of the Project's Archaeology and Heritage Management Plan and Chance Find Procedure will facilitate the protection of any as-yet unknown paleontological resources within the LSA, which may be identified during Construction. Therefore, as-yet undiscovered paleontological resources will be avoided and/or properly mitigated and managed, and residual effects are not anticipated. As residual effects to protected Heritage sites are not anticipated, cumulative effects to protected Heritage sites are also not anticipated.

9.3 SUMMARY OF ASSESSMENT OF POTENTIAL HERITAGE EFFECTS

Heritage resources are non-renewable, can be very susceptible to disturbance, and are finite in number. They are considered to be important resources that are protected and/or managed for their historical, cultural, scientific, and educational value to the general public, local communities, and Aboriginal groups. The Stk'emplupsemc te Secwépemc Nation (SSN) have indicated that areas associated with the Trout Children Story are of cultural importance and include but are not limited to:

- Jacko (Pipsell) Lake, the surrounding area, and its aquifers;
- the Prayer Tree;
- red headed woodpecker and chickadee habitat;
- the Hunting Blind Complex (EdRc-25); and
- Goose Lake, Peterson Creek, and the associated grasslands and sky world.

As described in the AIR for the Project, potential heritage effects are divided into to an assessment of archaeological sites (Section 9.1) protected under the *Heritage Conservation Act* (HCA; 1996) and Aboriginal and non-Aboriginal sites including paleontological sites considering baseline data, consultation activities, and any shared and relevant community knowledge (Section 9.2). As described in the AIR for the Project potential heritage effects are to be summarized by Project phase. This summary is outlined below and in Table 9.3-1.

9.3.1 Summary of Potential Effects of the Project for Archaeological Sites

Potential effects to both known and as-yet unknown archaeological sites may occur during the Construction phase of the Project due to activities associated with the movement, excavation, or disturbance of soil, and clearing and grubbing of vegetation. These activities have the highest potential for interactions between the Project and archaeological sites, if present. During the Operation, Decommissioning and Closure, and Post-Closure phases there is a potential for effects to archaeological sites due to increased human presence.

9.3.1.1 *Known Archaeological Sites*

There are currently 168 archaeological sites within the RSA, 46 of which are located within the Local Study Area (LSA). Of the 46 archaeological sites within the LSA, 28 are within 50 m of the Project footprint where direct effects are anticipated to occur including four sites around Jacko Lake (EdRc-5, EdRc-6, EdRc-7, and EdRc-8) and a site with a petroform identified as a possible hunting blind.

Archaeological sites will be marked as “no work zones” on Project construction maps and Project personnel will be educated about site avoidance. Where site avoidance is not possible, mitigation measures, determined in consultation with the Archaeology Branch and First Nations, will be used to reduce potential effects. It is anticipated that mitigation measures may include systematic data recovery and preservation through site capping.

Table 9.3-1. Summary of Assessment of Potential Heritage Effects

Valued Component	Potential Effect	Project Phase (timing of effect)		Summary Statement of Significance Analysis of Residual Effects
			Key Mitigation Measure(s)	
Archaeological Sites	Disturbance of Known Archaeological Sites	Construction	Avoidance or systematic data recovery approved by the Archaeology Branch and, if necessary, affected First Nations community(s).	With the exception of EdRc-25 effects from the Project will be reduced to not significant (minor).
	Disturbance of Known Archaeological Site EdRc-25	Construction	Avoidance or mitigation measures approved by the Archaeology Branch and, if necessary affected First Nations community(s). Mitigation could involve reconstruction of the petroforms at another location.	Effects from the Project will be reduced to not significant (moderate).
	Disturbance of As-Yet Unknown Archaeological Sites	All	Chance find procedure and avoidance or mitigation measures approved by the Archaeology Branch and, if necessary affected First Nations community(s).	Effects from the Project will be reduced to not significant (minor).
Heritage Sites	Disturbance of Paleontological Sites	Construction	Chance find procedure and avoidance or mitigation measures if the paleontological material is found to be of significance.	Effects from the Project will be reduced to not significant (minor).
	Disturbance of Aboriginal Heritage Sites	Construction and Operation	Hunting Blind protected by the HCA and avoidance or mitigations approved by the Archaeology Branch and affected First Nations community(s) will be carried out.	Effects from the Project will be reduced to not significant (minor).
	Disturbance of Non-Aboriginal Heritage Sites	Construction and Operation	Consultation with community stakeholders to determine if additional mitigation measures and/or preservation of the site is desired. Should evidence of the Nicola Brigade Trail be discovered during construction, documentation and associated mitigation will be addressed under the Heritage Chance Find Procedure.	Effects from the Project will be reduced to not significant (minor).

Due to the stated importance of archaeological site EdRc-25, the Hunting Blind Complex, to the SSN and the potential for a burial at EdRc-61, the St. Peter’s Church location, additional mitigation measures will be carried out. For EdRc-25, a mitigation strategy will be determined through discussions between KAM, SSN, and the Archaeology Branch. Such mitigation may include consultation, systematic data recovery and reconstruction of the petroform at another location. For EdRc-61, as avoidance is not feasible mitigation measures determined in consultation with the Archaeology Branch, the Anglican Church, and potentially other affected stakeholders (e.g., next of kin) will be determined. Such mitigation may include the removal and re-interment of the burial if the site is disturbed.

9.3.1.2 *As-yet Unknown Archaeological Sites*

Any revisions to the currently proposed Project footprint will be reviewed by a qualified professional archaeologist. The Project Chance Find Procedure will be used to provide a framework for the avoidance of archaeological sites, if present, that were not identified during the baseline program. Where avoidance is not possible, any alteration to an archaeological site protected under the HCA (1996) will require a Section 12 Site Alteration Permit from the Archaeology Branch. Additional mitigation measures will be determined in consultation with local First Nations and the Archaeology Branch.

9.3.1.3 *Summary of Residual Effects for Archaeological Sites*

Based on the mitigation measures summarized above it is assumed that, with the exception of archaeological site EdRc-25, the effects from the Project will be reduced to not significant (minor) for known and as-yet unknown archaeological sites.

For archaeological site EdRc-25, the Hunting Blind Complex, mitigation measures including data recovery undertaken prior to disturbance will acceptably offset any potential loss of archaeological data. However, due to the stated cultural significance of the site by the SSN (see Section 9.1.4.3), mitigation by systematic data collection and/or relocation of the sites will not offset all effects to the site. As such, the residual effects to the site have been assessed to be not significant (moderate).

9.3.2 **Summary of Potential Effects of the Project for Heritage Sites**

Potential effects to paleontological sites, non-Aboriginal heritage sites, and Aboriginal heritage sites (outlined in Section 9.2.4.1) may occur within the Construction phase of the Project due to activities associated with the movement, excavation, or disturbance of soil, and clearing and grubbing of vegetation. These activities have the highest potential for interactions between the Project and heritage sites, if present. Some interactions are also anticipated between non-Aboriginal heritage sites and Aboriginal heritage sites during the Operation phase of the Project.

9.3.2.1 *Paleontological Sites*

There is a low potential for impacts to paleontological sites. Should rocks with the potential to contain fossil remains be discovered, a cursory examination should be made to evaluate whether the rock contains fossils. If fossils are identified the Project Chance Find Procedure will be followed.

9.3.2.2 *Aboriginal Heritage Sites*

The SSN have defined cultural heritage to include a both tangible and intangible cultural heritage concerns including those summarized below:

- material sites objects and features from the past;
- named landscape features;
- places in the landscape associated with spiritually powerful beings;
- important dwelling and living places remembered by past generations;

- known powerful and spiritually associated places in the landscape;
- places that were/are known and used because of valued plant and animal resources; and
- cultural and linguistic knowledge that underlies connections to place (SSN 2014).

The *SSN Cultural Heritage Study* notes that Jacko Lake was fished for trout and the area was used to harvest roots and to hunt deer and elk (Ignace et al. 2014). There are currently six archaeological sites near the shore of Jacko Lake (EdRc-1, EdRc-5, EdRc-6, EdRc-7, EdRc-8, and EdRc-19). All six sites are classified as lithic sites and will require additional mitigation prior to disturbance. Based on the current Project footprint impacts are anticipated at four of the six sites (EdRc-5, EdRc-6, EdRc-7, and EdRc-8).

Effects to Jacko Lake's visual quality, fish, wildlife, and plants are detailed in Sections 8.5 and 8.7. The petroforms at EdRc-25, a possible hunting blind, are also identified as a heritage concern due to their value as a potential for promoting cultural and linguistic knowledge that can establish connections to the past.

Rock piles located to the north of the LSA have been identified by the SSN as having potential cultural significance. No rock piles associated with potential burials have been identified in the LSA that will be directly affected by the Project. If burials are present the rock piles will be protected under the HCA (1996) and the mitigation measures for archaeological sites detail in Section 9.1 will be followed.

Avoidance is always the preferred mitigation measure. To facilitate the avoidance of heritage sites KAM will arrange for site orientation and training of all employees and on-site personnel/contractors with regards to compliance with the HCA (1996) and the use of the Project's Heritage Chance Find Procedure.

Mitigation measures for archaeological sites around Jacko Lake, EdRc-1, EdRc-5, EdRc-6, EdRc-7, EdRc-8, and EdRc-19 and the petroforms at EdRc-25 are detailed in Section 9.1. No impacts are anticipated to EdRc-1. Indirect impact due to increased human presence is possible at EdRc-19 and will be marked as "No Work Zones" on development maps. An environmental staff member will be present during construction activities near the site and site boundaries will be flagged or fenced to limit any indirect impacts. For archaeological site EdRc-5, EdRc-6, EdRc-7, and EdRc-8 mitigation measures will be determined in consultation with the Archaeology Branch and First Nations, and may include systematic data recovery, construction monitoring, and/or site capping. Any alteration to these or other sites will require a Section 12 Site Alteration permit, issued by the Archaeology Branch.

For the remaining archaeological sites mitigation will be determined in consultation with the Archaeology Branch and First Nations, and may include systematic data recovery, construction monitoring, and/or site capping.

9.3.2.3 *Non-Aboriginal Heritage Sites*

Consultation with community stakeholders will be undertaken prior to disturbance of built heritage sites (within 50 m of the Project footprint) to determine relative significance and whether additional mitigation measures to record and/or preserve the sites are desired. In addition, should evidence of the Nicola Brigade Trail be encountered during construction, the Project Chance Find Procedure will be followed.

9.3.2.4 *Summary of Residual Effects for Heritage Sites*

Once mitigation and management measures have been conducted and/or established prior to anticipated Project effects, the potential for residual effects on heritage resources are not anticipated and as a result will be reduced to minor and not significant.

9.4 REFERENCES

Definitions of the acronyms and abbreviations used in this reference list can be found in the Glossary and Abbreviations section.

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