

What's Going On

June 2024

at the Island Mountain & Cariboo Gold Quartz Tailings Area in Wells, BC?

Overview

The Island Mountain Tailings project (former Island Mountain and Cariboo Gold Quartz mines) including Jack of Clubs Lake (JoCL) is located in the District of Wells, BC (the "Site"). Historic operation of the Island Mountain and Cariboo Gold Quartz mines left waste rock and tailings on Provincial Crown land at Wells, BC. Due to potential contaminants in these wastes, an environmental investigation of this land was initiated by the BC Ministry of Environment and Climate Change Strategy (ENV) in the late 1980s and early 1990s. Since the late 2000s the Ministry of Water, Land and Resource Stewardship (WLRS) has been managing the Site. The WLRS Crown Contaminated Sites Program (CCSP) manages unpermitted prioritized high risk contaminated sites on Crown Land for which the Province is responsible.

Parts of the area being investigated are shown in Figures 1 and 2. These areas are covered by tailings, and to a lesser extent, waste rock. In 2022/2023 SLR Consulting (Canada) Ltd. (SLR) prepared a Data Gap Assessment report and Human Health Risk Assessment (HHRA) Opinion Letter informed by the review of available past environmental investigation reports. Based on recommendations presented in these documents, CCSP retained SLR to conduct field investigations including a Detailed Site Investigation (DSI), Background Assessments, a Drinking Water Standards Applicability Study, and a Mercury and Methylmercury in Fish Study. These investigations were completed and reported in 2023 and the findings assisted CCSP to better understand the contamination at the Site. In addition, to create more awareness about the contamination at the Site and minimize public exposure to potential contaminants of concern (COCs), CCSP has replaced seven caution signs



Island Mountain tailings as seen from east to west



Tailings and Cariboo Gold Quartz mine waste rock pile in the background - 2022

and installed three more signs throughout the Site. In addition, a risk communication plan (RCP) was prepared and a public presentation by CCSP and SLR was delivered in the summer of 2023 in Wells to consult with the residents of the District of Wells and other stakeholders. The 2023 DSI recommendations included to complete a Supplementary Site Investigation (SSI), to address additional data gaps, and Detailed Human Health and Ecological Risk Assessments (DHHERA) in 2024/2025. The DHHERA will support the analysis of risk-based remedial options to manage the contamination at the Site.

Site History and Setting

Island Mountain and Cariboo Gold Quartz mines were underground gold mines located on the outskirts of Wells, on either side of JoCL. Major production at both mines began in 1933/1934 and continued operating through to 1967. Between 1933 and 1967, an estimated 2.65 million tonnes of tailings, and placer outwash from operations on Lowhee Creek, were deposited into the northeast end of JoCL at and near the lake outlet into the Willow River. Tailings extend over the flood plain, on the bottom of JoCL (approximately 500 metres or more laterally) and along the banks of the Willow River. Approximately 30 hectares (ha) of the northeast end (outlet) of JoCL were filled-in,

which prompted construction of a 900 m long drainage channel to allow the lake to continue to drain into the Willow River. The area with tailings and placer outwash covers approximately 73 ha within the District of Wells. The environmental investigation area of interest includes the area of tailings and placer outwash located on Crown land and outside of the proposed Osisko Development Corp. (Osisko) mine footprint (total area of approximately 46 ha). The waste rock and tailings from the historic mine operations contain heavy metals and can generate acidity that may result in metals leaching into surface water and groundwater.



Island Mountain view towards Cariboo Gold quartz mine – 1930s

Previous Environmental Work

The BC ENV investigations in the late 1980s and early 1990s focused on the residential properties and the town baseball diamond. Remediation included excavating the contaminated surface soils and backfilling with clean soil. This work was completed by the Ministry of Mines and was completed to an acceptable standard, reviewed and approved by the Cariboo Public Health Board and ENV. The Cariboo Public Health Board then reported out to the community in Wells.

A fish consumption advisory for mercury was placed on JoCL in 1989, as a human health precaution, and is still in effect. The advisory is for lake trout more than 45 cm long.

Site investigations conducted to date have identified, elevated metal concentrations (including arsenic and lead) in tailings, sediment, and shallow groundwater in the tailings. Arsenic and lead concentrations in the tailings exceeded BC Contaminated Sites Regulation (CSR) standards. Arsenic concentrations up to 7,600 mg/kg and lead up to 1,560 mg/kg were measured in the tailings adjacent to JoCL. Concentration in shallow groundwater in the tailings (dissolved arsenic 164 µg/L and lead 54.3 µg/L) exceeded CSR aquatic life standards, and concentrations in sediment (arsenic 5,780 mg/kg and lead 518 mg/kg) from the shore of JoCL exceeded CSR sediment standards. Dissolved metals (copper, cobalt, cadmium, aluminum and/or iron) and sulphate in surface water from JoCL, Willow River, and Lowhee Creek slightly exceed the BC Water Quality Guidelines (BCWQG) for freshwater aquatic life. The District of Wells municipal groundwater well is screened in a deep aquifer, and water quality records do not show any evidence of contamination.

Caution signs, to warn the public that the Site is contaminated with heavy metals and not to disturb the soil/sediment, were reinstalled throughout the Site in 2023.



Caution sign at the north-central portion of beach (exposed tailings)

In summary, within the tailings, JoCL, Willow River, Lowhee Creek, Swimming Beach (locally known as the Y), and Williams Meadow Tailings (including walking trail) one or more metal parameters exceed applicable standards as follows:

SOIL: Select metal parameters are above CSR soil standards and the most common soil COCs are arsenic, iron, lead, and cadmium.

SEDIMENT: Select metal parameters are above CSR sediment standards and the most common COCs are arsenic, iron, manganese, and nickel.

GROUNDWATER: Select dissolved metal parameters and sulphate are above applicable CSR groundwater standards. The most groundwater COCs are dissolved arsenic, iron, manganese, and total sulphate.

SURFACE WATER: Multiple metals (dissolved copper, iron, cobalt, cadmium, and aluminum) and sulphate are above the BC WQGs.

FISH: A Fish Consumption Advisory for lake trout more than 45 cm long is based on Federal guidance regarding mercury in fish.

In general, based on the 2023 DSI results, the contamination at the Site is not fully delineated, and BC ENV Protocol 11 - Upper Cap Concentrations (UCCs) of Substances are exceeded at some locations. Based on the presence of soil and sediment in the upper 1 m with concentrations of arsenic exceeding the UCCs and in accordance with ENV Protocol 12, the Site was classified as High Risk in a submission to ENV in February 2024; the submission to ENV was made to request a Director's Approval of local background concentrations of arsenic and iron in soil for the Site. The areas of environmental concern (AECs) were re-mapped at the end of the 2023 DSI to group the AECs by major depositional and surface features, areas requiring similar approaches to remediation and risk management, by primary responsibility (i.e., CCSP versus Osisko), and finally by geographic area. Specific locations with High-Risk conditions are shown on Figure 3 (Figures 3a and 3b).

NOTE: THE DISTRICT OF WELLS DRINKING WATER SUPPLY IS NOT IMPACTED BY HISTORICAL MINING ACTIVITY BECAUSE THE WATER SOURCE IS FROM A DEEP CONFINED AQUIFER / GROUNDWATER SOURCE.

What Is Planned in 2024/25?

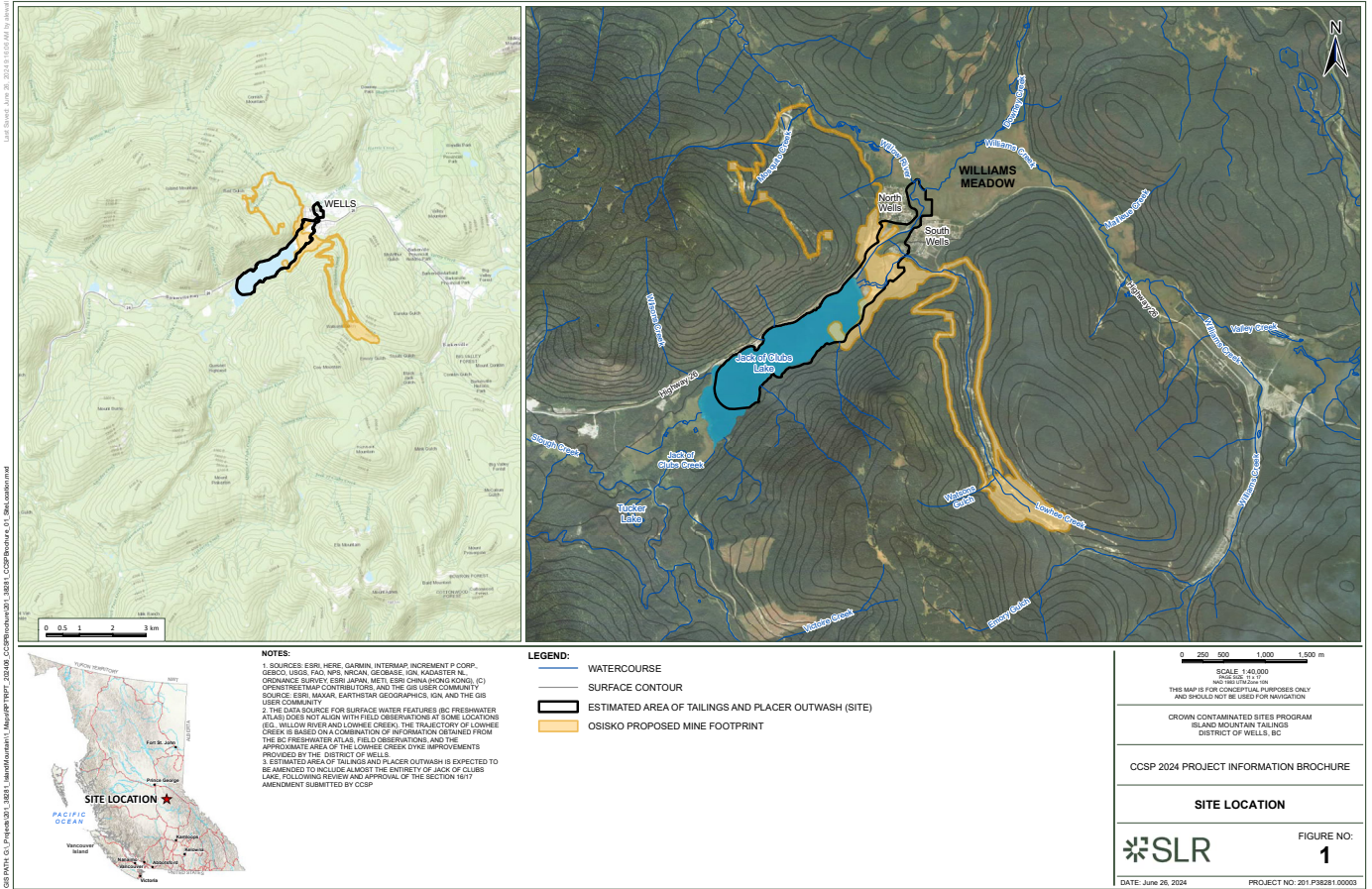
SSI and DHHERA investigations are planned. The SSI will include several investigations/ assessments and studies described in the table below. The table below

is a summary of the SSI and DHHERA activities/studies to be completed in 2024/25.

INVESTIGATION OR STUDY TYPE	SAMPLING PLAN AND/OR ACTIVITY TO BE COMPLETED
SSI	Additional soil, sediment, groundwater, surface water, and porewater investigations and monitoring Soil and Sediment Arsenic and Lead Bioaccessibility Assessment Terrestrial Plant and Invertebrates Tissue Sampling Macrophyte Tissue Sampling Benthic Invertebrate Tissue Sampling Plume Stability Assessment
DHHERA	Detailed human health and ecological risk assessment (includes consultation with First Nations, Osisko, and other stakeholders with respect to risk assessment)

What's Next?

The results from the 2024 SSI will be evaluated and used to complete a DHHERA. Following completion of the DHHERA, risk-based remedial options for the Site will be prepared and evaluated. The District of Wells, Northern Health Authority, Lhtako Dené First Nation, Xat'sül First Nation, Williams Lake First Nation, Osisko, residents of Wells, BC ENV, and other stakeholders will be consulted on approaches to manage and remediate the contamination at the Site.



NOTES:

- SOURCES: ESRI, HERE, GAUSS, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NIPON, DEGRAND, DON KAGASTER, L. ORNDANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY.
- THE DATA SOURCE FOR SURFACE WATER FEATURES (SIC PRESWATERS ATLAS) DOES NOT ALIGN WITH FIELD OBSERVATIONS AT SOME LOCATIONS (E.G. WILLOW RIVER AND LOWHEE CREEK); THE TRAJECTORY OF LOWHEE CREEK IS BASED ON A COMBINATION OF INFORMATION OBTAINED FROM THE SIC PRESWATERS ATLAS, FIELD OBSERVATIONS, AND THE APPROXIMATE AREA OF THE LOWHEE CREEK DYKE IMPROVEMENTS PROVIDED BY THE DISTRICT OF WELLS.
- ESTIMATED AREA OF TAILINGS AND PLACER OUTWASH IS EXPECTED TO BE AMENDED TO INCLUDE ALMOST THE ENTIRETY OF JACK OF CLUBS LAKE, FOLLOWING REVIEW AND APPROVAL OF THE SECTION 1617 AMENDMENT SUBMITTED BY CCSP.

LEGEND:

- WATERCOURSE
- SURFACE CONTOUR
- ESTIMATED AREA OF TAILINGS AND PLACER OUTWASH (SITE)
- OSISKO PROPOSED MINE FOOTPRINT

0 250 500 1,000 1,500 m

SCALE: 1:40,000
 NOT TO SCALE IN
 THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY
 AND SHOULD NOT BE USED FOR NAVIGATION

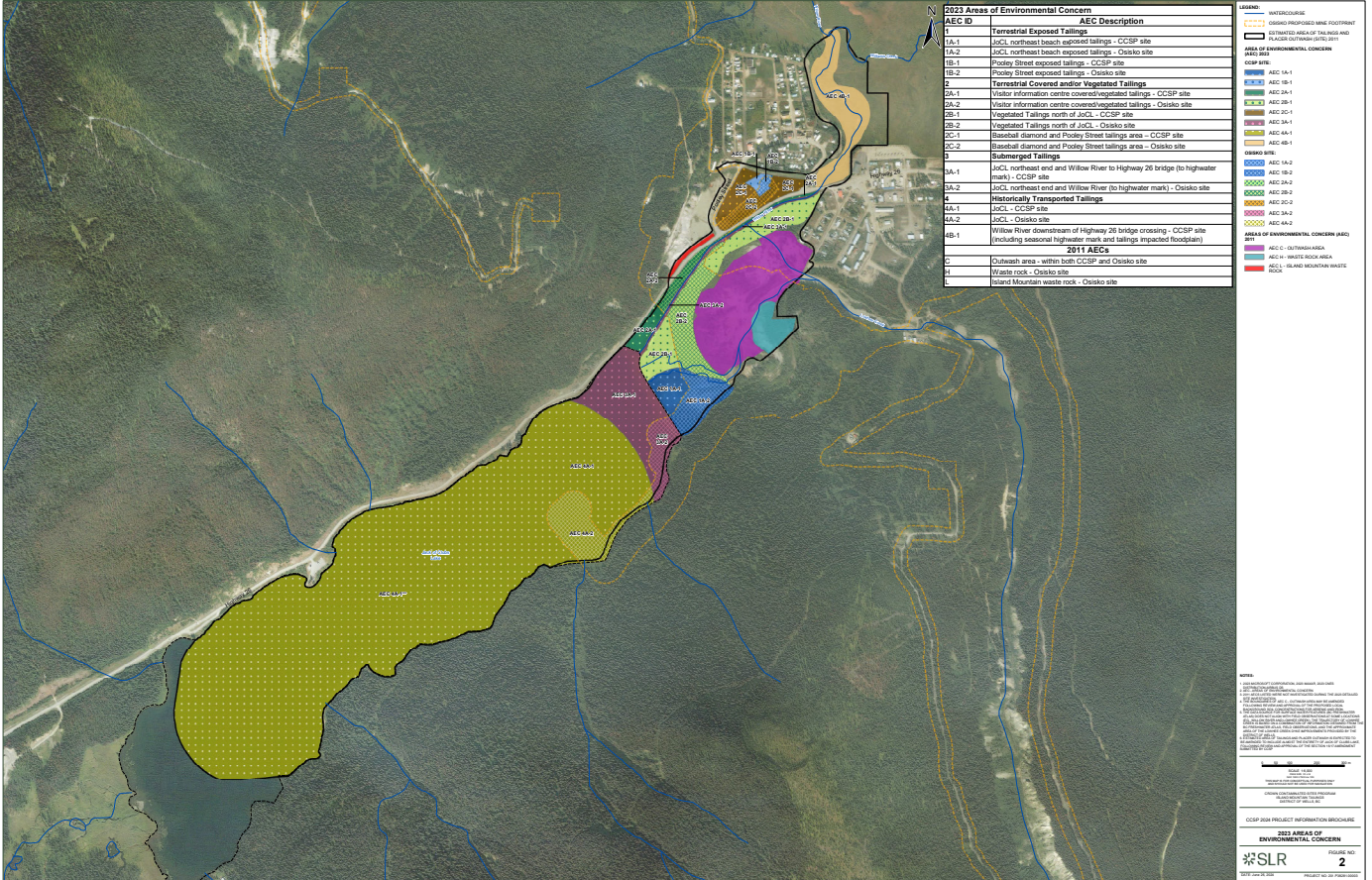
CROWN CONTAMINATED SITES PROGRAM
 ISLAND MOUNTAIN TAILINGS
 DISTRICT OF WELLS, BC

CCSP 2024 PROJECT INFORMATION BROCHURE

SITE LOCATION

FIGURE NO:
1

DATE: June 26, 2024 PROJECT NO: 201-P38281-0009







For further information or to ask questions,
contact the Ministry of Water, Land and Resource Stewardship:

Crown Contaminated Sites Program

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Further information on the CCSP program is available on the following website:
Crown Contaminated Sites Program - Province of British Columbia (gov.bc.ca).