Periodic Review
Sierra Zinc Mine

Stevens County
Facility Site ID: 1786484, Cleanup Site ID: 1838

Toxics Cleanup Program, Central Region

Washington State Department of Ecology
Union Gap, Washington

July 2024

Document Information

This document is available on the Department of Ecology's Sierra Zinc Mine cleanup site page.[1]

Related Information

- Facility Site ID: 1786484
- Cleanup Site ID: 1838

Contact Information

Toxics Cleanup Program

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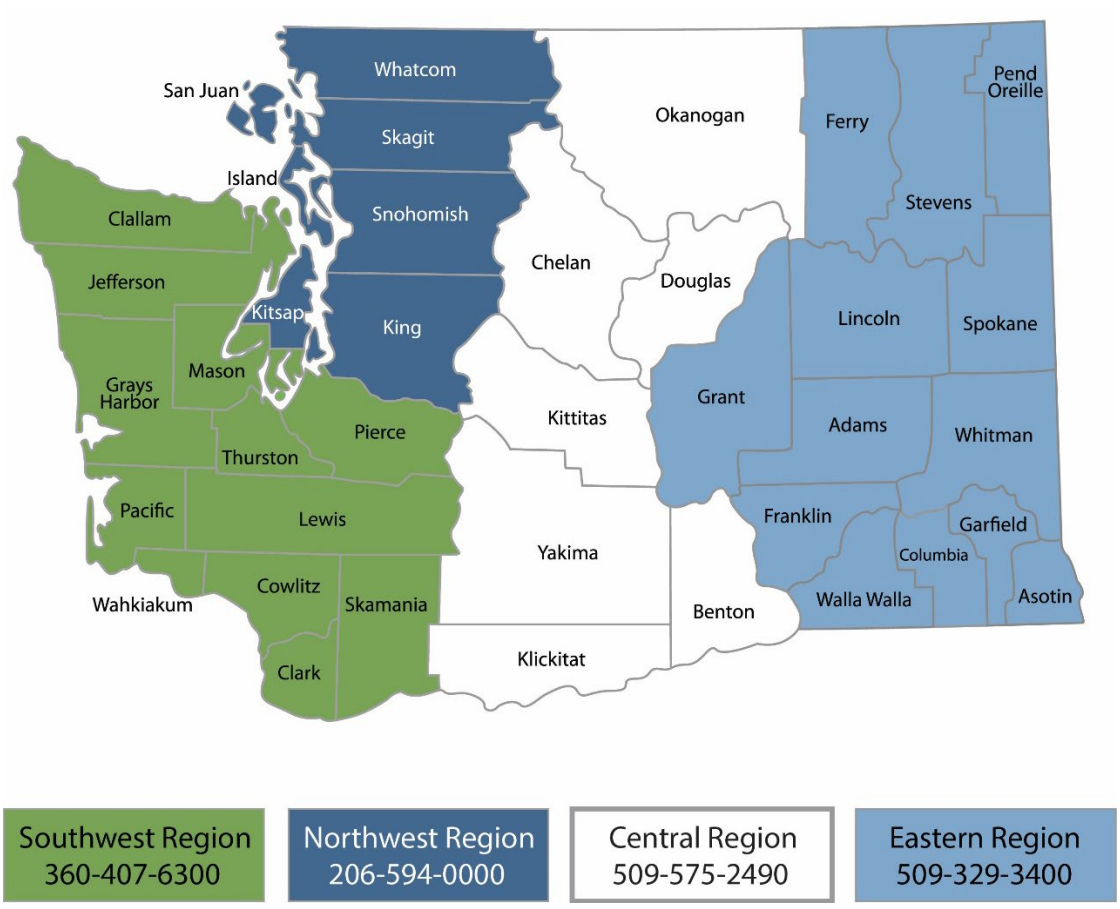
[1] https://apps.ecology.wa.gov/cleanupsearch/site/1838
[2] https://ecology.wa.gov/About-us/Who-we-are/Our-Programs/Toxics-Cleanup
[3] https://ecology.wa.gov/About-us/Accountability-transparency/Our-website/Accessibility

Department of Ecology's Regional Offices

Map of Counties Served



Southwest Region 360-407-6300	Northwest Region 206-594-0000	Central Region 509-575-2490	Eastern Region 509-329-3400

Region	Counties served	Mailing Address	Phone
Southwest	Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Mason, Lewis, Pacific, Pierce, Skamania, Thurston, Wahkiakum	PO Box 47775 Olympia, WA 98504	360-407-6300
Northwest	Island, King, Kitsap, San Juan, Skagit, Snohomish, Whatcom	PO Box 330316 Shoreline, WA 98133	206-594-0000
Central	Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima	1250 W Alder St Union Gap, WA 98903	509-575-2490
Eastern	Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman	4601 N Monroe Spokane, WA 99205	509-329-3400
Headquarters	Across Washington	PO Box 46700 Olympia, WA 98504	360-407-6000

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Introduction

The Washington State Department of Ecology (Ecology) reviewed post-cleanup site conditions and monitoring data to ensure human health and the environment are being protected at the Sierra Zinc Mine cleanup site (Site).

Cleanup activities at this Site were completed as removal actions under Comprehensive Environmental Response Compensation and Liability Act (CERCLA) authority by the United States Environmental Protection Agency (USEPA). These actions met cleanup levels under the Model Toxics Control Act (MTCA), Chapter 173-340 of the Washington Administrative Code (WAC).

Residual concentrations of arsenic, cadmium, lead, and zinc remained after cleanup that exceed MTCA Method A cleanup levels for soil established under WAC 173-340-740(2). The MTCA Method A cleanup levels for soil are established under WAC 173-340-740. Ecology determined institutional controls in the form of an environmental covenant would be required as part of the cleanup action for the Site. WAC 173-340-420(2)[4] requires Ecology to conduct a periodic review of certain sites every five years. For this Site, a periodic review is required because an institutional control is required as part of the cleanup action.

When evaluating whether human health and the environment are being protected, Ecology must consider the following factors (WAC 173-340-420(4)):

a) The effectiveness of ongoing or completed cleanup actions, including the effectiveness of engineered controls and institutional controls in limiting exposure to hazardous substances remaining at the site.

b) New scientific information for individual hazardous substances or mixtures present at the site.

c) New applicable state and federal laws for hazardous substances present at the site.

d) Current and projected site and resource uses.

e) The availability and practicability of more permanent remedies.

f) The availability of improved analytical techniques to evaluate compliance with cleanup levels.

Ecology publishes a notice of all periodic reviews in the *Site Register* and provides an opportunity for public comment.

[4] https://app.leg.wa.gov/wac/default.aspx?cite=173-340-420

Summary of Site Conditions

Site description and history

The Sierra Zinc Mine Site is in Stevens County and is about 24 miles north of Colville, Washington. The Site is the location of former lead and zinc mining and milling operations. Remnants of ore milling operations include a 25-acre tailings impoundment containing approximately 88,000 cubic yards of contaminated soils and mine waste.

Mining operations began at the Site in 1889 and continued sporadically through the mid- to late 1970s. Lead and zinc ore deposits were mined at the Site using underground mining techniques. From 1940 to 1949, the Site was owned by the Sierra Zinc Company. The first mill was constructed at the Site in 1941 and had a capacity to process 90 tons per day using crushing, ball-mill grinding, and flotation technology. The Site was sold to Goldfield Consolidated Mines Company in 1949 and, subsequently, the mill's capacity was increased to 500 tons per day. However, most of the ore processed at the mill came from nearby mines. The mill operated sporadically through the 1960s, however, little information is known about production totals. The mill property and the majority of the tailings impoundment were sold to Mr. Ron Nixon in 1975 who still owns portion of the Site. According to the Stevens County Assessor records at time of this periodic review, other owners of portions of the Site include James Quilter and Sally Pierce.

A vicinity map is in Appendix A, and a Site plan is in Appendix B.

Site investigations

Previous site investigations were conducted by the USEPA, Washington State Department of Natural Resources (DNR), and Resource and Environmental Management Consultants, Inc. (RMC) on behalf of The Goldfield Corporation.

USEPA performed a Preliminary Assessment/Site Inspection of the Site in 2001. During the investigation, samples were collected from the waste rock and tailings piles. Sample results from the tailings and waste rock piles indicated metal concentrations, including arsenic, cadmium, lead, mercury, thallium, and zinc, exceeded MTCA cleanup levels.

DNR completed an Inactive and Abandoned Mine Land Investigation in 2003. During the investigation, soil samples were collected from the tailings pile and surface water samples were collected from water flowing from the adit. Sample results indicated that metals lead and cadmium concentrations exceeded MTCA cleanup levels in soil samples.

USEPA completed a Removal Site Evaluation in 2013. RMC conducted site characterization work concurrent with the Removal Site Evaluation. These investigations included collecting soil, surface water, groundwater, and sediment samples from the Site and adjacent properties. Data collected during the investigations was used to define the extents of impacts and to define removal areas and processes.

Cleanup actions

Removal actions were completed at the Site between 2014 and 2016 that consisted of excavating contaminated soils, tailings, and waste rock and disposing material in the on-site tailings impoundment area. The demolition of the mill and barn buildings was included as part of the removal action. Contaminated soils and mine wastes were excavated and placed on the tailings impoundment with the exception of material located near the mill buildings which contained lead concentrations greater than 10,000 milligrams per kilograms (mg/kg) that was placed in a HDPE containment within the impoundment. The tailings impoundment was then covered with about 9 inches of eco-barrier (rock layer comprised of gravel to pebbly soil), 18 inches of clean cover soil, and 6 inches of topsoil.

About 88,000 cubic yards of contaminated soil and mine wastes were disposed of on the tailings impoundment. Following the removal action, an environmental covenant was recorded with Stevens County to restrict certain activities and uses that interfere with the remedial action.

Cleanup standards

Cleanup standards include cleanup levels, the location where these cleanup levels must be met (point of compliance), and any other regulatory requirements that apply to the Site. WAC 173-340-704[5] states MTCA Method A may be used to establish cleanup levels at sites that have few hazardous substances, are undergoing a routine cleanup action, and where numerical standards are available for all indicator hazardous substances in the media for which the Method A cleanup level is being used. Method B may be used at any site and is the most common method for setting cleanup levels when sites are contaminated with substances not listed under Method A. Method C cleanup levels may be used to set soil and air cleanup levels at industrial sites.

MTCA Method A cleanup levels for unrestricted land use were determined to be appropriate for contaminants at this Site. The cleanup actions conducted at the Site were determined to be routine, few hazardous substances were found at the Site, and numerical standards were available in the MTCA Method A table for each hazardous substance.

The point of compliance is the area where the cleanup levels must be attained. For soil cleanup levels based on the protection of groundwater, as they are for this Site, the point of compliance is established as soils throughout the Site (standard point of compliance).

Environmental Covenant

Ecology determined that institutional controls would be required as part of the cleanup action to document the remaining contamination, protect the cleanup action, and protect human

[5] https://app.leg.wa.gov/WAC/default.aspx?cite=173-340-704

health and the environment. On November 22, 2017, institutional controls in the form of an environmental covenant[6] (Covenant) were recorded for the Site.

The Covenant recorded for the Site imposes the following limitations:

1. Any activity within the Restrictive Covenant Area that may impact or interfere with the remedial action and any operation, maintenance, inspection, or monitoring of the remedial action without prior written approval from Ecology.

2. Any activity within the Restrictive Covenant Area that may threaten continued protection of human health or the environment without prior written approval from Ecology. This includes but is not limited to, any activity that results in the release of residual contamination that was contained as a part of the remedial action or that exacerbates or creates a new exposure to residual contamination remaining within the Restrictive Covenant Area including: drilling; digging; piercing the cap with sampling device, post, stake, or similar device; grading; excavation; installation of underground utilities; removal of the cap; or, application of loads in excess of the cap load bearing capacity.

3. Conveyance of any interest in any portion of the Restrictive Covenant Area of the Property without providing for the continued adequate and complete operation, maintenance and monitoring of remedial actions and continued compliance with the covenant.

4. The land within the Restrictive Covenant Area shall not be used for any purpose, in perpetuity, except as for open space or wildlife habitat. Prohibited uses on the Restrictive Covenant Area include residential uses, childcare facilities, K-12 public or private schools, parks, growing of food crops, and industrial and non-industrial commercial uses.

Periodic Review

Effectiveness of completed cleanup actions

During the Site visit Ecology conducted on November 15, 2023, the remedy appeared to be functioning as intended. The Site is undeveloped. The Site is accessed by an adjacent gravel road referred to as Harrier Creek Road. A barbwire fence surrounds the tailings impoundment area. There is no evidence that the public is entering the fenced impoundment area.

A photo log is in Appendix C.

[6] https://apps.ecology.wa.gov/cleanupsearch/document/124944

Direct contact

The cleanup actions were intended to eliminate exposure to contaminated soil at the Site. Exposure pathways to contaminated soils by ingestion and direct contact were reduced by installing an engineered cover system over the contaminated soil and institutional controls. The cap appears to be in satisfactory condition and no repair, maintenance, or contingency actions are currently required.

Institutional controls

Institutional controls in the form of a Covenant were implemented at the Site in 2017. The Covenant remains active and discoverable through the Stevens County Auditor. Ecology found no evidence a new instrument has been recorded that limits the effectiveness or applicability of the Covenant. This Covenant prohibits activities that will result in the release of contaminants contained as part of the cleanup action and prohibits any use of the property that is inconsistent with the Covenant, unless approved by Ecology in advance. This Covenant ensures the long-term integrity of the cleanup action will be protected.

New scientific information for individual hazardous substances or mixtures present at the Site

There is no new relevant scientific information for the hazardous substances remaining at the Site.

New applicable state and federal laws for hazardous substances present at the Site

There are no new applicable or relevant state or federal laws for hazardous substances remaining at the Site.

Current and projected Site and resource uses

The Site remains vacant. The perimeter fencing at the Site remains in good condition and prevents access to the tailings area. There have been no changes in current or projected future Site or resource uses. The current Site use is not likely to have a negative impact on the protectiveness of the cleanup action.

Availability and practicability of more permanent remedies

The remedy implemented included containing hazardous substances, and it continues to be protective of human health and the environment. While more permanent remedies may be available, they are still not practicable at this Site.

Availability of improved analytical techniques to evaluate compliance with cleanup levels

The analytical methods used at the time of the cleanup action were capable of detection below the selected MTCA cleanup levels. The presence of improved analytical techniques would not affect decisions or recommendations made for the Site.

Conclusions

- The cleanup actions completed at the Site appear to be protective of human health and the environment.
- Soil cleanup levels have not been met at the Site; however, the cleanup action is determined to comply with cleanup standards under WAC 173-340-740(6)(f), since the long-term integrity of the containment system is ensured and the requirements for containment technologies have been met.
- The Covenant for the property is in place and is effective in protecting human health and the environment from exposure to hazardous substances and the integrity of the cleanup action.

Based on this periodic review, Ecology has determined the requirements of the Covenant are being followed.

No additional cleanup actions are required at this time. The property owner is responsible for continuing to inspect the Site to ensure the integrity of the cap is maintained.

Next review

Ecology will schedule the next review for the Site five years from the date of this periodic review. If additional cleanup actions or institutional controls are required, the next periodic review will be scheduled five years after those activities are completed.

References

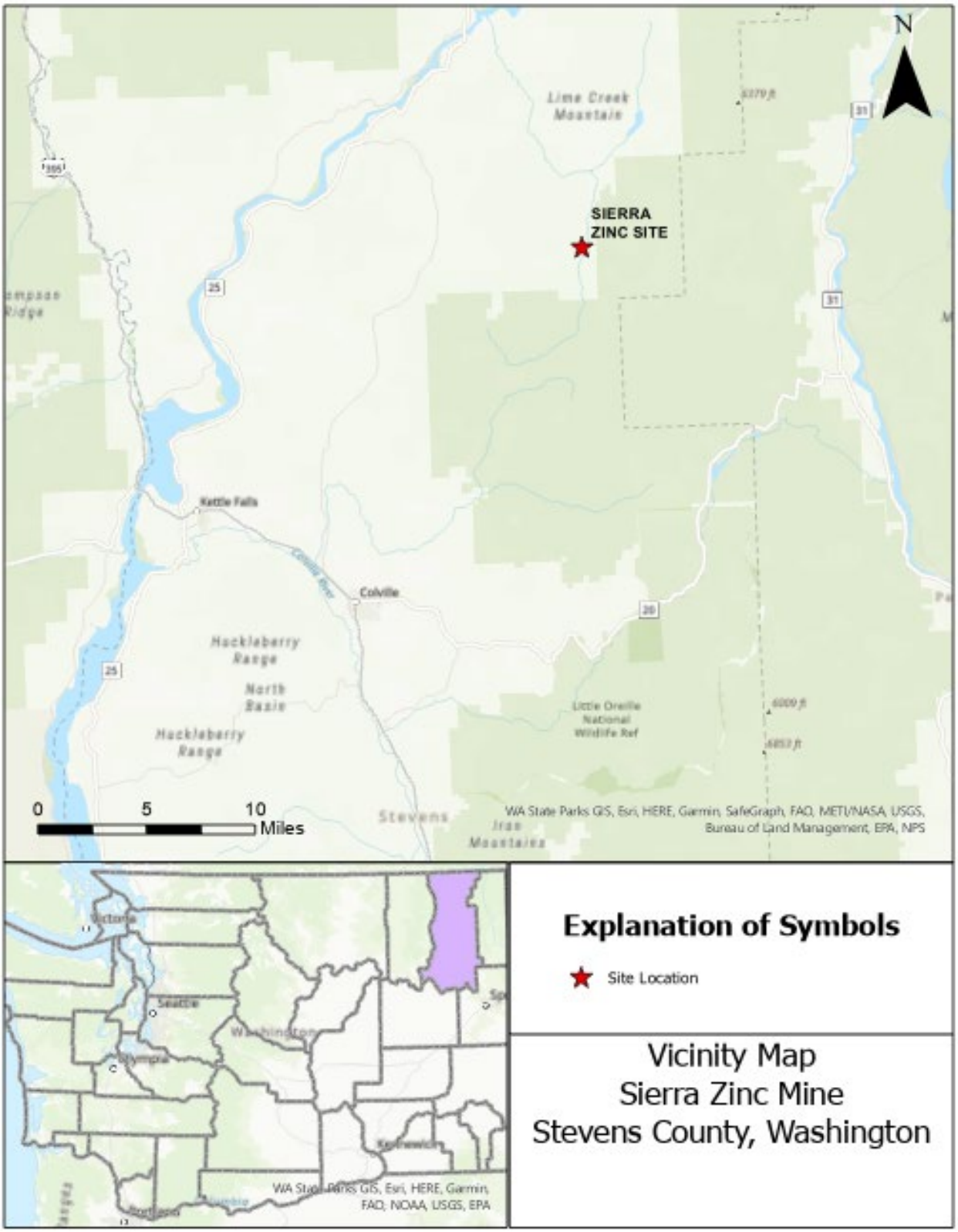
DNR. *Inactive and Abandoned Mine Lands, Sierra Zinc Mine, Chewelah Mining District, Stevens County, Washington.* October 2003.

USEPA. *Completion Report for Sierra Zinc Mine and Mill, Colville, Washington.* November 20, 2015.

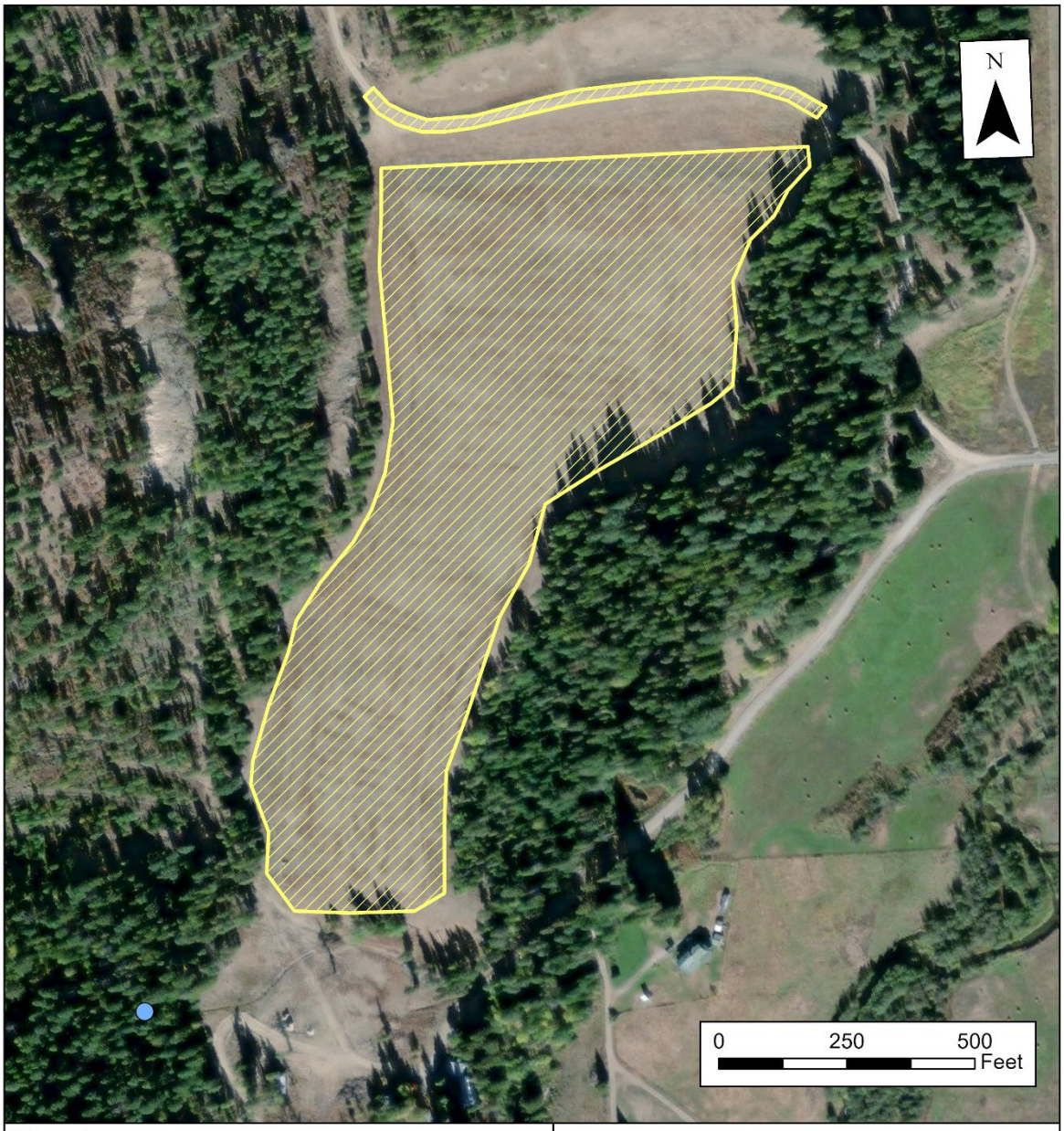
Ecology. *Environmental Covenant*. November 22, 2017.

Ecology. Site visit. November 15, 2023.

Appendix A. Vicinity Map



Appendix B. Site Plan



Site Plan
Sierra Zinc Mine
Stevens County, Washington

Notes: All locations shown are approximate. This drawing is for informational purposes. It is intended to assist in showing features discussed in the attached document.

Explanation of Symbols

Tailings impoundment area/Restrictive Covenant Area

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Appendix C. Photo Log

Photo 1: View of capped area looking south from Harrier Creek Road.

Photo 2: View of Harrier Creek Road adjacent to tailings impoundment.