PEBBLE PROJECT

2022 Reclamation Report

MLUP No. 6118

PREPARED BY:
PEBBLE LIMITED PARTNERSHIP

OCTOBER 2022

CONTENTS

TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

This report summarizes exploration drilling, reclamation and care and maintenance activities conducted during the 2022 field season at the Pebble Project, a mineral exploration and development project operated by the Pebble Limited Partnership (PLP). PLP is a U.S. company wholly owned by Northern Dynasty Minerals Ltd. of Vancouver, Canada, conducting exploration-related activities on state mineral claims leased to the Pebble East Claims Corporation and Pebble West Claims Corporation. These activities are authorized by Miscellaneous Land Use Permit (MLUP) No. 6118 issued by the Alaska Department of Natural Resources, Division of Mining, Land and Water (ADNR-MLW).

PLP's scheduled 2022 field season began on May 13 and concluded on June 29. During the season PLP successfully closed 106 monitoring wells within the claim block. Closure activities included plugging or grouting open boreholes and removing all above-ground structures to a sufficient depth below the surface. Closure methods were compliant with all regulatory and permit requires (Sec. 1.2). No artesian sites were closed during the 2022 field season.

In addition to monitoring well closures, PLP completely demobilized several satellite locations by removing all structures and equipment to Iliamna. Satellite locations removed include West Bay 1, West Bay 3, Pebble 1 met station, and the South Koktuli Mtn repeater.

No remaining surface disturbances were carried forward from 2021 and no new ground-disturbing activities were conducted in 2022.

On or about June 1, 2022 the Upper Talarik fire began burning several miles north of the Main Supply Depot. The UT fire continued burning at a low-level for several weeks before rapidly expanding in early July. The expanded fire resulted in damage or destruction of most of PLP's remaining field installations, including the ARD test site, most of the Main Supply Depot, and part of the Watershed installation. PLP mobilized field crews and helicopter support in September to remove debris from damaged areas. Details are provided in Section 2.3.

1.1 LOCATION

The Pebble Project is located in the Lake and Peninsula Borough in southwest Alaska. The main deposit is centered approximately 200 miles SW of Anchorage, 60 miles W of Cook Inlet and 17 miles NW of Iliamna (Figure 1). The Pebble Project comprises 1,840 Alaska state mineral claims and contains one of the world's most significant undeveloped deposits of copper, gold, and molybdenum (Figure 2).[1]

1.2 RECLAMATION OBJECTIVES AND REQUIREMENTS

Alaska statute (AS 27.19) and regulation (11 AAC 97) require mining operators to reclaim any disturbed land to a "stable condition", which means rehabilitation to a state that allows for the

[1] In 2021, PLP revised the active claims held by the Pebble West Claims Corporation and the Pebble East Claims Corporation by dropping 562 claims from the project area. No field installations or monitoring wells remain within the relinquished area. The previous and current claim blocks are shown in Figure 2.

reestablishment of a vegetative cover within a reasonable period of time. MLUP No. 6118, Section 1 identifies reclamation requirements, including:

- Surface disturbance shall be held to a minimum, and will be reclaimed by backfilling, contouring, and spreading of organic rich overburden to promote stabilization and natural revegetation.
- The area reclaimed shall be reshaped and recontoured to blend with surrounding physiography using strippings and overburden, and then stabilized to a condition that shall retain sufficient moisture to allow for natural revegetation.
- Upon completion of drilling activities, drill pads shall be reclaimed as necessary, including reseeding, to encourage natural revegetation of the sites and protect them from erosion.
- All drill hole casings shall be removed or cut off at, or below, ground level unless otherwise specifically approved by the Division of Mining, Land & Water.
- All drill holes shall be plugged with bentonite hole plug, a benseal mud, or equivalent slurry, for a minimum of 10 feet within the top 20 feet of the drill hole in competent material. The remainder of the hole will be backfilled to the surface with drill cuttings. If water is encountered in any drill hole, a minimum of 7 feet of bentonite holeplug, a benseal mud, or equivalent slurry shall be placed immediately above the static water level in the drill hole.

MLUP No. 6118 also requires the filing of this reclamation report and Annual Reclamation Statement by December 31 of each year the permit is in effect.

MLUP No. 6118 also includes multiple special stipulations addressing:

- Action Requirements on Inspection Reports (Special Stipulation B)
- Annual Work Plan (D)
- Mineral Closing Order 393 (E)
- Bristol Bay Area Plan requirements (F)
- Wildlife Management (G-J)
- Drilling Waste and Cuttings Management (K)
- Annual Exploration/Reclamation Report (M)
- Water Use (N)

Activities for special stipulations B, D–K, and M–N are described in Section 3.8. Water use (N) is summarized in Section 3.5. The entirety of this report satisfies Special Stipulation M (Annual Report).

1.3 WORK SUMMARY

Work conducted during the 2022 field season included:

- Identification, inspection, and closure of 106 monitoring wells.

- Demobilization of satellite field installations. Material and equipment removed to Main Supply Depot or storage locations in Iliamna, AK.
- Continued monitoring of select sites to evaluate revegetation success and previous repairs.
- Cleanup and debris removal of fire-damaged field installations.

Details on sites closed in 2022 are presented in Appendix E. Inspections and site status are presented in Appendix C. Representative photographs are included in Appendix A.

1.4 OTHER PERMITS AND REGULATORY REQUIREMENTS

In addition to MLUP No. 6118, PLP maintains Temporary Water Use Authorizations (TWUA) and Fish Habitat Permits to support exploration and repair work, as shown in Table 1. PLP did not conduct any activities governed by these permits in 2022.

Table 1. 2022 Permits and Authorizations

Permit/Authorization ID	Issuing Agency	Expiration	Purpose/Use
TWUA F2019-021	ADNR-Water	12/31/2023	Water withdrawal
TWUA F2019-022	ADNR-Water	12/31/2023	Water withdrawal
TWUA F2019-023	ADNR-Water	12/31/2023	Water withdrawal
TWUA F2019-082	ADNR-Water	12/31/2023	Water withdrawal (aquifer)
FH19-II-0056	ADFG	12/31/2023	Fish habitat/water withdrawal
FH19-II-0057	ADFG	12/31/2023	Fish habitat/water withdrawal
FH19-II-0058	ADFG	12/31/2023	Fish habitat/water withdrawal
FH19-II-0060	ADFG	12/31/2023	Fish habitat/water withdrawal
FH19-II-0062	ADFG	12/31/2023	Fish habitat/water withdrawal
FH19-II-0063	ADFG	12/31/2023	Fish habitat/water withdrawal

2.0 PROJECT DESCRIPTION

2.1 SITE ACCESS

Field operations are based out of PLP's office at the Iliamna Airport in Iliamna, AK. Access to all worksites within the Pebble deposit is by helicopter only. PLP does not use ground vehicles to access the deposit area or travel between worksites. As a result, the deposit area remains free of temporary roads and tracks.

2.2 ENVIRONMENTAL CONTROLS

2.2.1 Vegetation and Tundra Preservation

PLP's standard field work procedures require the use of wooden tundra pads and platforms for all heavy equipment and materials to minimize vegetation impacts. Individual worksites are also organized to have as small a footprint as possible, with mobilization and demobilization occurring within the shortest time frame to limit duration impacts. When a surface disturbance is necessary, groundcover, including vegetation, is removed and stockpiled for later use in reclaiming the site. Once the activity is complete, excavated areas are backfilled and re-covered with reserved tundra. Disturbed areas are also revegetated with native seed or an approved seed mixture as appropriate.

2.2.2 Fuel Management and Spill Prevention

PLP uses double-walled, welded aluminum fly tanks to transport and store all fuel for field operations. Tanks are filled at PLP's Iliamna location to no more than 80 percent of the total capacity. (Most tanks used have a total capacity of 110 gallons, meaning each will contain no more than 88 gallons.) Each tank is visually inspected for leaks or spills prior to transport by helicopter. A separate, double walled 500-gallon storage tank at the MSD is available to support field operations, but was not used during 2022. This tank was removed to Iliamna following damage from the Upper Talarik fire. It will not be used again unless re-certified.

All active fuel tanks are placed in welded aluminum containments sized to hold 110 percent of the tank's maximum capacity. Containments are placed on level ground at least 100 feet from any surface water.

Each tank location is stocked with a spill containment and cleanup kit. All field staff have been trained in the proper response and reporting protocols as part of PLP's SPCC Plan. PLP also maintains a contract with Alaska Chadux Corporation to provide 24-hour spill response, if necessary. After each worksite is demobilized, the area is inspected to ensure no leaks or spills occurred.

2.2.3 Erosion and Sediment Control

Where necessary, certified weed-free straw is used in conjunction with re-seeding efforts at to minimize wind and water erosion and promote more thorough vegetation growth. No re-seeding activity occurred during the 2022 season.

2.3 FIELD INSTALLATIONS

2.3.1 Main Supply Depot

The Main Supply Depot (MSD) was initially constructed in 2004 and serves as the primary storage and staging area for field operations. The site occupies approximately 2.5 acres of a gravel bluff in the West Deposit area (SE1/4 SE1/4 of Sec 21, T3S R35W and the NE1/4 NE1/4 of Sec 28, T3S, R35W) (ADL Nos. 516811 and 516874).

Multiple temporary wood frame buildings and platform tents provide sheltered storage for machinery, drilling equipment, environmental supplies, and variety of small parts and tools. Small quantities of drilling fluids, motor oils, and antifreeze are stored in sealed, original packaging inside weather-proof shelters. All temporary structures are constructed on elevated platforms or placed on tundra pads. Other items such as drill rods, lumber, tundra pads, outhouses, fuel containments, rig supports, are stored within the MSD yard on racks or elevated platforms.

The MSD was used as the primary staging area for 2022 field activities. At the end of the scheduled field season, all fuel was removed from the site (prior to the Upper Talarik fire).

The Upper Talarik fire in early July damaged or destroyed more than 90 percent of the MSD, including all temporary wooden structures, the main storage tent, boardwalks, tundra pads and miscellaneous supplies. The only remaining items include racks of drill steel and some large timbers used to support drill rigs.

In September 2022, ground crews initiated cleanup and debris removal operations at the MSD using a B3 helicopter. All damaged structures not consumed by the fire were dismantled and secured in transport slings for removal to Iliamna. Once large debris was removed, crews raked the entire site to gather smaller items (e.g., hardware), which were placed into covered totes for transport. Over 12 days, PLP removed 74 sling loads of debris from the MSD, or approximately 70 tons in total.

Field crews visually inspected the site for evidence of spills or damage; none were identified. PLP will continue to monitor the site for recovery in future field seasons and evaluate the need for enhanced reclamation.

Photos 114 – 116 show the MSD following the fire and site cleanup.

2.3.2 Fuel Storage

Jet A fuel is used for all large mechanized field equipment (pumps, generators, drill rigs). Multiple aluminum fly tanks were transported to and stored at the MSD by helicopter to support 2022 field operations in accordance with PLP's fuel management policies (Section 2.2.2). The maximum volume of fuel stored at the MSD during 2022 was approximately 400 gallons. Smaller volumes of fuel were transported to individual work sites as necessary and stored appropriately (aluminum containments, spill kits). All aluminum fly tanks were removed to Iliamna at the end of the scheduled 2022 field season (prior to the Upper Talarik fire). No fuel or other petroleum product spills were identified or reported during the 2022 field season.

2.3.3 Watershed

The Watershed site is located approximately 0.75 miles east of the MSD in the SW1/4 SE1/4 of Sec 22, T3S, R35W (ADL No. 524712). The site consists of three temporary buildings constructed on elevated platforms: one Quonset-style building with a corrugated metal roof (14' x 16') that serves as a light machine shop, and two wood frame buildings (9' x 38'; 10' x 16') used to store hoses, miscellaneous hand tools and field supplies. A small generator shed is attached to the Quonset hut.

The Upper Talarik fire in early July destroyed the machine shop structure and generator shed but left the other wood frame buildings intact. PLP will continue cleanup operations at the Watershed location in 2023 and evaluate the continued use of the site as the base of field operations in future field seasons.

Photo 117 shows the Watershed site following the fire.

2.3.4 West Bay 1 and 3

Each West Bay location consisted of two temporary wooden structures (an 8' x 12' emergency shelter and a smaller generator shack). These structures were used to provide shelter for monitoring crews during data collection. West Bay 1 was located in the SW1/4 SW1/4 of Sec 23, T3S, R35W (ADL No. 524714). West Bay 3 was located in the NE1/4 SW1/4 of Sec 33, T3S, R36W (ADL No. 642412).

In June 2022, PLP removed all structures, equipment, and material from each West Bay location. All items were transported by helicopter to the MSD. Each site was inspected for spills or damage; none were found. PLP will continue to monitor recovery of each site in successive field seasons to ensure compliance with all reclamation requirements.

Photos 107 – 109 show the West Bay sites following structure removal.

2.3.5 Meteorological and Communications

The Pebble 1 meteorological station was located in the SW1/4 NE1/4 of Sec 20, T3S, R35W (ADL No. 524829). The small site consisted of a temporary fiberglass structure (approximately 8 x 8 ft) and associated equipment. A small, secondary data repeater was placed on South Koktuli Mountain to provide a more consistent link to the Iliamna base station. This small repeater consisted of a transmitter and battery pack and was located in the SW 1/4 NW 1/4 of Section 12, T4S, R35W (ADL No. 567941).

The Koktuli Mountain radio repeater is located in the NE1/4 SW1/4 of Sec 36, T3S, R35W (ADL No. 646608). The small site consists of a temporary metal structure (approximately 8 x 8 ft) and associated equipment. This repeater is the primary means of communication between base operations in Iliamna and field crews.

Both the Pebble 1 met station and small repeater were demobilized to the MSD in June 2022. Each site was inspected for spills or damage; none were found.

Photos 112 – 113 show the Pebble 1 met station following structure removal.

2.3.6 Acid Rock Drainage Test Location

The ARD site was located in the SE 1/4 SE 1/4 of Section 22, T3S, R35W (ADL No. 524713). It was set up to evaluate real time weathering and acid generation potential in area rock. The site consisted of 12 large plastic barrels filled halfway with rock fragments. Barrels were racked on wood tundra pads.

During the 2022 field season, the ARD test site was inactive. However, the Upper Talarik fire in late June completely destroyed all structures and barrels containing rock. PLP removed all remaining debris by helicopter to the MSD. All rock fragments were transported by helicopter to Iliamna for secure storage. Following cleanup, PLP inspected the site for spills or damage; none were found. PLP will continue to monitor the site for recovery in future field seasons. At this time, PLP does not intend to resume ARD field testing.

Photos 110 – 111 show the ARD site following the fire and site cleanup.

2.4 FIELD STAFF AND LOGISTICS

All work crews are based out of Iliamna and ferried to the work site by helicopter each day work is being performed. All waste is removed from the field and properly disposed in Iliamna.

3.0 FIELD ACTIVITIES

3.1 EXPLORATION ACTIVITY

PLP did not conduct any new exploration activity during the 2022 field season.

3.2 SURFACE DISTURBANCE AND RECLAMATION

PLP did not create any new surface disturbances during the 2022 field season, nor were there any holdover disturbances from 2021 requiring reclamation.

3.3 CLOSURE SITES

PLP permanently plugged and closed 106 boreholes during the 2022 field season. Closure methods described below are fully compliance with MLUP No. 6118 Stipulation 1.h.

Each identified site was inspected to determine the integrity of the downhole casing, material competency of the surrounding ground, and suitability for closure without the need to redrill the borehole. Where present, the static water level was measured using an acoustic meter (Solinst Model 104) with an accuracy to 3 centimeters or 0.1 feet.

A bridge plug was created in each borehole at the static water level to establish the termination depth of the eventual grout or bentonite plug. Bridge plugs in small diameter boreholes (1-2 inches) are created by feeding very small quantities of bentonite chips down the borehole and allowing them to set. In larger boreholes, bridge plugs are created using wooden dowels sized to a slightly smaller diameter. Water causes the dowel to swell and creates a stable bridge plug at the water level.

Boreholes were then filled with 3/8-inch bentonite chips (Baroid) or pressure grouted from the bridge plug to 1.5 feet below the existing ground surface. Once a competent seal was confirmed, a small excavation was made around the borehole to cut off the casing 1.5 feet below ground. Existing vegetation was preserved where possible. The plugged borehole was then capped with cement (Portland Type III) and backfilled with excavated material and contoured to the surrounding ground. Any preserved vegetation was replaced in the excavated area. All surface materials (casing, broken cement, etc.) were removed to Iliamna for storage or disposal.

Post-closure inspections by PLP staff did not identify any remediation issues (e.g., subsidence, water leaks). These sites are now classified as 3-E (see Appendix B).

Post-closure photos are provided in Appendix A. Appendix E details the quantity and type of plug material used for each borehole as well as the measured depth to water and total plug length.

3.4 2022 REPAIR SITES

No borehole activities were conducted during the 2022 field season, nor were any sites identified as needing repair during inspections.

3.5 CONSUMPTIVE WATER USE

PLP used small quantities of water from surface waters to prepare cement mixtures. Water pumps were fitted with fish protection screens when in operation. Less than 200 gallons per day were withdrawn from multiple sources based on their proximity to each work site. The quantity and frequency of water used do not meet authorization requirements under 11 AAC 93.035(b).

3.6 STATE INSPECTION

Alaska DNR-Mining staff conducted a site inspection on June 7, 2022. As of the date of this annual report, PLP has not received a copy of the final inspection report. Inspection findings, if any, will be addressed in a timely manner.

3.7 INTERNAL INSPECTIONS

PLP conducts routine inspections of project drill sites during each field season to ensure compliance with all permit and regulatory requirements. Information is summarized and provided to DNR, including current status, repair or maintenance needs, presence of above ground structures, reclamation status, safety markings, and abandonment method, if applicable.

PLP assigns an alpha-numeric code to each drill site following inspection to more easily characterize each location and plan future maintenance and inspection needs. Numerals (1-3) describe the borehole operating status (e.g., active or potential use for monitoring or future drilling) while letters (A-E) describe the surface condition, including reclamation status and maintenance needs, if any. A detailed explanation of each code is provided in Appendix B.

During the 2022 field season, PLP inspected 131 individual borehole locations, including the 106 sites that were closed and reclaimed. The status of all project boreholes is provided in Appendix C.

As shown in Table 2, all sites are in stable condition and require no further action (D and E) beyond follow-up monitoring. None of the project drill sites require major repairs (A) or otherwise pose a notable risk of causing adverse impact.

Table 2. 2022 Borehole Status Summary

			Surface Condition					
			A Major Repairs	B Stable/ Minor Repairs	C Maintenance or Follow-up	D Stable/ Monitored	E Stable/ No Action	Total [a]
Borehole Status	1	Active	0	0	0	27	444	471
	2	Inactive	0	0	0	0	0	0
	3	Closed	0	0	0	9	900	909
		Total	0	0	0	36	1344	1380

[a] Includes drill sites within the active claim boundary only.

3.8 MLUP No. 6118 Special Stipulations

3.8.1 B—Action Items on Inspection Reports

See Section 3.6.

3.8.2 D—Annual Work Plan

PLP submitted the 2022 work plan by email to DNR-Mining on February 1, 2022.

3.8.3 E—Mineral Closing Order 393

PLP did not conduct any activity in 2022 within the boundaries of MCO 393.

3.8.4 F—Talarik Creek Vegetative Buffer

PLP did not conduct any activity in 2022 within 150 feet of the ordinary high water mark of Upper Talarik Creek.

3.8.5 G—Caribou Calving Areas

PLP routinely avoids wildlife when present near work sites. No caribou were observed near any work site. All 2022 work was conducted after the typical calving period for caribou in the vicinity. PLP coordinated with ADFG staff prior to commencing seasonal work as required.

3.8.6 H—Moose Calving, Rutting, and Overwintering Areas

PLP routinely avoids wildlife when present near work sites. No moose were observed near any 2022 work site. PLP coordinated with ADFG staff prior to commencing seasonal work as required.

3.8.7 I—Bear Denning

PLP does not conduct field activities within one-half mile of any known bear dens. PLP requested known bear den locations from ADFG as required, but none were provided. No bear dens were identified during the 2022 field season.

3.8.8 J—Waterfowl Molting Area

PLP did not conduct any 2022 field activities near waterfowl molting areas. Prior to the start of seasonal work, PLP coordinated with ADFG staff to minimize the potential for any impacts. No activity was conducted in BBAP Subunit 10-03.

3.8.9 K—Drilling Waste and Cuttings Management

PLP did not conduct any activity that generated cuttings or used drilling muds during 2022.

3.8.10 N—Water Use

See Section 3.5.

4.0 SIGNATURE

This report, prepared by Tim Havey, PLP Director, Environment and Permitting, is dated October 4, 2022 and satisfies the annual reporting requirements of MLUP No. 6118.

Signed,

Tim Havey
Director, Environment and Permitting, PLP

APPENDIX A

Representative Photographs

APPENDIX B

Inspection Categories

Table B-1. Borehole Status Codes

Code	Category	Description
1	Active	Primary designation for active monitoring wells (groundwater quality, geotechnical, etc.). Also used for some former exploration boreholes that are maintained as possible water sources. Active sites do not have material plugs (grout, cement, bentonite) but may be fitted with mechanical plugs or caps.
2	Inactive	*Category no longer in use.*
3	Closed	Site is fully decommissioned. Borehole has been plugged as appropriate. All surface structures removed, with possible exception of wood post indicating location and borehole ID.

Table B-2. Reclamation/Maintenance Condition Codes

Code	Category	Description
A	Major Repairs	Site condition presents an identified environmental compliance or health & safety concern, or is at risk of progressing if not addressed as soon as possible. Significant repairs necessary, typically requiring advanced planning, technical staff and additional equipment. Coordination and approval from DNR or other agency may be required. *Examples: upwelling of discolored or voluminous water; discharge to surface water.*
B	Minor repairs	Site condition requires repairs or rehabilitation, but is stable and not at risk of deteriorating further. Work does not require technical staff but generally cannot be completed during routine maintenance trips or by one person. Advance approval from DNR or other agency is usually not required unless circumstances dictate. All repair activities summarized in annual report. *Examples: Margo plug replacement/installation; large area rehabilitation or revegetation efforts; grout injection.*
C	Routine Maintenance or Additional Investigation	Maintenance requirements are small or insignificant and generally the result of normal operation or exposure to elements. Repairs can be completed by staff during routine inspections and do not require specialized equipment or advance planning. Also used to identify sites where condition cannot be confirmed, thus requiring additional inspection or involvement of higher level staff. *Examples: application of sealant around cap; water valve replacement; ponded surface water with unconfirmed source.*
D	Stable/ Monitored	Site condition is stable and has been fully reclaimed, but with past maintenance issues or known to have higher maintenance needs. All structural equipment, if any, is in good condition. Routine monitoring is generally more frequent than Category E sites. *Examples: artesian sites; sites with recent, major repairs.*
E	Stable/ No Action	Site condition is stable and has been fully reclaimed. All structural equipment, if any, is in good condition. No known issues. No history of upwellings, leaks, or staining. Located in an area unlikely to cause concern (e.g., wetlands, artesian zone). Inspection frequency is lower than Category D sites.

APPENDIX C

Borehole Status
(electronic file)

APPENDIX D

AHEA Reclamation Spreadsheet (electronic file)

APPENDIX E

2022 Borehole Closure Details (electronic file)