EXECUTIVE SUMMARY:

Pebble Project

Preliminary Economic Assessment

NI 43-101 Technical Report

Pebble Project, Alaska, USA

Effective Date: September 9, 2021

Prepared for: Northern Dynasty Minerals Ltd.

Prepared by: Ausenco Engineering Canada

List of Qualified Persons:

• Robin Kalanchey, P.Eng., Ausenco, • Hassan Ghaffari, P.Eng., Tetra Tech Canada Inc., • Sabry Abdel Hafez, P.Eng., Tetra Tech Canada Inc., • Les Galbraith, P.Eng., P.E., Knight Piésold Ltd., • J. David Gaunt, P.Geo., Hunter Dickinson Services Inc., • Eric Titley, P.Geo., Hunter Dickinson Services Inc., • Stephen Hodgson, P.Eng., Hunter Dickinson Services Inc., • • James Lang, P.Geo., J M Lang Professional Consulting Inc.

This Executive Summary is an excerpt, comprising section 1.0 Summary from the document entitled, Preliminary Economic Assessment NI 43-101 Technical Report, Pebble Project, Alaska, USA, Effective Date: September 9, 2021, by Robin Kalanchey P.Eng., Ausenco, Hassan Ghaffari, P.Eng., Tetra Tech Canada Inc., Sabry Abdel Hafez, P.Eng., Tetra Tech Canada Inc., Les Galbraith, P.Eng., P.E., Knight Piésold Ltd., J. David Gaunt, P.Geo., Hunter Dickinson Services Inc., Eric Titley, P.Geo., Hunter Dickinson Services Inc., Stephen Hodgson, P.Eng., Hunter Dickinson Services Inc., James Lang, P.Geo., J M Lang Professional Consulting Inc. Further information is available in the full document posted here on the Company's website and under the Company's profile on www.sedar and www.sec.gov.

This document has been reviewed by all the Qualified Persons named above. The document has been reviewed and approved for posting by Stephen Hodgson, P.Eng., a Qualified Person who is not independent of Northern Dynasty Minerals Ltd.

Important Notice

This report was prepared as National Instrument 43-101 Technical Report for Northern Dynasty Minerals Ltd. (NDM) by Ausenco Engineering Canada Inc. (Ausenco), Tetra Tech Canada Inc., Knight Piésold Ltd., Hunter Dickinson Services Inc., and J M Lang Professional Consulting Inc., collectively the "Report Authors". The quality of information, conclusions, and estimates contained herein is consistent with the level of effort involved in the Report Authors' services, based on i) information available at the time of preparation, ii) data supplied by outside sources, and iii) the assumptions, conditions, and qualifications set forth in this report. This report is intended for use by NDM subject to the terms and conditions of its contracts with each of the Report Authors. Except for the purposed legislated under Canadian provincial and territorial securities law, any other uses of this report by any third party is at that party's sole risk.

Table of Contents

Appendix

List of Tables

List of Figures

1 SUMMARY

1.1 Introduction

The Pebble deposit was originally discovered in 1989 and was acquired by Northern Dynasty Minerals Ltd. (Northern Dynasty) in 2001. Since that time, Northern Dynasty and, subsequently, the Pebble Limited Partnership (Pebble Partnership) in which Northern Dynasty currently owns a 100% interest, have conducted significant mineral exploration, environmental baseline data collection, and engineering studies to advance the Pebble Project (the Project).

Since the acquisition by Northern Dynasty, exploration has led to an overall expansion of the Pebble deposit, as well as the discovery of several other mineralized occurrences along an extensive northeast-trending mineralized system underlying the property. Over 1 million feet of drilling has been completed on the property, a large proportion of which has been focused on the Pebble deposit.

Comprehensive deposit delineation, environmental, socioeconomic and engineering studies of the Pebble deposit began in 2004 and continued through 2013. As described in previous technical reports, the estimates indicate that the Pebble deposit contains significant amounts of copper, gold, molybdenum, silver, and rhenium.

In December 2017, Pebble Partnership filed an application for permits under the Clean Water Act (CWA) and River and Harbors Act (RHA), triggering the requirement for an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA). The EIS was prepared by the US Army Corps of Engineers (USACE) with the Final EIS (FEIS) published in July 2020. The Project Description required under NEPA was updated during the EIS process. The final version, which was submitted with the Revised Project Application in June 2020, is attached to the FEIS. In November 2020, USACE issued its Record of Decision (ROD) denying Pebble Partnership's application. Pebble Partnership submitted a Request for Appeal (RFA), which was accepted by USACE in February 2021 and the request is currently under adjudication.

In September 2020, Northern Dynasty published a Technical Report on the Project. The purpose of that report was to document recent studies of the occurrence of rhenium and to estimate the rhenium mineral resources in the deposit. Previous work also determined palladium is present, at least in parts of the deposit; however, insufficient analyses have been completed to date to undertake a resource estimate for that metal. The report also updated the proposed plan for the Project as documented in the FEIS. In March 2021, Northern Dynasty published a Technical Report that updated the status of the Appeal of the ROD. Information on closure was added to the Project Description and Permitting Section.

The purpose of this Preliminary Economic Assessment (2021 PEA) is to present the projected economics of the production plan and a corresponding project configuration which aligns with the June 2020 Revised Project Application (the Proposed Project). The 2021 PEA also explores potential expansion scenarios for the Project. The 2021 PEA is based on, and no changes have been made to, the resource estimate from the September 2020 Technical Report.

1.2 Forward Looking Information and Other Cautionary Factors

The 2021 PEA includes certain statements that may be deemed "forward-looking statements" under the United States Private Securities Litigation Reform Act of 1995 and under applicable provisions of Canadian provincial securities laws. All statements in the 2021 PEA, other than statements of historical facts, which address permitting, development and production for the Project are forward-looking statements. These include statements regarding:

- the mine plan for the Project, the financial results of the 2021 PEA, including net present value and internal rates of return, and the ability of the Pebble Partnership to secure the financing to proceed with the development of the Project, including any stream financing and infrastructure outsourcing;
- the social integration of the Project into the Bristol Bay region and benefits for Alaska;
- the political and public support for the permitting process;
- the ability to successfully appeal the negative Record of Decision and secure the issuance of a positive Record of Decision by the U.S. Army Corps of Engineers and the ability of the Pebble Project to secure all required Federal and State permits;
- the right-sizing and de-risking of the Project, including any determination to pursue any of the expansion scenarios for the Pebble Project or to incorporate a gold plant;
- the design and operating parameters for the Project mine plan, including projected capital and operating costs;
- exploration potential of the Project;
- future demand for copper and gold and the metals prices assumed for the financial projections including the 2021 PEA;
- the potential addition of partners in the Project; and
- the ability and timetable of Northern Dynasty to develop the Project and become a leading copper, gold and molybdenum producer.

Although Northern Dynasty believes the expectations expressed in these forward-looking statements are based on reasonable assumptions, such statements should not be in any way be construed as guarantees that the Project will secure all required government permits, establish the commercial feasibility of the Project, achieve the required financing or develop the Project. Such forward-looking statements or information related to the 2021 PEA include but are not limited to statements or information with respect to the mined and processed material estimates; the internal rate of return; the annual production; the net present value; the life of mine (LOM); the capital costs, operating costs estimated for each of the Proposed Project and the potential expansion scenarios for the Project; and other costs and payments for the proposed infrastructure for the Project (including how, when, where and by whom such infrastructure will be constructed or developed); projected metallurgical recoveries; plans for further development, and securing the required permits and licenses for further studies to consider expansion of the operation; and market price of precious and base metals; or other statements that are not statement of fact.

Forward-looking statements are necessarily based upon a number of factors and assumptions that, while considered reasonable by Northern Dynasty as of the date of such statements, are inherently subject to significant business, economic and competitive uncertainties and contingencies. Assumptions used by Northern Dynasty to develop forward-looking statements include:

- the Project will obtain all required environmental and other permits and all land use and other licenses without undue delay;
- any feasibility studies prepared for the development of the Project will be positive;

- Northern Dynasty's estimates of Mineral Resources will not change, and Northern Dynasty will be successful in converting Mineral Resources to Mineral Reserves;
- Northern Dynasty will be able to establish the commercial feasibility of the Project; and
- Northern Dynasty will be able to secure the financing required to develop the Project.

The likelihood of future mining at the Project is subject to a large number of risks and will require achievement of a number of technical, economic and legal objectives, including:

- obtaining necessary mining and construction permits, licenses and approvals without undue delay, including without delay due to third party opposition or changes in government policies;
- finalization of the mine plan for the Project;
- the completion of feasibility studies demonstrating that any Pebble Project mineral resources that can be economically mined;
- completion of all necessary engineering for mining and processing facilities;
- the inability of Northern Dynasty to secure a partner for the development of the Project; and
- receipt by Northern Dynasty of significant additional financing to fund these objectives as well as funding mine construction, which financing may not be available to Northern Dynasty on acceptable terms or on any terms at all.

Northern Dynasty is also subject to the specific risks inherent in the mining business as well as general economic and business conditions, such as the current uncertainties with regard to COVID-19. Investors should also consider the risk factors identified in its Annual Information Form for the year ended December 31, 2020, as filed on SEDAR and included in the Company's annual report on Form 40-F filed by the Company with the SEC on EDGAR.

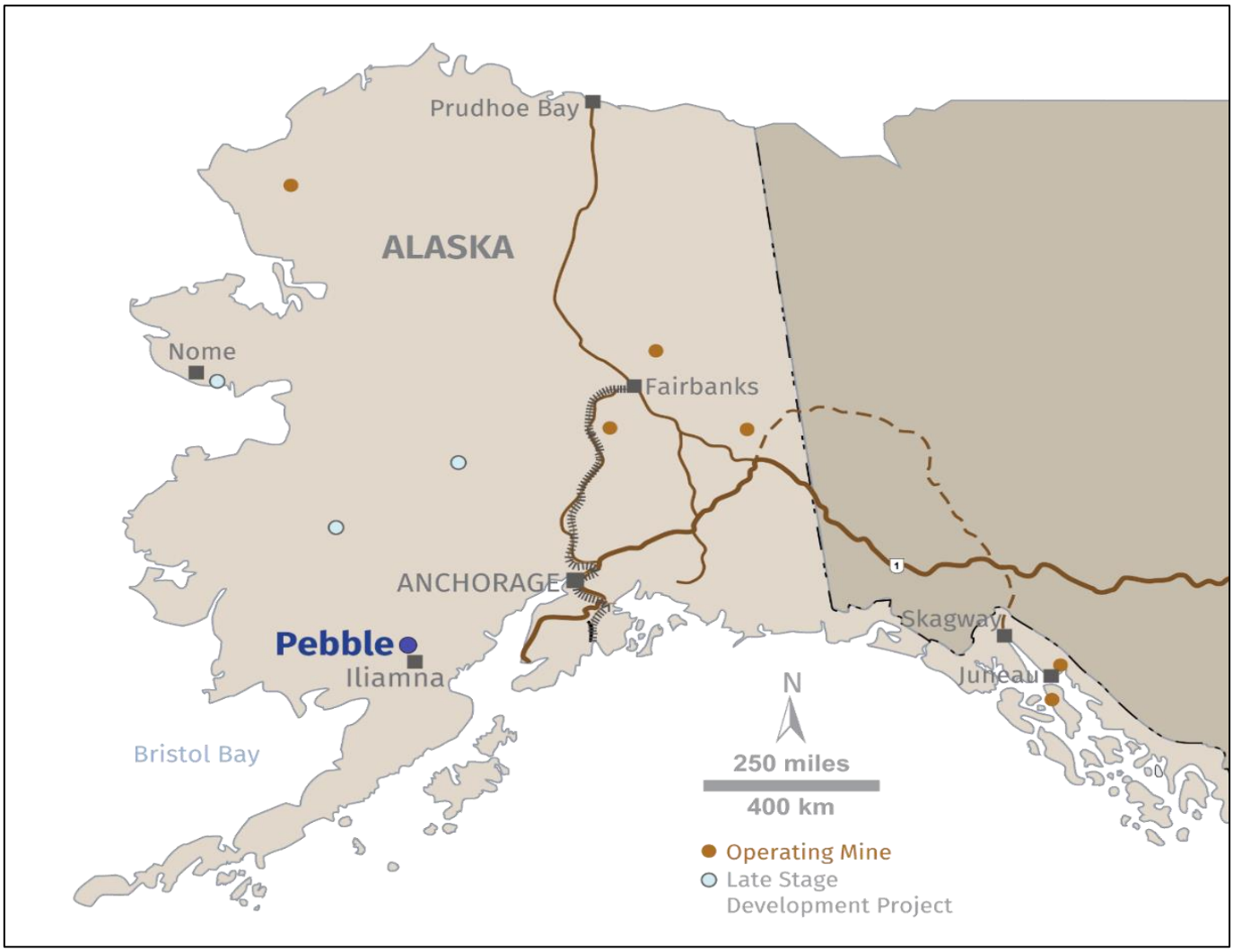
The NEPA EIS process requires a comprehensive "alternatives assessment" be undertaken to consider a broad range of development alternatives, the final project design and operating parameters for the Project and associated infrastructure may vary significantly from that currently contemplated. As a result, the Company will continue to consider various development options and no final project design has been selected at this time, and no determination has been made to pursue any of the potential expansion scenarios identified in the 2021 PEA.

For more information on Northern Dynasty, investors should review Northern Dynasty's filings with the United States Securities and Exchange Commission at www.sec.gov and its home jurisdiction filings that are available at www.sedar.com.

1.3 Project Setting

The Pebble deposit is located in southwest Alaska, approximately 200 miles southwest of Anchorage, 17 miles northwest of the village of Iliamna, 100 miles northeast of Bristol Bay, and approximately 60 miles west of Cook Inlet (Figure 1-1).

Figure 1-1: Property Location Map



Note: Prepared by NDM, 2021.

1.4 Property Description

Northern Dynasty holds, indirectly through Pebble East Claims Corporation and Pebble West Claims Corporation, wholly-owned subsidiaries of the Pebble Partnership, a 100% interest in a contiguous block of 2,402 mining claims and leasehold locations covering approximately 417 square miles (which includes the Pebble deposit).

1.5 Project Description

On December 22, 2017, the Pebble Partnership submitted its permit application under the CWA and RHA. The Project Description in the permit application envisaged the Pebble deposit would be developed as an open pit mine with associated on and off-site infrastructure. Over the course of the subsequent 30 months, additional engineering work completed to

support the environmental assessment process, as well as recommendations from USACE in the FEIS, resulted in some modifications to the plan and the Project Description was updated accordingly. The Proposed Project as described in the 2021 PEA corresponds to the Project Description issued with the June 2020 Revised Project Application, which is attached to the FEIS. Project infrastructure includes:

- a 270-megawatt (MW) power plant located at the mine site;
- a 6-MW power plant located at the marine terminal;
- a 164-mile natural gas pipeline connecting existing supply on the Kenai Peninsula to the power plants at the marine terminal and mine sites, respectively;
- an 82-mile transportation corridor from the mine site to the marine terminal, located north of Diamond Point in Iliamna Bay on Cook Inlet, consisting of:
    - a private two-lane unpaved road that also connects to the existing Iliamna/Newhalen road system;
    - the on-shore portion of the natural gas pipeline, buried adjacent to the road;
    - a concentrate pipeline to transport copper-gold concentrate from the mine site to the port with a return water pipeline to the mine site, both buried adjacent to the road;
- a marine terminal incorporating:
    - concentrate dewatering, storage and handling;
    - fuel and supply storage; and
    - barge docks for receiving supplies and to facilitate bulk transhipment of concentrate to an offshore location in Iniskin Bay for loading onto bulk carriers.

The mine site layout is shown in Figure 1-2.

Figure 1-2: Mine Site Layout

Source: NDM, 2021

Following four and a half years of construction activity, the Proposed Project would operate for 20 years, with conventional drill-blast-shovel-truck operations in an open pit feeding a conventional copper porphyry flotation process plant. The mining rate would average approximately 70 million tons per year, with 66 million tons of mineralized material processed through the process plant each year (180,000 tons per day), for an extremely low life-of-mine waste to mineralized material ratio (strip ratio) of 0.12:1.

The development proposed in Pebble Partnership's Project Description is substantially smaller than previous iterations, and presents significant new environmental safeguards, including:

- a development footprint less than half the size previously envisaged;
- the consolidation of most major site infrastructure in a single drainage (the North Fork Koktuli River) and the absence of any primary mine operations in the Upper Talarik Creek drainage;
- more conservative tailings storage facility (TSF) designs, including enhanced buttresses, flatter slope angles and improved factors of safety;
- separation of pyritic tailings, which are potentially acid generating (PAG), from bulk tailings (non-PAG), with the pyritic tailings stored in a fully-lined TSF;

- a comprehensive tailings and water management plan including a flow through design for the bulk TSF main embankment;
- no permanent waste rock piles; and
- no secondary gold recovery plant.

The development plan outlined in the Proposed Project uses a portion of the currently estimated Pebble mineral resources. This does not preclude future development of additional resources, but such development would require additional evaluation and would be subject to separate permitting processes.

1.6 Mineral Tenure, Surface Rights, Water Rights, Royalties and Agreements

Northern Dynasty currently does not own any surface rights associated with the mineral claims that comprise the Pebble property. All mineral claims are on lands held by the State of Alaska and surface rights may be acquired from the State once areas required for mine development have been determined and permits awarded.

The access corridor is owned by a number of landowners, including the State of Alaska, Alaska Native Village Corporations, and private individuals. Pebble Partnership has completed access agreements with two Native Village Corporations and a private individual. Under the terms of these agreements, the Native Village Corporations could receive significant sums over the life of the mine. Negotiations have advanced with other Native Village Corporations and individuals, but no agreements are in place. In June 2021, one of the Native Village Corporations announced they had signed an agreement whereby a fund has obtained an option to buy portions of their land to create a conservation easement. The fund must exercise its option by the end of 2022. If the fund closes this agreement with the Native Village Corporation, Pebble Partnership would be required to identify an alternate route to the proposed marine terminal on Cook Inlet.

A portion of the mineral claims are subject to a Net Profits Interest (NPI) royalty payable to Teck Resources Limited (Teck). However, the portion of the deposit to be mined by the Proposed Project lies outside the portion subject to the NPI and is therefore not subject to the Teck royalty. The Project is subject to a State of Alaska royalty.

The Pebble Performance Dividend LLP will distribute a 3% Net Profits Royalty Interest in the Project to adult residents of Bristol Bay villages that have subscribed as participants. The Pebble Performance Dividend will distribute a guaranteed minimum annual payment of US$3 million each year the Pebble mine operates beginning at the outset of construction. Total life of mine payments for the Proposed Project could total approximately $200 million to $240 million and could range as high as almost $3.7 billion for the life of the Potential Expansion Scenarios with a gold plant.

The Pebble property is within the Lake and Peninsula Borough and is subject to a 1.5% severance tax. The life of mine severance tax payments for the Proposed Project could total approximately $480 million and range as high as $4.5 billion for the life of the Potential Expansion Scenarios with a gold plant.

Accordingly, the Project could potentially provide more than $8 billion to the Southwest Alaska region through the Pebble Performance Dividend and the Lake and Peninsula Borough severance tax over the life of the potential expansion scenarios. This is in addition to the other significant benefits that could flow from the existing and possible future agreements with Alaska Native Village Corporations.

1.7 Geological Setting and Mineralization

Pebble is a porphyry-style copper-gold-molybdenum-silver-rhenium deposit that comprises the Pebble East and Pebble West zones of approximately equal size, with slightly lower-grade mineralization in the center of the deposit where the two zones merge. The Pebble deposit is located at the intersection of crustal-scale structures that are oriented both parallel and obliquely to a magmatic arc which was active in the mid-Cretaceous and which developed in response to the northward subduction of the Pacific Plate beneath the Wrangellia Superterrane.

The oldest rock within the Pebble district is the Jurassic-Cretaceous age Kahiltna flysch, composed of turbiditic clastic sedimentary rocks, interbedded basalt flows and associated gabbro intrusions. During the mid-Cretaceous (99 to 96 Ma), the Kahiltna assemblage was intruded first by approximately coeval granodiorite and diorite sills and slightly later by alkalic monzonite intrusions. At approximately 90 Ma, hornblende diorite porphyry plutons of the Kaskanak batholith were emplaced. Copper-gold-molybdenum-silver-rhenium mineralization is related to smaller granodiorite plutons and dykes that are similar in composition to, and emplaced near and above the margins of, the Kaskanak batholith.

The Pebble East and Pebble West zones are coeval hydrothermal centers within a single magmatic-hydrothermal system. The movement of mineralizing fluids was constrained by a broadly vertical fracture system acting in conjunction with a hornfels aquitard that induced extensive lateral fluid migration. The large size of the deposit, as well as variations in metal grade and ratios, may be the result of multiple stages of metal introduction and redistribution.

Mineralization in the Pebble West zone extends from surface to approximately 3,000 ft deep and is centered on four small granodiorite plutons. Mineralization is hosted by flysch, diorite and granodiorite sills, and alkalic intrusions and breccias. The Pebble East zone is of higher grade and extends to a depth of at least 5,810 ft; mineralization on the eastern side of the zone was later dropped 1,970 to 2,950 ft by normal faults which bound the northeast-trending East Graben. The Pebble East zone mineralization is hosted by granodiorite plutons and dykes, and by adjacent granodiorite sills and flysch. The Pebble East and West zone granodiorite plutons merge at depth.

Mineralization at Pebble is predominantly hypogene, although the Pebble West zone contains a thin zone of variably developed supergene mineralization overlain by a thin leached cap. Disseminated and vein-hosted copper-gold-molybdenum-silver-rhenium mineralization, dominated by chalcopyrite and locally accompanied by bornite, is associated with early potassic alteration in the shallow part of the Pebble East zone and with early sodic-potassic alteration in the Pebble West zone and deeper portions of the Pebble East zone. Rhenium occurs in molybdenite and high rhenium concentrations are present in molybdenite concentrates. Elevated palladium concentrations occur in many parts of the deposit but are highest in rocks affected by advanced argillic alteration. High-grade copper-gold mineralization also is associated with younger advanced argillic alteration that overprinted potassic and sodic-potassic alteration and was controlled by a syn-hydrothermal, brittle-ductile fault zone located near the eastern margin of the Pebble East zone. Late quartz veins introduced additional molybdenum into several parts of the deposit.

1.8 History

Cominco Alaska, a division of Cominco Ltd., now Teck, began reconnaissance exploration in the Pebble region in the mid-1980s, and in 1984 discovered the Sharp Mountain gold prospect near the southern margin of the current property. Teck staked their first mineral claims on the Property during reconnaissance mapping and sampling programs in the Cone and Sharp Mountain areas in August and September 1984. In November 1987, Teck staked claims on the newly-discovered Sill and Pebble prospects and added claims to these two areas in July 1988. This staking, along with additional claims added in the 1990s, led to the formation of a large continuous claim group. Teck completed a two-part purchase option with Hunter Dickinson Group Inc. (HDGI), which in turn assigned 80% of that option to Northern Dynasty in October 2001.

The first part of the option agreement covered that portion of the property which had previously been drilled and on which the majority of the then known copper mineralization occurred (the Resource Lands Option) and the remaining area outside the Resource Lands (the Exploration Lands). In November 2004, Northern Dynasty exercised the Resource Lands Option and acquired 80% of the Resource Lands. In February 2005, Teck elected to sell its residual 50% interest in the Exploration Lands to Northern Dynasty for US$4 million. Teck still retains a 4% pre-payback advance net profits royalty interest (after debt service) and 5% after-payback net profits interest royalty in any mine production from the Exploration Lands portion of the Pebble property.

In June 2006, Northern Dynasty acquired, through its Alaska subsidiaries, the remaining HDGI 20% interest in the Resource Lands and Exploration Lands by acquiring HDGI from its shareholders and through its various subsidiaries had thereby acquired an aggregate 100% interest in the Pebble Property, subject only to the Teck net-profits royalties on the Exploration Lands.

In July 2007, the Pebble Partnership was created and an indirectly wholly-owned subsidiary of Anglo American plc (Anglo American) subscribed for 50% of the Pebble Partnership's equity effective July 31, 2007. In December 2013, Northern Dynasty exercised its right to acquire Anglo American's interest in the Pebble Partnership and now holds a 100% interest in the Pebble Partnership.

On June 29, 2010, Northern Dynasty entered into an agreement with Liberty Star Uranium and Metals Corp. and its subsidiary, Big Chunk Corp. (together, Liberty Star), pursuant to which Liberty Star sold 23.8 mi^2 of claims (the 95 Purchased Claims) to a U.S. subsidiary of Northern Dynasty in consideration for both a $1 million cash payment and a secured convertible loan from Northern Dynasty in the amount of $3 million. Northern Dynasty later agreed to accept transfer of 199 claims (the Settlement Claims) located north of the ground held 100% by the Pebble Partnership in settlement of the loan, and subsequently both the Purchased Claims and the Settlement Claims were transferred to a Northern Dynasty subsidiary and ultimately to Pebble West Claims Corporation, a subsidiary of the Pebble Partnership.

On January 31, 2012, the Pebble Partnership entered into a Limited Liability Company Agreement with Full Metal Minerals (USA) Inc. (FMMUSA), a wholly-owned subsidiary of Full Metal Minerals Corp., to form Kaskanak Copper LLC. On May 8, 2013, the Pebble Partnership purchased FMMUSA's entire ownership interest in the LLC for a cash consideration of $750,000. As a result, the Pebble Partnership gained a 100% ownership interest in the LLC, the indirect owner of a 100% interest in a group of 464 claims located south and west of other ground held by the Pebble Partnership. In 2014 the LLC was merged into Pebble East Claims Corporation, a subsidiary of the Pebble Partnership, which now holds title to these claims.

On December 15, 2017 Northern Dynasty entered into a Framework Agreement with First Quantum Minerals Ltd. (First Quantum) that contemplated that an affiliate of First Quantum would subsequently execute an option agreement with Northern Dynasty with an option payment of US$150 million staged over four years. This option would entitle First Quantum to acquire the right to earn a 50% interest in the Pebble Partnership for US$1.35 billion. First Quantum made an early option payment of US$37.5 million to Northern Dynasty, applied solely for the purposes of progressing the permitting of the Proposed Project but withdrew from the Project in 2018.

1.9 Exploration

Geological, geochemical and geophysical surveys were conducted in the Project area from 2001 to 2007 by Northern Dynasty and since mid-2007 by the Pebble Partnership.

Geological mapping for rock type, structure and alteration was done between 2001 and 2006 at the entire Project area. This work provided an important geological framework for interpretation of other exploration data and drilling programs.

Geophysical surveys were completed between 2001 and 2010. In 2001, dipole-dipole IP surveys totalling 19.3 line-mi were completed by Zonge Geosciences for Northern Dynasty, following up on and augmenting similar surveys completed by Teck. During 2002, a ground magnetometer survey totalling 11.6 line-mi was completed at Pebble. The principal objective of this survey was to obtain a higher resolution map of magnetic patterns than was available from existing regional government magnetic maps. During 2007, a limited magnetotelluric survey was completed by GSY-USA Inc., under the supervision of Northern Dynasty geologists. The survey focused on the area of drilling in the Pebble East zone and comprised 196 stations on nine east-west lines and one north-south line, at a nominal station spacing of 656 ft. In July 2009, Spectrem Air Limited completed an airborne electromagnetic, magnetic and radiometric survey over the Pebble area. The objectives of this work included provision of geophysical constraints for structural and geological interpretation in areas with significant glacial cover. Between the second half of 2009 and mid-2010, a total of 120.5 line-mi of IP chargeability and resistivity data were collected by Zonge Engineering and Research Organization Inc. The objective of this survey was to extend the area of IP coverage completed prior to 2001 by Teck and during 2001 by Northern Dynasty. During 2010, an airborne electromagnetic (EM) and magnetometer geophysical survey was completed on the Pebble property totalling 4,009 line-mi.

Geochemical surveys were completed between 2001 and 2012. Between 2001 and 2003, Northern Dynasty collected 1,026 soil samples (Rebagliati and Lang, 2009). Samples were more widely spaced near the north, west and southwest margins of the grid. Three very limited surficial geochemical surveys were completed by the Pebble Partnership in 2010 and 2011; no significant geochemical anomalies were identified. A total of 126 samples, comprising 113 till and 13 soil samples, were collected on the KAS claims located in the southern end of the property; samples were on lines spaced approximately 8,000 ft apart with a sample spacing of approximately 1,300 ft. Additional surveys were completed between 2007 and 2012 by researchers from the USGS and the University of Alaska Anchorage. The results of these surveys were largely consistent with the results obtained by earlier soil sampling programs.

1.10 Drilling and Sampling

Samples from the 2002 through 2012 core drilling programs completed by Northern Dynasty and the Pebble Partnership provide 91% of the assays used in the Mineral Resource estimate. These drilling and sampling programs were carried out in a proficient manner consistent with industry standard practices at the time of the programs. Core recovery was typically very good and averaged over 98%; two-thirds of all measured intervals have 100% core recovery. No significant factors of drilling, sampling, or recovery that impact the accuracy and reliability of the results were observed.

The remaining 9% of assays used in the Mineral Resource estimate derive from historical 1988 to 1992 and 1997 Teck core drill programs. Northern Dynasty expended considerable effort to assess the veracity of the Teck drilling over several years. This included: re-survey of drill hole locations, review of remaining half core, extensive re-drilling of areas targeted by Teck, and plotting and comparison of Teck drill holes with nearby Northern Dynasty drill holes. No significant factors of the drilling, sampling or recovery of the Teck program that impact the accuracy and reliability of the results were observed.

QP Eric Titley considers the drill programs to be reasonable and adequate for the purposes of Mineral Resource estimation.

1.11 Metallurgical Testwork

Metallurgical testwork for the Project was initiated by Northern Dynasty in 2003 and continued under the direction of Northern Dynasty until 2008. From 2008 to 2013, metallurgical testwork progressed under the direction of the Pebble Partnership.

Geometallurgical studies were initiated by the Pebble Partnership in 2008 and continued through 2012. The principal objective of this work was to quantify significant differences in metal deportment that may result in variations in metal

recoveries during mineral processing. The results of the geometallurgical studies indicate that the deposit comprises several geometallurgical (or material type) domains. These domains are defined by distinct, internally consistent copper and gold deportment characteristics that correspond spatially with changes in silicate and sulphide alteration mineralogy.

Metallurgical testwork and associated analytical procedures were performed by recognized testing facilities with extensive experience with these tests and analyses, with this type of deposit, and with the Project. The samples selected for the comminution, copper-gold-molybdenum bulk flotation, and copper-molybdenum separation testing were considered to be representative of the various types and styles of mineralization at the Pebble deposit.

A conventional flotation process is proposed to produce saleable copper-gold and molybdenum concentrates. The flotation test results on variability samples derived from the 103 locked cycle flotation and the subsequent copper-molybdenum separation flotation tests indicate that marketable copper and molybdenum concentrates can be produced. The copper concentrate will also contain gold and silver contents that meet or exceed payable levels in representative smelter contracts; the molybdenum concentrate will contain significant rhenium (Re), with a reported grade range from 791 to 832 g/t Re observed in the locked cycle test (LCT) results of the copper-molybdenum separation.

Gravity gold recovery tests were completed on three composite samples in 2010 and on four composite samples from the continuous testwork program. These demonstrated gold was recoverable by gravity and accordingly treatment of a side stream from the regrind circuit, with 1% overall gold recovery to a gravity concentrate. In the flowsheet for the Proposed Project, the gravity concentrate would be bagged and shipped off-site to a refinery. In the potential expansion scenarios with a secondary gold plant, the gravity concentrate would comprise a portion of the secondary gold plant feed.

A preliminary hydrometallurgical test program was performed on rougher and cleaner molybdenum concentrates to investigate the production of the marketable products of molybdenum trioxide (MoO_3) and ammonium perrhenate (NH_4ReO_4). The test program included pressure oxidation leach, a series of metal extractions/purifications from the pregnant leach solution, and a calcination process. The tested methods were found technically feasible. Satisfactory dissolution rates of molybdenum and rhenium were obtained from the rougher molybdenum concentrate samples while additional alkaline leach is required on the pressure oxidation leach residues for the cleaner molybdenum concentrate samples.

In the 2021 PEA, the overall metal recovery projections of copper, gold, silver and molybdenum to concentrate are adjusted to an increased primary grind size (from 125 µm to 135 µm) from those published in the 2018 technical report. A rhenium recovery estimate at a high level has been completed and included. Table 1-1 provides projected metals recoveries via flotation concentration. The recovery estimate bases are summarized as follows:

- The initial metal recovery projections of copper, gold, silver and molybdenum were published in 2014 based on a combined flotation and cyanide leach method. A total of 111 LCTs on the 103 samples representing 8 geometallurgical domains across the east and west of Pebble deposit were reviewed to establish the copper, gold and molybdenum distributions to the bulk copper-molybdenum concentrate. Ten of the 111 LCTs with silver assay results were utilized to estimate the silver recovery to the bulk flotation concentrate.

- The 2018 metal recoveries were updated to reflect the changes of the proposed processing methods, including the exclusion of the cyanide leach process and the implementation of a coarser primary grind particle size.

- The 2020 metal recovery projections were further updated to include rhenium recovery from the molybdenum concentrate. The estimated rhenium recovery was 70.8%, based on the 10 LCT results of the rhenium recovery to the bulk concentrate, a one LCT stage recovery result in the subsequent separation of copper and molybdenum, as well as a recovery adjustment due to the change of primary grind size.

Table 1-1: Projected Metallurgical Recoveries

Domain	Flotation Recovery %				
	Cu Con, 26% Cu			Mo Con, 50% Mo	
	Cu	Au	Ag	Mo	Re
Supergene:					
Sodic Potassic	74.7	60.4	64.1	51.2	70.8
Illite Pyrite	68.1	43.9	64.1	62.6	70.8
Hypogene:					
Illite Pyrite	91.0	46.2	67.5	77.1	70.8
Sodic Potassic	91.0	63.8	67.7	80.9	70.8
Potassic	93.0	63.1	66.0	84.8	70.8
Quartz Pyrophyllite	95.0	65.5	64.6	80.7	70.8
Sericite	91.0	41.3	67.5	77.1	70.8
Quartz Sericite Pyrite	90.5	33.3	67.5	86.8	70.8
LOM Average[1]	87	60	67	75	71

Note: prepared by Tetra Tech, 2021. An additional 1% Au recovery to the gravity concentrate is expected.

1.12 Mineral Resource Estimation

The current resource estimate is based on approximately 59,000 assays obtained from 699 drill holes. The resource was estimated by ordinary kriging and is presented in Table 1-2. The tabulation is based on copper equivalency (CuEq) that incorporates the contribution of copper, gold and molybdenum. Although the estimate includes silver and rhenium, neither were used as part of the copper equivalency calculation in order to facilitate comparison with previous estimates which did not consider the minor economic contribution of either of these metals. The highlighted 0.3% CuEq cut off is considered appropriate for deposits of this type in the Americas.

[1] Per financial model.

Table 1-2: Pebble Resource Estimate August 2020

MEASURED			METAL GRADES					CONTAINED METAL				
Cutoff CuEq (%)	CuEq (%)	Tonnage	Cu (%)	Au (g/t)	Mo (ppm)	Ag (g/t)	Re (ppm)	Cu (Blbs)	Au (Moz)	Mo (Blbs)	Ag (Moz)	Re (Kg)
0.1	0.64	531,000,000	0.33	0.35	177	1.7	0.31	3.87	5.96	0.21	28.4	167,000
0.2	0.64	530,000,000	0.33	0.35	177	1.7	0.32	3.87	5.96	0.21	28.4	167,000
0.3	**0.65**	**527,000,000**	**0.33**	**0.35**	**178**	**1.7**	**0.32**	**3.83**	**5.93**	**0.21**	**28.1**	**167,000**
0.4	0.66	508,000,000	0.34	0.36	180	1.7	0.32	3.81	5.88	0.20	27.4	163,000
0.6	0.77	279,000,000	0.40	0.42	203	1.8	0.36	2.46	3.77	0.12	16.5	100,000
1.0	1.16	28,000,000	0.62	0.62	302	2.3	0.52	0.38	0.56	0.02	2.0	14,000

INDICATED			METAL GRADES					CONTAINED METAL				
Cutoff CuEq (%)	CuEq (%)	Tonnage	Cu (%)	Au (g/t)	Mo (ppm)	Ag (g/t)	Re (ppm)	Cu (Blbs)	Au (Moz)	Mo (Blbs)	Ag (Moz)	Re (Kg)
0.1	0.73	6,409,000,000	0.39	0.32	233	1.6	0.39	54.38	66.56	3.29	328.5	2,500,000
0.2	0.73	6,305,000,000	0.39	0.33	236	1.6	0.40	54.20	66.08	3.28	326.0	2,497,000
0.3	**0.77**	**5,929,000,000**	**0.41**	**0.34**	**246**	**1.7**	**0.41**	**53.58**	**64.81**	**3.21**	**316.4**	**2,443,000**
0.4	0.82	5,185,000,000	0.45	0.35	261	1.8	0.44	51.42	58.35	2.98	291.7	2,271,000
0.6	0.99	3,455,000,000	0.55	0.41	299	2.0	0.51	41.88	45.54	2.27	221.1	1,748,000
1.0	1.29	1,412,000,000	0.77	0.51	343	2.4	0.60	23.96	23.15	1.07	109.9	853,000

MEASURED+INDICATED			METAL GRADES					CONTAINED METAL				
Cutoff CuEq (%)	CuEq (%)	Tonnage	Cu (%)	Au (g/t)	Mo (ppm)	Ag (g/t)	Re (ppm)	Cu (Blbs)	Au (Moz)	Mo (Blbs)	Ag (Moz)	Re (Kg)
0.1	0.72	6,941,000,000	0.38	0.33	228	1.6	0.39	58.29	72.53	3.49	357.1	2,672,000
0.2	0.73	6,835,000,000	0.39	0.33	231	1.6	0.39	58.15	72.08	3.49	354.5	2,666,000
0.3	**0.76**	**6,456,000,000**	**0.40**	**0.34**	**240**	**1.7**	**0.41**	**56.92**	**70.57**	**3.42**	**344.6**	**2,615,000**
0.4	0.81	5,693,000,000	0.44	0.35	253	1.8	0.43	55.21	64.06	3.18	320.3	2,431,000
0.6	0.97	3,734,000,000	0.54	0.41	291	2.0	0.50	44.44	49.22	2.40	237.7	1,848,000
1.0	1.29	1,440,000,000	0.76	0.51	342	2.4	0.60	24.12	23.61	1.08	112.0	867,000

INFERRED			METAL GRADES					CONTAINED METAL				
Cutoff CuEq (%)	CuEq (%)	Tonnage	Cu (%)	Au (g/t)	Mo (ppm)	Ag (g/t)	Re (ppm)	Cu (Blbs)	Au (Moz)	Mo (Blbs)	Ag (Moz)	Re (Kg)
0.1	0.45	6,435,000,000	0.20	0.23	174	1.1	0.28	28.22	47.38	2.47	232.1	1,789,000
0.2	0.48	5,819,000,000	0.22	0.24	190	1.1	0.30	27.57	44.34	2.44	212.2	1,763,000
0.3	**0.55**	**4,454,000,000**	**0.25**	**0.25**	**226**	**1.2**	**0.36**	**24.54**	**35.80**	**2.22**	**170.4**	**1,603,000**
0.4	0.68	2,646,000,000	0.33	0.30	269	1.4	0.44	19.24	25.52	1.57	119.1	1,154,000
0.6	0.89	1,314,000,000	0.48	0.37	292	1.8	0.51	13.90	15.63	0.85	75.6	673,000
1.0	1.20	361,000,000	0.68	0.45	377	2.3	0.69	5.41	5.22	0.30	26.3	251,000

- David Gaunt, P. Geo, a qualified person who is not independent of Northern Dynasty is responsible for the estimate.
- Copper equivalent (CuEq) calculations use the following metal prices: US$1.85 /lb for Cu, US$902 /oz for Au and US$12.50 /lb for Mo, and recoveries: 85% Cu, 69.6% Au, and 77.8% Mo (Pebble West zone) and 89.3% Cu, 76.8% Au, 83.7% Mo (Pebble East zone).

- Contained metal calculations are based on 100% recoveries.
- The base case Mineral Resource estimate (bolded) is reported above a 0.30% CuEq cut-off.
- The Mineral Resource estimate is constrained by a conceptual pit shell that was developed using a Lerchs-Grossmann algorithm and is based in the following parameters: 42 degree pit slope; metal prices and recoveries for gold of US$1,540.00/oz and 61% Au, for copper of US$3.63/lb and 91% Cu, for silver of US$20.00/oz and 67% Ag and for molybdenum of US$12.36/lb and 81% Mo, respectively; a mining cost of US$1.01/ton with a US$0.03/ton/bench increment and other costs (including processing, G&A and transport) of US$6.74/ton.
- The terms "Measured Resources", "Indicated Resources" and "Inferred Resources" are recognized and required by Canadian regulations under 43-101. The SEC has adopted amendments to its disclosure rules to modernize the mineral property disclosure required for issuers whose securities are registered with the SEC under the US Securities Exchange Act of 1934, effective February 25, 2019, that adopt definitions of the terms and categories of resources which are "substantially similar" to the corresponding terms under Canadian Regulations in 43-101. Accordingly, there is no assurance any mineral resources that we may report as Measured Resources, Indicated Resources and Inferred Resources under 43-101 would be the same had we prepared the resource estimates under the standards adopted under the SEC Modernization Rules. Investors are cautioned not to assume that all or any part of mineral deposits in these categories will ever be converted into Mineral Reserves or be legally or economically mineable. In addition, Inferred Resources have a great amount of uncertainty as to their economic and legal feasibility. Under Canadian rules, estimates of Inferred Resources may not form the basis of feasibility or pre-feasibility studies, or economic studies except for a Preliminary Economic Assessment as defined under 43-101.
- Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
- The Mineral Resource estimates contained herein have not been adjusted for any risk that the required environmental permits may not be obtained for the Project. The risk associated with the ability of the Project to obtain required environmental permits is a risk to the reasonable prospects for eventual economic extraction of the mineralization and the classification of the estimate as a Mineral Resource.

1.13 Mining Methods

The 2021 PEA is preliminary in nature and includes Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves. There is no certainty that the 2021 PEA results will be realized. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

The mining operations are planned to use conventional open pit mining methods and equipment. The proposed Pebble mine would be a conventional drill, blast, truck, and shovel operation with an average mining rate of approximately 70 million tons per year and an overall strip ratio of 0.12 ton of waste per ton of mineralized material.

The open pit would be developed in stages, with each stage expanding the area and deepening the previous stage. The final dimensions of the open pit would be approximately 6,800 ft long and 5,600 ft wide, with depths to 1,950 ft.

The projected mining schedule was generated using five pushbacks and was based on a maximum processing capacity of 180,000 ton/d. Based on the selected ultimate pit, final pit design and the generated production schedule, the Project's total LOM is 21 years, including 1 year of pre-stripping followed by 20 years of production.

1.14 Recovery Methods

The proposed processing plant is designed to process mineralized feed material at a rate of 180,000 tons per day. The designed process to treat feed material contemplates methods that are conventional and well-proven in the industry. The comminution and recovery processes proposed are used widely in commercial practice, with no significant elements of technological innovation.

The following unit operations would be employed to produce three final products: a copper-gold flotation concentrate, a molybdenum flotation concentrate and a gravity gold concentrate:

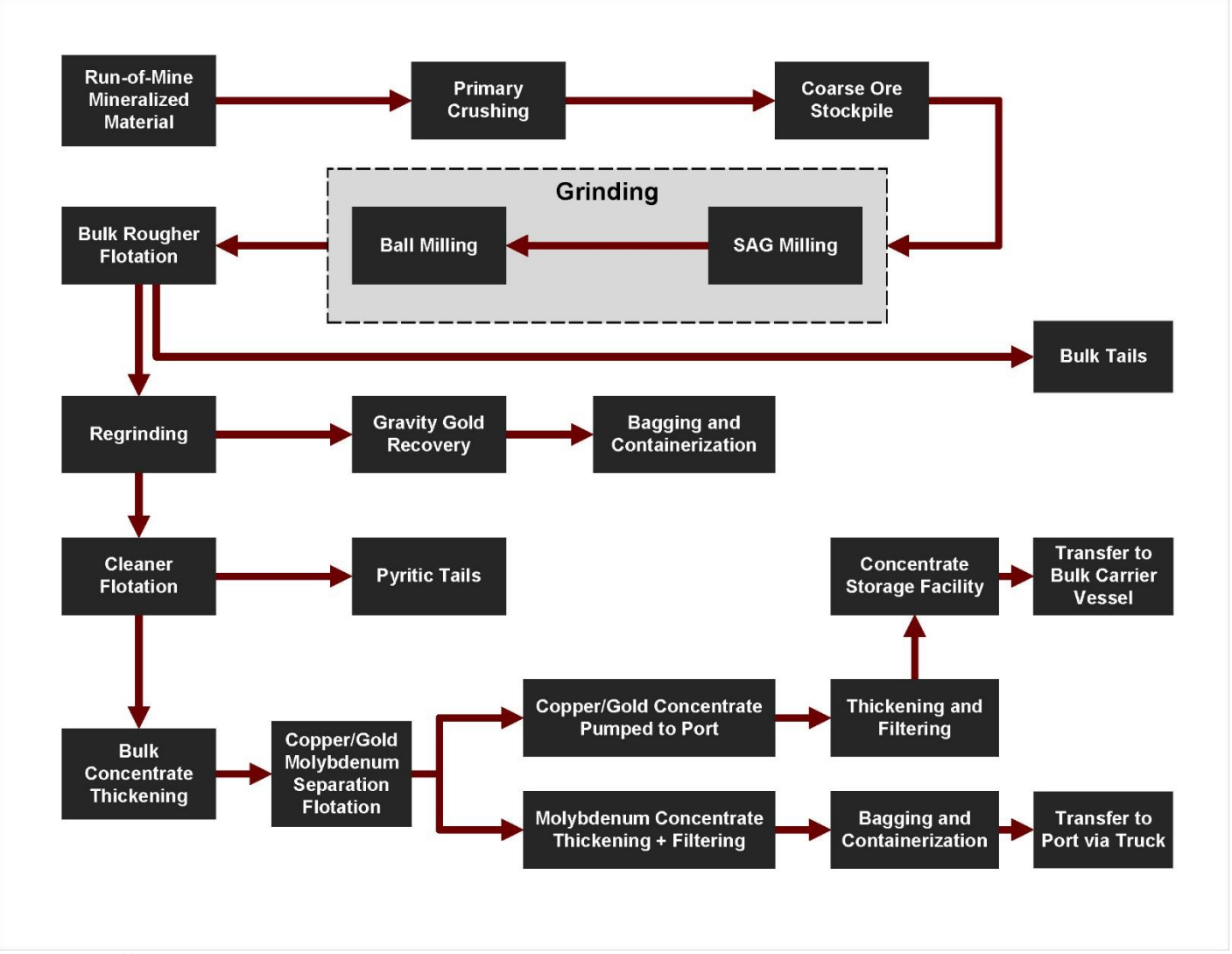
- Primary crushing;
- Grinding with semi-autogenous grinding (SAG) and ball mills;

- Bulk copper-gold-molybdenum flotation;
- Molybdenum flotation to separate a copper-gold flotation concentrate and a molybdenum flotation concentrate; and,

Gravity concentration to produce a gravity gold concentrate.

Figure 1-3 shows a simplified process flow diagram of the entire process route.

Figure 1-3: Simplified Flow Diagram



Note: Prepared by NDM, 2021.

The process plant flowsheet design was based on testwork results, previous study designs and industry standard practices. Further, the testwork results support the recovery projections used in the economic analysis.

The production summary for the Proposed Project is shown in Table 1-3.

Table 1-3: Proposed Project Production Summary

Proposed Project	Units	
Mineralized Material	B tons	1.3
Copper Equivalent[2]	%	0.58
Copper	%	0.29
Gold	oz/ton	0.009
Molybdenum	ppm	154
Silver	oz/ton	0.042
Rhenium	ppm	0.28
Waste	B tons	0.2
Open Pit Strip Ratio		0.12
Open Pit Life	Years	20
Life of Mine	Years	20
Metal Production (LOM)		
Copper	M lb	6,400
Gold (in Cu Concentrate)	k oz	7,300
Silver (in Cu Concentrate)	k oz	37,000
Gold (in Gravity Concentrate)	k oz	110
Molybdenum	M lb	300
Rhenium	k kg	230
Metal Production (Annual[3])		
Copper	M lb	320
Copper Concentrate	k tons	559
Gold (in Cu Concentrate)	k oz	363
Silver (in Cu Concentrate)	k oz	1,800
Molybdenum	M lb	15
Molybdenum Concentrate	k tons	14
Rhenium	k kg	12

1.15 Project Infrastructure

The Project is located in an area of Alaska that has minimal development and would require construction of both on-site and off-site infrastructure to support construction and operations of the Proposed Project.

The primary off-site infrastructure would incorporate a natural gas pipeline, marine terminal, access road between the marine terminal and mine site, and a pipeline system to transport concentrate to the marine terminal. The marine terminal facility would include facilities capable of handling barges for concentrate bulk transhipment as well as large ocean barges (400 x 100 ft) for transport of construction materials and operating supplies by container. The access road would provide year-round access between the marine terminal and the mine site for construction and operations. The natural gas and concentrate pipelines would be buried adjacent to the access road.

[2] Copper equivalent (CuEq) calculations use metal prices: US$1.85/lb for Cu, US$902/oz for Au and US$12.50/lb for Mo, and recoveries of 85% Cu, 69.6% Au, and 77.8% Mo (Pebble West zone) and 89.3% Cu, 76.8% Au, 83.7% Mo (Pebble East zone).
[3] Life of mine volumes ÷ life of mine years.

The onsite facilities would provide all necessary support for construction and operation. These include temporary and permanent worker accommodations, power reticulation, site roads, administration buildings, truck shop, warehouse, maintenance facilities.

The Proposed Project site would also include tailings storage facilities, water management ponds, and water treatment plants (WTPs). Waste and water management at the Project would be an integrated system designed to safely contain these materials, to facilitate water treatment and discharge, and to provide adequate process water to support the operations. The design of these facilities would incorporate a significant climate record, extensive site investigation, and several features intended to ensure safe operation.

The Proposed Project would incorporate a sophisticated water management plan with water collection, treatment, and discharge. That plan requires attention to the annual and seasonal variability of the incoming and receiving flows and achieving very specific water quality standards for the released water. Temporary water treatment facilities would be in place during construction, followed by three WTPs during the operations and closure phases.

Natural gas-fired power plants would be constructed at both the mine site and the marine terminal.

1.16 Environmental, Permitting and Social Considerations

1.16.1 Environmental Considerations

The Pebble deposit is located on State land that has been specifically designated for mineral exploration and development. The Pebble area has been the subject of two comprehensive land-use planning exercises conducted by the Alaska Department of Natural Resources (ADNR), the first in the 1980s and the second completed in 2005 and subsequently revised in 2013. ADNR identified five land parcels (including Pebble) within the Bristol Bay planning area as having "significant mineral potential," and where the planning intent is to accommodate mineral exploration and development. These parcels total 2.7% of the total planning area (ADNR, 2013).

Environmental standards and permitting requirements in Alaska are stable, objective, rigorous and science-driven. These features are an asset to projects like Pebble that are being designed to meet U.S. and international best practice standards of design and performance.

Northern Dynasty began an extensive field study program in 2004 to characterize the existing physical, chemical, biological, and social environments in the Bristol Bay and Cook Inlet areas where the Project might occur. The Pebble Partnership compiled the data for the 2004-2008 study period into a multi-volume Environmental Baseline Document (EBD, PLP, 2012). These studies have been designed to:

- fully characterize the existing biophysical and socioeconomic environment;
- support environmental analyses required for effective input into project design;
- provide a strong foundation for internal environmental and social impact assessment to support corporate decision-making;
- provide the information required for stakeholder consultation and eventual mine permitting in Alaska; and
- provide a baseline for long-term monitoring of potential changes associated with mine development.

Additional data collected from the 2009-2013 period was compiled into the Supplemental EBD (PLP, 2018) and transmitted to USACE. In 2017, select environmental baseline studies were re-initiated and expanded. Monitoring data collected through 2019 has been provided to USACE.

The baseline study program includes:

- surface water hydrology
- groundwater hydrology
- surface and groundwater quality
- geochemistry
- snow surveys
- fish and aquatic resources
- noise
- wetlands
- trace elements
- fish habitat – stream flow modelling
- marine
- wildlife
- air quality
- cultural resources
- subsistence
- land use
- recreation
- socioeconomics
- visual aesthetics
- climate and meteorology
- Iliamna Lake

1.16.2 Closure and Reclamation Considerations

The Pebble Partnership's core operating principles are governed by a commitment to conduct all mining operations, including reclamation and closure, in a manner that adheres to socially and environmentally responsible stewardship while maximizing benefits to state and local stakeholders.

Reclamation and closure of the Proposed Project falls under the jurisdiction of the ADNR Division of Mining, Land, and Water, and the ADEC. A miner may not engage in a mining operation until the ADNR has approved a reclamation plan for the operation. The Pebble Partnership submitted a preliminary closure plan to USACE in support of the EIS analysis. Four phases of closure are envisioned for the Proposed Project.

1.16.3 Permitting Considerations

To prepare its CWA permit application, the Pebble Partnership developed a mine plan of smaller scale and footprint and shorter mine life than had been included in previous analyses. The application under Section 404 of the CWA and Section 10 of the RHA was submitted to USACE on December 22, 2017. On January 8, 2018, USACE deemed the permit application complete and confirmed that an Environmental Impact Statement (EIS) level of analysis was required to comply with its National Environmental Policy Act (NEPA) review of the Proposed Project. The EIS process progressed through the scoping phase in 2018. USACE delivered the Draft EIS in the first quarter of 2019 and completed a public comment period from March to July 2019. In the latter part of 2019 and early 2020, USACE advanced toward a Final EIS. The preliminary Final EIS was circulated to cooperating agencies for review in February 2020. As part of the EIS preparation process, USACE had undertaken a comprehensive alternatives assessment to consider a broad range of development alternatives and announced the conclusions of the draft Least Environmentally Damaging Practicable Alternative (LEDPA) in May 2020. USACE published the Final EIS (FEIS) on July 24, 2020.

The Department of the Army Permit Application was submitted in December 2017 and the permitting process over the next three years involved the Pebble Partnership being actively engaged with USACE on the evaluation of the Proposed Project. There were numerous meetings between representatives of USACE and the Pebble Partnership regarding, among other things, compensatory mitigation for the Proposed Project. The Pebble Partnership submitted several draft compensatory

mitigation plans to the USACE, each refined to address comments from the USACE and that the Pebble Partnership believed was consistent with mitigation proposed and approved for other major development projects in Alaska.

The FEIS published by USACE on July 24, 2020 was the culmination of a 2½ year long, intensive review process under the National Environmental Policy Act (NEPA). Led by USACE, the Pebble FEIS also involved eight federal cooperating agencies (including the US Environmental Protection Agency and US Fish & Wildlife Service), three State cooperating agencies (including the Alaska Department of Natural Resources and the Alaska Department of Environmental Conservation), the Lake & Peninsula Borough and two federally recognized tribes.

The FEIS was viewed by Pebble Partnership as positive in that it found impacts to fish and wildlife would not be expected to affect subsistence harvest levels, there would be no measurable change to the commercial fishing industry including prices, and there would be a number of positive socioeconomic impacts on local communities.

In late June 2020, USACE verbally identified a preliminary finding of "significant degradation" of certain aquatic resources, with the requirement of new compensatory mitigation. The Pebble Partnership understood from these discussions that the new compensatory mitigation plan for the Proposed Project would include in-kind, in-watershed mitigation and continued its work to meet these new USACE requirements. USACE formally advised the Pebble Partnership by letter dated August 20, 2020 that it had made preliminary factual determinations under Section 404(b)(1) of the CWA that the Proposed Project would result in significant degradation to aquatic resources. In connection with this preliminary finding of significant degradation, USACE formally informed the Pebble Partnership that in-kind compensatory mitigation within the Koktuli River Watershed would be required to compensate for all direct and indirect impacts caused by discharges into aquatic resources at the mine site. USACE requested the submission of a new compensatory mitigation plan to address this finding within 90 days of its letter.

In response, the Pebble Partnership developed a compensatory mitigation plan (CMP) to align with the requirements outlined by the USACE. This plan envisioned creation of a 112,445-acre Koktuli Conservation Area on land belonging to the State of Alaska in the Koktuli River Watershed downstream of the Project. The plan was submitted to the USACE on November 4, 2020.

On November 25, 2020, USACE issued a ROD rejecting the Pebble Partnership's permit application, finding concerns with the proposed CMP and determining that the Proposed Project would cause significant degradation and be contrary to the public interest. USACE concluded the proposed CMP was not compliant with USACE regulations.

The Pebble Partnership submitted its request for appeal of the ROD to USACE Pacific Ocean Division on January 19, 2021. The request for appeal reflects the Pebble Partnership's position that USACE's ROD and permitting decision – including its "Significant Degradation" finding, its "public interest review" findings, and its rejection of the Pebble Partnership's CMP – are contrary to law, unprecedented in Alaska, and fundamentally unsupported by the administrative record, including the Proposed Project FEIS. In a letter dated February 24, 2021, USACE confirmed the Pebble Partnership's RFA is "complete and meets the criteria for appeal." While federal guidelines suggest the appeal should conclude within 90 days, USACE has indicated the complexity of issues and volume of materials associated with Pebble's case means the review will likely take additional time.

On January 22, 2021, the State of Alaska, acting in its role as owner of the Pebble deposit, also submitted a request for appeal. The State appeal was rejected on the basis that the State did not have standing to pursue an administrative appeal with USACE.

The Project will require additional Federal permits, in addition to those issued under the CWA and RHA permits, as well as a range of permits issued by the State of Alaska.

1.17 Markets and Contracts

No market studies were completed, but consensus long term metals pricing and industry typical refining terms have been used for the purposes of the economic assessment. The anticipated concentrate analyses suggest there will be no significant penalty elements in the copper or gravity gold concentrates. Copper in the molybdenum concentrate will be at penalty levels, but there is an opportunity at some future phase of the Project to incorporate secondary processing at site to maximize molybdenum payables. Logistics and transportation costs based on Alaskan norms have been used. At this time no contracts have been entered for supply of materials or for off-take of products.

1.18 Capital Cost and Operating Cost Estimates

1.18.1 Capital Cost Estimates

The total initial capital cost for the design, construction, installation, and commissioning of the Proposed Project is estimated to be $6.05 billion, which includes all direct, indirect, and Owner's costs, as well as a contingency. Northern Dynasty believes it is most likely that, if approved, the Proposed Project would be developed with partners who will provide the primary infrastructure (marine terminal, access road, natural gas pipeline, mine site power plant) in return for lease payments or tolls at rates which provide a return on investment to the providers of the infrastructure. The capital cost of this infrastructure which may be provided by third parties is estimated at $1.68 billion, which reduces the cash outlay required for construction. In addition, precious metal streaming is considered a viable project financing alternative and the 2021 PEA assumes $1.14 billion would be available to the Proposed Project in the form of various streaming agreements. The combination of third-party infrastructure financing and precious metal streaming would reduce the required capital investment for the Proposed Project to $3.44 billion; this scenario was evaluated in the economic model as the Base Case. A Full Capital Case, without the benefit of the precious metal stream financing and third-party infrastructure participation, was also evaluated.

Sustaining capital investment in the Proposed Project over the 20-year mine life is limited to TSF improvements, and replacement of mobile equipment for mining and road maintenance. These life cycle costs are applied in the financial model on a year-by-year basis, with a cumulative total of $1.52 billion including indirect and Owner's costs as well as contingency costs.

Initial reclamation trust funding and letter of credit premiums during construction would total $179 million. The remaining mine closure and reclamation costs are not included in the capital or operating costs but are factored into the financial model to account for long term closure and water treatment plant requirements. A reclamation fund of $1,396 million would be accumulated over the mine life comprising $831 million in contributions and $565 million in accrued interest.

Table 1-4 provides the capital cost estimates.

Table 1-4: Pebble Proposed Project – Initial Capital

Description	Cost ($M)
Mining	321
Process	736
Other Infrastructure	345
Tailings	1,278
Pipelines	189
Access Road	296
Port Infrastructure	246
Power Generation	779
Indirect Costs	1,182
Contingency	678
Total Capital Cost Estimate	**6,049**
Add: Reclamation and other funding during construction	211
Initial Capital Investment – Full Capital Case	**6,259**
Less: Outsourced Infrastructure	(1,680)
Less: Pre-production proceeds from gold stream partners	(1,142)
Initial Capital Investment - Base Case	**3,439**

1.18.2 Operating Cost Estimates

The average life of mine operating costs for the Proposed Project Base Case, based on the 180,000 ton/day plant capacity, are estimated to be:

- Average operating cost – $10.98/ton milled
- Average copper C1 cost (co-product basis) – $1.65/lb CuEq
- All-in sustaining cost (AISC) (co-product basis) – $1.88/lb CuEq
- Average gold C1 cost (co-product basis) – $753/oz AuEq
- Average copper C1 cost (by-product basis) – $0.69/lb
- All-in sustaining cost (AISC) (by-product basis) – $1.10/lb
- Average gold C1 cost (by-product basis) – ($1,148)/oz

1.19 Economic Analysis and Sensitivities

1.19.1 Economic Analysis

An economic model was developed to estimate annual pre-tax and post-tax cash flows and sensitivities of the Proposed Project based on a 7% discount rate. By convention, a discount rate of 8% is typically applied to copper and other base metal projects, while 5% is applied to gold and other precious metal projects. Given the polymetallic nature of the Pebble deposit and the large contribution of gold to total revenues, a 7% blended discount rate was selected and is considered appropriate for the purposes of discounted cash flow analyses. The net present value (NPV) is calculated by discounting cash flows to start of construction. The combination of third-party infrastructure financing and precious metal streaming was evaluated in the economic model as the Base Case. A Full Capital Case, without the benefit of the precious metal stream financing and third-party infrastructure participation, was also evaluated.

Calendar years used in the economic analysis are provided for conceptual purposes only. Permits still must be obtained in support of operations and approval to proceed is still required from Northern Dynasty's Board of Directors.

The Proposed Project and the potential alternative scenarios in Section 1.17 in the 2021 PEA are preliminary in nature and include Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves. There is no certainty that the 2021 PEA results will be realized. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

The results were estimated with forecast long-term prices and sensitivity tested with prevailing metal prices. Both sets of prices are shown in Table 1-5.

Table 1-5: Metal Price Assumptions

Metal	Unit	Long-term ($)	Prevailing ($)
Copper	lb	3.50	4.25
Gold	Oz	1,600	1,800
Molybdenum	Lb	10	18
Silver	Oz	22	24
Rhenium	kg	1,500	1,600

The cost and taxes summary for the proposed Project, both Base Case and Full Capital Case, are shown in Table 1-6. The results of the economic analysis are shown in Table 1-7.

Table 1-6: Proposed Project Cost and Tax Summary

		Base Case	Full Capital
Costs			
Total Initial Capital Cost	$billion	6.05	6.05
Infrastructure Lease	$billion	1.68	-
Net Initial Capital Cost	$billion	4.37	6.05
Sustaining Capital Cost	$billion	1.52	1.54
Life of Mine Operating Cost[4]	$/ton	10.98	8.31
Copper C1 Cost[5]	$/lb CuEq	1.65	1.32
AISC (Co-Product Basis)	$/lb CuEq	1.88	1.56
Gold C1 Cost	$/oz AuEq	753	605
Closure Funding			
Annual Contribution	$million/yr	34	34
Life of Mine Contribution	$billion	0.83	0.83
Life of Mine Bond Premium	$billion	0.16	0.16
Closure Fund[6]	$billion	1.4	1.4
Life of Mine Taxes[7]			
Alaska Mining License	$billion	0.69	0.76
Alaska Royalty	$billion	0.30	0.33
Alaska Income Tax	$billion	0.75	0.87
Borough Severance & Tax	$billion	0.49	0.53
Federal Income Tax	$billion	1.38	1.61
Annual Taxes[8]			
Alaska Mining License	$million	34	38
Alaska Royalty	$million	15	17
Alaska Income Tax	$million	38	44
Borough Severance & Tax	$million	25	26
Federal Income Tax	$million	69	81

[4] Includes cost of infrastructure lease - $2.80/ton milled
[5] C1 costs calculated on co product basis
[6] Maximum value of closure fund during life of mine based on 4% compound interest
[7] Estimated based on current Alaskan statutes
[8] Life of mine taxes ÷ life of mine years

Table 1-7: Proposed Project Forecast Financial Results

Proposed Project			
		Base Case	Full Capital
Revenue[9]			
Annual Gross Revenue	$million	1,700	1,800
Life of Mine Gross Revenue	$million	35,000	37,000
Realization Charges			
Annual Charges	$million	150	150
Life of Mine Charges	$million	2,900	2,900
Net Smelter Return			
Annual NSR	$million	1,600	1,700
Life of Mine NSR	$million	32,000	34,000
Financial Model Results			
Post Tax IRR	%	15.7	11.2
Post Tax NPV_7	$million	2,300	2,000
Payback	Years	4.8	6.1

Table 1-8 provides the sensitivity results when the prevailing metal prices are applied against the Base Case.

Table 1-8: Proposed Project Base Case Forecast Financial Results with Prevailing Metal Prices

		Base Case	Full Capital
Revenue[10]			
Annual Gross Revenue	$million	2,100	2,300
Life of Mine Gross Revenue	$million	43,000	45,000
Realization Charges			
Annual Charges	$million	150	150
Life of Mine Charges	$million	2,900	2.900
Net Smelter Return			
Annual NSR	$million	2,000	2,100
Life of Mine NSR	$million	40,000	43,000
Financial Model Results			
Post Tax IRR	%	23.7	15.4
Post Tax NPV_7	$million	4,700	4,400
Payback	Years	3.1	4.7

[9] Revenue values do not include a gold plant contribution
[10] Revenue values do not include a gold plant contribution

1.19.2 Sensitivity Analysis

The sensitivity of the Proposed Project's pre-tax NPV, and IRR to several project variables, as listed below, were evaluated.

- Copper price
- Gold price
- Molybdenum price
- Initial capital cost
- Operating Cost
- Sustaining capital costs (including potential expansion scenarios)
- Head grade

Each variable, except head grade, was changed in increments of 10% between -30% to +30% while holding all other variables constant. The Proposed Project's NPV at a 7% discount rate is most sensitive to changes in copper price, initial capex, operating costs, gold price, molybdenum price, and sustaining capex. The head grade evaluation tested the sensitivity to a range of ±10%, while holding the other all other variables constant, as variation beyond that range is extremely unlikely given the extent of the drilling defining the Mineral Resource and the methodology used to estimate the Mineral Resource.

The Project's NPV at a 7% discount rate is, from most to least, sensitive to changes in head grade, copper price, initial capital costs, on-site operating costs, gold price, molybdenum price and sustaining capital costs.

1.20 Potential Expansion Scenarios

The Proposed Project evaluated in the 2021 PEA would extract only a small portion of the total Mineral Resources estimated at Pebble. To evaluate the possible extent of opportunities for the Project, seven potential expansion scenarios were identified for consideration. Six of these potential expansion scenarios contemplate an expansion of the open pit mine and increased mill throughput over a significantly longer mine life. These scenarios were modeled on an expanded scenario outlined in a response to a Request for Information from USACE during the EIS process and which is incorporated in the EIS administrative record. Three of these six scenarios consider the addition of an onsite gold plant. The seventh potential expansion scenario contemplates the addition of the onsite gold plant to the Proposed Project without changes to its throughput or mine life. Each of the potential expansion scenarios would require additional permitting and environmental regulatory review, and there is no certainty that any of the potential expansion scenarios could be pursued. The potential expansion scenarios are designated by the year in which the contemplated expanded process plant would commence operation. They utilize the same life of mine open pit design, with variations based on the year of the expansion and the expanded throughput rate. The Year 21 scenario is based on the scenario outlined in the EIS, with the plant expanded to 250,000 tons per day. The expanded rate in the other two scenarios is 270,000 tons per day.

Table 1-9 provides the production information from these potential expansion scenarios and compares them to the Proposed Project.

Table 1-9: Summary Potential Expansion Case Scenario Production Information

		Proposed Project	Potential Expansion Scenarios		
			Year 21	Year 10	Year 5
Mineralized Material	B tons	1.3	8.6	8.6	8.6
CuEq[11]	%	0.57	0.72	0.72	0.72
Copper	%	0.29	0.39	0.39	0.39
Gold	oz/ton	0.009	0.01	0.01	0.01
Molybdenum	ppm	154	208	208	208
Silver	oz/ton	0.042	0.047	0.046	0.046
Rhenium	ppm	0.28	0.36	0.36	0.36
Waste	B tons	0.2	14.4	14.4	14.4
Open Pit Strip Ratio		0.12	1.67	1.67	1.67
Open Pit Life	Years	20	78	73	68
Life of Mine	Years	20	101	91	90
Metal Production (LOM)					
Copper	M lb	6,400	60,400	60,400	60,400
Gold (in Cu Concentrate)	k oz	7,300	50,400	50,500	50,500
Silver (in Cu Concentrate)	k oz	37,000	267,000	267,000	267,000
Gold (in Gravity Concentrate)	k oz	110	782	783	782
Molybdenum	M lb	300	2,900	2,900	2,900
Rhenium	k kg	200	2,000	2,000	2,000
Metal Production (Annual[12])					
Copper	M lb	320	600	660	670
Copper Concentrate	k tonne	559	1,000	1,200	1,200
Gold (in Cu Concentrate)	k oz	363	500	560	560
Silver (in Cu Concentrate)	k oz	1,800	2,600	2,900	3,000
Molybdenum	M lb	15	29	32	32
Molybdenum Concentrate	k tonnes	14	26	29	29
Rhenium	k kg	12	20	22	22

The estimated costs for the potential expansion scenarios are shown in Table 1-10. The economic analysis for all potential expansion scenarios included third party infrastructure and precious metal streaming partners. The results are shown in Table 1-10 based on long-term metal prices.

[11] CuEQ calculations use metal prices: US$1.85/lb for Cu, US$902/oz for Au and US$12.50/lb for Mo, and recoveries: 85% Cu, 69.6% Au, and 77.8% Mo (Pebble West zone) and 89.3% Cu, 76.8% Au, 83.7% Mo (Pebble East zone).
[12] Life of mine volumes ÷ life of mine years

Table 1-10: Potential Expansion Scenarios Estimated Costs

		Potential Expansion Scenarios		
		Year 21	Year 10	Year 5
Costs				
Total Initial Capital Cost	$billion	6.05	6.05	6.05
Infrastructure Lease	$billion	1.68	1.68	1.68
Net Initial Capital Cost	$billion	4.37	4.37	4.37
Sustaining Capital Cost	$billion	16.9	17.0	17.2
Life of Mine Operating Cost[13]	$/ton	12.46	12.14	12.21
Copper C1 Cost[14]	$/lb CuEq	1.56	1.53	1.54
AISC (Co-Product Basis)	$/lb CuEq	1.77	1.74	1.74
Gold C1 Cost[8]	$/oz AuEq	712	699	702
Closure Funding				
Annual Contribution	$million/yr	9	10	11
Life of Mine Contribution	$billion	1.00	0.97	1.01
Life of Mine Bond Premium	$billion	1.14	0.78	0.85
Closure Fund[15]	$billion	3.2	3.3	3.1
Life of Mine Taxes[16]				
Alaska Mining License	$billion	8.16	8.34	8.32
Alaska Royalty	$billion	3.61	3.68	3.68
Alaska Income Tax	$billion	10.20	10.46	10.40
Borough Severance & Tax	$billion	4.34	4.33	4.34
Federal Income Tax	$billion	18.94	19.42	19.31
Annual Taxes[17]				
Alaska Mining License	$million	81	92	93
Alaska Royalty	$million	36	41	41
Alaska Income Tax	$million	101	115	116
Borough Severance & Tax	$million	43	48	47
Federal Income Tax	$million	188	213	215

[13] Includes cost of infrastructure lease:

Year 21 Expansion - $0.54/ton milled
Year 10 Expansion - $0.53/ton milled
Year 5 Expansion - $0.53/ton milled

[14] C1 costs calculated on co product basis
[15] Maximum value of closure fund during life of mine based on 4% compound interest
[16] Estimated based on current Alaskan statutes
[17] Life of mine taxes ÷ life of mine years

Table 1-11: Potential Expansion Scenarios Financial Results[18]

		Potential Expansion Scenarios		
		Year 21	Year 10	Year 5
Revenue[19]				
Annual Gross Revenue	$million	3,100	3,400	3,500
Life of Mine Gross Revenue	$million	312,000	312,000	312,000
Realization Charges				
Annual Charges	$million	270	300	310
Life of Mine Charges	$million	28,000	28,000	28,000
Net Smelter Return				
Annual NSR	$million	2,800	3,100	3,200
Life of Mine NSR	$million	285,000	285,000	285,000
Financial Model Results				
Post Tax IRR	%	18.1	19.5	21.5
Post Tax NPV_7	$million	5,700	7,300	8,500
Payback	Years	4.4	4.4	5.0

The gold plant included in the potential expansion scenarios was based of metallurgical testwork results for a specific gold recovery technology. However, other technologies may be applicable for the Pebble deposit. Further, the addition of a gold plant under any scenario will require additional testwork and engineering and will require the receipt of pertinent Federal and State permits prior to implementation.

The onsite gold plant would process the pyrite concentrate in conjunction with the gravity concentrate to produce a precious metal doré. In all but the Year 5 scenario, the gold plant capacity would match the 180,000 tons per day process plant capacity. In the Year 5 scenario, it would match the expanded plant capacity while in the Year 10 and Year 21 scenarios, it would be expanded with the process plant.

Table 1-12 provides the total metal production from these scenarios.

[18] Includes infrastructure partners and precious metal streaming
[19] Revenue values do not include a gold plant contribution

Table 1-12: Summary Gold Plant Potential Expansion Scenarios Information

		Proposed Project	Expansion Scenarios		
			Year 21	Year 10	Year 5
Concentrate (LOM)					
Copper	M lb	6,500	61,200	61,200	61,200
Gold (in Cu Concentrate)	k oz	7,300	50,400	50,500	50,500
Silver (in Cu Concentrate)	k oz	37,000	267,000	267,000	267,000
Molybdenum	M lb	300	2,900	2,900	2,900
Rhenium	k kg	200	2,000	2,000	2,000
Gold Plant (LOM)					
Gold (as Doré)	k oz	1,800	14,500	14,500	14,400
Silver (as Doré)	k oz	2,600	22,600	22,600	22,500
Total Production (LOM)					
Gold	k oz	9,000	65,000	65,100	64,900
Silver	k oz	39,000	289,000	289,000	289,000

Table 1-13: Potential Gold Plant Scenario Financial Results[20]

		Proposed Project	Expansion Scenarios		
			Year 21	Year 10	Year 5
IRR	%	16.5	18.8	20.3	22.7
NPV_7	$million	2,700	6,600	8,400	9,700
Payback	Years	4.9	4.6	4.5	5.0

1.21 Risks and Opportunities

A number of risks and opportunities are identified through the 2021 PEA. This section highlights several of these but is not an exhaustive list nor a summary of those contained in the body of the 2021 PEA.

1.21.1 Opportunities

A number of opportunities exist to enhance the Project.

1.21.1.1 Resource

- The Pebble property includes a number of opportunities to expand the Mineral Resource estimate through future exploration. The most significant opportunity is obtained in drill hole 6348 which intersected 949 ft with an average grade of 1.24% copper, 0.74 g/t gold and 0.042% molybdenum, or 1.92% CuEq. This drill hole lies east of the ZG1 Fault and follow up drilling of the Cretaceous host rocks to this mineralization has not yet been completed, thereby leaving the extent of this high-grade mineralization unknown.

- Geophysical and geochemical surveys and reconnaissance exploration drilling have identified several targets located well outside the current Pebble resource estimate area that warrant future exploration.

[20] Proposed Project and Potential Expansion Scenarios include infrastructure partners and precious metal streaming.

- Elevated levels of palladium, vanadium, titanium and tellurium have been noted in raw analytical data and in metallurgical studies and represent opportunities to further benefit the economics of the Pebble deposit.

1.21.1.2 Mining

The Proposed Project mine plan was developed using conventional mining technology. Three areas which could improve the mining results are:

- Use of trolley-assist haulage. Trolley-assist has been shown to improve cycle times and improve engine life at other mines, both of which would reduce operating costs. To accomplish this, additional capacity would likely be required for the power plant.

- In-pit crushing. While the mine plan for the potential expansion scenarios incorporates in-pit crushing, further evaluation for the Proposed Project as well as extending the in-pit crushing for the potential expansion scenarios may prove beneficial.

- Autonomous operation. Mine operations are increasingly moving to autonomous equipment with remote operations centres. These have seen real benefits, particularly in a remote operation such as envisioned at Pebble.

1.21.1.3 Processing

- Flotation. A number of measures have been developed recently which could improve flotation performance at Pebble, including advances in coarse particle flotation. Further analysis of these advances could benefit Pebble.

- Supergene flotation performance. The supergene domains at Pebble would contribute a significant portion of the process plant feed during the first several years of operation. Additional testwork and analysis could determine if alternate strategies could be employed to improve recoveries in these zones.

- Pre-sorting. Pre-sorting techniques have become accepted components of many new process plants. A study is warranted to determine if pre-sorting could enhance Pebble outcomes.

- Gold recovery. Analysis of alternate secondary gold recovery technologies could improve the financial results and enhance the permitting process.

- Molybdenum refinery. The molybdenum concentrate production creates the opportunity to add a molybdenum concentrate refinery to produce a value-added product in Alaska and reduce overall carbon footprint by reduced shipping.

- Concentrate pipeline. Optimization of the concentrate pipeline design could improve costs of the proposed concentrate and water return pipelines.

1.21.1.4 Infrastructure

- Water treatment. Further detailed analysis of the influent water quality and water treatment schemes could see reductions in complexity and cost.

1.21.1.5 Environment

- Carbon footprint. Evaluation of carbon dioxide capture, and sequestration opportunities could reveal an opportunity to reduce the Project's carbon emissions.

1.21.2 Risks

1.21.2.1 Resource

- Inferred Mineral Resources. The 2021 PEA includes the use of Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves. There is no certainty that the 2021 PEA results will be realized.
- The Mineral resources estimates may ultimately be affected by a broad range of environmental, permitting, legal, title, socio-economic, marketing and political factors pertaining to the specific characteristics of the Pebble deposit (including its scale, location, orientation and polymetallic nature) as well as its setting (from a natural, social, jurisdictional and political perspective).
- Factors that may affect the Mineral Resource estimate include:
    - changes to the geological, geotechnical and geometallurgical models as a result of additional drilling or new studies;
    - the discovery of extensions to known mineralization as a result of additional drilling;
    - changes to the Re:Mo correlation coefficients and resultant regression equation due to additional drilling;
    - changes to commodity prices resulting in changes to the test for reasonable prospects for eventual economic extraction; and
    - changes to the metallurgical recoveries resulting in changes to the test for reasonable prospects for eventual economic extraction.
- Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
- The Mineral Resource estimates contained have not been adjusted for any risk that the required environmental permits may not be obtained for the Project. The uncertainty associated with the ability of the Project to obtain required environmental permits is a risk to the reasonable prospects for eventual economic extraction of the mineralisation and the classification of the estimate as a Mineral Resource.

1.21.2.2 Mining

- Pit wall slopes. The pit wall slope assessments were completed to a prefeasibility level of confidence. Additional field work and analysis are required to confirm these designs for operations.

1.21.2.3 Process

- Process recoveries. The metallurgical testwork completed on the Pebble deposit has been extensive but additional work is required to complete a feasibility study and design.

- Deleterious elements. The metallurgical testwork highlighted the low levels of impurity elements in the Project feed materials and correspondingly low deportment to saleable products, and likewise the process plant design incorporated no special treatment steps to manage impurities in the feed. There is a risk that pockets of the Pebble deposit will contain elevated levels of deleterious elements that could report to the concentrates products at levels which could incur penalty charges or adversely influence the saleability of the products. Operational controls could avoid these potential impacts.

1.21.2.4 Project Execution

- Weather. Adverse weather conditions and other factors such as pandemics could impact on the construction schedule.

- Labour. The construction schedule and operations performance require deployment of sufficient numbers of adequately trained and experienced personnel. Inability to realize this deployment could impact the construction schedule and operational results.

1.21.2.5 Tailings and Water Management

- Tailings structures designs. The tailings and water management pond structures designs have been completed to a preliminary level. Significant additional field data and design are required to prepare these structures for construction.

- Alaska dam permitting. The tailings and water management structures will be subject to an extensive design review and permitting process in Alaska. The process may result in changes to the designs.

- Groundwater. Additional field work and analysis are required to confirm specific design criteria for open pit wall and tailings structures.

1.21.2.6 Social Issues

- Land tenure. While the Pebble deposit lies within claims on State land, for which there is an identified path forward to gaining tenure, the transportation corridor crosses land belonging to Native Village Corporations and private individuals and agreements have not been reached with several of these entities. One of the Native Village Corporations has signed an agreement whereby a fund has obtained an option to buy portions of their land to create a conservation easement. The fund must exercise its option by the end of 2022. If the fund closes this agreement with the Native Village Corporation, the Pebble Partnership would be required to identify an alternate route to the proposed marine terminal on Cook Inlet.

- Project opposition. The Project is the subject of significant public opposition in Alaska and elsewhere in the United States.

1.21.2.7 Legal

- Legal actions. Northern Dynasty is party to several class action legal complaints and Pebble Partnership is subject to a government investigation regarding public statements made regarding the project. While these matters do not directly affect the development of the Project, they could negatively impact Northern Dynasty's and the Pebble Partnership's ability to finance the development of the Project or the ability to obtain required permitting.

- EPA. The EPA has announced it plans to re-initiate the process of making a CWA Section 404(c) determination for the waters of Bristol Bay, which would set aside the 2019 withdrawal of that action that was based on a 2017 settlement agreement between the EPA and Pebble Partnership. The 2019 withdrawal was contested by Project opponents and is currently subject to ongoing litigation. Such EPA activity could negatively affect the ability of the Pebble Partnership to obtain required permitting and develop the Project.

1.21.2.8 Permitting

- USACE Record of Decision. In November 2020, USACE denied Pebble Partnership's permit application. That decision is currently under appeal. The Proposed Project cannot proceed unless and until the ROD is overturned and all necessary permits, including the CWA 404 Permit, are obtained. There is no certainty that these permits will be obtained.

- Bristol Bay Forever. Bristol Bay Forever was a public initiative approved by Alaskan voters in November 2014. Based on that initiative, development of the Proposed Project requires legislative approval upon securing all other permits and authorizations.

1.21.2.9 Financial Results

- Cost estimates. The cost estimates contained in the 2021 PEA are completed to a preliminary level. Additional analysis and engineering are required to confirm these results.

- Metal prices and realization costs. Metal prices and realization costs are subject to significant fluctuation, particularly over the periods identified for the Proposed Project and potential expansion scenarios. These fluctuations could have a significant impact on the financial results of future studies and the actual results achieved by an operating mine.

- Taxation. The Proposed Project is subject to taxation at three government levels (local, State, and Federal). These tax regimes may change over time, resulting in different results than those identified in the 2021 PEA.

1.22 Interpretation and Conclusions

The Pebble property hosts a globally significant copper-gold-molybdenum-silver-rhenium deposit. The exploration and drilling programs completed thus far are appropriate to the type of the deposit. The exploration, drilling, geological modelling, and research work support the interpreted genesis of the mineralization and the domaining employed in the resource estimation.

The drill database for the Pebble deposit is reliable and sufficient to support the Mineral Resource estimate.

Estimations of mineral resources for the Project conform to industry best practices and are reported using the 2014 CIM Definition Standards.

Products from mining this deposit, including rhenium, support development of alternative energy supply and other purposes of strategic national significance. The Project would have significant regional economic importance for southwest Alaska and the entire state through the creation of high-wage jobs and training opportunities, supply and service contracts for local businesses, and government revenue.

The results of the 2021 PEA indicate the Pebble project could provide significant economic returns on investment. Further, the potential expansion and gold plant scenarios indicate potential economic upside through the expansion of processing capacity over an extended mine life. Based on the work carried out, this study should be followed by further technical and economic studies leading to an advancement to the next level of development.

1.23 Recommendations

1.23.1 Resource

- A small portion of the Mineral Resource forecast to be mined in the Proposed Project is classified as Inferred and should be upgraded for a future prefeasibility or feasibility study.
- The resource model should be further updated as additional data are acquired from drilling and metallurgical testwork.
- A scoping level study is recommended to assess how best to complete follow up drilling to test the compelling exploration potential of drill hole 6348.
- A scoping level program is recommended to determine the deportment and distribution of additional metals, as well as the best approach to their quantification.
- The estimated cost of the recommended program, including drilling, is $10.2 million.

1.23.2 Mining

- Detailed mine planning should be completed to understand potential bottlenecks and to assess other technologies, such as in-pit crushing and conveying and autonomous trucking and blast hole drilling,
- Detailed geotechnical studies should be conducted to better define the appropriate pit slope angles and design parameters for the pit, stockpiles, and overburden stockpiles.
- The estimated cost to complete the recommended work is $8.1 million, including drilling additional geotechnical investigation holes.

1.23.3 Metallurgy and Processing

- Future testwork is required to provide additional data to define silver recovery to the copper concentrate, rhenium recovery to the molybdenum concentrate, and precious metals to the gravity concentrate.
- Additional analysis and circuit optimization are recommended for treatment of supergene material. This should include collection of additional metallurgical samples from drilling these specific metallurgical domains.
- Complete an initial assessment of potential treatment methods of molybdenum concentrates to optimize the value of molybdenum and rhenium.
- Continued analysis is recommended to determine the optimum grinding circuit configuration and to evaluate coarse particle and column or other means of flotation.

- The estimated cost to complete the recommended metallurgical program, including sample collection, is $8.5 million.

1.23.4 Infrastructure

- Studies are recommended to finalize the location of the facilities and to determine site conditions.
- Additional data are required to finalize the access road alignment and to optimize costs.
- Additional data are required to advance the tailings and water and waste management designs.
- An Independent Review Panel should be established and the permitting process through the Alaska Dam Safety Program initiated.
- The estimated cost to complete the recommended infrastructure programs is $19.5 million.

Appendix

List of Abbreviations and Units

Name Abbreviations (not already defined)

Name description	Abbreviation
Gold Equivalent	AuEq, using long term prices
Alaska Department of Environmental Conservation	ADEC
CIM	Canadian Institute of Mining and Metallurgy
Copper	Cu
U.S. Environmental Protection Agency	EPA
Gold	Au
Internal Rate of Return	IRR
Kaskanak Copper Limited Liability Company	The LLC
Molybdenum	Mo
National Instrument 43-101	NI 43-101
Pebble Limited Partnership	PLP or Pebble Partnership
Qualified Person	QP
Rhenium	Re
Silver	Ag
United States Geological Survey	USGS

Unit Abbreviations

Unit Description	Abbreviation
Acre	ac
Ampere	A
Annum (year)	a
Billion	B
Centimetre	cm
Cubic centimetre	cm^3
Cubic feet per minute	cfm
Cubic feet per second	ft^3/s
Cubic foot	ft^3
Cubic inch	in^3
Cubic metre	m^3
Day	d
Days per week	d/wk
Days per year (annum)	d/a
Degree	°
Degrees Celsius	°C
Degrees Fahrenheit	°F
Feet	ft
Gram	g
Grams per cubic centimetre	g/cm^3
Grams per litre	g/L
Grams per tonne	g/t
US Gallons	USG
US Gallons per minute	GPM

Unit Description	Abbreviation
Greater than	>
Hectare (10,000 m^2)	ha
Horsepower	hp
Hour	h
Hours per day	h/d
Hours per week	h/w
Hours per year	h/a
Inch	in
Kilo (thousand)	k
Kilogram	kg
Kilograms per hour	kg/h
Kilograms per square metre	kg/m^2
Kilometre	km
Kilometres per hour	km/h
Kilopascal	kPa
Kilovolt	kV
Kilowatt	kW
Kilowatt hour	kWh
Kilowatt hours per tonne (metric ton)	kWh/t
Kilowatt hours per year	kWh/a
Less than	<
Litres	L
Litres per minute	L/m
Megawatts	MW
Megawatt hour	MWh
Metres	m
Metres above sea level	masl
Microns	µm
Mile	mi
Milligram	mg
Milligrams per litre	mg/l
Millilitre	mL
Millimetre	mm
Million	M
Million tonnes	Mt
Minute (plane angle)	(')
Minute (time)	min
Month	mo
Ounce	oz
Parts per million	ppm
Parts per billion	ppb
Percent	%
Pounds	lb
Pounds per square inch	psi
Pounds per ton	lb/ton
Second (plane angle)	"
Second (time)	s
Square centimetre	cm^2
Square foot	ft^2
Square inch	in^2
Square kilometer	km^2
Square metre	m^2

Unit Description	Abbreviation
Revolutions per minute	rpm
Tonnes (metric - 1,000 kg)	t
Thousand tonnes	kt
Tons (imperial – 2,000 lb)	ton
Volt	V
Week	wk
Year (annum)	a

Qualified Persons and Responsibilities

Report Section	Qualified Person(s)
1.0 - Summary	
1.1 - Introduction	Stephen Hodgson, P.Eng.
1.2 – Forward Looking Information and Other Cautionary Factors	Stephen Hodgson, P.Eng.
1.3 – Project Setting	Stephen Hodgson, P.Eng.
1.4 – Property Description	Stephen Hodgson, P.Eng.
1.5 – Project Description	Stephen Hodgson, P.Eng.
1.6 – Mineral Tenure, Surface Rights, Water Rights, Royalties and Agreements	Stephen Hodgson, P.Eng.
1.7 - Geological Setting and Mineralization	James Lang, P.Geo.
1.8 - History	Stephen Hodgson, P.Eng., J. David Gaunt P.Geo., James Lang, P.Geo., Eric Titley, P.Geo.
1.9 - Exploration	James Lang, P.Geo., Eric Titley, P.Geo.
1.10 – Drilling and Sampling	James Lang, P.Geo., Eric Titley, P.Geo.
1.11 – Metallurgical Testwork	Hassan Ghaffari, P. Eng.
1.12 – Mineral Resource Estimate	J. David Gaunt, P.Geo.
1.13 – Mining Methods	Sabry Abdel Hafez, P. Eng.
1.14 – Recovery Methods	Robin Kalanchey, P. Eng.
1.15 – Project Infrastructure	Stephen Hodgson, P.Eng., Les Galbraith, P.Eng., P.E., Robin Kalanchey, P.Eng.
1.16 – Environmental, Permitting and Social Considerations	Stephen Hodgson, P.Eng.
1.17 – Marketing and Contracts	Stephen Hodgson, P.Eng.
1.18 – Capital and Operating Costs	Stephen Hodgson, P.Eng., Robin Kalanchey, P.Eng., Sabry Abdel, Hafez, P.Eng., Les Galbraith, P.Eng., P.E.
1.19 – Economic Analysis and Sensitivities	Stephen Hodgson, P.Eng.
1.20 – Potential Expansion Scenarios	Stephen Hodgson, P.Eng., Robin Kalanchey, P.Eng., Sabry Abdel, Hafez, P.Eng., Les Galbraith, P.Eng., P.E.
1.21 – Risks and Opportunities	Stephen Hodgson, P.Eng., Robin Kalanchey, P.Eng., Sabry Abdel, Hafez, P.Eng., Les Galbraith, P.Eng., P.E., J. David Gaunt, P.Geo.
1.22 – Interpretation and Conclusions	Stephen Hodgson, P.Eng., Robin Kalanchey, P.Eng., Hassan Ghaffari, P. Eng., Sabry Abdel, Hafez, P.Eng., J. David Gaunt, P.Geo., James Lang, P.Geo., Eric Titley, P.Geo.
1.23 - Recommendations	Stephen Hodgson, P.Eng., Robin Kalanchey, P.Eng., Hassan Ghaffari, P. Eng., Sabry Abdel, Hafez, P.Eng., Les Galbraith, P.Eng., P.E., J. David Gaunt, P.Geo.

Robin Kalanchey, P.Eng., Hassan Ghaffari, P. Eng., Sabry Abdel, Hafez, P.Eng., and Les Galbraith, P.Eng., P.E., are independent Qualified Persons. Stephen Hodgson, P.Eng., J. David Gaunt P.Geo., James Lang, P.Geo., and Eric Titley, P.Geo., are not independent of Northern Dynasty Minerals Ltd.