NORTHERN DYNASTY MINERALS LTD.

2004 SUMMARY REPORT
ON THE
PEBBLE PORPHYRY GOLD-COPPER PROJECT

Iliamna Lake Area
Southwestern Alaska
U.S.A.

Latitude 59º54' N
Longitude 155º18' W

By

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1.0 SUMMARY

The Pebble property is centred at latitude 59º53'54" N and longitude155º17'44" W in the Bristol Bay region of southwestern Alaska, 380 km southwest of Anchorage and 27 km west-northwest of the village of Iliamna. It forms a continuous block consisting of 1,331 located Alaska State mineral claims totaling 98,000 acres. Annual assessment work or cash in lieu of obligations totals US$150,900.

Under assigned and amended agreements with Teck Cominco, Northern Dynasty purchased a 80% interest in the 36 claims, "Resource Lands", hosting the Pebble resource by paying to Teck Cominco US$10 million in Northern Dynasty shares prior to November 30, 2004. In 2005, Northern Dynasty purchased the remaining 20% Hunter Dickinson Group Inc. interest in the "Resource Lands". In the surrounding "Exploration Lands" in 2004, Northern Dynasty earned a 50% interest by completing the required 60,000-foot exploration drilling program. In 2005, Teck Cominco sold its remaining interest in the Exploration Lands for US$4 million in Northern Dynasty shares and the granting to Teck Cominco of a 5% Net Profits Royalty.

The Pebble property encompasses the eastern and southern margins of the ca. 200 km^2, Late Cretaceous (89.7 Ma), granodiorite-quartz monzodiorite-monzonite Kaskanak Batholith and the adjacent, Jurassic-Cretaceous, basinal volcaniclastic turbidites and interbedded mafic volcanic and subvolcanic rocks. On the east side of the batholith, a northeast-trending structural corridor is marked by a linear cluster of multi-phased, compositionally and texturally variable, mainly felsic, irregular stocks, sills, dikes and breccia bodies. Besides the Pebble deposit, numerous gold and copper-gold mineral occurrences, including the Thirty-Eight and 308 porphyry copper-gold-molybdenum zones, are related to this diverse group of intrusions.

The Pebble deposit is a calc-alkalic porphyry associated with four small granodiorite-quartz monzodiorite stocks and related sill-like apophases. These stocks intrude moderately warped and previously hornfelsed, volcaniclastic sedimentary rocks that had been intruded by diorite sills and later, intermediate to felsic intrusions and intrusion breccias. Sulphide mineralization, consisting principally of pyrite, chalcopyrite and molybdenite, occurs in zones of strong potassium-silicate alteration in and disseminated adjacent to quartz-vein stockworks in all rock types. It is strongest in and near the upper parts of the granodiorite stocks and in a major granodiorite sill. Gold occurs with sulphides in a ratio of about 1.2 g/t gold to 1% copper. The copper/molybdenum ratio is about 20/1.

In 2004, core drilling by Northern Dynasty was targeted primarily in and adjacent to the Pebble deposit where 132 geology holes totaling 32,826 m and 26 metallurgy holes totaling 6505 m were completed in the Resource Lands, and 15 holes totaling 7177 m were completed in the Exploration Lands to test for continuity and extensions of higher-grade zones. One hole totaling 263 m was drilled in the southwestern part of the Exploration Lands to test an IP/resistivity anomaly. Various sites for proposed tailings and waste disposal were tested by 53 engineering holes totaling 2778 m.

This drilling identified a significant, new porphyry centre (the East Zone) on the eastern side of the Pebble deposit beneath a cover of Tertiary rocks that becomes progressively thicker to the east. The characteristics of the East Zone indicate a setting proximal to a thermal and fluid centre. These include the intense biotite (potassic) alteration, the high density of early-stage quartz veins, the extent to greater depth of strong Au-Cu-Mo mineralization and alteration, the presence of numerous granodiorite sills and dykes at depth, and the weakness of late-stage, lower-temperature alteration overprints. The source of heat and fluids for the East Zone may be a stock of granodiorite below and/or to the east of the current drilling. The East Zone is unconstrained to the east and northeast under Tertiary cover, to the south and to depth. Further drilling will be necessary to adequately assess its extent.

In the Pebble deposit, copper-gold-molybdenum mineralization extends over a known area of 3 km by 2.2 km and to a depth of 600 m in the West and Central zones, and to a depth of 800 m in the East Zone. A phyllic alteration envelope around the deposit is up to 5.5 km by 2.5 km in area; many samples from this zone contain gold concentrations over 100 ppb.

Diamond drilling programs by Teck Cominco from 1988 to 1997 identified a billion-tonne porphyry copper-gold deposit at Pebble. Based on diamond drilling programs by Northern Dynasty up to and including 2004, a mineral-resource estimate by independent qualified persons of Roscoe Postle Associates, Inc., showed that the Pebble deposit contains a Measured and Indicated Mineral Resource of 3.03 billion tonnes grading 0.32 g/t Au, 0.28% Cu and 0.015% Mo, with an additional Inferred Mineral Resource of 1.13 billion tonnes grading 0.30 g/t Au, 0.27% Cu and 0.015% Mo (0.55% copper-equivalent) above a cut-off grade of 0.30% copper-equivalent (Rennie et al., 2005). The Measured and Indicated Resource contains 31.3 million ounces of gold 18.8 billion pounds of copper and nearly 1 billion pounds of molybdenum. A higher-grade resource core consists of 569 million tonnes grading 0.50 g/t Au, 0.46% Cu and 0.021% Mo (0.88% copper-equivalent) above a cut-off grade of 0.70% copper-equivalent.

PEBBLE DEPOSIT - MEASURED MINERAL RESOURCES

Cut-Off	Size	Grade				Contained Metal		
CuEQ[2] %	Million Tonnes	Copper %	Gold g/t	Molybdenum %	CuEQ %	Copper B lbs	Gold M ozs	Molybdenum M lbs
0.30[4]	711	0.33	0.36	0.016	0.63	5.1	8.1	256
0.40	655	0.34	0.37	0.017	0.66	4.9	7.8	244
0.50	525	0.37	0.40	0.018	0.70	4.3	6.7	207
0.60	356	0.41	0.43	0.019	0.78	3.2	4.9	150
0.70	214	0.47	0.47	0.021	0.87	2.2	3.3	97

PEBBLE DEPOSIT - INDICATED MINERAL RESOURCES

Cut-Off	Size	Grade				Contained Metal		
CuEQ %	Million Tonnes	Copper %	Gold g/t	Molybdenum %	CuEQ %	Copper B lbs	Gold M ozs	Molybdenum M lbs
0.30	2,320	0.27	0.31	0.014	0.54	13.7	23.2	736
0.40	1,760	0.30	0.34	0.016	0.59	11.6	19.2	611
0.50	1,100	0.35	0.39	0.017	0.68	8.4	13.9	423
0.60	615	0.40	0.45	0.020	0.79	5.5	8.9	270
0.70	356	0.46	0.51	0.021	0.89	3.6	5.9	167

PEBBLE DEPOSIT - MEASURED PLUS INDICATED MINERAL RESOURCES

Cut-Off	Size	Grade				Contained Metal		
CuEQ %	Million Tonnes	Copper %	Gold g/t	Molybdenum %	CuEQ %	Copper B lbs	Gold M ozs	Molybdenum M lbs
0.30	3,026	0.28	0.32	0.015	0.56	18.8	31.3	993
0.40	2,413	0.31	0.35	0.016	0.61	16.5	27.0	855
0.50	1,628	0.35	0.39	0.018	0.69	12.7	20.5	629
0.60	970	0.41	0.45	0.020	0.78	8.7	13.8	420
0.70	569	0.46	0.50	0.021	0.88	5.8	9.1	265

Copper-equivalent calculations used metal prices of US$1.00/lb for copper, US$400/oz for gold, and US$6.00/lb for molybdenum. CuEQ = Cu % + (Au g/t x 12.86/22.06) + (Mo% x 132.28/22.06). Copper-equivalent has not been adjusted for metallurgical recoveries. Adjustment factors to account for differences in relative metallurgical recoveries for gold, copper and molybdenum will depend upon the completion of definitive metallurgical testing.

Based upon comparable operations and economic modeling, the Pebble deposit has excellent potential to evolve into an economically viable mining venture. The primary objectives of Northern Dynasty are to complete a bankable feasibility study on the measured and indicated resources and to explore for extensions of the deposit, mainly to the east and at depth.

The intrusive and intrusive breccia complex that extends south for more than 1.5 km from the presently defined southern edge of the deposit has been tested mainly by shallow and widely spaced holes. Alteration assemblages indicate that is a prospective area for exploration for another porphyry copper-gold centre. The margins of the intrusive complex are zones that may have undergone multiple stages of dilation, intrusion and hydrothermal activity, which could be conducive to formation of higher-grade copper-gold mineralization; these also warrant further drill testing.

In 2004, a drill hole in the southwestern part of the Exploration Lands intersected a 247-m-long zone of porphyry-style mineralization in an arm of the Kaskanak batholith that extends southwest from the main batholith into a broad area of hornfelsed, andesitic sedimentary rocks, which on surface contains 2-5% disseminated pyrite. This 308 Zone is similar in character and grade to the Thirty-Eight Zone a few kilometers to the east-northeast. To determine the extent and grade of the 308 Zone will require further drill testing.

The proposed drill program for 2005 includes 97,000 ft of exploration and infill drilling and 9,000 ft of metallurgical drilling, all in and near the Pebble deposit.

2.0 INTRODUCTION AND TERMS OF REFERENCE

Diamond drilling programs by Teck Cominco from 1988 to 1997 identified the Pebble porphyry Au-Cu-Mo deposit. Additional diamond drilling programs in 2002, 2003 and 2004 by Northern Dynasty greatly enlarged the main Pebble deposit, and led to discovery of several additional magmatic-hydrothermal deposits and prospects in the Pebble property.

In 2004, Northern Dynasty continued surface mapping of the Exploration Lands at a scale of 1:10,000, and drilled 39,320 m of core in the Pebble Resource Lands and 10,216 m of core in the Exploration Lands. In the Exploration Lands, 7,177 m of core drilling were completed in 15 holes adjacent to the Pebble Resource Lands, 2778 m of core drilling were completed in 53 engineering holes, and 268 m of core drilling were completed in one hole in the southwestern part of the Exploration Lands. (All reported lengths include overburden, some of which was triconed with no core recovery.)

The drill holes in the eastern part of the Resource Lands and those further to the east in the Exploration Lands have identified a major, new, porphyry-style, hydrothermal centre. This new "East Zone" contains some of the highest grades of Au-Cu-Mo mineralization, the most intense potassic alteration, and the highest density of quartz veins thus far encountered in the Pebble district. It is open to the east, north and south, and to depth. A broad zone of lower-grade, porphyry-style mineralization hosted by intrusion breccia extends into the Exploration Lands to the south of the Resource Lands.

At the end of the 2003 exploration season, drill results from the main Pebble deposit were used by Norwest Corporation, an independent consultant, to estimate an inferred resource of 2.74 billion tonnes at a 0.3% copper-equivalent cut-off (CuEQ), and a higher grade resource of 435 million tonnes at 0.84% CuEQ at a cut-off of 0.7% CuEQ. This resource estimate is for those parts of the deposit that lie in the "Resource Lands". This resource was increased substantially by the 2004 drilling program; it extends beyond the eastern boundary of the Resource Lands into the Exploration Lands (the Resource Lands and Exploration Lands are defined in the Memorandum of Understanding dated May 1, 2001, between Hunter Dickinson Inc. and Cominco American). As well, the quality of the estimate in the core of the deposit has been upgraded from inferred to measured and indicated. Significant increases in the prices of Au, Cu, Mo, and Ag during 2004 and 2005 have enhanced the economic viability of the main Pebble deposit and other exploration targets.

Hole 4308 in the 308 Zone in the southwestern part of the Exploration Lands encountered porphyry-style mineralization throughout its length that is similar in nature and grade to that in the Thirty-Eight Zone a few km to the east-northeast.

Work at site in 2004 occurred from mid-April to early November. Richard Moses was the site manager for the program and was on-site during most of the program. In 2004, John Payne, Ph.D., P.Geo., spent 77 days on site and Jim Lang, Ph.D., P.Geo., spent 71 days on site and his work contributed greatly to this report. Richard Haslinger, B.Sc., P.Eng., was site manager for the 2001, 2002, and 2003 field seasons, and in 2004 acted as facilitating engineer. Mark Rebagliati B.Sc., P.Eng., supervised the 2001-2004 programs and spent 6 days on site.

This report presents the results of the 2004 core-drilling and surface mapping programs and provides recommendations for further exploration and deposit delineation. Also included in the report are descriptions of the current claim holdings, exploration history, geology, mineralization and mineral resources of the Pebble property, and a brief description of base-line environmental studies that were begun in 2004.

This technical report has been prepared in compliance with the requirements of National Instrument 43-101 and Form 43-101F1. It is intended to be used as supporting documentation to be filed with the Company's Annual Information Form.

Sources of information for this report include the direct data derived from the 2004 exploration program, and other sources of information as referenced and listed in the "References" section of this report. An independent resource estimate has been prepared by Roscoe Postle Associates, Inc. based on data collected in 2004.

All reports listed in the references concerning the property have been reviewed and have been used, as referenced, in this report. All units of measurement used herein are metric and monetary amounts used in resource calculations are in Canadian dollars, unless otherwise noted.

Disclaimer:

The authors make no representation as to the validity of the claim data nor the status of the property options, which information has been provided by the Company (information in Section 16, Other Related Information, was derived from internal company reports prepared by other qualified persons), nor the independent resource estimates that were prepared by Norwest Corporation in 2004 and by Roscoe Postle Associates, Inc. in 2005. The authors have not made a field examination of the claim posts and can pass no opinion on the manner of staking, nor can they verify the detailed position of the claims.

3.0 PROPERTY LOCATION AND DESCRIPTION

The Pebble property is centered at latitude 59º53'54" N and longitude 155º17'44" W in the Bristol Bay region of southwestern Alaska, 380 km southwest of Anchorage and 27 km northwest of the village of Iliamna (Figure 1). It is in USGS topographic maps, Iliamna D6 and D7, in Townships 3 - 5 South, Ranges 34 - 37 West, Seward Meridian.

The property forms a continuous block consisting of 1,331 located Alaska State mineral claims totaling 98,000 acres. Included in this total are 12 claims that were staked in 2004 to cover an inlier on the east side of the main claim block on Koktuli Mountain and 169 claims that were staked over potential areas of tailings and waste impoundment. The location of the claims and major deposits and showings are indicated in Figures 2.1, 2.2 and 2.3, and the details of the claims are listed in Appendix 1. State mineral claims in Alaska may be kept in good standing by incurring annual assessment work or by paying cash in lieu of assessment work in the amount of US$100 per 40-acre mineral claim per year and by paying annual escalating state rentals. Annual rental fees are US$160,295 and annual assessment work obligations are US$245,000. The annual state rentals for 2004 of US$193,100 were paid on September 1, 2004.

4.0 PROPERTY OPTION SUMMARY

The following summary of property agreements and their present status has been provided by Northern Dynasty management and has not been verified or reviewed by the writers.

In October 2001, Northern Dynasty acquired the right to earn up to a 100% interest in the Pebble Property from Teck Cominco American Incorporated ("Teck Cominco") and Hunter Dickinson Group Inc. ("HDGI"). The first of the two options permitted Northern Dynasty to purchase the previously drilled portions of the prospect on which the majority of the known mineralization exists (the "Resource Lands Option") through the payment of cash and shares aggregating US$10 million prior to November 30, 2004. The second part of the Option permitted Northern Dynasty to earn a minimum of 40% (and up to 100%) interest in the remainder of the Pebble Property (the "Exploration Lands") by doing 60,000 feet of exploration drilling by November 30, 2004. The Company completed 67,651 feet of drilling by September 30, 2004.

In November 2004, Northern Dynasty exercised the option from Teck Cominco to acquire 80% of the Resource Lands. In February 2005, Teck Cominco sold its 50% interest in the Exploration Lands to Northern Dynasty for US$4 million. Teck Cominco retains a 4% pre-payback nets profits interest (after debt service) and 5% after-payback net profits interest in any mine production from the Exploration lands portion of the Pebble property.

Northern Dynasty had the right until March 14, 2005 to acquire the remaining 20% interest from a related party, HDGI, for shares based on its independent valuation. On March 15, 2005, Northern Dynasty announced that it had reached an agreement with HDGI to acquire the 20% remaining carried interest in the Resource Lands portion and the Exploration Lands portion of the Pebble Property (the "Carried Interest"). The Carried Interest will be acquired by Northern Dynasty for a purchase price consisting of 14,002,268 Northern Dynasty common shares, which represents approximately 20% of the adjusted market capitalization of Northern Dynasty.

5.0 INFRASTRUCTURE, ACCESSIBILITY, LOCAL RESOURCES, CLIMATE AND PHYSIOGRAPHY

The Iliamna region contains the communities of Iliamna, Newhalen and Nondalton that have a combined population of 700 people. The State of Alaska manages a modern airfield at Iliamna that, with two, paved, 1,500-m runways, is suitable for DC-6 and Hercules cargo aircraft, and small, commercial jet aircraft. Paved roads connect the airport to Iliamna and Newhalen, and a partly paved, partly gravel road extends to the Newhalen River crossing near Nondalton. The Pebble Property is 95 km from tidewater.

No road connects Iliamna to the Alaskan coast on Cook Inlet but one is planned as part of the proposed Pebble mining operation. Access to the coast from Lake Iliamna is provided by a 30-km, state-maintained road, which extends from Pile Bay at the eastern end of Lake Iliamna to Williamsport near Iniskin Bay on Cook Inlet. Bulk fuel and heavy freight can also be barged in during the summer months to Lake Iliamna via the Kvichak River.

Iliamna and surrounding communities have only limited commercial infrastructure, except for that which services a seasonal sports fishing and hunting industry. A small hydroelectric installation provides power for the three communities.

The climate of the Iliamna area is similar to that of Anchorage; the mean daily maximum temperature in July is 17∀C and the mean daily minimum temperature in January is -13∀C. The average annual precipitation is 69 cm, most of which is rainfall from June through August. The climate, while periodically harsh, is sufficiently moderate to allow a well-planned mineral exploration program to be conducted year-round.

The Pebble property lies 80 km west of the Alaska Range in the Nushagak–Big River Hills, an area of rolling hills and low mountains separated by wide, shallow valleys blanketed with glacial deposits and numerous meandering streams and small, shallow lakes. Elevations range from 250 m above sea level (asl) to 841 m asl at Kaskanak Peak, the highest point on the property. Access to the property from Iliamna is by helicopter, a distance of 27 km.

Tundra plant communities (mixtures of shrub and herbaceous plants) cover the project area. Willow is common only along streams and sparse patches of dense alder are confined to better-drained areas where coarse soils have developed. Poorly drained regions underlain by fine soils support dwarf birch and grasses (Detterman and Reed, 1973). Aside from the local displacement of fish and wildlife resources and increased human impact on both by a mine development project, the writers are not aware of any specific environmental liabilities that affect the mineral claims.

6.0 HISTORY

In the mid 1980s, Cominco Alaska began reconnaissance exploration in the Pebble region and in 1984 discovered the Sharp Mountain gold prospect. Gold occurs in drusy quartz veins of probable Tertiary age that cut Cretaceous rocks near the peak of Sharp Mountain (anonymous Cominco Alaska report, 1984). Grab samples of veins in talus ranged from 1.5 g/t Au to 9.32 oz/ton Au and 3.0 oz/ton silver. No record of further work is available.

Examination and sampling of several color anomalies in 1987 yielded anomalous gold concentrations from the Sill prospect, recognized as a precious-metal, epithermal-vein occurrence, and the Pebble discovery outcrop, which was of uncertain affinity. The 1988 exploration program included 24 diamond drill holes at the Sill epithermal gold prospect (Table 6.1), soil sampling, geological mapping and two diamond drill holes at the Pebble target (Table 6.2). Drilling at the Sill prospect intercepted mineralization with gold grades that justified more work, but the initial Pebble drill holes yielded only modest encouragement. In 1989, an expanded soil sampling program, an IP survey and 12 diamond drill holes were completed at the Pebble target, and 15 diamond drill holes were completed at the Sill prospect. Although limited in scope, the IP survey at Pebble displayed a response characteristic of a large, porphyry-copper system. This interpretation was validated by subsequent drilling by Teck Cominco, which intercepted significant intervals of porphyry-style gold, copper, and molybdenum mineralization.

Table 6.1 – Drilling on Sill Prospect to end of 2003

Year and Company	# Drill Holes	Metres
1988 Teck Cominco	24	2,148
1989 Teck Cominco	15	1,036
Total Sill Prospect Drilling	**39**	**3,184**

Table 6.2 – Drilling on Pebble Deposit Resource Lands to end of 2003

Year and Company	# Drill Holes	Metres
1988 Teck Cominco	2	169
1989 Teck Cominco	7	787
1990 Teck Cominco	25	2,991
1991 Teck Cominco	48	8,414
1992 Teck Cominco	14	2,014
1997 Teck Cominco	20	4,327
2002 Northern Dynasty	**2**	**379**
2003 Northern Dynasty	**58**	**19,729**
Total (Resource Lands)	**173**	**38,809**

Table 6.3 – Total Drilling on Pebble Property to end of 2003		
Year and Company	**# Drill Holes**	**Metres**
1988 Teck Cominco	26	2,317
1989 Teck Cominco	27	2,256
1990 Teck Cominco	25	3,054
1991 Teck Cominco	48	8,574
1992 Teck Cominco	14	2,014
1993 Teck Cominco	4	382
1997 Teck Cominco	20	4,479
2002 Northern Dynasty	**68**	**11,306**
2003 Northern Dynasty	**67**	**21,717**
Total (Pebble Property)	**299**	**56,099**

When it became apparent that a significant copper-gold porphyry deposit had been discovered, exploration was accelerated in 1990 and 1991 when 73 additional diamond drill holes were completed. In 1991, baseline environmental and engineering studies were initiated and weather stations were established. A preliminary economic evaluation was undertaken by CESL in 1991 and subsequently revised in 1992. In 1992, 14 drill holes were completed in the deposit area. In 1993, IP surveying and a 4-hole drilling program were completed at a target 6 km to the south of the Pebble deposit. In 1997, Teck Cominco did IP surveying, geochemical sampling and geological mapping, and drilled 20 holes into and around the Pebble deposit (Table 6.3). In 2001, Hunter Dickinson staked the PEB claims to cover ground where Teck Cominco had detected a multi-element, soil-geochemical anomaly and high IP chargeability on two, widely spaced, reconnaissance lines. On the new PEB claims, Hunter Dickinson collected and analyzed 601 soil samples and did 30-line km of IP/resistivity surveying.

During 2002, Northern Dynasty drilled 68 holes totaling 11,306 m exploring for additional porphyry deposits within which to define higher-grade resources. The Thirty-Eight Zone, a till-covered copper-gold porphyry deposit, was discovered 12 km south-southwest of the Pebble deposit. Some 86% of Teck Cominco's drill core from the Pebble deposit (16,000 m) was relogged and a sectional geological model was completed. Based on this model, the Pebble deposit resource was calculated (Snowden, 2003). Surface work included an 18.5-line-km ground magnetometer survey; a 328-sample soil geochemical survey and a few man-days of geological traverses.

In 2003, Northern Dynasty drilled 58 holes totaling 19,729 m to define higher-grade portions in the Pebble deposit and 9 holes totaling 1,987 m to test four other prospective zones. Limited surface exploration was conducted, consisting of 5 days of geological mapping and collection of 97 samples in three soil geochemical traverses. The Pebble deposit resource was re-estimated (Norwest Corporation, 2004). Locations of drill holes are shown on Figures 3.1 and 3.2. A summary of all drilling on the Pebble deposit to the end of 2003 is shown in Table 6.3.

7.0 REGIONAL GEOLOGY

The regional setting of the Pebble district has been discussed by Plafker and Berg (1994), Bouley et al. (1995), Goldfarb (1997), Young et al. (1997), and their contained references. Alaska contains an assemblage of northeast-trending tectonostratigraphic terranes that amalgamated southward in response to long-lived, north-trending subduction beginning in the Late Paleozoic (Goldfarb, 1997). The Pebble property is in rocks of the Kahiltna terrane, near its southeastern boundary with rocks of the Peninsular terrane (Figure 4). The terrane boundary is along the Lake Clark structure, a major, translational fault.

The Kahiltna terrane is one of several small basins filled by Jurassic to Cretaceous flysch (Plafker et al., 1989) that closed in the middle Mesozoic due to approach of the Wrangellia terrane from the south (Nokleberg et al., 1994). The southern part of the Kahiltna terrane is dominated by andesitic turbidities of Late Jurassic to Early Cretaceous age that were deposited in a basinal setting, with lesser zones of Late Triassic and younger basalt, andesite, tuff, chert, shale and limestone (Jones et al., 1987; Wallace et al., 1984). The Kahiltna terrane in the area of the Pebble deposit was intruded by the Late Cretaceous Kaskanak batholith of intermediate to felsic composition. A northeast-oriented zone of diverse, texturally and compositionally variable stocks, dykes, sills and irregular bodies occurs on the east side of the Kaskanak batholith and hosts the Pebble deposit and several major showings.

The Peninsular terrane contains Permian limestone, Upper Triassic limestone, chert, tuff and agglomerate (that may correlate with similar rocks in the Kahiltna terrane), Early to Middle Jurassic volcanic and intrusive rocks, and Middle Jurassic to Cretaceous clastic rocks. The Peninsular terrane and the southeast part of the Kahiltna terrane were intruded under compression by mid-Cretaceous plutonic rocks as a result of northwest-dipping subduction (Engebretson et al., 1987; Goldfarb, 1997). East of Lake Iliamna, the bedded rocks of the Peninsular terrane are bounded on the west by the Alaska-Aleutian Range quartz diorite batholith of Middle to Upper Jurassic age. In the area around Pebble, intrusions include the mid-Cretaceous, intermediate to felsic Kaskanak batholith and, on the east side of the batholith, a northeast-trending belt of texturally and compositionally variable stocks, dykes and sills.

Tertiary to Recent volcanic rocks and associated sedimentary rocks formed in response to northward subduction of the Pacific plate beneath the North American plates on the modern Aleutian arc (Goldfarb, 1997; Young et. al., 1997). The region was deformed along a series of thrust and transverse faults, including the Lake Clark structure. The Pebble region was eroded by Quaternary to Recent glaciers, and most valleys were filled with glacial sedimentary deposits.

8.0 PROPERTY GEOLOGY

Rock types in the Pebble district include a bedded sequence of Jurassic to Cretaceous, mainly andesitic sedimentary rocks, coeval mafic extrusive and subvolcanic rocks, Cretaceous intrusive rocks of diverse composition, and Tertiary volcanic and sedimentary rocks and sub-volcanic dykes. The surface distribution of these units in the property is shown in Figure 5.

The Pebble district is disposed around the eastern and southern margins of the Late Cretaceous Kaskanak batholith, a body of mainly quartz monzodiorite to granodiorite composition that was dated at 89.7±0.2 Ma (U-Pb zircon) (Bouley et al., 1994). It intruded a thick sequence of basinal, volcaniclastic turbidites and interbedded mafic flows of Jurassic to Cretaceous age.

A key feature of the district is a north-northeast-trending igneous belt of stocks, sills and dykes of diverse composition that includes biotite pyroxenite, gabbro, diorite, monzodiorite, monzonite, syenomonzonite and granodiorite, as well as large bodies of felsic to intermediate, intrusion breccia. Isotopic dates on the intrusions are limited to imprecise K-Ar ages of 96.1±4.8 Ma on biotite from the biotite pyroxenite and 99.8±5 Ma on igneous K-feldspar from a granodiorite immediately northwest of the Pebble deposit (Bouley et al., 1995).

This belt has been traced for 22 km in the Pebble property and has not been constrained along strike. It cuts the andesitic sedimentary rocks on the eastern and southern margins of the Kaskanak batholith, and is localized along a probably major, northeast-trending structure of crustal scale that extends beyond the Pebble district. Magmatic-hydrothermal activity in this belt produced numerous Au, Cu-Au and Cu-Au-Mo mineral occurrences that have a close spatial and temporal relationship to more- felsic, intrusive phases. The most important occurrences are discussed later in the report.

The Jurassic and Cretaceous strata and intrusive rocks and their associated mineral deposits were covered by Tertiary volcanic and sedimentary rocks and/or by Quaternary glacial sediments. Of particular economic significance is a wedge of Tertiary rocks that thickens to the east and that covers the eastern part of the Pebble deposit. A swarm of Tertiary basalt, andesite, and latite dykes trends easterly across the western part of the Pebble deposit.

The epithermal-Au Sill deposit lies 6 km southeast of the Pebble deposit (Figure 5). It is hosted by a very fine-grained latite dated by U/Pb in zircon at 46.2±0.2 Ma (Bouley et al., 1995), and comprises several narrow, discontinuous quartz veins and quartz breccias enclosed in pyritic alteration envelopes. Sixteen significant intersections between 0.6 and 1.5 m in width yielded Au grades of 10 to 30 g/t, with two higher concentrations of 141 g/t over 1.07 m and 60.9 g/t over 0.64 m. Detailed results are available in Rebagliati and Haslinger (2003). Northern Dynasty has not conducted any work on the Sill prospect and it is not discussed further in this report.

Tertiary faults and shear zones are evident in drill core and surface mapping, and six major structures have been interpreted in the Pebble deposit from drill core data. Only one has a significant surface expression; the others are covered by extensive overburden.

8.1 Rock Types and Stratigraphy (Property)

8.1.1 Jurassic to Cretaceous Volcanic and Sedimentary Rocks (Units Y, W, C, B and R)

The Early Jurassic to Late Cretaceous strata include a unit dominated by andesitic sedimentary rocks, and another dominated by mafic volcanic and hypabyssal rocks. The sedimentary unit consists of andesitic siltstone and mudstone (Unit Y), fine-grained andesitic sandstone/ greywacke (Unit W), and minor intervals of interbedded pebble conglomerate and wacke (Unit C). These rocks were thermally metamorphosed to biotite hornfels in a wide aureole that surrounds the Kaskanak batholith. The volcanic/hypabyssal unit consists of basalt flows and minor volcaniclastic rocks (Unit B) that were intruded by, and in places grade into, numerous small bodies of coeval(?) hypabyssal gabbro (Unit R).

Schematic stratigraphic columns are shown for the south and north parts of the Pebble property; the latter includes the Pebble deposit (Figure 6). At the base of the southern section is an interval of basalt-gabbro that includes a large body of gabbro on the southwest flank of the Kaskanak batholith. Above this on the south side of the Koktuli valley, and dipping gently to moderately to the south and southeast, is a sequence of andesitic sedimentary rocks dominated by mudstone and siltstone (Unit Y). Near the base of this interval is a discontinuous interval (Unit C) up to several metres thick that consists of pebble conglomerate beds up to one metre thick that are interlayered with and gradational to massive wacke. Pebbles are of uncertain provenance and comprise chert, quartz, quartzite and lesser, commonly porphyritic, felsic hypabyssal rocks. Unit C is overlain by up to 100 metres of massive to weakly bedded, brown-weathering wacke (Unit W), which, in turn, is overlain by a variable interval of Unit Y that contains subintervals up to a few hundred metres thick that range from well and finely-bedded to weakly bedded.

The base of the northern section is marked by up to 100 metres of poorly exposed, massive to thinly-bedded, andesitic argillite and siltstone (Unit Y). At the top of this interval is a zone up to a few tens of metres thick that contains angular to rounded fragments of bedded andesitic argillite-siltstone of Unit Y and rounded pebbles of other rock types, including minor ones of basalt, in a matrix of Unit Y (Unit Y.Y-B). This interval is overlain by massive basalt flows of Unit B with a number of small, genetically associated intrusions of very fine-grained to medium-grained gabbro (Unit R). Rocks dip gently to the south and are warped slightly. This area is separated from the main Pebble zone by an arm of the Kaskanak batholith and is interpreted to underlie stratigraphically the rocks in the immediate Pebble area.

North and west of the Pebble deposit, hilltops are covered by rubble of Unit Y. Overlying this zone, just northwest of the Pebble deposit is a very poorly exposed zone of gabbro and diorite that may be of similar origin to that of the diorite sills in the Pebble deposit.

In the Pebble area, bedded rocks are mainly andesitic argillite and siltstone (Unit Y), with scattered, narrow intervals of wacke (Unit W) that become increasingly abundant to the east. This has economic significance in the East Zone, as rocks of Unit W were more permeable than those of Unit Y and generally were affected more strongly by alteration and contain higher grades of gold and copper than adjacent rocks of Unit Y. Graded beds, load casts, and other small-scale features indicate that the stratigraphic section is upright. In the Pebble area, rocks of Unit Y were warped slightly to moderately.

8.1.2 Cretaceous Intrusive Rocks

Major units of the Cretaceous intrusive suite are described below in order of decreasing relative age based, where possible, upon observed crosscutting relationships. Some age relations are uncertain. These rocks were described in more detail by Lang (2003b) and Payne (2002).

Diorite and Porphyritic Diorite Sills (Unit D)

Diorite forms a few massive sills up to a few hundred metres thick and several much thinner sills in the Resource Lands and in the southern part of the Exploration Lands. Broad warps in the sills are interpreted to correspond to flexures in the enclosing bedded rocks of Units Y and W. The sills may represent hypabyssal relatives to Units B and R. In a few places, diorite sills increase rapidly in thickness and in a few others, they terminate abruptly against older rocks.

Most diorite sills are fine-grained and equigranular, and consist of intergrown prismatic plagioclase and lesser hornblende with accessory magnetite and apatite. Locally, diorite contains up to 15%, equant to slightly elongated phenocrysts of plagioclase up to 2 mm in size. The diorite sills at Pebble underwent moderate to intense potassic and locally propylitic alteration (Gonzalez, 1997). At one locality, small dikes of biotite pyroxenite are reported to cut porphyritic diorite (Turner, 1998). In the Pebble deposit, diorite sills are cut by granodiorite and monzodiorite stocks, and fragments of diorite occur in most other types of intrusive rocks and in intrusion breccias.

Pyroxenite (Unit U)

Pyroxenite forms a large, irregular, elongate body that trends northwest across the central part of the district. Most of it is fine-grained to very fine-grained, with local coarse-grained to pegmatitic zones. In places it forms coarse breccias with fragments of medium/coarse-grained rocks in a sparse to abundant matrix of fine-grained rocks or locally vice versa. The fine-grained rock is dominated by diopsidic augite with 5 to 15% magnetite and 0 to 10% interstitial plagioclase. The coarser-grained phase commonly contains up to 20% patches up to several mm across of medium- to coarse-grained biotite and locally similar patches of magnetite (up to

20%) and of apatite (up to 10%). A K/Ar age determination on coarse grained biotite gave an age of 96.1±4.8 Ma (Bouley et al., 1995).

The southern part of the pyroxenite was intruded by abundant, irregular bodies of monzonite (Unit Mz; see below). Contact zones are marked by zones of intrusion breccia up to a few tens of metres across. These grade from monzonite with minor to abundant inclusions of pyroxenite (near the monzonite) to zones of brecciated pyroxenite containing abundant to minor breccia matrix and dykelets of monzonite (near the pyroxenite). Additional information on the relationship between pyroxenite and monzonite is in Lang (2003a).

Kaskanak Batholith: Quartz Monzodiorite to Granodiorite, Monzonite (Units GK, MK)

The Kaskanak batholith (Unit GK) consists of medium- to coarse-grained, porphyritic to equigranular, quartz monzodiorite to granodiorite that contains subhedral, equant to crudely rectangular phenocrysts of plagioclase and hornblende in a finer-grained matrix of granular plagioclase, quartz, weakly perthitic orthoclase, and minor magnetite. A typical mode is plagioclase 60-70%, quartz 10-20%, orthoclase 7-10%, hornblende 4-5% and magnetite 1-2%. In the southwestern part of the Exploration Lands, a few monzonite to quartz-bearing monzonite dykes (Unit MK) are similar in texture to the main part of the batholith but contain less quartz. The batholith was altered hydrothermally in a few zones in the southern part of the Exploration Lands where it was intruded by younger, more felsic plutons. A date for the batholith, as determined from U/Pb in zircon, is 89.7±0.2 Ma (Bouley et al. 1995).

Hornfels formed in Unit Y and possibly in Unit D in a wide aureole around the Kaskanak batholith. In Unit Y, hornfels is massive and has a constant mineralogy and texture. Major minerals are biotite, K-feldspar or K-Na feldspar, albite-plagioclase, and quartz. Biotite in thin section is medium to dark brownish green and is distinct from red-brown hydrothermal biotite. Minor (<5%) phases include magnetite or variably hematized magnetite, lesser apatite, rutile, ilmenite and pyrrhotite, and trace barite and monazite. Sericite, chlorite and/or calcite are common, particularly outside the deposit where they replace biotite and feldspar. Hornfels within the deposit that was least-overprinted by hydrothermal alteration contains an average of 2% disseminated pyrite, with common concentrations near or above 5%; pyrite commonly is accompanied by trace chalcopyrite. Hornfels is cut by fractures and narrow veinlets of highly variable density that contain combinations of K-feldspar, biotite, quartz, sericite, chlorite, calcite, pyrrhotite and/or pyrite, and which commonly have narrow alteration envelopes of K-feldspar and less commonly biotite.

Monzodiorite (Unit MD)

Several small plutons and plugs of very fine- to fine-grained monzodiorite are exposed in the southeastern part of the Exploration Lands. These rocks are texturally intermediate between diorite and monzonite. Many intrusions were affected by strong phyllic alteration that includes 1 to 5% disseminated pyrite.

Monzonite, Porphyritic Monzonite (Units M, P, Mz)

Intrusions of monzonite (Unit M) and porphyritic monzodiorite (Unit P) form bodies up to at least several tens of metres in size in the western part of the Resource Lands. In places, Unit M contains euhedral to irregular K-feldspar and plagioclase megacrysts from 0.5-2 cm in length in a dense groundmass dominated by plagioclase with scattered grains and clusters of grains of primary biotite. Unit P contains similar megacrysts in a finer-grained, granular groundmass of plagioclase and biotite that is similar to the matrix of Unit N (see below). Unit P is interpreted to be a finer-grained border phase of Unit M. Two dates from Bouley et al (1995) may be from Unit M/P. One from a “large K-feldspar grain” yielded a K/Ar date of 99.8±5 Ma. The other from another “large K-feldspar grain” yielded a K/Ar date of 90.5±4.5 Ma. These dates do not agree with field data, which indicate that the Kaskanak batholith and the hornfelsing of Unit Y along its margins predated the intrusion of the monzonite stocks.

South of the Pebble deposit, a very fine- to fine-grained monzonite to locally syenite and quartz-bearing monzonite (Unit Mz) intrudes a large body of pyroxenite. The monzonite contains plagioclase phenocrysts in a groundmass of plagioclase and minor K-feldspar and biotite, and locally contains K-feldspar megacrysts that are similar to those in Unit M, suggesting a possible genetic relationship. Alteration ranges from weak in much of the body to strong phyllic in the southeast. Further south, this unit may be gradational into Unit MD.

Monzodiorite (Unit N) and Associated Intrusion Breccia (Unit X)

These units occur almost exclusively in the igneous complex in the West Zone of the Pebble deposit. The monzodiorite (Unit N) contains up to 7% plagioclase phenocrysts in a very fine-grained, granular groundmass of plagioclase and biotite. Much of Unit N contains abundant xenoliths of Units Y, D, M and P. Zones of more abundant xenoliths of one or other rock type generally are adjacent to contacts with the corresponding wall rock. In places, older rocks were cut by dykelets of Unit N and in others they were brecciated slightly to moderately and contain a sparse to abundant matrix of monzodiorite of Unit N.

Unit X is defined as an intrusion breccia that contains >50% xenoliths in a matrix of Unit N and grades into Unit N. Grossly, Unit N occurs above the largest body of Unit X, with a few smaller bodies of Unit X higher in the deposit. Unit N may have been emplaced largely by stoping of overlying rock types with only minor mixing and milling of wall rocks. The mechanism of formation of Unit X is uncertain. The complex, pre-granodiorite, intrusive region in the western part of the Pebble deposit includes irregular bodies of Units N and X and abundant blocks of Units M, P, Y and D up to several decametres in size. This area is being modeled as an intrusive mega-breccia.

Granodiorite (Unit G)

Unit G ranges in composition from quartz monzodiorite to granodiorite, and is important because of its spatial and genetic association with Au-Cu-Mo mineralization and related hydrothermal alteration. It has been subdivided into two mineralogically and chemically similar units, medium-grained Unit Gp and fine-grained Unit Gs. Unit Gp contains phenocrysts of plagioclase (30 to 60%) and hornblende (2-5%), and locally minor phenocrysts of quartz and biotite in a matrix dominated by plagioclase (20-30%), quartz (10-20%) and K-feldspar (10-15%). Unit Gs contains small plagioclase phenocrysts. Textures gradational between Units Gp and Gs are common near the boundary between the two units. Xenoliths of other rock types are typically minor and small in both varieties and most occur near contacts with wall rocks.

At Pebble, Unit Gp is interpreted to form a large pluton at depth, which extends to and is exposed on the ridge to the southwest of the deposit. In the deposit, Unit Gp forms large stocks A and B and smaller stocks C and D (Figures 7.1 and 7.2). Stocks A and D are in the western intrusive complex and Stocks B and C are in the central sill complex. They are interpreted as apophyses above the pluton. Unit Gs forms sills above and lateral to the granodiorite stocks. In the East Zone (and locally elsewhere), small dykes of Unit Gp cut deeper parts of the stratigraphic section; along with hydrothermal alteration patterns in the East Zone, these suggest the presence of a nearby granodiorite stock.

8.1.3 Tertiary Volcanic Rocks and Intercalated Sedimentary Rocks

Tertiary rocks comprise mafic to intermediate flows and tuffs, minor felsic tuffs, poorly- indurated volcaniclastic rocks, and clastic sedimentary rocks. In places remnants of Tertiary rocks cap older rocks and elsewhere the two rock types are in fault contact. An eastwardly thickening wedge of mixed sedimentary and subordinate volcanic rocks overlies the eastern part of the Pebble deposit. The western part of Kaskanak Mountain consists of Tertiary dacite/latite flows with a local basal conglomerate of rounded granitic cobbles derived from the underlying batholith. The eastern part of this exposure consists of andesite to basalt flow and flow breccia. On the northeast flank is a large, northwest-trending dyke of platy, Tertiary latite. North of the Kaskanak batholith, basalt flows occur in a graben along North Koktuli Creek. In the southeastern part of the Exploration Lands, Tertiary andesite and basalt flows overlie the Cretaceous rocks. Some contacts between Tertiary and Cretaceous rocks are faulted and indicate that the Tertiary rocks occur in grabens between highlands of Cretaceous rocks. In the southwest corner of the Exploration Lands, a thin zone of Tertiary andesite and basalt overlies rocks of Units Y and P. In the northeastern and far eastern parts of the property, thick layers of Tertiary felsic rocks underlie Tertiary mafic volcanic rocks. On Koktuli Mountain, these rocks were deposited on a core of older rocks including those of Units D and Unit Y. Minor erosion relics of Tertiary felsic volcanic rocks overlie monzonite a few km south of the Pebble deposit.

8.1.4 Quaternary Deposits and Erosion Features

During the Pleistocene, the area was glaciated repeatedly, producing unconsolidated surficial deposits that mantle most of the lower parts of the area (Detterman and Reed, 1973). Gravel deposits are exposed on glacial terraces, especially just northwest of Pebble (see Figure 5).

Rubble, formed by frost action on bedrock, covers many of the gently rounded hilltops and upland surfaces. Solifluction sheets and lobes, most common in plutonic rocks, initiate on the upper part of hills where they are thin and pile up on mid-slopes. Downslope of solifluction lobes are Early Wisconsin terraced and modified moraine deposits, and further downslope are Late (Classical) Wisconsin recessional moraines, each with a transport direction of 180º to 220º. Filling valley bottoms up to a depth of 50 m are Holocene fluvial, glaciofluvial and lacustrine deposits, composed mainly of alternating layers of gravel with lenses of cobbles and silt. Locally these deposits are covered by thin swamp accumulations.

8.2 Structure

Bedding orientations in rocks of Unit Y obtained from abundant outcrops in the southern part of the Exploration Lands, scattered outcrops elsewhere, and from drill holes show that these rocks were warped gently to moderately, probably during the Late Cretaceous to Early Tertiary. In the Pebble deposit, the primary structural element in Unit Y is a broad, M-shaped anticline that is outlined by the distribution of diorite and granodiorite sills. In the southern part of the property, several diorite sills reflect the broad warps in bedding in Unit Y. In many zones underlain by rocks of Unit Y, no outcrop is present.

Faults are widespread in the district, but, due to the paucity of outcrop, their extent and movement histories are poorly understood. In the Resource Lands, a few faults have been correlated confidently between drill holes, and others have been inferred during construction of cross sections. Six major faults (ZA to ZF; Figures 5, 7.1, and 7.2) have been identified. Fault ZA is a steep reverse fault and the others are normal faults. Displacement on each fault is of the order of a few tens of metres, and probably started late in the period of folding and continued intermittently until after the deposition of the Tertiary rocks. Fault ZF is a major, steeply west-dipping structure that is interpreted to exist between the Pebble deposit and the 001 Gold Zone in gabbro-diorite to the northwest. The gabbro/diorite was affected by propylitic alteration and contains abundant pyrite, mainly in veinlets. Scattered high-grade Au concentrations and very low-grade Cu concentrations give the rocks in this area a high Au/Cu ratio. Based on limited data, the motion on Fault ZF is interpreted to be normal.

In the southern part of the Exploration Lands (Figure 5), the Koktuli fault occupies a linear series of east-trending depressions; its displacement is unknown. Further to the south, the sub-parallel Sharp Mountain fault occupies a similar depression; the offset of a diorite sill indicates that it has normal, south-side-down movement. To the west of Sharp Mountain, a wedge of Tertiary andesite occurs in a graben between two strands of this structure.

9. DEPOSIT TYPES

The Pebble property hosts porphyry gold-copper-molybdenum deposits and minor skarn deposits and gold vein occurrences.

Porphyry copper-gold deposits are the principal exploration targets at the Pebble property. Worldwide, porphyry deposits, of which the Pebble deposit is typical, are known for their large size and suitability to bulk-mining methods. They are the world's most important source of copper and molybdenum, and are increasingly significant producers of both gold and silver (Kirkham, 1997). Porphyry deposits commonly occur in clusters within sulphide-rich areas that, as defined by IP geophysical surveys, range from a few square km to 100 km^2 or more.

Peripheral to many porphyry districts are skarn and/or gold-vein deposits that were formed as integral parts of the same hydrothermal system that produced the porphyry deposits. Typically, these deposit types have higher unit values and much smaller sizes than the porphyry deposits.

10.0 2004 EXPLORATION TARGETS AND POTENTIAL

10.1 Property Overview

Geological, geochemical and geophysical surveys indicate that the Pebble deposit is part of an extensive sulphide-bearing, hydrothermal system. A broad IP/chargeability anomaly measuring 21 km in length and up to 9 km in width, with extensive, largely coincident, moderate to strong copper-gold-molybdenum soil geochemical anomalies, coincides with the northeast-trending intrusive corridor. Several of these composite targets were drilled by Northern Dynasty in 2002.

As part of the 2002 program, 16,000 m of core from 104 holes drilled by Teck Cominco in and near the Pebble deposit were relogged in order to model the deposit and assess its potential to host additional, higher-grade resources and to gain a better understanding of the deposit in order to apply that knowledge to the exploration of other targets on the property.

In 2003, Northern Dynasty completed 19,729 m of drilling in 58 holes in and adjacent to the Pebble deposit testing for continuity and extensions of the higher-grade resources. Drill data were compiled and interpreted on sets of 75-m-spaced, geological cross-sections oriented at 060∀and 330∀, a surface map, and three level plans. Nine holes totaling 1,987 m were drilled to test for extensions and new mineralization at four other zones including the Thirty-Eight porphyry copper gold-molybdenum deposit and Thirty-Seven copper-gold skarn zone.

The principal objective in 2004 was to locate additional, higher-grade, porphyry copper-gold resources to complement the previously defined higher-grade area in the Pebble deposit, and thereby define the starter pit(s) required for rapid recovery of capital costs during initial production and generate a feasible mining venture. As well, the goal was to upgrade the resource in the main "starter-pit" area from "indicated" to "measured" and the higher-grade portions of the enclosing mineralized area from "inferred" to "indicated". To this end, Northern Dynasty drilled 39,320 m of core in the Pebble Resource Lands and 7,177 m of core in the adjacent Exploration Lands. Also in the Exploration Lands, 268 m were completed in one exploration hole in the 308 Zone, and 2,788 m were completed in 53 engineering holes. All reported lengths include overburden, much of which was triconed with no core recovery. In some holes, up to 10 m of rubbly bedrock also was triconed. As well, surface mapping of the Exploration Lands was continued at a scale of 1:10,000.

10.2 Pebble Porphyry Gold-Copper-Molybdenum Deposit

The current interpretation of the Pebble porphyry Au-Cu-Mo deposit is the product of the geological synthesis of 38,809 metres of drill core from 173 core holes. These holes have been drilled from surface to depths of up to 800 m and over an area of 7.0 km^2. The geology of the subsurface and 100-m level plan is shown in Figures 7.1 and 7.2, respectively, and that of illustrative cross sections is shown in Figures 9 and 10.

10.2.1 Geology

The Pebble deposit can be subdivided into four zones that manifest distinct combinations of geological and hydrothermal characteristics (Figures 5, 7.1, and 7.2). The **West Zone** is dominated by a multi-phase, intrusive complex, containing abundant intrusion breccias on scales from microbreccia to megabreccia. These rocks are pre-hydrothermal, and are cut by granodiorite stocks and sills and related K-silicate alteration and high-grade Au-Cu-Mo mineralization. The eastern margin of the intrusive breccia complex terminates fairly abruptly along an irregular, steeply dipping, intrusive discontinuity that marks the boundary between the West and Central Zones near cross-section 060_3900. One deep drillhole in this area (Hole 4309, the final hole of the 2004 program) penetrated through the intrusive breccia into a thick diorite sill overlying andesitic sedimentary rocks; this suggests a more complex contact than had been interpreted from previous drilling. The **Central** and **East** Zones are marked by hornfelsed sedimentary strata and diorite sills that were cut by granodiorite sills and a small stock of granodiorite. The Central Zone contains mineralization of moderate grade related to K-silicate alteration developed within and around granodiorite in its upper part, and is gradational to the East Zone, which contains intense K-silicate alteration and high-grade Au-Cu-Mo mineralization that extends to a depth of at least 800 m below surface. The East Zone also contains a few granodiorite and diorite sills deeper in the stratigraphic section than those in the Central Zone. The East Zone extends into the Exploration Lands, is mostly covered by Tertiary rocks and remains open to the east, north, south, and to depth. The West and East Zones define two thermal and fluid centers separated by the Central Zone. The **Peripheral** Zone extends up to several kilometres beyond the well-mineralized core, and is marked by strong sericitic and lesser propylitic alteration that partially overprints the Pebble deposit. It has consistently elevated concentrations of gold and, to the south, gold-base metals with little to no copper.

Following is a summary of the stratigraphy, structure, crosscutting relations, alteration, and mineralization. This report emphasizes megascopic relations of lithological units as shown in the representative geological plans (Figures 7.1 and 7.2) and sections (Figures 8.1 and 8.2). A complete set of sections is stored at the Northern Dynasty office. At Pebble, the main members of the stratigraphic section, including intrusive sills, are as follows (see Figure 6):

Jurassic to Cretaceous Sedimentary/Volcanosedimentary Rocks

Unit Y,W *Andesitic Bedded Rocks (Argillite, Siltstone)*

These rocks consist mainly of aphanitic to extremely fine grained, andesitic argillite and siltstone (Unit Y), with much less abundant, very fine- to fine-grained, andesitic sandstone and wacke (Unit W). In the Pebble deposit, as elsewhere bordering the Kaskanak batholith, these rocks are uniformly hornfelsed as evidenced by pervasive, extremely fine-grained, green biotite.

Bedding is preserved in parts of the section, mainly where finer- and coarser-grained beds are interlayered. In vertical drill holes, most beds dip less than 20º and a few dip up to 45º. Some beds are graded and some contain rip-up clasts. Broad folds are interpreted from the distribution of sills of diorite and granodiorite. The volcanosedimentary rocks are highly fractured over extensive areas and are unfoliated.

In 2002 and 2003, for ease in structural interpretation, Unit Y was subdivided, based on its pseudo-stratigraphic relationship with the diorite and granodiorite sills, into Units Y_0, Y_1, Y_2, and Y_3 (see Figure 6). Unit Y_2, between Sill D_1 and Sill D_2, was divided into upper (Unit Y_{2U}) and lower (Unit Y_{2L}) subunits that are separated by the main granodiorite sill (Sill Gs). Locally where the granodiorite sill splits into two sills, the interval of Unit Y between them is designated Y_{2m}.

Locally, near the base of Unit Y_1 are one or two, lensoidal intervals up to a few metres thick that contain minor to moderately abundant pebbles of quartzite/vein-quartz, cherty plagioclase-quartz intergrowths, and minor hypabyssal, porphyritic felsic rocks (**Unit Y.Q**). Pebbles are mainly less than 2 cm in size; their provenance probably is similar to that of pebbles in the conglomerate of Unit C in the southwest part of the property, but it would be speculative to correlate these zones stratigraphically.

Cretaceous Stratiform Plutonic Rocks

Unit D *Diorite/Gabbro*

Previous work had defined two main diorite sills in Unit Y, D_1 (below) and D_2 (above). A few much thinner, discontinuous, unnamed diorite sills between the main sills can be correlated over distances of up to three hundred metres. In the central and northern part of the area, Sill D_2 thickens abruptly to over 300 m in a tight synform. In the southeast and northwest parts of the area, D_2 forms thinner intersections on the outer limbs of the large, M-shaped anticline. The West Zone contains numerous, laterally discontinuous bodies of diorite that are interpreted to be large blocks of the main sills that were caught up in a monzonite-breccia complex (see below).

More continuous diorite sills occur to the west and northwest of the breccia complex outside of the deposit. These are in fault contact with a large body of fine-grained, equigranular gabbro and diorite to which they may be related genetically.

In a few places, granodiorite sills occur in the same stratigraphic positions as Sills D_2 and D_1; these are designated Sill Gs_2 and Gs_1, respectively. Conversely, in the west, a diorite sill at the stratigraphic level of Sill Gs is designated Sill Ds. In the southeastern part of the zone, a downfaulted block contains a thin granodiorite sill (Gs_3) within Unit Y_3. As more drilling is done, the sills are seen to be less continuous and more complex than previously interpreted.

Deep drilling in the East Zone in 2004 encountered other diorite and granodiorite sills deeper in the section. Because the stratigraphy in these areas is known poorly, these sills have been assigned labels based on their relative depth in the stratigraphic column. As in the overlying sills, the same part of the stratigraphic section may be occupied by diorite and granodiorite sills. In order not to disrupt the previously defined nomenclature of the sills higher in the section, these lower sills have been labeled as D_0/Gs_0, D_{-1}/Gs_{-1}, and D_{-2}/Gs_{-2}, which lie, respectively, progressively deeper in the section above intervals of Unit Y that are labeled Y_0, Y_{-1}, and Y_{-2}.

Diorite is fine-grained and relatively uniform in texture. It is dominated by plagioclase with 20-40% hornblende, up to 4% disseminated magnetite and accessory apatite. Locally it contains up to 15% slightly elongated phenocrysts of plagioclase up to 2 mm long. Normally it is light to dark brown or brownish green (from alteration to biotite-K-feldspar-ankerite) and contains light grey zones produced by later phyllic alteration that was overprinted on the potassic alteration. Similar phyllic alteration occurs in envelopes about some intermediate quartz-pyrite veins. Diorite sills may be similar in origin to a body of diorite that occurs northwest of the deposit (northwest of Fault ZF) in a zone containing rubble and minor outcrops of gabbro and pyroxenite.

Unit Gs *Granodiorite sill(s)*

One main, continuous granodiorite sill (Sill Gs) and a few, smaller, discontinuous sills extend outwards from near the top of Stock B stratigraphically between diorite Sills D1 and D2. Unit Gs is microporphyritic to equigranular, and contains fine-grained, subhedral to euhedral plagioclase crystals in an aphanitic matrix of quartz, plagioclase, and potassium feldspar. Mafic minerals generally are much less abundant than in Unit Gp. The main Gs sill is persistent over an area of 3.6 km^2. Locally, it splits into two thinner sills enclosing a thin wedge of rocks of Unit Y_{2m}. Deep drilling in the East Zone has encountered three major granodiorite sills deeper in the stratigraphic section; these have been labeled Gs_0, Gs_{-1}, and Gs_{-2}. Associated with some of these are discontinuous sills of diorite. Limited data indicate that most deeper sills are not continuous across the deposit and do not occur everywhere at the same stratigraphic levels, resulting in some ambiguity in nomenclature.

Cretaceous Plutonic Rocks (cross-cutting)

Intrusive Complex

The West Zone contains an intrusive and intrusive breccia complex in which fragments of Unit Y and earlier intrusive rocks occur in a matrix of younger intrusive rocks. Some fragments are up to a few hundred metres across. More-closely spaced drilling shows an increasing difficulty in correlation of rock types between drill holes, suggesting that rafts of included rocks are smaller than had been interpreted from earlier, more widely spaced drill holes. The geological interpretation on the cross-sections is complex, and for modeling purposes, this zone is being treated as a megabreccia. From oldest to youngest, the intrusive rock units in the core of the breccia complex are: 1) diorite sills [Unit D], 2) porphyritic monzonite [Unit M] and feldspar megacrystic, porphyritic monzodiorite [Unit P], and 3) porphyritic monzodiorite [Unit N] that commonly contains abundant inclusions of Units Y, D, M, and P, and scattered fragments of intrusive rocks exotic to the deposit. Where the abundance of fragments in Unit N is >50%, the rock is designated Unit X. The breccia complex was intruded by stocks of porphyritic granodiorite to quartz monzodiorite (Unit Gp), with which the main hydrothermal mineralization is associated genetically.

Unit M Monzonite

Unit M forms a few large bodies and many smaller ones in the megabreccia near Stock A. It is characterized by K-feldspar megacrysts and plagioclase phenocrysts in a very fine- to locally fine-grained, mainly white matrix dominated by plagioclase. In thin section, the coarser-grained patches of groundmass commonly are seen to have a fan-shaped to subradiating texture of lathy plagioclase grains with scattered, disseminated grains and clots of primary biotite. Many K-feldspar megacrysts have unusual shapes, in part with curved outlines, and many contain inclusions of euhedral plagioclase phenocrysts and biotite grains. This suggests that the megacrysts grew during late stages of intrusion of Unit M, possibly where the magma was contaminated by partial melting of rocks of Unit Y, rather than being early-formed phenocrysts. Scattered patches of Unit M up to a few metres across contain texture-destructive, K-feldspar-magnetite alteration, some of which is finely banded. A feature of some samples of Units M and P is the presence of coarse, partly recrystallized megacrysts/phenocrysts of apatite.

Unit P Porphyritic Monzodiorite to Quartz Monzodiorite

Unit P forms a few small bodies near Stock A and fragments in nearby bodies of Unit N. Its close spatial relationship to Unit M and the presence of similar K-feldspar megacrysts in both suggest that it is genetically related to Unit M. It has been interpreted as a border or sill phase associated with larger bodies of Unit M. Unit P is characterized by distinctive, euhedral, medium- to coarse-grained plagioclase phenocrysts, lesser euhedral megacrysts of potassium feldspar and plagioclase (1 to 2 cm long), and minor, medium- to coarse-grained, anhedral quartz phenocrysts that are set in a very fine-grained matrix of monzodiorite to quartz monzodiorite composition containing moderately abundant biotite. Megascopically, the matrix is similar to that of Unit N.

Units N and X *Monzodiorite and Associated Intrusion Breccia*

Unit N is a very fine-grained, in part slightly plagioclase-phyric monzodiorite that forms a large stock in the southern and southeastern part of the Pebble deposit, on the eastern flank of Stock A of Unit Gp. It contains sparse fine- and rare medium-grained equant plagioclase phenocrysts in a very fine-grained matrix of plagioclase and biotite with minor apatite. In many places it contains minor to moderately abundant inclusions, mainly of Units M, Y and D. In general, where Unit N cuts an older unit, most of the inclusions it contains are of that rock type. In places, Unit Y is brecciated near the contact with Unit N and the contact consists of a mixed zone of brecciated Unit Y and zones of Unit N with angular inclusions of Unit Y. In some areas, fragments of Unit M have ragged borders, and in places large fragments are bordered by zones that contain small fragments of Unit M enclosed in a matrix of Unit N. These textures suggest that Unit M was being assimilated into Unit N.

The amount and variety of fragments in Unit N is unusually high for an intrusive rock. Fragment size is mainly from 0.3 to 1.5 cm, with a few fragments in the range of 2 to 10 cm. Secondary biotite is common in the fragments, especially those of Units D and Y; abundant secondary biotite gives these a black colour in hand sample. Although no cross-cutting relations were seen between Units N and G, because Unit N does not cut Unit Gp and does not contain fragments of Unit Gp, it is interpreted as being older than Unit Gp.

Commonly at depth, the inclusion-rich monzodiorite of Unit N grades into an intrusion breccia (Unit X) containing >50% fragments mainly from 0.5 to 3 cm and a few from 5 to 10 cm across. Some of the varieties of Unit X contain closely packed fragments with less than 20% monzodiorite matrix, and in places it is difficult to determine megascopically whether the matrix is igneous or fragmental. Fragments include all older rocks present in the study area and some hypabyssal, felsic igneous phases not encountered other than as fragments in Unit X. The main zone of Unit X is up to 50 m thick and occurs below Unit N along the upper contact of Units Gp and F/X2. The fragment populations range from chaotic mixtures of many rock types or mixtures dominated by the nearby wallrock lithology. In larger intervals of Unit X, monolithologic drill-core intervals up to a few metres are interpreted as blocks and rafts. In places, breccia zones grade into zones of wall rock containing dykelets of Unit N and elsewhere to crackle-brecciated zones in which Unit N forms the breccia matrix. The high degree of mixing and commonly small size and subrounded nature of fragments in many breccias are not consistent with genesis in a viscous silicate melt. Most contacts between different phases of intrusion breccia are gradational, and obscured by alteration. The local abundance of mixed, small and somewhat rounded fragments suggests that the monzodiorite may have intruded an earlier, porphyritic, intrusive breccia.

The presence of Unit X and of abundant fine exotic fragments in Unit N suggests a dynamic intrusion for part of these units during which volatile components could have been lost; this would have diminished the ability of the magma to produce a significant quantity of a late-stage, metal-rich, hydrothermal phase. The contrast in character of rocks of Units N and X with those of Unit Gp indicates their emplacement in differing tectonic conditions.

Gold-copper mineralization and potassic alteration (biotite and potassium feldspar) are widespread in rocks of Units N and X, but do not correlate as closely with them as they do with rocks of Unit G. This suggests that a hydrothermal phase may have developed as a late-stage of the intrusion of Unit N, but that it would not have been as intense or enriched in gold, copper, or molybdenum as that associated with Unit G.

Units F and X2 Monzonite and associated Intrusion Breccia

The south side of the West Zone hosts a distinctive, porphyritic monzonite (Unit F) that grades into an igneous breccia (Unit X2), which has a matrix dominated by milled Unit F. These units generally occur to the southeast of and beneath zones of Unit X. Unit F contains lathy plagioclase phenocrysts in an extremely fine-grained groundmass of plagioclase and K-feldspar that, in places, resembles the groundmass of Unit M and in places is similar to Unit Mz to the south. Unit F generally contains moderately abundant fragments of Unit F and minor ones of Units Y and D from 0.5 to 2 cm in size. Unit X2 contains >50% milled fragments, mainly of Unit F with much less abundant fragments of Units Y and D, in a subordinate, milled groundmass dominated by Unit F. Weak potassic alteration with a moderate to strong phyllic overprint is widespread. Because Units F and X2 are so intimately intermixed and essentially similar in origin, for modeling purposes they are treated as a single unit (Unit F/X2).

Granodiorite-Quartz Monzodiorite (Unit Gp)

Unit Gp is interpreted to form a broad pluton at depth, from which several, steeply-sided stocks were emplaced at higher levels. Stocks A and D are in the intrusive complex of the West Zone whereas Stocks B and C are in the sill complex of the Central Zone. A few dykes and sills were intersected in deep drilling in the East Zone where an as-yet-undiscovered stock is interpreted to exist below or to the east of the East Zone.

Unit Gp contains 30 to 60% fine- to medium-grained plagioclase phenocrysts in a very fine-grained matrix dominated by quartz, potassium feldspar, and plagioclase with accessory magnetite and apatite and trace zircon. Phenocrysts of hornblende, quartz and biotite form 1-5% of the rock. Least altered rocks of Unit Gp contain 10 to 20% quartz and 7 to 10% potassium feldspar. In general, rocks in the plutons contain coarser-grained plagioclase (and hornblende) phenocrysts, than do those in the sills (Unit Gs). In places a transition in grain size occurs where a sill extends outward from near the top of a pluton. Inclusions are rare and typically occur near contacts with country rocks. The composition of Unit Gp is intermediate between granodiorite and quartz monzodiorite. Quartz monzodiorite in the core of the Thirty-Eight Zone 12 km to the southwest is similar in texture and composition to Unit Gp.

Tertiary Rocks

Sedimentary Units TC, TW and TY; Mixed Unit TF; Volcanic Units TB, TA and TD

An eastwardly thickening wedge of Tertiary sedimentary and volcanic rocks covers the eastern parts of the Pebble deposit. This wedge contains a lower zone dominated by Tertiary pebble to boulder conglomerate and an upper zone dominated by interbedded wacke and mudstone. Discontinuous intervals up to a few tens of metres thick are of basalt to latite flows and subvolcanic intrusions and of poorly sorted, fragmental rocks, probably partly tuffaceous in origin. In general, the Tertiary volcanic rocks overlie fresh, pyrite-bearing Cretaceous rocks, indicating a pre-mid-Tertiary exposure and erosion of the Pebble porphyry system.

In the volcaniclastic rocks, most cobbles and boulders are of plagioclase-phyric andesite and plagioclase- and/or pyroxene-phyric basalt, with most phenocrysts <0.5 mm in size. Coarse-grained calcite is disseminated in the matrix of some fragmental units and is concentrated in scattered replacement patches up to 10 cm in size. A few varieties of andesite and basalt contain more abundant, coarser plagioclase and pyroxene phenocrysts. A few cobbles are of finely flow-banded dacite. Near the base of the section are scattered cobbles of porphyritic, possibly Cretaceous rocks. In the middle of the section in several drill holes, one boulder-rich unit is dominated by a distinctive porphyritic basalt that contains 12 to 15% plagioclase phenocrysts 1 to 4 mm in size and 5 to 7% pyroxene phenocrysts from 1 to 3 mm in size. Fragments of this unit were not seen elsewhere in the Tertiary section, suggesting that it was a single flow that was reworked slightly. Depending on its lateral extent, it might be a suitable marker horizon in the Tertiary section.

Interlayers up to several feet thick are of fine to coarse wacke and minor units are of carbonaceous siltstone-mudstone. Some wacke intervals contain upright gradational beds. Many intervals are poorly consolidated.

Near the base of the section in a few holes, a wacke bed contains moderately abundant hematite, suggesting a minor regolith. However, the contact between a lower wacke bed with the Cretaceous basement is sharp and shows no sign of regolith development.

Cutting the south central part of the deposit is an east-west trending swarm of Tertiary basalt dikes (Unit TBd), mainly between one to three metres thick. Contacts dip moderately to steeply in drill core and in one east-trending surface outcrop. Preliminary drillhole interpretation suggests that the dikes dip to the south. Most dykes are basaltic, with lesser ones of andesite and latite, and many have chilled border zones. The cores of some contain zones with 2-5%, prominent calcite-rich amygdules. Most dykes were emplaced into active fault zones and many of them have sheared and altered border zones, indicating that deformation continued after dike emplacement. Many dike margins were altered by weathering.

Quaternary Deposits

Unit Ob Overburden

Unconsolidated glacial gravel, sand, and clay deposits cover much of the area. These glacial deposits, typically gravel, are a few metres thick over the northern and central portions of the deposit. In the broad valley to the southeast and east they thicken to 30 m. To the west are hummocky tills in excess of 40 m thick. They contain a mixture of well rounded and sorted pebbles with more angular rocks of similar size. Over the eastern portion of the Pebble deposit, basal sand layers in the Quaternary are typically positively charged aquifers that flow sand and water where intersected by drill holes. Artesian water was intersected at various levels from surface to bedrock in the thicker, eastern and western glacial deposits.

Unit Fc Ferricrete

At several places along the base of the overburden is a zone of ferricrete up to a few metres thick containing angular fragments of bedrock and angular to rounded fragments of glacial deposits that were cemented by orange-brown limonite.

10.2.2 Structure

The primary structural element at the Pebble copper-gold resource is a broad, M-shaped anticline that encompasses the entire resource. This fold was outlined by the distribution of diorite and granodiorite sills in Unit Y; the fact that bedding orientations in Unit Y generally are at low to moderate angles to the horizontal supports this interpretation. The contact between Sill D_2 and Unit Y contains several subordinate synclinal and anticlinal warps in various orientations, including a large one in the northeast of the deposit where D2 sill thickens greatly. The folding probably occurred during and after intrusion of Unit G.

In the southern part of the West Zone, a pluton of Unit N and associated intrusion breccia of Unit X were emplaced across the nose of the entire M-fold. Further south and southwest, stock F and intrusion breccia X2 were emplaced. A series of small granodiorite stocks was intruded along a roughly east-west axis in the core of the deposit.

Some contacts between units are along moderate to strong faults. For example, in places, a moderate fault separates older rocks above from those of Unit G below, and in some of these, rocks of Unit G below the fault are much less altered than the rocks above. Some of the faults have been correlated between drill holes and, during construction of the cross sections, others have been inferred. Six major faults have been identified or inferred and others probably exist. Fault ZA, a reverse fault, was identified in the 2002 relogging program of Teck Cominco drill holes. Offset is up to 30 m and decreases to zero at the southeast end. In 2003, three normal faults labeled ZB, ZC and ZD were interpreted in the area northeast of Fault ZA in an area that previously had a very low density of drill holes. Offset on these is of the order of 20-50 m. In

2004, Fault ZE was identified in the southern part of the deposit; it is a curved, normal fault with an offset of 50-100 m. Movement on all faults is of the order of a few tens of metres, and probably began late in the period of folding and was reactivated during the Tertiary.

A major structural discontinuity (Fault ZF) is interpreted between the main Pebble zone and the 001 Gold Zone to the northwest. It is interpreted as a steep, normal fault with an offset of 50-100 metres. The 001 Gold Zone is in gabbro/diorite that shows propylitic alteration. Sulphides in it are mainly pyrite, copper concentrations are very low and gold/copper ratios are much higher than in the Pebble deposit.

10.2.3 Hydrothermal Mineralization

The Pebble deposit is a calc-alkalic porphyry that manifests characteristics typical of many porphyry Cu-Au-Mo systems. Mineralization is strongest in and around the upper parts of granodiorite stocks and is associated with strong, high-temperature potassic alteration (biotite and/or K-feldspar) and the development of abundant quartz-vein stockworks. Sulphides are mainly pyrite, chalcopyrite, and molybdenite, with minor bornite; they occur in and disseminated adjacent to quartz-rich veins. Gold is present mainly with copper-bearing sulphides in a ratio of 1 g/t Au to 1% Cu. Studies on gold-copper porphyry deposits show a wide range of gold/copper ratios and suggest that in high-temperature deposits (>550°), gold mainly precipitates in solid solution in copper-bearing minerals, with the minerals containing more abundant copper having a higher partition of gold than those lower in copper content (i.e., chalcocite > bornite > chalcopyrite) (Kesler, 2004).

Limited petrographic studies at Pebble show that gold occurs in native form as grains a few microns in diameter in and near the boundaries of chalcopyrite and pyrite grains (Casselman, 2001) and on borders of chalcopyrite with molybdenite (Payne, pers.comm.). Molybdenite occurs predominately in Type B quartz veins, and to a lesser extent intergrown with disseminated chalcopyrite in K-silicate alteration assemblages. Pyrite is present in low concentrations (mostly <2 to 3%) in zones of strong potassic alteration and is much more abundant (mostly >5%) in zones of phyllic alteration.

Deposit mineralization is present over an area of at least 2.8 km by 2.2 km and to a depth of at least 400 m and up to 590 m in the West and Central Zones and at least 800 m in the East Zone. A general zonation pattern grades from an elongate, high-temperature core with strong Au-Cu-Mo mineralization, relatively low pyrite concentration and strong potassium-silicate alteration, through an intermediate zone dominated quartz-sericite-pyrite (phyllic) alteration with strongly anomalous Au but low Cu-Mo, to a peripheral, low-temperature zone marked by propylitic and sericite-pyrite-quartz alteration with scattered polymetallic veins, some of which contain highly anomalous concentrations in lead, zinc, silver, and gold. The phyllic and propylitic alteration envelope around the deposit is up to 5.5 km by 2.5 km in area and contains many areas in which gold concentrations exceed 100 ppb. The distribution of drill holes containing sample intervals with gold concentrations >5.0 g/t displays an annular distribution of high gold grades associated with sericite-quartz-pyrite veins at the deposit periphery, a feature common to classic porphyry systems. Gold-copper-molybdenum mineralization is open to the east beneath the Tertiary cover, to the south, where Tertiary cover is absent, and to depth.

The highest average concentration of gold and copper is in Unit D near Unit Gp stocks, with slightly lesser average values in Units M and P near Unit Gp stocks, in the outer parts of the Gp stocks, and in the main Unit Gs sill. Deeper and more interior parts of the Gp stocks contain much lower-grade mineralization and strong, lower-temperature phyllic and propylitic alteration overprints on the original K-silicate alteration assemblage. The strong spatial association between high-grade mineralization, strong K-silicate alteration, and high densities of early- to intermediate-stage quartz veins (Types B and C) with the upper parts of Unit G stocks and the Unit Gs sills implies a magmatic-hydrothermal association. The high grades typically of parts of Unit D reflect enhanced sulphide precipitation due to high permeability and probably also due to a favourable, Fe-enriched host-rock composition and abundant appropriate sites (biotite grains) for nucleation of sulphide minerals. The lower grades typical of Unit Y are due, at least in part, to the low permeability of this massive hornfels unit; this is supported by the presence of stronger alteration and mineralization in coarser-grained beds of Unit W that are interleaved with less mineralized rocks of Unit Y.

As indicated by widely spaced and generally shallow drilling, the intrusive complex in the southern part of the West Zone (Unit F/X2) extends south from the south edge of Pebble deposit for at least 1.5 km and has an estimated width in the order of 600 m. This zone of intrusion breccia contains persistent, low-grade mineralization from 0.2 to 0.3 g/t Au and 0.07 to 0.1% Cu. It is not clear if this mineralization is related to granodiorite stocks at depth (none have been intersected in the drilling) or if it is earlier mineralization related genetically to one or more of the older intrusive phases. The high copper concentrations where the intrusive breccia complex was intruded by granodiorite might have resulted from a combination of a subordinate copper/gold contribution from one or more of the earlier intrusive phases with that produced during the main copper mineralization related to the later granodiorite.

Significant intersections of copper, gold, and molybdenum from the 2004 drill program are shown in Table 10.2.3.1 along with copper-equivalent concentrations. Copper-equivalent calculations use metal prices of US$1.00/lb for copper, US$400/oz for gold, and US$6.00/lb for molybdenum. CuEQ = Cu % + (Au g/t x 12.86/22.06) + (Mo% x 132.28/22.06). Copper-equivalent has not been adjusted for metallurgical recoveries. Adjustment factors to account for differences in relative metallurgical recoveries for gold, copper and molybdenum will depend upon the completion of definitive metallurgical testing.

Table 10.2.3.1 Significant Intersections from 2004 Drill Program

(a line in bold type is a selected higher-grade interval within the longer interval listed directly above)

Drill Hole Number		From (metres)	To (metres)	Intercept (metres)	Au g/t	Cu %	Mo %	Ag ppm	CuEQ1 %
4136		149.4	313.9	164.6	0.40	0.42	0.020	1.8	0.79
4136	**Incl.**	**234.7**	**301.8**	**67.1**	**0.59**	**0.48**	**0.020**	**1.9**	**0.97**
4137		32.0	381.6	349.6	0.39	0.36	0.022	2.3	0.73
4137	**Incl.**	**166.7**	**310.0**	**143.3**	**0.54**	**0.52**	**0.028**	**2.8**	**1.02**
4138		39.6	303.9	264.3	0.42	0.31	0.023	1.4	0.71
4138	**Incl.**	**114.0**	**194.8**	**80.8**	**0.68**	**0.42**	**0.029**	**1.6**	**1.01**
4139		25.6	154.8	129.2	0.51	0.42	0.014	1.5	0.83
4140		6.1	200.3	194.2	0.37	0.30	0.014	1.7	0.62
4140	**Incl.**	**87.5**	**162.8**	**75.3**	**0.52**	**0.36**	**0.014**	**2.0**	**0.77**
4141		28.0	44.8	16.8	1.96	0.03	0.001	1.1	1.28
4141		142.3	163.7	21.3	1.28	0.10	0.002	1.7	0.93
4141		266.1	325.8	59.7	0.43	0.37	0.015	2.3	0.73
4142		24.4	283.2	258.8	0.68	0.44	0.019	2.2	0.98
4142	**Incl.**	**24.4**	**45.4**	**21.0**	**0.50**	**0.61**	**0.044**	**2.1**	**1.18**
4142	**Incl.**	**130.8**	**234.4**	**103.6**	**1.11**	**0.52**	**0.018**	**3.1**	**1.33**
4143		24.1	54.6	30.5	0.32	0.31	0.015	1.2	0.60
4143		134.1	197.8	63.7	0.40	0.36	0.018	1.2	0.71
4143		231.7	258.8	27.1	0.33	0.35	0.034	1.7	0.75
4144		157.0	292.3	135.3	0.37	0.34	0.019	1.8	0.68
4144	**Incl.**	**222.2**	**292.3**	**70.1**	**0.50**	**0.42**	**0.025**	**1.8**	**0.88**
4145		21.0	280.1	259.1	0.68	0.55	0.037	2.2	1.20
4145	**Incl.**	**85.0**	**249.6**	**164.6**	**0.88**	**0.69**	**0.050**	**2.6**	**1.54**
4145	**Incl.**	**106.4**	**249.6**	**143.3**	**0.93**	**0.74**	**0.053**	**2.7**	**1.63**
4146		29.3	142.7	113.4	0.45	0.34	0.018	1.6	0.72
4146	**Incl.**	**69.5**	**142.7**	**73.2**	**0.46**	**0.38**	**0.022**	**1.8**	**0.80**
4147		24.1	185.6	161.5	0.80	0.40	0.010	2.0	0.96
4147	**Incl.**	**60.7**	**161.2**	**100.6**	**0.99**	**0.42**	**0.011**	**2.4**	**1.11**
4148		18.3	78.9	60.7	0.46	0.38	0.019	1.5	0.78
4148	**Incl.**	**18.3**	**51.5**	**33.2**	**0.50**	**0.43**	**0.025**	**1.5**	**0.88**
4148		179.5	213.1	33.5	0.36	0.38	0.010	1.8	0.66
4149		171.6	473.4	301.8	0.49	0.46	0.026	1.8	0.92
4149	**Incl.**	**171.6**	**407.8**	**236.2**	**0.54**	**0.51**	**0.027**	**2.0**	**1.01**
4150		39.3	60.7	21.3	0.54	0.32	0.008	1.4	0.71
4150		88.1	241.1	153.0	0.42	0.32	0.014	1.9	0.67
4151		48.5	78.9	30.5	0.27	0.25	0.013	1.4	0.50
4152		48.5	78.9	30.5	0.30	0.19	0.010	1.2	0.44
4153		72.5	261.5	189.0	0.30	0.27	0.013	1.7	0.54
4153	**Incl.**	**72.5**	**93.9**	**21.3**	**0.56**	**0.36**	**0.010**	**3.9**	**0.78**
4154		24.1	66.8	42.7	0.60	0.21	0.001	2.9	0.60
4154		208.3	289.3	80.9	0.33	0.39	0.015	2.6	0.68
4155		185.6	310.6	125.0	0.42	0.46	0.018	2.6	0.83
4158		127.7	155.1	27.4	0.58	0.24	0.008	2.1	0.65
4158		225.6	310.6	85.0	0.63	0.42	0.009	2.5	0.88
4160		75.3	105.2	29.9	0.47	0.29	0.005	1.6	0.62
4161		48.5	85.8	37.3	0.52	0.33	0.010	2.3	0.72
4161		167.3	205.1	37.8	0.51	0.35	0.009	1.7	0.72
4162		39.3	143.0	103.6	0.56	0.29	0.018	1.2	0.75
4162		152.1	216.1	64.0	0.32	0.28	0.019	1.1	0.60
4163		22.6	212.8	190.2	0.42	0.30	0.011	2.2	0.63
4164		39.6	185.4	145.8	0.38	0.29	0.018	1.9	0.63
4164		229.3	271.0	41.7	0.27	0.33	0.011	1.7	0.57
4165		25.5	330.7	305.3	0.48	0.32	0.015	2.0	0.71
4165	**Incl.**	**25.5**	**57.9**	**32.5**	**0.43**	**0.45**	**0.011**	**1.7**	**0.78**
4165	**Incl.**	**266.7**	**330.7**	**64.0**	**0.75**	**0.30**	**0.014**	**2.6**	**0.85**
4166		15.2	118.6	103.3	0.63	0.37	0.007	2.1	0.81
4168		36.3	197.8	161.5	0.46	0.29	0.006	1.5	0.62
4169		27.7	228.3	200.6	0.48	0.32	0.014	1.4	0.70
4169	**Incl.**	**143.0**	**213.1**	**70.1**	**0.58**	**0.36**	**0.018**	**1.4**	**0.83**
4170		21.0	161.2	140.2	0.41	0.31	0.006	1.3	0.61
4170	**Incl.**	**127.3**	**161.2**	**34.0**	**0.46**	**0.39**	**0.010**	**2.1**	**0.73**
4171		136.9	286.2	149.4	0.25	0.28	0.009	1.5	0.50
4172		63.1	289.9	226.8	0.67	0.34	0.010	2.6	0.83
4172	**Incl.**	**63.1**	**207.0**	**143.9**	**0.85**	**0.38**	**0.011**	**2.8**	**0.98**
4173		104.9	182.3	77.4	0.48	0.40	0.016	2.3	0.79

Drill Hole Number		From (metres)	To (metres)	Intercept (metres)	Au g/t	Cu %	Mo %	Ag ppm	CuEQ1 %
4175		145.5	214.3	68.7	0.23	0.29	0.023	1.3	0.56
4175	**Incl.**	**145.5**	**162.5**	**16.9**	**0.31**	**0.39**	**0.022**	**1.8**	**0.71**
4175		255.4	295.1	39.6	0.25	0.33	0.029	1.2	0.65
4176		132.6	207.0	74.4	0.35	0.35	0.007	3.1	0.61
4177		83.5	134.7	51.3	0.48	0.29	0.011	2.5	0.66
4178		21.3	330.1	308.8	0.26	0.31	0.019	1.7	0.58
4178	**Incl.**	**48.5**	**124.7**	**76.2**	**0.38**	**0.38**	**0.020**	**1.8**	**0.73**
4179		30.2	57.6	27.4	0.41	0.36	0.011	1.0	0.68
4180		124.7	216.1	91.4	0.45	0.34	0.011	2.3	0.69
4181		163.7	274.0	110.3	0.75	0.33	0.022	2.1	0.93
4182		24.4	307.2	282.9	0.39	0.41	0.031	1.8	0.83
4182	**Incl.**	**196.6**	**285.9**	**89.3**	**0.43**	**0.49**	**0.047**	**1.8**	**1.03**
4183		91.1	191.7	100.6	0.48	0.26	0.006	2.5	0.60
4184		30.5	216.1	185.6	0.28	0.31	0.027	1.4	0.64
4184	**Incl.**	**30.5**	**115.5**	**85.0**	**0.33**	**0.37**	**0.025**	**1.5**	**0.72**
4185		33.5	179.5	146.0	0.37	0.30	0.006	1.4	0.57
4186		28.7	151.8	123.1	0.40	0.51	0.035	1.5	0.96
4186	**Incl.**	**82.0**	**133.2**	**51.2**	**0.54**	**0.60**	**0.044**	**1.7**	**1.19**
4187		31.1	170.7	139.6	0.39	0.61	0.057	1.4	1.19
4187	**Incl.**	**42.7**	**118.9**	**76.2**	**0.47**	**0.86**	**0.063**	**1.4**	**1.51**
4188		181.5	426.4	244.9	0.55	0.47	0.031	1.5	1.00
4188	**Incl.**	**216.1**	**368.5**	**152.4**	**0.65**	**0.57**	**0.032**	**1.8**	**1.16**
4189		12.2	296.9	284.7	0.34	0.39	0.025	1.8	0.75
4189	**Incl.**	**12.2**	**76.5**	**64.3**	**0.73**	**0.81**	**0.081**	**3.5**	**1.73**
4190		12.5	96.9	84.4	0.55	0.42	0.023	1.5	0.90
4191		57.3	118.3	61.0	0.43	0.33	0.009	1.2	0.66
4192		103.3	122.6	19.3	0.47	0.36	0.022	1.1	0.78
4193		69.8	128.9	59.1	0.54	0.30	0.009	2.1	0.70
4194		18.0	64.9	46.9	0.72	0.51	0.011	2.5	1.04
4194		64.9	320.0	255.1	0.22	0.27	0.018	1.4	0.51
4194	**Incl.**	**277.1**	**320.0**	**43.0**	**0.36**	**0.36**	**0.027**	**2.3**	**0.74**
4195		30.2	112.5	82.3	0.33	0.34	0.028	1.8	0.71
4196		36.3	249.6	213.4	0.45	0.47	0.014	2.0	0.84
4196	**Incl.**	**66.8**	**249.6**	**182.9**	**0.48**	**0.49**	**0.015**	**2.1**	**0.88**
4196	**Incl.**	**144.8**	**188.7**	**43.9**	**0.61**	**0.63**	**0.015**	**2.0**	**1.09**
4197		18.0	45.2	27.2	0.50	0.34	0.004	1.8	0.69
4197		79.6	228.3	148.7	0.27	0.31	0.011	1.8	0.55
4198		38.4	106.4	68.0	0.40	0.45	0.013	2.5	0.78
4198		121.0	154.2	33.2	0.24	0.40	0.014	2.5	0.63
4198		204.2	286.2	82.0	0.31	0.40	0.013	1.5	0.67
4199		25.3	37.5	12.2	0.47	0.39	0.003	2.4	0.70
4199		53.2	199.5	146.3	0.48	0.48	0.011	2.1	0.85
4199	**Incl.**	**96.0**	**148.3**	**52.3**	**0.65**	**0.65**	**0.013**	**2.1**	**1.13**
4200		23.3	264.9	241.6	0.31	0.34	0.012	2.2	0.60
4200	**Incl.**	**216.1**	**264.9**	**48.8**	**0.40**	**0.49**	**0.009**	**2.4**	**0.80**
4201		39.6	128.0	88.4	0.26	0.41	0.029	1.5	0.74
4201	**Incl.**	**42.7**	**73.2**	**30.5**	**0.29**	**0.55**	**0.026**	**1.9**	**0.87**
4202		51.8	221.9	170.1	0.21	0.35	0.027	1.4	0.64
4202	**Incl.**	**51.8**	**81.4**	**29.6**	**0.21**	**0.53**	**0.031**	**1.8**	**0.84**
4203		17.7	109.1	91.4	0.41	0.51	0.067	1.7	1.15
4203		133.5	182.3	48.8	0.24	0.41	0.032	3.5	0.74
4204		28.4	200.0	171.6	0.39	0.53	0.039	2.2	1.01
4204	**Incl.**	**28.4**	**135.9**	**107.6**	**0.49**	**0.68**	**0.035**	**2.5**	**1.19**
4205		17.7	310.3	289.6	0.39	0.36	0.016	1.6	0.70
4205	**Incl.**	**44.8**	**78.6**	**33.8**	**0.45**	**0.48**	**0.012**	**1.1**	**0.83**
4205	**Incl.**	**197.2**	**231.0**	**33.8**	**0.44**	**0.46**	**0.022**	**1.8**	**0.86**
4206		65.8	189.9	124.1	0.46	0.36	0.017	1.7	0.75
4206	**Incl.**	**74.1**	**104.6**	**30.5**	**0.54**	**0.40**	**0.015**	**1.9**	**0.83**
4206	**Incl.**	**159.4**	**189.9**	**30.5**	**0.46**	**0.41**	**0.021**	**2.0**	**0.82**
4207		33.7	395.6	362.0	0.32	0.41	0.016	2.0	0.71
4207	**Incl.**	**55.6**	**107.6**	**52.0**	**0.51**	**0.51**	**0.014**	**1.5**	**0.91**
4207	**Incl.**	**122.5**	**167.0**	**44.5**	**0.49**	**0.56**	**0.013**	**3.5**	**0.94**
4208		14.3	337.4	323.1	0.43	0.26	0.008	1.8	0.58
4208	**Incl.**	**14.3**	**191.1**	**176.8**	**0.43**	**0.27**	**0.009**	**1.6**	**0.60**
4208	**Incl.**	**14.3**	**127.1**	**112.8**	**0.45**	**0.29**	**0.008**	**1.5**	**0.62**
4210		184.7	368.2	183.5	0.43	0.53	0.018	2.2	0.90
4210	**Incl.**	**184.7**	**282.9**	**98.2**	**0.51**	**0.65**	**0.021**	**2.7**	**1.09**
4211		27.1	97.2	70.1	0.51	0.27	0.012	2.2	0.67

Drill Hole Number		From (metres)	To (metres)	Intercept (metres)	Au g/t	Cu %	Mo %	Ag ppm	CuEQ1 %
4211	**Incl.**	**63.7**	**97.2**	**33.5**	**0.59**	**0.33**	**0.012**	**2.6**	**0.77**
4212		11.9	166.1	154.2	0.45	0.37	0.012	2.2	0.72
4212	**Incl.**	**11.9**	**30.2**	**18.3**	**0.68**	**0.54**	**0.005**	**3.6**	**1.00**
4213		12.5	23.5	11.0	0.58	0.46	0.011	2.9	0.89
4213		60.7	133.8	73.2	0.32	0.29	0.021	1.4	0.61
4214		7.9	310.6	302.7	0.29	0.31	0.024	1.2	0.63
4214		7.9	60.7	52.7	0.45	0.55	0.038	2.3	1.06
4215		39.3	146.0	106.7	0.26	0.27	0.022	1.7	0.56
4216		9.1	286.2	277.1	0.31	0.28	0.020	1.3	0.60
4216	**Incl.**	**9.1**	**79.6**	**70.4**	**0.45**	**0.34**	**0.017**	**1.5**	**0.72**
4216	**Incl.**	**225.3**	**286.2**	**61.0**	**0.31**	**0.33**	**0.030**	**1.2**	**0.70**
4217		9.1	210.0	200.9	0.29	0.34	0.015	2.2	0.61
4217	**Incl.**	**9.1**	**86.3**	**77.1**	**0.42**	**0.42**	**0.015**	**2.4**	**0.78**
4218		18.3	57.8	39.5	1.24	0.64	0.008	2.5	1.48
4218		165.2	231.3	66.1	0.32	0.39	0.019	1.6	0.70
4219		11.9	289.3	277.4	0.30	0.36	0.013	2.4	0.62
4219	**Incl.**	**14.9**	**48.2**	**33.2**	**0.43**	**0.47**	**0.012**	**2.4**	**0.81**
4219	**Incl.**	**200.3**	**271.6**	**71.3**	**0.30**	**0.51**	**0.017**	**2.9**	**0.79**
4220		30.2	277.1	246.9	0.45	0.50	0.021	1.5	0.91
4220	**Incl.**	**30.2**	**216.1**	**185.9**	**0.48**	**0.54**	**0.022**	**1.6**	**0.98**
4221		17.7	261.5	243.8	0.43	0.56	0.028	2.9	0.99
4221	**Incl.**	**17.7**	**185.3**	**167.6**	**0.50**	**0.64**	**0.030**	**2.7**	**1.13**
4222		23.8	185.9	162.2	0.36	0.57	0.047	2.0	1.06
4222	**Incl.**	**23.8**	**100.0**	**76.2**	**0.48**	**0.86**	**0.033**	**2.7**	**1.35**
4223		32.9	123.4	90.5	0.28	0.34	0.040	1.2	0.74
4223	**Incl.**	**45.1**	**72.5**	**27.4**	**0.38**	**0.55**	**0.074**	**1.3**	**1.21**
4226		6.1	26.7	20.6	0.34	0.48	0.011	2.9	0.75
4226		66.8	130.8	64.0	0.37	0.35	0.009	2.2	0.64
4226		188.7	274.0	85.3	0.47	0.45	0.015	2.5	0.84
4226	**Incl.**	**216.1**	**274.0**	**57.9**	**0.55**	**0.51**	**0.017**	**2.7**	**0.95**
4227		9.1	84.3	75.1	0.58	0.40	0.012	2.9	0.84
4228		10.1	33.8	23.8	0.64	0.68	0.008	5.4	1.13
4229		29.6	213.1	183.5	0.33	0.38	0.013	3.9	0.67
4229	**Incl.**	**36.1**	**146.0**	**109.9**	**0.40**	**0.42**	**0.014**	**5.5**	**0.75**
4230		9.1	42.4	33.2	0.57	0.47	0.009	2.6	0.88
4230		56.1	80.5	21.6	0.73	0.39	0.015	2.6	0.94
4230		130.8	219.2	88.4	0.30	0.34	0.023	1.2	0.66
4230		249.6	299.6	50.0	0.34	0.41	0.012	1.7	0.69
4231		6.4	103.3	96.9	0.43	0.44	0.026	2.7	0.86
4231	**Incl.**	**6.4**	**75.9**	**69.5**	**0.52**	**0.51**	**0.021**	**3.1**	**0.96**
4231		146.0	225.3	79.3	0.35	0.34	0.020	1.3	0.68
4232		11.9	109.4	97.5	0.45	0.26	0.013	1.7	0.62
4232		179.5	280.1	100.6	0.61	0.41	0.015	2.5	0.89
4233		4.6	18.0	13.4	0.45	0.47	0.016	2.7	0.84
4233		48.5	69.8	21.3	0.56	0.48	0.018	3.0	0.94
4233		88.1	108.7	20.6	0.68	0.38	0.008	2.1	0.85
4234		18.3	152.1	133.8	0.62	0.37	0.007	2.5	0.81
4234	**Incl.**	**18.3**	**45.4**	**27.1**	**0.73**	**0.49**	**0.006**	**3.4**	**0.98**
4234	**Incl.**	**91.4**	**152.1**	**60.7**	**0.83**	**0.35**	**0.008**	**2.0**	**0.92**
4235		51.5	89.3	37.8	0.27	0.38	0.006	1.5	0.59
4236		9.1	249.6	240.5	0.41	0.33	0.011	1.7	0.66
4236		71.6	115.5	43.9	0.72	0.37	0.009	2.0	0.89
4237		7.3	78.9	71.6	0.36	0.35	0.014	1.9	0.67
4238		6.7	267.9	261.2	0.36	0.32	0.022	1.3	0.67
4238		63.7	91.1	27.4	0.58	0.41	0.018	1.8	0.88
4238		228.3	255.7	27.4	0.46	0.42	0.044	1.3	0.97
4239		13.7	149.1	135.3	0.48	0.34	0.020	2.1	0.76
4239	**Incl.**	**13.7**	**36.3**	**22.6**	**0.63**	**0.38**	**0.009**	**2.5**	**0.83**
4239	**Incl.**	**45.4**	**83.8**	**38.4**	**0.74**	**0.43**	**0.024**	**2.2**	**1.03**
4240		9.1	109.4	100.3	0.45	0.39	0.014	2.0	0.75
4240	**Incl.**	**9.1**	**78.9**	**69.8**	**0.53**	**0.45**	**0.015**	**2.3**	**0.87**
4244		27.1	182.6	155.5	0.37	0.40	0.018	1.7	0.73
4244	**Incl.**	**60.7**	**182.6**	**121.9**	**0.33**	**0.45**	**0.019**	**1.8**	**0.76**
4244	**Incl.**	**152.1**	**182.6**	**30.5**	**0.44**	**0.59**	**0.016**	**2.4**	**0.96**
4245		36.3	115.5	79.3	0.31	0.38	0.020	1.3	0.69
4245	**Incl.**	**36.3**	**75.9**	**39.6**	**0.37**	**0.43**	**0.023**	**1.5**	**0.79**
4248		81.7	89.9	8.2	0.44	0.41	0.021	0.7	0.81
4250		261.8	304.2	42.4	0.62	0.43	0.010	1.1	0.89

Drill Hole Number		From (metres)	To (metres)	Intercept (metres)	Au g/t	Cu %	Mo %	Ag ppm	CuEQ1 %
4251		213.4	282.9	69.5	0.33	0.32	0.007	1.5	0.57
4253		84.4	127.7	43.3	0.12	0.40	0.004	2.5	0.50
4254		12.2	170.4	158.2	0.35	0.30	0.023	2.5	0.66
4254	**Incl.**	**12.2**	**100.3**	**88.1**	**0.40**	**0.32**	**0.026**	**2.4**	**0.72**
4255		39.3	57.6	18.3	0.55	0.17	0.002	2.9	0.53
4256		8.8	36.3	27.4	0.48	0.36	0.008	3.5	0.71
4256		45.4	88.1	42.7	0.33	0.29	0.013	3.4	0.57
4256		108.5	152.1	43.6	0.30	0.29	0.026	2.1	0.63
4257		6.1	103.3	97.2	0.47	0.36	0.018	2.7	0.75
4257	**Incl.**	**36.3**	**78.9**	**42.7**	**0.56**	**0.34**	**0.019**	**2.4**	**0.81**
4258		12.8	139.9	127.1	0.47	0.31	0.015	1.7	0.69
4258	**Incl.**	**12.8**	**91.1**	**78.3**	**0.61**	**0.35**	**0.016**	**1.8**	**0.83**
4258	**Incl.**	**33.8**	**57.6**	**23.8**	**1.09**	**0.47**	**0.011**	**2.0**	**1.23**
4259		9.1	213.1	203.9	0.25	0.28	0.019	2.1	0.54
4259	**Incl.**	**9.1**	**27.1**	**18.0**	**0.29**	**0.45**	**0.015**	**4.9**	**0.72**
4260		33.2	155.1	121.9	0.52	0.22	0.009	2.5	0.60
4260	**Incl.**	**103.3**	**115.5**	**12.2**	**0.68**	**0.33**	**0.014**	**2.8**	**0.84**
4260	**Incl.**	**146.0**	**155.1**	**9.1**	**0.78**	**0.44**	**0.020**	**2.7**	**1.05**
4261		10.1	27.1	17.1	0.31	0.43	0.011	1.9	0.69
4261		54.6	88.1	33.5	0.31	0.38	0.020	1.9	0.69
4262		11.9	213.1	198.4	0.43	0.28	0.019	1.8	0.66
4262	**Incl.**	**75.6**	**94.2**	**18.6**	**0.88**	**0.31**	**0.027**	**2.1**	**1.02**
4263		30.8	201.2	170.4	0.33	0.41	0.050	2.1	0.90
4263	**Incl.**	**30.8**	**159.7**	**128.9**	**0.35**	**0.46**	**0.058**	**1.9**	**1.00**
4264		12.5	41.2	28.7	0.67	0.24	0.014	4.5	0.74
4265		103.3	202.4	98.8	0.80	0.40	0.019	1.9	1.01
4265	**Incl.**	**162.5**	**202.4**	**39.9**	**1.01**	**0.61**	**0.023**	**2.6**	**1.39**
4266		25.6	111.0	85.3	0.50	0.34	0.014	2.6	0.74
4267		31.9	202.7	170.8	0.27	0.52	0.020	1.7	0.81
4267	**Incl.**	**41.2**	**115.5**	**74.4**	**0.29**	**0.60**	**0.017**	**1.5**	**0.88**
4269		14.0	202.4	188.4	0.35	0.38	0.030	1.3	0.77
4269	**Incl.**	**14.0**	**82.1**	**68.1**	**0.58**	**0.60**	**0.033**	**2.2**	**1.15**
4270		17.4	245.4	228.0	0.47	0.50	0.022	2.3	0.93
4270	**Incl.**	**17.4**	**151.3**	**134.0**	**0.57**	**0.57**	**0.023**	**2.5**	**1.06**
4271		6.4	152.4	146.0	0.88	0.70	0.013	2.9	1.34
4272		124.7	188.7	64.0	0.42	0.23	0.013	1.0	0.57
4275		5.5	174.5	338.0	0.30	0.29	0.019	1.7	0.59
4275	**Incl.**	**5.5**	**85.3**	**159.7**	**0.34**	**0.34**	**0.014**	**2.2**	**0.64**
4275		263.7	306.3	85.3	0.29	0.36	0.031	0.7	0.72
4276		4.6	201.2	196.6	0.37	0.37	0.018	1.6	0.70
4276	**Incl.**	**4.6**	**94.5**	**89.9**	**0.45**	**0.48**	**0.022**	**2.2**	**0.88**
4277		91.4	291.4	200.0	0.39	0.41	0.025	2.6	0.80
4277	**Incl.**	**91.4**	**134.1**	**42.7**	**0.62**	**0.34**	**0.044**	**3.9**	**0.98**
4277	**Incl.**	**200.0**	**291.4**	**91.4**	**0.40**	**0.54**	**0.025**	**2.6**	**0.93**
4278		45.4	109.4	64.0	0.56	0.25	0.008	2.0	0.65
4278		141.1	249.6	108.5	0.43	0.29	0.019	1.5	0.67
4279		7.6	146.0	138.4	0.33	0.34	0.019	1.8	0.66
4279	**Incl.**	**24.1**	**69.8**	**45.7**	**0.43**	**0.44**	**0.019**	**2.5**	**0.82**
4280		10.7	191.7	178.0	0.36	0.26	0.013	1.8	0.56
4280	**Incl.**	**18.0**	**73.5**	**55.5**	**0.53**	**0.35**	**0.010**	**2.6**	**0.75**
4281		33.2	115.5	82.3	0.44	0.25	0.008	1.6	0.57
4281	**Incl.**	**33.2**	**57.0**	**23.8**	**0.58**	**0.31**	**0.006**	**2.2**	**0.71**
4282		51.5	77.3	25.8	0.33	0.34	0.015	0.8	0.63
4284		248.0	566.6	318.7	0.46	0.46	0.019	1.5	0.86
4284	**Incl.**	**248.0**	**399.0**	**151.0**	**0.64**	**0.56**	**0.020**	**2.2**	**1.08**
4285		6.1	41.5	35.4	0.70	0.31	0.002	3.0	0.77
4286		63.7	131.1	67.4	0.44	0.32	0.005	1.8	0.63
4286		219.5	281.6	62.2	0.28	0.39	0.015	1.4	0.65
4287		45.4	237.4	192.0	0.29	0.46	0.052	2.1	0.94
4287	**Incl.**	**45.4**	**87.8**	**42.4**	**0.51**	**0.81**	**0.052**	**2.0**	**1.42**
4288		17.4	266.4	249.0	0.51	0.38	0.015	1.9	0.78
4288	**Incl.**	**164.3**	**266.4**	**102.1**	**0.54**	**0.46**	**0.016**	**2.1**	**0.89**
4289		15.2	27.1	11.9	0.58	0.37	0.007	2.0	0.78
4289		42.4	112.5	69.8	0.44	0.27	0.016	2.4	0.64
4289		210.0	300.8	90.8	0.38	0.47	0.014	1.9	0.79
4290		35.4	67.4	32.0	0.42	0.28	0.011	0.6	0.61
4290		140.2	246.9	106.7	0.36	0.31	0.021	1.7	0.66
4291		27.4	277.1	249.6	0.50	0.63	0.016	2.7	1.04

Drill Hole Number		From (metres)	To (metres)	Intercept (metres)	Au g/t	Cu %	Mo %	Ag ppm	CuEQ1 %
4292		212.0	652.9	440.9	0.38	0.43	0.029	1.3	0.84
4292	Incl.	212.0	341.1	129.1	0.55	0.57	0.021	2.1	1.04
4292	**Incl.**	**603.2**	**652.9**	**49.7**	**0.48**	**0.53**	**0.023**	**1.2**	**0.97**
4293		247.5	716.0	468.5	0.59	0.43	0.026	1.3	0.95
4293	**Incl.**	**247.5**	**411.2**	**163.7**	**0.86**	**0.61**	**0.020**	**2.2**	**1.26**
4294		21.0	554.7	533.7	0.26	0.26	0.018	1.6	0.52
4294	**Incl.**	**21.0**	**305.7**	**284.7**	**0.36**	**0.34**	**0.012**	**1.9**	**0.64**
4294	**Incl.**	**21.0**	**44.2**	**23.2**	**0.78**	**0.59**	**0.006**	**3.1**	**1.12**
4294	**Incl.**	**97.2**	**305.7**	**208.5**	**0.34**	**0.34**	**0.014**	**1.8**	**0.63**
4295		42.7	231.7	189.0	0.39	0.44	0.023	2.4	0.82
4295	**Incl.**	**51.8**	**125.0**	**73.2**	**0.53**	**0.66**	**0.020**	**3.7**	**1.11**
4296		33.5	298.7	265.2	0.28	0.34	0.016	1.2	0.61
4296	**Incl.**	**33.5**	**103.6**	**70.1**	**0.28**	**0.50**	**0.014**	**1.8**	**0.75**
4297		26.5	260.0	233.5	0.74	0.49	0.019	2.5	1.07
4297	**Incl.**	**26.5**	**132.0**	**105.5**	**1.06**	**0.56**	**0.021**	**3.0**	**1.35**
4299		23.2	45.1	22.0	0.43	0.34	0.020	0.8	0.73
4299		75.9	274.6	198.7	0.45	0.34	0.017	2.4	0.72
4300		303.4	719.9	416.5	0.65	0.46	0.033	1.3	1.06
4300	**Incl.**	**303.4**	**435.6**	**132.1**	**0.98**	**0.66**	**0.017**	**1.9**	**1.38**
4300	**Incl.**	**627.3**	**719.9**	**92.7**	**0.52**	**0.31**	**0.081**	**1.0**	**1.09**
4301		306.3	371.9	65.5	1.00	0.73	0.016	1.6	1.46
4302		292.9	645.6	352.7	0.55	0.43	0.020	1.2	0.90
4302	**Incl.**	**292.9**	**411.2**	**118.3**	**0.67**	**0.52**	**0.020**	**1.6**	**1.05**
4302	**Incl.**	**466.0**	**591.0**	**125.0**	**0.58**	**0.41**	**0.025**	**1.0**	**0.91**
4303		313.2	688.5	375.4	0.50	0.47	0.027	1.4	0.94
4303	**Incl.**	**313.2**	**399.0**	**85.8**	**0.87**	**0.75**	**0.018**	**2.4**	**1.41**
4303	**Incl.**	**645.9**	**688.5**	**42.7**	**0.55**	**0.35**	**0.042**	**1.0**	**0.94**
4305		102.1	517.9	415.6	0.27	0.30	0.022	1.4	0.59
4305	**Incl.**	**102.1**	**120.7**	**18.6**	**1.38**	**0.60**	**0.012**	**3.0**	**1.55**
4305	**Incl.**	**150.1**	**240.5**	**90.2**	**0.42**	**0.36**	**0.022**	**1.9**	**0.75**
4306		24.1	310.6	286.5	0.40	0.47	0.022	1.9	0.85
4306	**Incl.**	**27.1**	**158.2**	**131.1**	**0.51**	**0.54**	**0.022**	**1.8**	**0.99**
4307		9.1	277.4	268.2	0.42	0.33	0.030	1.7	0.76
4307	**Incl.**	**9.1**	**70.1**	**61.0**	**0.88**	**0.52**	**0.022**	**2.2**	**1.21**
4308		51.5	237.4	185.9	0.19	0.17	0.013	1.5	0.36
4308	**Incl.**	**185.6**	**237.4**	**51.8**	**0.22**	**0.20**	**0.018**	**1.8**	**0.44**
4309		15.2	127.7	112.5	0.44	0.25	0.019	1.6	0.64
4309	**Incl.**	**15.2**	**54.6**	**39.3**	**0.74**	**0.36**	**0.026**	**2.4**	**0.98**
4309		127.7	450.8	323.1	0.34	0.34	0.024	1.6	0.70

Results from other holes (lower grade or not sampled)

4156	0.35% CuEQ over hole length of 117 feet.
4157	0.22% CuEQ over hole length of 150 feet.
4159	0.27% CuEQ, over hole length of 124 feet.
4167	0.28% CuEQ over hole length of 899 feet.
4174	abandoned, no core, redrilled as 4177.
4198	abandoned, not sampled
4209	0.41% CuEQ over hole length of 931.5 feet.
4224	0.11% CuEQ over hole length of 120 feet.
4225	0.29% CuEQ over hole length of 370 feet.
4241	0.06% CuEQ over hole length of 349 feet.
4242	0.18% CuEQ over hole length of 669 feet.
4243	0.19% CuEQ over hole length of 399 feet.
4246	0.26% CuEQ over hole length of 652 feet.
4247	0.12% CuEQ over hole length of 489 feet.
4248	0.20% Cu over total length
4249	0.18% CuEQ over hole length of 664 feet.
4252	0.29% CuEQ over hole length of 409 feet.
4268	0.42% CuEQ over hole length of 272 feet.
4273	0.34% CuEQ over hole length of 889 feet.
4274	0.18% CuEQ over hole length of 936 feet.
4283	0.36% CuEQ over hole length of 1909 feet.

10.2.4 Quality Control

Mark Rebagliati, P.Eng and Morris Beattie, P.Eng, are the Qualified Persons for the Pebble Project and are supervising the quality control and assurance program. Logging and sampling is completed in Northern Dynasty's secure facility at Iliamna, Alaska. The NQ-size core is split and samples are transported to the ALS Chemex laboratory in Fairbanks for drying, weighing and crushing. Samples are shipped by airfreight to the main ALS Chemex laboratory, North Vancouver, Canada (an ISO 9002 certified laboratory) for final preparation and analysis. Gold is determined by 30-g Fire Assay (FA) fusion with an Atomic Absorption Spectroscopy (AAS) finish. Copper and molybdenum assays are by four-acid digestion with an Inductively Coupled Plasma-Emission Spectroscopy (ICP-ES) finish. All samples are also analyzed for 23 additional elements by four-acid digestion ICP-ES. Northern Dynasty includes standards, duplicates and blanks in addition to the laboratory's internal quality control work. Duplicate samples are analyzed by Acme Analytical Laboratories of Vancouver, Canada.

10.2.5 Vein Classification

Veins are a key control on mineralization and alteration in the Pebble deposit and their characteristics have been documented in some detail. The veins have been generally classified (Table 10.2.5) according to the system developed by Gustafson and Hunt (1975) for the El Salvador, Chile deposit, with modifications based on Sillitoe (2000), discussion with that author, and features of the Pebble deposit. Veins are listed in Table 10.2.5 from oldest to youngest, with inference that they were formed in a declining temperature regime. Common types of veins are Types EB, B, C, and D; less common are Types M, E, and F, and rare are Type A. Higher-temperature veins are most common in the core of the deposit and lower-temperature veins are most common further from the core. Type B veins as defined at El Salvador have centre lines whereas those at Pebble do not have a centre line. In the Pebble classification, definitions are given to an intermediate-stage vein type (Type C) and two late-stage vein types, Type E (pyrite-sphalerite-galena-gold rich) and Type F (calcite-rich).

Table 10.2.5 Classification of Vein Types

Type	Style	Mineralogy	Width (mm)	Envelope	Age
EB	stockwork	qtz-ank-(py)	0.5-1	Bt	early
A	irregular	Qtz	1-5	None	early
B	Planar to irregular	qtz-ank-moly-py-cpy	5->1000	none to bt-Kf-cpy-py-moly	early-intermediate
M	Planar to irregular	mt-qtz-cpy	1-20	none to weak Kf	early-intermediate
C	Planar	qtz-ank-py-cpy	0.5-2	Kf-py-cpy-ser-qtz-mt	intermediate
D	Planar	py-(qtz-ank-cpy)	0.3->100	none to qtz-py-ser	intermediate-late
E	Planar	py-ser-gal-sph-cpy	3-10	ser-py-qtz	late
F	irregular	Cal-(qtz)	0.3->20	none or cal	very late

Early, High-Temperature

Type EB Very early, quartz-ankerite-(pyrite) vein stockworks with biotite in envelopes. generally are less than 1 mm wide, and commonly have distinct dark green alteration envelopes mainly from 2 to 5 mm wide dominated by biotite. They are most common in Units Y and D, and probably were formed during and shortly after late-stage magmatism and contact metasomatism. Trace sulphides include chalcopyrite and pyrrhotite. The erratic occurrence of these veins across the deposit and similarity to veins found throughout the district suggests that they are intrinsic to hornfels, although compatibility with the type EB veins of Gustafson and Quiroga (1995) cannot be discounted.

Type A These uncommon, discontinuous, late-magmatic quartz veins are in part irregular to braided and branching and commonly vitreous. They occur mainly in Unit G, are from 1 to 5 mm wide, contain only minor sulphides, and commonly have diffuse margins with no alteration envelopes. Most are sinuous, 1 to 10 mm in width and commonly form braided networks. Most have diffuse contacts with wall rock and lack alteration envelopes. They typically consist of recrystallized, undulose quartz, with locally trace pyrite and/or chalcopyrite. They are consistent with Type A veins of Gustafson and Hunt (1975) and may be transitional in time and properties to later Type B veins; the transitional veins are referred to as **Type AB** veins.

Type B These high- to moderate-temperature, quartz and quartz-ankerite-molybdenite-pyrite-chalcopyrite veins are mainly from 5 to 20 mm wide and were formed by infill of open spaces. They are dominated by milky, undulose, recrystallized quartz with trace to minor K-feldspar, gypsum, apatite, biotite, rutile and/or trace barite; some contain late kaolinite. Most contain <1 to 3% sulphide which comprises chalcopyrite, lesser pyrite, trace to minor molybdenite, and local traces of bornite. Pyrite commonly contains ovoid inclusions of intergrown, hypogene bornite-covellite, commonly accompanied by chalcopyrite and, in rare cases, by chalcocite or digenite; similar inclusions have been reported in pyrite in high temperature alteration zones in other auriferous porphyry deposits (e.g., Lickfold et al., 2004). Molybdenite commonly is concentrated in planar zones, mainly near vein margins. Ankerite, chalcopyrite, and pyrite commonly occur together as coarse patches; pyrite also forms disseminated grains and seams. Gypsum forms patches (after anhydrite); above a depth of about 200 m gypsum was leached, giving the vein a vuggy appearance. Most veins have very narrow envelopes of strong K-feldspar alteration, and some have broader envelopes dominated by biotite, chalcopyrite and pyrite. In some parts of the deposit these veins do not contain gypsum (or vugs) and contain very little Mo. Towards the margins of the deposit, calcite occurs with or instead of ankerite. These veins offset Type EB veins and bedding (S_o) in Unit Y, locally by as much as 4 cm. A few Type B veins are loci of later Type D and F veins. Commonly, Type F veins were emplaced along brecciated zones in Type B veins.

Type M These high- to moderate-temperature veins consist of magnetite and magnetite-quartz with subordinate K-feldspar and ankerite, minor to trace apatite and rutile, and rare barite. Most are from 1 to 20 mm wide, have no alteration envelopes and probably are about the same age as Type B veins. A few contain patches of chalcopyrite that are intergrown coarsely with magnetite. These veins are most common in Unit D and adjacent Unit Y, and are rare in other rock types.

Intermediate, Moderate-Temperature

Type C These quartz-ankerite-pyrite-chalcopyrite veins are from 0.5 to 1.5 mm wide and have distinct, texture-destructive alteration envelopes up to 20 mm wide containing K-feldspar with or without pyrite, chalcopyrite, sericite, and quartz. Many alteration envelopes contain abundant, very fine- grained, disseminated chalcopyrite. Some veins have thin, outer envelopes of biotite mainly from 1 to 3 mm wide. These veins and alteration envelopes contain the bulk of the copper (and probably gold) at Pebble. They cut veins of Types A and B.

Type D These veins are dominated by pyrite with lesser quartz, chalcopyrite and ankerite. They have sharply defined, planar borders and generally no alteration envelopes. Some are up to a few cm wide, and a few of these contain moderate chalcopyrite. Others are narrow (0.3 to 1.5 mm) along late, planar fractures; some of these contain chalcopyrite. Possibly pyrite-chalcopyrite veins are higher-temperature and earlier than pyrite-only veins. These veins cut all earlier veins. Some veins occur in re-opened fractures along Type B veins.

Late, Low-Temperature

Type E These polymetallic veins are from 1 to 10 mm wide with alteration envelopes up to a few tens of cm wide of sericite-quartz-pyrite (phyllic) alteration. They are common in the broad zone of phyllic alteration that extends at least several kilometres south of the deposit. The mineral assemblage comprises major quartz, calcite or manganiferous calcite, pyrite (locally arsenian on SEM spectra), sphalerite and galena, minor chalcopyrite, and trace arsenopyrite, tennantite-tetrahedrite, freibergite, argentite, native gold, and lead- and gold-tellurides. Many veins with abundant sphalerite and galena have high concentrations in gold and silver.

Type F These calcite and calcite-quartz veins are mainly 0.3 to 0.7 mm wide, with a few from 1 to 4 mm wide. Some contain minor amounts of one or more of kaolinite, sericite, chlorite, and pyrite. They cut all earlier veins and are most common away from the core of the deposit. Some Type B veinlets were brecciated and healed with a cement of calcite or locally ankerite, and some Type F veinlets occur along re-opened fractures along Type B veins. Most Type F veinlets have no alteration envelopes; a few large veins have diffuse envelopes up to 3 cm wide of carbonate alteration. Type F veins also occur in and bordering Tertiary basalt dikes and overlying Tertiary rocks. Veins fill narrow (<2-4 mm), planar to sinuous fractures, lack alteration envelopes, and are most abundant near post-hydrothermal faults.

10.2.6 Alteration

Major alteration assemblages include potassic (biotite and/or K-feldspar-rich), phyllic (sericite-pyrite), and propylitic (epidote-chlorite), with minor intermediate argillic (illite) and SCC (sericite-chlorite-clay). In general, K-silicate assemblages occur in a broad core of the deposit and are interpreted to be the highest-temperature assemblage. Sericite-pyrite alteration forms a zone up to 5.5 by 2.5 km in size that surrounds the K-silicate core, and which overprints it to highly variable degrees. Propylitic alteration occurs mostly on the margins of the hydrothermal system, particularly to the north, but also occurs deep in the granodiorite stocks. Intermediate argillic alteration is prominent in some higher parts of Unit G stocks and sills; some of it may be associated with faults. The distribution of alteration assemblages is shown near surface and on the 100-m level on Figures 8.1 and 8.2, respectively. A 3-dimensional model has been prepared to show the distribution of major alteration assemblages; this will be interpreted with results of milling tests to determine what correlations are present between the degree of alteration and milling characteristics. A good correlation will allow the alteration model to be used to help determine power consumption during comminution of the rock in the mill.

Potassic

An irregular zone of potassic alteration encompasses much of the core of the deposit area and is associated with the stocks, plutons, and sills of Units Gp. K-silicate alteration ranges widely in intensity from weak to texturally destructive. Typically, it is related to quartz veins of Types C and B (Table 4), but in some places forms a truly pervasive alteration. This assemblage is dominated by one or both of biotite and K-feldspar. Biotite alteration is strongest in Units D, W and Y, whereas K-feldspar alteration is relatively more common in Unit G and locally is intense in Unit Y. In places, Units N and X are affected strongly by either assemblage. Alteration biotite is black in the West and Central Zones, and brown in the East Zone; qualitative SEM (Scanning Electron Microscope) spectra indicate slightly higher Fe/Mg ratios in black biotite compared to brown. Comparatively weak biotite alteration in Unit G typically manifests selectively pervasive replacement of hornblende phenocrysts and lesser concentrations in the matrix. Magnetite is common in Type M veins, less common as texturally destructive intergrowths with K-feldspar, and forms an accessory in a few Type B and Type C veins. Magnetite is most common in a zone 500 by 1000 m in size in the core of the potassic zone associated with Stock A. Carbonate forms up to 5% of the assemblage and is mostly ankerite or ferroan dolomite, with minor early siderite and late calcite.

Intense alteration dominated by K-feldspar is found primarily in Unit Gs and near the margins of Gp intrusions where it overprints biotite-rich alteration. The alteration reflects coalescing alteration envelopes in domains of high density of Type C veins. The main minerals are K-feldspar and much less abundant biotite, with minor quartz, apatite, ankerite or ferroan dolomite, and rutile, and local traces of magnetite or hematized magnetite. The concentration of sulphide commonly exceeds 15%, has a higher ratio of pyrite to chalcopyrite than does biotite alteration, and carries the highest grade mineralization in the deposit; it is the principal alteration in the main Unit Gs sill at the top of the East Zone. Sulphides are pyrite and chalcopyrite, highly variable molybdenite, trace tetrahedrite-tennantite and pyrrhotite (as rare inclusions in pyrite), and extremely rare bornite, covellite and/or chalcocite/digenite.

Near or in the core of the zones of strong potassic alteration are zones of strong quartz vein stockworks that commonly occupy 10-25% and locally up to 50% of the total rock volume. The strongest stockworks are in the East Zone (where a zone of intense quartz-vein stockwork suggests the presence nearby of a granodiorite stock) and associated with Stock B. This zone continues through the Central Zone to the West Zone but is less intense and generally occurs along the northern side of the zone of abundant magnetite veins.

Biotite alteration is strongest in the East Zone, where it extends to >700 metres depth and is related to Type AB quartz veins. Domains between AB veins commonly are cut by myriad fractures that emanate from the narrow, mineralogically similar K-feldspar envelopes that enclose AB veins. Wide, outer envelopes of brown biotite alteration surround the AB veins and coalesce to form pervasive alteration where the vein density is high. Mineralization is typically stronger in the K-feldspar and biotite envelopes compared to the veins themselves, which can actually dilute grade. Although total sulphide is mostly <4%, this alteration has high grades of copper-gold due to a chalcopyrite to pyrite ratio that is mostly >2. Molybdenite is common and intergrown with disseminated chalcopyrite. Bornite, covellite and chalcocite/digenite form rare inclusions in pyrite.

Weaker brown biotite alteration and lower-grade mineralization that occur between about 350 and >550 metres depth in the West Zone correspond to regions with lower densities of AB veins. Black biotite alteration above about 350 metres depth in the Central and West Zones is also well-mineralized, but commonly has total sulphide >8% and a high pyrite to chalcopyrite ratio. The density of AB veins generally is low in these areas, and the biotite alteration may instead reflect coalescence of the outer biotite envelopes to B veins. Strong black biotite alteration in the Central Zone grades rapidly to slightly altered hornfels below 350 metres depth.

The most intense potassic alteration is defined by scattered zones of pervasive, texture-destructive replacement of the host rock (commonly Unit Y) by extremely fine grained K-feldspar and less commonly by K-feldspar containing very fine laminations of magnetite. Magnetite is concentrated as replacement patches and veinlets in a zone measuring 500 by 1000 m in the core of the potassic zone associated with Stock A. Less intense potassic alteration is defined by broad zones containing replacement of hornblende by biotite, by partial alteration of plagioclase to K-feldspar, and by the presence of K-feldspar and biotite in veinlets and alteration envelopes. In some rocks, mafic minerals were altered to biotite but K-feldspar was not present; the origin of some of this alteration predated the main stage of K-feldspar alteration.

Megascopically, some primary biotite is difficult to distinguish from secondary biotite; in Unit Gp the latter generally forms clumps (after hornblende phenocrysts) and the former generally forms disseminated flakes or clusters of a few flakes. Petrographic reports by Teck Cominco and Northern Dynasty indicate that in the zone of potassic alteration, diorite/gabbro commonly was altered to the assemblage potassium feldspar-biotite-ankerite. Potassic alteration of granodiorite was recognized by partial K-feldspar replacement of plagioclase, biotite replacement of hornblende and locally by texture-destructive replacement by K-feldspar and/or magnetite. Granodiorite was relatively stable during weak to moderate potassic alteration. In some rocks, biotite was later replaced by chlorite during retrograde alteration.

Phyllic

Early, moderate-temperature, phyllic alteration forms an elongated aureole that extends at least 2.5 km to the northeast and southwest of the centre of the Pebble deposit. The strongest alteration occurs just outside of the core of potassic alteration, and the intensity gradually decreases outward. It consists of quartz-sericite-pyrite alteration and, where it is intense, the original rock texture was destroyed. Veinlets of pyrite are common. Commonly in the West and Central zones, but more rarely in the East zone, late veins of quartz and pyrite-quartz bordered by phyllic alteration envelopes overprint parts of the potassic core. In places these alteration envelopes grade into broader zones of pervasive phyllic alteration. Figures 8.1 and 8.2 show zones of moderate to strong phyllic alteration that overprinted the potassic alteration zone during cooling of the hydrothermal system. As seen in vein envelopes, generally, sericite-pyrite alteration removes copper from the rock.

In many areas in the zone of potassic alteration, phyllic alteration envelopes on veins contain metastable K-feldspar. Over broad intervals in a few holes, phyllic alteration becomes stronger at the expense of potassic alteration with depth; this might be explained by lateral fluid flow from the margins to the core during collapse of the hydrothermal system.

In zones of moderately phyllic alteration in granodiorite, hornblende phenocrysts are not obvious in the core, but their outlines are identifiable in thin section. In more strongly altered zones, their outlines were destroyed, and primary hornblende was replaced by irregular clusters of alteration minerals, including quartz, biotite, sericite, muscovite, and ankerite. In some of these, subhedral to euhedral inclusions of apatite are the main indication that the alteration clusters were formed from hornblende.

Intermediate Argillic and Sericite-Chlorite-Clay (SCC) Alteration

Granodiorite stocks and sills contain zones of moderate, intermediate argillic alteration, in which the rock has a pale to light yellow or green colour from alteration of plagioclase to illite/sericite. In drill core, these zones are structurally weak and commonly expand when exposed to air and moisture. This alteration generally contains only minor pyrite and commonly does not destroy pre-existing chalcopyrite mineralization.

Some parts of the East and Central Zones have been overprinted by a pervasive, green alteration that affects domains, mostly in Unit Y, where AB veins and their biotitic envelopes are narrow and/or widely spaced. In some cases, stockworks of discontinuous quartz-sericite± pyrite fractures are present. This alteration is dominated by sericite and may contain minor clay, but generally does not contain significant pyrite. In general, it preserves chalcopyrite mineralization and may be broadly compatible with the sericite-chlorite-clay (SCC) assemblage of Sillitoe and Gappe (1984). The distribution of this alteration, particularly in the Central and West Zones, is not well-defined.

Propylitic

Near the Pebble deposit, pervasive propylitic alteration occurs mainly in Unit R gabbro northwest of Fault ZF and less commonly in diorite in the deposit. It also occurs peripheral to and, in some drill holes, below zones of sericite-pyrite alteration in the core of Unit G stocks. Propylitic alteration is widespread to regional in a broader area on the margin of the Kaskanak Batholith. It is recognized by the presence of epidote and minor actinolite, and commonly contains chlorite, calcite and/or hematite. Locally the D_2 sill on the western side of the deposit contains abundant veinlets and replacement patches of epidote and magnetite interpreted to be part of the propylitic assemblage. In zones of weak propylitic alteration in the cores of the granodiorite stocks, relic primary textures are preserved, and the shapes of hornblende phenocrysts are readily identified in the core.

10.2.7 Skarn

Minor skarn bodies up few metres thick were formed along borders of intrusions of Unit P against rocks of Unit Y. These bodies are dominated by two or more of epidote, magnetite, quartz, ankerite and pyrite. In some, minor chalcopyrite is intergrown with magnetite. In Unit D, a few replacement skarn zones consist of quartz, magnetite, pyrite, ankerite, and minor chalcopyrite.

10.2.8 Mineralization in Zones of Weathering

Oxidation and supergene effects at Pebble are weak, which is consistent with the unfavourable paleoclimatic conditions described by Young et al. (1997) for southwest Alaska since the Cretaceous. The West Zone contains a small but significant zone of oxidation and supergene enrichment (Kerckhoff, 2004). The **Oxide** zone commonly extends to a depth of 15 to 25 m. In this zone, the rock was leached pervasively and abundant limonite coats fractures and occurs as irregular patches along fractures. Below this, Fe-oxides are common on fractures to a depth of about 30 m and rare on fractures at greater depth, locally reaching a depth of 65 m. Leached zones contain mainly <0.1 % Cu assay concentrations over intervals of 5 to 35 m. In contrast, gold and molybdenite were leached only slightly if at all.

A zone 3 to 10 m thick of intermediate copper abundance is common between the leached cap and the high-grade supergene zone. In areas where the host rocks, mainly Unit Y, contain relatively low copper concentrations, a moderately leached oxide zone is present with no zone of secondary copper minerals below it.

Below the oxide zone, the main supergene zone forms a lensy sheet with an irregular oval outline over the core of the deposit, elongated along a line that connects Stock A with Stock C. In it, copper is concentrated moderately (0.6 to 1.0%). The core of the supergene zone is mainly 20 to 40 m thick, and is locally is up to 70 m thick. On the margins is a thinner, commonly lower-grade, supergene zone from 10 to 15 m thick. Contacts with the oxide zone are irregular to diffuse. The supergene sulphide zone contains minor to moderately abundant chalcocite, with much less digenite and/or bornite, mainly coating pyrite in pyrite-rich veins. In some holes, chalcocite also forms coatings on disseminated pyrite and replaces margins of chalcopyrite grains. In many holes, the zone of secondary copper enrichment is weak, with pyrite in some fractures being coated by chalcocite and that in other adjacent fractures being fresh. Secondary copper sulphides occur locally on major fractures up to a few metres below the main zone of secondary enrichment. Hole 3071 contains abundant secondary copper minerals to a depth of 165 m, possibly because of strong fracturing along an adjacent fault (Fault A). In the nearby Cominco holes to the north, Holes 043 and 085 - both drilled in strongly fractured rock, the oxide zone extends to a depth of 60 m. Rocks below this contain abundant secondary copper minerals. Secondary copper oxides and carbonates are present in a few holes near the top of the supergene zone. In several holes, native copper forms dendritic growths on a few fractures below the oxide zone. Abundances of Au and Mo remain largely unaffected by oxidation and supergene processes, whereas Cu was highly mobile. The base of the zone of secondary sulphide enrichment corresponds well to the level where copper assays decrease moderately and become more uniform downhole in the hypogene zone.

Hypogene sulphide mineralization beneath the Tertiary cover in the eastern part of the deposit contains pyrite that is almost completely fresh. Hole 3074 contains a sharp, unoxidized contact at the base of the Tertiary section with only a weak zone of secondary copper sulphides in the first 3 metres below the contact. Other holes in this area enter fresh, pyrite-bearing rocks directly below the Tertiary rocks or overburden. These data indicate that in these regions, any pre-Tertiary oxide and secondary enrichment zones were removed by erosion prior to formation of the Tertiary sedimentary and volcanic rocks.

10.3 Thirty-Eight Porphyry Gold-Copper-Molybdenum Deposit

During 2002, reconnaissance drill testing of a previously unexplored 1-km by 3-km IP chargeability anomaly situated in a broad valley under 20-30 m of glaciofluvial gravels resulted in the discovery of the Thirty-Eight porphyry copper-gold-molybdenum deposit (Figure 5). For a complete description of the deposit geology, alteration and mineralization, please refer to Rebagliati and Haslinger (2004).

The main rock type is medium-grained, crowded plagioclase, hornblende porphyritic quartz monzodiorite of the Kaskanak batholith (Unit GK), with only narrow dikes of fine- to medium-grained sparsely porphyritic monzonite. Alteration is characterized by an extensive zone of secondary biotite and lesser K-feldspar, overprinted by more localized phyllic alteration. Potassic alteration gradually weakens in the lower part of the hole below 230 metres and propylitic alteration becomes proportionally stronger. Chalcopyrite concentration decreases with the weakening potassic alteration.

Table 10.3.1 – Drilling on the Thirty-Eight Porphyry Deposit

Year and Company	# Drill Holes	Metres
2002 Northern Dynasty	16	4,021
2003 Northern Dynasty	1	246
Total	**17**	**4,267**

Exploration drilling has demonstrated that the Thirty-Eight porphyry gold-copper-molybdenum deposit is a major porphyry occurrence displaying classic alteration and sulphide assemblages and distributions. The highest copper grades coincide with increased fracture and quartz vein density adjacent to and northeast of a small monzonite stock that intruded into the southern end of the Kaskanak batholith. The deposit is open to the northeast. Additional drilling to more fully define the deposit and to seek zones of higher Cu-Au concentrations should be deferred until the Pebble deposit has been defined fully.

10.4 Thirty-Seven Copper-Gold Skarn

In 2002, during reconnaissance drill testing of a copper-gold soil geochemical anomaly 5 km west of the Thirty-Eight porphyry deposit, skarn-type copper and gold mineralization was found associated with calc-silicate alteration. Hole 2037 intersected strong copper-gold skarn mineralization and 5 holes were drilled in total (Tables 10.4.1). A subsequent ground magnetometer survey revealed a strong northeast trending magnetic anomaly northeast of Hole 2037, in an area where anomalous copper soil geochemistry is present.

In 2003, two holes tested a section across the combined magnetic-geochemical target; this proved to be caused by magnetite-rich, propylitically altered diorite and gabbro containing abundant epidote as replacement patches in the groundmass and in plagioclase grains. Sericite and quartz-ankerite alteration commonly overprint the propylitic suite and, where they are present, almost all magnetite is sulphidized. Scattered base-metal mineralization in both holes consists of quartz-calcite-chlorite-marcasite veinlets bearing chalcopyrite, sphalerite and galena, and quartz-epidote-pyrite-chalcopyrite veinlets. Details of this showing are described by Rebagliati and Haslinger (2004).

Table 10.4.1 – Drilling on the Thirty-Seven Skarn Zone		
Year and Company	**# Drill Holes**	**Metres**
2002 Northern Dynasty	5	895
2003 Northern Dynasty	2	402
Total Thirty-Seven Drilling	**7**	**1,297**

The alteration suite in Holes 3088 and 3090 is the lowest-temperature and finest-grained found in the three areas drill tested in the Thirty-Seven skarn zone. Marcasite may have replaced earlier pyrrhotite. Scattered base-metal- bearing veins indicate that a porphyry system may exist in this general area, but alteration and contact metamorphic minerals encountered in Holes 2037, 2053, 2055 and 2057 are indicative of more proximal locations in terms of heat flow. The calc-silicate assemblage and the gold-copper intercepts encountered in the 2002 holes extend across 600 m and were moderately encouraging. However, because of the lower-intensity, more-distal mineral assemblage encountered in the 2003 holes, no further drilling is proposed.

Although exploration for gold-bearing skarn at Pebble is at a grass-roots level and is a high-risk endeavor, such deposits are an important component of some porphyry gold-copper systems and should receive careful consideration in future drilling programs.

10.5 25 Gold Zone

The Twenty-Five Gold zone contains high gold and copper concentrations in soils over an area of 700 x 1000 m in the south-central portion of a 12 km^2, pyroxenite body that was intruded by irregular bodies of very fine grained monzonite (Figure 5). In the contact zones that are up to a few tens of metres wide, the rock ranges from pyroxenite through pyroxenite cut by dykelets of monzonite, to heterolithic breccias containing mixed and rotated fragments of pyroxenite, gabbro, monzonite and rare porphyritic orthoclase syenite clasts, to monzonite containing pyroxenite/gabbro megaclasts, and to monzonite intrusions with few to no ultramafic inclusions. Much of the intrusion breccia complex has a moderate-intensity IP chargeability response (Figure 11).

Alteration, dominated by a chlorite-epidote-calcite-pyrite propylitic assemblage, occurs as disseminated patches, phenocryst replacement, and rims on pyroxenite breccia clasts. Locally, primary pyroxene is altered to actinolite. Some of the monzonite has a pinkish to purple color caused by hematite pigmentation of sodic plagioclase. Locally, the intrusion breccia contains quartz as veins, patchy replacement, and breccia matrix. Skarn, formed along the contact of pyroxenite with monzonite, consists of chlorite, epidote, calcite and garnet in widely varying proportions and grain sizes.

Gold occurs in 1) polymetallic veins and veinlets with sphalerite, galena and chalcopyrite, with minor disseminated chalcopyrite in the wall rocks, 2) significant zones of 3-8% pyrite associated in places with quartz-carbonate breccia and in others with exceptionally strong chlorite-epidote alteration, and 3) quartz veins, replacement patches and breccia with minor pyrite.

The higher-grade gold intervals are moderately to significantly different from one another and cannot be correlated from hole to hole. All are associated with widespread pyritic propylitic/skarn alteration. Controls for the deposition of gold and structures hosting the gold are not well understood but are spatially associated with pyroxenite-monzonite contacts.

10.6 Northeast Pebble IP Anomaly Area

In 2003, three holes totaling 2,288 m were drilled to test a 1.5 km strike-length along the east flank of the IP chargeability anomaly that extends to the north from the northeastern portion of the Pebble deposit where the Cretaceous rocks become covered by onlapping Tertiary rocks. These holes intersected peripheral porphyry mineralization that decreases northward. The data indicate a strong probability for an extension of the Pebble deposit east of Hole 3074.

10.7 308 Anomaly

At the request of Teck-Cominco, Drill Hole 4308, the penultimate hole in the 2004 exploration program, was drilled in the southwestern part of the Exploration Lands to test the potential in an IP-chargeability anomaly in an area where a monzodiorite dyke offshoot from the Kaskanak batholith intrudes a broad zone of gently to moderately, southward dipping well bedded rocks of hornfelsed and pyritic rocks of Unit Y (see Figures 3b, 5). It intersected porphyry-style alteration and mineralization visually similar to that in the Thirty-Eight zone throughout its length. A main stage consists of weak, K-feldspar alteration with disseminated chalcopyrite and related quartz veins containing mostly low concentrations of chalcopyrite and molybdenite. This was overprinted by commonly strong, sericite-pyrite alteration related to quartz-pyrite or pyrite veins. Evidence for epidote-bearing propylitic alteration is also present, and several narrow polymetallic veins were intersected. The abundance of chalcopyrite decreases markedly with depth, and the density of veins of all types is low throughout. The drill hole exhibits characteristics compatible with a magmatic-hydrothermal centre broadly comparable to that in the Thirty-Eight Zone. The aerial extent of this zone is unknown.

11.0 EXPLORATION

Teck Cominco conducted exploration on the Pebble property from 1985 to 2001. In 2001, HDGI conducted soil geochemical and IP/resistivity surveys. In 2002, Northern Dynasty conducted diamond drilling, soil geochemical surveying and a ground magnetometer survey. Northern Dynasty completed additional diamond drilling in 2003 and 2004 and soil geochemical surveying in 2003. Engineering drilling and test pitting were begun in 2004.

11.1 Geophysics

From 1988 to 1990, induced polarization surveys were conducted by Teck Cominco. In 1997, Zonge Geosciences completed 121 line-km of IP surveying for Teck Cominco using a dipole-dipole array with an "a" spacing of 150 m and n=6 level readings. The Zonge data were integrated with the Teck Cominco survey results. The 30-line-km IP survey conducted in 2001 by HDGI was also contracted to Zonge and the same survey parameters were used for easy integration with the preceding data.

The IP data define a north-northeast trending composite zone of anomalous IP effect that extends over 89 km^2 and measures 21 km long and up to 9 km wide (Figure 11). It remains open to the south and possibly to the southeast. To the east the anomaly is masked by overlying Tertiary volcanic and sedimentary rocks (Casselman and Osatenko, 1996; Zonge, 1997). To the north, the anomaly is open under a thin Tertiary cover. The west side of the IP/chargeability anomaly is well defined and corresponds closely with the eastern margin of the Kaskanak Batholith, where it reflects, at least in part, the presence of disseminated sulphides in hornfelsed rocks of Unit Y. Within the broader anomaly are 11 distinct centres of more highly anomalous chargeability, many of which are coincident with extensive areas of copper, gold and molybdenum soil geochemical anomalies. These include the Pebble deposit, the Thirty-Eight Zone, and the 308 Zone. Most chargeability anomalies have been tested by drilling.

The huge scale of this composite sulphide system suggests the presence of several mineralized intrusive centres. The Pebble hydrothermal sulphide system compares favorably in aerial extent to those of other world-class porphyry systems, many of which contain more than one deposit (Osatenko and Casselman, 1998).

After the 2002 drilling program was completed, an 18.5-line-km ground-magnetometer survey by Northern Dynasty over the Thirty-Seven gold-copper skarn area encountered a magnetic anomaly that correlates with the gold-copper skarn mineralization.

11.2 Geochemistry

During the period 1988-1997 Teck Cominco undertook several soil geochemical surveys on the property, collecting a total of 7,337 samples. In 2001 HDGI collected 601 samples, and in 2002 and 2003, respectively, Northern Dynasty collected 328 and 97 soil samples. Throughout the central part of the large geochemical grid, samples were taken at 30 to 80 m intervals along lines spaced 130 to 260 m apart. In several large areas, especially along the northern, western and southwestern margin of the grid, sample density was significantly lower.

These sampling programs outlined a coalescing group of high contrast, extensive and coincident gold, copper, and molybdenum soil geochemical anomalies measuring 9 km in length and up to 4 km in width, with several significant outliers (Figures 12, 13, and 14). These anomalies are inside the strong IP chargeability anomaly.

12.0 DRILLING

The Pebble district has been drilled extensively and intensively; drilling statistics are compiled in Table 12.3. Details of all but the 2004 drilling program are presented in Haslinger and Rebagliati (2003) and Haslinger et al. (2004).

Table 12.3 Summary of Drilling in the Pebble District (to end of 2004)

Company	Area	No. of Holes	Cumulative Length (m)
TC[1]	Resource Lands	113	18,701
TC	Exploration Lands	51	4,375
TC	Sill Zone	39	3,178
NDM	Resource Lands	218	59,232
NDM	Exploration Lands	105	21,325
NDM	Engineering (Resource)	39	2,002
TOTALS		**565**	**108,813**

[1]TC = Teck Cominco; NDM = Northern Dynasty

Holes drilled by Teck Cominco were vertical except for six holes in its "starter" pit area and 11 holes near the periphery of the deposit that were drilled to explore for gold-bearing structures. Drill spacing ranged from 100 to 250 m throughout much of the deposit, increasing to up to 300 m on the margins. In the higher-grade core of the western zone, drill-hole density was greater, with hole spacing from 60 to 70 m. Most Teck Cominco holes were from 125 and 250 m long. Only five holes were drilled below a depth of 300 m, with the deepest hole (#118) reaching a depth of 457 m. Almost all of the holes bottomed in sulphide mineralization: 50% bottomed on 0.60% CuEQ (copper equivalent[1]) or higher and 96% bottomed in 0.30% CuEQ or higher. Teck Cominco completed a few generally shallow holes in the extensive, composite IP chargeability and geochemical anomaly to the south and southwest of the Pebble deposit.

At the Sill target (Figure 5, Table 6.1), Teck Cominco completed 39 holes totaling 3,178 m to evaluate high-level epithermal gold mineralization.

In 2002, Northern Dynasty drilled 68 holes totaling 11,306 m to test IP/chargeability anomalies in other parts of the extensive sulphide-rich hydrothermal system in search of additional porphyry copper-gold deposits. This program discovered the Thirty-Eight porphyry gold-copper deposit, the Fifty-Two porphyry copper occurrence, the Thirty-Seven gold-copper skarn, the Twenty-Five Gold Zone, and several smaller gold occurrences in which gold values exceeded 3.0 g/t.

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[1] CuEQ = Cu % + (Au g/t x 11.25/17.64) + (Mo % x 99.23/17.64) Copper and gold equivalent calculations use metal prices of US$1.00/lb for copper, US$400/oz for gold, and US$6.00/lb for molybdenum. The contained gold and copper represent estimated contained metal in the ground and have not been adjusted for metallurgical recoveries. Adjustment factors to account for differences in relative metallurgical recoveries for gold, copper and molybdenum will depend upon the completion of definitive metallurgical testing.

In 2003, Northern Dynasty drilled 58 holes totaling 19,729 m mainly in and adjacent to the Pebble deposit to test for continuity and extensions of higher-grade zones. Most holes were drilled to the 0-m elevation, and were from 300-400 m in length. Of these, 54 were inclined and 4 were vertical. Nine holes totaling 1,987 m were drilled to test for extensions and new mineralization at four other zones on the Exploration Lands, including the Thirty-Eight Porphyry gold-copper-molybdenum deposit and Thirty-Seven gold-copper skarn.

13.0 SAMPLE PREPARATION, ANALYSIS, AND SECURITY

The following description of "Sample Preparation, Analysis, and Security" is repeated here as it was summarized in the Snowden report and extracted from the Summary Report on the Pebble Copper-Gold Porphyry Project, by C.M. Rebagliati, P.Eng., and R.J. Haslinger, P.Eng., dated February 7, 2003, which is filed on SEDAR.

Prior to 2001, all soil and drill core samples taken from the property were collected by Teck Cominco personnel and sent to well-recognized laboratories. Samples prior to the 1997 program were prepared and analyzed by Chemex Labs in North Vancouver, B.C. The 1997 drill hole samples were prepared by Chemex Labs in Anchorage and analyzed by Teck Cominco's Exploration and Research Laboratory in Vancouver, BC.

13.1 Teck Cominco Drill Core

Teck Cominco drill core was transported from the drill site by helicopter to a logging and sampling site in Iliamna, Alaska. The half-core samples were transported by air charter to Anchorage and by airfreight to Vancouver, B.C. Coarse rejects have been discarded and remaining pulps were shipped to the secured NDM warehouse for long term storage at Port Kells, B.C.

The 1997 drill core samples were prepared by air drying followed by crushing to 70% minus 10 mesh (1.7 mm). A 250 g portion was pulverized to 85% minus 200 mesh (75 microns). A 250 g sample was analyzed for copper using an Aqua Regia digestion with an Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP-AES) finish. Gold was analyzed using Fire Assay (FA) on a one-assay-ton sample with an Atomic Absorption Spectroscopy (AAS) finish. Trace elements were also analyzed by Aqua Regia digestion and ICP-AES. One blind standard was inserted for every 20 samples analyzed. One duplicate sample was taken for each ten samples analyzed.

All samples from Teck Cominco's 164 drill holes were analyzed for gold. Copper assays were performed for samples from Hole 004 onward. Molybdenum assays were completed on a selective basis. Multi-element ICP analysis was also done on every sixth sample beginning with Hole 106. Details of the 1997 sampling, analysis and QA/QC methodology are provided in Figure 15.1.

13.2 NDM 2002 Drill Core

A total of 2,467 core samples, averaging 3.9 m in length, were taken by NDM personnel from the 68 NQ2 (5.02 cm diameter) core holes drilled during 2002 by NDM.

At the Fairbanks laboratory, the sample bags were verified against the numbers listed on the shipment notice. The entire sample of drill core was dried, weighed and crushed to 70% passing 10 mesh (1.7 mm), then a 250 g split was taken and pulverized to 85% passing 200 mesh (75 microns). The pulp was split, and approximately 125 g shipped by commercial airfreight for analysis at ALS Chemex, North Vancouver, British Columbia. The remaining pulps were shipped to the secure NDM warehouse for long-term storage at Port Kells, B.C. The coarse rejects were held for several months at the Fairbanks laboratory until all QA/QC measures were completed and then they were discarded.

ALS Chemex of North Vancouver, B.C., an ISO 9002 certified laboratory, performed the analytical work for the 2002 program. All 2,467 samples were analyzed by fire assay for gold (Au), and for 34 elements, including copper (Cu) and molybdenum (Mo), using a standard multi-element geochemical method. In addition, several drill holes exhibiting copper-gold porphyry style mineralization were subject to Cu assay level determinations, and a few Mo assay level determinations were also performed.

Gold (Au) content was determined by 30 g Fire Assay (FA) fusion with lead as a collector and an Atomic Absorption Spectroscopy (AAS) finish. The four samples that returned Au results greater than 10,000 ppb (10 g/t), were re-analyzed by 1-assay-ton FA fusion with a gravimetric finish. All samples were subject to multi-element analysis for 34 elements, including Cu and Mo, by Aqua Regia (AR) digestion with an ICP-AES finish.

A total of 1,822 samples from 31 drill holes exhibiting porphyry copper-gold style mineralization were assayed for Cu by four-acid (total) digestion with an AAS finish to the ppm level. For Cu assays >10,000 ppm another total digestion with an AAS finish analysis was performed to the percent level. A further 61 samples from drill hole 2034 were assayed for Mo by four-acid digestion with an AAS finish to the ppm level.

Details of the 2002 sampling, analysis and QA/QC methodology are provided in Figure 15.2.

13.3 NDM 2003 Drill Core

In 2003, the diamond drill contractor, Quest America Drilling, Inc., drilled NQ2 (5.02 cm diameter) core. The drill core was boxed at the drill rig and transported daily by helicopter to NDM's secure logging facility at the village of Iliamna, AK. In Phase I, 25 widely spaced holes were completed. The 1,973 samples taken in this Phase averaged 3.12 m in length. Phase II was followed up by 42 holes, 3094 through 3135. In Phase II, 4,470 samples were taken, averaging 3.0 m in length.

Coarse rejects are stored at SGS mineral Services in Fairbanks, Alaska. Remaining pulps have been shipped to the secured NDM warehouse for long-term storage at Port Kells, B.C.

SGS Canada Inc. of Toronto, Ontario, an ISO 9002 registered ISO 17025 accredited laboratory, performed the analytical work for the 2003 drill program. All 6,443 samples were analyzed by fire assay for gold (Au), and for 33 elements, including copper (Cu) and molybdenum (Mo), using a standard multi-element geochemical method. All samples from drill holes within the main Pebble porphyry deposit area were assayed for copper.

Gold content was determined at SGS Rouyn, Quebec by one-assay-ton (30 g), lead-collection Fire Assay (FA) fusion with an Atomic Absorption Spectroscopy (AAS) finish, with results reported in ppb. Ten samples which returned gold results greater than 2,000 ppb (2 grams per tonne) were re-analyzed by 30-g, FA fusion with a gravimetric finish, with results reported in grams per tonne.

Copper assays were done at SGS Toronto, Ontario. Samples were fused with sodium peroxide, digested in dilute nitric acid and the solution analyzed by ICP-AES, with results reported in per cent.

All samples were subject to multi-element analysis for 33 elements including Cu, Mo and S by Aqua Regia (AR) digestion with an ICP-AES finish at SGS, Toronto.

All duplicates were analyzed at ALS Chemex laboratory in North Vancouver, B.C.

Details of the 2003 sampling, analysis and QA/QC methodology are provided in Figure 15.3.

13.4 NDM 2004 Drill Core

In 2004, the diamond drill contractor, Quest America Drilling, Inc., drilled NQ2 (5.02 cm), HQ (6.35 cm) and PQ (8.31 cm diameter) core. The drill core was boxed at the drill rig and transported daily by helicopter to NDM's secure logging facility at the village of Iliamna, AK. Between May and October 2004, 162,510 feet were drilled in 227 holes. The 13,208 samples taken in this Phase averaged 10 feet in length.

The 2004 drilling program included 26 large diameter holes for metallurgical testing. A total of 1990 samples were taken from these holes for analysis. Samples were taken by cutting an off-center slice representing 20% of the core volume which was submitted for analysis. The remaining 80% was used for metallurgical purposes.

Coarse rejects are stored at Delta Junction, Alaska. Remaining pulps have been shipped to the secured NDM warehouse for long term storage at Port Kells, B.C.

ALS Chemex laboratory in Fairbanks Alaska performed sample drying and crushing. ALS Chemex Laboratories of North Vancouver, an ISO 9001:2000 registered laboratory pulverized the samples and performed the analytical work for the 2004 drill program. All 13,208 samples were analyzed for 25 elements, including copper (Cu) and molybdenum (Mo), by a four-acid-digestion, multi-element method. All samples, except for 188 Tertiary waste rock characterization samples, were analyzed by fire assay for gold (Au)

Gold content was determined by one-assay-ton (30 g) lead collection Fire Assay (FA) fusion with an Atomic Absorption Spectroscopy (AAS) finish, with results reported in ppm. One sample which returned Au results greater than 10 ppm was re-analyzed by 30 g FA fusion with a gravimetric finish, with results reported in ppm. Total copper content was determined by four-acid-digestion ($HF-HNO_3-HClO_4-HF-HCl$) and the solution analyzed by Inductively Coupled Plasma – Atomic Emission Spectroscopy (ICP-AES) with results reported in ppm.

All samples were subject to multi-element analysis, for 25 elements including Cu, Mo and S by four-acid-digestion with an ICP-AES finish.

All duplicates were analyzed at Acme Analytical Laboratories in Vancouver, B.C.

Details of the 2004 sampling, analysis and QA/QC methodology are provided in Figures 15.4 and Figure 15.5.

14.0 DATA VERIFICATION

The 2004 drill hole data was collected and digitally entered by NDM geological and technical personnel at the Iliamna site and sent to the Vancouver office on a weekly basis. In Vancouver, the digital database was compiled, merged with the analytical results, and reviewed for QAQC. Verification and validation took place at Iliamna and Vancouver. At Iliamna, the geologist responsible for each drill hole reviewed print-outs of the digitally entered geology, sample and field log data. The merged sample logs and analytical results were also reviewed by site personnel and, if necessary, checked against the drill core.

In Vancouver, the compiled data from the header, survey, assay, geology and geotechnical tables was validated for missing, overlapping or duplicated intervals or sample numbers, and for matching drill hole lengths in each table. Drill hole collars and traces were plotted out in plan and sectional view as a visual check on the validity of the location information by a geologist. As the analytical data was returned from the laboratory it was merged with the sample logs, printed out and the Au, Cu, Mo and Ag values verified against the original assay certificates provide by the laboratory. Particular attention was paid to laboratory reruns where the analytical results were revised for QAQC reasons to ensure the correct data was applied. Revised laboratory certificates were marked *superseded* if replaced by reruns.

Verification and validation work was completed on the 2004 data by January 2005 and a low number of errors were reported. Mislabeled standards in the sample log were the main source of error. This originated because individual standard pulps are not labeled with the standard name for QAQC reasons. Personnel at site were instructed to apply the sample number to the standard pulp and record it in the sample log with the standard name as soon as they were used to avoid recurrence of the problem. Digital values not matching the analytical certificates were the next area of concern. In this case, the digital data was usually correct, as the certificates had been superseded by to QAQC reruns. New certificates were provided by the laboratory.

The 2003 digital data was also verified against the assay certificates. In 2003, the digital analytical results were provided by SGS laboratory in a QAQC format that had more digits than the three significant figures on the printed certificates. Also, this format was not trimmed to the upper detection limit for each element. Because of this, sixteen 2003 gold assays over 2000 ppb had an incorrect value assigned to them. The correct Fire Assay rerun values by were applied in the database. No “overlimits” exist in the 2003 copper values; however, a single molybdenum value (sample 242801 from hole 3097) was left untrimmed because the value was substantiated by an ALS Chemex check result on the same sample. Overlimits for other elements were not trimmed from the QAQC values reported by SGS.

The 2002 analytical data was also verified and validated. A few errors were identified and corrected.

The 1997 and prior Cominco data was validated by NDM in 2003 using:

1. The digital data and printed information provided by Teck Cominco.
2. Digital assay results obtained directly from ALS Chemex and Teck Cominco Exploration Research laboratories, where available.
3. By re-assaying the original assay pulps in a few instances.

Most of the pre-2002 data in the current database is derived from a digital compilation created by Cominco in 1999. A total of 28 Au results from 1998 and 1989 holes, which existed only on hand written drill logs, were added to the database. Although a complete set of original information does not exist for all the historical holes, and in particular, the printed assay certificates were not found, the digital data is of good quality. The data compiled by Cominco matches the digital analytical data received directly from the laboratories, with few exceptions. Most differences are likely due to separately reported overlimits and reruns. The small number of errors identified in the Cominco data, including: mismatched assay data, conversion errors, unapplied overlimits and typos, were corrected.

This verification and validation work performed on the digital database indicates that it is of good quality and acceptable for use in geological and resource modeling of the Pebble deposit.

15.0 MINERAL RESOURCE ESTIMATES (PEBBLE DEPOSIT)

In 2005, a resource estimate was made based upon drill core assay results from 70,719 m of drilling in 265 holes which were completed by Northern Dynasty during 2003 and 2004, and 19,245 m in 118 holes completed by Teck Cominco American Incorporated up to 1997. The resource estimate was completed under the direction of David W. Rennie, P. Eng. of Roscoe Postle Associates Inc., and R. Mohan Srivastava, M.Sc., P.Geo., of FSS Canada Consultants Inc., independent Qualified Persons as defined by Canadian Regulatory Policy NI 43-101. A technical report detailing the resource estimate will be filed on www.sedar.com within 30 days (of March 4, 2005). A summary of mineral resources for the Pebble deposit at various cut-off grades is shown in Tables 15.1 to 15.4.

TABLE 15.1
PEBBLE DEPOSIT - MEASURED MINERAL RESOURCES[1]

Cut-Off	Size	Grade				Contained Metal		
CuEQ[2] %	Million Tonnes	Copper %	Gold g/t	Molybdenum %	CuEQ %	Copper B lbs	Gold M ozs	Molybdenum M lbs
0.30[4]	711	0.33	0.36	0.016	0.63	5.1	8.1	256
0.40	655	0.34	0.37	0.017	0.66	4.9	7.8	244
0.50	525	0.37	0.40	0.018	0.70	4.3	6.7	207
0.60	356	0.41	0.43	0.019	0.78	3.2	4.9	150
0.70	214	0.47	0.47	0.021	0.87	2.2	3.3	97

TABLE 15.2
PEBBLE DEPOSIT - INDICATED MINERAL RESOURCES

Cut-Off	Size	Grade				Contained Metal		
CuEQ %	Million Tonnes	Copper %	Gold g/t	Molybdenum %	CuEQ %	Copper B lbs	Gold M ozs	Molybdenum M lbs
0.30	2,320	0.27	0.31	0.014	0.54	13.7	23.2	736
0.40	1,760	0.30	0.34	0.016	0.59	11.6	19.2	611
0.50	1,100	0.35	0.39	0.017	0.68	8.4	13.9	423
0.60	615	0.40	0.45	0.020	0.79	5.5	8.9	270
0.70	356	0.46	0.51	0.021	0.89	3.6	5.9	167

TABLE 15.3
PEBBLE DEPOSIT - MEASURED PLUS INDICATED MINERAL RESOURCES

Cut-Off	Size	Grade				Contained Metal		
CuEQ %	Million Tonnes	Copper %	Gold g/t	Molybdenum %	CuEQ %	Copper B lbs	Gold M ozs	Molybdenum M lbs
0.30	3,026	0.28	0.32	0.015	0.56	18.8	31.3	993
0.40	2,413	0.31	0.35	0.016	0.61	16.5	27.0	855
0.50	1,628	0.35	0.39	0.018	0.69	12.7	20.5	629
0.60	970	0.41	0.45	0.020	0.78	8.7	13.8	420
0.70	569	0.46	0.50	0.021	0.88	5.8	9.1	265

TABLE 15.4
PEBBLE DEPOSIT – INFERRED[3] MINERAL RESOURCES

Cut-Off	Size	Grade				Contained Metal		
CuEQ %	Million Tonnes	Copper %	Gold g/t	Molybdenum %	CuEQ %	Copper B lbs	Gold M ozs	Molybdenum M lbs
0.30	1,130	0.24	0.30	0.014	0.50	5.9	10.8	361
0.40	756	0.27	0.34	0.017	0.57	4.5	8.2	278
0.50	417	0.31	0.42	0.018	0.67	2.9	5.6	168
0.60	226	0.36	0.49	0.020	0.77	1.8	3.6	101
0.70	143	0.40	0.56	0.020	0.85	1.3	2.6	62

Note 1 By prescribed definition, "Mineral Resources" do not have demonstrated economic viability.

Note 2 Copper equivalent calculations use metal prices of US$1.00/lb for copper, US$400/oz for gold, and US$6.00/lb for molybdenum. Copper equivalent has not been adjusted for metallurgical recoveries. Adjustment factors to account for differences in relative metallurgical recoveries for gold, copper and molybdenum will depend upon the completion of definitive metallurgical testing. CuEQ = Cu % + (Au g/t x 12.86/22.06) + (Mo% x 132.28/22.06).

Note 3 An Inferred Mineral Resource is that part of a mineral resource for which quantity and grade can be estimated on the basis of geological evidence and limited sampling and reasonably assumed, but not verified, geological and grade continuity.

Note 4 A 0.30% CuEQ cut-off is considered to be comparable to that used for porphyry deposit operations in the Americas, but is subject to completion of a feasibility study.

16.0 OTHER RELATED INFORMATION

The information in this section was derived from internal Company correspondence prepared by other qualified persons.

16.1 Environmental and Socioeconomic Considerations

The local communities within the Bristol Bay district of southwestern Alaska are reliant on the commercial salmon-fishing industry, the recreational sports fishing industry, and subsistence hunting and fishing. Although, the region is searching for ways to diversify, economically, it is important that potential mineral development in the area is designed in such a way as to ensure that surface and groundwater quality standards will be maintained.

Accordingly, a wide variety of comprehensive and multi-disciplinary base-line environmental and socioeconomic studies where begun in 2004. The studies are being conducted at the project site, along the road and at the potential port site include:

∉ Meteorology;
∉ Air quality;
∉ Surface water quantity/quality;
∉ Ground water quantity/quality;
∉ Fish and aquatic resources;
∉ Wildlife and terrestrial resources;
∉ Wetland resources;
∉ Marine studies at the port site;

- Trace elements in sediment, soils, vegetation, fish and aquatic resources;
- Subsistence;
- Cultural resources;
- Renewable Resource use;
- Socio-economic factors;
- Viewscapes;
- Noise;
- Mine rock and tailings chemical characterization;
- Laboratory Analysis quality samples taken during the study;
- Impact assessment and management; and
- Mine closure and reclamation.

There are 24 different consulting companies providing experts and more than 80% are Alaskans. Along with the surveys of the wetlands; spring stream surveys, marine studies, and summer fisheries studies are also ongoing.

This comprehensive environmental and socio-economic studies program began in 2004 and will garner the scientific and traditional knowledge that provides the foundation for:

- Sound environmental design of the Pebble project;
- Documenting baseline conditions;
- Assessing/managing project impacts; and
- Rigorous project review and permitting.

The 2004 program of studies will be continued in 2005 to ensure that an adequate baseline of environmental and socioeconomic data is available to support the permitting phase of project development. Approximately $20 million has been allocated for the 2005 study program.

An extensive community relations program has been initiated involving local residents in Iliamna, Newhalen, Nondalton, Pedro Bay and 14 other Bristol Bay native communities. Northern Dynasty have been assigned to visit these communities on a regular basis in order to establish meaningful relationships with community leaders, provide specific information to the communities as a whole and solicit information from them regarding their desires and concerns for responsible mineral development. The Company is also initiating, with local and state authorities a workforce development strategy for the project moving forward.

In order to facilitate the project permitting process, a project design process has been initiated to integrate the environmental baseline information with the engineering factors needed to develop a viable project. The process is designed to address the environmental and socioeconomic factors at an early stage.

16.2 Engineering Studies

16.2.1 Preliminary Assessment

In November, 2004, a Preliminary Assessment of the Pebble project was done based on the 2004 resource estimate by Norwest Corporation (Barratt and Beaudoin, 2004). The following is a summary of the results.

The Preliminary Assessment was prepared in order to quantify the Pebble project's cost parameters and to provide guidance for the ongoing engineering work that will ultimately define the optimal scale of production. Preliminary forecasts and estimates in the report were developed to an order of magnitude level and are not based on systematic engineering studies. As is normal at this stage of a project, data is incomplete and estimates were developed based on the expertise of the engineers involved.

The Preliminary Assessment indicates that the Pebble gold-copper-molybdenum porphyry deposit would be developed by conventional, large-scale, open-pit-mining methods. Four open-pit stages were designed using the block model of the Pebble deposit established by Norwest Corporation for the February 2004 resource estimate. Processing of mill feed from the open pit would produce a flotation copper sulphide concentrate with gold and silver values as well as a separate molybdenum sulphide concentrate. Targeted metal recoveries of 88% for copper, 76% for gold and silver, and 60% for molybdenum were used in the financial modeling. These estimates are based upon on-going testwork by Northern Dynasty, and are in line with other, comparable, large, gold-copper porphyry mines. In the Preliminary Assessment, the copper concentrate was estimated to grade 28% copper, 26.6 g/t gold, and 100 g/t silver, and the molybdenum concentrate was estimated to grade 50% molybdenum.

The Preliminary Assessment examined three production-rate scenarios: 100,000 tonnes per day (tpd), 200,000 tonnes per day, and a phased expansion from 100,000 tonnes per day to 200,000 tonnes per day in year six. Construction capital costs, sustaining capital, operating costs, and off-site charges (such as concentrate transportation and smelter/refining charges) as well as revenues were all estimated in 2004 US dollars. Capital and operating cost estimates for the three production scenarios were developed from initial estimates by the major company which was the previous operator, as well as site-specific data, current major equipment costs and reported costs at similar operating mines throughout the world. Capital cost estimates range from US$1.0 billion for a 100,000 tpd facility (Case 1) to US$1.5 billion for a 200,000 tpd facility (Case 2). Life of mine sustaining capital estimates range from a total of US$276 million for a 100,000 tpd project (Case 1) to a total of US$197 million for a 200,000 tpd project (Case 2). Operating cost estimates range from US$5.06 per tonne milled for a 100,000 tpd production rate (Case 1) to US$4.36 per tonne milled for a 200,000 tpd production rate (Case 2).

Financial models were developed on a pre-tax, 100 per cent equity financed basis for each of the three production rates assessed. For the Preliminary Assessment, long-term average metal prices were estimated to be US$0.95/lb copper, US$395/oz gold, US$5.00/oz silver, and US$5.00/lb molybdenum. In addition, for each production-rate scenario, financial analyses were completed over a range of metal prices. Although a capital cost of US$103 million was estimated for construction of the seaport and access road for the Pebble project, the financial analyses in this Preliminary Assessment do not include these costs, on the assumption that the State of Alaska will parallel the implementation of its Southwest Alaska Regional Transportation Plan with project development. The results of financial analyses for the three production rates under consideration indicate that, at the long-term average metal prices used in the Preliminary Assessment, the Pebble project could generate an Internal Rate of Return (IRR) of between 15.3% and 20.3%, and a Net Present Value (NPV), discounted at 5%, of between US$1.047 billion and US$2.091 billion. At recent metal prices of US$1.25/lb Cu, US$415/oz Au, US$7.00/oz Ag, and US$15/lb Mo, the IRR would increase to between 33.0% and 40.8% and the NPV, discounted at 5%, to between US$3.511 billion and US$5.972 billion.

These financial analyses are preliminary in nature and are based entirely on the inferred mineral resources estimated to early 2004. Inferred resources are considered too speculative geologically to be categorized as mineral reserves and to have economic considerations applied to them. There is no assurance that the operating and financial projections in the Preliminary Assessment will be realized.

16.2.2 Feasibility Study

The following summary of engineering studies was provided by the Company. In 2004, the focus of the Pebble project changed from exploration to comprehensive studies designed to collect the necessary resource, engineering, environmental and socioeconomic data to complete a feasibility study and application for permits for a large-scale, open-pit mining operation. Engineering studies for all project components, including road access, seaport and power transmission, as well as comprehensive environmental and socioeconomic base-line data collection and studies took place throughout 2004 and are continuing in 2005.

In December 2004, AMEC Americas, Ltd., was selected as the lead engineering contractor for preparation of the Pebble Project Feasibility Study. In association with the local Alaskan power utility, Homer Electric Association, Power Engineers, Ltd., was retained to undertake the detailed investigation of power supply to the proposed mine location.

Geotechnical

Knight Piesold Consulting was contracted to collect geotechnical and hydrogeological data required for a feasibility-level, open-pit slope design (Hall et al., 2005). The program consisted of eight oriented drill holes totaling 3065 m, 50 overburden holes (GH-series), and test pitting. A comprehensive geotechnical database was developed that includes results from both laboratory and field strength tests on point load and direct shear. In situ, packer permeability testing was completed in the deeper, more competent rock in the geotechnical holes. Standpipe piezometers were installed in some exploration holes to characterize hydrogeological characteristics of the rock mass. The overburden holes and test pits were done to investigate the geotechnical and hydrogeological characteristic of overburden material in order to select suitable areas for storage of waste rock and mill tailings. The oriented holes were drilled to obtain structural information required for the design of a Stage-1 open pit. They were oriented outwards to intersect the proposed pit walls.

The Knight Piesold study concluded that the intact strength of the rock mass at Pebble is fair to good, with some poor sections in the Tertiary sedimentary rocks and upper parts of intrusions. Steeply dipping faults and shears are present and will affect the pitwall design. The groundwater table is near the surface and moderate groundwater flow is expected at the interface between overburden and bedrock. The permeability of the rock mass generally is low.

Vein orientations were measured and analyzed from cores of the oriented holes to identify vein sets and significant structural orientations (McLaughlin, 2004). The data show a strong cluster of veins whose dips are oriented inwards from the northwest and southeast sides of the zone, a pattern that is consistent with the interpretation of the Pebble deposit as occupying the core of a broad anticline trending east-northeast. The veins are interpreted to occupy preferentially fractures in zones of dilatent stress on the limbs of the anticline. Patterns are generally similar for veins of all ages. The data may be biased because the preferred orientation in all holes was subperpendicular to the axis of the hole.

Metallurgical

In November 2004, 85 tons of samples from 27 PQ (3.35-inch diameter) and HQ (2.5-inch diameter) drill holes in the Pebble gold-copper molybdenum deposit were shipped to SGS Lakefield Research Limited ("Lakefield") in Ontario, Canada for metallurgical test work. At Lakefield's research facilities, the drill core will be prepared into a number of composite samples for testing variability in the crushing, grinding and processing properties of the mineralized zones and different rock types in the Pebble deposit. These composites will be selected to define the metallurgical variances across the deposit in rock masses of sufficient tonnage to impact daily, monthly and yearly production schedules. These detailed studies will provide a thorough understanding of the Pebble deposit in terms of power requirements for crushing and grinding as well as expected metal recoveries and product quality during flotation. Reject products from the process will be characterized for the most suitable manner of disposal so that appropriate conventional waste management facilities can be designed.

The Company's metallurgical consultants assessed the amount of material required for the planned test work. The 85 tons of material shipped is considered to be an adequate tonnage to allow for accurate definition of the metallurgical characteristics of the Pebble deposit and will permit the metallurgical testing to closely resemble what would be encountered in the actual, full-scale operation.

These metallurgical studies are part of ongoing testing of drill core material that has been underway since mid 2004. Work on the new composite samples will commence upon receipt by Lakefield, and is expected to continue through the first quarter of 2005. Planning and design of the crushing and grinding circuits for the Project is being directed by Mr. Derek Barratt, P.Eng., and development of the flotation process is under the direction of Dr. Morris Beattie, P.Eng., both of whom are Qualified Persons as defined under National Instrument 43-101.

Infrastructure

Infrastructure requirements for the Pebble project are being defined and significant progress has been made on specific infrastructure development plans. Development of a mine at Pebble will require the construction of an 85-mi-long road to connect the project to tidewater at Cook Inlet and a deep seaport facility. The State of Alaska's Southwest Regional Transportation Plan includes the construction of transportation facilities from Cook Inlet to the town of Iliamna, 17 mi from the Pebble project. Northern Dynasty and the State discussing integration of this sector of the State's plan with the Pebble project's potential development schedule. A recent transportation-corridor analysis, commissioned by the State's Department of Transportation and Public Facilities, identified a preferred road corridor and port option.

Pre-feasibility engineering studies for the port site and the road transportation corridor have been commissioned by the State, with results expected to be reported in early 2005. Northern Dynasty's environmental consulting team is collecting the necessary data for year-round road and port permit applications. The State and Northern Dynasty plan to continue their co-operation under a Memorandum of Understanding to be negotiated in the coming months.

A number of options for the provision of electric power to the project and neighboring villages have been identified and are being evaluated. These options include connection to the State's existing power transmission grid, either through a 66-kilometer (41 mi) submarine connection to the Kenai Peninsula or an overland route on the west side of Cook Inlet. An alternative to a transmission grid connection would involve the establishment of new generation facilities close to the mine or port area. Homer Electric Utility and Northern Dynasty are jointly funding a feasibility study of a power development plan to connect the deposit site to the State of Alaska's Railbelt electrical grid.

16.2.3 Proposed 2005 Program

The waste and water management system assessment will be continued for incorporation in the feasibility study. This work will include additional data collection for seepage control, foundation design, and waste and water characterization. The facility layouts will continue.

The metallurgical testwork, which commenced in 2004, will continue to mid 2005. In addition, as a result of the expansion of the resource to the east, additional testwork requirements were identified. A second suite of samples, based on a combination of existing drill core and a series of new drill holes, will be collected and the tests on these samples added to the program. The goal of the metallurgical program is two-fold. First, the data generated will be adequate to support the feasibility level design of the process plant. Second, the response of the ore within the plant – i.e. grindability, metal recovery, reagent consumption, etc. – will be defined to permit to the proper estimate of operating costs and financial returns.

The transportation studies also have two components. The first is to support the State in its assessment of the Southwest Alaska transportation system. The second is to determine the transportation requirements for the project. This latter task includes evaluating concentrate transport alternatives, developing a project logistics plan, and determining the costs for the feasibility study.

Northern Dynasty will continue to support Homer Electric in its assessment of the capacity of the Railbelt electrical grid to supply power to the project.

The basic objective of the feasibility study will be to consolidate the results of the various engineering studies into a comprehensive document that defines the costs and financial returns of the project. The work specific to the study will be to complete mine planning based on the new resource estimate, complete a feasibility-level plan for the process plant and associated infrastructure, and to estimate the costs of these facilities.

The budget for engineering programs is $10.6 million.

17.0 INTERPRETATION AND CONCLUSIONS

On the Pebble property, integrated geological, geochemical and geophysical surveys have outlined a Au-Cu-Mo-rich, hydrothermally altered, sulphide system covering an area of 89 km^2. Exploration since 1987 has discovered one large-scale porphyry gold-copper-molybdenum deposit, two smaller zones of somewhat similar but lower grade porphyry-type mineralization, a gold-copper skarn occurrence, and numerous gold zones associated with a multi-phased, Late Cretaceous intrusive complex.

A volcanosedimentary sequence dominated by andesitic argillite and siltstone was intruded by several, early diorite sills. Later, a zone in the southwest of the deposit area was the locus of repeated intrusion, consisting of early intrusion of rocks of Units M and P, later intrusion of Unit N and associated Unit X, and finally more explosive intrusion of Units F and associated Unit X2. A pluton of Unit Gp was intruded beneath much of the area, from which several stocks ending into the overlying rocks. Stocks A and D were intruded into the intrusive complex (West Zone) and Stocks B and C were intruded into the stratiform sequence to the northeast (Central Zone). Another stock is postulated to exist in or east of the East Zone to explain the presence of the strong potassic alteration and high-grade gold-copper-molybdenum mineralization in the East Zone. Associated with all stocks, but mainly with Stock B, are sills of finer grained granodiorite (Unit Gs). The volcano-sedimentary rocks and sills were warped moderately during intrusion of the granodiorite pluton and stocks. Associated with a southwest-elongate zone of potassic alteration, copper-gold-molybdenum mineralization formed in and above the stocks of granodiorite (Unit Gp) and the major associated sill (Unit Gs). Lesser gold-copper-molybdenite mineralization was associated with the earlier intrusion of Unit N (and Unit X) and Unit F (and Unit X2). On a more regional scale, this zone of potassic alteration probably is synchronous with similar potassic alteration at the Thirty-Eight porphyry deposit and West Koktuli Zone some 12-15 km to the southwest.

Gold mineralization is associated with zones of strong phyllic alteration that flank the zone of potassic alteration and with peripheral zones of propylitic alteration. Gold also occurs in zones of phyllic alteration that crosscut the core of potassic alteration. Zinc-lead-silver±gold mineralization also accompanies bands of phyllic alteration that crosscut the core of potassic alteration. Both of these represent a lower-temperature, later event than the main copper-gold-molybdenum deposition.

Localization of the Pebble deposit was controlled at several scales. The principal regional control is the northeast-trending, arc-oblique, crustal-scale Lake Clark fault, which is similar to the scenario recognized in many porphyry belts (e.g., Tosdal et al., 2002; Richards et al., 2001). This control may account for the northeast-southwest elongation of the gold and gold-base metal envelopes to the deposit. However, within the deposit the loci of Unit G intrusions, K-silicate alteration and mineralization trend easterly. This may reflect control by dilational cross structures between or adjacent to major strands of the Lake Clark fault, and/or an influence by the axes of open, east-trending folds in the host sedimentary rocks. Deflection of syn-magmatic fault movement around the coherent Kaskanak batholith may have aided emplacement around its margins of the late-stage Unit G intrusions as well as other post-hornfels intrusive rocks.

The West Zone is a thermal and fluid centre in which stronger mineralization is related to higher densities of quartz-sulphide veins and more intense associated K-silicate alteration that formed near the margins of and surrounding several small cupolas of Unit Gp that coalesce at depth. The West Zone exhibits only modest vertical zoning from brown biotite alteration with minor bornite at depth to black biotite alteration without bornite above, contains mostly B veins and relatively few AB veins, and has been strongly overprinted by late sericite-pyrite and lesser propylitic alteration.

The East Zone is considered a much stronger magmatic-hydrothermal centre. In contrast to the West Zone, very strong and laterally extensive zones trend from the Central Zone to the deeper parts of the East Zone. These include: 1) a progressive increase in the intensity of K-silicate alteration; 2) a change from black to more magnesian brown biotite; 3) an increase in the density of AB veins to >25 vol %; 4) a decrease in sulphide concentration and an increase in the ratio of chalcopyrite to pyrite; 5) a higher, but still minor, concentration of bornite and lesser covellite-digenite/chalcocite; 6) an increase in molybdenum grades to >500 ppm over large rock volumes; 7) an abrupt downward plunge of intense K-silicate alteration and mineralization from

<350 to >700 metres depth; 8) a smaller relative grade contrast between hornfelsed sedimentary rocks and intrusions; and 9) an almost complete absence of late, peripheral alteration assemblages in the East Zone. Drillhole intersection of numerous dykes of Unit Gp below 500 metres depth in the East Zone suggests that the patterns of zoning, and the more intense alteration and higher grades of mineralization, reflect proximity to a much larger mineralizing Unit G intrusion located laterally and/or below the current limits of drilling.

The more weakly mineralized Central Zone is interpreted as having been formed in a comparatively passive setting. Mineralization reflects weaker hydrothermal activity related to Unit Gs sills distal to their probable source in the East Zone, augmented by lateral fluid flow from the adjacent East and West Zones. This scenario accounts for the lower overall grade of the Central Zone, the very strong grade contrast between Unit Y hornfels and coarser-grained intrusive rock types, the well-defined and shallower base to strong K-silicate alteration and mineralization, and the strong overprint by late alteration assemblages.

Oxidation and attendant supergene processes affected the higher-elevation portions of the West and Central Zones. Where not eroded by glacial scouring, a limonitic, leached cap ranging from 7 to 33 m thick grades downwards into a variably developed supergene zone ranging from 5 to 50 m thick. In the supergene zone, primary copper-bearing sulphides are totally replaced in the upper part by covellite, digenite, and lesser chalcocite but only partially replaced by the same minerals in the lower part. Remnant pyrite and chalcopyrite are rare in the oxidized leached cap. Along structures, oxidation and supergene mineralization are present deeper into the protore. Supergene zones are not well developed at lower elevations or in areas with Tertiary cover.

The exploration-drilling program on the Pebble deposit up to and including 2004 has defined a very large mineral resource that, based upon comparable operations and in-house economic modeling, has excellent potential to evolve into an economically viable mining venture. The 2004 drilling program in the Pebble deposit expanded the overall size of the deposit and the higher-grade resource in the deposit and greatly enlarged the East Zone.

The West and Central Zones are open at depth. Hole 4309, drilled deep beneath the edge of the intrusion-breccia complex along the border between the West and Central zones, penetrated through the intrusive complex into rocks of Units D and Y. Over a length of 591 m, the overall grade in this hole is 0.566 Cu EQ, which is well above the cutoff grade used in tonnage estimates. The East Zone is open to the east and at depth. Drilling in the Central Zone has been on widely spaced, mainly shallow holes; based on the positive results of drilling in 2004 in the East Zone, the depth potential of the Central Zone remains untested.

The milled intrusive breccia complex (dominated by Units F and X2) that extends south for more than 1.5 km from the presently defined south edge of the Pebble deposit has potential to contain porphyry gold-copper-molybdenum mineralization. The margin of the intrusive complex is a zone that may have undergone multiple stages of dilation, intrusion and hydrothermal activity, which would be conducive to forming higher-grade copper-gold mineralization. This zone warrants further drill-testing.

In 2004, the focus of the Pebble project made a transition from exploration to comprehensive studies designed to collect the necessary resource, engineering, environmental and socioeconomic data to complete a feasibility study and application for permits for a large scale open pit mining operation. Engineering studies for all project components, including road access, port and power transmission, as well as comprehensive environmental and socioeconomic base line data collection and studies took place through out 2004 and are continuing in 2005.

18.0 RECOMMENDATIONS

Northern Dynasty's priority objective should be to complete definition and in-fill drilling within and adjacent to the deposit to determine indicated and measured resources to allow for the completion of a bankable feasibility study on the starter pit area that is centred on the West Zone.

Drilling in 2005 at the Pebble deposit is recommended to the east and at depth to enlarge the volume of rock that can be included as a measured resource, and to explore for the extensions of the mineralized zone at the level of indicated resource. As well, metallurgical drilling will continue to provide data where the present density of metallurgical data is low.

Drilling in other parts of the property is not recommended for 2005. However, additional property-wide exploration is warranted to systematically assess known zones of mineralization. Drill-testing of outstanding IP and soil geochemical anomalies is warranted a later date.

Environmental base-line studies and comprehensive engineering and mine design studies will continue.

Regions of pre-Tertiary bedrock on the property that have not yet been mapped by Northern Dynasty will be mapped.

19.0 PROPOSED BUDGET (2005)

A CDN$44.5 million program is planned by the Company for 2005. Of this, $10.2 million is proposed for exploration and drilling.

The core drilling portion includes 30,000 m (97,000 ft) of exploration and infill drilling, focused on the East Zone, and 2,700 m (9,000 ft) of metallurgical drilling in the Pebble deposit. In addition, 60 days of reverse circulation drilling to collect further hydrological data throughout the site is also planned. The budget (Table 19.1) includes the cost of drilling (both core and rotary), assay costs, helicopter support (for drilling and geology), staff and support salaries, transportation costs, room and board, and purchase of three used vehicles for Iliamna. The exploration and drilling budget does not include helicopter support and lodging expenses for environmental and/or engineering studies nor salaries for ground water consultants for the rotary drilling program. These are part of the environmental and engineering budgets.

Engineering, environmental, and socioeconomic programs, designed for the completion of a feasibility study and permit applications will continue in parallel with the drill program.

Table 19.1 Proposed Budget

2005 PROJECT BUDGET		
Item		**Total (CDN$)**
Resource Core Drilling	3,582,800	
Exploration Lands (79,000 feet)		
Resource Lands (18,000 feet)		
Rotary Drilling (60 days)	290,400	
Metallurgical Core Drilling (9,000 feet)	1,990,500	
Assays	317,500	
Transportation	1,652,300	
Salaries	975,300	
Freight, Site Costs & Miscellaneous	1,356,200	
Exploration/Drilling		**10,165,000**

20.0 DATE

This report is dated March 31, 2005.

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22.0 CERTIFICATES OF AUTHORS

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CERTIFICATE OF AUTHOR

I, C. Mark Rebagliati, P.Eng., am a Professional Engineer of 2503-588 Broughton Street in the City of Vancouver, in the Province of British Columbia.

I am a member in good standing of the Association of Professional Engineers and Geoscientists of British Columbia.

I am a graduate of the Provincial Institute of Mining, Haileybury, Ontario (Mining Technology, 1966).

I am a graduate of the Michigan Technological University, Houghton, Michigan USA (B.Sc., Geological Engineering, 1969).

I have practiced my profession continuously since graduation and have been involved in mineral exploration for precious and based metals in Canada, USA, Mexico, Brazil and South Africa.

As a result of my experience and qualifications I am a Qualified Person as defined in National Instrument 43–101.

I have visited the Pebble Project several times, and having supervised the 2001, 2002, 2003, and 2004 exploration programs. I am very familiar with the geology, topography, physical features, access and local infrastructure.

I am not aware or any material fact or material change with respect to the subject matter of this technical report, which is not reflected in the report, the omission of which to disclose would make this report misleading.

I have read National Instrument 43-101, Form 43-101FI and this report has been prepared in compliance with NI 43-101 and Form 43-101FI.

Date in Vancouver on this 31st day of March, 2005.

"C. Mark Rebagliati"

C. Mark Rebagliati, P.Eng.

John Payne, PhD, P.Geo.
7846 160th Street,
Surrey, British Columbia, V3S 3T3
Phone 604-597-1080, jgpayne@telus.net

CERTIFICATE

I, John Payne, PhD., P.Geo., of the city of Surrey, British Columbia herby certify that:

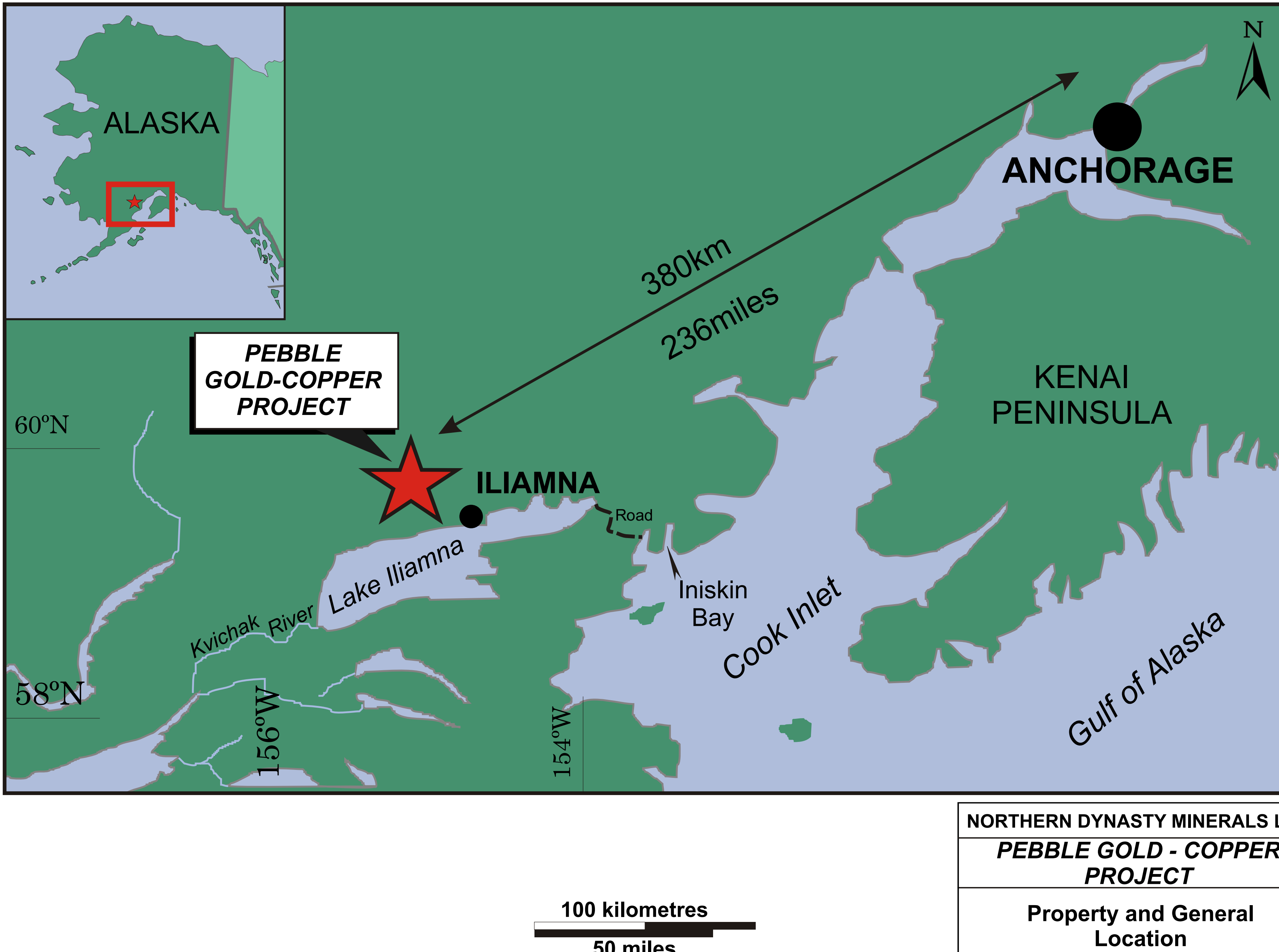
1. I am an employee of Hunter Dickinson Inc, with a business office at Suite 1020-800 West Pender Street, Vancouver, British Columbia. I was contracted by Hunter Dickinson Inc. on behalf of Northern Dynasty Minerals Ltd., to carry out exploration programs on the Pebble property, Alaska, USA in 2004.
2. I am a graduate of Queen's University (B.Sc. Geological Engineering, 1961) and of McMaster University (Ph.D. Geochemistry, 1966).
3. I have practiced my profession continuously since graduation and have been involved at a senior level in exploration projects internationally, including delineation and evaluation of mineral deposit resources in Canada, United States of America, Mexico, South America, Europe, Asia, and Africa.
4. I am a member in good standing of the Association of Professional Engineers and Geoscientists of British Columbia, Licence #27828.
5. As a result of my experience and qualifications, I am a Qualified Person as defined under National Instrument 43-101.
6. I have visited the Pebble property several times and was actively involved in the drilling programs in 2004. I was on site for a total of 77 days during 2004. I am familiar with the geology, topography, physical features, access and local infrastructure.
7. I am not aware of any material fact or change with respect to the subject matter of this Report, which is not reflected in the Report, and the omission of which would make the Report misleading.
8. I have read national Instrument 43-101 and Form 43-101FI and this report has been prepared in compliance with NI 43-101 and Form 43-101FI.
9. I consent to the use of this report as the Technical Report for the year-end filing of Northern Dynasty Minerals Ltd.

Signed in Surrey, British Columbia on the 31st day of March, 2005.

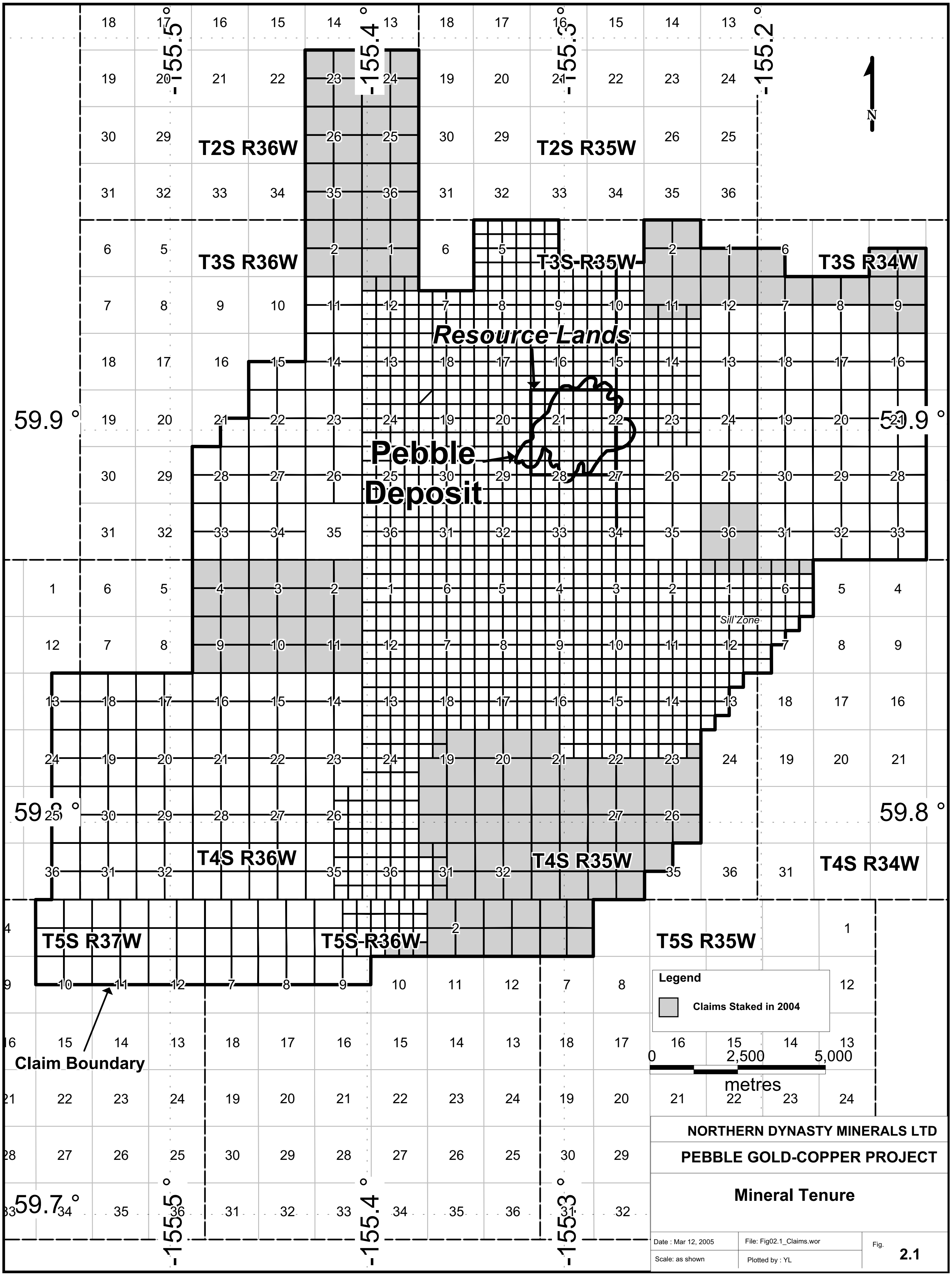
"John Payne"

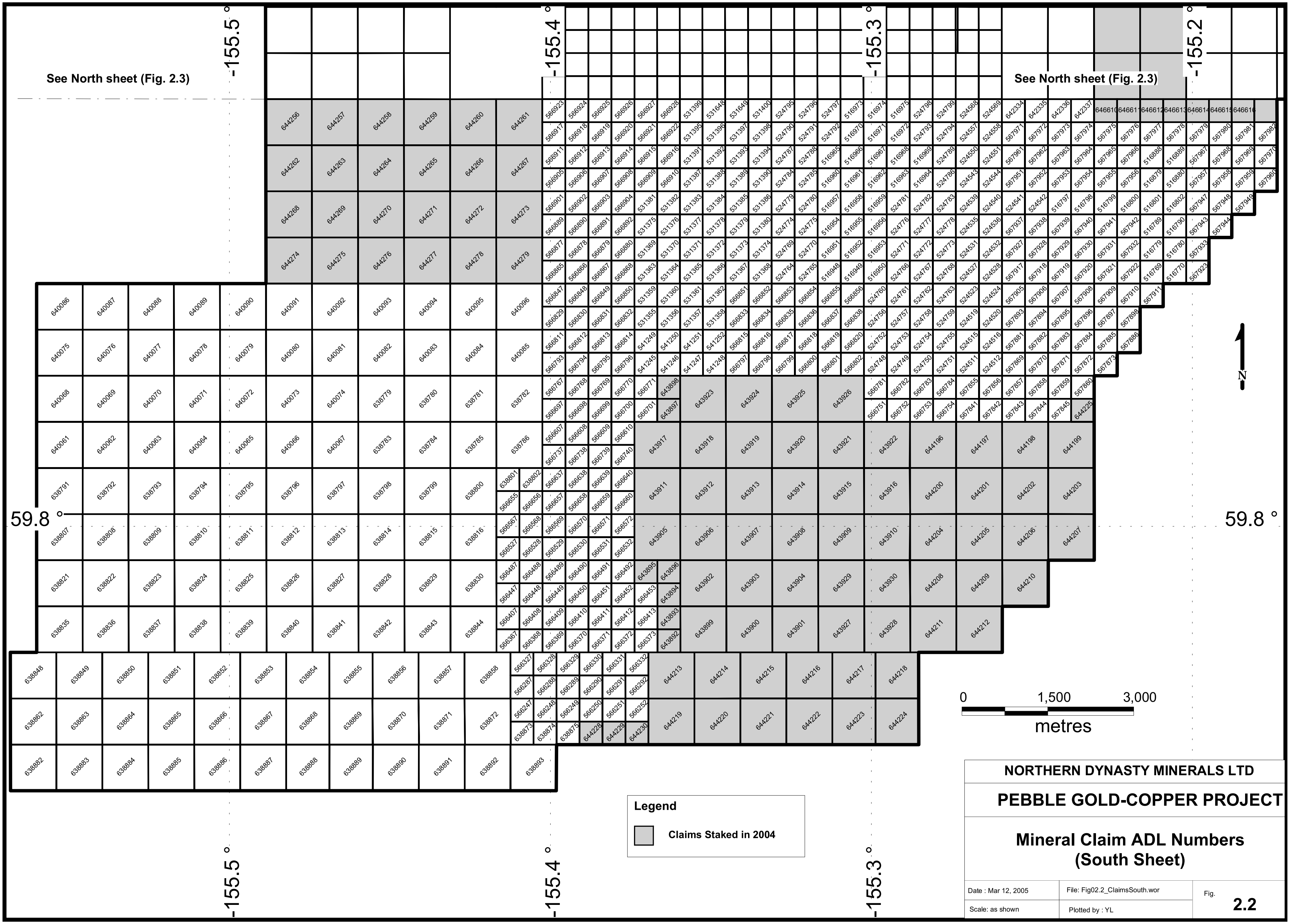
John Payne, PhD., P.Geo.

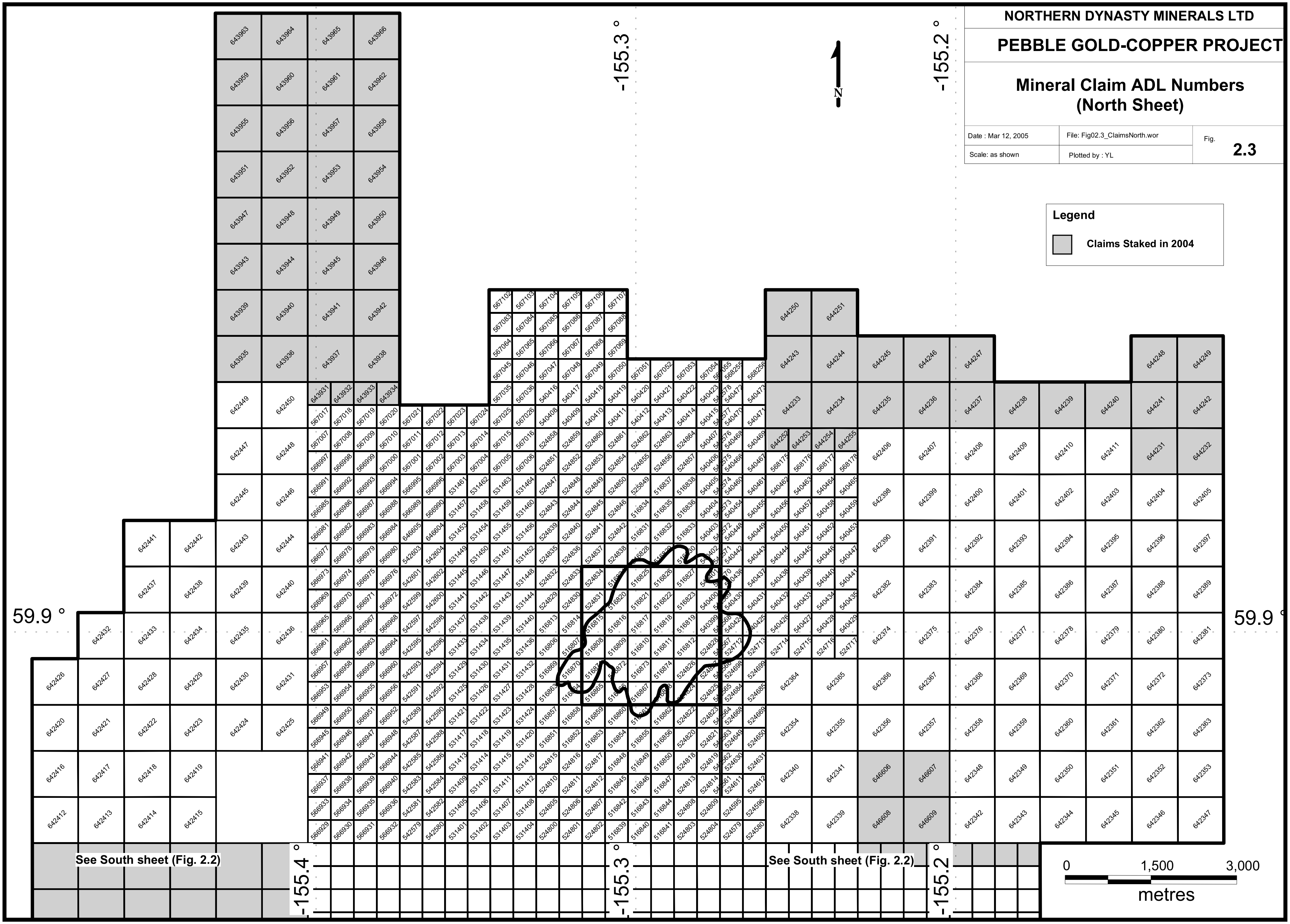
23.0 ILLUSTRATIONS

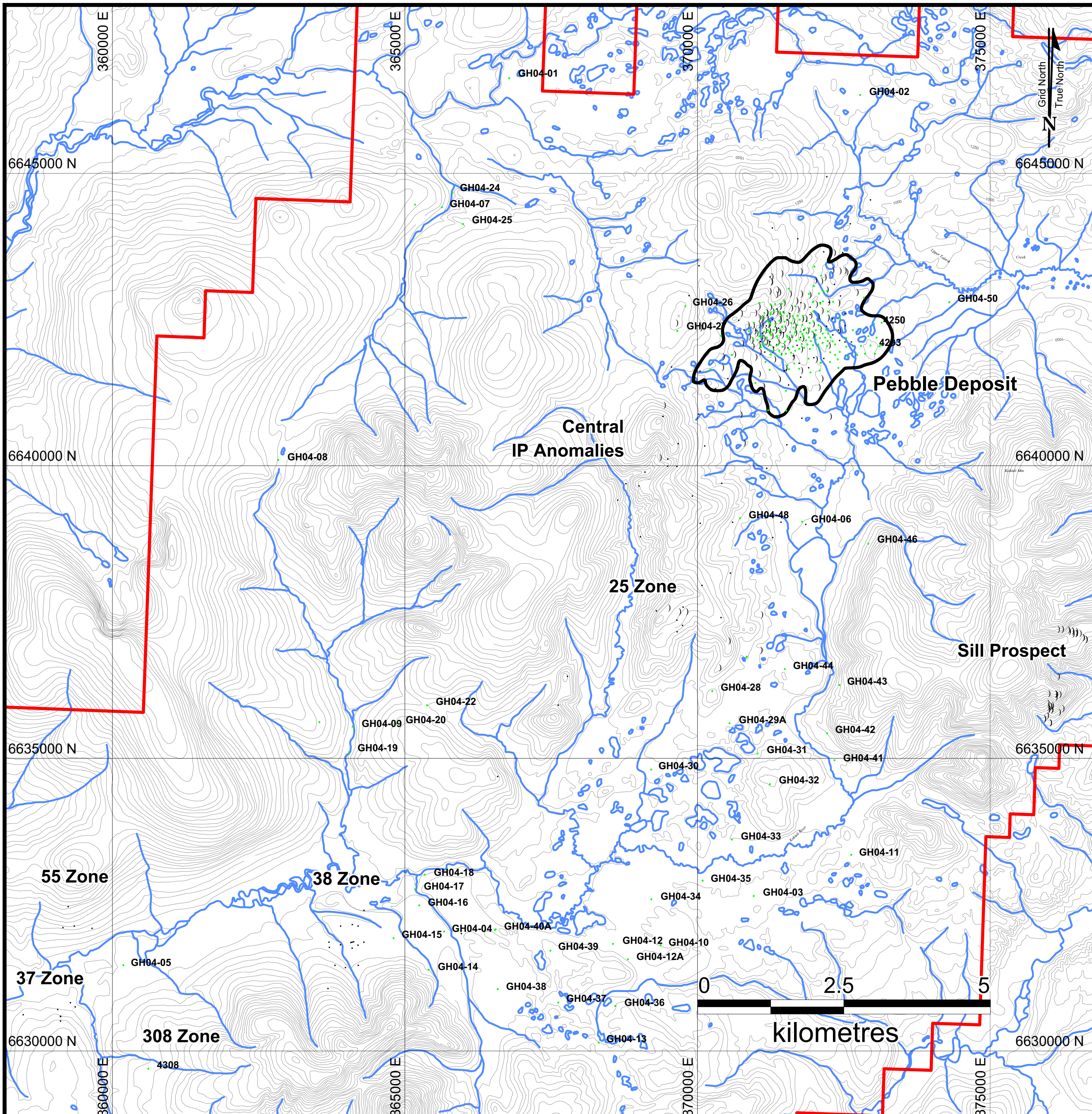


NORTHERN DYNASTY MINERALS LTD.		
PEBBLE GOLD - COPPER PROJECT		
Property and General Location		
Date: Mar 21, 2005	File: Fig01_PropLocation.cdr	Fig 1
Scale as shown	Drawn by: PC, YL	


T2S R36W
T2S R35W
T3S R36W
T3S R35W
T3S R34W
T4S R36W
T4S R35W
T4S R34W
T5S R37W
T5S R36W
T5S R35W
Resource Lands
Pebble Deposit
Sill Zone
Claim Boundary
-155.5 °
-155.4 °
-155.3 °
-155.2 °
59.9 °
59.8 °
59.7 °
N
Legend
Claims Staked in 2004
0 2,500 5,000
metres
NORTHERN DYNASTY MINERALS LTD
PEBBLE GOLD-COPPER PROJECT
Mineral Tenure
Date : Mar 12, 2005
File: Fig02.1_Claims.wor
Scale: as shown
Plotted by : YL
Fig.
2.1


See North sheet (Fig. 2.3)
See North sheet (Fig. 2.3)
-155.5 °
-155.4 °
-155.3 °
-155.2 °
59.8 °
59.8 °
N
0
1,500
3,000
metres
Legend
Claims Staked in 2004
NORTHERN DYNASTY MINERALS LTD
PEBBLE GOLD-COPPER PROJECT
Mineral Claim ADL Numbers
(South Sheet)
Date : Mar 12, 2005
File: Fig02.2_ClaimsSouth.wor
Scale: as shown
Plotted by : YL
Fig.
2.2


NORTHERN DYNASTY MINERALS LTD
PEBBLE GOLD-COPPER PROJECT
Mineral Claim ADL Numbers
(North Sheet)
Date : Mar 12, 2005
File: Fig02.3_ClaimsNorth.wor
Fig.
2.3
Scale: as shown
Plotted by : YL
Legend
Claims Staked in 2004
N
-155.3 °
-155.2 °
-155.4 °
59.9 °
See South sheet (Fig. 2.2)
0
1,500
3,000
metres



UTM ZONE 5 NAD27 FOR ALASKA

Legend

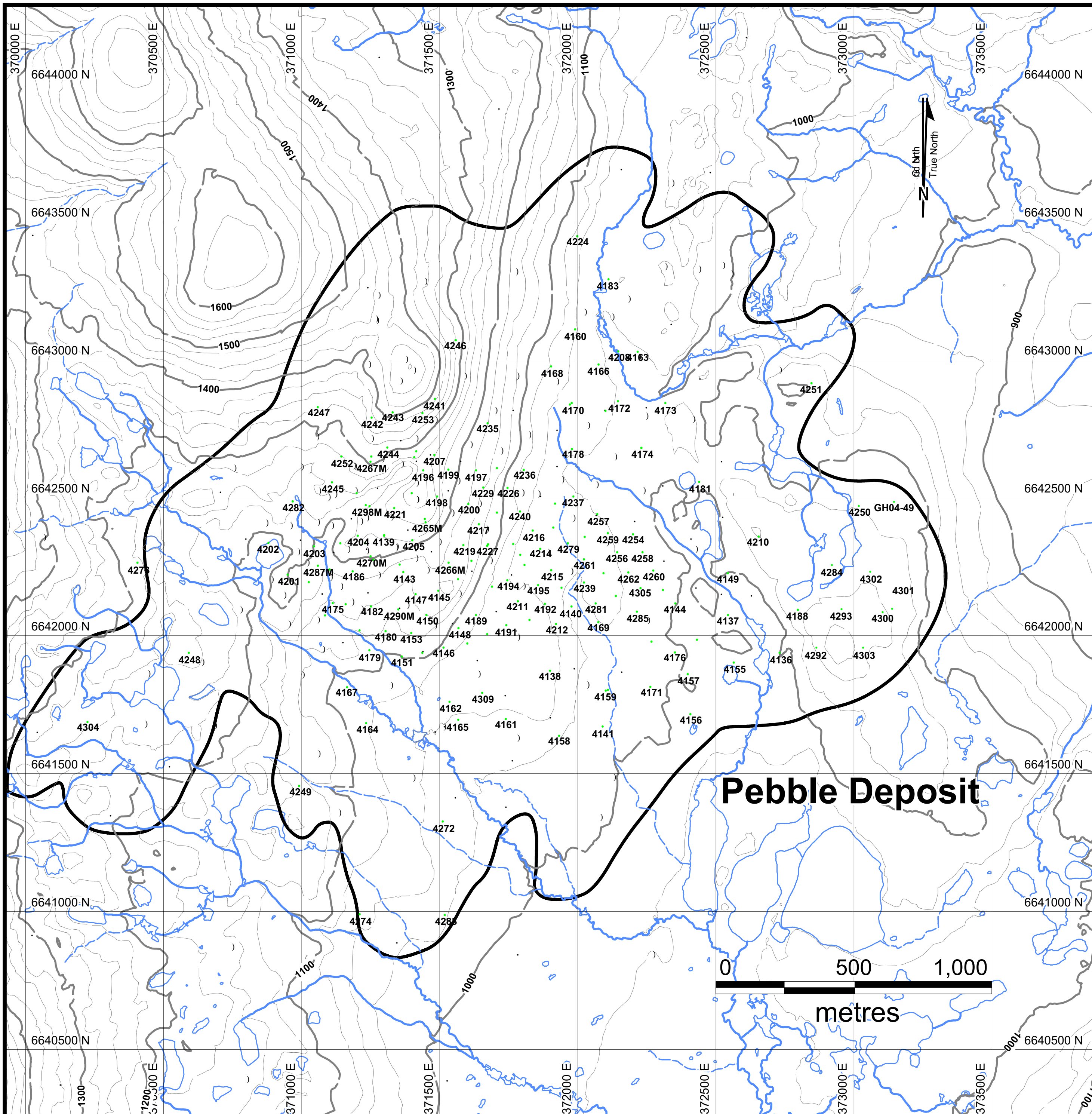
-) Cominco Drill Hole
- . 2002-2003 NDM Drill Hole
- . 2004 NDM Drill Hole
- Claim Boundary
- Pebble Deposit

NORTHERN DYNASTY MINERALS LTD

PEBBLE GOLD-COPPER PROJECT

Drill Holes and Topography (Pebble Property)

Date: March 12, 2005	File: Fig03.1_DrillHoles_Topo.wor	Fig. 3.1
Scale: as shown		



UTM NAD27 FEET AK
Thin contour line interval is 25ft

Legend

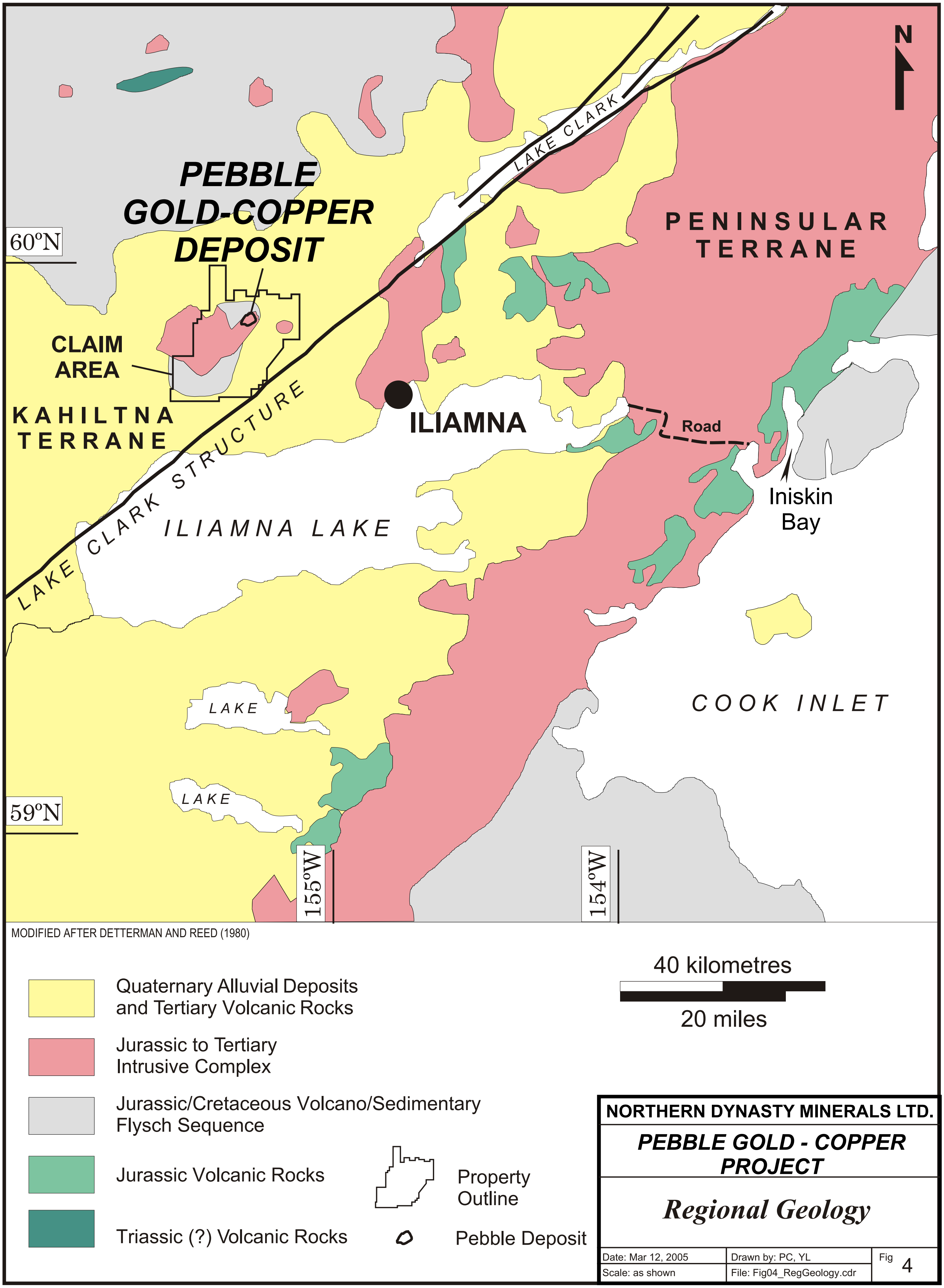
-) Cominco Drill Hole
- . 2002-2003 NDM Drill Hole
- . 2004 NDM Drill Hole
- Claim Boundary
- Pebble Deposit

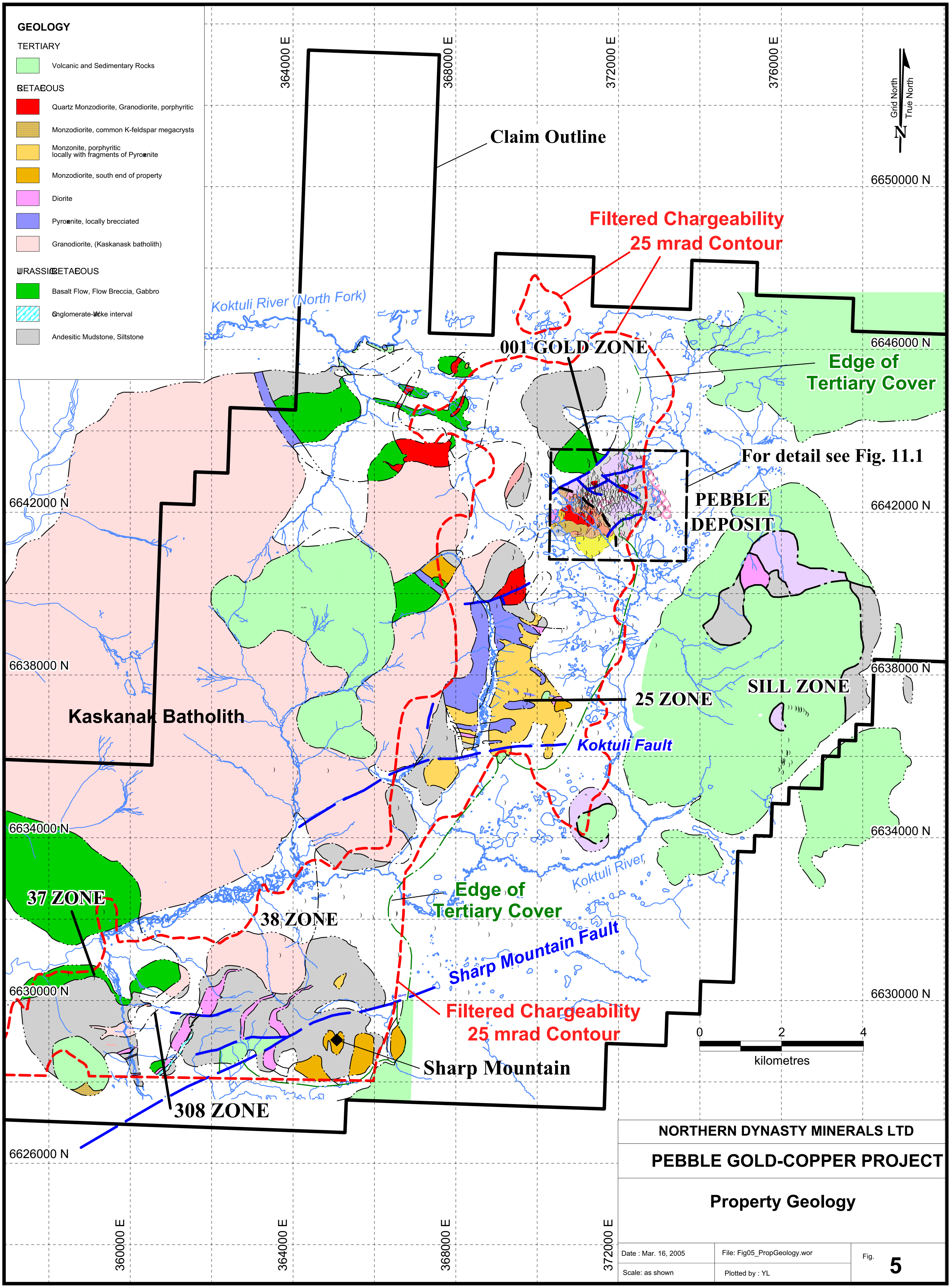
NORTHERN DYNASTY MINERALS LTD

PEBBLE GOLD-COPPER PROJECT

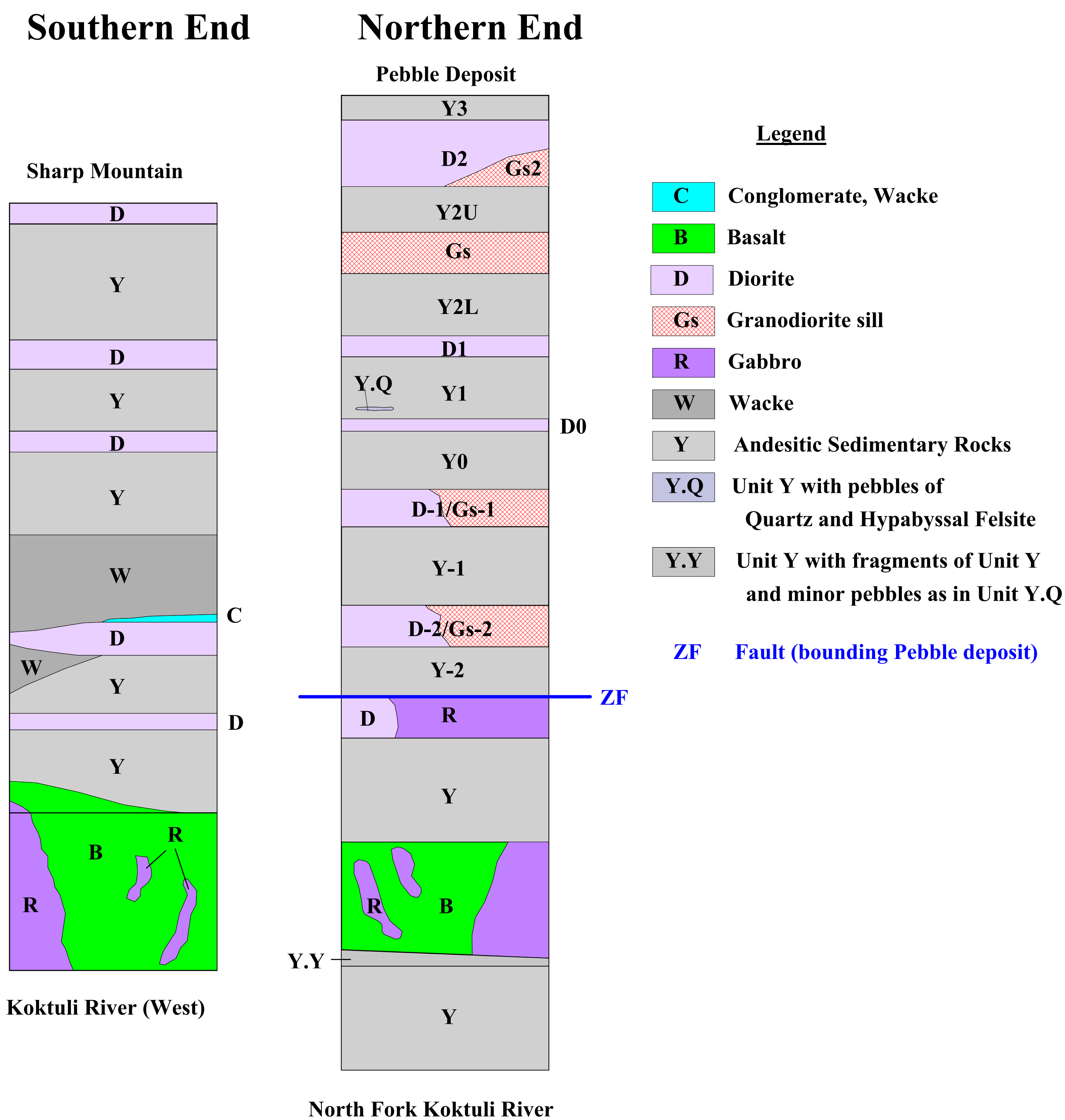
Drill Holes and Topography (Pebble Deposit and Vicinity)

Date: March 12, 2005	File: Fig03.2_Drillholes_Top.wor	Fig. 3.2
Scale: as shown		


N
PEBBLE
GOLD-COPPER
DEPOSIT
60°N
CLAIM
AREA
KAHILTNA
TERRANE
LAKE CLARK STRUCTURE
LAKE CLARK
PENINSULAR
TERRANE
ILIAMNA
Road
Iniskin
Bay
ILIAMNA LAKE
COOK INLET
LAKE
LAKE
59°N
155°W
154°W
MODIFIED AFTER DETTERMAN AND REED (1980)
Quaternary Alluvial Deposits
and Tertiary Volcanic Rocks
Jurassic to Tertiary
Intrusive Complex
Jurassic/Cretaceous Volcano/Sedimentary
Flysch Sequence
Jurassic Volcanic Rocks
Triassic (?) Volcanic Rocks
Property
Outline
Pebble Deposit
40 kilometres
20 miles
NORTHERN DYNASTY MINERALS LTD.
PEBBLE GOLD - COPPER
PROJECT
Regional Geology
Date: Mar 12, 2005
Drawn by: PC, YL
Fig
4
Scale: as shown
File: Fig04_RegGeology.cdr



UTM ZONE 5 NAD 27 FOR ALASKA

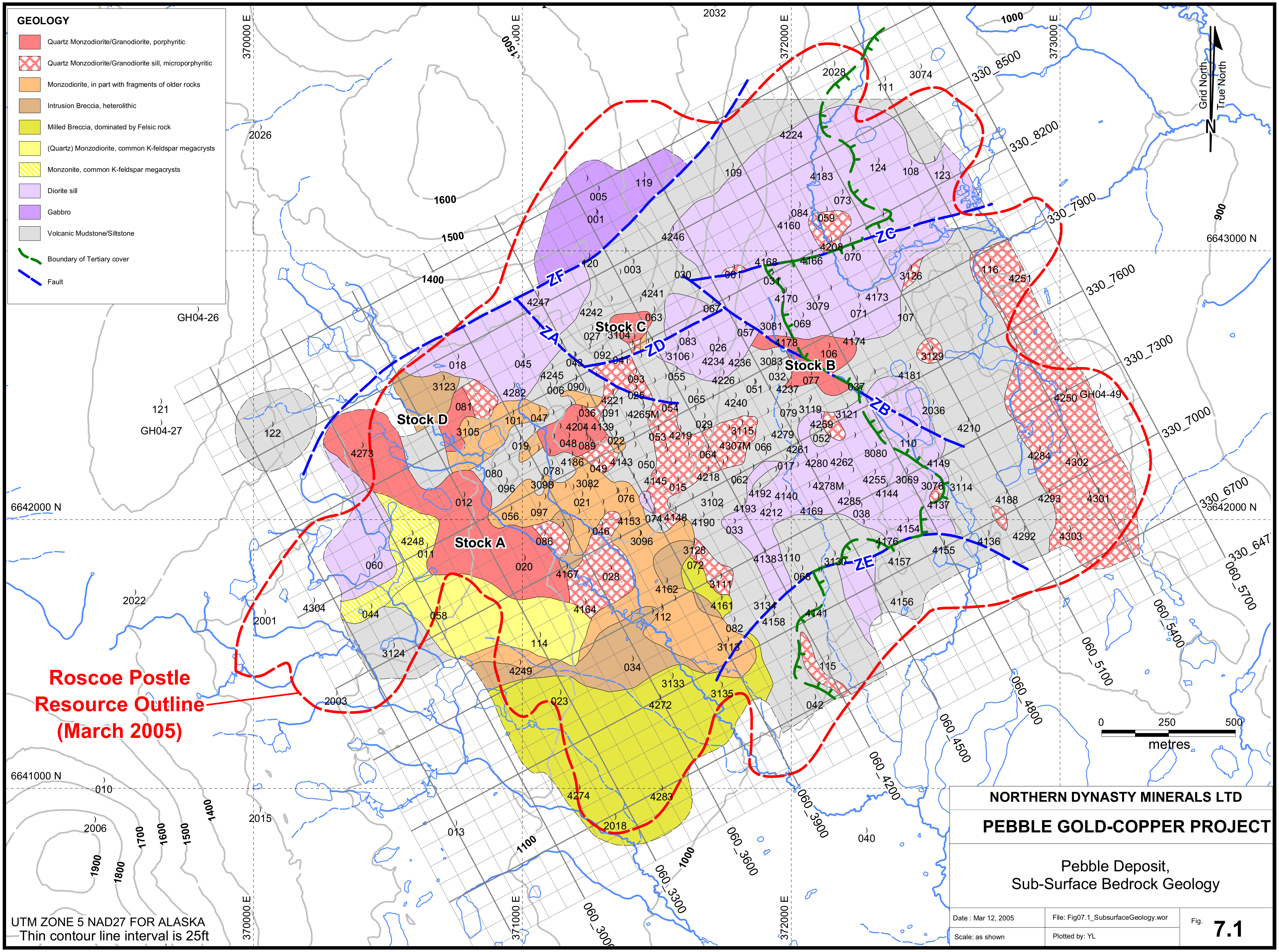


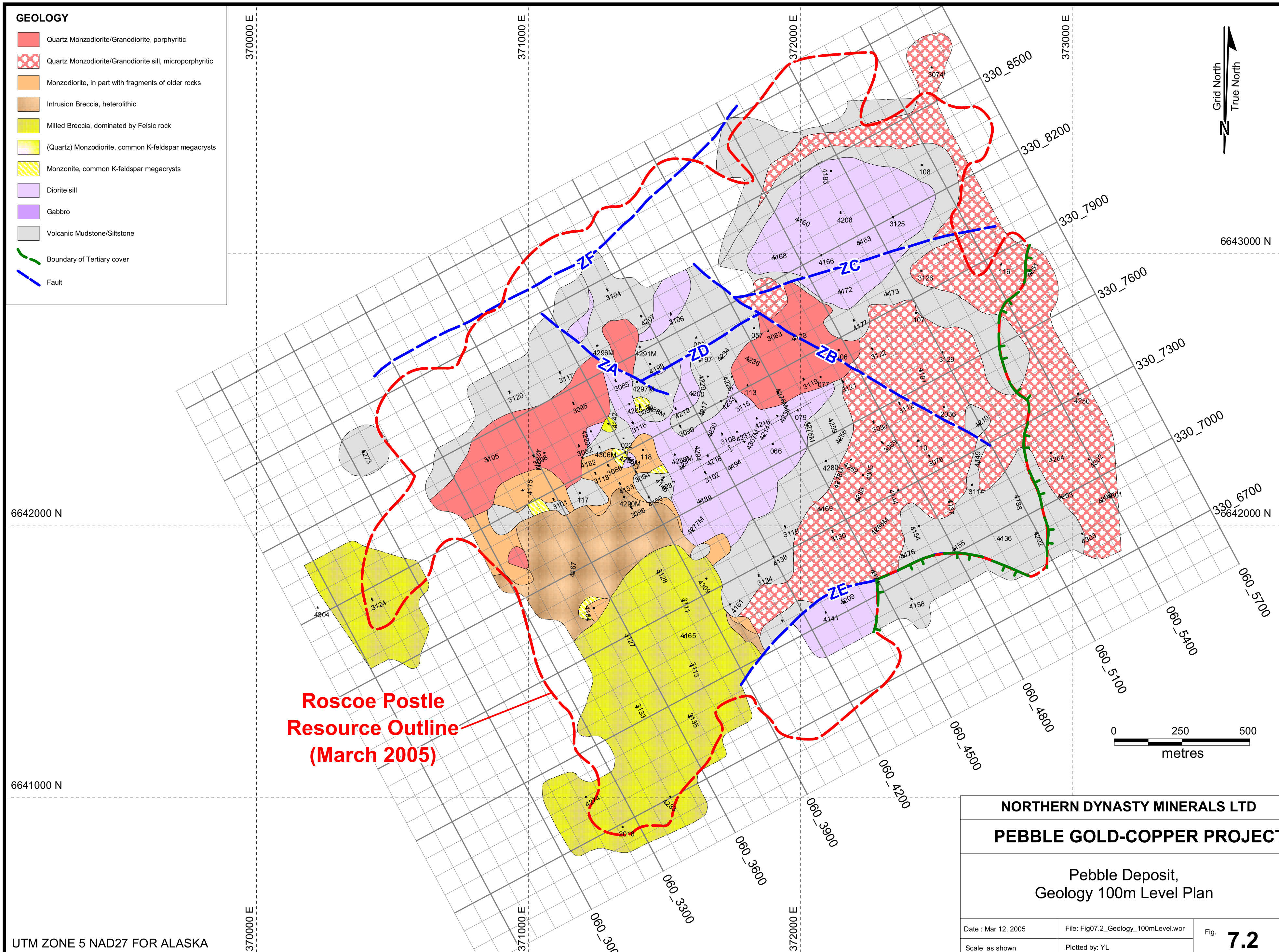
NORTHERN DYNASTY MINERALS LTD

PEBBLE GOLD-COPPER PROJECT

Schematic Stratigraphic Columns

Date: March 12, 2005	File: Fig6_Stratigraphy	Fig **6**
Scale: as shown		


GEOLOGY
Quartz Monzodiorite/Granodiorite, porphyritic
Quartz Monzodiorite/Granodiorite sill, microporphyritic
Monzodiorite, in part with fragments of older rocks
Intrusion Breccia, heterolithic
Milled Breccia, dominated by Felsic rock
(Quartz) Monzodiorite, common K-feldspar megacrysts
Monzonite, common K-feldspar megacrysts
Diorite sill
Gabbro
Volcanic Mudstone/Siltstone
Boundary of Tertiary cover
Fault
Stock A
Stock B
Stock C
Stock D
ZA
ZB
ZC
ZD
ZE
ZF
Roscoe Postle
Resource Outline
(March 2005)
Grid North
True North
N
0
250
500
metres
UTM ZONE 5 NAD27 FOR ALASKA
Thin contour line interval is 25ft
NORTHERN DYNASTY MINERALS LTD
PEBBLE GOLD-COPPER PROJECT
Pebble Deposit,
Sub-Surface Bedrock Geology
Date : Mar 12, 2005
File: Fig07.1_SubsurfaceGeology.wor
Scale: as shown
Plotted by: YL
Fig.
7.1

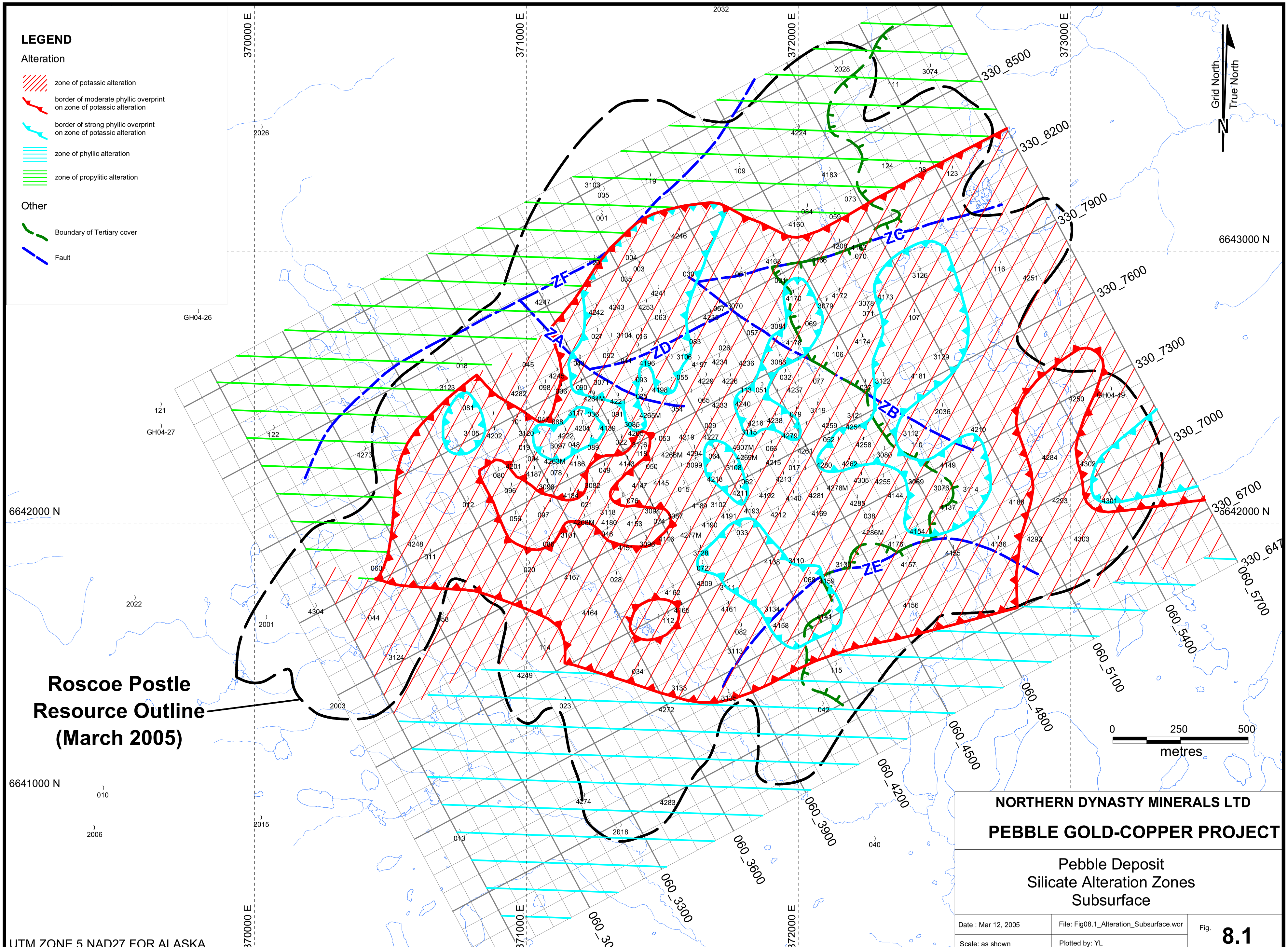


NORTHERN DYNASTY MINERALS LTD

PEBBLE GOLD-COPPER PROJECT

Pebble Deposit,
Geology 100m Level Plan

Date : Mar 12, 2005	File: Fig07.2_Geology_100mLevel.wor	Fig. 7.2
Scale: as shown	Plotted by: YL	

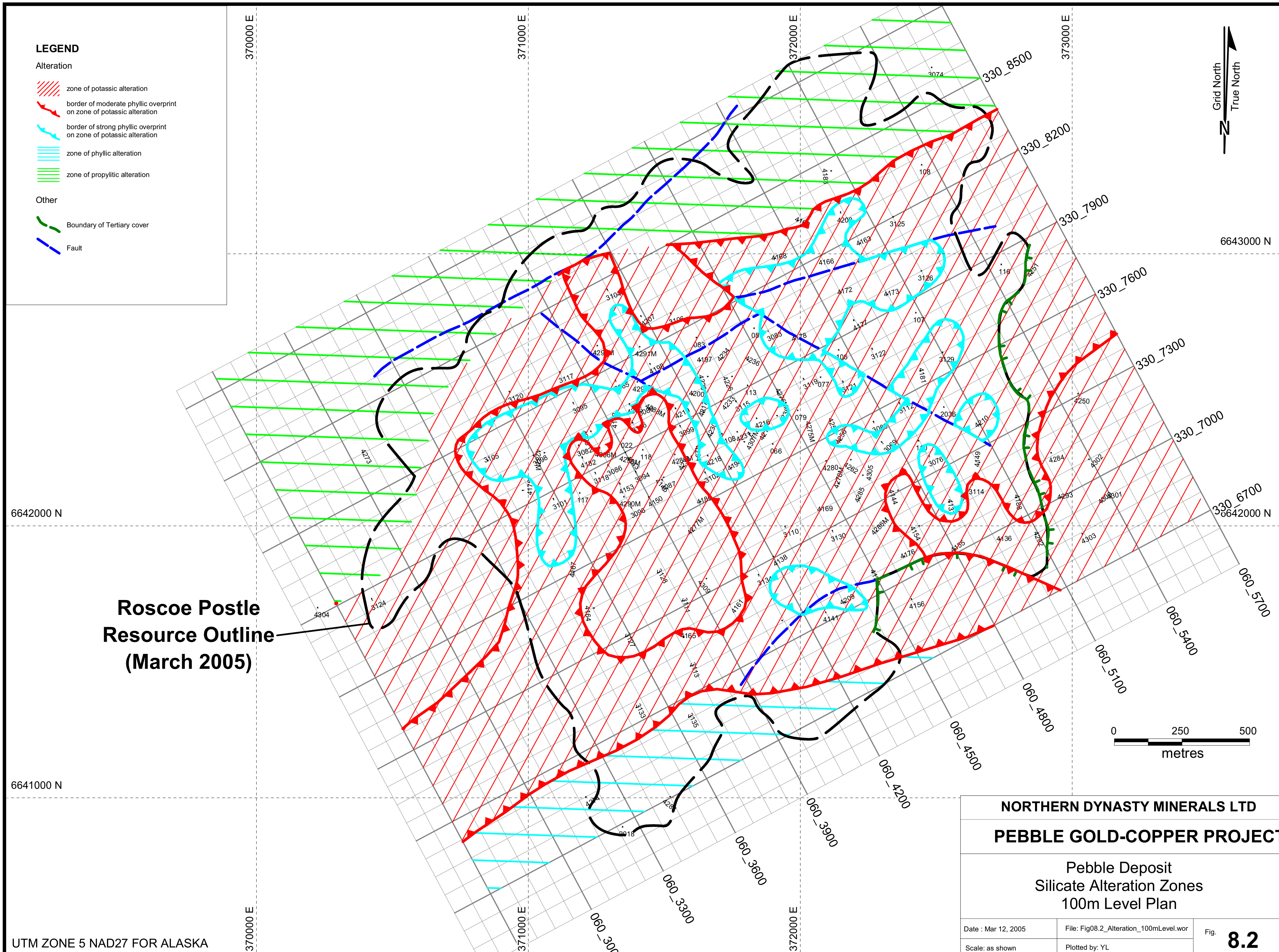


NORTHERN DYNASTY MINERALS LTD

PEBBLE GOLD-COPPER PROJECT

Pebble Deposit
Silicate Alteration Zones
Subsurface

Date : Mar 12, 2005	File: Fig08.1_Alteration_Subsurface.wor	Fig. 8.1
Scale: as shown	Plotted by: YL	

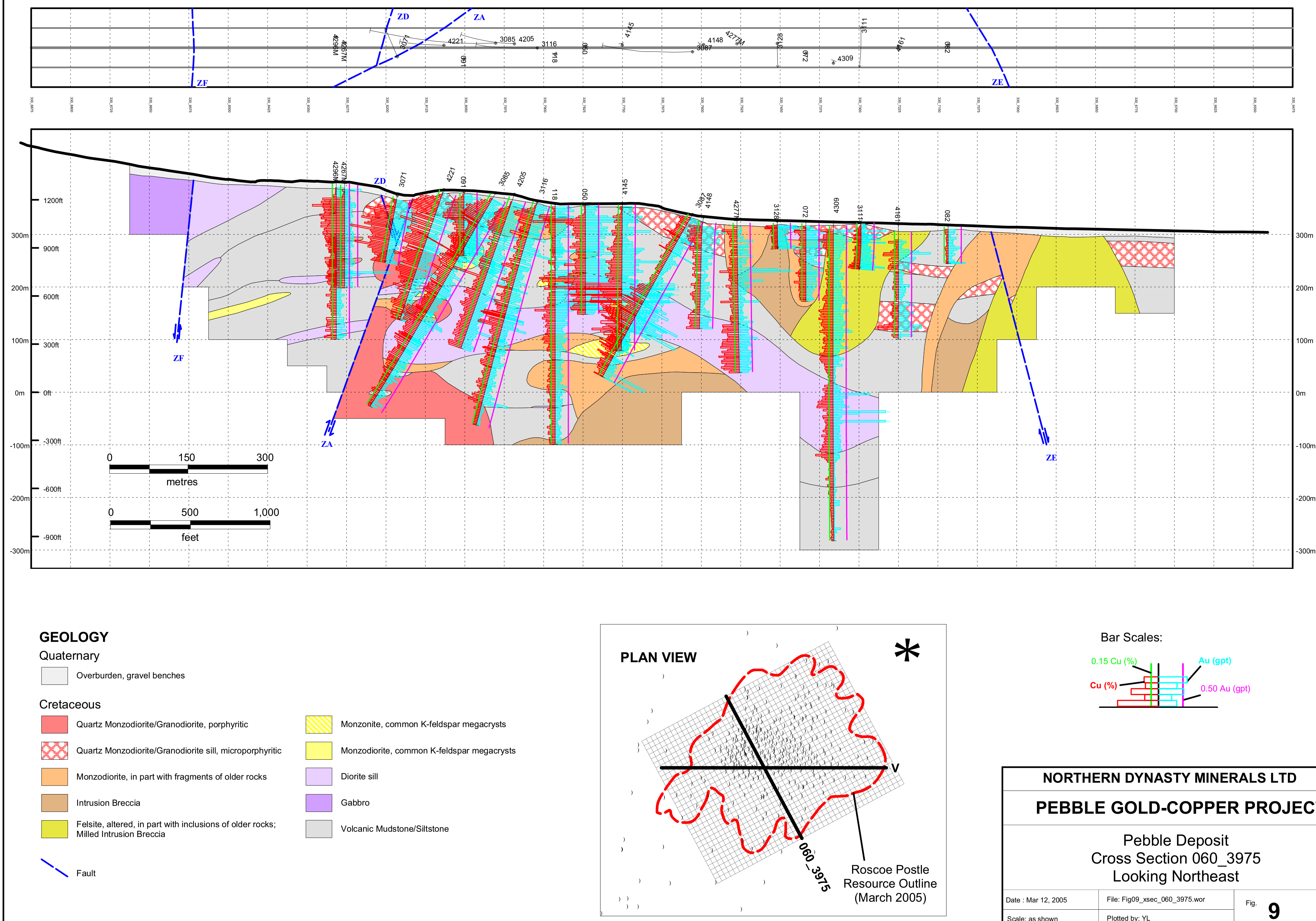


NORTHERN DYNASTY MINERALS LTD

PEBBLE GOLD-COPPER PROJECT

Pebble Deposit
Silicate Alteration Zones
100m Level Plan

Date : Mar 12, 2005	File: Fig08.2_Alteration_100mLevel.wor	Fig. 8.2
Scale: as shown	Plotted by: YL	



GEOLOGY

Quaternary

- Overburden, gravel benches

Cretaceous

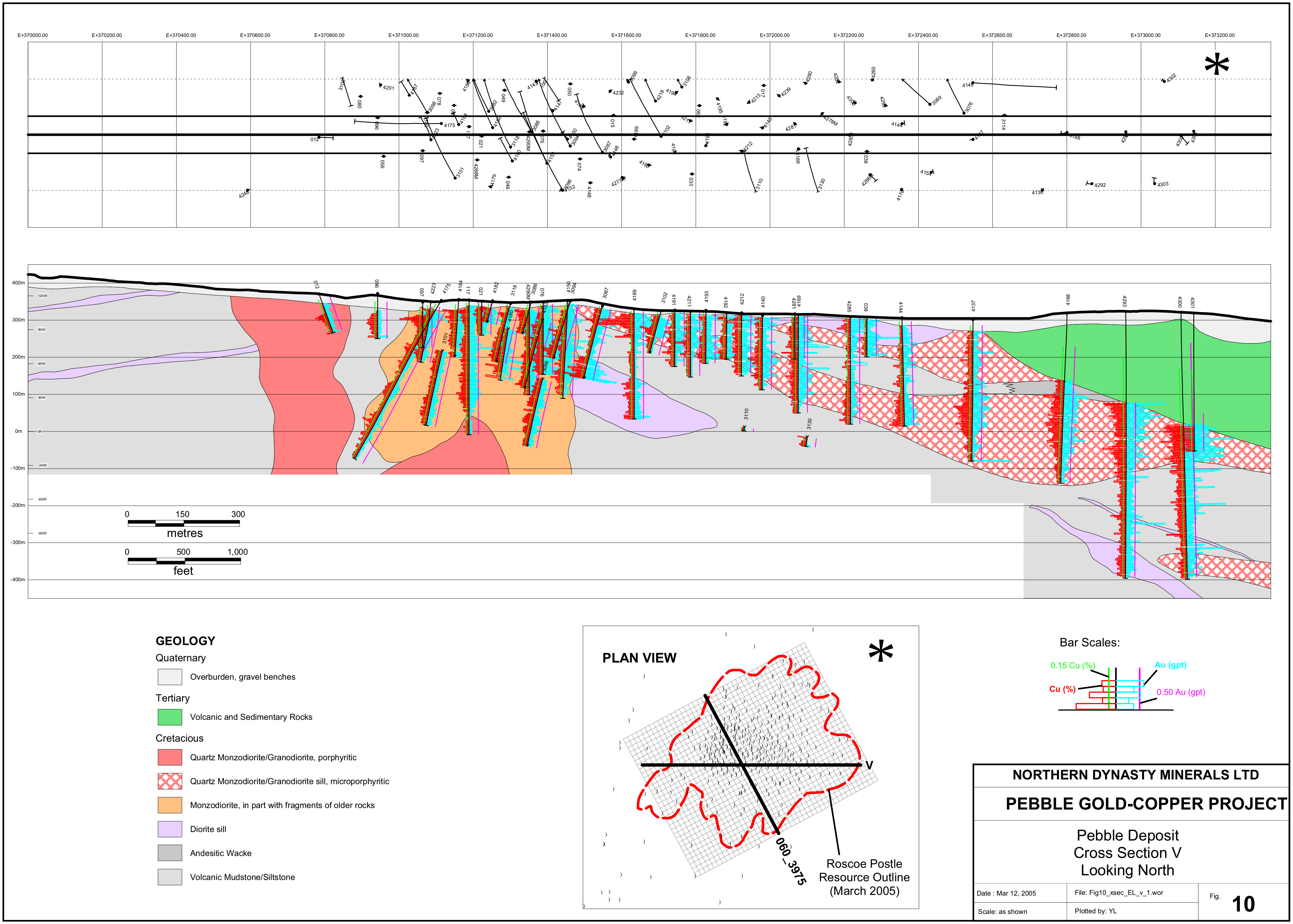
- Quartz Monzodiorite/Granodiorite, porphyritic
- Quartz Monzodiorite/Granodiorite sill, microporphyritic
- Monzodiorite, in part with fragments of older rocks
- Intrusion Breccia
- Felsite, altered, in part with inclusions of older rocks; Milled Intrusion Breccia
- Monzonite, common K-feldspar megacrysts
- Monzodiorite, common K-feldspar megacrysts
- Diorite sill
- Gabbro
- Volcanic Mudstone/Siltstone
- Fault

NORTHERN DYNASTY MINERALS LTD

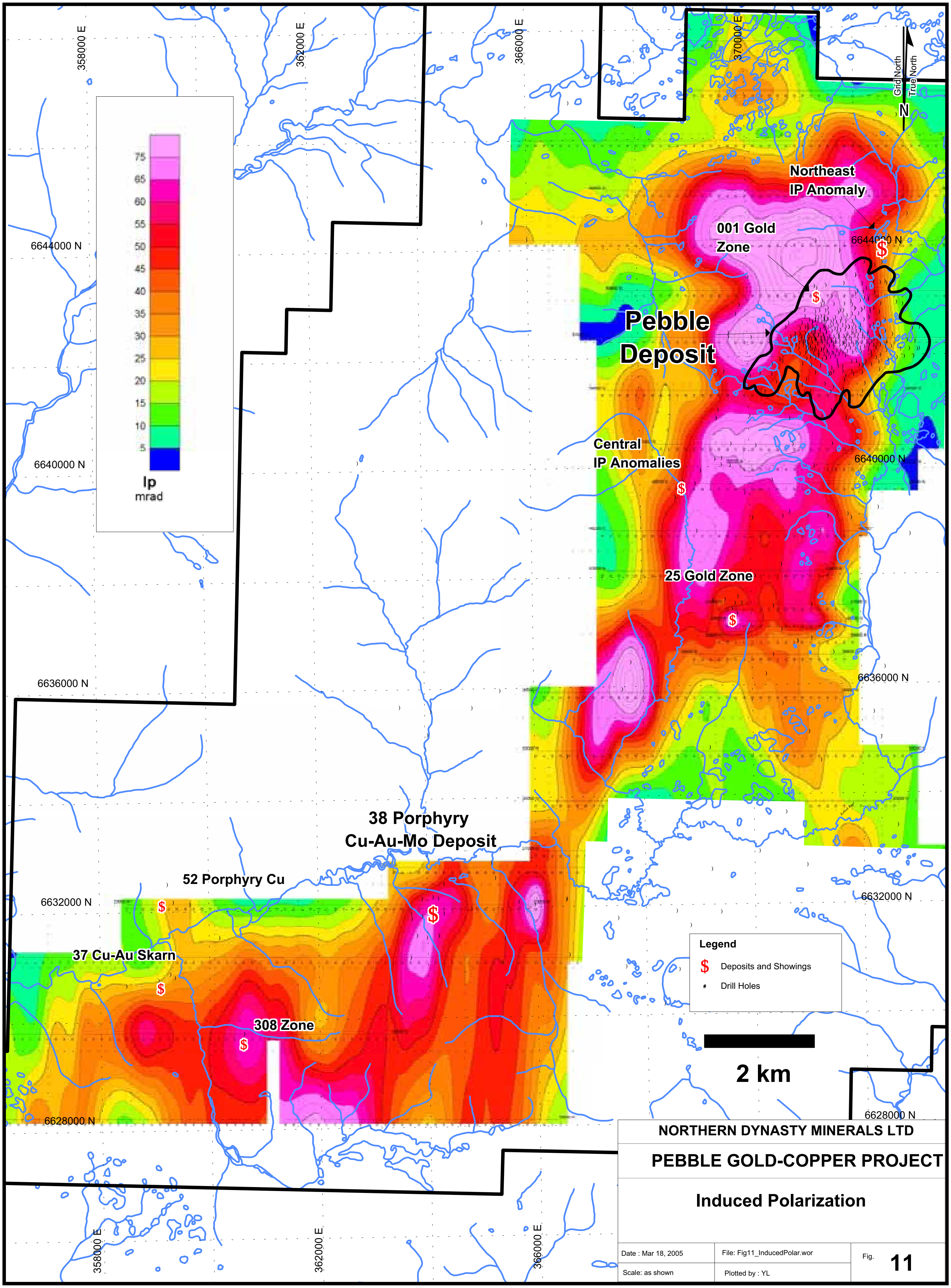
PEBBLE GOLD-COPPER PROJECT

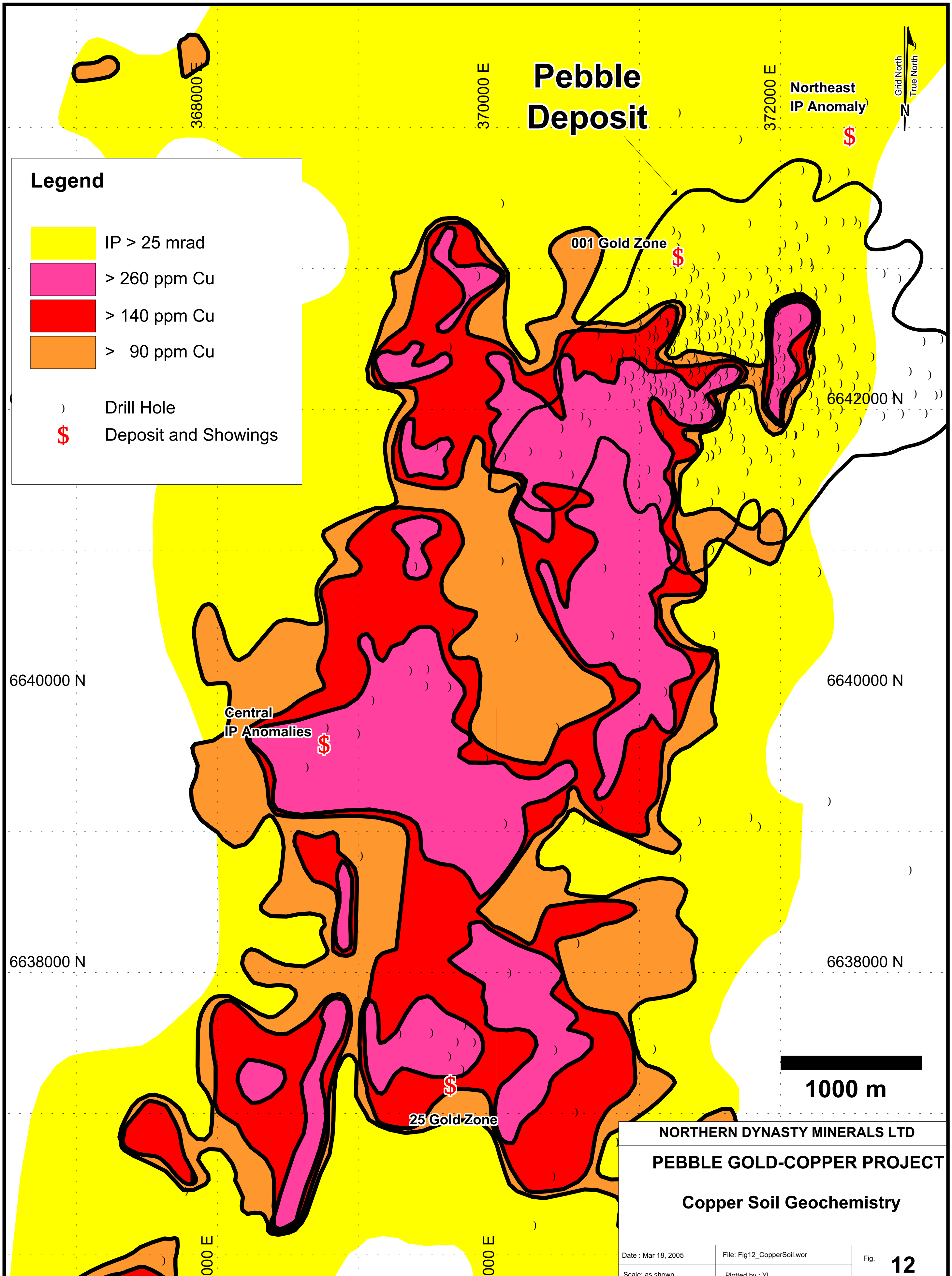
Pebble Deposit
Cross Section 060_3975
Looking Northeast

Date : Mar 12, 2005	File: Fig09_xsec_060_3975.wor	Fig. 9
Scale: as shown	Plotted by: YL	



E+370000.00
E+370200.00
E+370400.00
E+370600.00
E+370800.00
E+371000.00
E+371200.00
E+371400.00
E+371600.00
E+371800.00
E+372000.00
E+372200.00
E+372400.00
E+372600.00
E+372800.00
E+373000.00
E+373200.00
400m
300m
200m
100m
0m
-100m
-200m
-300m
-400m
0 150 300
metres
0 500 1,000
feet
GEOLOGY
Quaternary
Overburden, gravel benches
Tertiary
Volcanic and Sedimentary Rocks
Cretacious
Quartz Monzodiorite/Granodiorite, porphyritic
Quartz Monzodiorite/Granodiorite sill, microporphyritic
Monzodiorite, in part with fragments of older rocks
Diorite sill
Andesitic Wacke
Volcanic Mudstone/Siltstone
PLAN VIEW
V
060_3975
Roscoe Postle Resource Outline (March 2005)
Bar Scales:
0.15 Cu (%)
Au (gpt)
Cu (%)
0.50 Au (gpt)
NORTHERN DYNASTY MINERALS LTD
PEBBLE GOLD-COPPER PROJECT
Pebble Deposit
Cross Section V
Looking North
Date : Mar 12, 2005
File: Fig10_xsec_EL_v_1.wor
Fig.
10
Scale: as shown
Plotted by: YL


358000 E
362000 E
366000 E
370000 E
Grid North
True North
N
75
65
60
55
50
45
40
35
30
25
20
15
10
5
Ip
mrad
6644000 N
6640000 N
6636000 N
6632000 N
6628000 N
Northeast
IP Anomaly
001 Gold
Zone
Pebble
Deposit
Central
IP Anomalies
25 Gold Zone
38 Porphyry
Cu-Au-Mo Deposit
52 Porphyry Cu
37 Cu-Au Skarn
308 Zone
Legend
Deposits and Showings
Drill Holes
2 km
NORTHERN DYNASTY MINERALS LTD
PEBBLE GOLD-COPPER PROJECT
Induced Polarization
Date : Mar 18, 2005
File: Fig11_InducedPolar.wor
Scale: as shown
Plotted by : YL
Fig.
11

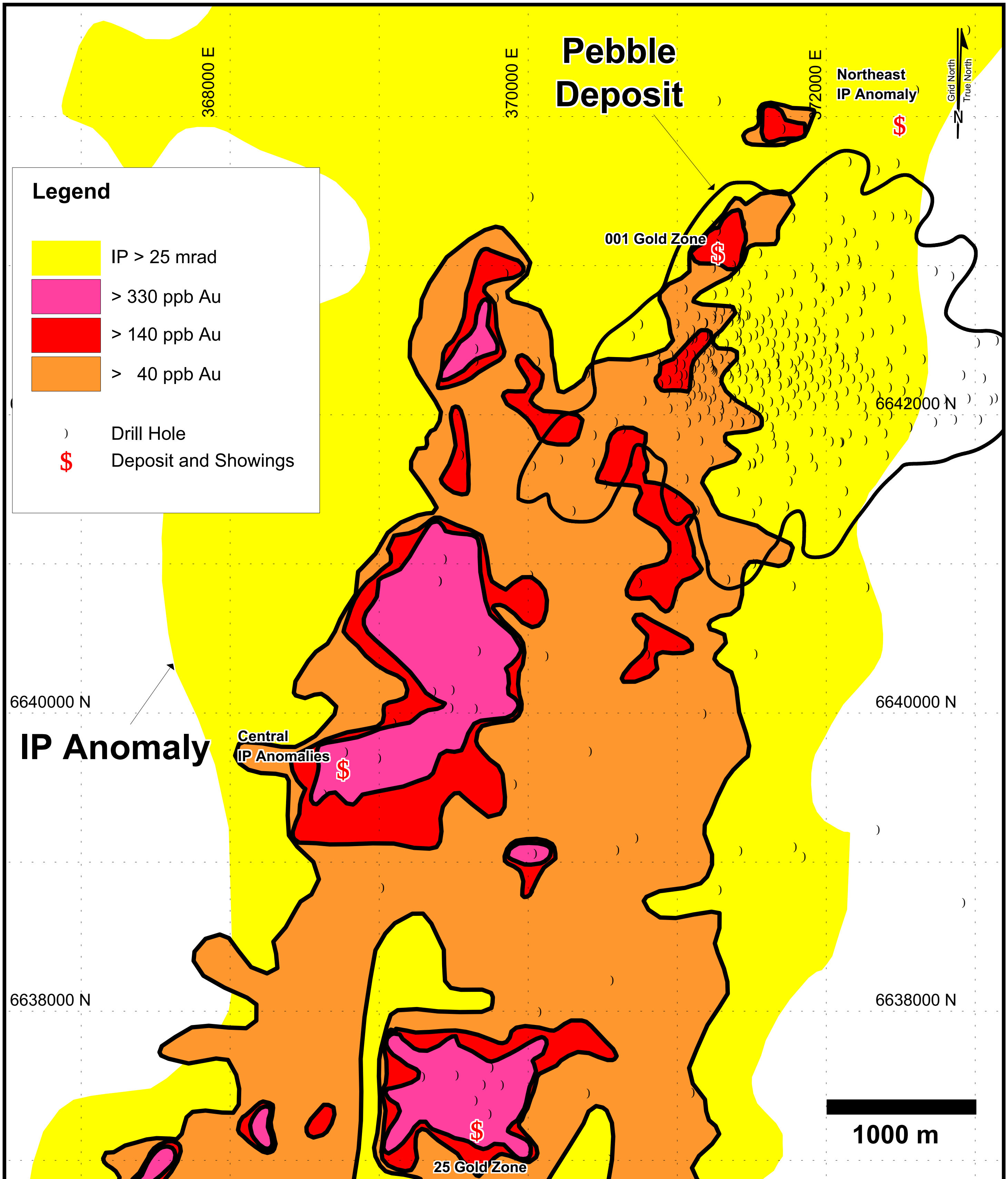


NORTHERN DYNASTY MINERALS LTD

PEBBLE GOLD-COPPER PROJECT

Copper Soil Geochemistry

Date : Mar 18, 2005	File: Fig12_CopperSoil.wor	Fig. 12
Scale: as shown	Plotted by : YL	



NORTHERN DYNASTY MINERALS LTD

PEBBLE GOLD-COPPER PROJECT

Gold Soil Geochemistry

Date : Mar 18, 2005	File: Fig13_GoldSoil.wor	Fig. 13
Scale: as shown	Plotted by : YL	

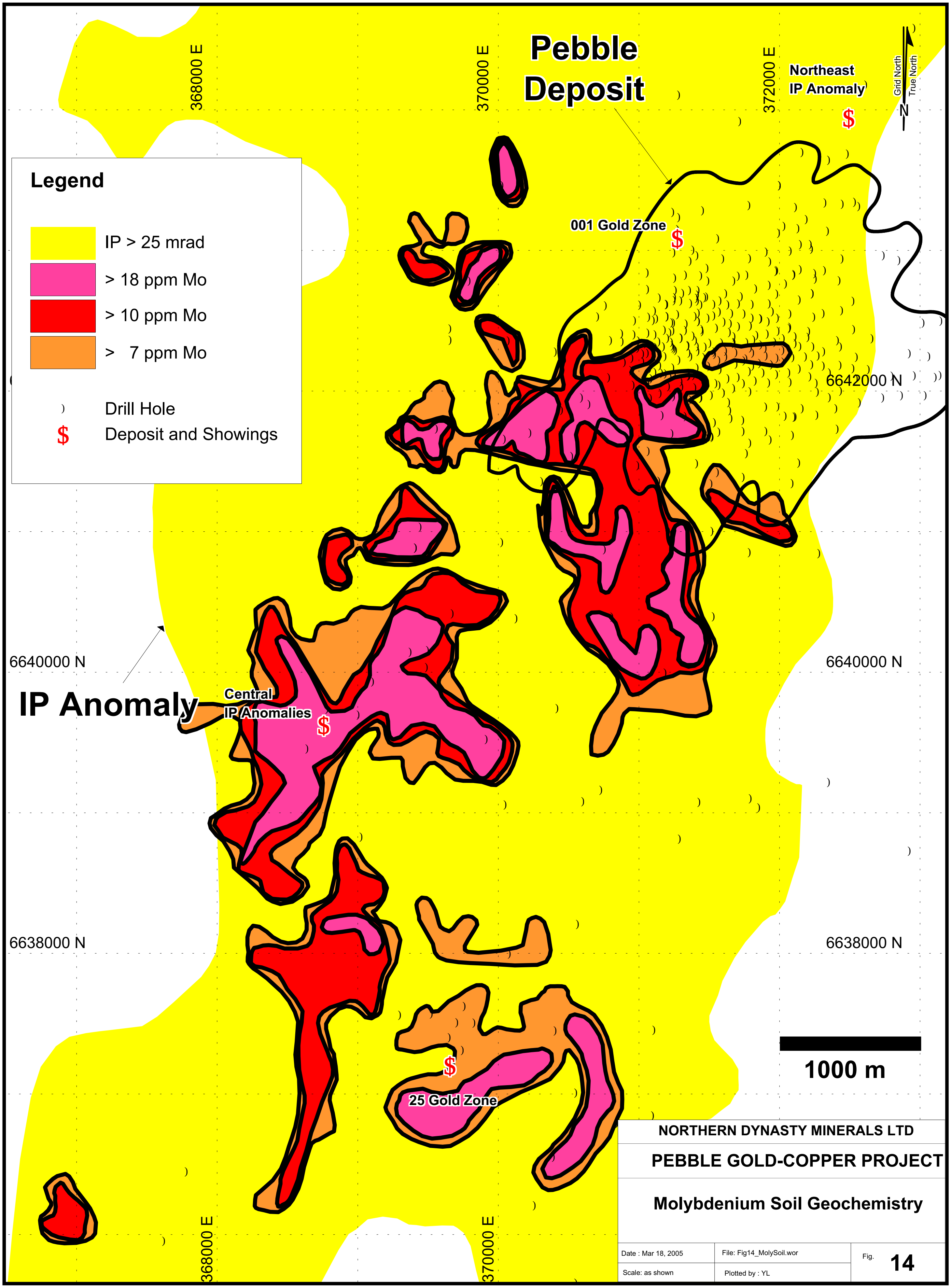

Pebble Deposit
Northeast IP Anomaly
Grid North
True North
N
368000 E
370000 E
372000 E
Legend
IP > 25 mrad
> 18 ppm Mo
> 10 ppm Mo
> 7 ppm Mo
Drill Hole
Deposit and Showings
001 Gold Zone
6642000 N
6640000 N
6638000 N
IP Anomaly
Central IP Anomalies
25 Gold Zone
1000 m
NORTHERN DYNASTY MINERALS LTD
PEBBLE GOLD-COPPER PROJECT
Molybdenium Soil Geochemistry
Date : Mar 18, 2005
File: Fig14_MolySoil.wor
Fig. 14
Scale: as shown
Plotted by : YL

Figure 15.1 1997 Drill Core Sampling and Analytical Flow Chart

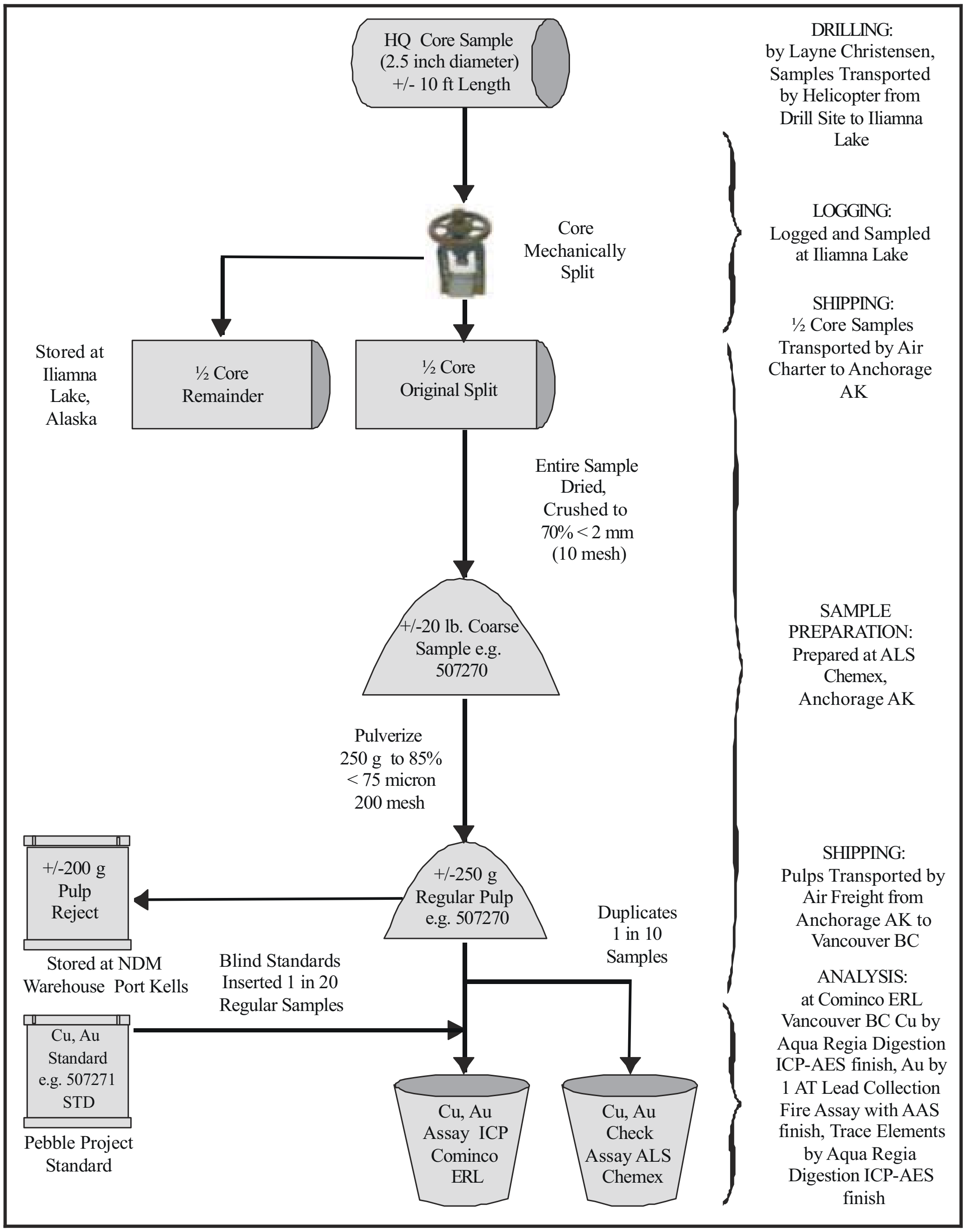


Figure 15.2 2002 Drill Core Sampling and Analytical Flow Chart

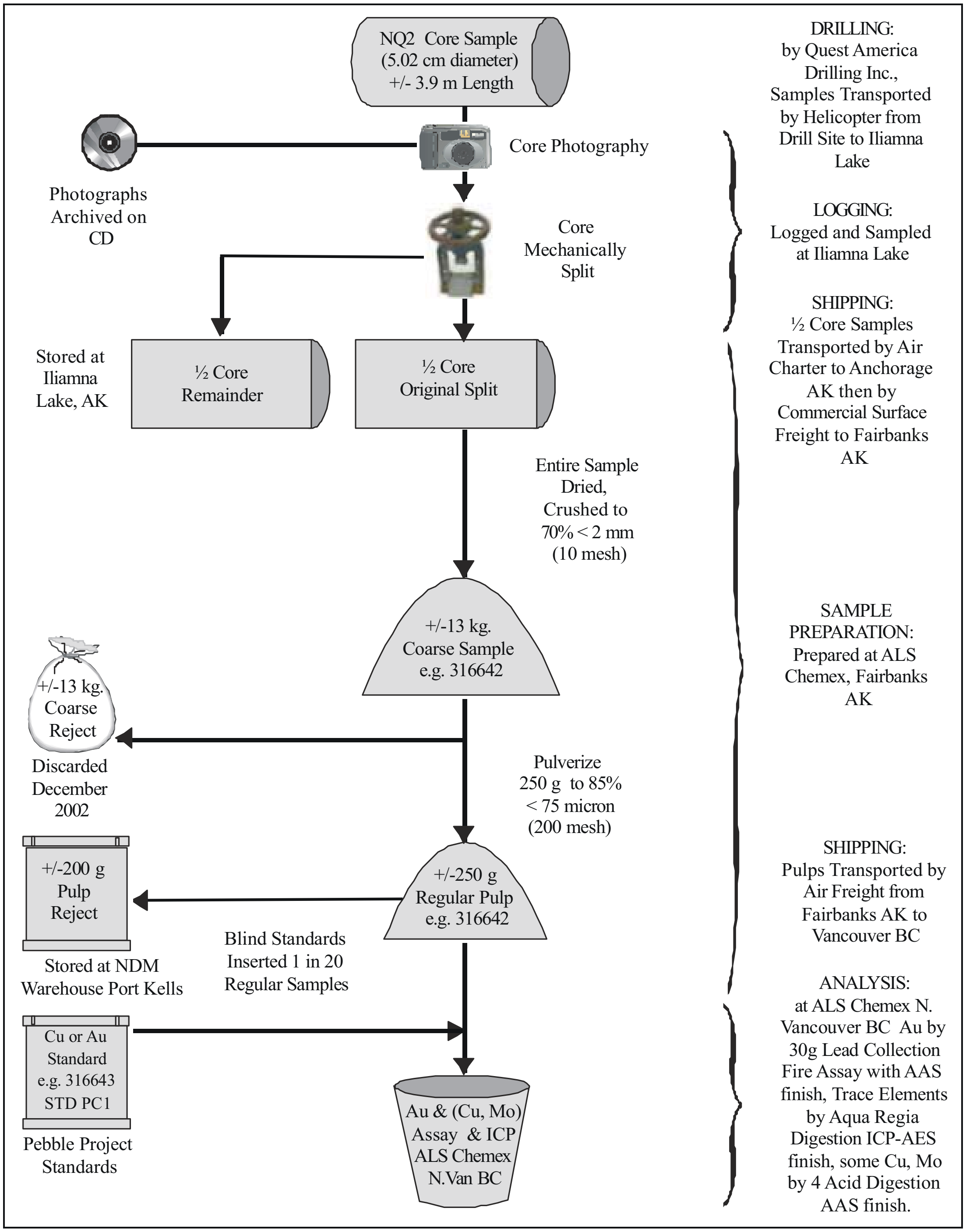


Figure 15.3   2003 Drill Core Sampling and Analytical Flow Chart

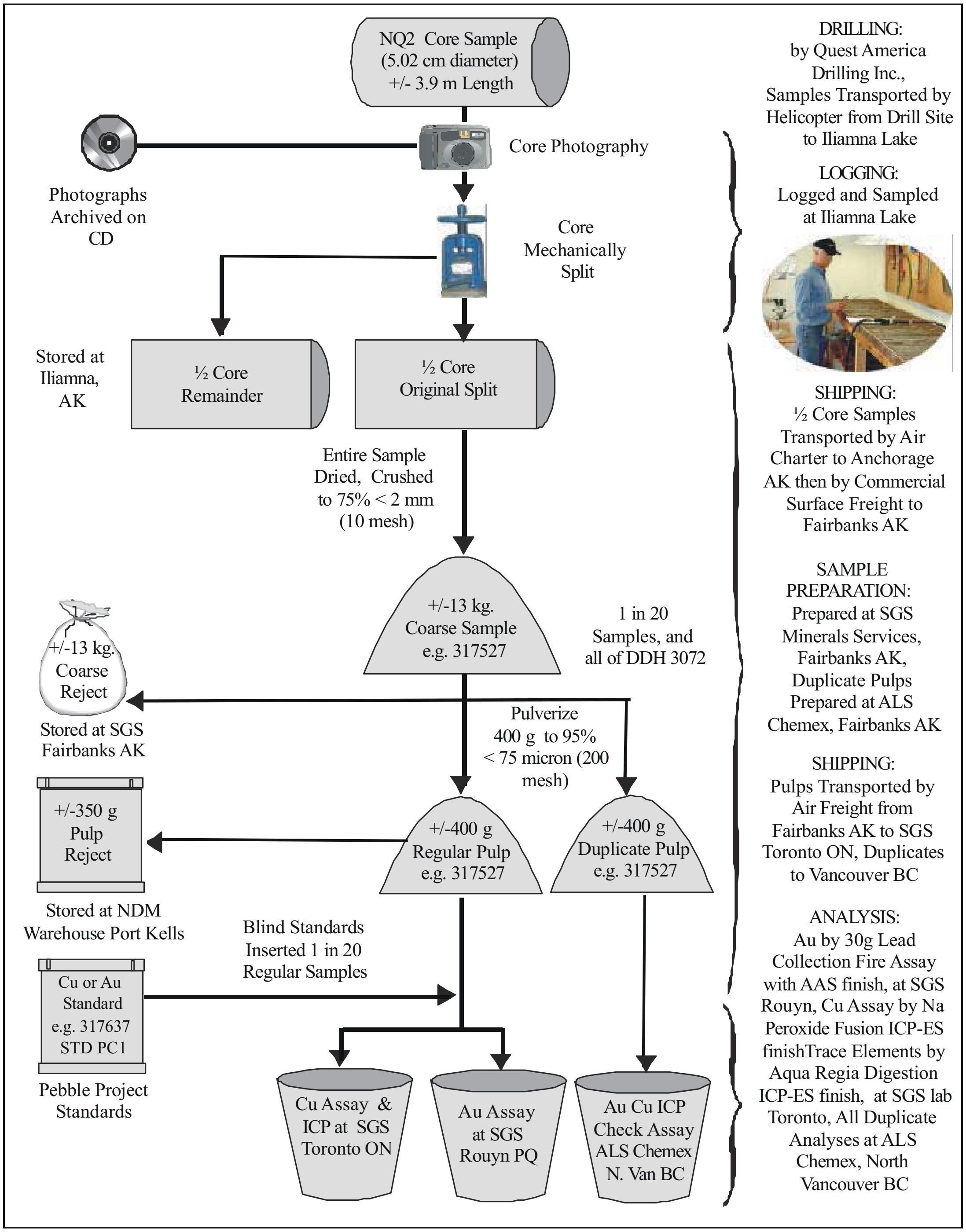


Figure 15.4   2004 Drill Core Sampling and Analytical Flow Chart

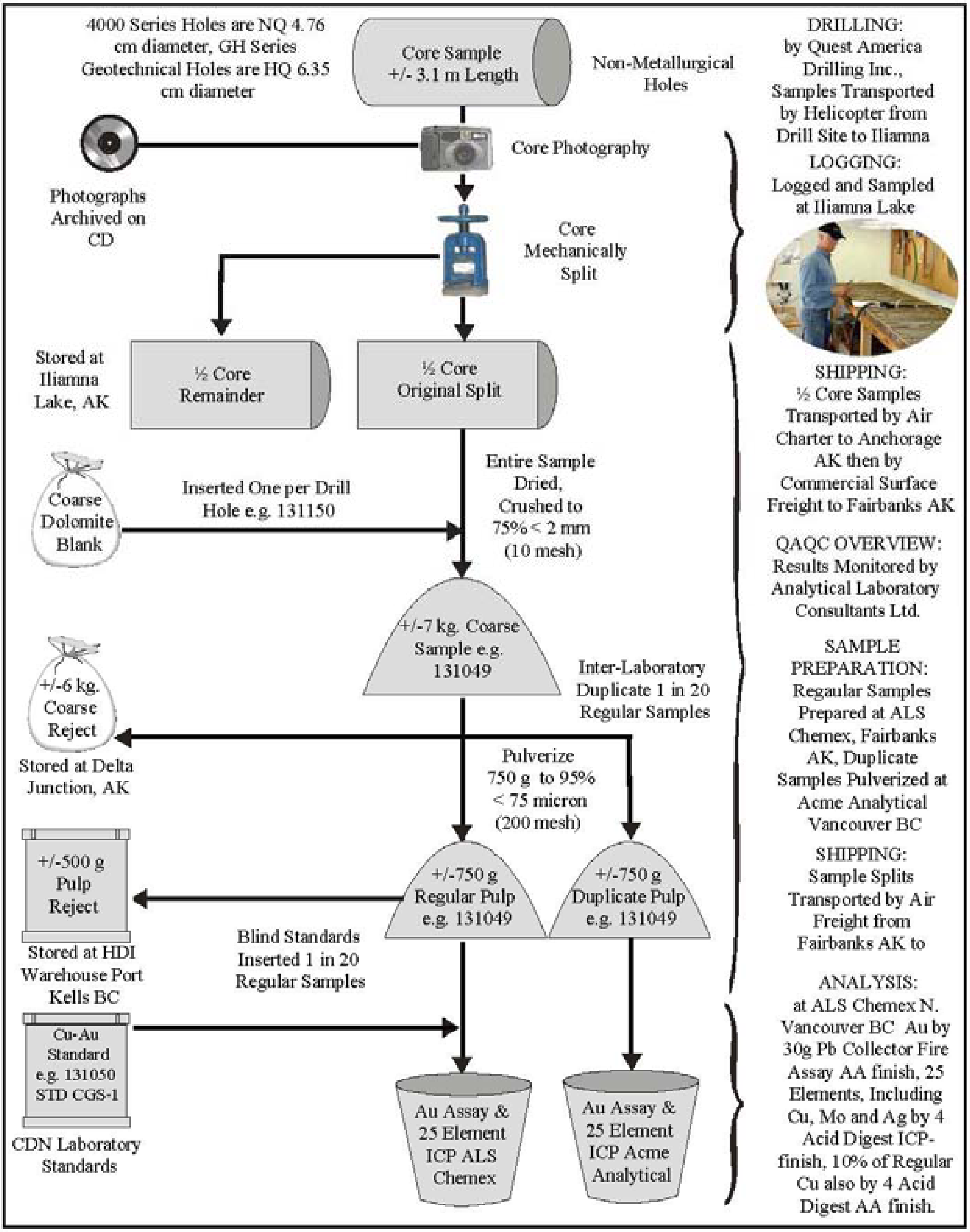
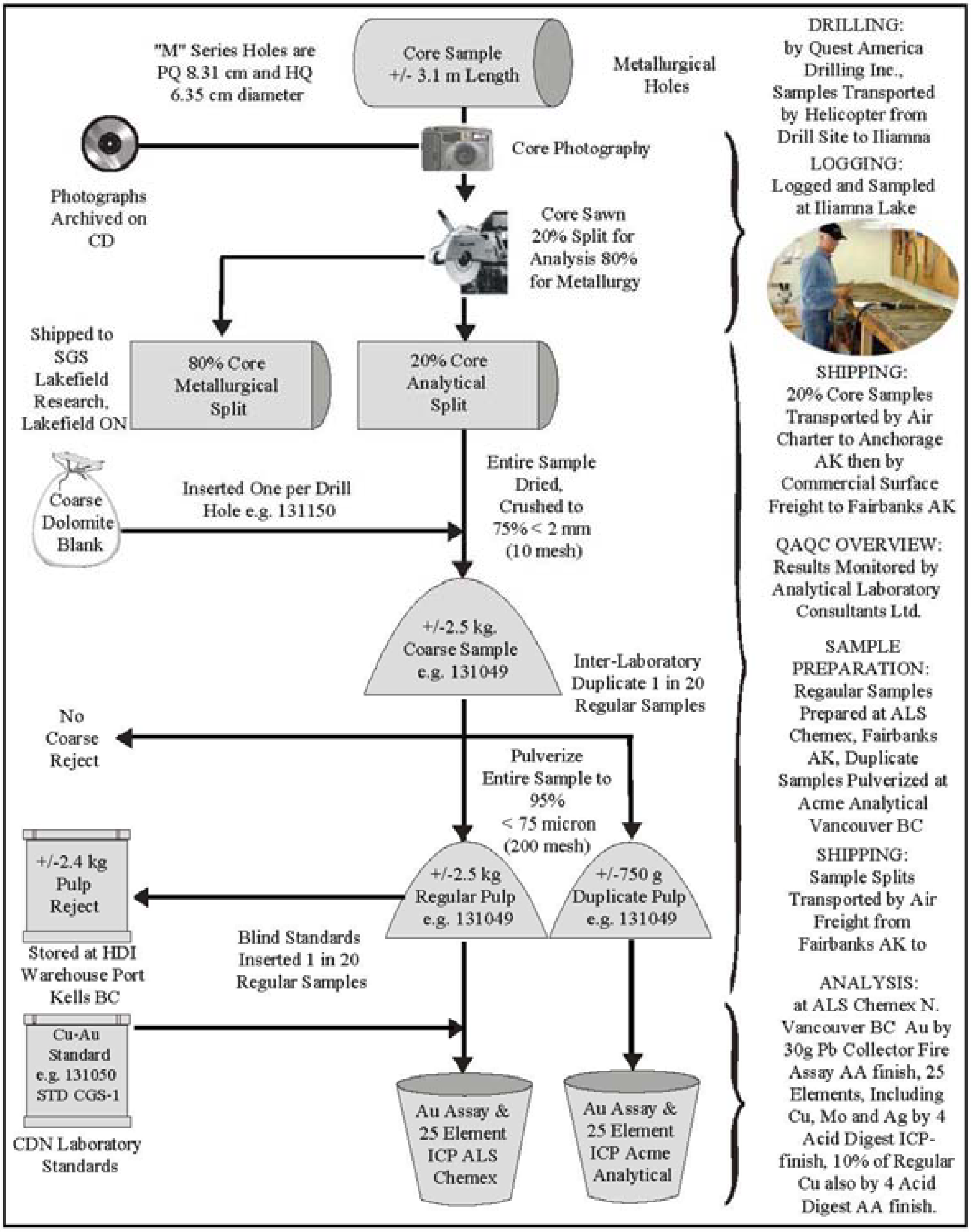


Figure 15.5 2004 Metallurgical Drill Core Sampling and Analytical Flow Chart



APPENDIX 1
Pebble Project Mineral Claim Data

Claim Name	ADL Number	Meridian	Township	Range	Quoter Section	Size (acres)
Sill 5951	516769	Seward	4S	35W	SE12	40
Sill 5952	516770	Seward	4S	35W	SE12	40
Sill 6051	516779	Seward	4S	35W	SE12	40
Sill 6052	516780	Seward	4S	35W	SE12	40
Sill 6151	516789	Seward	4S	35W	NE12	40
Sill 6152	516790	Seward	4S	35W	NE12	40
Sill 6247	516797	Seward	4S	35W	NE11	40
Sill 6248	516798	Seward	4S	35W	NE11	40
Sill 6249	516799	Seward	4S	35W	NW12	40
Sill 6250	516800	Seward	4S	35W	NW12	40
Sill 6251	516801	Seward	4S	35W	NE12	40
Sill 6252	516802	Seward	4S	35W	NE12	40
Pebble Beach 5448	516806	Seward	3S	35W	SE20	40
Pebble Beach 5449	516807	Seward	3S	35W	SE20	40
Pebble Beach 5450	516808	Seward	3S	35W	SW21	40
Pebble Beach 5451	516809	Seward	3S	35W	SW21	40
Pebble Beach 5452	516810	Seward	3S	35W	SE21	40
Pebble Beach 5453	516811	Seward	3S	35W	SE21	40
Pebble Beach 5454	516812	Seward	3S	35W	SW22	40
Pebble Beach 5548	516813	Seward	3S	35W	SE20	40
Pebble Beach 5549	516814	Seward	3S	35W	SE20	40
Pebble Beach 5550	516815	Seward	3S	35W	SW21	40
Pebble Beach 5551	516816	Seward	3S	35W	SW21	40
Pebble Beach 5552	516817	Seward	3S	35W	SE21	40
Pebble Beach 5553	516818	Seward	3S	35W	SE21	40
Pebble Beach 5554	516819	Seward	3S	35W	SW22	40
Pebble Beach 5651	516820	Seward	3S	35W	NW21	40
Pebble Beach 5652	516821	Seward	3S	35W	NE21	40
Pebble Beach 5653	516822	Seward	3S	35W	NE21	40
Pebble Beach 5654	516823	Seward	3S	35W	NW22	40
Pebble Beach 5751	516824	Seward	3S	35W	NW21	40
Pebble Beach 5752	516825	Seward	3S	35W	NE21	40
Pebble Beach 5753	516826	Seward	3S	35W	NE21	40
Pebble Beach 5754	516827	Seward	3S	35W	NW22	40
Pebble Beach 5852	516828	Seward	3S	35W	SE16	40
Pebble Beach 5853	516829	Seward	3S	35W	SE16	40
Pebble Beach 5854	516830	Seward	3S	35W	SW15	40
Pebble Beach 5952	516831	Seward	3S	35W	SE16	40
Pebble Beach 5953	516832	Seward	3S	35W	SE16	40
Pebble Beach 5954	516833	Seward	3S	35W	SW15	40
Pebble Beach 6052	516834	Seward	3S	35W	NE16	40
Pebble Beach 6053	516835	Seward	3S	35W	NE16	40
Pebble Beach 6054	516836	Seward	3S	35W	NW15	40
Pebble Beach 6153	516837	Seward	3S	35W	NE16	40
Pebble Beach 6154	516838	Seward	3S	35W	NW15	40
Pebble Beach 4651	516839	Seward	3S	35W	SW33	40
Pebble Beach 4652	516840	Seward	3S	35W	SE33	40
Pebble Beach 4653	516841	Seward	3S	35W	SE33	40
Pebble Beach 4751	516842	Seward	3S	35W	SW33	40
Pebble Beach 4752	516843	Seward	3S	35W	SE33	40
Pebble Beach 4753	516844	Seward	3S	35W	SE33	40
Pebble Beach 4851	516845	Seward	3S	35W	NW33	40
Pebble Beach 4852	516846	Seward	3S	35W	NE33	40
Pebble Beach 4853	516847	Seward	3S	35W	NE33	40
Pebble Beach 4951	516848	Seward	3S	35W	NW33	40
Pebble Beach 4952	516849	Seward	3S	35W	NE33	40
Pebble Beach 4953	516850	Seward	3S	35W	NE33	40
Pebble Beach 5048	516851	Seward	3S	35W	SE29	40
Pebble Beach 5049	516852	Seward	3S	35W	SE29	40
Pebble Beach 5050	516853	Seward	3S	35W	SW28	40
Pebble Beach 5051	516854	Seward	3S	35W	SW28	40
Pebble Beach 5052	516855	Seward	3S	35W	SE28	40
Pebble Beach 5053	516856	Seward	3S	35W	SE28	40
Pebble Beach 5148	516857	Seward	3S	35W	SE29	40

Pebble Beach 5149	516858	Seward	3S	35W	SE29	40
Pebble Beach 5150	516859	Seward	3S	35W	SW28	40
Pebble Beach 5151	516860	Seward	3S	35W	SW28	40
Pebble Beach 5152	516861	Seward	3S	35W	SE28	40
Pebble Beach 5153	516862	Seward	3S	35W	SE28	40
Pebble Beach 5248	516863	Seward	3S	35W	NE29	40
Pebble Beach 5249	516864	Seward	3S	35W	NE29	40
Pebble Beach 5250	516865	Seward	3S	35W	NW28	40
Pebble Beach 5251	516866	Seward	3S	35W	NW28	40
Pebble Beach 5252	516867	Seward	3S	35W	NE28	40
Pebble Beach 5253	516868	Seward	3S	35W	NE28	40
Pebble Beach 5348	516869	Seward	3S	35W	NE29	40
Pebble Beach 5349	516870	Seward	3S	35W	NE29	40
Pebble Beach 5350	516871	Seward	3S	35W	NW28	40
Pebble Beach 5351	516872	Seward	3S	35W	NW28	40
Pebble Beach 5352	516873	Seward	3S	35W	NE28	40
Pebble Beach 5353	516874	Seward	3S	35W	NE28	40
Sill 6351	516879	Seward	4S	35W	SE1	40
Sill 6352	516880	Seward	4S	35W	SE1	40
Sill 6451	516888	Seward	4S	35W	SE1	40
Sill 6452	516889	Seward	4S	35W	SE1	40
Pebble Beach 3850	516948	Seward	4S	35W	SW9	40
Pebble Beach 3851	516949	Seward	4S	35W	SW9	40
Pebble Beach 3852	516950	Seward	4S	35W	SE9	40
Pebble Beach 3950	516951	Seward	4S	35W	SW9	40
Pebble Beach 3951	516952	Seward	4S	35W	SW9	40
Pebble Beach 3952	516953	Seward	4S	35W	SE9	40
Pebble Beach 4050	516954	Seward	4S	35W	NW9	40
Pebble Beach 4051	516955	Seward	4S	35W	NW9	40
Pebble Beach 4052	516956	Seward	4S	35W	NE9	40
Pebble Beach 4150	516957	Seward	4S	35W	NW9	40
Pebble Beach 4151	516958	Seward	4S	35W	NW9	40
Pebble Beach 4152	516959	Seward	4S	35W	NE9	40
Pebble Beach 4250	516960	Seward	4S	35W	SW4	40
Pebble Beach 4251	516961	Seward	4S	35W	SW4	40
Pebble Beach 4252	516962	Seward	4S	35W	SE4	40
Pebble Beach 4253	516963	Seward	4S	35W	SE4	40
Pebble Beach 4254	516964	Seward	4S	35W	SW3	40
Pebble Beach 4350	516965	Seward	4S	35W	SW4	40
Pebble Beach 4351	516966	Seward	4S	35W	SW4	40
Pebble Beach 4352	516967	Seward	4S	35W	SE4	40
Pebble Beach 4353	516968	Seward	4S	35W	SE4	40
Pebble Beach 4354	516969	Seward	4S	35W	SW3	40
Pebble Beach 4451	516970	Seward	4S	35W	NW4	40
Pebble Beach 4452	516971	Seward	4S	35W	NE4	40
Pebble Beach 4453	516972	Seward	4S	35W	NE4	40
Pebble Beach 4551	516973	Seward	4S	35W	NW4	40
Pebble Beach 4552	516974	Seward	4S	35W	NE4	40
Pebble Beach 4553	516975	Seward	4S	35W	NE4	40
Sill 5543	524511	Seward	4S	35W	SE15	40
Sill 5544	524512	Seward	4S	35W	SE15	40
Sill 5643	524515	Seward	4S	35W	SE15	40
Sill 5644	524516	Seward	4S	35W	SE15	40
Sill 5743	524519	Seward	4S	35W	NE15	40
Sill 5744	524520	Seward	4S	35W	NE15	40
Sill 5843	524523	Seward	4S	35W	NE15	40
Sill 5844	524524	Seward	4S	35W	NE15	40
Sill 5943	524527	Seward	4S	35W	SE10	40
Sill 5944	524528	Seward	4S	35W	SE10	40
Sill 6043	524531	Seward	4S	35W	SE10	40
Sill 6044	524532	Seward	4S	35W	SE10	40
Sill 6143	524535	Seward	4S	35W	NE10	40
Sill 6144	524536	Seward	4S	35W	NE10	40
Sill 6243	524539	Seward	4S	35W	NE10	40
Sill 6244	524540	Seward	4S	35W	NE10	40
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Sill 6246	524542	Seward	4S	35W	NW11	40
Sill 6343	524543	Seward	4S	35W	SE3	40
Sill 6344	524544	Seward	4S	35W	SE3	40
Sill 6443	524550	Seward	4S	35W	SE3	40

Sill 6444	524551	Seward	4S	35W	SE3	40
Sill 6543	524557	Seward	4S	35W	NE3	40
Sill 6544	524558	Seward	4S	35W	NE3	40
Sill 6643	524568	Seward	4S	35W	NE3	40
Sill 6644	524569	Seward	4S	35W	NE3	40
Sill 6743	524579	Seward	3S	35W	SE34	40
Sill 6744	524580	Seward	3S	35W	SE34	40
Sill 6843	524595	Seward	3S	35W	SE34	40
Sill 6844	524596	Seward	3S	35W	SE34	40
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Sill 6944	524612	Seward	3S	35W	NE34	40
Sill 7043	524630	Seward	3S	35W	NE34	40
Sill 7044	524631	Seward	3S	35W	NE34	40
Sill 7143	524649	Seward	3S	35W	SE27	40
Sill 7144	524650	Seward	3S	35W	SE27	40
Sill 7243	524668	Seward	3S	35W	SE27	40
Sill 7244	524669	Seward	3S	35W	SE27	40
Sill 7343	524684	Seward	3S	35W	NE27	40
Sill 7344	524685	Seward	3S	35W	NE27	40
Sill 7443	524698	Seward	3S	35W	NE27	40
Sill 7444	524699	Seward	3S	35W	NE27	40
Sill 7543	524712	Seward	3S	35W	SE22	40
Sill 7544	524713	Seward	3S	35W	SE22	40
Sill 7545	524714	Seward	3S	35W	SW23	40
Sill 7546	524715	Seward	3S	35W	SW23	40
Sill 7547	524716	Seward	3S	35W	SE23	40
Sill 7548	524717	Seward	3S	35W	SE23	40
Pebble Beach 3452	524748	Seward	4S	35W	SE16	40
Pebble Beach 3453	524749	Seward	4S	35W	SE16	40
Pebble Beach 3454	524750	Seward	4S	35W	SW15	40
Pebble Beach 3455	524751	Seward	4S	35W	SW15	40
Pebble Beach 3552	524752	Seward	4S	35W	SE16	40
Pebble Beach 3553	524753	Seward	4S	35W	SE16	40
Pebble Beach 3554	524754	Seward	4S	35W	SW15	40
Pebble Beach 3555	524755	Seward	4S	35W	SW15	40
Pebble Beach 3652	524756	Seward	4S	35W	NE16	40
Pebble Beach 3653	524757	Seward	4S	35W	NE16	40
Pebble Beach 3654	524758	Seward	4S	35W	NW15	40
Pebble Beach 3655	524759	Seward	4S	35W	NW15	40
Pebble Beach 3752	524760	Seward	4S	35W	NE16	40
Pebble Beach 3753	524761	Seward	4S	35W	NE16	40
Pebble Beach 3754	524762	Seward	4S	35W	NW15	40
Pebble Beach 3755	524763	Seward	4S	35W	NW15	40
Pebble Beach 3848	524764	Seward	4S	35W	SE8	40
Pebble Beach 3849	524765	Seward	4S	35W	SE8	40
Pebble Beach 3853	524766	Seward	4S	35W	SE9	40
Pebble Beach 3854	524767	Seward	4S	35W	SW10	40
Pebble Beach 3855	524768	Seward	4S	35W	SW10	40
Pebble Beach 3948	524769	Seward	4S	35W	SE8	40
Pebble Beach 3949	524770	Seward	4S	35W	SE8	40
Pebble Beach 3953	524771	Seward	4S	35W	SE9	40
Pebble Beach 3954	524772	Seward	4S	35W	SW10	40
Pebble Beach 3955	524773	Seward	4S	35W	SW10	40
Pebble Beach 4048	524774	Seward	4S	35W	NE8	40
Pebble Beach 4049	524775	Seward	4S	35W	NE8	40
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Pebble Beach 4255	524786	Seward	4S	35W	SW3	40
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Pebble Beach 4349	524788	Seward	4S	35W	SE5	40
Pebble Beach 4355	524789	Seward	4S	35W	SW3	40
Pebble Beach 4448	524790	Seward	4S	35W	NE5	40

Pebble Beach 4449	524791	Seward	4S	35W	NE5	40
Pebble Beach 4450	524792	Seward	4S	35W	NW4	40
Pebble Beach 4454	524793	Seward	4S	35W	NW3	40
Pebble Beach 4455	524794	Seward	4S	35W	NW3	40
Pebble Beach 4548	524795	Seward	4S	35W	NE5	40
Pebble Beach 4549	524796	Seward	4S	35W	NE5	40
Pebble Beach 4550	524797	Seward	4S	35W	NW4	40
Pebble Beach 4554	524798	Seward	4S	35W	NW3	40
Pebble Beach 4555	524799	Seward	4S	35W	NW3	40
Pebble Beach 4648	524800	Seward	3S	35W	SE32	40
Pebble Beach 4649	524801	Seward	3S	35W	SE32	40
Pebble Beach 4650	524802	Seward	3S	35W	SW33	40
Pebble Beach 4654	524803	Seward	3S	35W	SW34	40
Pebble Beach 4655	524804	Seward	3S	35W	SW34	40
Pebble Beach 4748	524805	Seward	3S	35W	SE32	40
Pebble Beach 4749	524806	Seward	3S	35W	SE32	40
Pebble Beach 4750	524807	Seward	3S	35W	SW33	40
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Pebble Beach 4755	524809	Seward	3S	35W	SW34	40
Pebble Beach 4848	524810	Seward	3S	35W	NE32	40
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Pebble Beach 4954	524818	Seward	3S	35W	NW34	40
Pebble Beach 4955	524819	Seward	3S	35W	NW34	40
Pebble Beach 5054	524820	Seward	3S	35W	SW27	40
Pebble Beach 5055	524821	Seward	3S	35W	SW27	40
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Pebble Beach 5255	524825	Seward	3S	35W	NW27	40
Pebble Beach 5354	524826	Seward	3S	35W	NW27	40
Pebble Beach 5355	524827	Seward	3S	35W	NW27	40
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Pebble Beach 5649	524830	Seward	3S	35W	NE20	40
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Pebble Beach 5749	524833	Seward	3S	35W	NE20	40
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Pebble Beach 5949	524840	Seward	3S	35W	SE17	40
Pebble Beach 5950	524841	Seward	3S	35W	SW16	40
Pebble Beach 5951	524842	Seward	3S	35W	SW16	40
Pebble Beach 6048	524843	Seward	3S	35W	NE17	40
Pebble Beach 6049	524844	Seward	3S	35W	NE17	40
Pebble Beach 6050	524845	Seward	3S	35W	NW16	40
Pebble Beach 6051	524846	Seward	3S	35W	NW16	40
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Pebble Beach 6149	524848	Seward	3S	35W	NE17	40
Pebble Beach 6150	524849	Seward	3S	35W	NW16	40
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Pebble Beach 6248	524851	Seward	3S	35W	SE8	40
Pebble Beach 6249	524852	Seward	3S	35W	SE8	40
Pebble Beach 6250	524853	Seward	3S	35W	SW9	40
Pebble Beach 6251	524854	Seward	3S	35W	SW9	40
Pebble Beach 6252	524855	Seward	3S	35W	SE9	40
Pebble Beach 6253	524856	Seward	3S	35W	SE9	40
Pebble Beach 6254	524857	Seward	3S	35W	SW10	40
Pebble Beach 6348	524858	Seward	3S	35W	SE8	40
Pebble Beach 6349	524859	Seward	3S	35W	SE8	40
Pebble Beach 6350	524860	Seward	3S	35W	SW9	40

Pebble Beach 6351	524861	Seward	3S	35W	SW9	40
Pebble Beach 6352	524862	Seward	3S	35W	SE9	40
Pebble Beach 6353	524863	Seward	3S	35W	SE9	40
Pebble Beach 6354	524864	Seward	3S	35W	SW10	40
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Pebble Beach 3645	531358	Seward	4S	35W	NE18	40
Pebble Beach 3742	531359	Seward	4S	35W	NW18	40
Pebble Beach 3743	531360	Seward	4S	35W	NW18	40
Pebble Beach 3744	531361	Seward	4S	35W	NE18	40
Pebble Beach 3745	531362	Seward	4S	35W	NE18	40
Pebble Beach 3842	531363	Seward	4S	35W	SW7	40
Pebble Beach 3843	531364	Seward	4S	35W	SW7	40
Pebble Beach 3844	531365	Seward	4S	35W	SE7	40
Pebble Beach 3845	531366	Seward	4S	35W	SE7	40
Pebble Beach 3846	531367	Seward	4S	35W	SW8	40
Pebble Beach 3847	531368	Seward	4S	35W	SW8	40
Pebble Beach 3942	531369	Seward	4S	35W	SW7	40
Pebble Beach 3943	531370	Seward	4S	35W	SW7	40
Pebble Beach 3944	531371	Seward	4S	35W	SE7	40
Pebble Beach 3945	531372	Seward	4S	35W	SE7	40
Pebble Beach 3946	531373	Seward	4S	35W	SW8	40
Pebble Beach 3947	531374	Seward	4S	35W	SW8	40
Pebble Beach 4042	531375	Seward	4S	35W	NW7	40
Pebble Beach 4043	531376	Seward	4S	35W	NW7	40
Pebble Beach 4044	531377	Seward	4S	35W	NE7	40
Pebble Beach 4045	531378	Seward	4S	35W	NE7	40
Pebble Beach 4046	531379	Seward	4S	35W	NW8	40
Pebble Beach 4047	531380	Seward	4S	35W	NW8	40
Pebble Beach 4142	531381	Seward	4S	35W	NW7	40
Pebble Beach 4143	531382	Seward	4S	35W	NW7	40
Pebble Beach 4144	531383	Seward	4S	35W	NE7	40
Pebble Beach 4145	531384	Seward	4S	35W	NE7	40
Pebble Beach 4146	531385	Seward	4S	35W	NW8	40
Pebble Beach 4147	531386	Seward	4S	35W	NW8	40
Pebble Beach 4244	531387	Seward	4S	35W	SE6	40
Pebble Beach 4245	531388	Seward	4S	35W	SE6	40
Pebble Beach 4246	531389	Seward	4S	35W	SW5	40
Pebble Beach 4247	531390	Seward	4S	35W	SW5	40
Pebble Beach 4344	531391	Seward	4S	35W	SE6	40
Pebble Beach 4345	531392	Seward	4S	35W	SE6	40
Pebble Beach 4346	531393	Seward	4S	35W	SW5	40
Pebble Beach 4347	531394	Seward	4S	35W	SW5	40
Pebble Beach 4444	531395	Seward	4S	35W	NE6	40
Pebble Beach 4445	531396	Seward	4S	35W	NE6	40
Pebble Beach 4446	531397	Seward	4S	35W	NW5	40
Pebble Beach 4447	531398	Seward	4S	35W	NW5	40
Pebble Beach 4544	531399	Seward	4S	35W	NE6	40
Pebble Beach 4547	531400	Seward	4S	35W	NW5	40
Pebble Beach 4644	531401	Seward	3S	35W	SE31	40
Pebble Beach 4645	531402	Seward	3S	35W	SE31	40
Pebble Beach 4646	531403	Seward	3S	35W	SW32	40
Pebble Beach 4647	531404	Seward	3S	35W	SW32	40
Pebble Beach 4744	531405	Seward	3S	35W	SE31	40
Pebble Beach 4745	531406	Seward	3S	35W	SE31	40
Pebble Beach 4746	531407	Seward	3S	35W	SW32	40
Pebble Beach 4747	531408	Seward	3S	35W	SW32	40
Pebble Beach 4844	531409	Seward	3S	35W	NE31	40
Pebble Beach 4845	531410	Seward	3S	35W	NE31	40
Pebble Beach 4846	531411	Seward	3S	35W	NW32	40
Pebble Beach 4847	531412	Seward	3S	35W	NW32	40
Pebble Beach 4944	531413	Seward	3S	35W	NE31	40
Pebble Beach 4945	531414	Seward	3S	35W	NE31	40
Pebble Beach 4946	531415	Seward	3S	35W	NW32	40
Pebble Beach 4947	531416	Seward	3S	35W	NW32	40
Pebble Beach 5044	531417	Seward	3S	35W	SE30	40
Pebble Beach 5045	531418	Seward	3S	35W	SE30	40
Pebble Beach 5046	531419	Seward	3S	35W	SW29	40

Pebble Beach 5047	531420	Seward	3S	35W	SW29	40
Pebble Beach 5144	531421	Seward	3S	35W	SE30	40
Pebble Beach 5145	531422	Seward	3S	35W	SE30	40
Pebble Beach 5146	531423	Seward	3S	35W	SW29	40
Pebble Beach 5147	531424	Seward	3S	35W	SW29	40
Pebble Beach 5244	531425	Seward	3S	35W	NE30	40
Pebble Beach 5245	531426	Seward	3S	35W	NE30	40
Pebble Beach 5246	531427	Seward	3S	35W	NW29	40
Pebble Beach 5247	531428	Seward	3S	35W	NW29	40
Pebble Beach 5344	531429	Seward	3S	35W	NE30	40
Pebble Beach 5345	531430	Seward	3S	35W	NE30	40
Pebble Beach 5346	531431	Seward	3S	35W	NW29	40
Pebble Beach 5347	531432	Seward	3S	35W	NW29	40
Pebble Beach 5444	531433	Seward	3S	35W	SE19	40
Pebble Beach 5445	531434	Seward	3S	35W	SE19	40
Pebble Beach 5446	531435	Seward	3S	35W	SW20	40
Pebble Beach 5447	531436	Seward	3S	35W	SW20	40
Pebble Beach 5544	531437	Seward	3S	35W	SE19	40
Pebble Beach 5545	531438	Seward	3S	35W	SE19	40
Pebble Beach 5546	531439	Seward	3S	35W	SW20	40
Pebble Beach 5547	531440	Seward	3S	35W	SW20	40
Pebble Beach 5644	531441	Seward	3S	35W	NE19	40
Pebble Beach 5645	531442	Seward	3S	35W	NE19	40
Pebble Beach 5646	531443	Seward	3S	35W	NW20	40
Pebble Beach 5647	531444	Seward	3S	35W	NW20	40
Pebble Beach 5744	531445	Seward	3S	35W	NE19	40
Pebble Beach 5745	531446	Seward	3S	35W	NE19	40
Pebble Beach 5746	531447	Seward	3S	35W	NW20	40
Pebble Beach 5747	531448	Seward	3S	35W	NW20	40
Pebble Beach 5844	531449	Seward	3S	35W	SE18	40
Pebble Beach 5845	531450	Seward	3S	35W	SE18	40
Pebble Beach 5846	531451	Seward	3S	35W	SW17	40
Pebble Beach 5847	531452	Seward	3S	35W	SW17	40
Pebble Beach 5944	531453	Seward	3S	35W	SE18	40
Pebble Beach 5945	531454	Seward	3S	35W	SE18	40
Pebble Beach 5946	531455	Seward	3S	35W	SW17	40
Pebble Beach 5947	531456	Seward	3S	35W	SW17	40
Pebble Beach 6044	531457	Seward	3S	35W	NE18	40
Pebble Beach 6045	531458	Seward	3S	35W	NE18	40
Pebble Beach 6046	531459	Seward	3S	35W	NW17	40
Pebble Beach 6047	531460	Seward	3S	35W	NW17	40
Pebble Beach 6144	531461	Seward	3S	35W	NE18	40
Pebble Beach 6145	531462	Seward	3S	35W	NE18	40
Pebble Beach 6146	531463	Seward	3S	35W	NW17	40
Pebble Beach 6147	531464	Seward	3S	35W	NW17	40
Pebble Beach 4545	531648	Seward	4S	35W	NE6	40
Pebble Beach 4546	531649	Seward	4S	35W	NW5	40
Pebble Beach 5555	540399	Seward	3S	35W	SW22	40
Pebble Beach 5655	540400	Seward	3S	35W	NW22	40
Pebble Beach 5755	540401	Seward	3S	35W	NW22	40
Pebble Beach 5855	540402	Seward	3S	35W	SW15	40
Pebble Beach 5955	540403	Seward	3S	35W	SW15	40
Pebble Beach 6055	540404	Seward	3S	35W	NW15	40
Pebble Beach 6155	540405	Seward	3S	35W	NW15	40
Pebble Beach 6255	540406	Seward	3S	35W	SW10	40
Pebble Beach 6355	540407	Seward	3S	35W	SW10	40
Pebble Beach 6448	540408	Seward	3S	35W	NE8	40
Pebble Beach 6449	540409	Seward	3S	35W	NE8	40
Pebble Beach 6450	540410	Seward	3S	35W	NW9	40
Pebble Beach 6451	540411	Seward	3S	35W	NW9	40
Pebble Beach 6452	540412	Seward	3S	35W	NE9	40
Pebble Beach 6453	540413	Seward	3S	35W	NE9	40
Pebble Beach 6454	540414	Seward	3S	35W	NW10	40
Pebble Beach 6455	540415	Seward	3S	35W	NW10	40
Pebble Beach 6548	540416	Seward	3S	35W	NE8	40
Pebble Beach 6549	540417	Seward	3S	35W	NE8	40
Pebble Beach 6550	540418	Seward	3S	35W	NW9	40
Pebble Beach 6551	540419	Seward	3S	35W	NW9	40
Pebble Beach 6552	540420	Seward	3S	35W	NE9	40
Pebble Beach 6553	540421	Seward	3S	35W	NE9	40

Pebble Beach 6554	540422	Seward	3S	35W	NW10	40
Pebble Beach 6555	540423	Seward	3S	35W	NW10	40
Sill 7643	540424	Seward	3S	35W	SE22	40
Sill 7644	540425	Seward	3S	35W	SE22	40
Sill 7645	540426	Seward	3S	35W	SW23	40
Sill 7646	540427	Seward	3S	35W	SW23	40
Sill 7647	540428	Seward	3S	35W	SE23	40
Sill 7648	540429	Seward	3S	35W	SE23	40
Sill 7743	540430	Seward	3S	35W	NE22	40
Sill 7744	540431	Seward	3S	35W	NE22	40
Sill 7745	540432	Seward	3S	35W	NW23	40
Sill 7746	540433	Seward	3S	35W	NW23	40
Sill 7747	540434	Seward	3S	35W	NE23	40
Sill 7748	540435	Seward	3S	35W	NE23	40
Sill 7843	540436	Seward	3S	35W	NE22	40
Sill 7844	540437	Seward	3S	35W	NE22	40
Sill 7845	540438	Seward	3S	35W	NW23	40
Sill 7846	540439	Seward	3S	35W	NW23	40
Sill 7847	540440	Seward	3S	35W	NE23	40
Sill 7848	540441	Seward	3S	35W	NE23	40
Sill 7943	540442	Seward	3S	35W	SE15	40
Sill 7944	540443	Seward	3S	35W	SE15	40
Sill 7945	540444	Seward	3S	35W	SW14	40
Sill 7946	540445	Seward	3S	35W	SW14	40
Sill 7947	540446	Seward	3S	35W	SE14	40
Sill 7948	540447	Seward	3S	35W	SE14	40
Sill 8043	540448	Seward	3S	35W	SE15	40
Sill 8044	540449	Seward	3S	35W	SE15	40
Sill 8045	540450	Seward	3S	35W	SW14	40
Sill 8046	540451	Seward	3S	35W	SW14	40
Sill 8047	540452	Seward	3S	35W	SE14	40
Sill 8048	540453	Seward	3S	35W	SE14	40
Sill 8143	540454	Seward	3S	35W	NE15	40
Sill 8144	540455	Seward	3S	35W	NE15	40
Sill 8145	540456	Seward	3S	35W	NW14	40
Sill 8146	540457	Seward	3S	35W	NW14	40
Sill 8147	540458	Seward	3S	35W	NE14	40
Sill 8148	540459	Seward	3S	35W	NE14	40
Sill 8243	540460	Seward	3S	35W	NE15	40
Sill 8244	540461	Seward	3S	35W	NE15	40
Sill 8245	540462	Seward	3S	35W	NW14	40
Sill 8246	540463	Seward	3S	35W	NW14	40
Sill 8247	540464	Seward	3S	35W	NE14	40
Sill 8248	540465	Seward	3S	35W	NE14	40
Sill 8343	540466	Seward	3S	35W	SE10	40
Sill 8344	540467	Seward	3S	35W	SE10	40
Sill 8443	540468	Seward	3S	35W	SE10	40
Sill 8444	540469	Seward	3S	35W	SE10	40
Sill 8543	540470	Seward	3S	35W	NE10	40
Sill 8544	540471	Seward	3S	35W	NE10	40
Sill 8643	540472	Seward	3S	35W	NE10	40
Sill 8644	540473	Seward	3S	35W	NE10	40
PB 113	541245	Seward	4S	35W	SW18	40
PB 114	541246	Seward	4S	35W	SW18	40
PB 115	541247	Seward	4S	35W	SE18	40
PB 116	541248	Seward	4S	35W	SE18	40
PB 117	541249	Seward	4S	35W	SW18	40
PB 118	541250	Seward	4S	35W	SW18	40
PB 119	541251	Seward	4S	35W	SE18	40
PB 120	541252	Seward	4S	35W	SE18	40
Pebble Beach 4856	542561	Seward	3S	35W	NE34,NW34	4
Pebble Beach 4956	542562	Seward	3S	35W	NE34,NW34	4
Pebble Beach 5056	542563	Seward	3S	35W	SE27,SW27	4
Pebble Beach 5156	542564	Seward	3S	35W	SE27,SW27	4
Pebble Beach 5256	542565	Seward	3S	35W	NE27,NW27	4
Pebble Beach 5356	542566	Seward	3S	35W	NE27,NW27	4
Pebble Beach 5456	542567	Seward	3S	35W	SE22,SW22	4
Pebble Beach 5556	542568	Seward	3S	35W	SE22,SW22	4
Pebble Beach 5656	542569	Seward	3S	35W	NE22,NW22	4
Pebble Beach 5756	542570	Seward	3S	35W	NE22,NW22	4

Pebble Beach 5856	542571	Seward	3S	35W	SE15,SW15	4
Pebble Beach 5956	542572	Seward	3S	35W	SE15,SW15	4
Pebble Beach 6056	542573	Seward	3S	35W	NE15,NW15	4
Pebble Beach 6156	542574	Seward	3S	35W	NE15,NW15	4
Pebble Beach 6256	542575	Seward	3S	35W	SE10,SW10	4
Pebble Beach 6356	542576	Seward	3S	35W	SE10,SW10	4
Pebble Beach 6456	542577	Seward	3S	35W	NE10,NW10	4
Pebble Beach 6556	542578	Seward	3S	35W	NE10,NW10	4
Pebble Beach 4642	542579	Seward	3S	35W	SW31	40
Pebble Beach 4643	542580	Seward	3S	35W	SW31	40
Pebble Beach 4742	542581	Seward	3S	35W	SW31	40
Pebble Beach 4743	542582	Seward	3S	35W	SW31	40
Pebble Beach 4842	542583	Seward	3S	35W	NW31	40
Pebble Beach 4843	542584	Seward	3S	35W	NW31	40
Pebble Beach 4942	542585	Seward	3S	35W	NW31	40
Pebble Beach 4943	542586	Seward	3S	35W	NW31	40
Pebble Beach 5042	542587	Seward	3S	35W	SW30	40
Pebble Beach 5043	542588	Seward	3S	35W	SW30	40
Pebble Beach 5142	542589	Seward	3S	35W	SW30	40
Pebble Beach 5143	542590	Seward	3S	35W	SW30	40
Pebble Beach 5242	542591	Seward	3S	35W	NW30	40
Pebble Beach 5243	542592	Seward	3S	35W	NW30	40
Pebble Beach 5342	542593	Seward	3S	35W	NW30	40
Pebble Beach 5343	542594	Seward	3S	35W	NW30	40
Pebble Beach 5442	542595	Seward	3S	35W	SW19	40
Pebble Beach 5443	542596	Seward	3S	35W	SW19	40
Pebble Beach 5542	542597	Seward	3S	35W	SW19	40
Pebble Beach 5543	542598	Seward	3S	35W	SW19	40
Pebble Beach 5642	542599	Seward	3S	35W	NW19	40
Pebble Beach 5643	542600	Seward	3S	35W	NW19	40
Pebble Beach 5742	542601	Seward	3S	35W	NW19	40
Pebble Beach 5743	542602	Seward	3S	35W	NW19	40
Pebble Beach 5842	542603	Seward	3S	35W	SW18	40
Pebble Beach 5843	542604	Seward	3S	35W	SW18	40
Pebble Beach 1936	566247	Seward	5S	36W	SE4	40
Pebble Beach 1937	566248	Seward	5S	36W	SE4	40
Pebble Beach 1938	566249	Seward	5S	36W	SW3	40
Pebble Beach 1939	566250	Seward	5S	36W	SW3	40
Pebble Beach 1940	566251	Seward	5S	36W	SE3	40
Pebble Beach 1941	566252	Seward	5S	36W	SE3	40
Pebble Beach 2036	566287	Seward	5S	36W	NE4	40
Pebble Beach 2037	566288	Seward	5S	36W	NE4	40
Pebble Beach 2038	566289	Seward	5S	36W	NW3	40
Pebble Beach 2039	566290	Seward	5S	36W	NW3	40
Pebble Beach 2040	566291	Seward	5S	36W	NE3	40
Pebble Beach 2041	566292	Seward	5S	36W	NE3	40
Pebble Beach 2136	566327	Seward	5S	36W	NE4	40
Pebble Beach 2137	566328	Seward	5S	36W	NE4	40
Pebble Beach 2138	566329	Seward	5S	36W	NW3	40
Pebble Beach 2139	566330	Seward	5S	36W	NW3	40
Pebble Beach 2140	566331	Seward	5S	36W	NE3	40
Pebble Beach 2141	566332	Seward	5S	36W	NE3	40
Pebble Beach 2236	566367	Seward	4S	36W	SE35	40
Pebble Beach 2237	566368	Seward	4S	36W	SE35	40
Pebble Beach 2238	566369	Seward	4S	36W	SW36	40
Pebble Beach 2239	566370	Seward	4S	36W	SW36	40
Pebble Beach 2240	566371	Seward	4S	36W	SE36	40
Pebble Beach 2241	566372	Seward	4S	36W	SE36	40
Pebble Beach 2242	566373	Seward	4S	35W	SW31	40
Pebble Beach 2336	566407	Seward	4S	36W	SE35	40
Pebble Beach 2337	566408	Seward	4S	36W	SE35	40
Pebble Beach 2338	566409	Seward	4S	36W	SW36	40
Pebble Beach 2339	566410	Seward	4S	36W	SW36	40
Pebble Beach 2340	566411	Seward	4S	36W	SE36	40
Pebble Beach 2341	566412	Seward	4S	36W	SE36	40
Pebble Beach 2342	566413	Seward	4S	35W	SW31	40
Pebble Beach 2436	566447	Seward	4S	36W	NE35	40
Pebble Beach 2437	566448	Seward	4S	36W	NE35	40
Pebble Beach 2438	566449	Seward	4S	36W	NW36	40
Pebble Beach 2439	566450	Seward	4S	36W	NW36	40

Pebble Beach 2440	566451	Seward	4S	36W	NE36	40
Pebble Beach 2441	566452	Seward	4S	36W	NE36	40
Pebble Beach 2442	566453	Seward	4S	35W	NW31	40
Pebble Beach 2536	566487	Seward	4S	36W	NE35	40
Pebble Beach 2537	566488	Seward	4S	36W	NE35	40
Pebble Beach 2538	566489	Seward	4S	36W	NW36	40
Pebble Beach 2539	566490	Seward	4S	36W	NW36	40
Pebble Beach 2540	566491	Seward	4S	36W	NE36	40
Pebble Beach 2541	566492	Seward	4S	36W	NE36	40
Pebble Beach 2636	566527	Seward	4S	36W	SE26	40
Pebble Beach 2637	566528	Seward	4S	36W	SE26	40
Pebble Beach 2638	566529	Seward	4S	36W	SW25	40
Pebble Beach 2639	566530	Seward	4S	36W	SW25	40
Pebble Beach 2640	566531	Seward	4S	36W	SE25	40
Pebble Beach 2641	566532	Seward	4S	36W	SE25	40
Pebble Beach 2736	566567	Seward	4S	36W	SE26	40
Pebble Beach 2737	566568	Seward	4S	36W	SE26	40
Pebble Beach 2738	566569	Seward	4S	36W	SW25	40
Pebble Beach 2739	566570	Seward	4S	36W	SW25	40
Pebble Beach 2740	566571	Seward	4S	36W	SE25	40
Pebble Beach 2741	566572	Seward	4S	36W	SE25	40
Pebble Beach 3138	566607	Seward	4S	36W	SW24	40
Pebble Beach 3139	566608	Seward	4S	36W	SW24	40
Pebble Beach 3140	566609	Seward	4S	36W	SE24	40
Pebble Beach 3141	566610	Seward	4S	36W	SE24	40
Pebble Beach 2938	566637	Seward	4S	36W	NW25	40
Pebble Beach 2939	566638	Seward	4S	36W	NW25	40
Pebble Beach 2940	566639	Seward	4S	36W	NE25	40
Pebble Beach 2941	566640	Seward	4S	36W	NE25	40
Pebble Beach 2836	566655	Seward	4S	36W	NE26	40
Pebble Beach 2837	566656	Seward	4S	36W	NE26	40
Pebble Beach 2838	566657	Seward	4S	36W	NW25	40
Pebble Beach 2839	566658	Seward	4S	36W	NW25	40
Pebble Beach 2840	566659	Seward	4S	36W	NE25	40
Pebble Beach 2841	566660	Seward	4S	36W	NE25	40
Pebble Beach 3238	566697	Seward	4S	36W	NW24	40
Pebble Beach 3239	566698	Seward	4S	36W	NW24	40
Pebble Beach 3240	566699	Seward	4S	36W	NE24	40
Pebble Beach 3241	566700	Seward	4S	36W	NE24	40
Pebble Beach 3242	566701	Seward	4S	35W	NW19	40
Pebble Beach 3038	566737	Seward	4S	36W	SW24	40
Pebble Beach 3039	566738	Seward	4S	36W	SW24	40
Pebble Beach 3040	566739	Seward	4S	36W	SE24	40
Pebble Beach 3041	566740	Seward	4S	36W	SE24	40
Pebble Beach 3252	566751	Seward	4S	35W	NE21	40
Pebble Beach 3253	566752	Seward	4S	35W	NE21	40
Pebble Beach 3254	566753	Seward	4S	35W	NW22	40
Pebble Beach 3255	566754	Seward	4S	35W	NW22	40
Pebble Beach 3338	566767	Seward	4S	36W	NW24	40
Pebble Beach 3339	566768	Seward	4S	36W	NW24	40
Pebble Beach 3340	566769	Seward	4S	36W	NE24	40
Pebble Beach 3341	566770	Seward	4S	36W	NE24	40
Pebble Beach 3342	566771	Seward	4S	35W	NW19	40
Pebble Beach 3352	566781	Seward	4S	35W	NE21	40
Pebble Beach 3353	566782	Seward	4S	35W	NE21	40
Pebble Beach 3354	566783	Seward	4S	35W	NW22	40
Pebble Beach 3355	566784	Seward	4S	35W	NW22	40
Pebble Beach 3438	566793	Seward	4S	36W	SW13	40
Pebble Beach 3439	566794	Seward	4S	36W	SW13	40
Pebble Beach 3440	566795	Seward	4S	36W	SE13	40
Pebble Beach 3441	566796	Seward	4S	36W	SE13	40
Pebble Beach 3446	566797	Seward	4S	35W	SW17	40
Pebble Beach 3447	566798	Seward	4S	35W	SW17	40
Pebble Beach 3448	566799	Seward	4S	35W	SE17	40
Pebble Beach 3449	566800	Seward	4S	35W	SE17	40
Pebble Beach 3450	566801	Seward	4S	35W	SW16	40
Pebble Beach 3451	566802	Seward	4S	35W	SW16	40
Pebble Beach 3538	566811	Seward	4S	36W	SW13	40
Pebble Beach 3539	566812	Seward	4S	36W	SW13	40
Pebble Beach 3540	566813	Seward	4S	36W	SE13	40

Pebble Beach 3541	566814	Seward	4S	36W	SE13	40
Pebble Beach 3546	566815	Seward	4S	35W	SW17	40
Pebble Beach 3547	566816	Seward	4S	35W	SW17	40
Pebble Beach 3548	566817	Seward	4S	35W	SE17	40
Pebble Beach 3549	566818	Seward	4S	35W	SE17	40
Pebble Beach 3550	566819	Seward	4S	35W	SW16	40
Pebble Beach 3551	566820	Seward	4S	35W	SW16	40
Pebble Beach 3638	566829	Seward	4S	36W	NW13	40
Pebble Beach 3639	566830	Seward	4S	36W	NW13	40
Pebble Beach 3640	566831	Seward	4S	36W	NE13	40
Pebble Beach 3641	566832	Seward	4S	36W	NE13	40
Pebble Beach 3646	566833	Seward	4S	35W	NW17	40
Pebble Beach 3647	566834	Seward	4S	35W	NW17	40
Pebble Beach 3648	566835	Seward	4S	35W	NE17	40
Pebble Beach 3649	566836	Seward	4S	35W	NE17	40
Pebble Beach 3650	566837	Seward	4S	35W	NW16	40
Pebble Beach 3651	566838	Seward	4S	35W	NW16	40
Pebble Beach 3738	566847	Seward	4S	36W	NW13	40
Pebble Beach 3739	566848	Seward	4S	36W	NW13	40
Pebble Beach 3740	566849	Seward	4S	36W	NE13	40
Pebble Beach 3741	566850	Seward	4S	36W	NE13	40
Pebble Beach 3746	566851	Seward	4S	35W	NW17	40
Pebble Beach 3747	566852	Seward	4S	35W	NW17	40
Pebble Beach 3748	566853	Seward	4S	35W	NE17	40
Pebble Beach 3749	566854	Seward	4S	35W	NE17	40
Pebble Beach 3750	566855	Seward	4S	35W	NW16	40
Pebble Beach 3751	566856	Seward	4S	35W	NW16	40
Pebble Beach 3838	566865	Seward	4S	36W	SW12	40
Pebble Beach 3839	566866	Seward	4S	36W	SW12	40
Pebble Beach 3840	566867	Seward	4S	36W	SE12	40
Pebble Beach 3841	566868	Seward	4S	36W	SE12	40
Pebble Beach 3938	566877	Seward	4S	36W	SW12	40
Pebble Beach 3939	566878	Seward	4S	36W	SW12	40
Pebble Beach 3940	566879	Seward	4S	36W	SE12	40
Pebble Beach 3941	566880	Seward	4S	36W	SE12	40
Pebble Beach 4038	566889	Seward	4S	36W	NW12	40
Pebble Beach 4039	566890	Seward	4S	36W	NW12	40
Pebble Beach 4040	566891	Seward	4S	36W	NE12	40
Pebble Beach 4041	566892	Seward	4S	36W	NE12	40
Pebble Beach 4138	566901	Seward	4S	36W	NW12	40
Pebble Beach 4139	566902	Seward	4S	36W	NW12	40
Pebble Beach 4140	566903	Seward	4S	36W	NE12	40
Pebble Beach 4141	566904	Seward	4S	36W	NE12	40
Pebble Beach 4238	566905	Seward	4S	36W	SW1	40
Pebble Beach 4239	566906	Seward	4S	36W	SW1	40
Pebble Beach 4240	566907	Seward	4S	36W	SE1	40
Pebble Beach 4241	566908	Seward	4S	36W	SE1	40
Pebble Beach 4242	566909	Seward	4S	35W	SW6	40
Pebble Beach 4243	566910	Seward	4S	35W	SW6	40
Pebble Beach 4338	566911	Seward	4S	36W	SW1	40
Pebble Beach 4339	566912	Seward	4S	36W	SW1	40
Pebble Beach 4340	566913	Seward	4S	36W	SE1	40
Pebble Beach 4341	566914	Seward	4S	36W	SE1	40
Pebble Beach 4342	566915	Seward	4S	35W	SW6	40
Pebble Beach 4343	566916	Seward	4S	35W	SW6	40
Pebble Beach 4438	566917	Seward	4S	36W	NW1	40
Pebble Beach 4439	566918	Seward	4S	36W	NW1	40
Pebble Beach 4440	566919	Seward	4S	36W	NE1	40
Pebble Beach 4441	566920	Seward	4S	36W	NE1	40
Pebble Beach 4442	566921	Seward	4S	35W	NW6	40
Pebble Beach 4443	566922	Seward	4S	35W	NW6	40
Pebble Beach 4538	566923	Seward	4S	36W	NW1	40
Pebble Beach 4539	566924	Seward	4S	36W	NW1	40
Pebble Beach 4540	566925	Seward	4S	36W	NE1	40
Pebble Beach 4541	566926	Seward	4S	36W	NE1	40
Pebble Beach 4542	566927	Seward	4S	35W	NW6	40
Pebble Beach 4543	566928	Seward	4S	35W	NW6	40
Pebble Beach 4638	566929	Seward	3S	36W	SW36	40
Pebble Beach 4639	566930	Seward	3S	36W	SW36	40
Pebble Beach 4640	566931	Seward	3S	36W	SE36	40

Pebble Beach 4641	566932	Seward	3S	36W	SE36	40
Pebble Beach 4738	566933	Seward	3S	36W	SW36	40
Pebble Beach 4739	566934	Seward	3S	36W	SW36	40
Pebble Beach 4740	566935	Seward	3S	36W	SE36	40
Pebble Beach 4741	566936	Seward	3S	36W	SE36	40
Pebble Beach 4838	566937	Seward	3S	36W	NW36	40
Pebble Beach 4839	566938	Seward	3S	36W	NW36	40
Pebble Beach 4840	566939	Seward	3S	36W	NE36	40
Pebble Beach 4841	566940	Seward	3S	36W	NE36	40
Pebble Beach 4938	566941	Seward	3S	36W	NW36	40
Pebble Beach 4939	566942	Seward	3S	36W	NW36	40
Pebble Beach 4940	566943	Seward	3S	36W	NE36	40
Pebble Beach 4941	566944	Seward	3S	36W	NE36	40
Pebble Beach 5038	566945	Seward	3S	36W	SW25	40
Pebble Beach 5039	566946	Seward	3S	36W	SW25	40
Pebble Beach 5040	566947	Seward	3S	36W	SE25	40
Pebble Beach 5041	566948	Seward	3S	36W	SE25	40
Pebble Beach 5138	566949	Seward	3S	36W	SW25	40
Pebble Beach 5139	566950	Seward	3S	36W	SW25	40
Pebble Beach 5140	566951	Seward	3S	36W	SE25	40
Pebble Beach 5141	566952	Seward	3S	36W	SE25	40
Pebble Beach 5238	566953	Seward	3S	36W	NW25	40
Pebble Beach 5239	566954	Seward	3S	36W	NW25	40
Pebble Beach 5240	566955	Seward	3S	36W	NE25	40
Pebble Beach 5241	566956	Seward	3S	36W	NE25	40
Pebble Beach 5338	566957	Seward	3S	36W	NW25	40
Pebble Beach 5339	566958	Seward	3S	36W	NW25	40
Pebble Beach 5340	566959	Seward	3S	36W	NE25	40
Pebble Beach 5341	566960	Seward	3S	36W	NE25	40
Pebble Beach 5438	566961	Seward	3S	36W	SW24	40
Pebble Beach 5439	566962	Seward	3S	36W	SW24	40
Pebble Beach 5440	566963	Seward	3S	36W	SE24	40
Pebble Beach 5441	566964	Seward	3S	36W	SE24	40
Pebble Beach 5538	566965	Seward	3S	36W	SW24	40
Pebble Beach 5539	566966	Seward	3S	36W	SW24	40
Pebble Beach 5540	566967	Seward	3S	36W	SE24	40
Pebble Beach 5541	566968	Seward	3S	36W	SE24	40
Pebble Beach 5638	566969	Seward	3S	36W	NW24	40
Pebble Beach 5639	566970	Seward	3S	36W	NW24	40
Pebble Beach 5640	566971	Seward	3S	36W	NE24	40
Pebble Beach 5641	566972	Seward	3S	36W	NE24	40
Pebble Beach 5738	566973	Seward	3S	36W	NW24	40
Pebble Beach 5739	566974	Seward	3S	36W	NW24	40
Pebble Beach 5740	566975	Seward	3S	36W	NE24	40
Pebble Beach 5741	566976	Seward	3S	36W	NE24	40
Pebble Beach 5838	566977	Seward	3S	36W	SW13	40
Pebble Beach 5839	566978	Seward	3S	36W	SW13	40
Pebble Beach 5840	566979	Seward	3S	36W	SE13	40
Pebble Beach 5841	566980	Seward	3S	36W	SE13	40
Pebble Beach 5938	566981	Seward	3S	36W	SW13	40
Pebble Beach 5939	566982	Seward	3S	36W	SW13	40
Pebble Beach 5940	566983	Seward	3S	36W	SE13	40
Pebble Beach 5941	566984	Seward	3S	36W	SE13	40
Pebble Beach 6038	566985	Seward	3S	36W	NW13	40
Pebble Beach 6039	566986	Seward	3S	36W	NW13	40
Pebble Beach 6040	566987	Seward	3S	36W	NE13	40
Pebble Beach 6041	566988	Seward	3S	36W	NE13	40
Pebble Beach 6042	566989	Seward	3S	35W	NW18	40
Pebble Beach 6043	566990	Seward	3S	35W	NW18	40
Pebble Beach 6138	566991	Seward	3S	36W	NW13	40
Pebble Beach 6139	566992	Seward	3S	36W	NW13	40
Pebble Beach 6140	566993	Seward	3S	36W	NE13	40
Pebble Beach 6141	566994	Seward	3S	36W	NE13	40
Pebble Beach 6142	566995	Seward	3S	35W	NW18	40
Pebble Beach 6143	566996	Seward	3S	35W	NW18	40
Pebble Beach 6238	566997	Seward	3S	36W	SW12	40
Pebble Beach 6239	566998	Seward	3S	36W	SW12	40
Pebble Beach 6240	566999	Seward	3S	36W	SE12	40
Pebble Beach 6241	567000	Seward	3S	36W	SE12	40
Pebble Beach 6242	567001	Seward	3S	35W	SW7	40

Pebble Beach 6243	567002	Seward	3S	35W	SW7	40
Pebble Beach 6244	567003	Seward	3S	35W	SE7	40
Pebble Beach 6245	567004	Seward	3S	35W	SE7	40
Pebble Beach 6246	567005	Seward	3S	35W	SW8	40
Pebble Beach 6247	567006	Seward	3S	35W	SW8	40
Pebble Beach 6338	567007	Seward	3S	36W	SW12	40
Pebble Beach 6339	567008	Seward	3S	36W	SW12	40
Pebble Beach 6340	567009	Seward	3S	36W	SE12	40
Pebble Beach 6341	567010	Seward	3S	36W	SE12	40
Pebble Beach 6342	567011	Seward	3S	35W	SW7	40
Pebble Beach 6343	567012	Seward	3S	35W	SW7	40
Pebble Beach 6344	567013	Seward	3S	35W	SE7	40
Pebble Beach 6345	567014	Seward	3S	35W	SE7	40
Pebble Beach 6346	567015	Seward	3S	35W	SW8	40
Pebble Beach 6347	567016	Seward	3S	35W	SW8	40
Pebble Beach 6438	567017	Seward	3S	36W	NW12	40
Pebble Beach 6439	567018	Seward	3S	36W	NW12	40
Pebble Beach 6440	567019	Seward	3S	36W	NE12	40
Pebble Beach 6441	567020	Seward	3S	36W	NE12	40
Pebble Beach 6442	567021	Seward	3S	35W	NW7	40
Pebble Beach 6443	567022	Seward	3S	35W	NW7	40
Pebble Beach 6444	567023	Seward	3S	35W	NE7	40
Pebble Beach 6445	567024	Seward	3S	35W	NE7	40
Pebble Beach 6446	567025	Seward	3S	35W	NW8	40
Pebble Beach 6447	567026	Seward	3S	35W	NW8	40
Pebble Beach 6546	567035	Seward	3S	35W	NW8	40
Pebble Beach 6547	567036	Seward	3S	35W	NW8	40
Pebble Beach 6646	567045	Seward	3S	35W	SW5	40
Pebble Beach 6647	567046	Seward	3S	35W	SW5	40
Pebble Beach 6648	567047	Seward	3S	35W	SE5	40
Pebble Beach 6649	567048	Seward	3S	35W	SE5	40
Pebble Beach 6650	567049	Seward	3S	35W	SW4	40
Pebble Beach 6651	567050	Seward	3S	35W	SW4	40
Pebble Beach 6652	567051	Seward	3S	35W	SE4	40
Pebble Beach 6653	567052	Seward	3S	35W	SE4	40
Pebble Beach 6654	567053	Seward	3S	35W	SW3	40
Pebble Beach 6655	567054	Seward	3S	35W	SW3	40
Pebble Beach 6656	567055	Seward	3S	35W	SW3,SE3	0
Pebble Beach 6746	567064	Seward	3S	35W	SW5	40
Pebble Beach 6747	567065	Seward	3S	35W	SW5	40
Pebble Beach 6748	567066	Seward	3S	35W	SE5	40
Pebble Beach 6749	567067	Seward	3S	35W	SE5	40
Pebble Beach 6750	567068	Seward	3S	35W	SW4	40
Pebble Beach 6751	567069	Seward	3S	35W	SW4	40
Pebble Beach 6846	567083	Seward	3S	35W	NW5	40
Pebble Beach 6847	567084	Seward	3S	35W	NW5	40
Pebble Beach 6848	567085	Seward	3S	35W	NE5	40
Pebble Beach 6849	567086	Seward	3S	35W	NE5	40
Pebble Beach 6850	567087	Seward	3S	35W	NW4	40
Pebble Beach 6851	567088	Seward	3S	35W	NW4	40
Pebble Beach 6946	567102	Seward	3S	35W	NW5	40
Pebble Beach 6947	567103	Seward	3S	35W	NW5	40
Pebble Beach 6948	567104	Seward	3S	35W	NE5	40
Pebble Beach 6949	567105	Seward	3S	35W	NE5	40
Pebble Beach 6950	567106	Seward	3S	35W	NW4	40
Pebble Beach 6951	567107	Seward	3S	35W	NW4	40
Sill 5343	567841	Seward	4S	35W	NE22	40
Sill 5344	567842	Seward	4S	35W	NE22	40
Sill 5345	567843	Seward	4S	35W	NW23	40
Sill 5346	567844	Seward	4S	35W	NW23	40
Sill 5347	567845	Seward	4S	35W	NE23	40
Sill 5443	567855	Seward	4S	35W	NE22	40
Sill 5444	567856	Seward	4S	35W	NE22	40
Sill 5445	567857	Seward	4S	35W	NW23	40
Sill 5446	567858	Seward	4S	35W	NW23	40
Sill 5447	567859	Seward	4S	35W	NE23	40
Sill 5448	567860	Seward	4S	35W	NE23	40
Sill 5545	567869	Seward	4S	35W	SW14	40
Sill 5546	567870	Seward	4S	35W	SW14	40
Sill 5547	567871	Seward	4S	35W	SE14	40

Sill 5548	567872	Seward	4S	35W	SE14	40
Sill 5549	567873	Seward	4S	35W	SW13	40
Sill 5645	567881	Seward	4S	35W	SW14	40
Sill 5646	567882	Seward	4S	35W	SW14	40
Sill 5647	567883	Seward	4S	35W	SE14	40
Sill 5648	567884	Seward	4S	35W	SE14	40
Sill 5649	567885	Seward	4S	35W	SW13	40
Sill 5650	567886	Seward	4S	35W	SW13	40
Sill 5745	567893	Seward	4S	35W	NW14	40
Sill 5746	567894	Seward	4S	35W	NW14	40
Sill 5747	567895	Seward	4S	35W	NE14	40
Sill 5748	567896	Seward	4S	35W	NE14	40
Sill 5749	567897	Seward	4S	35W	NW13	40
Sill 5750	567898	Seward	4S	35W	NW13	40
Sill 5845	567905	Seward	4S	35W	NW14	40
Sill 5846	567906	Seward	4S	35W	NW14	40
Sill 5847	567907	Seward	4S	35W	NE14	40
Sill 5848	567908	Seward	4S	35W	NE14	40
Sill 5849	567909	Seward	4S	35W	NW13	40
Sill 5850	567910	Seward	4S	35W	NW13	40
Sill 5851	567911	Seward	4S	35W	NE13	40
Sill 5945	567917	Seward	4S	35W	SW11	40
Sill 5946	567918	Seward	4S	35W	SW11	40
Sill 5947	567919	Seward	4S	35W	SE11	40
Sill 5948	567920	Seward	4S	35W	SE11	40
Sill 5949	567921	Seward	4S	35W	SW12	40
Sill 5950	567922	Seward	4S	35W	SW12	40
Sill 5953	567923	Seward	4S	34W	SW7	40
Sill 6045	567927	Seward	4S	35W	SW11	40
Sill 6046	567928	Seward	4S	35W	SW11	40
Sill 6047	567929	Seward	4S	35W	SE11	40
Sill 6048	567930	Seward	4S	35W	SE11	40
Sill 6049	567931	Seward	4S	35W	SW12	40
Sill 6050	567932	Seward	4S	35W	SW12	40
Sill 6053	567933	Seward	4S	34W	SW7	40
Sill 6145	567937	Seward	4S	35W	NW11	40
Sill 6146	567938	Seward	4S	35W	NW11	40
Sill 6147	567939	Seward	4S	35W	NE11	40
Sill 6148	567940	Seward	4S	35W	NE11	40
Sill 6149	567941	Seward	4S	35W	NW12	40
Sill 6150	567942	Seward	4S	35W	NW12	40
Sill 6153	567943	Seward	4S	34W	NW7	40
Sill 6154	567944	Seward	4S	34W	NW7	40
Sill 6253	567947	Seward	4S	34W	NW7	40
Sill 6254	567948	Seward	4S	34W	NW7	40
Sill 6255	567949	Seward	4S	34W	NE7	40
Sill 6345	567951	Seward	4S	35W	SW2	40
Sill 6346	567952	Seward	4S	35W	SW2	40
Sill 6347	567953	Seward	4S	35W	SE2	40
Sill 6348	567954	Seward	4S	35W	SE2	40
Sill 6349	567955	Seward	4S	35W	SW1	40
Sill 6350	567956	Seward	4S	35W	SW1	40
Sill 6353	567957	Seward	4S	34W	SW6	40
Sill 6354	567958	Seward	4S	34W	SW6	40
Sill 6355	567959	Seward	4S	34W	SE6	40
Sill 6356	567960	Seward	4S	34W	SE6	40
Sill 6445	567961	Seward	4S	35W	SW2	40
Sill 6446	567962	Seward	4S	35W	SW2	40
Sill 6447	567963	Seward	4S	35W	SE2	40
Sill 6448	567964	Seward	4S	35W	SE2	40
Sill 6449	567965	Seward	4S	35W	SW1	40
Sill 6450	567966	Seward	4S	35W	SW1	40
Sill 6453	567967	Seward	4S	34W	SW6	40
Sill 6454	567968	Seward	4S	34W	SW6	40
Sill 6455	567969	Seward	4S	34W	SE6	40
Sill 6456	567970	Seward	4S	34W	SE6	40
Sill 6545	567971	Seward	4S	35W	NW2	40
Sill 6546	567972	Seward	4S	35W	NW2	40
Sill 6547	567973	Seward	4S	35W	NE2	40
Sill 6548	567974	Seward	4S	35W	NE2	40

Sill 6549	567975	Seward	4S	35W	NW1	40
Sill 6550	567976	Seward	4S	35W	NW1	40
Sill 6551	567977	Seward	4S	35W	NE1	40
Sill 6552	567978	Seward	4S	35W	NE1	40
Sill 6553	567979	Seward	4S	34W	NW6	40
Sill 6554	567980	Seward	4S	34W	NW6	40
Sill 6555	567981	Seward	4S	34W	NE6	40
Sill 6556	567982	Seward	4S	34W	NE6	40
Sill 8345	568175	Seward	3S	35W	SW11	40
Sill 8346	568176	Seward	3S	35W	SW11	40
Sill 8347	568177	Seward	3S	35W	SE11	40
Sill 8348	568178	Seward	3S	35W	SE11	40
Sill 8743	568255	Seward	3S	35W	SE3	40
Sill 8744	568256	Seward	3S	35W	SE3	40
PEB 1	638779	Seward	4 S	36 W	NW22	160
PEB 2	638780	Seward	4 S	36 W	NE22	160
PEB 3	638781	Seward	4 S	36 W	NW23	160
PEB 4	638782	Seward	4 S	36 W	NE23	160
PEB 5	638783	Seward	4 S	36 W	SW22	160
PEB 6	638784	Seward	4 S	36 W	SE22	160
PEB 7	638785	Seward	4 S	36 W	SW23	160
PEB 8	638786	Seward	4 S	36 W	SE23	160
PEB 13	638791	Seward	4 S	37 W	NE25	160
PEB 14	638792	Seward	4 S	36 W	NW30	160
PEB 15	638793	Seward	4 S	36 W	NE30	160
PEB 16	638794	Seward	4 S	36 W	NW29	160
PEB 17	638795	Seward	4 S	36 W	NE29	160
PEB 18	638796	Seward	4 S	36 W	NW28	160
PEB 19	638797	Seward	4 S	36 W	NE28	160
PEB 20	638798	Seward	4 S	36 W	NW27	160
PEB 21	638799	Seward	4 S	36 W	NE27	160
PEB 22	638800	Seward	4 S	36 W	NW26	160
PEB 23	638801	Seward	4 S	36 W	NE 26	40
PEB 24	638802	Seward	4 S	36 W	NE 26	40
PEB 29	638807	Seward	4 S	37 W	SE25	160
PEB 30	638808	Seward	4 S	36 W	SW30	160
PEB 31	638809	Seward	4 S	36 W	SE30	160
PEB 32	638810	Seward	4 S	36 W	SW29	160
PEB 33	638811	Seward	4 S	36 W	SE29	160
PEB 34	638812	Seward	4 S	36 W	SW28	160
PEB 35	638813	Seward	4 S	36 W	SE28	160
PEB 36	638814	Seward	4 S	36 W	SW27	160
PEB 37	638815	Seward	4 S	36 W	SE27	160
PEB 38	638816	Seward	4 S	36 W	SW26	160
PEB 43	638821	Seward	4 S	37 W	NE36	160
PEB 44	638822	Seward	4 S	36 W	NW31	160
PEB 45	638823	Seward	4 S	36 W	NE31	160
PEB 46	638824	Seward	4 S	36 W	NW32	160
PEB 47	638825	Seward	4 S	36 W	NE32	160
PEB 48	638826	Seward	4 S	36 W	NW33	160
PEB 49	638827	Seward	4 S	36 W	NE33	160
PEB 50	638828	Seward	4 S	36 W	NW34	160
PEB 51	638829	Seward	4 S	36 W	NE34	160
PEB 52	638830	Seward	4 S	36 W	NW35	160
PEB 57	638835	Seward	4 S	37 W	SE36	160
PEB 58	638836	Seward	4 S	36 W	SW31	160
PEB 59	638837	Seward	4 S	36 W	SE31	160
PEB 60	638838	Seward	4 S	36 W	SW32	160
PEB 61	638839	Seward	4 S	36 W	SE32	160
PEB 62	638840	Seward	4 S	36 W	SW33	160
PEB 63	638841	Seward	4 S	36 W	SE33	160
PEB 64	638842	Seward	4 S	36 W	SW34	160
PEB 65	638843	Seward	4 S	36 W	SE34	160
PEB 66	638844	Seward	4 S	36 W	SW35	160
PEB 70	638848	Seward	5 S	37 W	NW3	160
PEB 71	638849	Seward	5 S	37 W	NE3	160
PEB 72	638850	Seward	5 S	37 W	NW2	160
PEB 73	638851	Seward	5 S	37 W	NE2	160
PEB 74	638852	Seward	5 S	37 W	NW1	160
PEB 75	638853	Seward	5 S	37 W	NE1	160

PEB 76	638854	Seward	5 S	36 W	NW6	160
PEB 77	638855	Seward	5 S	36 W	NE6	160
PEB 78	638856	Seward	5 S	36 W	NW5	160
PEB 79	638857	Seward	5 S	36 W	NE5	160
PEB 80	638858	Seward	5 S	36 W	NW4	160
PEB 84	638862	Seward	5 S	37 W	SW3	160
PEB 85	638863	Seward	5 S	37 W	SE3	160
PEB 86	638864	Seward	5 S	37 W	SW2	160
PEB 87	638865	Seward	5 S	37 W	SE2	160
PEB 88	638866	Seward	5 S	37 W	SW1	160
PEB 89	638867	Seward	5 S	37 W	SE1	160
PEB 90	638868	Seward	5 S	36 W	SW6	160
PEB 91	638869	Seward	5 S	36 W	SE6	160
PEB 92	638870	Seward	5 S	36 W	SW5	160
PEB 93	638871	Seward	5 S	36 W	SE5	160
PEB 94	638872	Seward	5 S	36 W	SW4	160
PEB 95	638873	Seward	5 S	36 W	SE4	40
PEB 96	638874	Seward	5 S	36 W	SE4	40
PEB 97	638875	Seward	5 S	36 W	SW3	40
PEB 104	638882	Seward	5 S	37 W	NW10	160
PEB 105	638883	Seward	5 S	37 W	NE10	160
PEB 106	638884	Seward	5 S	37 W	NW11	160
PEB 107	638885	Seward	5 S	37 W	NE11	160
PEB 108	638886	Seward	5 S	37 W	NW12	160
PEB 109	638887	Seward	5 S	37 W	NE12	160
PEB 110	638888	Seward	5 S	36 W	NW7	160
PEB 111	638889	Seward	5 S	36 W	NE7	160
PEB 112	638890	Seward	5 S	36 W	NW8	160
PEB 113	638891	Seward	5 S	36 W	NE8	160
PEB 114	638892	Seward	5 S	36 W	NW9	160
PEB 115	638893	Seward	5 S	36 W	NE9	160
PEB N 1	640061	Seward	4 S	37 W	SE24	160
PEB N 2	640062	Seward	4S	36 W	SW19	160
PEB N 3	640063	Seward	4 S	36 W	SE19	160
PEB N 4	640064	Seward	4 S	36 W	SW20	160
PEB N 5	640065	Seward	4 S	36 W	SE20	160
PEB N 6	640066	Seward	4 S	36 W	SW21	160
PEB N 7	640067	Seward	4 S	36 W	SE21	160
PEB N 8	640068	Seward	4 S	37 W	NE24	160
PEB N 9	640069	Seward	4 S	36 W	NW19	160
PEB N 10	640070	Seward	4 S	36 W	NE19	160
PEB N 11	640071	Seward	4 S	36 W	NW20	160
PEB N 12	640072	Seward	4 S	36 W	NE20	160
PEB N 13	640073	Seward	4 S	36 W	NW21	160
PEB N 14	640074	Seward	4 S	36 W	NE21	160
PEB N 15	640075	Seward	4 S	37 W	SE13	160
PEB N 16	640076	Seward	4 S	36 W	SW18	160
PEB N 17	640077	Seward	4 S	36 W	SE18	160
PEB N 18	640078	Seward	4 S	36 W	SW17	160
PEB N 19	640079	Seward	4 S	36 W	SE17	160
PEB N 20	640080	Seward	4 S	36 W	SW16	160
PEB N 21	640081	Seward	4 S	36 W	SE16	160
PEB N 22	640082	Seward	4 S	36 W	SW15	160
PEB N 23	640083	Seward	4 S	36 W	SE15	160
PEB N 24	640084	Seward	4 S	36 W	SW14	160
PEB N 25	640085	Seward	4 S	36 W	SE14	160
PEB N 26	640086	Seward	4 S	37 W	NE13	160
PEB N 27	640087	Seward	4 S	36 W	NW18	160
PEB N 28	640088	Seward	4 S	36 W	NE18	160
PEB N 29	640089	Seward	4 S	36 W	NW17	160
PEB N 30	640090	Seward	4 S	36 W	NE17	160
PEB N 31	640091	Seward	4 S	36 W	NW16	160
PEB N 32	640092	Seward	4 S	36 W	NE16	160
PEB N 33	640093	Seward	4 S	36 W	NW15	160
PEB N 34	640094	Seward	4 S	36 W	NE15	160
PEB N 35	640095	Seward	4 S	36 W	NW14	160
PEB N 36	640096	Seward	4 S	36 W	NE14	160
PEB EB A1	642334	Seward	4S	35W	NW2	40
PEB EB A2	642335	Seward	4S	35W	NW2	40
PEB EB A3	642336	Seward	4S	35W	NE2	40

PEB EB A4	642337	Seward	4S	35W	NE2	40
PEB EB 1	642338	Seward	3 S	35 W	SW35	160
PEB EB 2	642339	Seward	3 S	35 W	SE35	160
PEB EB 3	642340	Seward	3 S	35 W	NW35	160
PEB EB 4	642341	Seward	3 S	35 W	NE35	160
PEB EB 5	642342	Seward	3 S	34 W	SW31	160
PEB EB 6	642343	Seward	3 S	34 W	SE31	160
PEB EB 7	642344	Seward	3 S	34 W	SW32	160
PEB EB 8	642345	Seward	3 S	34 W	SE32	160
PEB EB 9	642346	Seward	3 S	34 W	SW33	160
PEB EB 10	642347	Seward	3 S	34 W	SE33	160
PEB EB 11	642348	Seward	3 S	34 W	NW31	160
PEB EB 12	642349	Seward	3 S	34 W	NE31	160
PEB EB 13	642350	Seward	3 S	34 W	NW32	160
PEB EB 14	642351	Seward	3 S	34 W	NE32	160
PEB EB 15	642352	Seward	3 S	34 W	NW33	160
PEB EB 16	642353	Seward	3 S	34 W	NE33	160
PEB EB 17	642354	Seward	3 S	35 W	SW26	160
PEB EB 18	642355	Seward	3 S	35 W	SE26	160
PEB EB 19	642356	Seward	3 S	35 W	SW25	160
PEB EB 20	642357	Seward	3 S	35 W	SE25	160
PEB EB 21	642358	Seward	3 S	34 W	SW30	160
PEB EB 22	642359	Seward	3 S	34 W	SE30	160
PEB EB 23	642360	Seward	3 S	34 W	SW29	160
PEB EB 24	642361	Seward	3 S	34 W	SE29	160
PEB EB 25	642362	Seward	3 S	34 W	SW28	160
PEB EB 26	642363	Seward	3 S	34 W	SE28	160
PEB EB 27	642364	Seward	3 S	35 W	NW26	160
PEB EB 28	642365	Seward	3 S	35 W	NE26	160
PEB EB 29	642366	Seward	3 S	35 W	NW25	160
PEB EB 30	642367	Seward	3 S	35 W	NE25	160
PEB EB 31	642368	Seward	3 S	34 W	NW30	160
PEB EB 32	642369	Seward	3 S	34 W	NE30	160
PEB EB 33	642370	Seward	3 S	34 W	NW29	160
PEB EB 34	642371	Seward	3 S	34 W	NE29	160
PEB EB 35	642372	Seward	3 S	34 W	NW28	160
PEB EB 36	642373	Seward	3 S	34 W	NE28	160
PEB EB 37	642374	Seward	3 S	35 W	SW24	160
PEB EB 38	642375	Seward	3 S	35 W	SE24	160
PEB EB 39	642376	Seward	3 S	34 W	SW19	160
PEB EB 40	642377	Seward	3 S	34 W	SE19	160
PEB EB 41	642378	Seward	3 S	34 W	SW20	160
PEB EB 42	642379	Seward	3 S	34 W	SE20	160
PEB EB 43	642380	Seward	3 S	34 W	SW21	160
PEB EB 44	642381	Seward	3 S	34 W	SE21	160
PEB EB 45	642382	Seward	3 S	35 W	NW24	160
PEB EB 46	642383	Seward	3 S	35 W	NE24	160
PEB EB 47	642384	Seward	3 S	34 W	NW19	160
PEB EB 48	642385	Seward	3 S	34 W	NE19	160
PEB EB 49	642386	Seward	3 S	34 W	NW20	160
PEB EB 50	642387	Seward	3 S	34 W	NE20	160
PEB EB 51	642388	Seward	3 S	34 W	NW21	160
PEB EB 52	642389	Seward	3 S	34 W	NE21	160
PEB EB 53	642390	Seward	3 S	35 W	SW13	160
PEB EB 54	642391	Seward	3 S	35 W	SE13	160
PEB EB 55	642392	Seward	3 S	34 W	SW18	160
PEB EB 56	642393	Seward	3 S	34 W	SE18	160
PEB EB 57	642394	Seward	3 S	34 W	SW17	160
PEB EB 58	642395	Seward	3 S	34 W	SE17	160
PEB EB 59	642396	Seward	3 S	34 W	SW16	160
PEB EB 60	642397	Seward	3 S	34 W	SE16	160
PEB EB 61	642398	Seward	3 S	35 W	NW13	160
PEB EB 62	642399	Seward	3 S	35 W	NE13	160
PEB EB 63	642400	Seward	3 S	34 W	NW18	160
PEB EB 64	642401	Seward	3 S	34 W	NE18	160
PEB EB 65	642402	Seward	3 S	34 W	NW17	160
PEB EB 66	642403	Seward	3 S	34 W	NE17	160
PEB EB 67	642404	Seward	3 S	34 W	NW16	160
PEB EB 68	642405	Seward	3 S	34 W	NE16	160
PEB EB 69	642406	Seward	3 S	35 W	SW12	160

PEB EB 70	642407	Seward	3 S	35 W	SE12	160
PEB EB 71	642408	Seward	3 S	34 W	SW7	160
PEB EB 72	642409	Seward	3 S	34 W	SE7	160
PEB EB 73	642410	Seward	3 S	34 W	SW8	160
PEB EB 74	642411	Seward	3 S	34 W	SE8	160
PEB WB 1	642412	Seward	3 S	36 W	SW33	160
PEB WB 2	642413	Seward	3 S	36 W	SE33	160
PEB WB 3	642414	Seward	3 S	36 W	SW34	160
PEB WB 4	642415	Seward	3 S	36 W	SE34	160
PEB WB 5	642416	Seward	3 S	36 W	NW33	160
PEB WB 6	642417	Seward	3 S	36 W	NE33	160
PEB WB 7	642418	Seward	3 S	36 W	NW34	160
PEB WB 8	642419	Seward	3 S	36 W	NE34	160
PEB WB 9	642420	Seward	3 S	36 W	SW28	160
PEB WB 10	642421	Seward	3 S	36 W	SE28	160
PEB WB 11	642422	Seward	3 S	36 W	SW27	160
PEB WB 12	642423	Seward	3 S	36 W	SE27	160
PEB WB 13	642424	Seward	3 S	36 W	SW26	160
PEB WB 14	642425	Seward	3 S	36 W	SE26	160
PEB WB 15	642426	Seward	3 S	36 W	NW28	160
PEB WB 16	642427	Seward	3 S	36 W	NE28	160
PEB WB 17	642428	Seward	3 S	36 W	NW27	160
PEB WB 18	642429	Seward	3 S	36 W	NE27	160
PEB WB 19	642430	Seward	3 S	36 W	NW26	160
PEB WB 20	642431	Seward	3 S	36 W	NW26	160
PEB WB 21	642432	Seward	3 S	36 W	SE21	160
PEB WB 22	642433	Seward	3 S	36 W	SW22	160
PEB WB 23	642434	Seward	3 S	36 W	SE22	160
PEB WB 24	642435	Seward	3 S	36 W	SW23	160
PEB WB 25	642436	Seward	3 S	36 W	SE23	160
PEB WB 26	642437	Seward	3 S	36 W	NW22	160
PEB WB 27	642438	Seward	3 S	36 W	NE22	160
PEB WB 28	642439	Seward	3 S	36 W	NW23	160
PEB WB 29	642440	Seward	3 S	36 W	NE23	160
PEB WB 30	642441	Seward	3 S	36 W	SW15	160
PEB WB 31	642442	Seward	3 S	36 W	SE15	160
PEB WB 32	642443	Seward	3 S	36 W	SW14	160
PEB WB 33	642444	Seward	3 S	36 W	SE14	160
PEB WB 34	642445	Seward	3 S	36 W	NW14	160
PEB WB 35	642446	Seward	3 S	36 W	NE14	160
PEB WB 36	642447	Seward	3 S	36 W	SW11	160
PEB WB 37	642448	Seward	3 S	36 W	SE11	160
PEB WB 38	642449	Seward	3 S	36 W	NW11	160
PEB WB 39	642450	Seward	3 S	36 W	NE11	160
PEB SE A1	643892	Seward	4S	35W	SW 31	40
PEB SE A2	643893	Seward	4S	35W	SW 31	40
PEB SE A3	643894	Seward	4S	35W	NW 31	40
PEB SE A4	643895	Seward	4S	35W	NW 31	40
PEB SE A5	643896	Seward	4S	35W	NW 31	40
PEB SE A6	643897	Seward	4S	35W	NW 19	40
PEB SE A7	643898	Seward	4S	35W	NW 19	40
PEB SE 1	643899	Seward	4S	35W	SE31	160
PEB SE 2	643900	Seward	4S	35W	SW32	160
PEB SE 3	643901	Seward	4S	35W	SE32	160
PEB SE 4	643902	Seward	4S	35W	NE31	160
PEB SE 5	643903	Seward	4S	35W	NW32	160
PEB SE 6	643904	Seward	4S	35W	NE32	160
PEB SE 7	643905	Seward	4S	35W	SW30	160
PEB SE 8	643906	Seward	4S	35W	SE30	160
PEB SE 9	643907	Seward	4S	35W	SW29	160
PEB SE 10	643908	Seward	4S	35W	SE29	160
PEB SE 11	643909	Seward	4S	35W	SW28	160
PEB SE 12	643910	Seward	4S	35W	SE28	160
PEB SE 13	643911	Seward	4S	35W	NW30	160
PEB SE 14	643912	Seward	4S	35W	NE30	160
PEB SE 15	643913	Seward	4S	35W	NW29	160
PEB SE 16	643914	Seward	4S	35W	NE29	160
PEB SE 17	643915	Seward	4S	35W	NW28	160
PEB SE 18	643916	Seward	4S	35W	NE28	160
PEB SE 19	643917	Seward	4S	35W	SW19	160

PEB SE 20	643918	Seward	4S	35W	SE19	160
PEB SE 21	643919	Seward	4S	35W	SW20	160
PEB SE 22	643920	Seward	4S	35W	SE20	160
PEB SE 23	643921	Seward	4S	35W	SW21	160
PEB SE 24	643922	Seward	4S	35W	SE21	160
PEB SE 25	643923	Seward	4S	35W	NE19	160
PEB SE 26	643924	Seward	4S	35W	NW20	160
PEB SE 27	643925	Seward	4S	35W	NE20	160
PEB SE 28	643926	Seward	4S	35W	NW21	160
PEB SE 29	643927	Seward	4S	35W	SW33	160
PEB SE 30	643928	Seward	4S	35W	SE33	160
PEB SE 31	643929	Seward	4S	35W	NW33	160
PEB SE 32	643930	Seward	4S	35W	NE33	160
PEB NW A1	643931	Seward	3S	36W	NW 12	40
PEB NW A2	643932	Seward	3S	36W	NW 12	40
PEB NW A3	643933	Seward	3S	36W	NE 12	40
PEB NW A4	643934	Seward	3S	36W	NE 12	40
PEB NW 1	643935	Seward	3S	36W	SW2	160
PEB NW 2	643936	Seward	3S	36W	SE2	160
PEB NW 3	643937	Seward	3S	36W	SW1	160
PEB NW 4	643938	Seward	3S	36W	SE1	160
PEB NW 5	643939	Seward	3S	36W	NW2	160
PEB NW 6	643940	Seward	3S	36W	NE2	160
PEB NW 7	643941	Seward	3S	36W	NW1	160
PEB NW 8	643942	Seward	3S	36W	NE1	160
PEB NW 9	643943	Seward	2S	36W	SW35	160
PEB NW 10	643944	Seward	2S	36W	SE35	160
PEB NW 11	643945	Seward	2S	36W	SW36	160
PEB NW 12	643946	Seward	2S	36W	SE36	160
PEB NW 13	643947	Seward	2S	36W	NW35	160
PEB NW 14	643948	Seward	2S	36W	NE35	160
PEB NW 15	643949	Seward	2S	36W	NW36	160
PEB NW 16	643950	Seward	2S	36W	NE36	160
PEB NW 17	643951	Seward	2S	36W	SW26	160
PEB NW 18	643952	Seward	2S	36W	SE26	160
PEB NW 19	643953	Seward	2S	36W	SW25	160
PEB NW 20	643954	Seward	2S	36W	SE25	160
PEB NW 21	643955	Seward	2S	36W	NW26	160
PEB NW 22	643956	Seward	2S	36W	NE26	160
PEB NW 23	643957	Seward	2S	36W	NW25	160
PEB NW 24	643958	Seward	2S	36W	NE25	160
PEB NW 25	643959	Seward	2S	36W	SW23	160
PEB NW 26	643960	Seward	2S	36W	SE23	160
PEB NW 27	643961	Seward	2S	36W	SW24	160
PEB NW 28	643962	Seward	2S	36W	SE24	160
PEB NW 29	643963	Seward	2S	36W	NW23	160
PEB NW 30	643964	Seward	2S	36W	NE23	160
PEB NW 31	643965	Seward	2S	36W	NW24	160
PEB NW 32	643966	Seward	2S	36W	NE24	160
PEB SE 33	644196	Seward	4 S	35 W	SW22	160
PEB SE 34	644197	Seward	4 S	35 W	SE22	160
PEB SE 35	644198	Seward	4 S	35 W	SW23	160
PEB SE 36	644199	Seward	4 S	35 W	SE23	160
PEB SE 37	644200	Seward	4 S	35 W	NW27	160
PEB SE 38	644201	Seward	4 S	35 W	NE27	160
PEB SE 39	644202	Seward	4 S	35 W	NW26	160
PEB SE 40	644203	Seward	4 S	35 W	NE26	160
PEB SE 41	644204	Seward	4 S	35 W	SW27	160
PEB SE 42	644205	Seward	4 S	35 W	SE27	160
PEB SE 43	644206	Seward	4 S	35 W	SW26	160
PEB SE 44	644207	Seward	4 S	35 W	SE26	160
PEB SE 45	644208	Seward	4 S	35 W	NW34	160
PEB SE 46	644209	Seward	4 S	35 W	NE34	160
PEB SE 47	644210	Seward	4 S	35 W	NW35	160
PEB SE 48	644211	Seward	4 S	35 W	SW34	160
PEB SE 49	644212	Seward	4 S	35 W	SE34	160
PEB SE 50	644213	Seward	5 S	36 W	NW2	160
PEB SE 51	644214	Seward	5 S	36 W	NE2	160
PEB SE 52	644215	Seward	5 S	36 W	NW1	160
PEB SE 53	644216	Seward	5 S	36 W	NE1	160

PEB SE 54	644217	Seward	5 S	35 W	NW6	160
PEB SE 55	644218	Seward	5 S	35 W	NE6	160
PEB SE 56	644219	Seward	5 S	36 W	SW2	160
PEB SE 57	644220	Seward	5 S	36 W	SE2	160
PEB SE 58	644221	Seward	5 S	36 W	SW1	160
PEB SE 59	644222	Seward	5 S	36 W	SE1	160
PEB SE 60	644223	Seward	5 S	35 W	SW6	160
PEB SE 61	644224	Seward	5 S	35 W	SE6	160
PEB SE A8	644225	Seward	4 S	35 W	NESE23	40
PEB SE A11	644228	Seward	5 S	36 W	SWSE3	40
PEB SE A12	644229	Seward	5 S	36 W	SESW3	40
PEB SE A13	644230	Seward	5 S	36 W	SESE3	40
PEB EB 75	644231	Seward	3S	34 W	SW9	160
PEB EB 76	644232	Seward	3S	34 W	SE9	160
PEB EB 77	644233	Seward	3S	35 W	NW11	160
PEB EB 78	644234	Seward	3S	35 W	NE11	160
PEB EB 79	644235	Seward	3S	35 W	NW12	160
PEB EB 80	644236	Seward	3S	35 W	NE12	160
PEB EB 81	644237	Seward	3S	34 W	NW7	160
PEB EB 82	644238	Seward	3S	34 W	NE7	160
PEB EB 83	644239	Seward	3S	34 W	NW8	160
PEB EB 84	644240	Seward	3S	34 W	NE8	160
PEB EB 85	644241	Seward	3S	34 W	NW9	160
PEB EB 86	644242	Seward	3S	34 W	NE9	160
PEB EB 87	644243	Seward	3S	35 W	SW2	160
PEB EB 88	644244	Seward	3S	35 W	SE2	160
PEB EB 89	644245	Seward	3S	35 W	SW1	160
PEB EB 90	644246	Seward	3S	35 W	SE1	160
PEB EB 91	644247	Seward	3S	34 W	SW6	160
PEB EB 92	644248	Seward	3S	34 W	SW4	160
PEB EB 93	644249	Seward	3S	34 W	SE4	160
PEB EB 94	644250	Seward	3S	35 W	NW2	160
PEB EB 95	644251	Seward	3S	35 W	NE2	160
PEB EB A5	644252	Seward	3S	35 W	SWNW11	40
PEB EB A6	644253	Seward	3S	35 W	SWNE11	40
PEB EB A7	644254	Seward	3S	35 W	SENW11	40
PEB EB A8	644255	Seward	3S	35 W	SENE11	40
PEB WB 40	644256	Seward	4 S	36 W	NW4	160
PEB WB 41	644257	Seward	4 S	36 W	NE4	160
PEB WB 42	644258	Seward	4 S	36 W	NW3	160
PEB WB 43	644259	Seward	4 S	36 W	NE3	160
PEB WB 44	644260	Seward	4 S	36 W	NW2	160
PEB WB 45	644261	Seward	4 S	36 W	NE2	160
PEB WB 46	644262	Seward	4 S	36 W	SW4	160
PEB WB 47	644263	Seward	4 S	36 W	SE4	160
PEB WB 48	644264	Seward	4 S	36 W	SW3	160
PEB WB 49	644265	Seward	4 S	36 W	SE3	160
PEB WB 50	644266	Seward	4 S	36 W	SW2	160
PEB WB 51	644267	Seward	4 S	36 W	SE2	160
PEB WB 52	644268	Seward	4 S	36 W	NW9	160
PEB WB 53	644269	Seward	4 S	36 W	NE9	160
PEB WB 54	644270	Seward	4 S	36 W	NW10	160
PEB WB 55	644271	Seward	4 S	36 W	NE10	160
PEB WB 56	644272	Seward	4 S	36 W	NW11	160
PEB WB 57	644273	Seward	4 S	36 W	NE11	160
PEB WB 58	644274	Seward	4 S	36 W	SW9	160
PEB WB 59	644275	Seward	4 S	36 W	SE9	160
PEB WB 60	644276	Seward	4 S	36 W	SW10	160
PEB WB 61	644277	Seward	4 S	36 W	SE10	160
PEB WB 62	644278	Seward	4 S	36 W	SW11	160
PEB WB 63	644279	Seward	4 S	36 W	SE11	160
Pebble Beach 5943	646604	Seward	3S	35W	NE SW 18	40
Pebble Beach 5942	646605	Seward	3S	35W	NW SW 18	40
PEB K1	646606	Seward	3S	35W	NW 36	160
PEB K2	646607	Seward	3S	35W	NE 36	160
PEB K3	646608	Seward	3S	35W	SW 36	160
PEB K4	646609	Seward	3S	35W	SE 36	160
PEB K5	646610	Seward	4S	35W	NW NW 1	40
PEB K6	646611	Seward	4S	35W	NE NW 1	40
PEB K7	646612	Seward	4S	35W	NW NE 1	40

PEB K8	646613	Seward	4S	35W	NE NE 1	40
PEB K9	646614	Seward	4S	34W	NW NW 6	40
PEB K10	646615	Seward	4S	34W	NE NW 6	40
PEB K11	646616	Seward	4S	34W	NW NE 6	40
PEB K12	646617	Seward	4S	34W	NE NE 6	40