Pebble Project

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

Application for Water Right

South Fork Koktuli River

JULY 7, 2006

Pebble Project

NORTHERN DYNASTY MINES INC.

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USA 99503

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July 7, 2006

Ms. Kellie M. Westphal
Alaska Department of Natural Resources
Water Resources Section
550 West 7th Avenue, Suite 1020
Anchorage, AK 99501-3562

Re: *South Fork Koktuli River* Water Right Application

Dear Ms. Westphal:

Enclosed is an Application for Water Right submitted jointly by Northern Dynasty Mines Inc. and Northern Dynasty Holdings Inc. The mining claims that constitute the Pebble Project are held either by Northern Dynasty Holdings Inc. or its sister corporation, Northern Dynasty Mines Inc. These two Alaska corporations are submitting this application to secure rights to the supply of water needed for the beneficial mining uses described in this application for the Pebble Project northwest of the community of Iliamna.

Northern Dynasty Mines Inc. is and will continue to be the entity that will carry out exploration, development and administrative work relating to the Pebble Project, including ingress and egress as necessary to withdraw, impound, divert and transport water of the State of Alaska. Therefore, NDMI and NDHI are referred to, collectively, for purposes of this application, as "Northern Dynasty Mines Inc." Each of the two entities accepts any and all responsibility and liability arising out of applying for, acquiring and holding the water right associated with this application.

Submitted with the application are location maps that further identify the site where water will be taken and beneficially used, as well as the information and documentation required pursuant to 11 AAC 93.040. Also enclosed is a Coastal Project Questionnaire (CPQ). NDMI previously has submitted a CPQ for its 2006 exploration drilling program.

We understand that the fee required under Alaska law for this application is to be set by negotiation. With this application, NDMI submits a check in the amount of $900 as a deposit to be applied to the fee that will be negotiated for processing this application. We are prepared to work with you to develop a fee schedule for mining projects as you determine the reasonable fee for this project, specifically.

This water right application is being submitted simultaneously with two other water right applications. These three water rights are needed for a supply of water for the beneficial mining uses described in this application.

Please feel free to contact me in the Anchorage office of NDMI, 339-2606, if you have any questions with regard to this application. In my absence, please contact Ella Ede in the Anchorage office, 339-2600.

Your efforts in adjudicating this application are very much appreciated.

Sincerely,
Northern Dynasty Mines Inc.

Michael C. T. Smith

Michael C. T. Smith
NEPA and Permitting Manager

Northern Dynasty Holdings Inc.

Bruce W. Jenkins
Authorized Officer

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT
Application for Water Right

South Fork Koktuli River

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Cover letter

Contents

Items requested by ADNR form: Application for Water Right:

Tab	Document
1.	Completed Application
2.	Possessory Interest Document
3.	Legal Access Document
4.	Driller's Well Log
5.	Project Description
6.	Map
7.	ADEC Wastewater System Certificate
8.	ADNR Fish Habitat Permit
9.	Statement of Beneficial Use
10.	Coastal Project Questionnaire
11.	Application Fee

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT
Application for Water Right

South Fork Koktuli River

APPLICATION BINDER INTRODUCTION

This binder contains a stand alone application for a water right on the South Fork Koktuli River. It is one of three applications being simultaneously submitted by Northern Dynasty Mines Inc. for its Pebble Project.

This binder is organized based on the formal Department of Natural Resources four-page "Application for Water Right." The instructions on page 1 of the application list 11 items that are to be submitted in support of the application. Thus, this binder contains 11 major numbered tabs that correspond to each specific numbered instruction. Three of these tabs are followed by supporting tabs that contain information (e.g., attachments) specifically required for that tab.

Therefore, to understand the overall structure of this binder, and the order of the documents it contains, the reader should continually refer to the numbered instructions on page 1 of the formal DNR application.

INSTRUCTION #1 – *Complete one application for each water source*

See DNR four-page application following this page.

DIVISION OF MINING, LAND AND WATER
WATER RESOURCES SECTION
www.dnr.state.ak.us/mlw/water/index.htm

Alaska Department of NATURAL RESOURCES

Anchorage Office 550 West 7th Avenue, Suite 1020 Anchorage, AK 99501-3562 (907) 269-8600 Fax: (907) 269-8947	Juneau Office PO Box 111020 400 Willoughby Avenue Juneau, AK 99811-1020 (907) 465-3400 Fax: (907) 586-2954	Fairbanks Office 3700 Airport Way Fairbanks, AK 99709 (907) 451-2790 Fax: (907) 451-2703	*For ADNR Use Only* *Date/Time Stamp*
For ADNR Use Only *LAS #*	*For ADNR Use Only* *CID #* *CID #*	*For ADNR Use Only* *Receipt Type* *WR*	

APPLICATION FOR WATER RIGHT

INSTRUCTIONS

1. Complete one application for each water source (incomplete applications will not be accepted).
2. Attach copy of executed deed, lease agreement, or other possessory interest document for property where water will be used (applicant must own, lease, or obtain written authorization to use water on property).
3. Attach copy of legal access document (e.g. right-of-way, easement, permit) or application for legal access to water withdrawal point and transport route, if applicable, or copy of request or application for legal access to water withdrawal point.
4. Attach driller's well log for drilled wells (if already drilled and available).
5. Attach sketch, photos, plans of water system, or project description (if applicable).
6. Attach legible map that includes meridian, township, range, and section lines such as a subdivision plat, USGS topographical quadrangle, or borough tax map. Indicate location of water withdrawal, route of water transmission, water use area boundary, points of water use within boundary, and point of water return flow (if applicable).
7. Attach copy of approved ADEC water and wastewater system certificate (if applicable).
8. Attach copy of ADNR fish habitat permit (if applicable).
9. Attach notarized Statement of Beneficial Use of Water form and associated fee, if water system and water use are fully developed, and total water use does not exceed 500 gallons of water per day.
10. Attach completed Coastal Project Questionnaire (if applicable - see page 4).
11. Submit non-refundable fee (see page 4).

APPLICANT INFORMATION

Northern Dynasty Mines Inc.
Organization Name (if applicable)

Agent or Consultant Name (if applicable)

Individual Applicant Name (if applicable)

Individual Co-applicant Name (if applicable)

3201 C Street, Suite 604
Mailing Address

Anchorage
City

AK
State

99503
Zip Code

(907) 339-2600
Daytime Phone Number

Alternate Phone Number (optional)

(907) 339-2601
Fax Number (if available)

E-Mail Address (optional)

PROPERTY DESCRIPTIONS

Location of Water Use

Subdivision Name or Survey Number	Lot, Block, or Tract	Meridian	Township	Range	Section	Quarter Sections	
See Attached						¼	¼

Location of Water Source

Subdivision Name or Survey Number	Lot, Block, or Tract	Meridian	Township	Range	Section	Quarter Sections	
See Attached						¼	¼

Location of Water Return Flow or Discharge (if applicable)

Geographic Name of Water Body or Well Depth	Meridian	Township	Range	Section	Quarter Sections	
Not Applicable					¼	¼

WATER SOURCE

Ground Water

Type (e.g. drilled, dug)	Total Depth (in feet)	Static Water Level (in feet)	Date Completed	Well Production Capacity
See Attached				

Surface Water

Type (e.g. stream, lake, spring)	Geographic Name (if named)
See Attached	South Fork Koktuli River

METHOD OF TAKING WATER (IF KNOWN)

Pump	Pump Intake See Inches Pump Output Attached GPM	Hours Working _____ Hours/Day Length of Pipe _____ Feet (from pump to point of use)
Gravity	Pipe Diameter See Inches Head Attached Feet	Length of Pipe _____ Feet (take point to point of use)
Ditch	L See H Attached W _____ Feet	Diversion Rate _____ ☐GPM or ☐CFS
Reservoir	L See H Attached W _____ Feet	Water Storage _____ AF
Dam	L See H Attached W _____ Feet	Water Storage _____ AF

AMOUNT OF WATER

Common Water Uses and Standard Amounts

Type of Use	How Many		Standard Amounts		Total Amount Requested	Months of Use Begin	Months of Use End
Fully Plumbed Single-family Home (includes irrigation of 10,000 sq. ft.)	#_____Homes	X	500 GPD	=			
Partially Plumbed Single-family Home (no hot water heater)	#_____Homes	X	250 GPD	=			
Unplumbed Single-family Home (hand carry water)	#_____Homes	X	75 GPD	=			
Duplex or Triplex	#_____Bldgs.	X	1000 GPD	=			
Four-plex and Larger Housing	#_____Units	X	250 GPD	=			
Motel or Resort	#_____Rooms	X	150 GPD	=			
Work Camps	#_____People	X	50 GPD	=			
Domestic Irrigation	#_____Sq. ft.	X	250 GPD per 10,000 Sq. ft.	=			
Non-domestic irrigation	#_____Acres	X	0.5 AFY	=			

Other Water Uses

Type of Use	How Many		Amount		Total Amount Requested	Months of Use Begin	Months of Use End
		X		=			
		X		=			

Type of Use	Total Amount Requested	Months of Use Begin	Months of Use End
See Attached	51 cfs		

Expected date for water system and water use to be fully developed *or* date when existing use started See Attached.
Note: Pursuant to AS 46.15.180(a)(1). Crimes, a person may not construct works for an appropriation, or divert, impound, withdraw, or use a significant amount of water from any source without a permit, certificate of appropriation, or authorization issued under this chapter.

11 AAC 93.040 sets out the required information on an application for a water right. 11 AAC 93.050 authorizes the commissioner to decide what additional information is needed to process an application for a water right. This information is made a part of the state public water records and becomes public information under AS 40.25.110 and 40.25.120. Public information is open to inspection by you or any member of the public. A person who is the subject of the information may challenge its accuracy or completeness under AS 44.99.310, by giving a written description of the challenged information, the changes needed to correct it, and a name and address where the person can be reached. False statements made in an application for a benefit are punishable under AS 11.56.210.

SIGNATURE

The information presented in this application is true and correct to the best of my knowledge. I understand that per 11 AAC 93.040 and 11 AAC 93.050 additional information may be required by the department to adjudicate this application. Failure to provide requested information could result in this file being closed.

Signature

July 7, 2006
Date

BRUCE W. JENKINS
Name (please print)

CHIEF OPERATING OFFICER
Title (if applicable)

REFERENCES

Measurement Units

GPD = gallons per day
CFS = cubic feet per second
GPM = gallons per minute
AF = acre-feet
AFY = acre-feet per year (325,851 gallons/year)
AFD = acre-feet per day (325,851 gallons/day)
MGD = million gallons per day

Conversion Table

5,000 GPD=	30,000 GPD=	100,000 GPD=	500,000 GPD=	1,000,000 GPD=
0.01 CFS	0.05 CFS	0.2 CFS	0.8 CFS	1.5 CFS
3.47 GPM	20.83 GPM	69.4 GPM	347. 2 GPM	694.4 GPM
5.60 AFY	33.60 AFY	112.0 AFY	560.1 AFY	1120.1 AFY
0.2 AFD	0.09 AFD	0.3 AFD	1.5 AFD	3.1 AFD
0.01 MGD	0.03 MGD	0.1 MGD	0.5 MGD	1.0 MGD

Fees required by regulation 11 AAC 05.010(a)(8)

- **$100** for one single-family residence or duplex, or for water use associated with one single-family residence or duplex
- **$1,200** for activities related to oil and gas and associated substances
- **Fee varies** for activities related to locatable minerals, unless the application is filed under 11 AAC 05.010(a)(9)(E)(i) or (9)(F)(i) - *contact Water Resources Section for pre-application meeting*
- **Fee varies** for hydroelectric power generation - *contact Water Resources Section for pre-application meeting*
- **Fee varies** for water removal out of a hydrologic unit under AS 46.15.035 or 46.15.037 - *contact Water Resources Section for pre-application meeting*
- **$200** for 5,000 GPD or less for a use not listed above
- **$450** for greater than 5,000 GPD and no more than 30,000 GPD for a use not listed above
- **$550** for greater than 30,000 GPD and no more than 100,000 GPD for a use not listed above
- **$900** for greater than 100,000 GPD for a use not listed above

Make checks payable to "Department of Natural Resources."

Coastal Zone

If this appropriation is within the Coastal Zone, and you are planning to use more than 1,000 GPD from a surface water source or 5,000 GPD from a subsurface water source, you need to submit a completed Coastal Project Questionnaire with this application. For more information on the Coastal Zone, contact the Office of Project Management and Permitting; Anchorage 269-7470, Juneau 465-3562, www.dnr.state.ak.us/acmp/.

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT

Application for Water Right

South Fork Koktuli River

ATTACHMENTS

PROPERTY DESCRIPTIONS

The proposed mine site is located 17 miles northwest of the community of Iliamna, on the north side of Lake Iliamna. The Pebble mining claims constitute the entirety of the property which is both the location of water use, and the location of water source. At this time no return flow or discharge of water is anticipated during construction or operations.

These claims are listed at Tab 2 (Possessory Interest Document) of this application binder. The location of the claims block, showing the township and section designations, is presented on the figure titled “Schedule ‘A’ – Pebble Property.”

More specifically, the location of water use, and the location of water source, are within the Seward Meridian as follows:

T3S, R35W

Sections: 20-22, 25-29, and 32-36

T4S, R35W

Sections: 1-5, 9-12, and 15-16

These locations of water use and source are identified on Figure SFK-1.

WATER SOURCE

This application is for all of the water up gradient of the proposed downstream limit of water extraction (DL-1 on Figure SFK-1). Therefore, the water source will be ground water, surface water, and direct precipitation, taken at several possible locations to be identified during the detailed design phase.

METHOD OF TAKING WATER

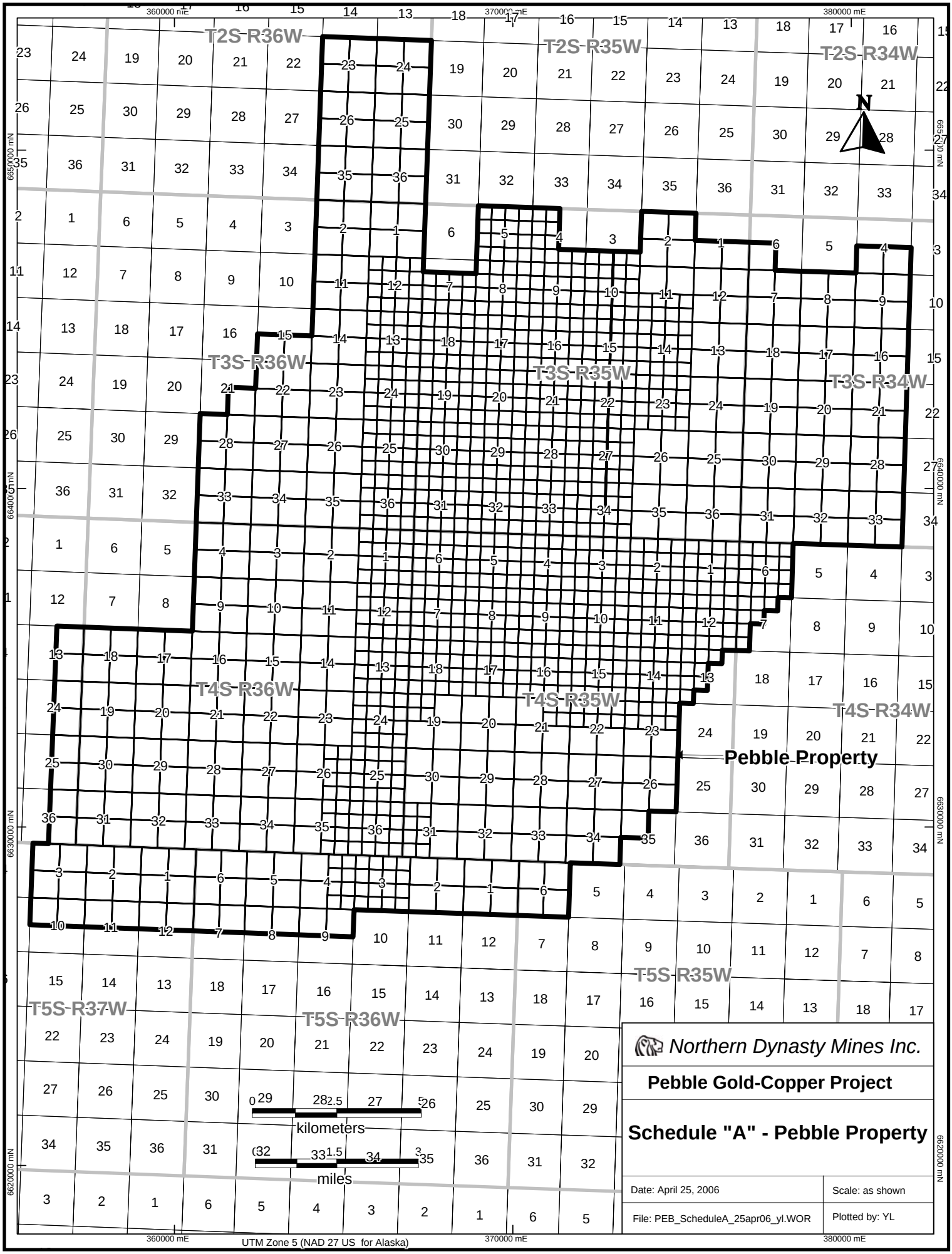
This application is for all of the water up gradient of the proposed downstream limit of water extraction (DL-1 on Figure SFK-1). Therefore, the method of taking water initially will be construction of a small dam to intercept all surface water to create a reservoir with sufficient volume to allow for mill processing to begin. A large impoundment structure also will be constructed that will extend into bed rock or other substantially impermeable layer that will intercept all surface and ground water flowing down the valley. Subsequently, surface and ground water above the downstream limit of water extraction may be taken via pumping, gravity, and channeling. Precipitation falling into the reservoir also will be captured.

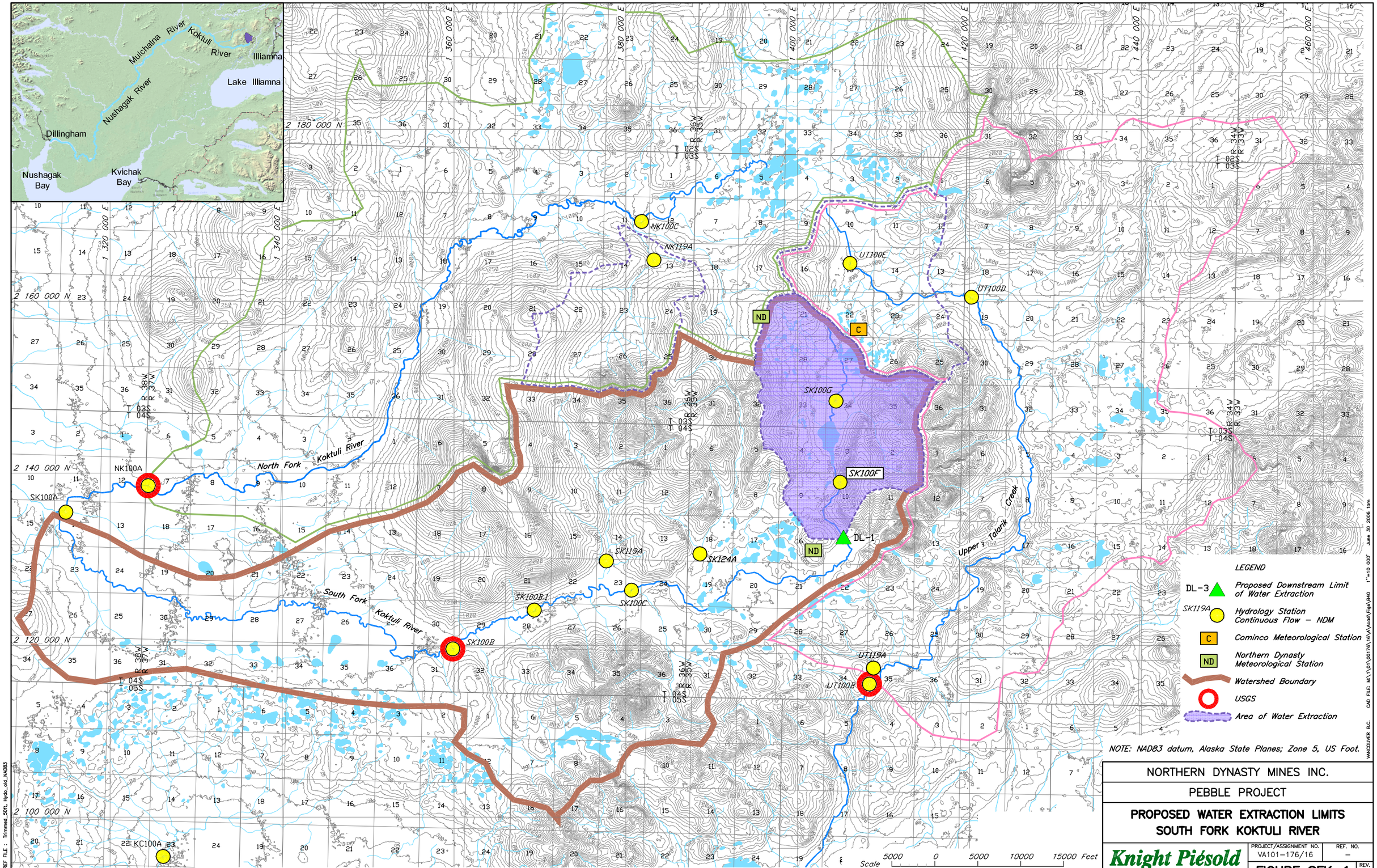
AMOUNT OF WATER

This application is for all of the water up gradient of the proposed downstream limit of water extraction (DL-1 on Figure SFK-1). At the 95th percentile of calculated discharge, this amounts to an annual average appropriation above the proposed downstream limit of water extraction of approximately 51 cfs. The basis for this volume of water is discussed below in the document: Flow Estimates for the South Fork Koktuli River. This 51 cfs volume figure will be better refined as NDM continues to gather data.

The nature (type) of water use is described in the document titled: Beneficial Uses for Appropriating Water that is located on the last page of this “Attachments” tab section. This information is also included behind Tab 5 “Project Description.” The water would be used all year (365 days).

Based on the present project development schedule, the expected date for water use to begin is approximately June 2010. The expected date for water use to be fully developed (maximum amount) is approximately November 2012.


T2S-R36W
T2S-R35W
T2S-R34W
T3S-R36W
T3S-R35W
T3S-R34W
T4S-R36W
T4S-R35W
T4S-R34W
T5S-R37W
T5S-R36W
T5S-R35W
Pebble Property
N
360000 mE
370000 mE
380000 mE
6650000 mN
6640000 mN
6630000 mN
6620000 mN
0 2.5 5
kilometers
0 1.5 3
miles
UTM Zone 5 (NAD 27 US for Alaska)
Northern Dynasty Mines Inc.
Pebble Gold-Copper Project
Schedule "A" - Pebble Property
Date: April 25, 2006
Scale: as shown
File: PEB_ScheduleA_25apr06_yl.WOR
Plotted by: YL



NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

PROPOSED WATER EXTRACTION LIMITS
SOUTH FORK KOKTULI RIVER

Knight Piésold CONSULTING

PROJECT/ASSIGNMENT NO.	REF. NO.
VA101-176/16	–

FIGURE SFK-1 REV. C

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT

FLOW ESTIMATES FOR THE SOUTH FORK KOKTULI RIVER IN SUPPORT OF AN APPLICATION FOR WATER RIGHT

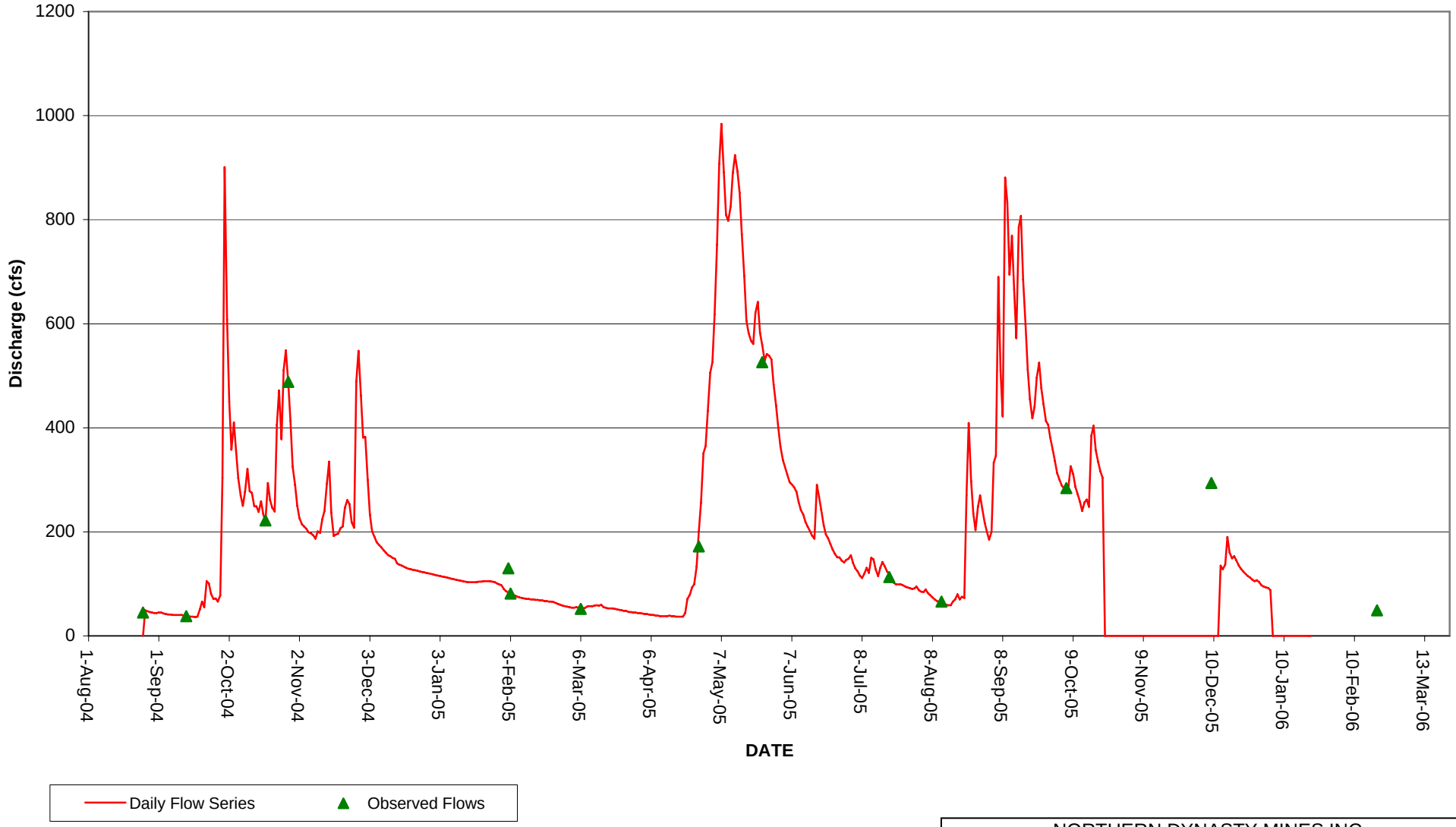
During the summer of 2004, Northern Dynasty Mines Inc. (NDM) installed five continuous flow-monitoring stations in the South Fork Koktuli River catchment, and the USGS installed one additional station. Further to that, in the spring and late fall of 2005, NDM installed two additional stations, for a total of eight stations. The locations of these gauges are shown on Figure SFK-1. A hydrometeorological assessment for the Pebble Project site was completed in September 2005 (see attached draft Pebble Project Hydrometeorology Report, Sept. 2005), and this provides supporting information for the following discharge estimate. The estimate is also based on the latest available data from the USGS station. The proposed downstream limit of water extraction for this application has NAD 83 coordinates of 2,132,326 N and 1,405,338 E, and is identified as DL-1 on Figure SFK-1.

The analysis for this application is based on data from the USGS station (Station 15302200 KOKTULI R NR ILIAMNA AK – identified on Figure SFK-1 as SK100B) and the station closest to the proposed downstream limit of water extraction (SK100F). Figure SFK-2 shows the daily flow hydrograph at SK100B, while monthly unit runoff hydrographs for the 2004/05 water year (Oct 04 – Sept 05), for SK100B and SK100F, are shown on Figure SFK-3. Annual discharges for the two locations are 228 cfs and 33 cfs, respectively. These values are slightly different to those presented in the Pebble Project Hydrometeorology Report, but are considered more valid because they include consideration of the latest available data. In order to estimate a long-term mean annual discharge, precipitation at Iliamna Airport and streamflow in the Terror River for the concurrent period were compared to long-term records. The Terror River was chosen for comparison as it is the nearest reasonably similar river with long-term records that include the 2004/05 water year. Closer systems such as the Tanalian River and the Tazamina River were considered, but were not selected for the analysis because of non-concurrent data records and different basin characteristics such as glacier coverage and greater drainage area and elevation range.

The two comparison sites show conflicting trends. Precipitation at Iliamna was approximately 25% above average for this period, while discharge in the Terror River was approximately 25% below average. On this basis, it was assumed that the calculated flow is indicative of the long-term mean annual discharge, although confidence in this result is not high. Ongoing data collection, site analysis and regional regression are proposed to improve accuracy and confidence of the estimates. Long-term monthly precipitation and precipitation during the 2004/05 water year at Iliamna are presented on Figure SFK-4 and show that the monthly distribution was reasonably indicative of long-term trends.

As shown on Figure SFK-3, unit runoff values at SK100B and SK100F are similar, and correspondingly a long-term average discharge of 36.4 cfs at DL-1 was calculated from the unit runoff at SK100F. Monthly and annual discharge values estimated for DL-1 are shown on Figure SFK-5 and in Table SFK-1. Both the precipitation records for Iliamna and the flow records for the Terror River indicate that the annual discharge in the South Fork Koktuli River will likely vary significantly from year to year, according to a coefficient of variation of approximately 0.20. Utilizing this value, the 95th percentile (5% chance of exceedance) annual discharge is estimated to be approximately 51 cfs. Monthly and annual discharge values corresponding with this value are shown on Figure SKF-5 and in Table SKF-1.

Table SFK-2 and Figure SFK-6 indicate the reduction of flows at SK100B that would result from the proposed flow appropriation at DL-1. Different options for compensating for the water appropriated at DL-1 are currently being considered.



NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

SOUTH FORK KOKTULI RIVER HYDROGRAPH
SK100B (USGS)

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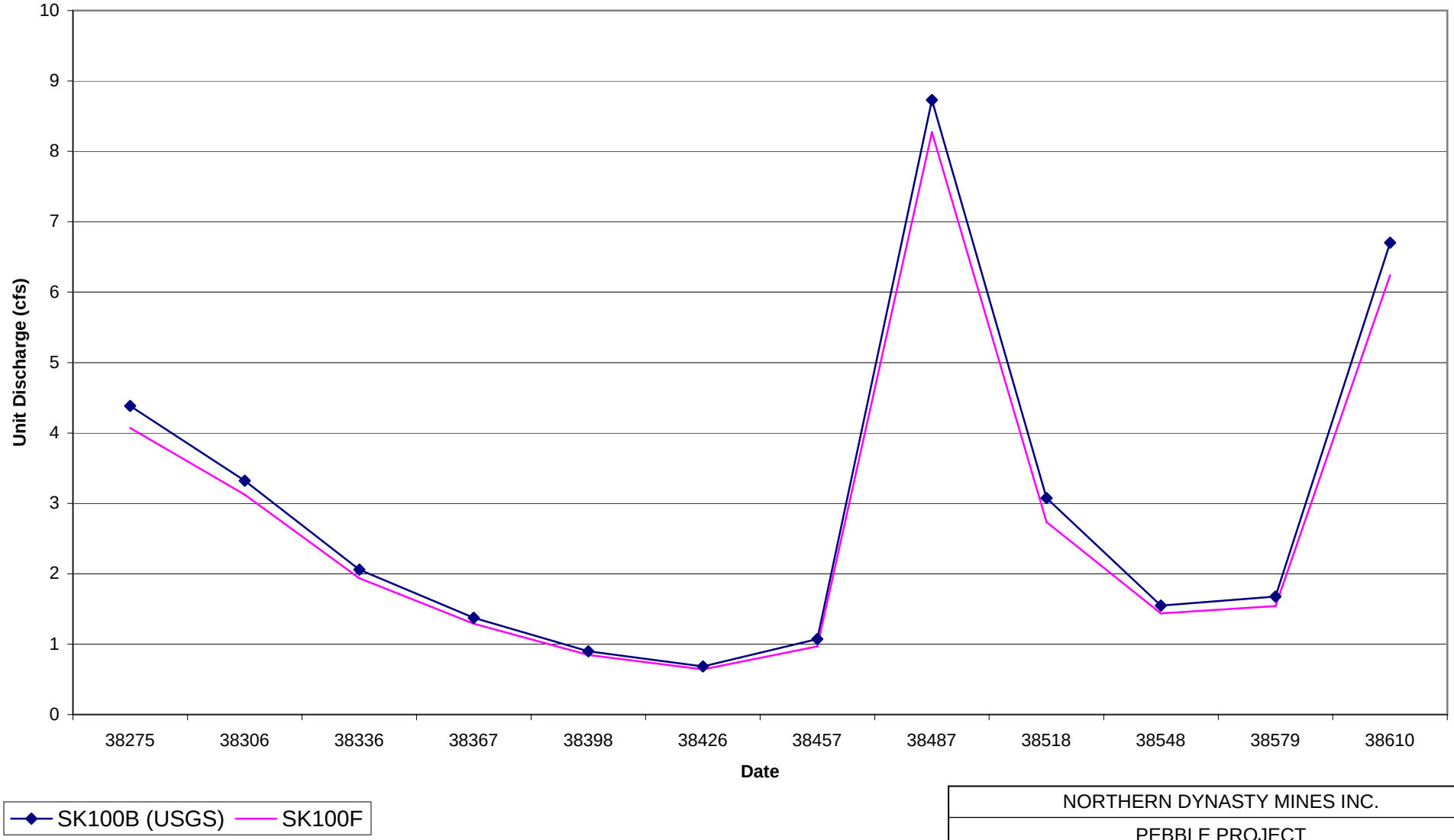
PROJECT / ASSIGNMENT NO.	REF NO.
VA101-00176/16	-

FIGURE SFK-2

REV. A

Rev A - Issued for Information



NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

MONTHLY UNIT RUNOFF
SOUTH FORK KOKTULI RIVER

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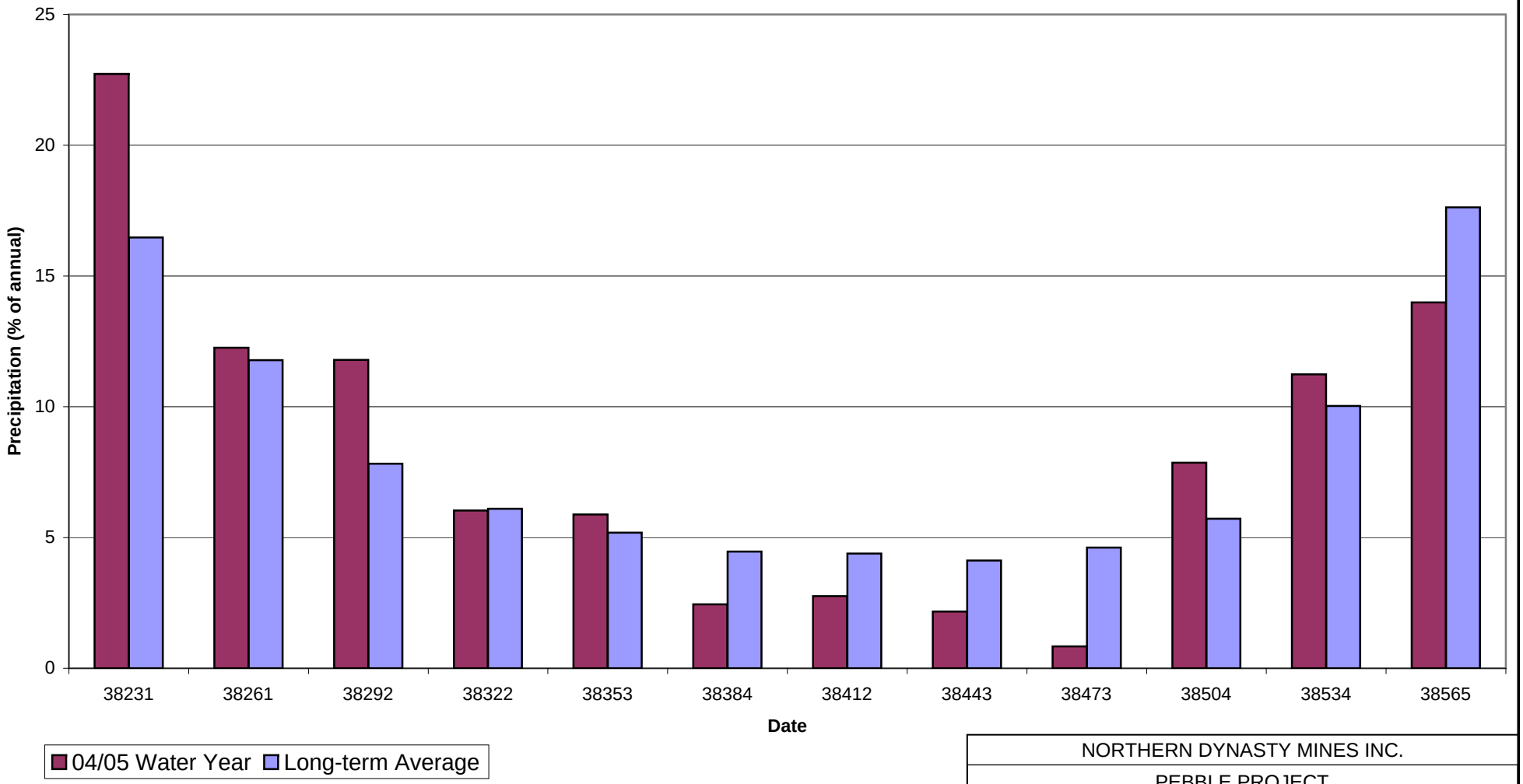
PROJECT / ASSIGNMENT NO.	REF NO.
VA101-00176/16-A	-

FIGURE SFK-3 REV. A

Rev A - Issued for Information



NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

ILIAMNA MONTHLY PRECIPITATION

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PROJECT / ASSIGNMENT NO.	REF NO.
VA101-00176/16-A	-

FIGURE SFK-4 REV A

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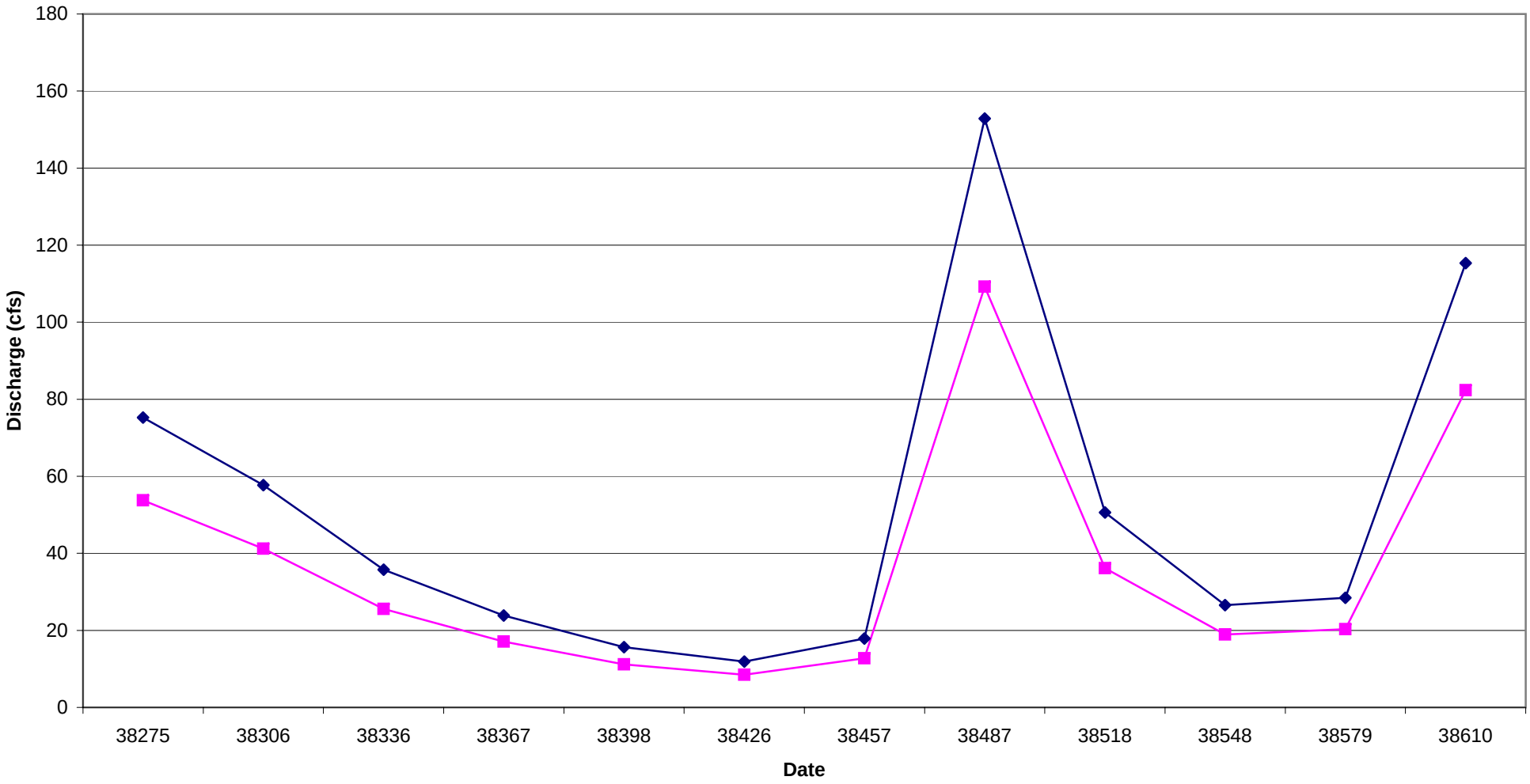

Average DL-1 — 95% Confidence

Notes:
1) It was assumed that the observed period was relatively typical (i.e. it represents average conditions) and an upper bound was estimated based on the standard deviation of annual precipitation at Iliamna and annual flows in the Terror River.

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

SOUTH FORK KOKTULI RIVER ESTIMATED MONTHLY FLOW AT THE DOWNSTREAM LIMIT OF EXTRACTION, DL-1

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PROJECT / ASSIGNMENT NO.	REF NO.
VA101-00176/16-A	-

FIGURE SFK-5 REV A

Rev A - Issued for Information

TABLE SFK-1

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT

FLOWS IN SOUTH FORK KOKTULI RIVER

Print Jul/06/06 20:51:32

P:\Water Rights Applications\6 Application Attachments\4 Flow Estimates Text & Figs\SFK\[60620 SFK Tabs and Figs.xls]Table SKF-1

Rev'd March 9, 06

	Catchment Area (mi^2)	Oct-04	Nov-04	Dec-04	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Aug-05	Sep-05	Annual Discharge (cfs)
SK100B (USGS - measured)	77.1	337.9	255.9	158.7	105.9	69.4	52.6	82.6	672.8	237.0	119.2	129.3	516.7	228.2
unit runoff (cfs/mi^2)		4.4	3.3	2.1	1.4	0.9	0.7	1.1	8.7	3.1	1.5	1.7	6.7	3.0
SK100F (measured)	12.0	48.7	37.4	23.2	15.5	10.1	7.7	11.6	99.0	32.8	17.2	18.4	74.7	33.0
unit runoff (cfs/mi^2)		4.1	3.1	1.9	1.3	0.8	0.6	1.0	8.3	2.7	1.4	1.5	6.2	2.8
DL-1 (estimated)	13.2	53.7	41.2	25.6	17.1	11.2	8.5	12.8	109.2	36.1	18.9	20.3	82.4	36.4
unit runoff (cfs/mi^2)		4.1	3.1	1.9	1.3	0.8	0.6	1.0	8.3	2.7	1.4	1.5	6.2	2.8
DL-1 (95% confidence)		75.2	57.7	35.8	23.9	15.6	11.9	17.9	152.9	50.6	26.5	28.5	115.3	51.0

Rev A - Issued for Information

TABLE SFK-2

NORTHERN DYNASTY MINES
PEBBLE PROJECT

PRE- AND POST-DEVELOPMENT FLOWS

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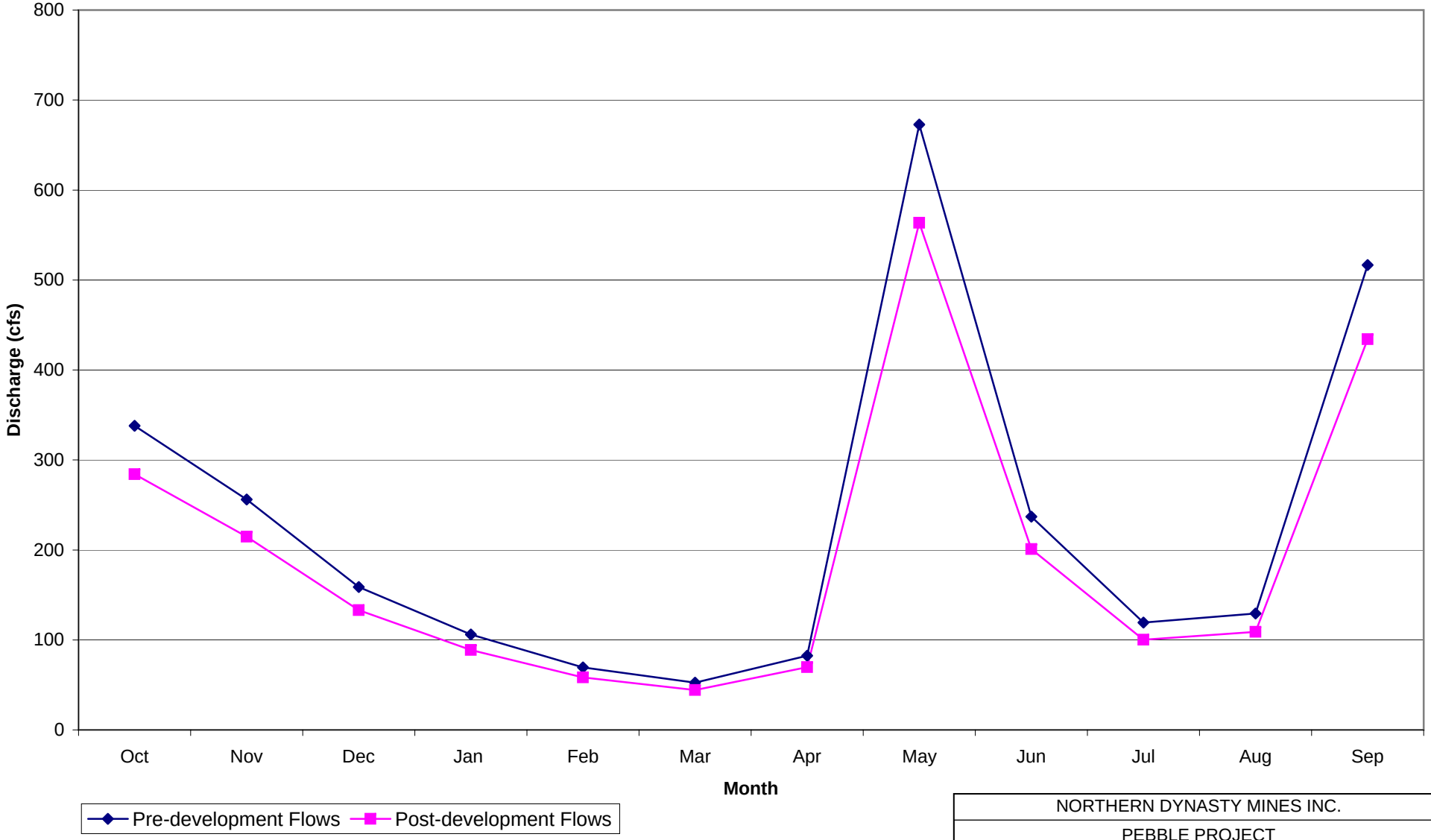
Rev'd Jun/20/06

		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
DL-1	**Pre-development (cfs)**	54	41	26	17	11	8	13	109	36	19	20	82	36
	Post-development (cfs)	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Reduction	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
SK100B	**Pre-development (cfs)**	338	256	159	106	69	53	83	673	237	119	129	517	228
	Post-development (cfs)	284	215	133	89	58	44	70	564	201	100	109	434	192
	% Reduction	16%	16%	16%	16%	16%	16%	15%	16%	15%	16%	16%	16%	16%

Notes:
1) Flow at DL-1 and SK100B is based on one water-year of data.

Rev A - Issued for Information



Notes:
1) Average monthly flow reduction at SK100B is 16% of pre-development monthly flow.
2) Flows and flow reductions are based on one water-year of data.

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

POTENTIAL DEVELOPMENT EFFECTS ON THE SOUTH FORK KOKTULI RIVER AT SK100B

Knight Piésold CONSULTING

PROJECT / ASSIGNMENT NO.	REF NO.
VA101-00176/16	-

FIGURE SFK-6 REV. B

Rev A - Issued for Information

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT

HYDROMETEOROLOGY
(REF. NO. VA101-00176/07-4)

EXECUTIVE SUMMARY

The climate of the Pebble Project Area is classified as maritime continental, with summer temperatures moderated by the open waters of the Bering Sea and Cook Inlet, and winter temperatures more continental in nature due to the presence of sea ice in Bristol Bay during the coldest months of the year. The objective of this report is to provide a hydrometeorological characterization of the Pebble Mine Site Area for purposes of water balance modeling, engineering design, water rights applications, and others, including environmental assessments. This is a draft report presenting preliminary estimates, which will be updated as additional information is obtained from ongoing data collection programs.

Hydrometeorological values for the project Mine Site Area were estimated on the basis of short-term site-specific data and long-term regional information. Meteorological data were collected at the Mine Site Area near the eastern extent of the known project ore body during the period of August 1991 to December 1993, and include intermittent records of temperature, precipitation, evaporation, and wind speed and direction. Long-term regional climate data suitable for comparison to the Mine Site Area data are available from Iliamna, which is located approximately 17 miles (27.4 km) southeast and 650 ft (198 m) lower than the Mine Site Area. Streamflow data were collected at four (4) locations in the Mine Site Area between 1991 and 1993. Fourteen (14) gauging stations were installed in July/August 2004. The US Geological Survey operates three (3) of these gauges, and ten months of data were available at the time or writing. The remaining eleven (11) gauges, operated by Northern Dynasty Mines Inc., were removed at freeze-up in October 2004 and then re-installed in April 2005. Groundwater and snowpack distribution sampling were undertaken during 2004 and 2005 and modelling is at various stages of completion. Preliminary data and results from these investigations have been included in this report.

The key findings of this study are summarized as follows:

- The long-term average annual temperature for the Mine Site Area is estimated to be 31.4°F (-0.3°C), with average monthly temperatures ranging from a high of 52.1°F (11.2°C) in July to 12.7°F (-10.7°C) in December.
- On average, temperatures at the Mine Site Area are 3.4°F (1.9°C) cooler than at Iliamna.
- Wind data indicate that the wind typically blows from the southeast and consistently averages speeds of between 8 and 15 knots (15 and 28 km/hr, respectively).
- The maximum wind speed recorded during the measurement period is 65 knots (120 km/hr), which occurred on November 28, 1991.
- Based on data from King Salmon, maximum global solar radiation occurs in June, while minimum radiation occurs in December.
- Mean annual lake evaporation for the Mine Site Area is estimated to be 14.0 inches (356 mm).
- Detailed investigations at Alaskan and northern Canadian locations suggest that sublimation of windblown snow can remove as much as 30% of the potential snowpack. Two empirical equations where applied with site-specific data inputs and the results confirm this value as appropriate for the Pebble Mine Site Area.
- Ice accumulation on the tailings pond was estimated to be 50 inches (1270 mm) per year. Accumulation is expected between November and May, followed by rapid melting in June.
- The long-term mean annual precipitation at Iliamna is 25.6 inches (650 mm), and due to orographic effects associated with high peaks surrounding the site, corresponding precipitation values for the Mine Site Area are estimated to be 36 inches (916 mm).
- The maximum 1 day precipitation recorded at Iliamna is 3.5 inches (89 mm), which corresponds to an estimated 4.8 inches (122 mm) for the Mine Site Area.
- Approximately 30% to 40% of precipitation at the Mine Site Area will fall as snow. However, high wind speeds and low vegetation cover result in significant wind blow at the site, and snow distribution surveys suggest that the Mine Site Area is a snow accumulation area. A windblow contribution of 7 inches (178 mm) of snow water equivalent (SWE) was estimated for the Mine Site Area. An average April snow depth of 14.5 inches (368 mm) of SWE (direct precipitation plus windblow less sublimation) was measured in the Mine Site catchment.
- Mine Site Area runoff results from rainfall and snowmelt, producing an annual hydrograph with two high flow seasons. The first peak occurs in April and May as a result of snowmelt, while the second peak occurs in August/September as a result of rainfall. A mean annual streamflow value was estimated for each of the 14 active stream gauging locations.
- Deep, permeable gravels downstream of Frying Pan Lake in the Upper South Fork Koktuli River basin result in significant groundwater flows. Interbasin transfer of

groundwater flow was determined to occur from the South Fork Koktuli River to Upper Talarik Creek and possibly also to Kaskanak Creek.

- Probable maximum precipitation (PMP) was estimated to be 14 inches (356 mm) for a 24hr storm.
- Climate change predictions for the period up to 2030 indicate patterns of increasing temperatures but consistent precipitation.

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT

HYDROMETEOROLOGY
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NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT

HYDROMETEOROLOGY
(REF. NO. VA101-00176/07-4)

SECTION 1.0 - INTRODUCTION

The climate of the Pebble Project Area is classified as maritime continental, with summer temperatures moderated by the open waters of the Bering Sea and Cook Inlet and winter temperatures more continental due to the presence of sea ice in Bristol Bay during the coldest months of the year.

Hydrometeorological values for the project Mine Site Area were calculated on the basis of short-term site-specific data and long-term regional information. The values were specifically derived for water balance modeling and engineering design purposes, but are also generally appropriate for other requirements including water rights applications and environmental assessments. Assumptions made and limitations of the hydrometeorological data presented should be carefully considered. The locations of all flow gauging and meteorological stations in the Project Area are shown on Figure 1.0.

Meteorological data for the Mine Site Area were collected at a station located near the eastern extent of the known project ore body during the period of August 1991 to December 1993. These data include intermittent records of temperature, precipitation, evaporation, and wind speed and direction. Two (2) new climate stations were established in the Mine Site Area in October 2004, but due were not fully operational until January 2005. Both stations collect temperature, precipitation, evaporation and wind data, while one site also measures solar radiation, barometric pressure and relative humidity.

Regional climate data suitable for comparison to the Mine Site Area data are available from Iliamna, which is located approximately 17 miles (27.4 km) southeast and 650 ft (198 m) lower than the Mine Site Area. A climate station has operated at this location since 1939. Data from other regional stations were also used, where appropriate.

Continuous streamflow data were collected at four (4) locations in the Mine Site Area for various periods between 1991 and 1993. In July/August 2004, fourteen (14) new continuous flow-gauging sites and sixteen (16) water quality sampling sites were

established. Flow data were collected between July and October 2004 at eleven continuous sites, prior to station removal for winter. The stations were then re-established after ice breakup in April 2005 and one (1) additional station was installed. The remaining three (3) continuous flow gauging sites are operated by the US Geological Survey (USGS) and flow data are collected year-round. Regional streamflow data are limited and largely pertain to river systems that are much larger than those that flow through the Mine Site Area. Nonetheless, the available data provide some basis for assessing expected long-term flow patterns and these were considered in the analyses.

In addition to climate and streamflow data collection, groundwater flows are monitored in the Mine Site Area with an extensive series of wells, and snowpack information is collected at a number of snow survey sites.

This report only considers data collected prior to 2005, with the exception of streamflow data collected by the USGS, which extends to June 2005.

SECTION 2.0 - HYDROMETEOROLOGIC PARAMETERS

2.1 TEMPERATURE

Temperatures recorded at the Mine Site Area Weather Station are summarized in Table 2.1. The maximum and minimum temperatures recorded over the short period (1991-1993) at the site are 66.6°F (18.9°C) and –29.5°F (-34.2°C), respectively, while the maximum and minimum temperatures recorded over the long-term at Iliamna are 91°F (33°C) and –47°F (-44°C). As would be anticipated because of elevation differences, the temperatures at the Mine Site Area are lower than those recorded at Iliamna, with an average difference estimated to be 3.4°F (1.9°C), which is the average of the monthly differences for the available records. Months with no temperature record for the Mine Site Area were estimated according to the average difference in temperature between Iliamna and the Mine Site Area for years with record for the particular month. The annual distribution of average monthly temperature is shown on Figure 2.1. The long-term average annual temperature for the Mine Site Area is estimated to be 31.4°F (-1.4°C), with average monthly temperatures ranging from a high of 52.1°F (11.2°C) in July to a low of 12.7°F (-10.7°C) in December.

2.2 WIND

Wind speeds recorded at the Mine Site Weather Station between 1991 and 1993 are summarized in Table 2.2. The maximum and minimum daily average wind speeds recorded are 34.7 knots (62 km/hr) and 1.0 knot (19 km/hr), respectively. The maximum wind speed recorded during the measurement period is 65 knots (120 km/hr), which occurred on November 28, 1991. The predominant wind direction at the Mine Site Area is from the southeast, and monthly average wind speeds ranged from 8 knots (15 km/hr) to 15 knots (28 km/hr). Monthly wind roses indicating the frequency and direction of wind during the period of record are shown on Figure 2.2.

2.3 SOLAR RADIATION

Site-specific solar radiation data are currently being collected at the Mine Site Area, but were not available at the time of this assessment. Consequently, regional solar radiation data considered reasonably representative of site conditions are presented. Hourly solar radiation data are available from the National Snow and Ice Data Centre for King Salmon, for the period 1961-1990. Figure 2.3 summarizes the average monthly global horizontal radiation. The figure indicates that solar radiation is typically greatest in June and least in December.

2.4 LAKE EVAPORATION

Evaporation was only measured for three (3) months during the summer seasons of 1992 and 1993, resulting in a total of six (6) months of values. With no directly relevant regional data available for comparison, monthly evaporation was estimated on the basis of known parameters. A relationship was developed between evaporation, temperature and wind speed to fit the available data, with the resulting values shown in Table 2.3. Raw pan evaporation values were converted to equivalent lake evaporation values using a pan coefficient of 0.45. This coefficient is quite low but is consistent with pan coefficients applicable in Northern Canada. Further, evaporation was assumed to be zero for months with mean monthly temperatures below 26 ^{o}F (-4 ^{o}C), which generally corresponds to months with daily temperatures continuously below freezing.

Long-term mean average monthly and annual lake evaporation values were generated for the Mine Site Area by averaging the values for 1992 and 1993, based on the fact that temperatures for this period are similar to long-term average values. Mean annual evaporation is estimated to be 14 inches (356 mm). This value is validated by historical evaporation records for areas near Anchorage (Matanuska AES and Palmer AES), which indicate annual lake evaporation in the order of 13 inches (330 mm) during May to September.

2.5 SUBLIMATION

Field data indicate that redistribution of snow by wind is a significant process at the site. During freezing months, water is removed from the catchment by sublimation, which is defined as the direct phase change of water from solid to a vapour (Schulz and de Jong, 2004), and detailed investigations suggest that it can form a significant proportion of a water balance. Sublimation rate is a function of air temperature, humidity, vapour pressure and heat transfer processes (Pomeroy et. al., 1997; Schulz and de Jong, 2004). The large surface area of wind blown snow and snow intercepted by vegetation increases heat transfer processes, and consequently sublimation is typically several orders of magnitude larger from windblown snow than from surface snow (Pomeroy et. al., 1997).

At the Pebble Mine Site Area, wind transport of snow is significant because existing vegetation is typically low and the interception of snow by vegetation is minimal. Furthermore, the aerodynamic roughness of snow-covered surfaces is low and there are long fetches across relatively flat topography. Development of the tailings pond will further reduce flow resistance and it is expected that all snow will be blown from the lake surface.

Recent research studies in northern regions of North America indicate that sublimation is typically equivalent to approximately 20% to 40% of the annual snowfall. At a study catchment in the low Arctic of northwestern Canada, Pomeroy *et. al.* (1997) estimated 19.5% of annual snowfall sublimated from blowing snow, and also reported results from Prudhoe Bay, Alaska, where sublimation from blowing snow was calculated as 32% of annual snowfall. Schulz and de Jong (2004) reported results from studies where it was found that 40% of annual snowfall in Canada sublimates.

Two empirical wind blown snow sublimation equations, as derived by Pomeroy (1988) and Tabler (1975), are presented in Cold Regions Hydrology and Hydraulics (pp.105-107, ASCE, 1990), and these were applied to assess site-specific sublimation. Pomeroy's equation was derived for various atmospheric conditions based on uniform snow transport over an area of unlimited fetch, while Tabler' s equation allows for variable fetch but assumes that the distance a snow particle travels before entirely evaporating, *T*, is independent of atmospheric conditions. Tabler's studies in Wyoming suggest that *T* can vary significantly between study areas and individual storms, but season-long averages are relatively constant and a value of 3000 m is considered appropriate for artic Alaska (ASCE, 1990). A value of 49% sublimation of annual snowfall from the tailings pond at the Pebble Mine Site Area was calculated with Tabler's equation. Pomeroy's equation is very sensitive to environmental conditions, and estimates of sublimation from blowing snow on the tailings pond were inconclusive. Based on detailed studies by others, described above, and the empirical equations applied, a value of 30% of annual snowfall is considered to be a reasonable estimate for the Pebble Mine Project area. Given that snowfall accounts for approximately 20% of annual precipitation, sublimation correspondingly represents approximately 6% of annual precipitation.

For the South Fork Koktuli River water balance model, in-situ snow measurements where used to determine snow accumulation, and sublimation was assumed to have already occurred. For the Mine Site Area water balance modeling purposes, it was assumed that all snow is blown from the tailings pond and that 30% sublimates during transport.

2.6 EVAPOTRANSPIRATION

Evapotranspiration includes interception, evaporation and transpiration from plants, and is primarily a function of air temperature, humidity, wind, and plant species and life stage. Vegetation at the site is predominantly comprised of low shrubs, grasses and

mosses, and temperatures are low, hence evaporation is likely quite low compared to that in temperate climates.

For quantitative purposes, evapotranspiration was combined with sublimation, and it was estimated that 10% of annual precipitation was lost from the system to these processes, based on water balance modeling in the South Fork Koktuli Catchment.

2.7 ICE GROWTH

Cumulative ice formation on the tailings ponds over the course of the winter months was calculated from

$$\frac{FI}{\rho_i L} = R(x_2 - x_1) + \frac{(x_2^2 - x_1^2)}{2k_i} \tag{2.1}$$

where FI is freezing index, ρ_i is density of ice, L is latent heat of fusion, R is thermal resistance above ice, x_2 is final ice thickness, x_1 is initial ice thickness and k_i is thermal conductivity of ice. The freezing index at the Mine Site Area was calculated from average monthly temperatures estimated for the Mine Site Area (based on Iliamna data) and the design FI was taken as the mean of three largest values in the past 30 years. Snow cover on the ice insulates the surface and increases R, thus reducing ice thickness. Assuming no snow cover, cumulative ice thickness was calculated as 50 inches. Observed ice thickness data at Port Alsworth on Lake Clark were used to verify calculated values. Based on Mine Site temperature values and ice cover observations from Port Alsworth, ice on the tailings pond can be expected to exist between November and June.

2.8 PRECIPITATION

Annual precipitation, which includes rain and snowfall, was previously estimated to be 34 inches at the Mine Site meteorological station, based on long-term data for Iliamna and a correlation between concurrent Iliamna and Mine Site meteorological station data for the period of 1991 to 1993. Precipitation values recorded at the Mine Site during 1992 and 1993 are summarized in Table 2.4.

At Iliamna, precipitation data indicate a mean annual depth of 26 inches (660 mm), while the Mine Site meteorological station data indicate that precipitation is approximately 33% greater than at Iliamna. This greater value agrees with an expected general trend of increasing precipitation with elevation, at a rate of approximately 10% per 328 ft (100 m)

rise in elevation. However, as several peaks within the Mine Site Area catchment rise upwards of 1000 ft above the gauge site, it is reasonable to expect precipitation depths to vary significantly over the catchment, and correspondingly that catchment average precipitation would be greater than 34 inches.

Furthermore, the high winds and freezing conditions at the Mine Site Area may contribute to gauge undercatch and corresponding under-measurement of precipitation. For an unprotected precipitation gauge exposed to wind speeds similar to those observed at the site, a rainfall under-catch of 25% and a snowfall under-catch of 50% might be expected (Ministry of Environment, 1991). Therefore, although the gauge at the Mine Site does have a windscreen, precipitation measurements are still suspected of being low.

An average annual precipitation value of 36 inches was calculated for the Mine Site Area, derived from water balance modeling, and allowing for increased precipitation with increasing catchment elevation and gauge under-catch. This value represents a 40% increase from Iliamna precipitation data. Applying this percentage increase, average monthly values for the Mine Site Area catchment range from a high of 6.5 inches (165 mm) in August to a low of 1.5 inches (38 mm) in April.

2.8.1 Snowpack Distribution

The precipitation record from the Mine Site meteorological station (1991–1993) did not differentiate between rainfall and snowfall. The proportion of annual precipitation falling as snow was calculated from adjusted Iliamna data and according to snow pack accumulation records for local monitored catchments that are considered similar to the Mine Site Area. Detailed snowpack distribution data are currently being prepared for the site.

The portion of total annual precipitation falling as snow at Iliamna is in the order of 25% to 30%. Due to consistently lower temperatures at the Mine Site Area, it is reasonable to conclude that approximately 30% to 40% of the total annual precipitation at the Mine Site Area will fall as snow. SNOTEL data for three locations southeast of the Mine Site Area (McNeil Canyon, Port Graham, and Anchor River Divide) were available from the US National Weather and Climate Centre, as summarized in Table 2.5. Snow pillow data for the 1st and 15th day of each month indicate that snowpack accumulates until April, followed by rapid melting in May. This trend agrees with the streamflow hydrographs for the Mine Site catchments.

Snowpack depth is highly variable at the site due to redistribution of snow by wind, which is considered a significant water transport process (ABR Inc., 2005a). Site-specific snow distribution data are currently being prepared by ABR Inc. Snow surveys were conducted in the upper catchments of Upper Talarik Creek, and the North and South Forks of the Koktuli River during April 2004. Snow depth and density were measured along 14 slope/aspect transects and 2 permanent snow courses. From this survey, mean snow water equivalent (SWE) depths from 0 to >53 inches were found. Average April 2005 snow water equivalent values where calculated for four sub-catchments in the South Fork Koktuli River catchment and range from 6.8 inches to 13.8 inches.

The site data will be combined with a detailed terrain map and snow accumulation indices (elevation, slope, aspect, vegetation cover and wind shelter) to develop a detailed snowpack distribution map for the Mine Site Area. Additional surveys in May 2004 allow estimation of ablation rates. Average results from the April and May 2004 surveys are presented in Table 2.6 (ABR Inc., 2005).

2.9 STREAMFLOW

During July and August of 2004, fourteen (14) stream gauging stations were developed on the North Fork Koktuli River, South Fork Koktuli River, Upper Talarik Creek, and Kaskanak Creek. Figure 1.0 shows gauge locations and identification codes. These gauges were installed and monitored by HDR Alaska Inc. and a draft report on surface water collection activities for 2004 has been completed (HDR Alaska Inc, 2005a).

Data for the North Fork Koktuli River are summarized on Figure 2.4. The difference in flow magnitude between gauges NK100C and NK100A indicates that flows increase in the downstream direction, as expected. Comparing concurrent records NK119A (located on a tributary on the south side of the North Fork of the Koktuli River) and NK100C indicates that NK100C has higher baseflows than NK119A and a relatively damped response to the rainfall event at the end of September 2004 (see Figure 2.5). This difference in response can be directly attributed to the physical characteristics of each sub-catchment's upstream basin characteristics. The sub-catchment contributing to NK119A is smaller and steeper than the catchment contributing to NK100C, causing a much more flashy response to rain events, which is apparent in the hydrographs for the storm event that occurred at the end of September 2004. Further, the presence of small lakes and marshes upstream of NK100C provide some water storage and runoff attenuation, therefore smoothing the runoff response and lowering peak flows relative to NK119A. Comparing unit runoff values, as shown on Figure 2.6, emphasizes these effects.

Flow records for the South Fork Koktuli River indicate significant streamflow-groundwater interaction, with flows decreasing in the downstream direction in some instances. In particular, streamflow loss to groundwater occurs between gauges SK100F and SK100C. This was initially apparent from analysis of historical streamflow records collected between 1991-1993, but is also demonstrated by the relative difference in streamflow between SK100F and SK100C, as shown on Figures 2.7 and 2.8. These figures show that in mid-July there is no flow at SK100C, while there is flow upstream at SK100F. During the precipitation event at the end of September 2004, however, flows at SK100C exceeded flows at SK100F.

An apparent second reach of significant surface flow loss to groundwater is located between gauges SK100B and SK100A. Figure 2.7 shows a significantly higher baseflow at SK100A than at SK100B, but during the storm event at the end of September, SK100B shows a rapid increase in flows to magnitudes far greater than those experienced at the downstream gauge. This result suggests that significant losses are occurring between these two gauges, with groundwater flow draining into the neighbouring Kaskanak Creek basin. However, it is suspected that much of the discrepancy in this plot is attributable to a poor rating curve for SK100A, and consequently the results should not be relied upon until validated by further flow measurements taken in 2005.

Four continuous flow gauges were installed on Upper Talarik Creek, in the western portion of the study area. Flow gauges on this creek demonstrate similar patterns to gauges on the North and South Forks of the Koktuli River, in that they indicate a slight drying trend throughout the summer months and into September, followed by a storm event at the end of September. These flow patterns can be seen on Figures 2.9 and 2.10. The figures show increasing flows in the downstream direction, indicating no significant groundwater/surface water interaction zones that were apparent in the South Fork of the Koktuli River. However, analysis of the unit hydrograph indicates that gauge UT119A, located on a tributary to Upper Talarik Creek in the vicinity of gauge UT100B, has the highest unit runoff of all the gauges. The headwaters of this tributary lie adjacent to the surface water/groundwater interaction zone on the south fork of the Koktuli River, indicating that there is likely some inter-basin transfer of water from the South Fork Koktuli River into this tributary and subsequently into Upper Talarik Creek. Further, the runoff measured on this tributary show proportionally lower peak flows and a more steady flow pattern, such as one would expect for a groundwater fed catchment.

2.9.1 Mean Annual Discharge

Streamflow hydrographs for the three stations operated by the USGS on the South Fork Koktuli River, North Fork Koktuli River and Upper Talarik Creek, are shown on Figures 2.11, 2.12, and 2.13, respectively. The hydrographs are based on data largely classified by the USGS as provisional. This classification reflects the fact that the data are unverified and may include errors. In an effort to assess the validity of the streamflow records, unit hydrographs for the three catchments where overlain and compared, as shown on Figure 2.14. Further validation is provided by plotting observed discharge measurements on the continuous hydrograph record, as shown on Figures 2.11, 2.12, and 2.13. To date, flow rates have been measured eight or nine times over a full-range of flows, and the with the exception of winter measurements on Upper Talarik Creek, the points plot very closely to the hydrographs generated from continuous water level measurements.

Table 2.7 presents average monthly discharge values for South Fork Koktuli River as a percent of total annual flow, for the period of June 2004 to May 2005. Mean monthly flow was estimated for unknown months. This distribution was to guide annual distributions at other gauging stations and mean annual flows were calculated as:

$$Q = \frac{Q_{obs}}{Q_{USGS}} K \qquad (2.2)$$

where Q is long-term mean annual flow at the gauging site, Q_{obs} is the sum of monthly flows observed at the gauging station, Q_{USGS} is the proportion of annual flow observed at the USGS station in the equivalent period, and K is a correction factor to adjust the record to the long-term mean. Total precipitation at Iliamna for the observation period was equal to the long-term mean annual, so a value of 1.0 was used for K.

Estimated long-term mean annual flow for each of the gauging sites is shown in Table 2.8. However, it should be noted that because only a small proportion of the annual flow record is known at the non-USGS stations, a minor variation in the actual distribution equates to a large error in the annual flow estimate. For example, at flow gauge SK100B the proportion of annual flow during July – October 2004 is 27%, indicating a significant contribution from snowmelt during the spring freshet. If the Mine Site Area actually has a higher proportion of flow during the period of record, say 32% between July and October, the estimated mean annual flow will be overestimated by 20%. Due to complex groundwater flows, surface ponding and significant redistribution of snow within

the South Fork Koktuli catchment, different annual flow distributions at the various gauging stations seems likely.

2.10 GROUNDWATER

During 2004, monitoring wells were installed and groundwater samples were collected to characterize the groundwater regime within the Mine Site Area. Data were assessed and modeled by Water Management Consultants and SLR Alaska (2005). Their findings, pertinent to our water balances, are summarized below.

Due to shallow bedrock levels near the outlet of Frying Pan Lake, groundwater flow is minimal. Between Frying Pan Lake and streamflow gauge SK100C, deep, permeable overburden results in significant groundwater recharge and the South Fork Koktuli River runs dry in this reach over the summer, as all water goes into the ground. In this reach, a mean annual groundwater flow of 19.5 cfs was estimated to transfer from the South Koktuli basin to the Upper Talarik basin. Furthermore, groundwater flow down-catchment at SK100C is high as a reduction in the aquifer cross-section below this gauging station forces water to the surface as springs. Groundwater flows calculated by Water Management Consultants (16 June 2005) were used for the South Koktuli water balance of Section 4.1, and the data are presented in Table 4.1.

SECTION 3.0 - FREQUENCY-MAGNITUDE ANALYSIS

3.1 INTENSITY-DURATION-FREQUENCY CURVES

Intensity-Duration-Frequency (IDF) curves for the Pebble Mine were generated from Alaskan isometric figures, adjusted for site orographic characteristics and consideration of global warming. Isometric figures for typical return periods and durations (Soil Conservation Service, 1963) were available online at the National Weather Services Hydrometeorological Design Studies Centre. Although prepared in the 1960's, discussions with National Oceanic and Atmospheric Administration (NOAA) personnel suggest that these data are the most recent available and there are no plans to update it in the near future. To validate these figures, the 2-year, 24-hour precipitation event was calculated for Iliamna from the annual maximum 24-hour precipitation series (1943 – 2004). A precipitation depth of 1.70 inches was calculated, which agrees very closely with the depth of 1.65 inches determined from the isometric figures. The resulting IDF curves for 30-minute to 10 days duration are shown on Figure 3.1.

3.2 PROBABLE MAXIMUM FLOOD

The probable maximum flood (PMF) is the flow resulting from the most severe combination of probable maximum precipitation (PMP) and basin hydrological conditions. The PMP is the precipitation which results form the worst possible meteorological conditions. The PMF is generally used for the design of facilities where substantial environmental risk or loss of life exists in the event of failure. It should be noted that the PMF is a purely hypothetical event that is sufficiently large to ensure that it is never exceeded, yet at the same time not so excessively large that design requirements are unnecessarily conservative. A PMF analysis was carried out for Pebble Mine Development Concept 25 (MDC 25) using the HEC-HMS (USACE, 2003) computer program. HEC-HMS is a hydrologic modeling package developed by the Hydrological Engineering Centre of the US Army Corps of Engineers. Inputs into the HEC-HMS model include precipitation depths and storm distribution, and various physical characteristics of the watershed. Selection of the input parameters is discussed in the following sections.

3.2.1 Catchment Parameters

There are three model parameters that were site specific to each basin being considered; time of concentration, catchment characteristics and baseflow. The time of concentration reflects how quickly a basin responds to precipitation. This parameter essentially determines the maximum slope of the hydrograph curve, and therefore the

time before peak flow is observed at the basin outlet. A large number of different equations, which typically produce a very wide range of possible time of concentration values, are available in the literature. In this instance, two methods commonly applied to natural basins in northern Canada and the US were used to compute the time of concentration for each of the sub-catchments being investigated; the Hathaway method (e.g. BC Ministry of Environment, 1991), and the SCS surface flow method (Equation (6-15), USACE, 2000). The average result of these two methods was considered to be appropriate for the purposes of this study. The Mine Site Area was modelled as two catchments; the pit catchment and the tailing storage facility (TSF) catchment. Catchment characteristics include area, average slope and longest flow path, and were estimated from site maps. Baseflow was estimated from US Geological Survey (USGS) streamflow data for gauge SK100B and non-USGS gauges SK100G and SK100F. Baseflow was considered negligible (<<1% of PMF) for all basins.

3.2.2 Probable Maximum Precipitation

The probable maximum precipitation (PMP) was determined under guidelines from Technical Paper 47 (Soil Conservation Service (SCS), 1963). The estimated PMP depth for a 24-hour duration storm at the Pebble Mine Site Area was determined to be 14 inches. However, precipitation will not fall at a uniform rate throughout the 24-hour period and thus a precipitation distribution is required to estimate the PMF. The SCS has developed four synthetic rainfall distributions to represent various regions of the United States, and these distributions are designed to generate the maximum possible discharge for a particular rainfall event. These distributions are generally used for return period precipitation, but can also be applied to PMP events. The SCS Type 1 curve is the distribution recommended for general application to the state of Alaska, and was therefore used in the analysis of the PMF for the Pebble site.

3.2.3 Snowmelt Component

The Guidelines for Cooperation with the Alaska Dam Safety Program recommends the use of Chapter 10 of *Engineering and Design – Runoff from Snowmelt* [EM 1110-2-1406], Published by ASCE (1998), for determining the snowmelt contribution to the PMF. Predominant environmental factors that influence snowmelt and its potential contribution to the PMF include air temperature, wind speed, precipitation depth and intensity, and snowpack depth at the time of the PMP storm event. The methods used for determining these parameters are discussed below.

3.2.3.1 Snowpack Determination

A snow water equivalent (SWE) depth of 13.7 inches and snowpack accumulation until April were determined from field data collected by ABR Inc. These observations were verified with data from Alaska SNOTEL sites at Port Graham and McNeil Canyon, which show similar SWE values for April.

3.2.3.2 Temperature Criteria

The maximum-recorded temperature at Iliamna for each month was used to determine the maximum theoretical 24-hour snowmelt depth.

3.2.3.3 Wind Speed Criteria

Wind speed data collected at the Pebble Mine Site was used to estimate the maximum daily average wind speed. A value of 39 mph was used for the PMF analysis.

3.2.3.4 Total Snowmelt Water Equivalent

The relationship for total snowmelt in open areas is given in [EM 1110-2-1406] by

$$M_t = (0.029 + 0.0084\, k\, v + 0.007\, P_r)(T_a - 32) + 0.09 \quad (3.1)$$

Where;

M_t = Total snowmelt in water equivalent (in/day)
k = Basin wind coefficient (0.3 - 1.0)
v = Wind speed 15 m above snow surface (mph)
T_a = Air temperature at 3 m above ground surface (°F)
P_r = Daily rain precipitation (in/day)

This equation was applied to the conditions determined for each month of the year as shown in Table 3.1. The resulting maximum snowmelt runoff was determined to occur in April, when potential 24-hour snowmelt is high and snowpack depth was greatest (see Figure 3.2). Assuming a basin wind coefficient of 1.0 (snowpack completely exposed to the wind), the maximum 24-hour snowmelt depth was calculated to be 13.7 inches.

3.2.3.5 Snowmelt Distribution

A synthetic snowmelt pattern was utilized to simulate snowmelt that may occur in conjunction with the PMP. The precipitation hyetograph was divided into four

zones, with 15% of the snowmelt occurring in the first six hours, 45% occurring in the second six hours, 25% occurring in the third six hours and the final 15% occurring in the last six hours. This resulted in the largest amount of snowmelt occurring during the highest intensity portion of the rainfall. This distribution is considered conservative, since historical observations show that snowmelt patterns do not follow drastic changes in precipitation intensity, but rather a more stable or damped response to storm events.

Due to the fact that HEC-HMS does not yet have snowmelt input capabilities, the computed snowmelt distribution was modeled as precipitation and added to the PMP distribution. The precipitation and snowmelt distributions are shown on Figure 3.3.

3.2.4 Results

The combined snowmelt and PMP storm were modeled using HEC-HMS in order to generate a runoff hydrograph, peak discharge and storm volume. The calculated PMF hydrographs for various subcatchments of MDC25 are shown on Figures 3.4 and 3.5, and runoff volumes and peak flows are shown in Table 3.2. The results are considered to be quite conservative overall, given that a cautious approach was adopted for the selection of each input variable, and the fact that the modeled occurrence of substantial snowmelt occurring in combination with the PMP is considered to be extremely unlikely, as historical data for the region indicate that storms of high intensity typically occur in the fall months, when no snowpack has developed.

SECTION 4.0 - WATER BALANCE

4.1 SOUTH FORK KOKTULI WATER BALANCE

Due to uncertainties in many of the hydrologic parameters of the Project Area, the South Fork Koktuli catchment was divided into four (4) sub-catchments with a flow gauge at the outlet of each sub-catchment, and a water balance was undertaken to ensure continuity between parameters. The general form of the water balance is

$$I - O = \Delta S \tag{4.1}$$

where I is water inputs, O is water outputs and ΔS is change in storage. Inputs were surface and groundwater flow from upstream catchments, and precipitation (including rain and snow). Outputs were surface and groundwater flow at catchment outlets, sublimation and evaporation. Water can be stored in surface ponds or groundwater aquifers, although for an annual balance in this relatively small catchment, change in storage is probably minimal. As discussed in Section 2.8.1, windblown snow, *WBS*, appears to be a significant water transport process in the catchment and was used as either an input or an output. The balance was set up such that the parameters where adjusted until calculated April snow depth matched observed depths. *WBS* was calculated as

$$WBS = \frac{\left[\left(Q_{S,out} + Q_{G,out}\right) - \left(Q_{S,in} + Q_{G,in}\right)\right]}{C} - P \tag{4.2}$$

where Q is long-term mean annual flow and the subscripts *S* and *G* denote surface and groundwater flow, respectively. The subscripts *in* and *out* refer to flows in and out of a sub-catchment. P is total annual precipitation and C is the annual runoff coefficient. All parameters have dimensions of L^3/T, except *C*, which is dimensionless. Streamflow at SK100B was considered the most reliable parameter, as ten months of observed data were available. A value of 0.9 was considered reasonable for *C,* which accounts for water losses to evaporation, sublimation, and transpiration. This value is higher than might be expected for a typical runoff coefficient, and it is speculated that the precipitation may be underestimated, although it should be noted that the coefficient accounts for both surface and groundwater, whereas it typically accounts for only surface water. Groundwater flows calculated by Water Management Consultants (16

June 2005) and an annual precipitation of 36 inches were used. Surface flows were calculated as described in Section 2.9.1. Results of the balance are shown in Table 4.1.

4.2 POST-DEVELOPMENT MINE SITE AREA WATER BALANCE

Development of the mine site will modify catchment hydrology. Construction of the tailings dam will cut-off groundwater flow from some areas of the Mine Site Area catchments. Development of the site (e.g. the open pit, roads and storage areas) will reduce interception and transpiration by vegetation, and therefore increase runoff. Existing vegetation is predominantly low shrubs, grasses and mosses.

The most significant changes to runoff conditions will be created by the tailings storage facility, which will cause increases to evaporation in the summer and wind blown snow transport and sublimation in winter, thereby resulting in a net increase to water loss from the catchment. Lake evaporation was previously estimated at 14 inches per year and this value was applied to the pond area. To account for windblown snow distribution, it was assumed that all snow will be blown from the pond area. Of this volume, 30% will be blown out of the catchment or lost to sublimation and the remainder was redistributed over the Pit Catchment area. Intuitively, it was considered reasonable that more snow would accumulate in the pit than in surrounding areas, so 50% of snow blown from the tailings pond was added to the Disturbed Pit Catchment, even though it represents less than 50% of the total Pit Catchment area. On this basis, windblown snow depth on the Pit Catchment area was determined as a function of the size of the tailings pond, and four development stages where considered; years –2 to 1, years 2 to 7, years 8 to 12 and years 13 to 27. Parameters used for the Mine Site Area water balance are summarized in Table 4.2.

4.2.1 Monthly Water Balance Parameters

For the purpose of monthly Mine Site water balance modelling, monthly precipitation-runoff parameters were calculated. The balance was based on monthly Iliamna precipitation data and snowfall and snowmelt were adjusted within reasonable bounds to match observed streamflow data and April snowpack depths.

Mean monthly precipitation values for the Mine Site catchment were computed by adjusting Iliamna values according to the ratio of site to Iliamna annual values. The proportion of precipitation falling as snow was adjusted using mean monthly temperature at the Mine Site Area and an annual proportion of snow ranging between 30% and 40%. Windblown snow was added uniformly during freezing months. The runoff coefficient of 0.9, which is somewhat high but accounts for the fact that precipitation appears to have

been underestimated (and will likely be revised in future updates), was applied to precipitation and windblown snow to calculate monthly input volumes.

Precipitation falling as rain was assumed to contribute to streamflow within the month it fell, while precipitation falling as snow was assumed to accumulate in the catchment. The proportion of snowpack melt was estimated so that April snowpack depths matched average depths observed within the catchment by ABR Inc. Monthly Streamflow at SK100B was also used to guide runoff estimates. However, as only 10 months of streamflow record are available, long-term average monthly streamflow values at SK100F were estimated based on a comparison between the 2004/05 and long-term Iliamna precipitation distributions (Figure 4.1). Monthly water balance parameters are shown in Table 4.3.

SECTION 5.0 - CLIMATE CHANGE

During the 20th Century, global temperatures were on the rise until the 1940's, after which they cooled until the mid-1960's, and then began another warming period which has lasted to present (Weller et. al., 1999). Since the mid-1960's the average annual temperature in Alaska has increased by up to 5 ^{o}F (3 ^{o}C), which is the largest increase of any state in the US. Alaska's enormous size also means there is large variability between regions. Along with milder temperatures, precipitation in Alaska has increased up to 30%, on average, from 1968 to 1990, although modeling suggests less pronounced increases, and even decreasing precipitation in the Alaskan southeast (Weller et. al., 1999).

The climate in Alaska has been predicted for the years 2030 and 2100 using two General Circulation Models. These models are the Canadian Regional Climate Model and the United Kingdom Hadley Centre Model. Both models show projections to 2030 and 2100 that are consistent with past trends and predict that winters will be wetter in the east and drier in the west and that summers will be drier in the southeast and wetter throughout the rest of Alaska. The Canadian Model predicts warming with an average annual temperature increase in the range of 3°F to 5.5^{o}F by the year 2030, and 9°F to 18°F by the year 2100. This latter temperature increase is expected to result in the complete melting of all Arctic sea ice. The Hadley Model predicts a slight reduction in Arctic sea ice and warming in the range of 3°F to 4.5^{o}F by 2030, with more severe temperature increases of 7.2^{o}F to 13.5^{o}F by 2100. Both models predict larger increases in mean monthly winter temperatures.

Temperature and precipitation data from Iliamna (1938 to 2004) were plotted and linear regression was used to identify the long-term trend. Mean annual temperatures where found to have increased approximately 4°F since 1940 and mean monthly January temperatures have increased approximately 6.5^{o}F during the same period. Linear extrapolation of this trend suggests an additional 1.5^{o}F warming of mean annual temperature by 2030. Scatter about total annual precipitation values showed a less clear trend, but a slight decrease was observed. Thus, climate modelling tends to agree with observed trends, and warmer temperatures and similar precipitation can be expected over the mine life. Long-term temperature and precipitation data are summarized on Figures 5.1 and 5.2, respectively.

Warmer temperatures can be expected to increase evapotranspiration and sublimation rates, and less precipitation will fall as snow. These effects combined with similar

annual precipitation conditions suggest that water quantity at the site will reduce over the mine life.

SECTION 6.0 - CONCLUSIONS

The key findings of this study are summarized as follows:

- The long-term average annual temperature for the Mine Site Area is estimated to be 31.4°F, with average monthly temperatures ranging from a high of 52.1°F in July to 12.7°F in December.
- On average, temperatures at the Mine Site Area are 3.4°F cooler than at Iliamna.
- Wind data indicate that the wind typically blows from the southeast and consistently averages speeds of between 8 and 15 knots.
- The maximum wind speed recorded during the measurement period is 65 knots, which occurred on November 28, 1991.
- Based on data from King Salmon, maximum global solar radiation is expected in June, while minimum radiation is expected in December.
- Mean annual lake evaporation for the Mine Site Area is estimated to be 14.0 inches.
- Detailed investigations at Alaskan and northern Canadian locations suggest that sublimation of windblown snow can remove 30% of snow. Two empirical equations where applied with site-specific data, which confirmed this value as reasonable estimate for the Pebble Mine Site Area.
- Ice accumulation on the tailings pond was estimated to be 50 inches per year. Accumulation is expected between October and April, followed by rapid melting during May.
- The long-term mean annual precipitation at Iliamna is 25.6 inches, and due to orographic effects associated with high peaks surrounding the site, average annual precipitation in at the Mine Site Area and in the South Fork Koktuli catchment is estimated to be 36 inches.
- The maximum 1 day precipitation recorded at Iliamna is 3.5 inches, which corresponds to an estimated 4.8 inches for the Mine Site area.
- Approximately 30% to 40% of precipitation at the Mine Site Area will fall as snow. However, high wind speed and low vegetation cover mean that windblown snow at the site is significant and snow distribution surveys suggest that the Mine Site catchment is a snow accumulation area. Accumulation of 7inches of snow water equivalent (SWE) of wind blow, in addition to precipitation, was estimated for the Mine Site catchment. An average April snow depth of 14.5 inches SWE was measured in the Mine Site catchment.
- Mine Site Area runoff results from rainfall and snowmelt, which produces an annual hydrograph with two high flow seasons. The first is during the snowmelt freshet in April and May, and the second occurs in August/September as a result of heavy rainfall. Mean annual streamflow was estimated for the fourteen gauging stations

located in the Upper Talarik Creek and the North and South Fork Koktuli River catchments.

- Deep, permeable gravels downstream of Frying Pan Lake result in significant groundwater flows. Interbasin transfer of groundwater flow was observed to occur from the South Fork Koktuli River basin to the Upper Talarik Creek basin. Furthermore, it is suspected that groundwater from the lower reaches of the South Fork Koktuli River basin drain into the Kaskanak Creek basin.
- Probable maximum precipitation (PMP) was estimated at 14 inches for a 24 hr storm.
- Climate change predictions indicate trends of significantly warming temperatures but consistent precipitation.

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SECTION 8.0 - CERTIFICATION

This report was prepared and approved by the undersigned.

Prepared by:

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Specialist Hydrotechnical Engineer

Approved by:

Ken J. Brouwer, P.Eng.
Managing Director

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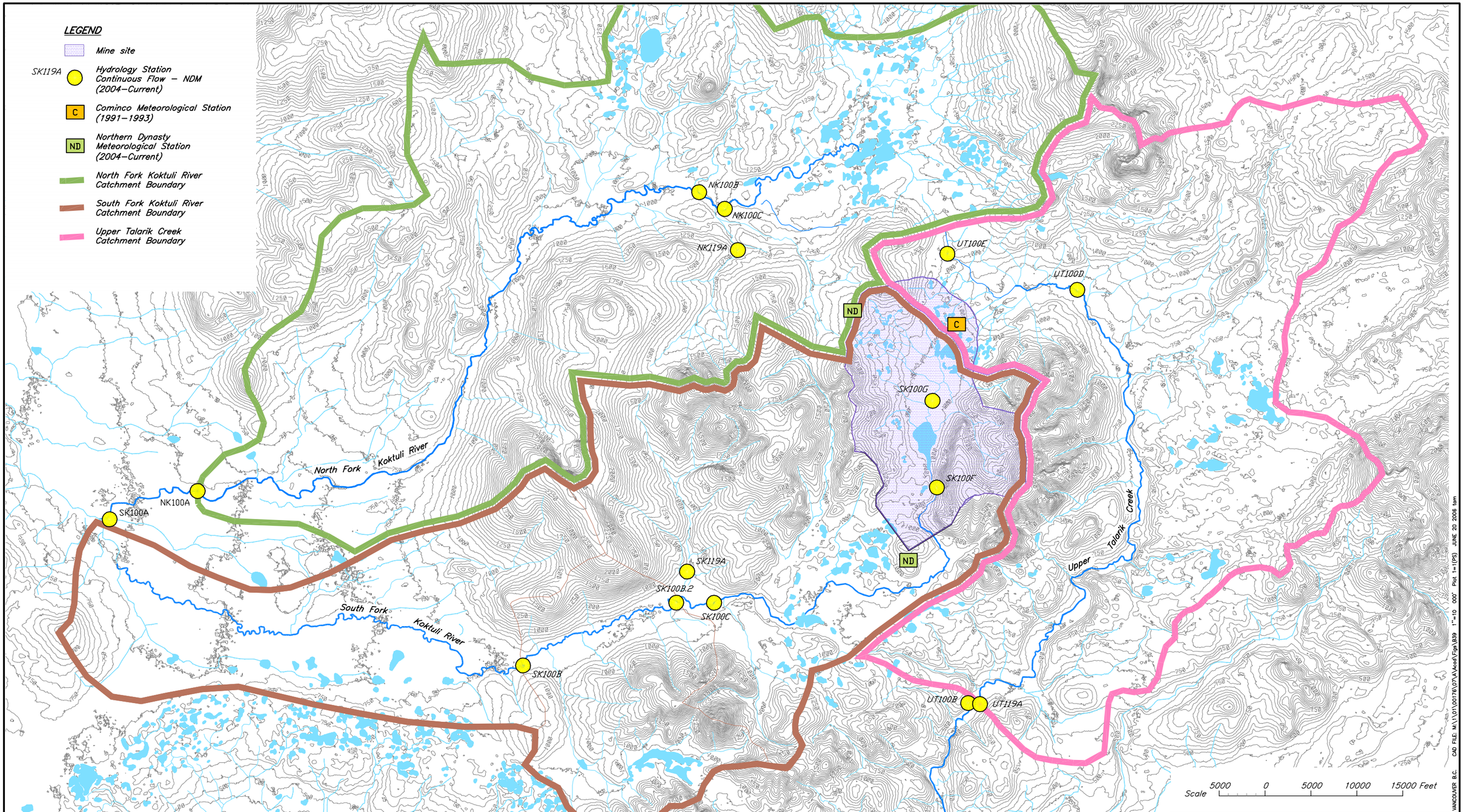

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

PEBBLE MINE SITE AREA
HYDROLOGY AND CLIMATE STATIONS

Knight Piésold CONSULTING

PROJECT/ASSIGNMENT NO.	REF. NO.
VA101-176/7	4

FIGURE 1.0 — REV. 0

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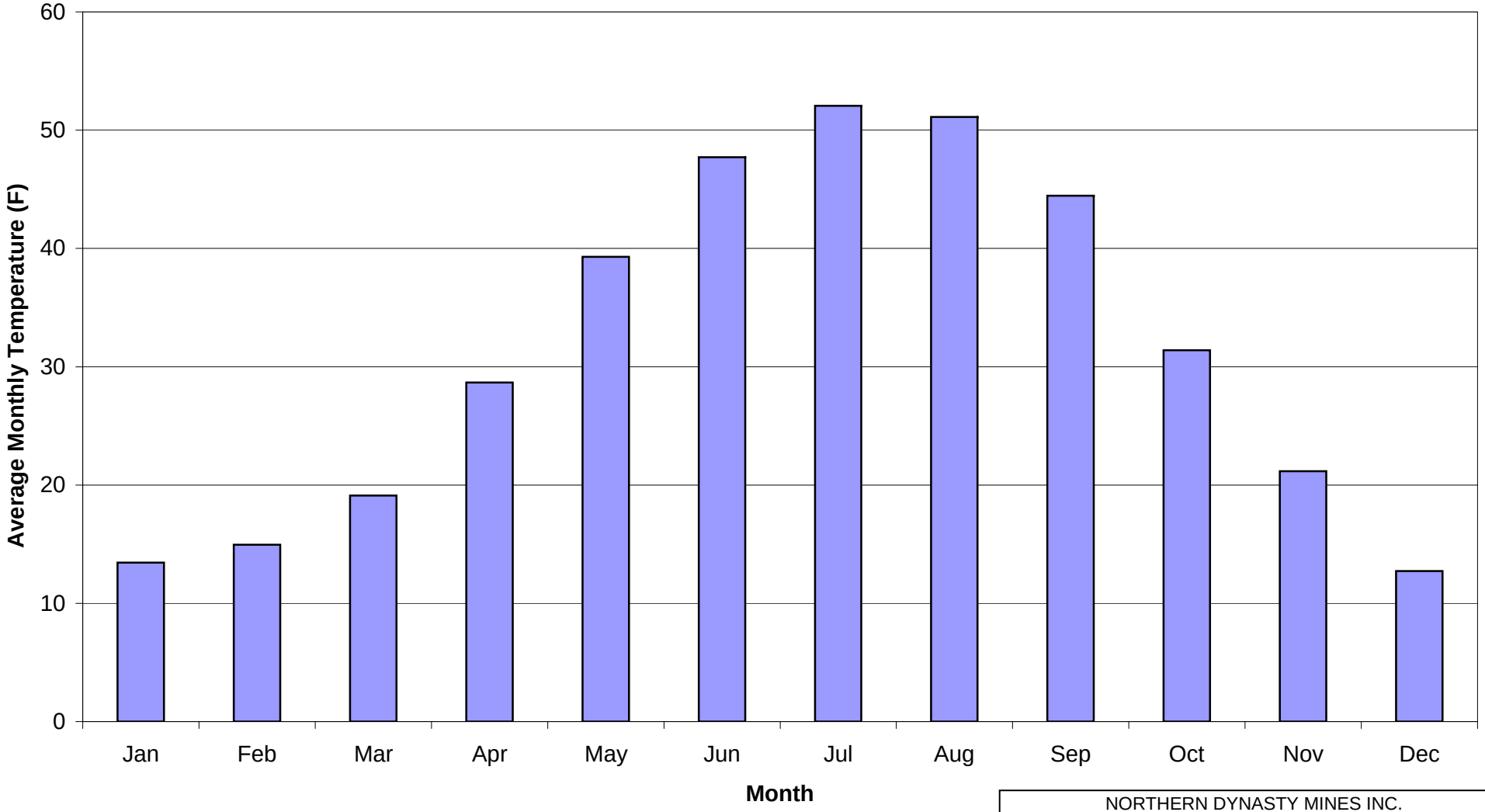

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

LONG-TERM AVERAGE MONTHLY TEMPERATURES FOR MINE SITE AREA

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PROJECT / ASSIGNMENT NO.	REF NO.
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FIGURE 2.1

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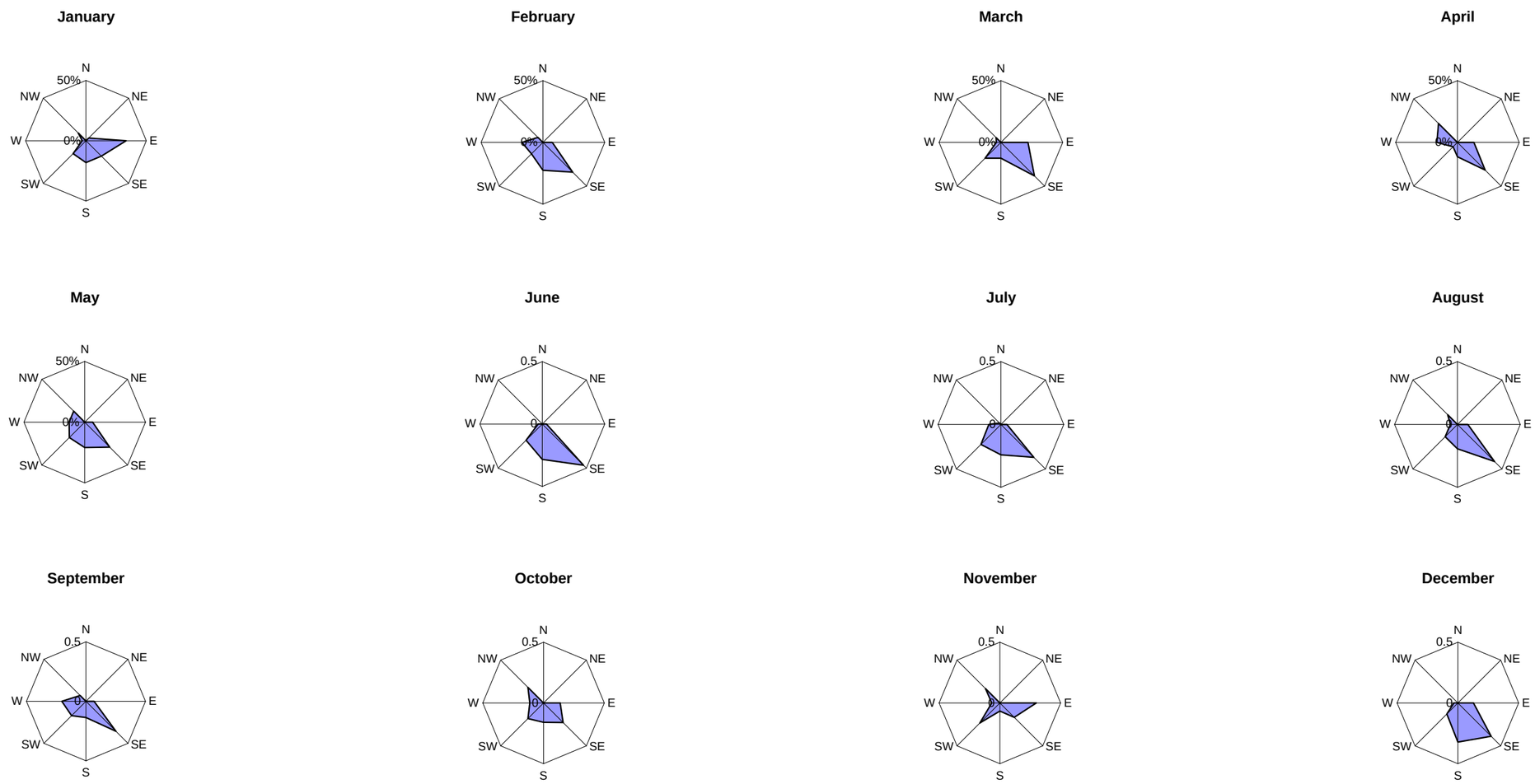

Note: Wind roses indicate the frequency, as % of days per month, and the direction from which the wind is blowing, I.e. the predominant wind direction is from the south-east.

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PEBBLE PROJECT

WIND ROSES FOR MINE SITE AREA WEATHER STATION (AUG 1991 - JUL 1993)

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FIGURE 2.2

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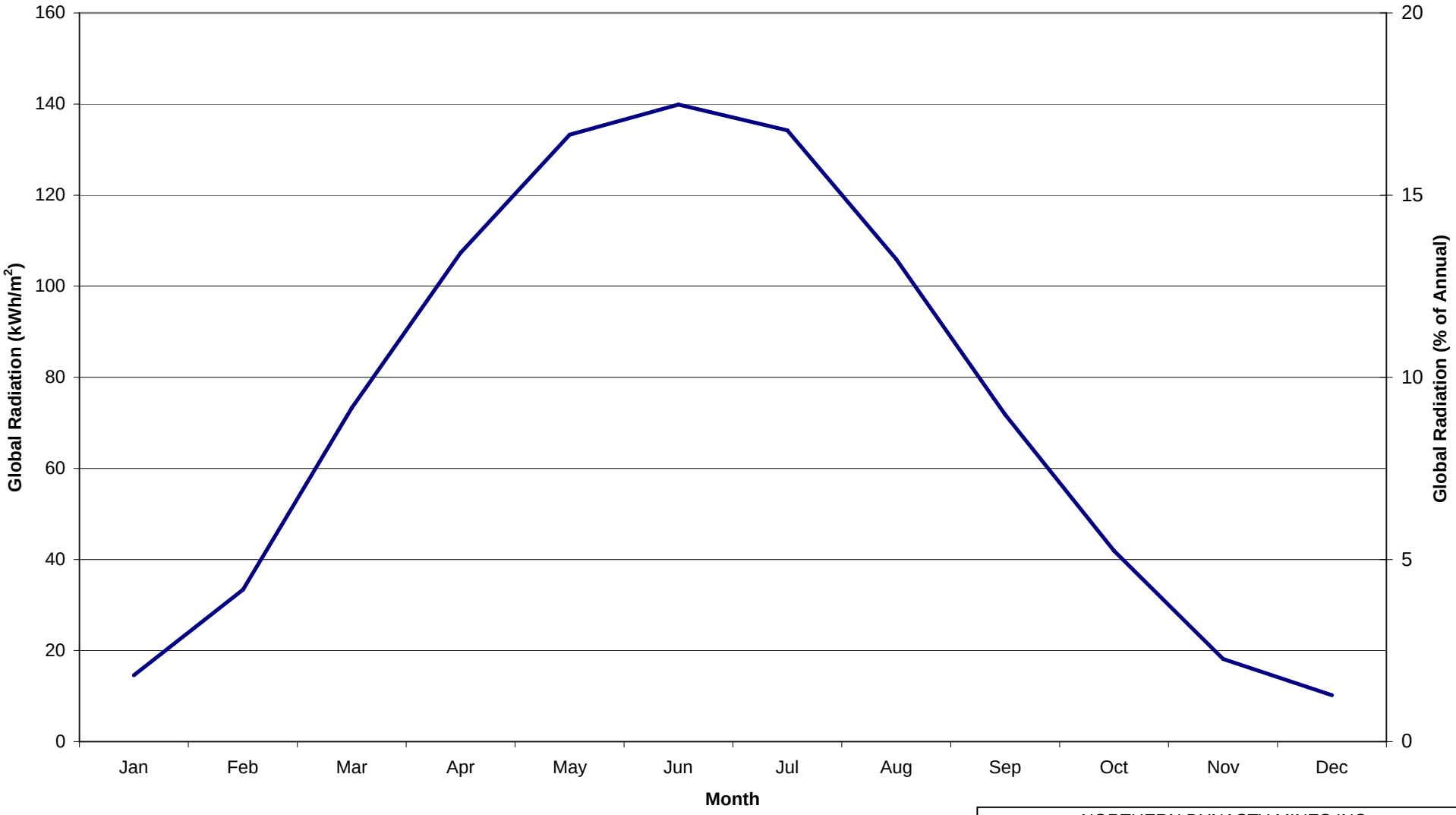

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PEBBLE PROJECT

AVERAGE MONTHLY GLOBAL SOLAR RADIATION AT KING SALMON (1961 - 1990)

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FIGURE 2.3

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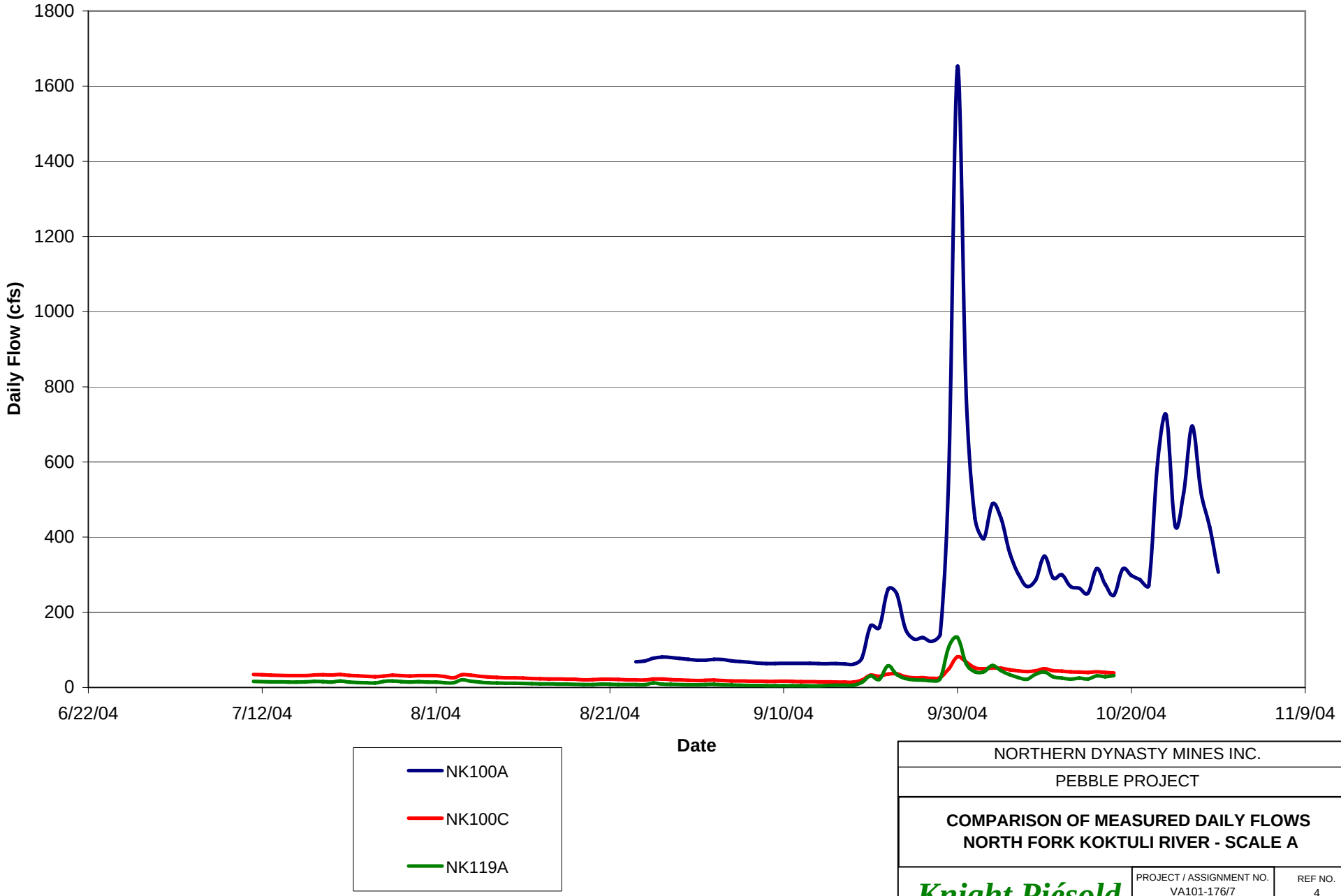

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PEBBLE PROJECT

COMPARISON OF MEASURED DAILY FLOWS
NORTH FORK KOKTULI RIVER - SCALE A

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VA101-176/7	4

FIGURE 2.4

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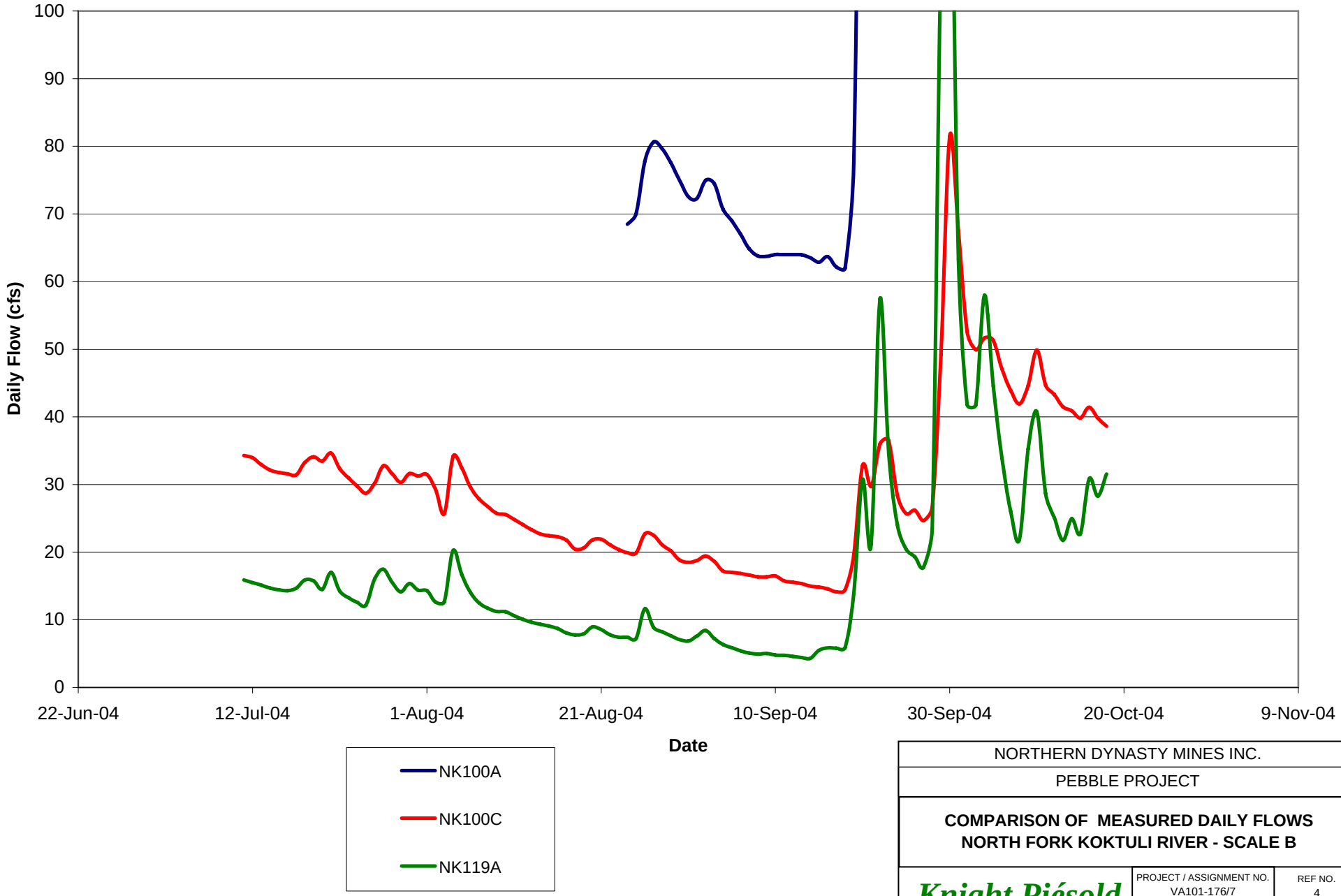

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

COMPARISON OF MEASURED DAILY FLOWS
NORTH FORK KOKTULI RIVER - SCALE B

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FIGURE 2.5

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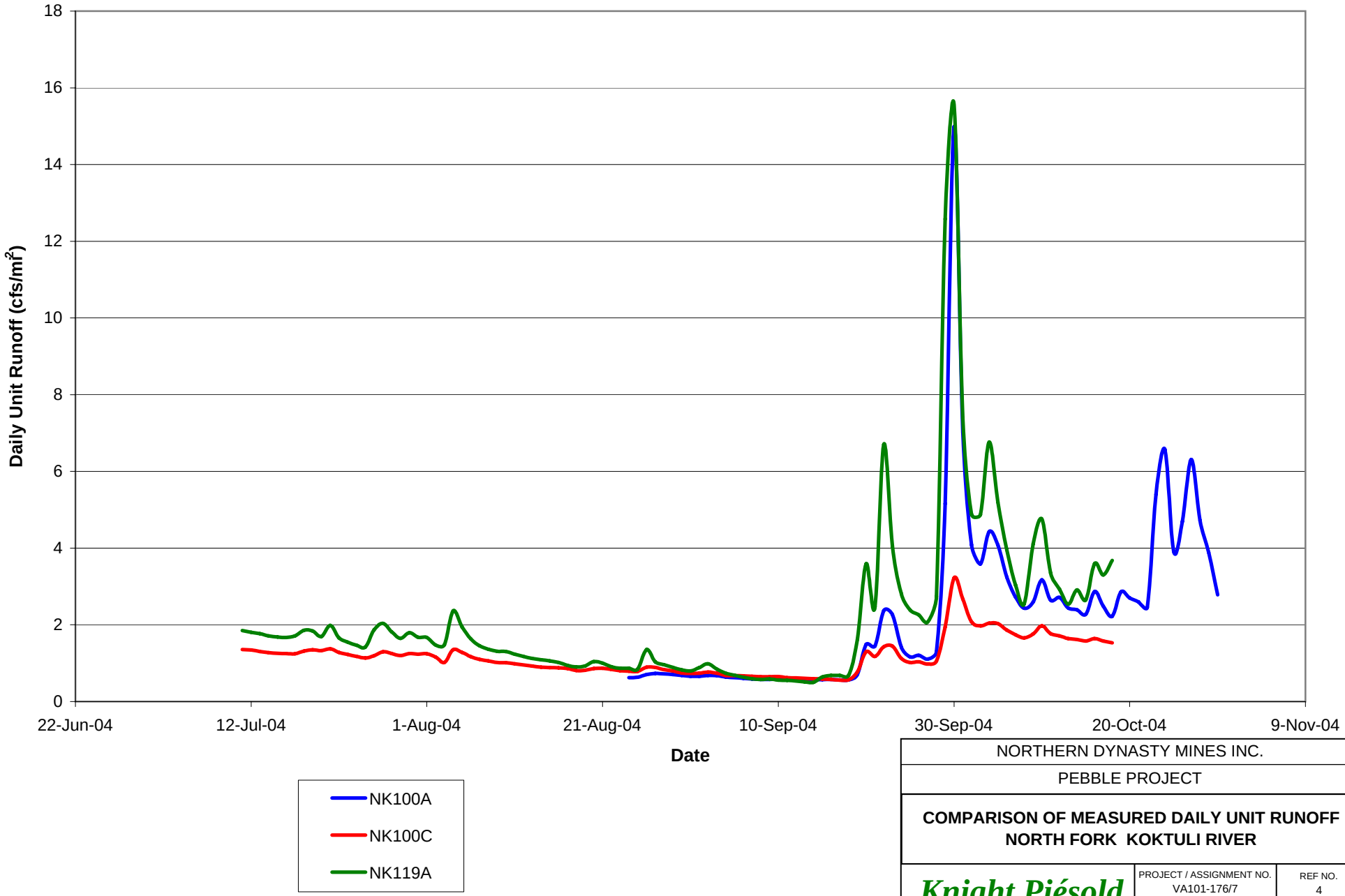

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PEBBLE PROJECT

COMPARISON OF MEASURED DAILY UNIT RUNOFF
NORTH FORK KOKTULI RIVER

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FIGURE 2.6 REV. 0

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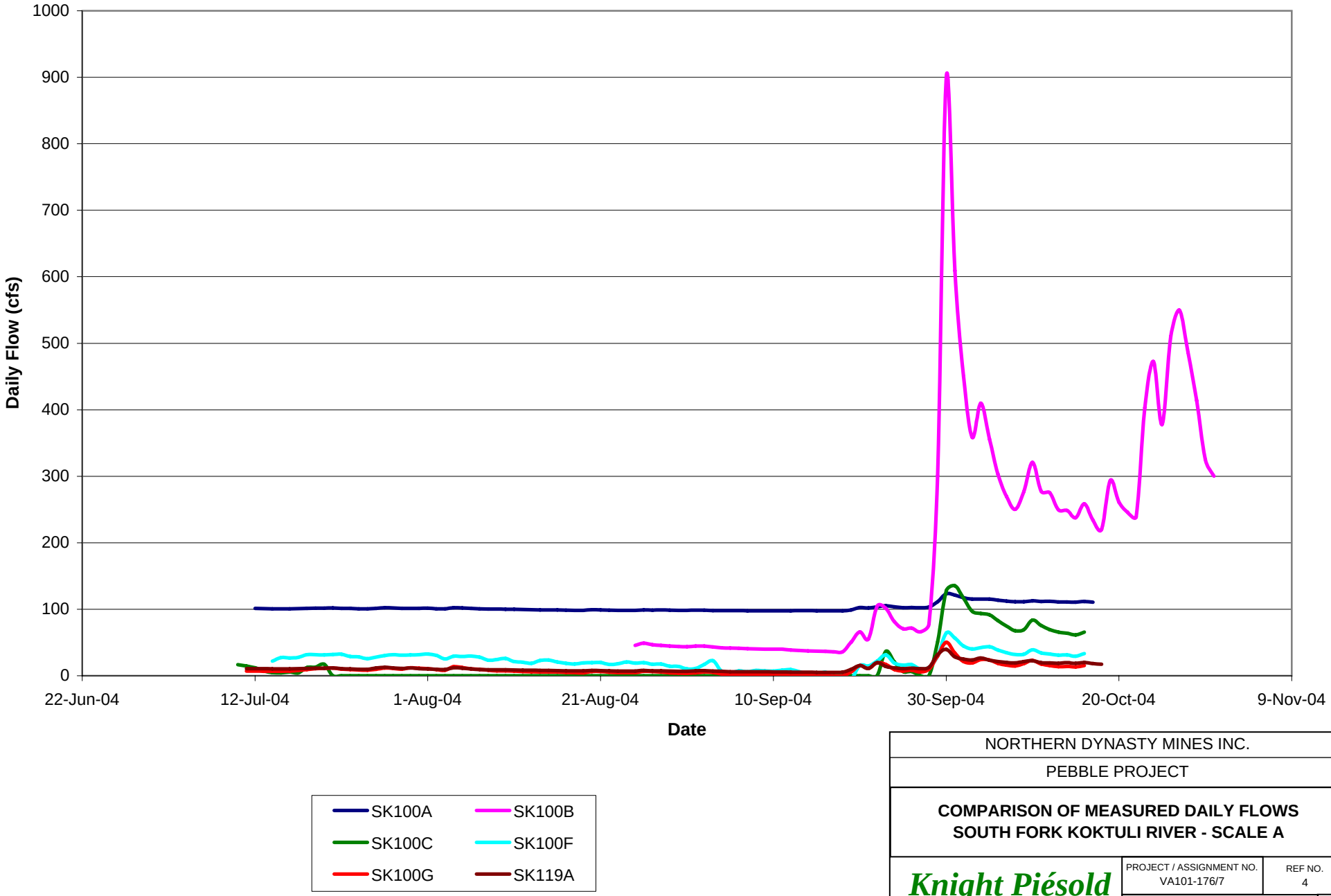

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

COMPARISON OF MEASURED DAILY FLOWS
SOUTH FORK KOKTULI RIVER - SCALE A

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VA101-176/7	4

FIGURE 2.7

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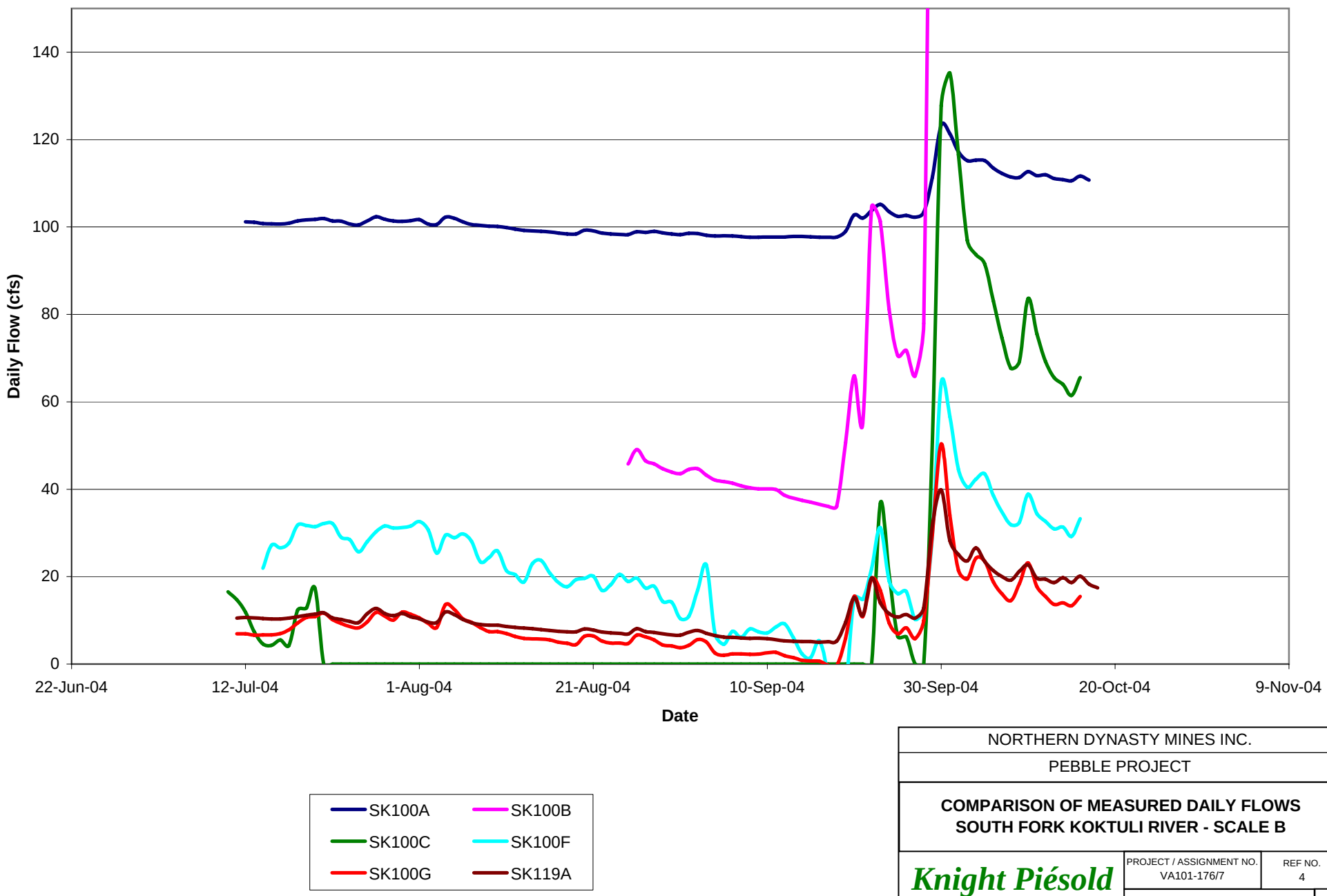

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PEBBLE PROJECT

COMPARISON OF MEASURED DAILY FLOWS
SOUTH FORK KOKTULI RIVER - SCALE B

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FIGURE 2.8

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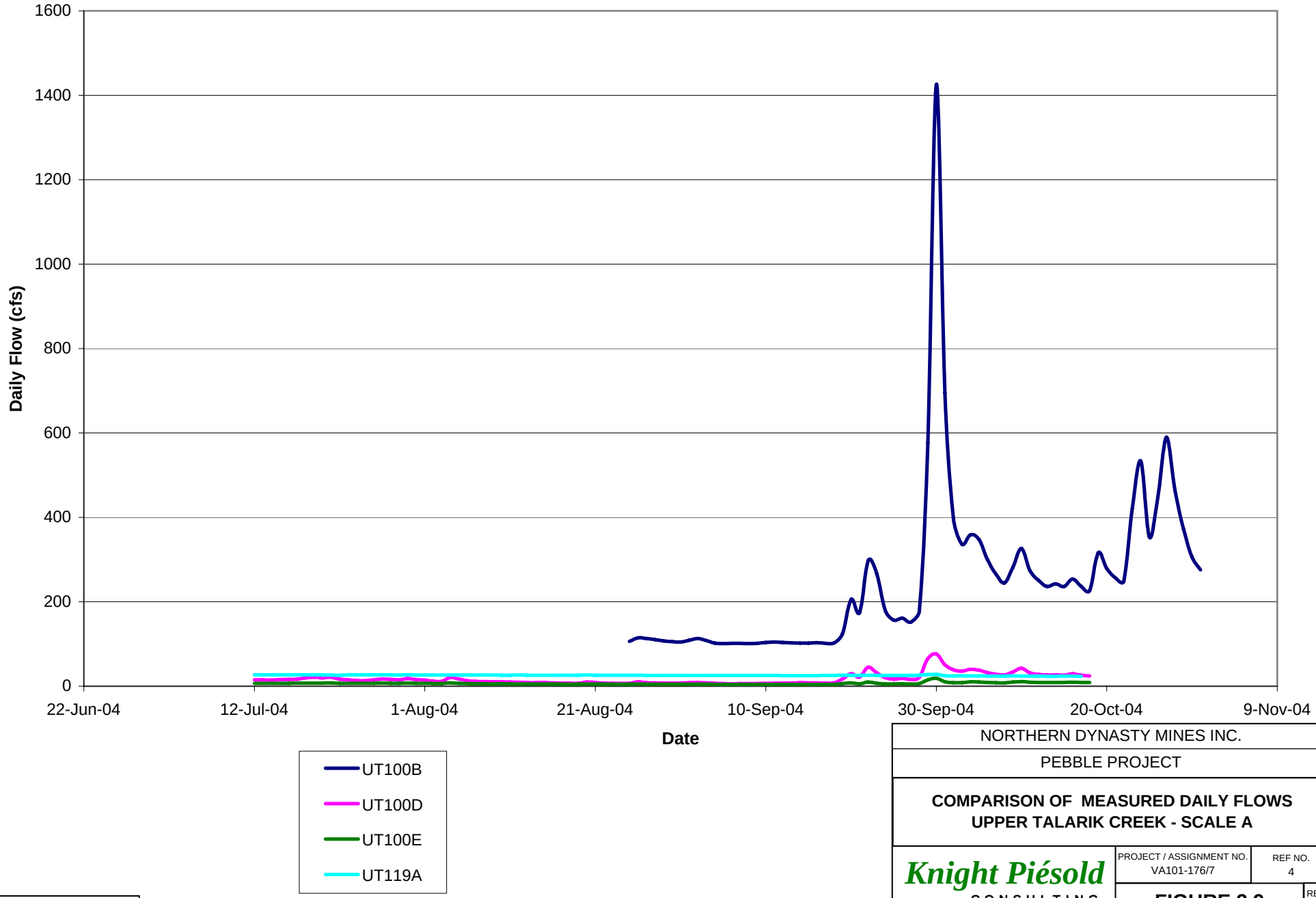

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

COMPARISON OF MEASURED DAILY FLOWS
UPPER TALARIK CREEK - SCALE A

Knight Piésold CONSULTING

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VA101-176/7	4

FIGURE 2.9

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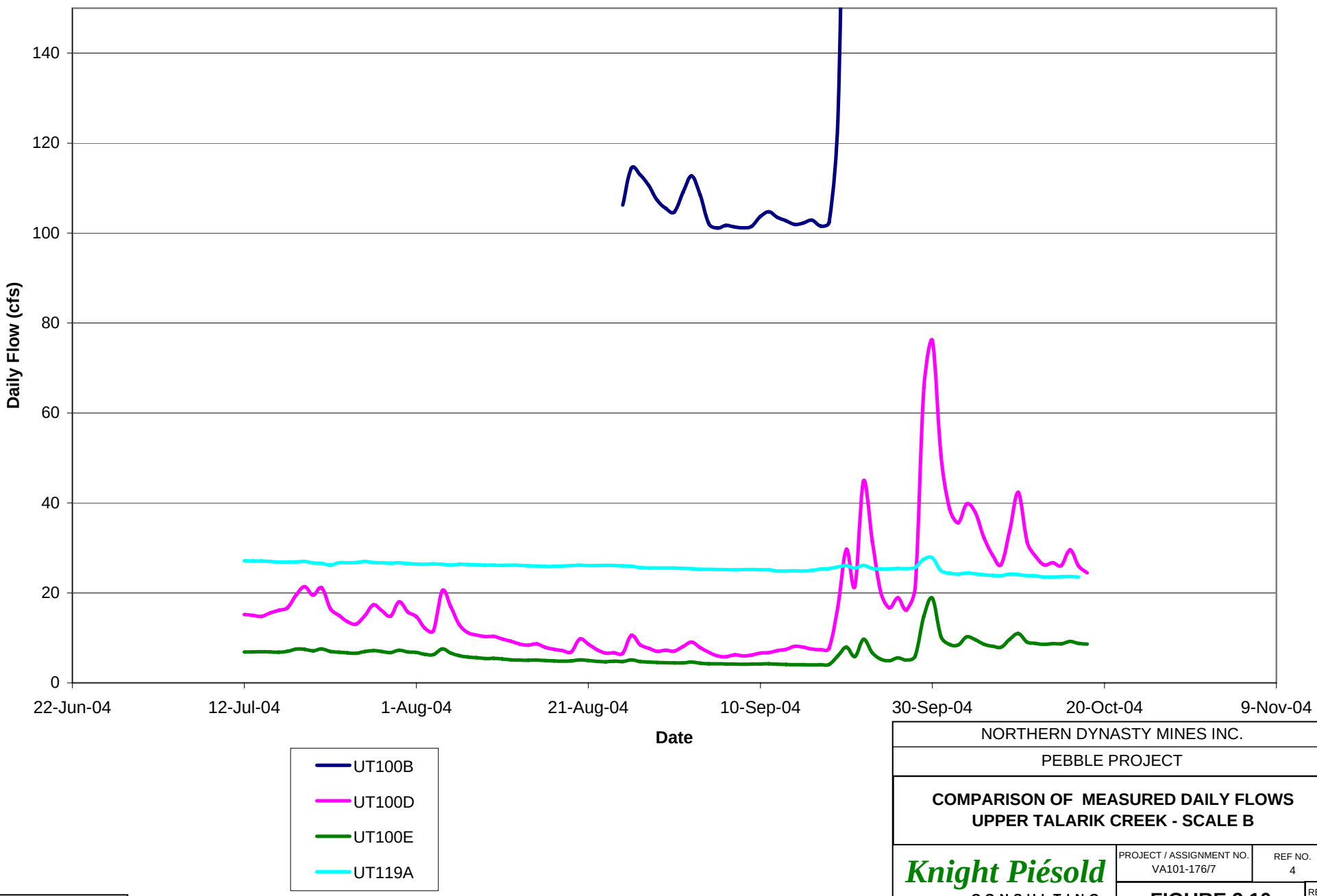

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

COMPARISON OF MEASURED DAILY FLOWS
UPPER TALARIK CREEK - SCALE B

Knight Piésold CONSULTING

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VA101-176/7	4

FIGURE 2.10

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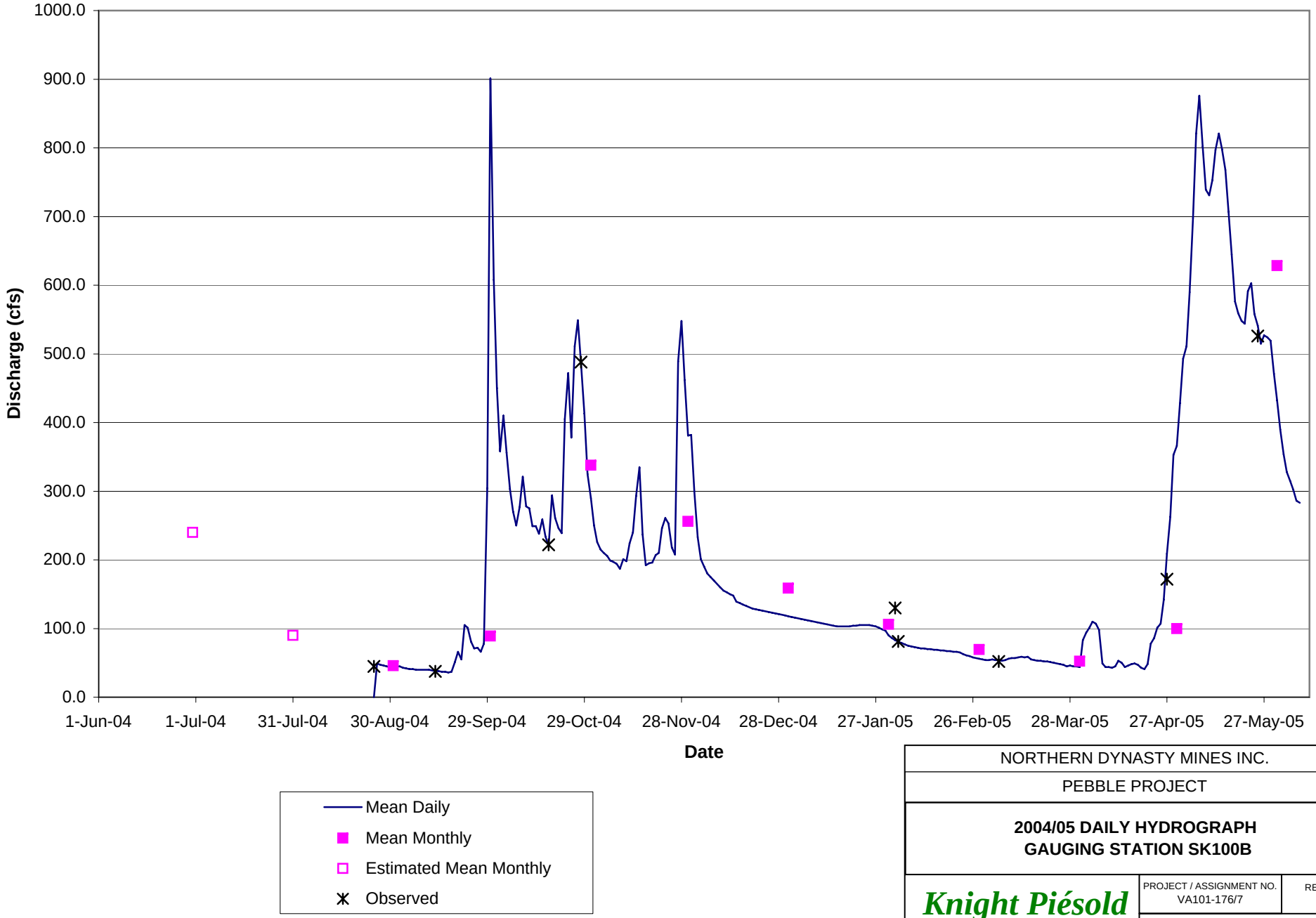

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

2004/05 DAILY HYDROGRAPH
GAUGING STATION SK100B

Knight Piésold CONSULTING

PROJECT / ASSIGNMENT NO.	REF NO.
VA101-176/7	4

FIGURE 2.11

REV. 0

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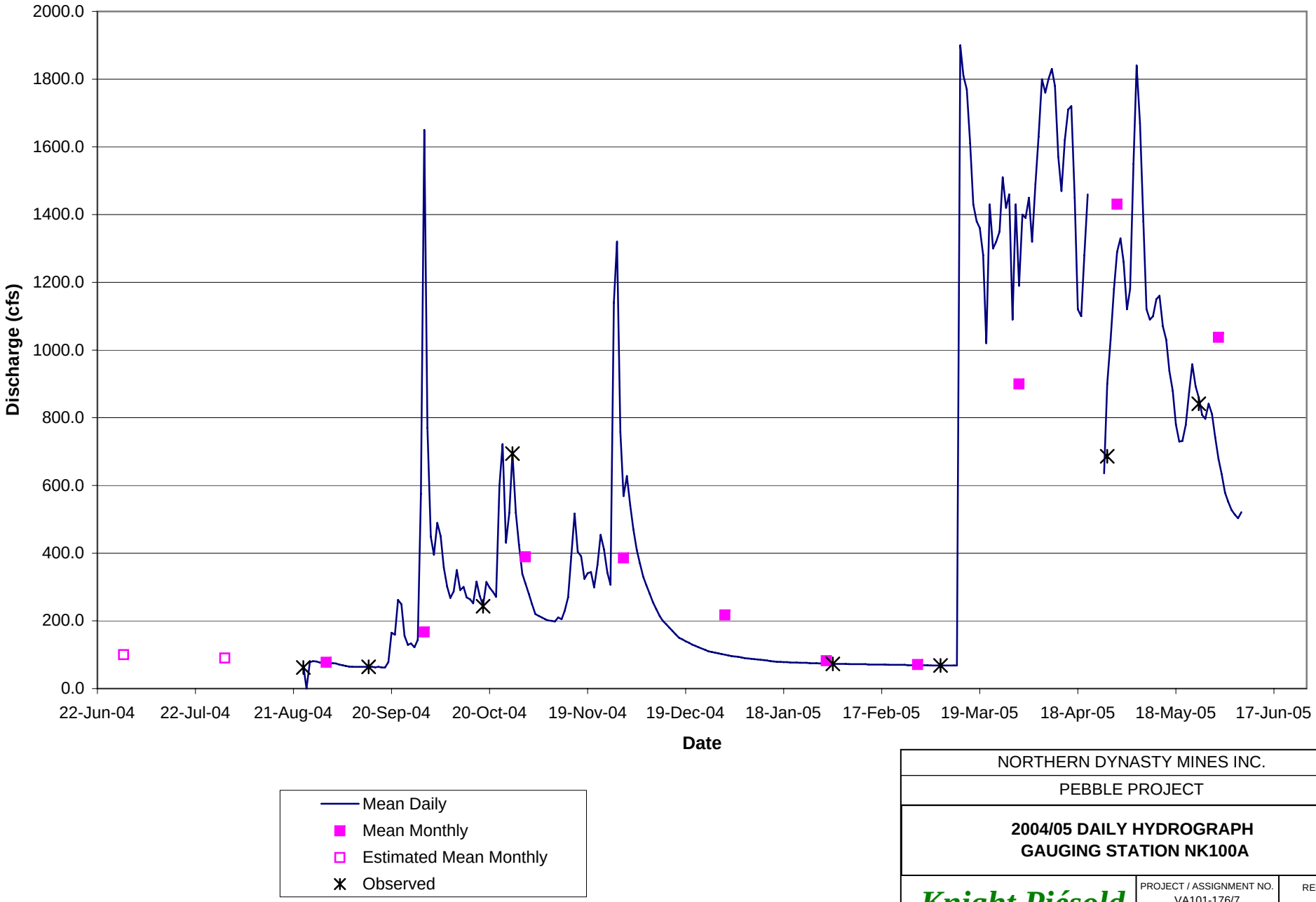

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

2004/05 DAILY HYDROGRAPH
GAUGING STATION NK100A

Knight Piésold CONSULTING

PROJECT / ASSIGNMENT NO.	REF NO.
VA101-176/7	4

FIGURE 2.12

REV. 0

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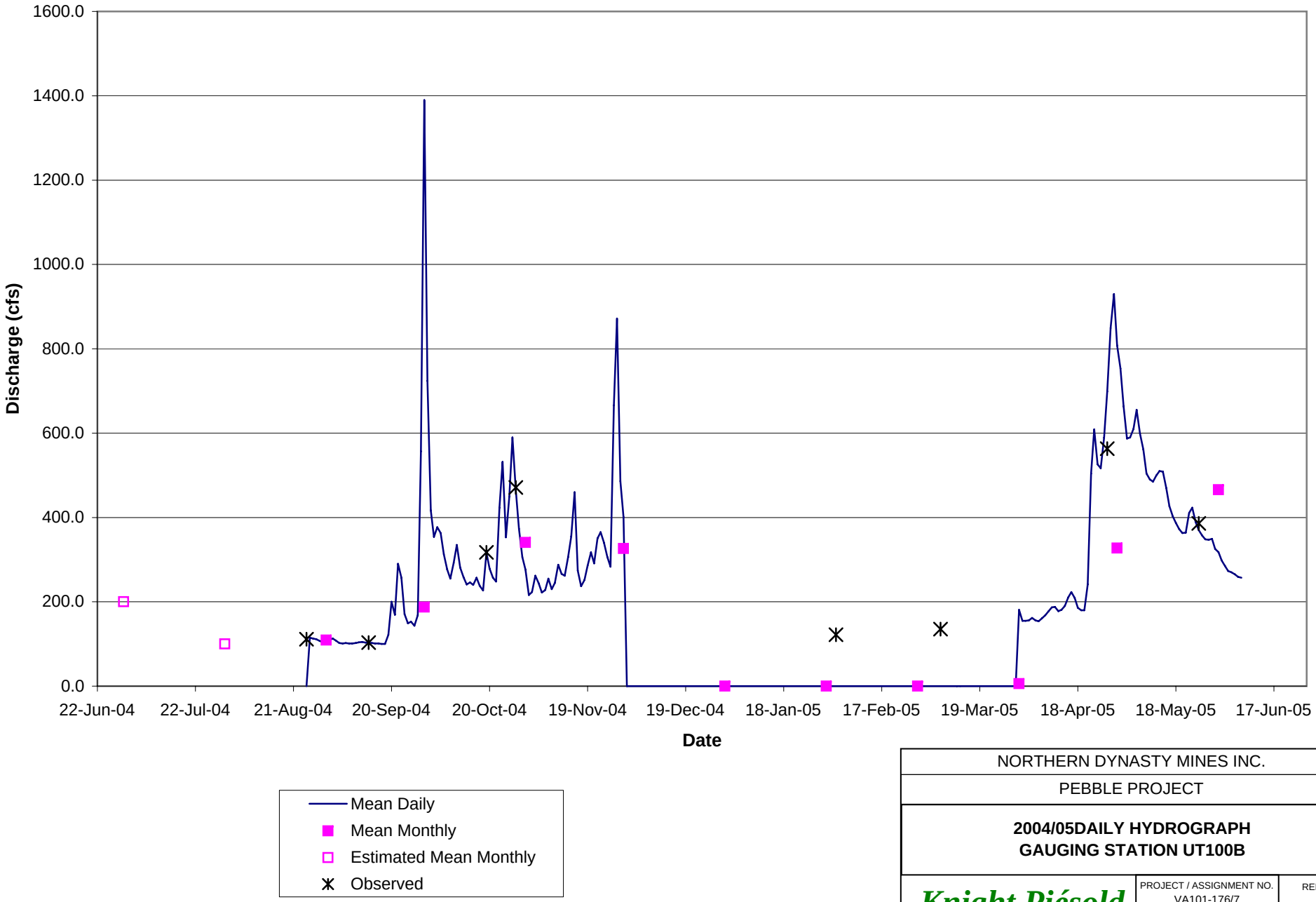

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

2004/05DAILY HYDROGRAPH
GAUGING STATION UT100B

Knight Piésold CONSULTING

PROJECT / ASSIGNMENT NO.	REF NO.
VA101-176/7	4

FIGURE 2.13 REV. 0

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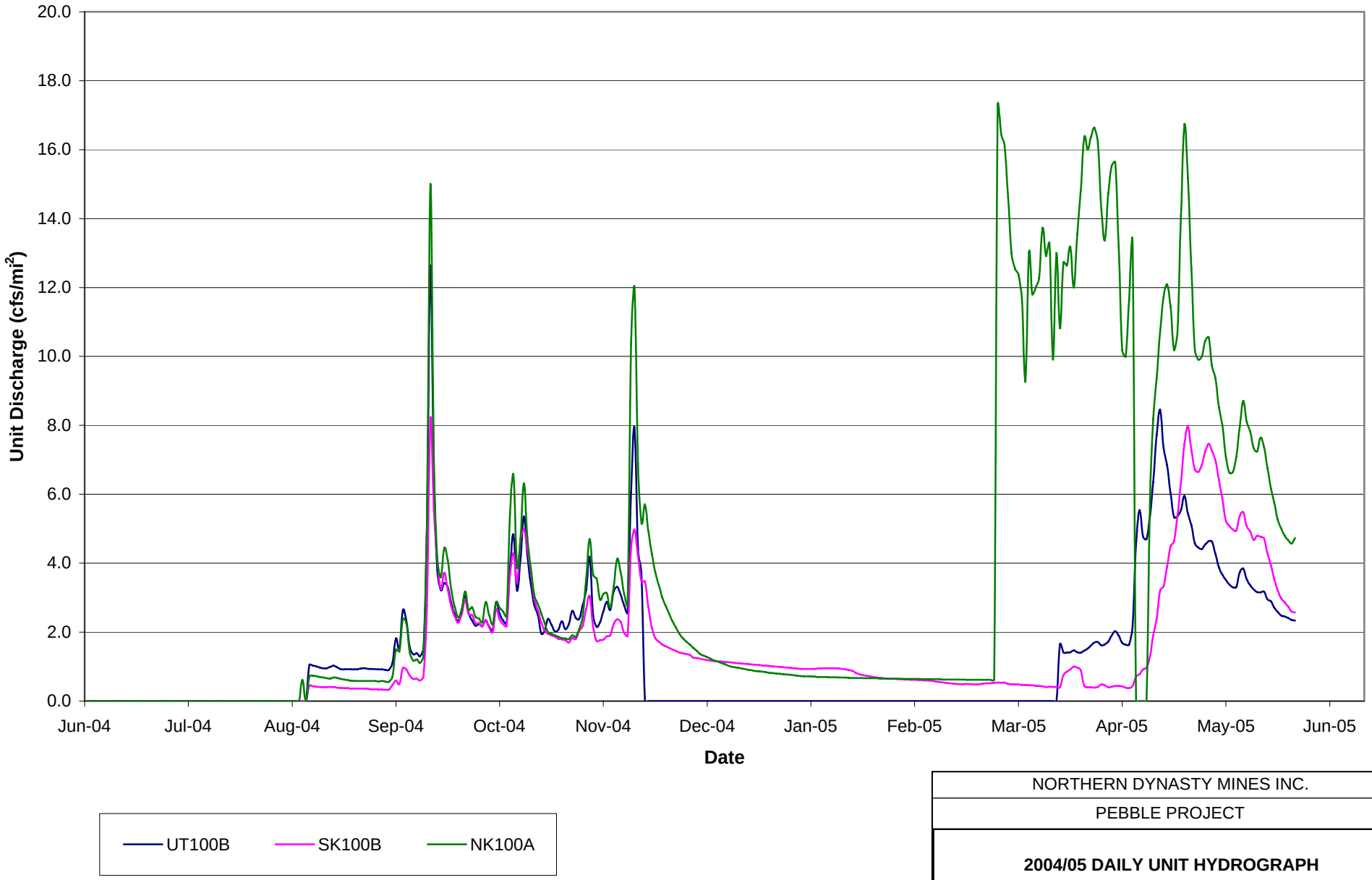

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

2004/05 DAILY UNIT HYDROGRAPH

Knight Piésold CONSULTING

PROJECT / ASSIGNMENT NO.	REF NO.
VA101-176/7	4

FIGURE 2.14

REV. 0

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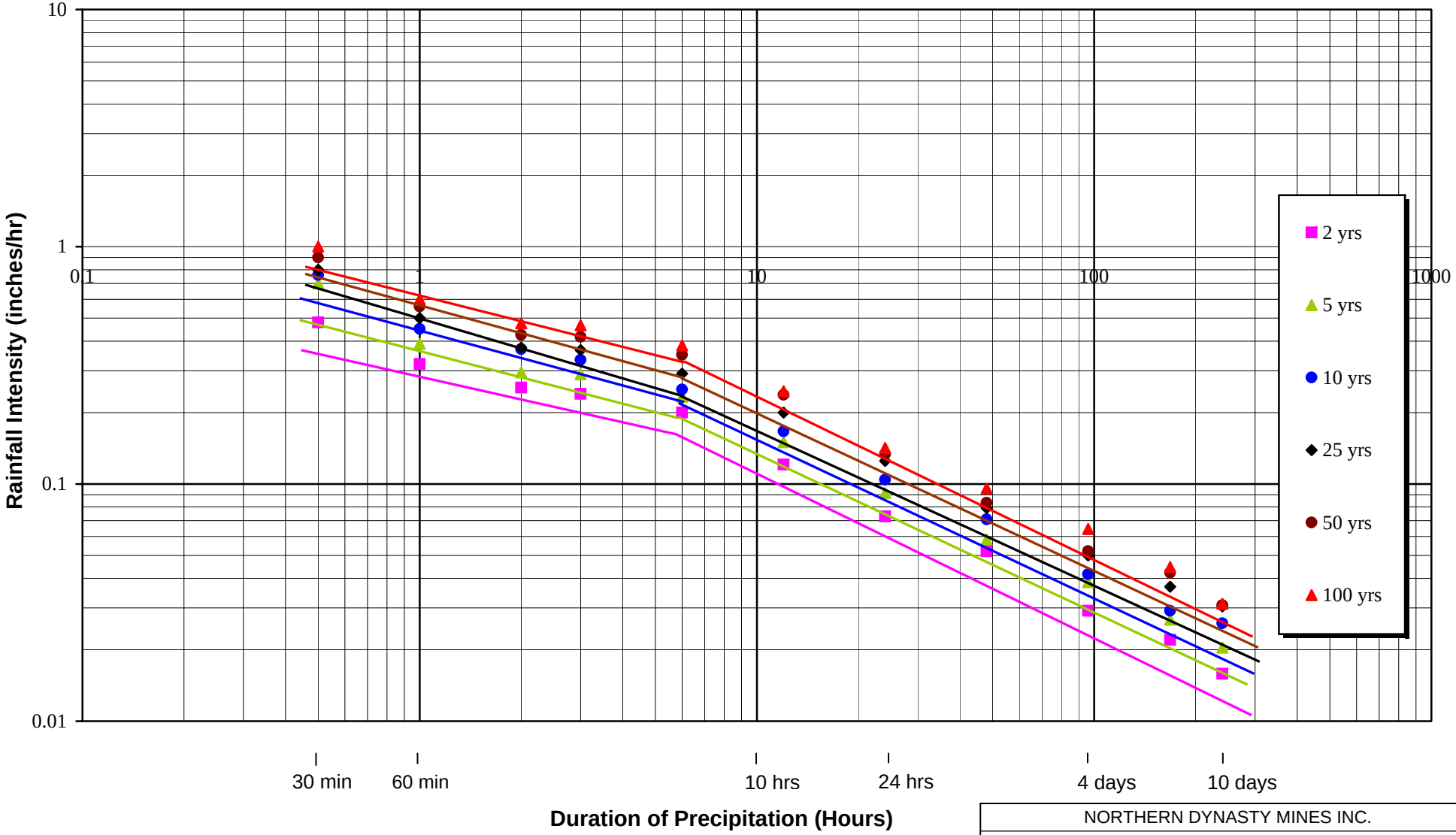

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

INTENSITY-DURATION-FREQUENCY CURVES
PEBBLE MINE SITE AREA

Knight Piésold CONSULTING

PROJECT / ASSIGNMENT NO.	REF NO.
VA101-176/7	4

FIGURE 3.1

REV. 0

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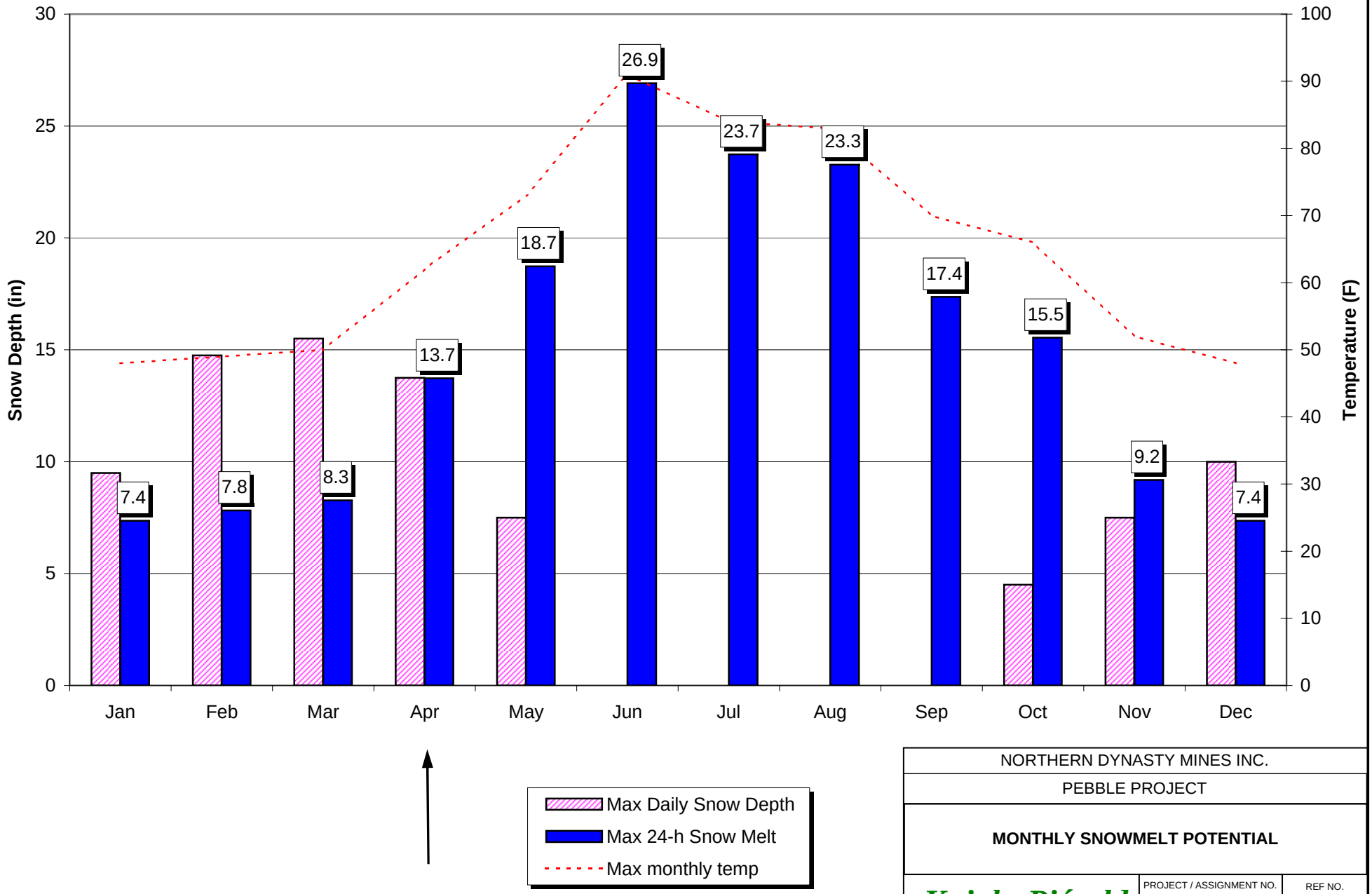

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

MONTHLY SNOWMELT POTENTIAL

Knight Piésold CONSULTING

PROJECT / ASSIGNMENT NO.	REF NO.
VA101-176/7	4

FIGURE3.2 REV. 0

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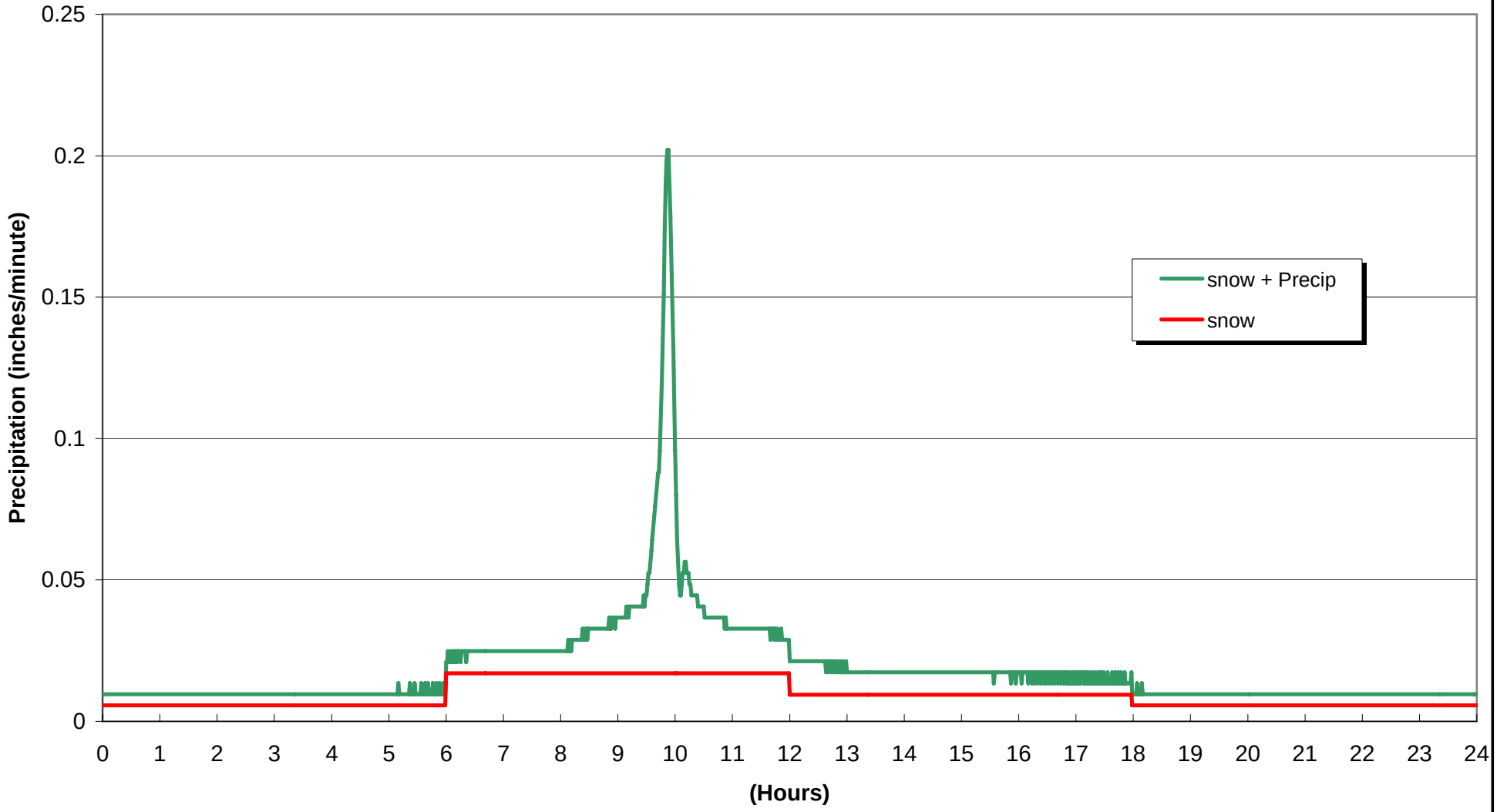

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

24-HOUR HYETOGRAPH WITH SNOWMELT

Knight Piésold CONSULTING

PROJECT / ASSIGNMENT NO.	REF NO.
VA101-176/7	4

FIGURE3.3 REV. 0

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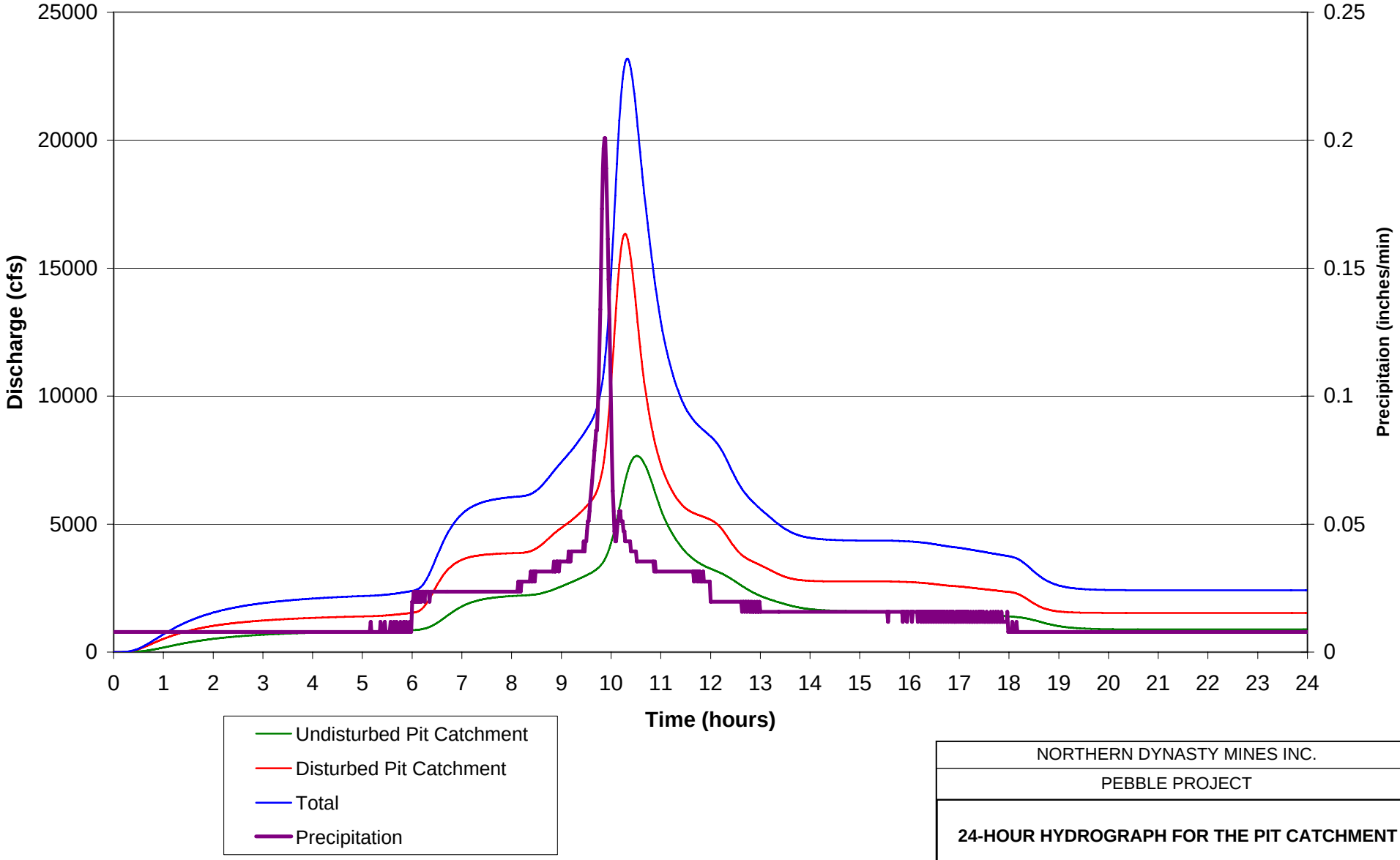

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

24-HOUR HYDROGRAPH FOR THE PIT CATCHMENT

Knight Piésold CONSULTING

PROJECT / ASSIGNMENT NO.	REF NO.
VA101-176/7	4

FIGURE3.4 REV. 0

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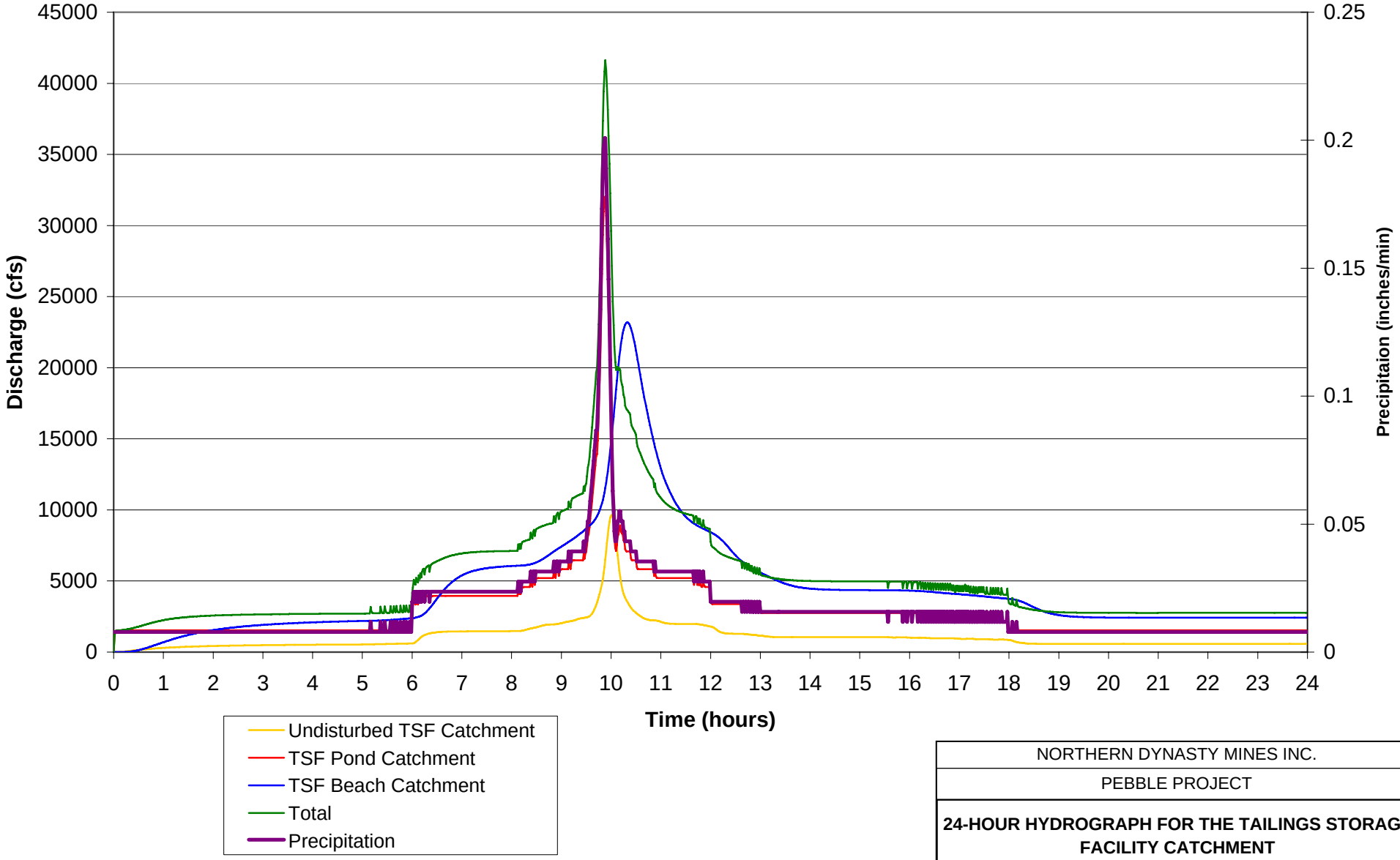

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

24-HOUR HYDROGRAPH FOR THE TAILINGS STORAGE FACILITY CATCHMENT

Knight Piésold CONSULTING

PROJECT / ASSIGNMENT NO.	REF NO.
VA101-176/7	4

FIGURE3.5 REV. 0

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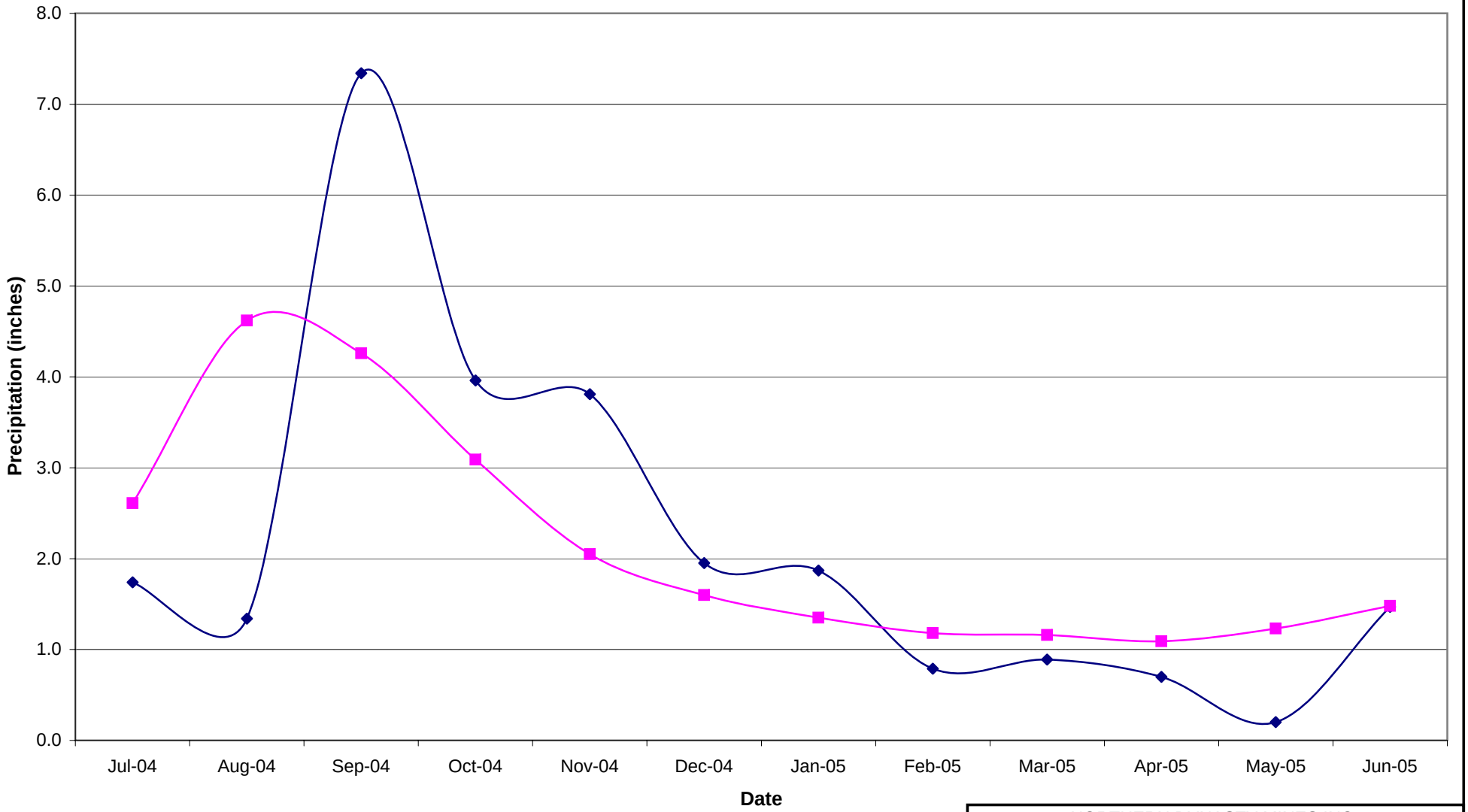

2004/05

Mean Total Annual

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

MONTHLY PRECIPITATION AT ILIAMNA

Knight Piésold CONSULTING

PROJECT / ASSIGNMENT NO.	REF NO.
VA101-176/7	4

FIGURE 4.1

REV. 0

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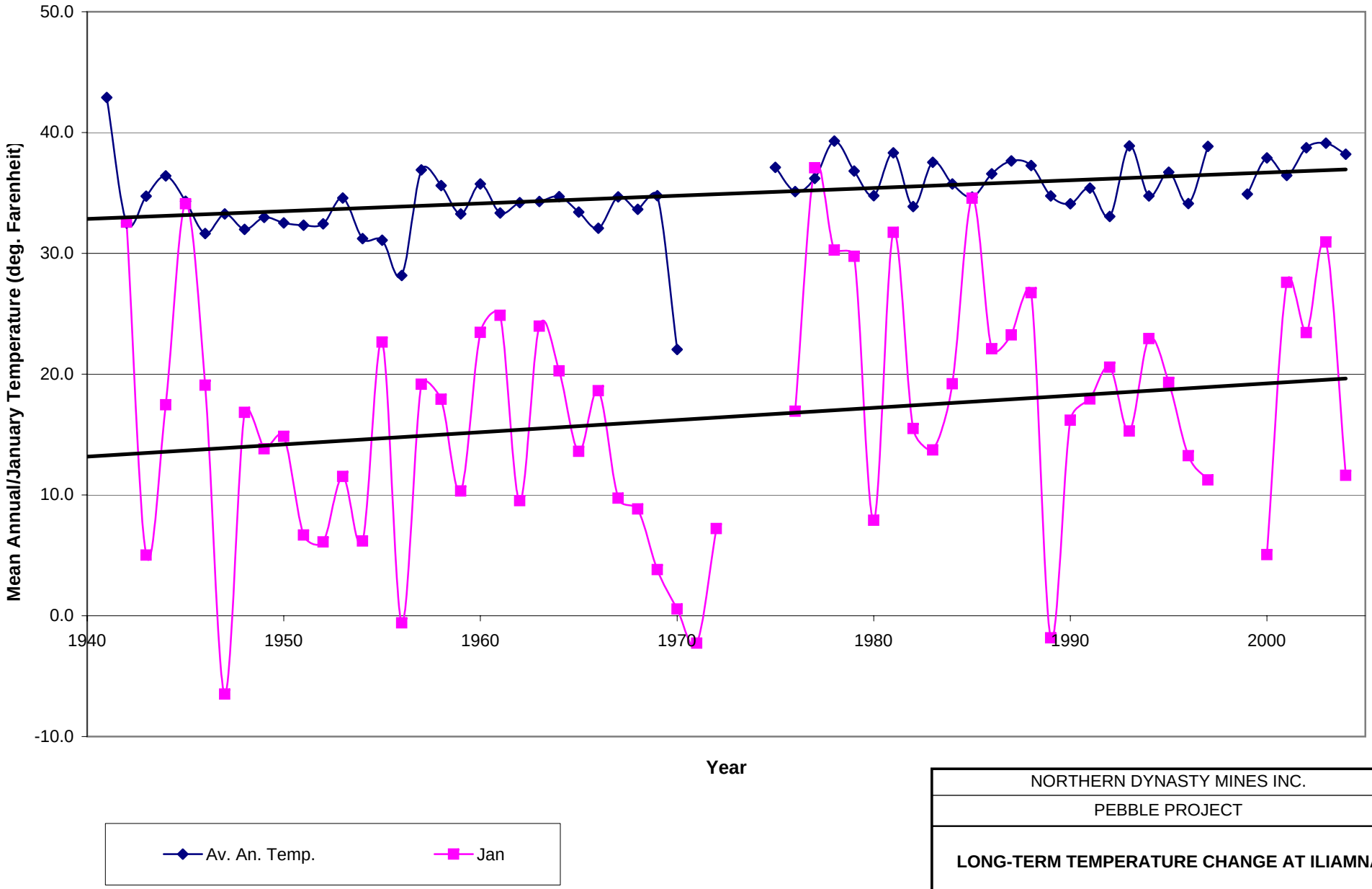

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

LONG-TERM TEMPERATURE CHANGE AT ILIAMNA

Knight Piésold CONSULTING

PROJECT / ASSIGNMENT NO.	REF NO.
VA101-176/7	4

FIGURE 5.1 REV. 0

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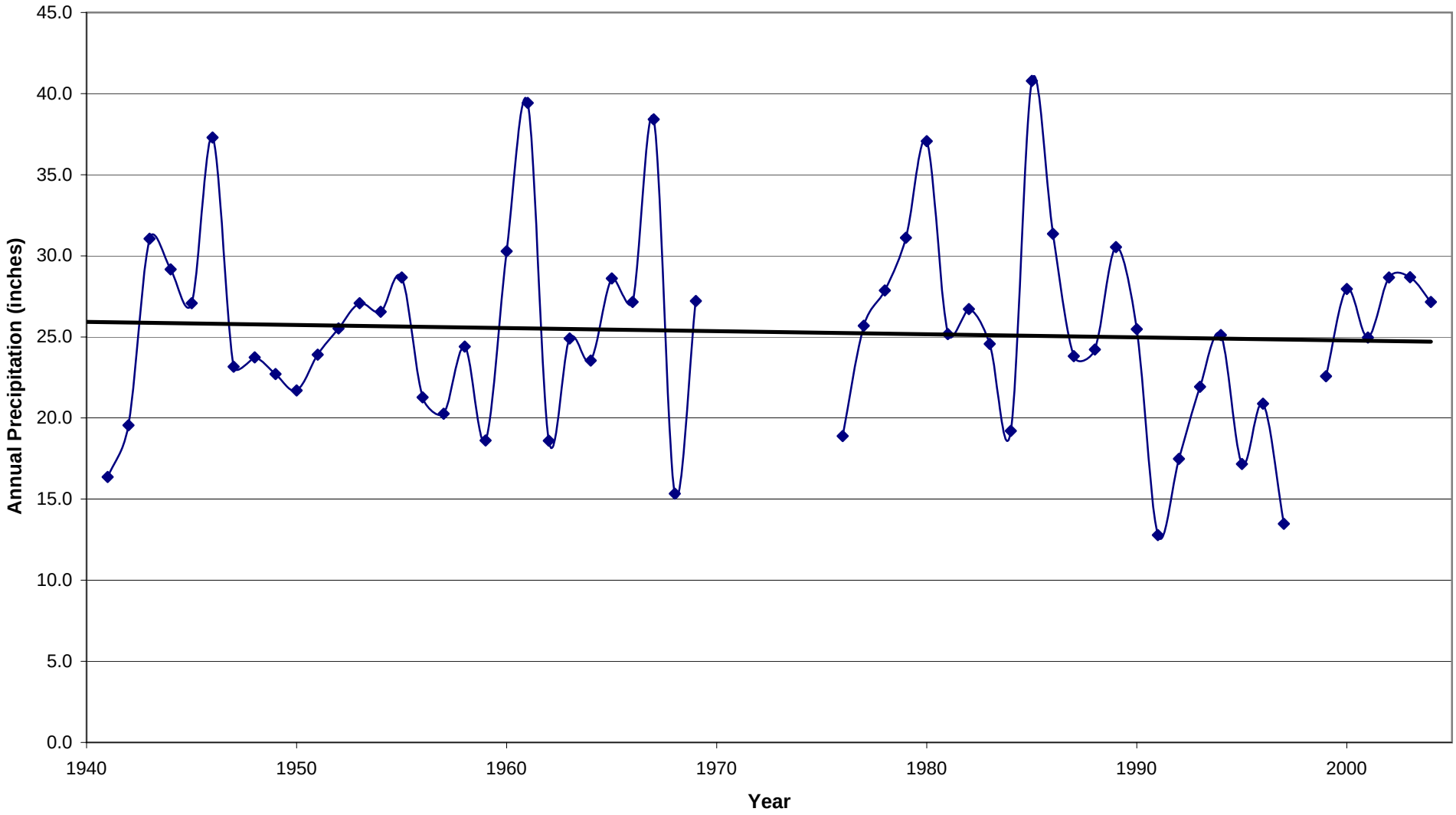

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

LONG-TERM PRECIPITATION CHANGE AT ILIAMNA

Knight Piésold CONSULTING

PROJECT / ASSIGNMENT NO.	REF NO.
VA101-176/7	4

FIGURE 5.2

REV. 0

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TABLE 2.1

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT

HYDROMETEOROLOGICAL REPORT
COMPARISON OF ILIAMNA AND MINE SITE AREA AVERAGE MONTHLY TEMPERATURE DATA (°F)

Print: 7/06/06 16:42

P:\Water Rights Applications\6 Application Attachments\5 Draft Hydromet Report\[60619 Hydromet Rev0 Tables.xls]Table 2.4 - Precip

Rev'd Jul/26/04

Station	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Iliamna	1991	17.93	14.25	23.34	36.35	44.68	49.94	55.52	53.28	51.08	**34.80**	24.97	18.22	35.36
Mine Site		**14.81**	**11.68**	**21.98**	**32.57**	**41.57**	**46.63**	**52.91**	47.84	46.22	33.26	19.40	14.72	31.97
Difference		-3.12	-2.57	-1.37	-3.78	-3.11	-3.31	-2.61	-5.44	-4.86	-1.54	-5.57	-3.50	-3.40
Iliamna	1992	20.57	7.39	21.09	33.05	41.73	51.78	56.24	54.15	**47.90**	33.10	25.73	18.84	34.30
Mine Site		17.96	4.46	19.58	28.40	38.12	48.92	53.60	50.18	35.24	27.14	23.00	16.16	30.23
Difference		-2.61	-2.93	-1.51	-4.65	-3.61	-2.86	-2.64	-3.97	-12.66	-5.96	-2.73	-2.68	-4.07
Iliamna	1993	15.29	21.43	28.18	39.95	48.29	54.12	58.70	56.71	48.05	39.60	28.55	27.79	38.89
Mine Site		11.66	19.22	26.96	37.04	45.68	50.36	56.12	**52.01**	**43.19**	**33.64**	**24.40**	**24.70**	35.41
Difference		-3.63	-2.21	-1.22	-2.91	-2.61	-3.76	-2.58	-4.71	-4.86	-5.96	-4.15	-3.09	-3.47
Iliamna	long-term	16.8	18.4	22.5	32.1	42.7	51.1	55.5	54.5	47.9	34.8	24.6	16.1	34.8
Mine Site		**13.4**	**15.0**	**19.1**	**28.7**	**39.3**	**47.7**	**52.1**	**51.1**	**44.5**	**31.4**	**21.2**	**12.7**	**31.4**

Notes: *1) Iliamna data for station at Iliamna FAA Airport, as published on Western Regional Climate Center website at www.wrcc.dri.edu.*
2) ***BOLD*** *values are estimated.*

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TABLE 2.2

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT

HYDROMETEOROLOGICAL REPORT
WIND SPEEDS AT MINE SITE AREA WEATHER STATION

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P:\Water Rights Applications\6 Application Attachments\5 Draft Hydromet Report\[60619 Hydromet Rev0 Tables.xls]Table 2.4 - Precip

Rev'd Jul/26/04

Month	1991 (knots)			1992 (knots)			1993 (knots)		
	Avg Month	Min Daily Avg	Max Daily Avg	Avg Month	Min Daily Avg	Max Daily Avg	Avg Month	Min Daily Avg	Max Daily Avg
Jan	-	-	-	9.3	1.0	27.4			
Feb	-	-	-	7.9	1.7	23.1	15.4	2.1	37.3
Mar	-	-	-	12.7	1.2	33.4	13.4	1.6	34.0
Apr	-	-	-	12.7	1.2	24.3	11.1	2.7	27.0
May	-	-	-	10.6	3.7	19.0	11.5	3.9	32.7
Jun	-	-	-	13.1	4.7	28.2	10.6	3.3	23.9
Jul	-	-	-	7.8	2.5	21.0	8.3	2.1	23.7
Aug	11.0	5.6	17.1	12.8	3.7	27.8	-	-	-
Sep	15.2	4.1	27.6	11.6	3.9	26.8	-	-	-
Oct	13.5	3.7	34.2				-	-	-
Nov	10.7	1.7	30.5				-	-	-
Dec	9.3	2.1	24.5				-	-	-

Notes: The maximum instantaneous wind speed recorded during the measurement period is 65 knots, which occurred on November 28, 1991. This wind storm blew down the precipitation gauge.

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TABLE 2.3

NORTHERN DYNASTY MINES INC.
PEBBLE MINE PROJECT

HYDROMETEOROLOGICAL REPORT
EVAPORATION VALUES (inches)

P:\Water Rights Applications\6 Application Attachments\5 Draft Hydromet Report\[60619 Hydromet Rev0 Tables.xls]Table 2.4 - Precip

Print: 7/06/06 16:42

Rev'd Jun/28/04

Unadjusted Pan Evaporation Measurments

Year	Instrument	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1992	gauge	-	-	-	-	-	-	4.11	7.91	5.04	-	-	-	**11.94**
	manual	-	-	-	-	-	-	5.32	5.58	5.15	-	-	-	**11.24**
1993	gauge	-	-	-	-	-	4.30	3.22	7.85	-	-	-	-	**10.76**
	manual	-	-	-	-	-	2.15	3.13	5.06	-	-	-	-	**7.24**

Estimated Lake Evaporation Values

Year	Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1992	Temperature (°F)	17.96	4.46	19.58	28.40	38.12	48.92	53.60	50.18	35.24	27.14	23.00	16.16	
	Wind (knots)	4.78	4.07	6.53	6.53	5.45	6.74	4.02	6.58	5.97	5.88	5.88	5.88	
	Evaporation (inches)	**0.00**	**0.00**	**0.00**	**0.46**	**2.36**	**2.95**	2.12	3.03	2.30	**0.44**	**0.00**	**0.00**	**13.66**
1993	Temperature (°F)	11.66	19.22	26.96	37.04	45.68	50.36	56.12	52.01	43.19	33.64	24.40	24.70	
	Wind (knots)	5.88	7.93	6.91	5.73	5.94	5.44	4.27	5.88	5.88	5.88	5.88	5.88	
	Evaporation (inches)	**0.00**	**0.00**	**0.43**	**2.44**	**2.64**	1.45	1.43	2.91	**2.58**	**0.54**	**0.00**	**0.00**	**14.42**
long-term	Evaporation (inches)	**0.00**	**0.00**	**0.22**	**1.45**	**2.50**	**2.20**	**1.77**	**2.97**	**2.44**	**0.49**	**0.00**	**0.00**	**14.04**

Notes:

1) The unadjusted data represent raw pan evaporation values that must be factored according to a pan coefficient in order to convert them to equivalent lake evaporation values.

2) The estimated lake evaporaton values include the use of a pan coefficient of 0.45. This coefficient is quite low but accounts for the high wind speeds common in the Mine Site area.

3) Evaporation assumed to be zero when average monthly temperature below 26° F.

*3) **BOLD** values are estimated evaporation.*

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TABLE 2.4

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT

HYDROMETEOROLOGICAL REPORT
COMPARISON OF ILIAMNA AND MINE SITE METEOROLOGICAL STATION PRECIPITATION DATA (Inches)

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P:\Water Rights Applications\6 Application Attachments\5 Draft Hydromet Report\[60619 Hydromet Rev0 Tables.xls]Table 2.4 - Precip

Rev'd Jun/28/04

Location	Year		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Iliamna	1991		0.51	0.59	1.80	0.62	0.48	0.02	1.88	1.81	2.35	**1.74**	1.00	1.73	14.5
Mine Site			**0.68**	**0.78**	**2.39**	**0.82**	**0.64**	**0.03**	**2.50**	**2.41**	**3.13**	**2.31**	**1.33**	**2.30**	20.1
Difference			**0.17**	**0.19**	**0.59**	**0.20**	**0.16**	**0.01**	**0.62**	**0.60**	**0.78**	**0.57**	**0.33**	**0.57**	**5.5**
Iliamna	1992		1.34	0.56	2.17	0.15	0.22	1.20	1.67	5.12	**3.42**	1.65	1.40	2.00	20.9
Mine Site			**1.78**	**0.74**	**2.89**	**0.20**	**0.29**	**1.60**	3.59	5.65	5.39	2.36	2.47	3.54	32.2
Difference			**0.44**	**0.18**	**0.72**	**0.05**	**0.07**	**0.40**	1.92	0.52	1.97	0.71	1.07	1.54	**11.3**
Iliamna	1993		1.58	0.80	0.70	0.18	0.52	0.24	1.05	2.63	5.44	2.40	4.48	1.90	21.9
Mine Site			2.01	1.37	0.07	0.55	1.65	0.54	2.01	5.17	4.24	5.60	2.92	1.23	27.9
Difference			0.43	0.57	-0.63	0.37	1.13	0.30	0.96	2.54	-1.20	3.20	-1.56	-0.67	6.0
Iliamna	long-term	mean	1.37	1.17	1.16	1.08	1.22	1.48	2.63	4.68	4.20	3.07	1.95	1.62	25.6
		stdev	0.83	0.74	0.91	0.73	0.84	1.07	1.48	2.02	2.08	1.61	1.51	1.05	5.4
		c.v.	0.61	0.63	0.78	0.68	0.69	0.72	0.56	0.43	0.50	0.52	0.77	0.65	0.21
Mine Site	long-term	mean	**1.8**	**1.6**	**1.5**	**1.4**	**1.6**	**2.0**	**3.5**	**6.2**	**5.6**	**4.1**	**2.6**	**2.2**	**34.1**
		stdev	**1.1**	**1.0**	**1.2**	**1.0**	**1.1**	**1.4**	**2.0**	**2.7**	**2.8**	**2.1**	**2.0**	**1.4**	**7.1**
		c.v.	**0.61**	**0.63**	**0.78**	**0.68**	**0.69**	**0.72**	**0.56**	**0.43**	**0.50**	**0.52**	**0.77**	**0.65**	**0.21**

Notes: *1) Iliamna data for station at Iliamna FAA Airport, as published on Western Regional Climate Center website at www.wrcc.dri.edu.*
2) ***BOLD*** *values are estimated.*
3) c.v. stands for coefficient of variation and these values are dimensionless.

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TABLE 2.5

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT

HYDROMETEOROLOGICAL REPORT
SUMMARY OF SNOWTEL DATA

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Rev'd: May/10/05

	Snow Water Equivalent (inches)												
Station	**Jan 1**	**Jan 15**	**Feb 1**	**Feb 15**	**Mar 1**	**Mar 15**	**Apr 1**	**Apr 15**	**May 1**	**May 15**	**Jun 1**	**Jun 15**	**Average**
McNeil Canyon	4.9	5.9	7.2	8.4	9.3	9.6	10.8	10.7	7.7	2.8	0	0	6.4
Port Graham	3.6	4	4.8	10.6	13.3	12.9	14.1	14.4	n/a	n/a	0	0	7.8
Anchor River	5.6	7	8.4	9.3	10.1	11.4	12.5	12.9	11.6	7.5	0.6	0	8.1

Notes:
1) n/a = not available

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TABLE 2.6

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT

HYDROMETEOROLOGICAL REPORT
SUMMARY OF APRIL 2004 SNOW SURVEY

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P:\Water Rights Applications\6 Application Attachments\5 Draft Hydromet Report\[60619 Hydromet Rev Rev'd: June/10/05

	Snow Depth [in]	Snow Water Equivalent (SWE) [in]	Abaltion Rate [SWE in/day]
Mean	34	13.8	0.75
Min	0	0	0
Max	95	53	2

Notes: *1) Data from ABR Inc. (2005)*

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TABLE 2.7

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT

HYDROMETEOROLOGICAL REPORT
2004/05 FLOW DISTRIBUTION FOR SOUTH FORK KOKTULI RIVER

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P:\Water Rights Applications\6 Application Attachments\5 Draft Hydromet Report\[60619 Hydromet Rev0 Tables.xls]Table 2.4 - Precip
Rev'd Jun/10/2005

	2004							2005						
	June (2)	**July (2)**	**Aug (1)**	**Sept**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**March**	**April**	**May**	**Annual**	**Jul - Oct**
SK100B	7.2%	4.3%	2.2%	4.3%	16.2%	12.3%	7.6%	5.1%	3.3%	2.5%	4.8%	30.2%	100.0%	27.0%

Notes: *1) Partial record*
2) Estimated
3) Distribution is a percentage of annual runoff volume.

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TABLE 2.8

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT

HYDROMETEOROLOGICAL REPORT
ESTIMATED LONG-TERM MEAN ANNUAL DISCHARGE

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Rev'd Jun/19/05

	SK100A	SK100B	SK100C	SK100F	SK100G	SK119A	NK100A	NK100C	NK119A	UT100B	UT100D	UT100E	UT119A	KC100A
Mean Annual Discharge[1] (cfs)	130	174	50	35	15	26	234	42	26	172	21	6	24	20
Catchment Area (mi^2)	114.8	77.1	36.9	12.0	5.3	10.2	110.3	25.3	8.6	85.9	17.2	2.7	3.7	28.7

Notes: 1) Observed discharges for July/August to October 2004 were scaled by percent of annual flow calculated from USGS hydrographs for August 2004 to May 2005 and increased to long-term mean annual flow based on Iliamna precipitation data

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TABLE 3.1

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT

PROBABLE MAXIMUM FLOOD ESTIMATE
MONTHLY SNOWMELT POTENTIAL ESTIMATES

Print Jul/06/06 16:42:44

P:\Water Rights Applications\6 Application Attachments\5 Draft Hydromet Report\[60619 Hydromet Rev0 Tables.xls]Table 2.4 - Precip

Rev'd Mar/02/04

k =	1.0	forest cover factor
v =	39.0	mph
P_r =	14.0	inches/day

$$M = (0.029 + 0.0084kv + 0.007P_r)(T_a - 32) + 0.09$$

	Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*
T_a (°F)	48	49	50	62	73	91	84	83	70	66	52	48
Max Snow Depth (in)	38	59	62	55	30	0	0	0	0	18	30	40
Max Snow Depth (SWE) (in.)	9.5	14.8	15.5	13.8	7.5	0	0	0	0	4.5	7.5	10
Theoretical Snow Melt (M) (in)	7.4	7.8	8.3	13.7	18.7	26.9	23.7	23.3	17.4	15.5	9.2	7.4
Max Possible Snow Melt (in)	7.4	7.8	8.3	13.7	7.5	0.0	0.0	0.0	0.0	4.5	7.5	7.4

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TABLE 3.2

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT

HYDROMETEOROLOGICAL REPORT
PROBABLE MAXIMUM FLOOD ESTIMATE

Print Jul/06/06 16:42:44
P:\Water Rights Applications\6 Application Attachments\5 Draft Hydromet Report\[60619 Hydromet Rev0 T Rev'd Mar/02/04

Sub-Basin	Drainage Area (mi^2)	Peak Inflow (ft^3/s)	Total 24-h Volume ($ft^3 x10^6$)
Tailings Pond	4.10	32,037	258
Tailings Pond Beach	1.76	6,441	108
Undisturbed TSF catchment	1.57	9,637	94
TSF Total	7.42	41,626	460
Disturbed Pit Catchment	4.13	16,343	246
Undisturbed Pit catchment	2.38	7,665	141
Total Pit Catchment	6.51	23,184	387

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TABLE 4.1

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT

HYDROMETEOROLOGICAL REPORT
ANNUAL WATER BALANCE FOR SOUTH FORK KOKTULI CATCHMENT

P:\Water Rights Applications\6 Application Attachments\5 Draft Hydromet Report\[60619 Hydromet Rev0 Tables.xls]Table 2.4 Print: 7/6/06 16:42

Rev'd Jul/7/2005

inputs

Catchment upstream of SK100F	
Total catchment area [mi^2]	12
Area - upstream area [mi^2]	12
inflow [cfs]	0
Runoff coeff [-]	0.90
Rain [inches]	29
Snow [SWE inches]	7
Precipitation [inches]	36
Precipitation [cfs]	32
windblown snow [SWE inches]	8
windblown snow [cfs]	7
April snow depth [SWE inches]	15
Groundwater out [cfs]	0.6
ouflow [cfs]	35
Total out [cfs]	36

Catchment upstream of SK100C	
Total catchment area [mi^2]	37
Area - upstream area [mi^2]	25
inflow [cfs]	36
Runoff coeff [-]	0.90
Rain [inches]	29
Snow [SWE inches]	7
Precipitation [inches]	36
Precipitation [cfs]	66
groundwater lost [cfs]	20
windblown snow [SWE inches]	5
windblown snow [cfs]	9
April snow depth [SWE inches]	12
Groundwater out [cfs]	33
ouflow [cfs]	50
Total out [cfs]	83

Catchment upstream of SK119A	
Total catchment area [mi^2]	10
Area - upstream area [mi^2]	10
inflow [cfs]	0
Runoff coeff [-]	0.90
Rain [inches]	29
Snow [SWE inches]	7
Precipitation [inches]	36
Precipitation [cfs]	27
windblown snow [SWE inches]	7
windblown snow [cfs]	5
April snow depth [SWE inches]	15
Groundwater out [cfs]	2.8
ouflow [cfs]	26
Total out [cfs]	29

Catchment upstream of SK100B	
Total catchment area [mi^2]	77
Area - upstream area [mi^2]	30
inflow [cfs]	112
Runoff coeff [-]	0.90
Rain [inches]	29
Snow [SWE inches]	7
Precipitation [inches]	36
Precipitation [cfs]	80
windblown snow [SWE inches]	2
windblown snow [cfs]	4
April snow depth [SWE inches]	9
Freshet flow [cfs]	
Groundwater out [cfs]	13.6
ouflow [cfs]	174
Total out [cfs]	187

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TABLE 4.2

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT

HYDROMETEOROLOGICAL REPORT
MINE SITE AREA WATER BALANCE PARAMETERS

P:\Water Rights Applications\6 Application Attachments\5 Draft Hydromet Report\[60619 Hydromet Rev0 Tables.xls]Table 2.4 - Precip

Print: 7/6/06 16:42
Rev'd Jul/8/2005

Stage	Runoff coefficinet [-]			Lake Evaporation [inches]	Annual Precipitation [Inches]	Windblown Snow [inches SWE]				
	Tailings pond	Disturbed Areas	Undisturbed areas			Undisturbed TSF	TSF Beach	TSF Pond	Disturbed Pit Catchment	Undisturbed Pit Catchment
Years -2 to 1	1.0	0.9	0.9	14.0	36.0	7.0	7.0	-7.0	8.5	7.8
Years 2 to 7	1.0	0.9	0.9	14.0	36.0	7.0	7.0	-7.0	11.1	10.1
Years 8 to 12	1.0	0.9	0.9	14.0	36.0	7.0	7.0	-7.0	11.2	12.2
Years 13 to 27	1.0	0.9	0.9	14.0	36.0	7.0	7.0	-7.0	11.9	15.4

Note: 1) total precipitaion depth = annual precipitaion + windblown snow

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TABLE 4.3

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT

HYDROMETEOROLOGICAL REPORT
MONTHLY WATERBALANCE PARAMETERS FOR THE MINE SITE AREA CATCHMENT

Print Jul/06/06 16:42:44

P:\Water Rights Applications\6 Application Attachments\5 Draft Hydromet Report\[60619 Hydromet Rev0 Tables.xls]Table 2.4 - Precip

Rev'd Jul/25/05

		Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
INPUTS	Long-term Precipitaion (inches)	1.9	1.7	1.6	1.5	1.7	2.1	3.6	6.5	5.9	4.3	2.8	2.3	36
	Windblown Snow (inch)	1.2	1.2	1.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.2	7
PROCESS	Rainfall (%)	0	0	0	0	80	100	100	100	100	50	0	0	
	Snowfall (%)	100	100	100	100	20	0	0	0	0	50	100	100	
	Snowpack Depth (inch SWE)	8.4	9.6	11.2	12.9	11.1	0.0		0.0	0.0	2.2	5.1	7.1	
	Snowmelt (%)	8.0	5.0	5.0	10.0	52.0	0.0	0.0	0.0	0.0	5.0	7.0	8.0	100
	Snowmelt (inches)	1.7	1.1	1.1	2.1	11.1	0.0	0.0	0.0	0.0	1.1	1.5	1.7	
OUTPUT	Runoff (inches)	1.5	1.0	1.0	1.9	11.2	1.9	3.2	5.8	5.3	2.9	1.3	1.5	39
	Long-term Streamflow (cfs)	16.5	10.3	10.3	20.6	120.4	20.2	34.6	62.9	57.2	31.2	14.4	16.5	35

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NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT

Application for Water Right

SOUTH FORK KOKTULI RIVER

BENEFICIAL USES FOR APPROPRIATING WATER

The Pebble Project property is centred at approximately latitude 59°53'54" and longitude 155°17'44", and is 201 miles southwest of Anchorage and 17 miles northwest of the Village of Iliamna.

The development of the Pebble Project will require capture of all surface and groundwater flows originating up gradient of the proposed downstream limit of water extraction, DL-1, as indicated in Figure SFK-1. The water appropriated from up gradient of DL-1 will be used for the following beneficial mining uses:

- To collect water prior to mill start-up to ensure there is sufficient water available to commence mine and mill operations, including during the winter months when ice development reduces the free water volume in the tailings pond.
- To provide all of the water required for ongoing mining processes (equipment cooling, mill process, tailings slurry transport, concentrate slurry transport, etc.).
- To ensure that there is sufficient water available in the system to offset the water that is lost to evaporation and sublimation, and the water that is permanently retained in the tailings voids.
- To provide potable water.
- To ensure that annual and seasonal fluctuations in the tailings pond do not impact the mining process.
- To protect the downstream aquatic resources by:
    - Submerging the potentially reactive waste materials deposited in the tailings storage facility (TSF) to prevent the potential development of acid drainage.
    - Promoting the saturation and/or flooding of tailings solids to prevent dust generation.
    - Controlling sediment.
    - Capturing and re-using process water that comes into contact with mineralized rock to ensure that the quality of the water for downstream fish and aquatic habitat is not adversely impacted by the mining operations.

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT

Application for Water Right

SOUTH FORK KOKTULI RIVER

POSSESSORY INTEREST

INSTRUCTION #2 – *Attach copy of executed deed, lease agreement, or other possessory interest document for property where water will be used.*

The following figure (Schedule "A" – Pebble Property) and list of claims demonstrate that the applicants have legal access to the property for mining and, thus, the water rights and use. The property consists of 1335 mining claims (the "Property") of which 918 are held of record by Northern Dynasty Holdings Inc., an Alaska corporation, and 417 of the claims are held of record by its sister corporation, Northern Dynasty Mines Inc., also an Alaska corporation. Accordingly the two corporations are the recorded owners of 100% of the Property claims. Attached are the two Quitclaim Deeds whereby Northern Dynasty Holdings Inc. received its 918 Property claims from the previous owner, Teck Cominco American Inc. Also attached are copies of the records showing that Northern Dynasty Mines Inc is the original staker and recorded owner of the balance of the property Claims. As holders of record of the mining claims, Northern Dynasty Mines Inc. and Northern Dynasty Holdings Inc. are exclusively authorized and responsible to carry out exploration, development and administrative work relating to the Pebble Project, including ingress and egress as necessary to withdraw, impound, divert and transport water of the State of Alaska. Northern Dynasty Mines Inc. is and will continue to be the entity that will carry out exploration, development and administrative work relating to the Pebble Project, including ingress and egress as necessary to withdraw, impound, divert and transport water of the State of Alaska. Therefore, NDMI and NDHI are referred to, collectively, for purposes of this application, as "Northern Dynasty Mines Inc."

Backup documentation for the QuitClaim Deeds can be found on the accompanying CD in a separate file.

Click here to view the backup documentation.

After recording return to:
L. Brommeland
Hunter Dickinson Inc.
1020-800 West Pender St.
Vancouver, B.C. V6C 2V6

2006-000249-0
Recording Dist: 320 - Iliamna
6/21/2006 2:04 PM Pages: 1 of 3

A L A S K A

QUITCLAIM DEED

The Grantor, Teck Cominco American Incorporated, formerly Cominco American Incorporated, a Washington corporation, of 15918 E. Euclid Avenue, Spokane Valley, Washington 99216 for and in consideration of Ten Dollars ($10.00) and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, conveys and quitclaims to Northern Dynasty Holdings Inc., an Alaska corporation, of Suite 604, 3201 C Street, Anchorage, Alaska 99503 all interest which it may have, if any, in the unpatented mining claims described on Exhibit A to this Quitclaim Deed and located in the Iliamna Recording District, State of Alaska.

CC

In Witness Whereof, the Grantor has caused this indenture to be signed this 1st day of June 2006.

TECK COMINCO AMERICAN INCORPORATED, GRANTOR

C. Bruce DiLuzio
Vice President, Law & Administration

STATE OF WASHINGTON)
: ss.
COUNTY OF SPOKANE)

On this 1st day of June, 2006, before me personally appeared C. Bruce DiLuzio, to me known to be the Vice President, Law & Administration, of Teck Cominco American Incorporated, the corporation that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act of said corporation, for the uses and purposes therein mentioned, and on oath stated that he was authorized to execute the said instrument on behalf of said corporation.

Given under my hand and official seal the day and year in this certificate first above written.

Deborah A. Frost
Notary Public in and for the State of Washington
residing at Spokane.

My Commission Expires: 5/11/07

DEBORAH A. FROST
COMMISSION EXPIRES
NOTARY
PUBLIC
5-11-07
STATE OF WASHINGTON

After recording return to:
L. Brommeland
Hunter Dickinson Inc.
1020-800 West Pender St.
Vancouver, B.C. V6C 2V6

2006-000250-0
Recording Dist: 320 - Iliamna
6/21/2006 2:06 PM Pages: 1 of 34

ALASKA

CC

QUITCLAIM DEED

The Grantor, Teck Cominco American Incorporated, formerly Cominco American Incorporated, a Washington corporation, of 15918 E. Euclid Avenue, Spokane Valley, Washington 99216 for and in consideration of Ten Dollars ($10.00) and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, conveys and quitclaims to Northern Dynasty Holdings Inc., an Alaska corporation, of Suite 604, 3201 C Street, Anchorage, Alaska 99503 all interest which it may have, if any, in the unpatented mining claims described on Exhibit A to this Quitclaim Deed and located in the Iliamna Recording District, State of Alaska.

Reserving unto Grantor a four percent (4%) advance royalty prior to payback of capital costs of constructing a mine on the Exhibit A claims, such royalty described in Exhibit B hereto; and

Further Reserving unto Grantor a five percent (5%) Net Profits Royalty after payback of capital costs of constructing a mine on the Exhibit A claims, such royalty described in Exhibit C hereto.

In Witness Whereof, the Grantor has caused this indenture to be signed this 15th day of June 2006.

TECK COMINCO AMERICAN INCORPORATED, GRANTOR

C. Bruce DiLuzio
Vice President, Law & Administration

STATE OF WASHINGTON)
: ss.
COUNTY OF SPOKANE)

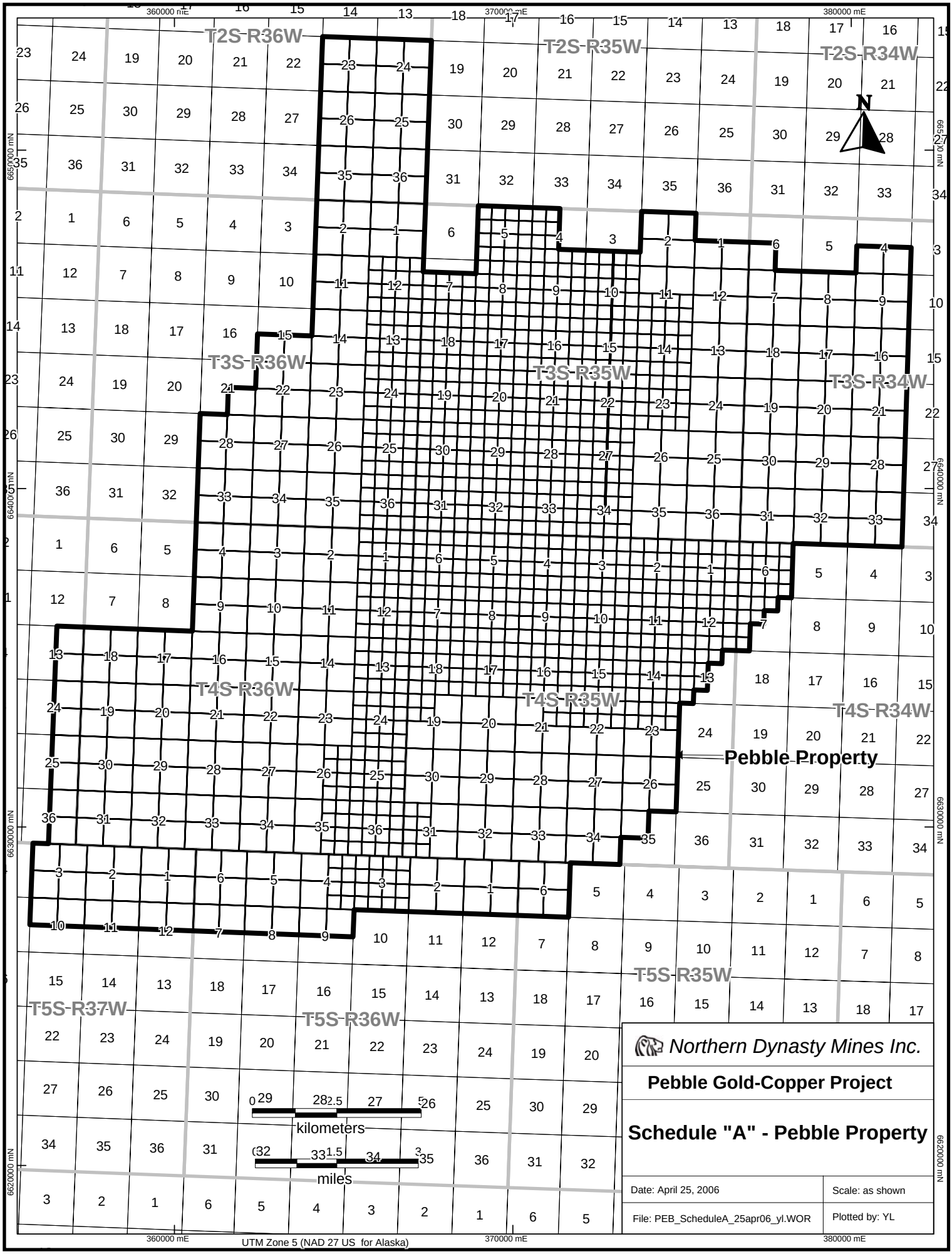
On this 1st day of June, 2006, before me personally appeared C. Bruce DiLuzio, to me known to be the Vice President, Law & Administration, of Teck Cominco American Incorporated, the corporation that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act of said corporation, for the uses and purposes therein mentioned, and on oath stated that he was authorized to execute the said instrument on behalf of said corporation.

Given under my hand and official seal the day and year in this certificate first above written.

Deborah A. Frost
Notary Public in and for the State of Washington
residing at Spokane.

My Commission Expires: 5/11/07

DEBORAH A. FROST
COMMISSION EXPIRES
NOTARY
PUBLIC
5-11-07
STATE OF WASHINGTON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T3S-R34W
T4S-R36W
T4S-R35W
T4S-R34W
T5S-R37W
T5S-R36W
T5S-R35W
Pebble Property
N
360000 mE
370000 mE
380000 mE
6650000 mN
6640000 mN
6630000 mN
6620000 mN
0 2.5 5
kilometers
0 1.5 3
miles
UTM Zone 5 (NAD 27 US for Alaska)
Northern Dynasty Mines Inc.
Pebble Gold-Copper Project
Schedule "A" - Pebble Property
Date: April 25, 2006
Scale: as shown
File: PEB_ScheduleA_25apr06_yl.WOR
Plotted by: YL

EXHIBIT A

The name and address of the claim owner for the 918 claims (all 40 acres in size) listed below is:

Northern Dynasty Holdings Inc.
Suite 604, 3201 C Street
Anchorage, Alaska 99503

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
516769	Sill 5951	4S	35W	SE12
516770	Sill 5952	4S	35W	SE12
516779	Sill 6051	4S	35W	SE12
516780	Sill 6052	4S	35W	SE12
516789	Sill 6151	4S	35W	NE12
516790	Sill 6152	4S	35W	NE12
516797	Sill 6247	4S	35W	NE11
516798	Sill 6248	4S	35W	NE11
516799	Sill 6249	4S	35W	NW12
516800	Sill 6250	4S	35W	NW12
516801	Sill 6251	4S	35W	NE12
516802	Sill 6252	4S	35W	NE12
516806	Pebble Beach 5448	3S	35W	SE20
516807	Pebble Beach 5449	3S	35W	SE20
516808	Pebble Beach 5450	3S	35W	SW21
516809	Pebble Beach 5451	3S	35W	SW21
516810	Pebble Beach 5452	3S	35W	SE21
516811	Pebble Beach 5453	3S	35W	SE21
516812	Pebble Beach 5454	3S	35W	SW22
516813	Pebble Beach 5548	3S	35W	SE20
516814	Pebble Beach 5549	3S	35W	SE20
516815	Pebble Beach 5550	3S	35W	SW21
516816	Pebble Beach 5551	3S	35W	SW21
516817	Pebble Beach 5552	3S	35W	SE21
516818	Pebble Beach 5553	3S	35W	SE21
516819	Pebble Beach 5554	3S	35W	SW22
516820	Pebble Beach 5651	3S	35W	NW21
516821	Pebble Beach 5652	3S	35W	NE21
516822	Pebble Beach 5653	3S	35W	NE21
516823	Pebble Beach 5654	3S	35W	NW22

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
516824	Pebble Beach 5751	3S	35W	NW21
516825	Pebble Beach 5752	3S	35W	NE21
516826	Pebble Beach 5753	3S	35W	NE21
516827	Pebble Beach 5754	3S	35W	NW22
516828	Pebble Beach 5852	3S	35W	SE16
516829	Pebble Beach 5853	3S	35W	SE16
516830	Pebble Beach 5854	3S	35W	SW15
516831	Pebble Beach 5952	3S	35W	SE16
516832	Pebble Beach 5953	3S	35W	SE16
516833	Pebble Beach 5954	3S	35W	SW15
516834	Pebble Beach 6052	3S	35W	NE16
516835	Pebble Beach 6053	3S	35W	NE16
516836	Pebble Beach 6054	3S	35W	NW15
516837	Pebble Beach 6153	3S	35W	NE16
516838	Pebble Beach 6154	3S	35W	NW15
516839	Pebble Beach 4651	3S	35W	SW33
516840	Pebble Beach 4652	3S	35W	SE33
516841	Pebble Beach 4653	3S	35W	SE33
516842	Pebble Beach 4751	3S	35W	SW33
516843	Pebble Beach 4752	3S	35W	SE33
516844	Pebble Beach 4753	3S	35W	SE33
516845	Pebble Beach 4851	3S	35W	NW33
516846	Pebble Beach 4852	3S	35W	NE33
516847	Pebble Beach 4853	3S	35W	NE33
516848	Pebble Beach 4951	3S	35W	NW33
516849	Pebble Beach 4952	3S	35W	NE33
516850	Pebble Beach 4953	3S	35W	NE33
516851	Pebble Beach 5048	3S	35W	SE29
516852	Pebble Beach 5049	3S	35W	SE29
516853	Pebble Beach 5050	3S	35W	SW28
516854	Pebble Beach 5051	3S	35W	SW28
516855	Pebble Beach 5052	3S	35W	SE28
516856	Pebble Beach 5053	3S	35W	SE28
516857	Pebble Beach 5148	3S	35W	SE29
516858	Pebble Beach 5149	3S	35W	SE29
516859	Pebble Beach 5150	3S	35W	SW28
516860	Pebble Beach 5151	3S	35W	SW28
516861	Pebble Beach 5152	3S	35W	SE28
516862	Pebble Beach 5153	3S	35W	SE28
516863	Pebble Beach 5248	3S	35W	NE29
516864	Pebble Beach 5249	3S	35W	NE29

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
516865	Pebble Beach 5250	3S	35W	NW28
516866	Pebble Beach 5251	3S	35W	NW28
516867	Pebble Beach 5252	3S	35W	NE28
516868	Pebble Beach 5253	3S	35W	NE28
516869	Pebble Beach 5348	3S	35W	NE29
516870	Pebble Beach 5349	3S	35W	NE29
516871	Pebble Beach 5350	3S	35W	NW28
516872	Pebble Beach 5351	3S	35W	NW28
516873	Pebble Beach 5352	3S	35W	NE28
516874	Pebble Beach 5353	3S	35W	NE28
516879	Sill 6351	4S	35W	SE1
516880	Sill 6352	4S	35W	SE1
516888	Sill 6451	4S	35W	SE1
516889	Sill 6452	4S	35W	SE1
516948	Pebble Beach 3850	4S	35W	SW9
516949	Pebble Beach 3851	4S	35W	SW9
516950	Pebble Beach 3852	4S	35W	SE9
516951	Pebble Beach 3950	4S	35W	SW9
516952	Pebble Beach 3951	4S	35W	SW9
516953	Pebble Beach 3952	4S	35W	SE9
516954	Pebble Beach 4050	4S	35W	NW9
516955	Pebble Beach 4051	4S	35W	NW9
516956	Pebble Beach 4052	4S	35W	NE9
516957	Pebble Beach 4150	4S	35W	NW9
516958	Pebble Beach 4151	4S	35W	NW9
516959	Pebble Beach 4152	4S	35W	NE9
516960	Pebble Beach 4250	4S	35W	SW4
516961	Pebble Beach 4251	4S	35W	SW4
516962	Pebble Beach 4252	4S	35W	SE4
516963	Pebble Beach 4253	4S	35W	SE4
516964	Pebble Beach 4254	4S	35W	SW3
516965	Pebble Beach 4350	4S	35W	SW4
516966	Pebble Beach 4351	4S	35W	SW4
516967	Pebble Beach 4352	4S	35W	SE4
516968	Pebble Beach 4353	4S	35W	SE4
516969	Pebble Beach 4354	4S	35W	SW3
516970	Pebble Beach 4451	4S	35W	NW4
516971	Pebble Beach 4452	4S	35W	NE4
516972	Pebble Beach 4453	4S	35W	NE4
516973	Pebble Beach 4551	4S	35W	NW4
516974	Pebble Beach 4552	4S	35W	NE4

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
516975	Pebble Beach 4553	4S	35W	NE4
524511	Sill 5543	4S	35W	SE15
524512	Sill 5544	4S	35W	SE15
524515	Sill 5643	4S	35W	SE15
524516	Sill 5644	4S	35W	SE15
524519	Sill 5743	4S	35W	NE15
524520	Sill 5744	4S	35W	NE15
524523	Sill 5843	4S	35W	NE15
524524	Sill 5844	4S	35W	NE15
524527	Sill 5943	4S	35W	SE10
524528	Sill 5944	4S	35W	SE10
524531	Sill 6043	4S	35W	SE10
524532	Sill 6044	4S	35W	SE10
524535	Sill 6143	4S	35W	NE10
524536	Sill 6144	4S	35W	NE10
524539	Sill 6243	4S	35W	NE10
524540	Sill 6244	4S	35W	NE10
524541	Sill 6245	4S	35W	NW11
524542	Sill 6246	4S	35W	NW11
524543	Sill 6343	4S	35W	SE3
524544	Sill 6344	4S	35W	SE3
524550	Sill 6443	4S	35W	SE3
524551	Sill 6444	4S	35W	SE3
524557	Sill 6543	4S	35W	NE3
524558	Sill 6544	4S	35W	NE3
524568	Sill 6643	4S	35W	NE3
524569	Sill 6644	4S	35W	NE3
524579	Sill 6743	3S	35W	SE34
524580	Sill 6744	3S	35W	SE34
524595	Sill 6843	3S	35W	SE34
524596	Sill 6844	3S	35W	SE34
524611	Sill 6943	3S	35W	NE34
524612	Sill 6944	3S	35W	NE34
524630	Sill 7043	3S	35W	NE34
524631	Sill 7044	3S	35W	NE34
524649	Sill 7143	3S	35W	SE27
524650	Sill 7144	3S	35W	SE27
524668	Sill 7243	3S	35W	SE27
524669	Sill 7244	3S	35W	SE27
524684	Sill 7343	3S	35W	NE27
524685	Sill 7344	3S	35W	NE27

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
524698	Sill 7443	3S	35W	NE27
524699	Sill 7444	3S	35W	NE27
524712	Sill 7543	3S	35W	SE22
524713	Sill 7544	3S	35W	SE22
524714	Sill 7545	3S	35W	SW23
524715	Sill 7546	3S	35W	SW23
524716	Sill 7547	3S	35W	SE23
524717	Sill 7548	3S	35W	SE23
524748	Pebble Beach 3452	4S	35W	SE16
524749	Pebble Beach 3453	4S	35W	SE16
524750	Pebble Beach 3454	4S	35W	SW15
524751	Pebble Beach 3455	4S	35W	SW15
524752	Pebble Beach 3552	4S	35W	SE16
524753	Pebble Beach 3553	4S	35W	SE16
524754	Pebble Beach 3554	4S	35W	SW15
524755	Pebble Beach 3555	4S	35W	SW15
524756	Pebble Beach 3652	4S	35W	NE16
524757	Pebble Beach 3653	4S	35W	NE16
524758	Pebble Beach 3654	4S	35W	NW15
524759	Pebble Beach 3655	4S	35W	NW15
524760	Pebble Beach 3752	4S	35W	NE16
524761	Pebble Beach 3753	4S	35W	NE16
524762	Pebble Beach 3754	4S	35W	NW15
524763	Pebble Beach 3755	4S	35W	NW15
524764	Pebble Beach 3848	4S	35W	SE8
524765	Pebble Beach 3849	4S	35W	SE8
524766	Pebble Beach 3853	4S	35W	SE9
524767	Pebble Beach 3854	4S	35W	SW10
524768	Pebble Beach 3855	4S	35W	SW10
524769	Pebble Beach 3948	4S	35W	SE8
524770	Pebble Beach 3949	4S	35W	SE8
524771	Pebble Beach 3953	4S	35W	SE9
524772	Pebble Beach 3954	4S	35W	SW10
524773	Pebble Beach 3955	4S	35W	SW10
524774	Pebble Beach 4048	4S	35W	NE8
524775	Pebble Beach 4049	4S	35W	NE8
524776	Pebble Beach 4053	4S	35W	NE9
524777	Pebble Beach 4054	4S	35W	NW10
524778	Pebble Beach 4055	4S	35W	NW10
524779	Pebble Beach 4148	4S	35W	NE8
524780	Pebble Beach 4149	4S	35W	NE8

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
524781	Pebble Beach 4153	4S	35W	NE9
524782	Pebble Beach 4154	4S	35W	NW10
524783	Pebble Beach 4155	4S	35W	NW10
524784	Pebble Beach 4248	4S	35W	SE5
524785	Pebble Beach 4249	4S	35W	SE5
524786	Pebble Beach 4255	4S	35W	SW3
524787	Pebble Beach 4348	4S	35W	SE5
524788	Pebble Beach 4349	4S	35W	SE5
524789	Pebble Beach 4355	4S	35W	SW3
524790	Pebble Beach 4448	4S	35W	NE5
524791	Pebble Beach 4449	4S	35W	NE5
524792	Pebble Beach 4450	4S	35W	NW4
524793	Pebble Beach 4454	4S	35W	NW3
524794	Pebble Beach 4455	4S	35W	NW3
524795	Pebble Beach 4548	4S	35W	NE5
524796	Pebble Beach 4549	4S	35W	NE5
524797	Pebble Beach 4550	4S	35W	NW4
524798	Pebble Beach 4554	4S	35W	NW3
524799	Pebble Beach 4555	4S	35W	NW3
524800	Pebble Beach 4648	3S	35W	SE32
524801	Pebble Beach 4649	3S	35W	SE32
524802	Pebble Beach 4650	3S	35W	SW33
524803	Pebble Beach 4654	3S	35W	SW34
524804	Pebble Beach 4655	3S	35W	SW34
524805	Pebble Beach 4748	3S	35W	SE32
524806	Pebble Beach 4749	3S	35W	SE32
524807	Pebble Beach 4750	3S	35W	SW33
524808	Pebble Beach 4754	3S	35W	SW34
524809	Pebble Beach 4755	3S	35W	SW34
524810	Pebble Beach 4848	3S	35W	NE32
524811	Pebble Beach 4849	3S	35W	NE32
524812	Pebble Beach 4850	3S	35W	NW33
524813	Pebble Beach 4854	3S	35W	NW34
524814	Pebble Beach 4855	3S	35W	NW34
524815	Pebble Beach 4948	3S	35W	NE32
524816	Pebble Beach 4949	3S	35W	NE32
524817	Pebble Beach 4950	3S	35W	NW33
524818	Pebble Beach 4954	3S	35W	NW34
524819	Pebble Beach 4955	3S	35W	NW34
524820	Pebble Beach 5054	3S	35W	SW27
524821	Pebble Beach 5055	3S	35W	SW27

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
524822	Pebble Beach 5154	3S	35W	SW27
524823	Pebble Beach 5155	3S	35W	SW27
524824	Pebble Beach 5254	3S	35W	NW27
524825	Pebble Beach 5255	3S	35W	NW27
524826	Pebble Beach 5354	3S	35W	NW27
524827	Pebble Beach 5355	3S	35W	NW27
524828	Pebble Beach 5455	3S	35W	SW22
524829	Pebble Beach 5648	3S	35W	NE20
524830	Pebble Beach 5649	3S	35W	NE20
524831	Pebble Beach 5650	3S	35W	NW21
524832	Pebble Beach 5748	3S	35W	NE20
524833	Pebble Beach 5749	3S	35W	NE20
524834	Pebble Beach 5750	3S	35W	NW21
524835	Pebble Beach 5848	3S	35W	SE17
524836	Pebble Beach 5849	3S	35W	SE17
524837	Pebble Beach 5850	3S	35W	SW16
524838	Pebble Beach 5851	3S	35W	SW16
524839	Pebble Beach 5948	3S	35W	SE17
524840	Pebble Beach 5949	3S	35W	SE17
524841	Pebble Beach 5950	3S	35W	SW16
524842	Pebble Beach 5951	3S	35W	SW16
524843	Pebble Beach 6048	3S	35W	NE17
524844	Pebble Beach 6049	3S	35W	NE17
524845	Pebble Beach 6050	3S	35W	NW16
524846	Pebble Beach 6051	3S	35W	NW16
524847	Pebble Beach 6148	3S	35W	NE17
524848	Pebble Beach 6149	3S	35W	NE17
524849	Pebble Beach 6150	3S	35W	NW16
524850	Pebble Beach 6151	3S	35W	NW16
524851	Pebble Beach 6248	3S	35W	SE8
524852	Pebble Beach 6249	3S	35W	SE8
524853	Pebble Beach 6250	3S	35W	SW9
524854	Pebble Beach 6251	3S	35W	SW9
524855	Pebble Beach 6252	3S	35W	SE9
524856	Pebble Beach 6253	3S	35W	SE9
524857	Pebble Beach 6254	3S	35W	SW10
524858	Pebble Beach 6348	3S	35W	SE8
524859	Pebble Beach 6349	3S	35W	SE8
524860	Pebble Beach 6350	3S	35W	SW9
524861	Pebble Beach 6351	3S	35W	SW9
524862	Pebble Beach 6352	3S	35W	SE9

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
524863	Pebble Beach 6353	3S	35W	SE9
524864	Pebble Beach 6354	3S	35W	SW10
525849	Pebble Beach 6152	3S	35W	NE16
531355	Pebble Beach 3642	4S	35W	NW18
531356	Pebble Beach 3643	4S	35W	NW18
531357	Pebble Beach 3644	4S	35W	NE18
531358	Pebble Beach 3645	4S	35W	NE18
531359	Pebble Beach 3742	4S	35W	NW18
531360	Pebble Beach 3743	4S	35W	NW18
531361	Pebble Beach 3744	4S	35W	NE18
531362	Pebble Beach 3745	4S	35W	NE18
531363	Pebble Beach 3842	4S	35W	SW7
531364	Pebble Beach 3843	4S	35W	SW7
531365	Pebble Beach 3844	4S	35W	SE7
531366	Pebble Beach 3845	4S	35W	SE7
531367	Pebble Beach 3846	4S	35W	SW8
531368	Pebble Beach 3847	4S	35W	SW8
531369	Pebble Beach 3942	4S	35W	SW7
531370	Pebble Beach 3943	4S	35W	SW7
531371	Pebble Beach 3944	4S	35W	SE7
531372	Pebble Beach 3945	4S	35W	SE7
531373	Pebble Beach 3946	4S	35W	SW8
531374	Pebble Beach 3947	4S	35W	SW8
531375	Pebble Beach 4042	4S	35W	NW7
531376	Pebble Beach 4043	4S	35W	NW7
531377	Pebble Beach 4044	4S	35W	NE7
531378	Pebble Beach 4045	4S	35W	NE7
531379	Pebble Beach 4046	4S	35W	NW8
531380	Pebble Beach 4047	4S	35W	NW8
531381	Pebble Beach 4142	4S	35W	NW7
531382	Pebble Beach 4143	4S	35W	NW7
531383	Pebble Beach 4144	4S	35W	NE7
531384	Pebble Beach 4145	4S	35W	NE7
531385	Pebble Beach 4146	4S	35W	NW8
531386	Pebble Beach 4147	4S	35W	NW8
531387	Pebble Beach 4244	4S	35W	SE6
531388	Pebble Beach 4245	4S	35W	SE6
531389	Pebble Beach 4246	4S	35W	SW5
531390	Pebble Beach 4247	4S	35W	SW5
531391	Pebble Beach 4344	4S	35W	SE6
531392	Pebble Beach 4345	4S	35W	SE6

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
531393	Pebble Beach 4346	4S	35W	SW5
531394	Pebble Beach 4347	4S	35W	SW5
531395	Pebble Beach 4444	4S	35W	NE6
531396	Pebble Beach 4445	4S	35W	NE6
531397	Pebble Beach 4446	4S	35W	NW5
531398	Pebble Beach 4447	4S	35W	NW5
531399	Pebble Beach 4544	4S	35W	NE6
531400	Pebble Beach 4547	4S	35W	NW5
531401	Pebble Beach 4644	3S	35W	SE31
531402	Pebble Beach 4645	3S	35W	SE31
531403	Pebble Beach 4646	3S	35W	SW32
531404	Pebble Beach 4647	3S	35W	SW32
531405	Pebble Beach 4744	3S	35W	SE31
531406	Pebble Beach 4745	3S	35W	SE31
531407	Pebble Beach 4746	3S	35W	SW32
531408	Pebble Beach 4747	3S	35W	SW32
531409	Pebble Beach 4844	3S	35W	NE31
531410	Pebble Beach 4845	3S	35W	NE31
531411	Pebble Beach 4846	3S	35W	NW32
531412	Pebble Beach 4847	3S	35W	NW32
531413	Pebble Beach 4944	3S	35W	NE31
531414	Pebble Beach 4945	3S	35W	NE31
531415	Pebble Beach 4946	3S	35W	NW32
531416	Pebble Beach 4947	3S	35W	NW32
531417	Pebble Beach 5044	3S	35W	SE30
531418	Pebble Beach 5045	3S	35W	SE30
531419	Pebble Beach 5046	3S	35W	SW29
531420	Pebble Beach 5047	3S	35W	SW29
531421	Pebble Beach 5144	3S	35W	SE30
531422	Pebble Beach 5145	3S	35W	SE30
531423	Pebble Beach 5146	3S	35W	SW29
531424	Pebble Beach 5147	3S	35W	SW29
531425	Pebble Beach 5244	3S	35W	NE30
531426	Pebble Beach 5245	3S	35W	NE30
531427	Pebble Beach 5246	3S	35W	NW29
531428	Pebble Beach 5247	3S	35W	NW29
531429	Pebble Beach 5344	3S	35W	NE30
531430	Pebble Beach 5345	3S	35W	NE30
531431	Pebble Beach 5346	3S	35W	NW29
531432	Pebble Beach 5347	3S	35W	NW29
531433	Pebble Beach 5444	3S	35W	SE19

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
531434	Pebble Beach 5445	3S	35W	SE19
531435	Pebble Beach 5446	3S	35W	SW20
531436	Pebble Beach 5447	3S	35W	SW20
531437	Pebble Beach 5544	3S	35W	SE19
531438	Pebble Beach 5545	3S	35W	SE19
531439	Pebble Beach 5546	3S	35W	SW20
531440	Pebble Beach 5547	3S	35W	SW20
531441	Pebble Beach 5644	3S	35W	NE19
531442	Pebble Beach 5645	3S	35W	NE19
531443	Pebble Beach 5646	3S	35W	NW20
531444	Pebble Beach 5647	3S	35W	NW20
531445	Pebble Beach 5744	3S	35W	NE19
531446	Pebble Beach 5745	3S	35W	NE19
531447	Pebble Beach 5746	3S	35W	NW20
531448	Pebble Beach 5747	3S	35W	NW20
531449	Pebble Beach 5844	3S	35W	SE18
531450	Pebble Beach 5845	3S	35W	SE18
531451	Pebble Beach 5846	3S	35W	SW17
531452	Pebble Beach 5847	3S	35W	SW17
531453	Pebble Beach 5944	3S	35W	SE18
531454	Pebble Beach 5945	3S	35W	SE18
531455	Pebble Beach 5946	3S	35W	SW17
531456	Pebble Beach 5947	3S	35W	SW17
531457	Pebble Beach 6044	3S	35W	NE18
531458	Pebble Beach 6045	3S	35W	NE18
531459	Pebble Beach 6046	3S	35W	NW17
531460	Pebble Beach 6047	3S	35W	NW17
531461	Pebble Beach 6144	3S	35W	NE18
531462	Pebble Beach 6145	3S	35W	NE18
531463	Pebble Beach 6146	3S	35W	NW17
531464	Pebble Beach 6147	3S	35W	NW17
531648	Pebble Beach 4545	4S	35W	NE6
531649	Pebble Beach 4546	4S	35W	NW5
540399	Pebble Beach 5555	3S	35W	SW22
540400	Pebble Beach 5655	3S	35W	NW22
540401	Pebble Beach 5755	3S	35W	NW22
540402	Pebble Beach 5855	3S	35W	SW15
540403	Pebble Beach 5955	3S	35W	SW15
540404	Pebble Beach 6055	3S	35W	NW15
540405	Pebble Beach 6155	3S	35W	NW15
540406	Pebble Beach 6255	3S	35W	SW10

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
540407	Pebble Beach 6355	3S	35W	SW10
540408	Pebble Beach 6448	3S	35W	NE8
540409	Pebble Beach 6449	3S	35W	NE8
540410	Pebble Beach 6450	3S	35W	NW9
540411	Pebble Beach 6451	3S	35W	NW9
540412	Pebble Beach 6452	3S	35W	NE9
540413	Pebble Beach 6453	3S	35W	NE9
540414	Pebble Beach 6454	3S	35W	NW10
540415	Pebble Beach 6455	3S	35W	NW10
540416	Pebble Beach 6548	3S	35W	NE8
540417	Pebble Beach 6549	3S	35W	NE8
540418	Pebble Beach 6550	3S	35W	NW9
540419	Pebble Beach 6551	3S	35W	NW9
540420	Pebble Beach 6552	3S	35W	NE9
540421	Pebble Beach 6553	3S	35W	NE9
540422	Pebble Beach 6554	3S	35W	NW10
540423	Pebble Beach 6555	3S	35W	NW10
540424	Sill 7643	3S	35W	SE22
540425	Sill 7644	3S	35W	SE22
540426	Sill 7645	3S	35W	SW23
540427	Sill 7646	3S	35W	SW23
540428	Sill 7647	3S	35W	SE23
540429	Sill 7648	3S	35W	SE23
540430	Sill 7743	3S	35W	NE22
540431	Sill 7744	3S	35W	NE22
540432	Sill 7745	3S	35W	NW23
540433	Sill 7746	3S	35W	NW23
540434	Sill 7747	3S	35W	NE23
540435	Sill 7748	3S	35W	NE23
540436	Sill 7843	3S	35W	NE22
540437	Sill 7844	3S	35W	NE22
540438	Sill 7845	3S	35W	NW23
540439	Sill 7846	3S	35W	NW23
540440	Sill 7847	3S	35W	NE23
540441	Sill 7848	3S	35W	NE23
540442	Sill 7943	3S	35W	SE15
540443	Sill 7944	3S	35W	SE15
540444	Sill 7945	3S	35W	SW14
540445	Sill 7946	3S	35W	SW14
540446	Sill 7947	3S	35W	SE14
540447	Sill 7948	3S	35W	SE14

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
540448	Sill 8043	3S	35W	SE15
540449	Sill 8044	3S	35W	SE15
540450	Sill 8045	3S	35W	SW14
540451	Sill 8046	3S	35W	SW14
540452	Sill 8047	3S	35W	SE14
540453	Sill 8048	3S	35W	SE14
540454	Sill 8143	3S	35W	NE15
540455	Sill 8144	3S	35W	NE15
540456	Sill 8145	3S	35W	NW14
540457	Sill 8146	3S	35W	NW14
540458	Sill 8147	3S	35W	NE14
540459	Sill 8148	3S	35W	NE14
540460	Sill 8243	3S	35W	NE15
540461	Sill 8244	3S	35W	NE15
540462	Sill 8245	3S	35W	NW14
540463	Sill 8246	3S	35W	NW14
540464	Sill 8247	3S	35W	NE14
540465	Sill 8248	3S	35W	NE14
540466	Sill 8343	3S	35W	SE10
540467	Sill 8344	3S	35W	SE10
540468	Sill 8443	3S	35W	SE10
540469	Sill 8444	3S	35W	SE10
540470	Sill 8543	3S	35W	NE10
540471	Sill 8544	3S	35W	NE10
540472	Sill 8643	3S	35W	NE10
540473	Sill 8644	3S	35W	NE10
541245	PB 113	4S	35W	SW18
541246	PB 114	4S	35W	SW18
541247	PB 115	4S	35W	SE18
541248	PB 116	4S	35W	SE18
541249	PB 117	4S	35W	SW18
541250	PB 118	4S	35W	SW18
541251	PB 119	4S	35W	SE18
541252	PB 120	4S	35W	SE18
542561	Pebble Beach 4856	3S	35W	NE34,NW34
542562	Pebble Beach 4956	3S	35W	NE34,NW34
542563	Pebble Beach 5056	3S	35W	SE27,SW27
542564	Pebble Beach 5156	3S	35W	SE27,SW27
542565	Pebble Beach 5256	3S	35W	NE27,NW27
542566	Pebble Beach 5356	3S	35W	NE27,NW27
542567	Pebble Beach 5456	3S	35W	SE22,SW22

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
542568	Pebble Beach 5556	3S	35W	SE22,SW22
542569	Pebble Beach 5656	3S	35W	NE22,NW22
542570	Pebble Beach 5756	3S	35W	NE22,NW22
542571	Pebble Beach 5856	3S	35W	SE15,SW15
542572	Pebble Beach 5956	3S	35W	SE15,SW15
542573	Pebble Beach 6056	3S	35W	NE15,NW15
542574	Pebble Beach 6156	3S	35W	NE15,NW15
542575	Pebble Beach 6256	3S	35W	SE10,SW10
542576	Pebble Beach 6356	3S	35W	SE10,SW10
542577	Pebble Beach 6456	3S	35W	NE10,NW10
542578	Pebble Beach 6556	3S	35W	NE10,NW10
542579	Pebble Beach 4642	3S	35W	SW31
542580	Pebble Beach 4643	3S	35W	SW31
542581	Pebble Beach 4742	3S	35W	SW31
542582	Pebble Beach 4743	3S	35W	SW31
542583	Pebble Beach 4842	3S	35W	NW31
542584	Pebble Beach 4843	3S	35W	NW31
542585	Pebble Beach 4942	3S	35W	NW31
542586	Pebble Beach 4943	3S	35W	NW31
542587	Pebble Beach 5042	3S	35W	SW30
542588	Pebble Beach 5043	3S	35W	SW30
542589	Pebble Beach 5142	3S	35W	SW30
542590	Pebble Beach 5143	3S	35W	SW30
542591	Pebble Beach 5242	3S	35W	NW30
542592	Pebble Beach 5243	3S	35W	NW30
542593	Pebble Beach 5342	3S	35W	NW30
542594	Pebble Beach 5343	3S	35W	NW30
542595	Pebble Beach 5442	3S	35W	SW19
542596	Pebble Beach 5443	3S	35W	SW19
542597	Pebble Beach 5542	3S	35W	SW19
542598	Pebble Beach 5543	3S	35W	SW19
542599	Pebble Beach 5642	3S	35W	NW19
542600	Pebble Beach 5643	3S	35W	NW19
542601	Pebble Beach 5742	3S	35W	NW19
542602	Pebble Beach 5743	3S	35W	NW19
542603	Pebble Beach 5842	3S	35W	SW18
542604	Pebble Beach 5843	3S	35W	SW18
566247	Pebble Beach 1936	5S	36W	SE4
566248	Pebble Beach 1937	5S	36W	SE4
566249	Pebble Beach 1938	5S	36W	SW3
566250	Pebble Beach 1939	5S	36W	SW3

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
566251	Pebble Beach 1940	5S	36W	SE3
566252	Pebble Beach 1941	5S	36W	SE3
566287	Pebble Beach 2036	5S	36W	NE4
566288	Pebble Beach 2037	5S	36W	NE4
566289	Pebble Beach 2038	5S	36W	NW3
566290	Pebble Beach 2039	5S	36W	NW3
566291	Pebble Beach 2040	5S	36W	NE3
566292	Pebble Beach 2041	5S	36W	NE3
566327	Pebble Beach 2136	5S	36W	NE4
566328	Pebble Beach 2137	5S	36W	NE4
566329	Pebble Beach 2138	5S	36W	NW3
566330	Pebble Beach 2139	5S	36W	NW3
566331	Pebble Beach 2140	5S	36W	NE3
566332	Pebble Beach 2141	5S	36W	NE3
566367	Pebble Beach 2236	4S	36W	SE35
566368	Pebble Beach 2237	4S	36W	SE35
566369	Pebble Beach 2238	4S	36W	SW36
566370	Pebble Beach 2239	4S	36W	SW36
566371	Pebble Beach 2240	4S	36W	SE36
566372	Pebble Beach 2241	4S	36W	SE36
566373	Pebble Beach 2242	4S	35W	SW31
566407	Pebble Beach 2336	4S	36W	SE35
566408	Pebble Beach 2337	4S	36W	SE35
566409	Pebble Beach 2338	4S	36W	SW36
566410	Pebble Beach 2339	4S	36W	SW36
566411	Pebble Beach 2340	4S	36W	SE36
566412	Pebble Beach 2341	4S	36W	SE36
566413	Pebble Beach 2342	4S	35W	SW31
566447	Pebble Beach 2436	4S	36W	NE35
566448	Pebble Beach 2437	4S	36W	NE35
566449	Pebble Beach 2438	4S	36W	NW36
566450	Pebble Beach 2439	4S	36W	NW36
566451	Pebble Beach 2440	4S	36W	NE36
566452	Pebble Beach 2441	4S	36W	NE36
566453	Pebble Beach 2442	4S	35W	NW31
566487	Pebble Beach 2536	4S	36W	NE35
566488	Pebble Beach 2537	4S	36W	NE35
566489	Pebble Beach 2538	4S	36W	NW36
566490	Pebble Beach 2539	4S	36W	NW36
566491	Pebble Beach 2540	4S	36W	NE36
566492	Pebble Beach 2541	4S	36W	NE36

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
566527	Pebble Beach 2636	4S	36W	SE26
566528	Pebble Beach 2637	4S	36W	SE26
566529	Pebble Beach 2638	4S	36W	SW25
566530	Pebble Beach 2639	4S	36W	SW25
566531	Pebble Beach 2640	4S	36W	SE25
566532	Pebble Beach 2641	4S	36W	SE25
566567	Pebble Beach 2736	4S	36W	SE26
566568	Pebble Beach 2737	4S	36W	SE26
566569	Pebble Beach 2738	4S	36W	SW25
566570	Pebble Beach 2739	4S	36W	SW25
566571	Pebble Beach 2740	4S	36W	SE25
566572	Pebble Beach 2741	4S	36W	SE25
566607	Pebble Beach 3138	4S	36W	SW24
566608	Pebble Beach 3139	4S	36W	SW24
566609	Pebble Beach 3140	4S	36W	SE24
566610	Pebble Beach 3141	4S	36W	SE24
566637	Pebble Beach 2938	4S	36W	NW25
566638	Pebble Beach 2939	4S	36W	NW25
566639	Pebble Beach 2940	4S	36W	NE25
566640	Pebble Beach 2941	4S	36W	NE25
566655	Pebble Beach 2836	4S	36W	NE26
566656	Pebble Beach 2837	4S	36W	NE26
566657	Pebble Beach 2838	4S	36W	NW25
566658	Pebble Beach 2839	4S	36W	NW25
566659	Pebble Beach 2840	4S	36W	NE25
566660	Pebble Beach 2841	4S	36W	NE25
566697	Pebble Beach 3238	4S	36W	NW24
566698	Pebble Beach 3239	4S	36W	NW24
566699	Pebble Beach 3240	4S	36W	NE24
566700	Pebble Beach 3241	4S	36W	NE24
566701	Pebble Beach 3242	4S	35W	NW19
566737	Pebble Beach 3038	4S	36W	SW24
566738	Pebble Beach 3039	4S	36W	SW24
566739	Pebble Beach 3040	4S	36W	SE24
566740	Pebble Beach 3041	4S	36W	SE24
566751	Pebble Beach 3252	4S	35W	NE21
566752	Pebble Beach 3253	4S	35W	NE21
566753	Pebble Beach 3254	4S	35W	NW22
566754	Pebble Beach 3255	4S	35W	NW22
566767	Pebble Beach 3338	4S	36W	NW24
566768	Pebble Beach 3339	4S	36W	NW24

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
566769	Pebble Beach 3340	4S	36W	NE24
566770	Pebble Beach 3341	4S	36W	NE24
566771	Pebble Beach 3342	4S	35W	NW19
566781	Pebble Beach 3352	4S	35W	NE21
566782	Pebble Beach 3353	4S	35W	NE21
566783	Pebble Beach 3354	4S	35W	NW22
566784	Pebble Beach 3355	4S	35W	NW22
566793	Pebble Beach 3438	4S	36W	SW13
566794	Pebble Beach 3439	4S	36W	SW13
566795	Pebble Beach 3440	4S	36W	SE13
566796	Pebble Beach 3441	4S	36W	SE13
566797	Pebble Beach 3446	4S	35W	SW17
566798	Pebble Beach 3447	4S	35W	SW17
566799	Pebble Beach 3448	4S	35W	SE17
566800	Pebble Beach 3449	4S	35W	SE17
566801	Pebble Beach 3450	4S	35W	SW16
566802	Pebble Beach 3451	4S	35W	SW16
566811	Pebble Beach 3538	4S	36W	SW13
566812	Pebble Beach 3539	4S	36W	SW13
566813	Pebble Beach 3540	4S	36W	SE13
566814	Pebble Beach 3541	4S	36W	SE13
566815	Pebble Beach 3546	4S	35W	SW17
566816	Pebble Beach 3547	4S	35W	SW17
566817	Pebble Beach 3548	4S	35W	SE17
566818	Pebble Beach 3549	4S	35W	SE17
566819	Pebble Beach 3550	4S	35W	SW16
566820	Pebble Beach 3551	4S	35W	SW16
566829	Pebble Beach 3638	4S	36W	NW13
566830	Pebble Beach 3639	4S	36W	NW13
566831	Pebble Beach 3640	4S	36W	NE13
566832	Pebble Beach 3641	4S	36W	NE13
566833	Pebble Beach 3646	4S	35W	NW17
566834	Pebble Beach 3647	4S	35W	NW17
566835	Pebble Beach 3648	4S	35W	NE17
566836	Pebble Beach 3649	4S	35W	NE17
566837	Pebble Beach 3650	4S	35W	NW16
566838	Pebble Beach 3651	4S	35W	NW16
566847	Pebble Beach 3738	4S	36W	NW13
566848	Pebble Beach 3739	4S	36W	NW13
566849	Pebble Beach 3740	4S	36W	NE13
566850	Pebble Beach 3741	4S	36W	NE13

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
566851	Pebble Beach 3746	4S	35W	NW17
566852	Pebble Beach 3747	4S	35W	NW17
566853	Pebble Beach 3748	4S	35W	NE17
566854	Pebble Beach 3749	4S	35W	NE17
566855	Pebble Beach 3750	4S	35W	NW16
566856	Pebble Beach 3751	4S	35W	NW16
566865	Pebble Beach 3838	4S	36W	SW12
566866	Pebble Beach 3839	4S	36W	SW12
566867	Pebble Beach 3840	4S	36W	SE12
566868	Pebble Beach 3841	4S	36W	SE12
566877	Pebble Beach 3938	4S	36W	SW12
566878	Pebble Beach 3939	4S	36W	SW12
566879	Pebble Beach 3940	4S	36W	SE12
566880	Pebble Beach 3941	4S	36W	SE12
566889	Pebble Beach 4038	4S	36W	NW12
566890	Pebble Beach 4039	4S	36W	NW12
566891	Pebble Beach 4040	4S	36W	NE12
566892	Pebble Beach 4041	4S	36W	NE12
566901	Pebble Beach 4138	4S	36W	NW12
566902	Pebble Beach 4139	4S	36W	NW12
566903	Pebble Beach 4140	4S	36W	NE12
566904	Pebble Beach 4141	4S	36W	NE12
566905	Pebble Beach 4238	4S	36W	SW1
566906	Pebble Beach 4239	4S	36W	SW1
566907	Pebble Beach 4240	4S	36W	SE1
566908	Pebble Beach 4241	4S	36W	SE1
566909	Pebble Beach 4242	4S	35W	SW6
566910	Pebble Beach 4243	4S	35W	SW6
566911	Pebble Beach 4338	4S	36W	SW1
566912	Pebble Beach 4339	4S	36W	SW1
566913	Pebble Beach 4340	4S	36W	SE1
566914	Pebble Beach 4341	4S	36W	SE1
566915	Pebble Beach 4342	4S	35W	SW6
566916	Pebble Beach 4343	4S	35W	SW6
566917	Pebble Beach 4438	4S	36W	NW1
566918	Pebble Beach 4439	4S	36W	NW1
566919	Pebble Beach 4440	4S	36W	NE1
566920	Pebble Beach 4441	4S	36W	NE1
566921	Pebble Beach 4442	4S	35W	NW6
566922	Pebble Beach 4443	4S	35W	NW6
566923	Pebble Beach 4538	4S	36W	NW1

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
566924	Pebble Beach 4539	4S	36W	NW1
566925	Pebble Beach 4540	4S	36W	NE1
566926	Pebble Beach 4541	4S	36W	NE1
566927	Pebble Beach 4542	4S	35W	NW6
566928	Pebble Beach 4543	4S	35W	NW6
566929	Pebble Beach 4638	3S	36W	SW36
566930	Pebble Beach 4639	3S	36W	SW36
566931	Pebble Beach 4640	3S	36W	SE36
566932	Pebble Beach 4641	3S	36W	SE36
566933	Pebble Beach 4738	3S	36W	SW36
566934	Pebble Beach 4739	3S	36W	SW36
566935	Pebble Beach 4740	3S	36W	SE36
566936	Pebble Beach 4741	3S	36W	SE36
566937	Pebble Beach 4838	3S	36W	NW36
566938	Pebble Beach 4839	3S	36W	NW36
566939	Pebble Beach 4840	3S	36W	NE36
566940	Pebble Beach 4841	3S	36W	NE36
566941	Pebble Beach 4938	3S	36W	NW36
566942	Pebble Beach 4939	3S	36W	NW36
566943	Pebble Beach 4940	3S	36W	NE36
566944	Pebble Beach 4941	3S	36W	NE36
566945	Pebble Beach 5038	3S	36W	SW25
566946	Pebble Beach 5039	3S	36W	SW25
566947	Pebble Beach 5040	3S	36W	SE25
566948	Pebble Beach 5041	3S	36W	SE25
566949	Pebble Beach 5138	3S	36W	SW25
566950	Pebble Beach 5139	3S	36W	SW25
566951	Pebble Beach 5140	3S	36W	SE25
566952	Pebble Beach 5141	3S	36W	SE25
566953	Pebble Beach 5238	3S	36W	NW25
566954	Pebble Beach 5239	3S	36W	NW25
566955	Pebble Beach 5240	3S	36W	NE25
566956	Pebble Beach 5241	3S	36W	NE25
566957	Pebble Beach 5338	3S	36W	NW25
566958	Pebble Beach 5339	3S	36W	NW25
566959	Pebble Beach 5340	3S	36W	NE25
566960	Pebble Beach 5341	3S	36W	NE25
566961	Pebble Beach 5438	3S	36W	SW24
566962	Pebble Beach 5439	3S	36W	SW24
566963	Pebble Beach 5440	3S	36W	SE24
566964	Pebble Beach 5441	3S	36W	SE24

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
566965	Pebble Beach 5538	3S	36W	SW24
566966	Pebble Beach 5539	3S	36W	SW24
566967	Pebble Beach 5540	3S	36W	SE24
566968	Pebble Beach 5541	3S	36W	SE24
566969	Pebble Beach 5638	3S	36W	NW24
566970	Pebble Beach 5639	3S	36W	NW24
566971	Pebble Beach 5640	3S	36W	NE24
566972	Pebble Beach 5641	3S	36W	NE24
566973	Pebble Beach 5738	3S	36W	NW24
566974	Pebble Beach 5739	3S	36W	NW24
566975	Pebble Beach 5740	3S	36W	NE24
566976	Pebble Beach 5741	3S	36W	NE24
566977	Pebble Beach 5838	3S	36W	SW13
566978	Pebble Beach 5839	3S	36W	SW13
566979	Pebble Beach 5840	3S	36W	SE13
566980	Pebble Beach 5841	3S	36W	SE13
566981	Pebble Beach 5938	3S	36W	SW13
566982	Pebble Beach 5939	3S	36W	SW13
566983	Pebble Beach 5940	3S	36W	SE13
566984	Pebble Beach 5941	3S	36W	SE13
566985	Pebble Beach 6038	3S	36W	NW13
566986	Pebble Beach 6039	3S	36W	NW13
566987	Pebble Beach 6040	3S	36W	NE13
566988	Pebble Beach 6041	3S	36W	NE13
566989	Pebble Beach 6042	3S	35W	NW18
566990	Pebble Beach 6043	3S	35W	NW18
566991	Pebble Beach 6138	3S	36W	NW13
566992	Pebble Beach 6139	3S	36W	NW13
566993	Pebble Beach 6140	3S	36W	NE13
566994	Pebble Beach 6141	3S	36W	NE13
566995	Pebble Beach 6142	3S	35W	NW18
566996	Pebble Beach 6143	3S	35W	NW18
566997	Pebble Beach 6238	3S	36W	SW12
566998	Pebble Beach 6239	3S	36W	SW12
566999	Pebble Beach 6240	3S	36W	SE12
567000	Pebble Beach 6241	3S	36W	SE12
567001	Pebble Beach 6242	3S	35W	SW7
567002	Pebble Beach 6243	3S	35W	SW7
567003	Pebble Beach 6244	3S	35W	SE7
567004	Pebble Beach 6245	3S	35W	SE7
567005	Pebble Beach 6246	3S	35W	SW8

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
567006	Pebble Beach 6247	3S	35W	SW8
567007	Pebble Beach 6338	3S	36W	SW12
567008	Pebble Beach 6339	3S	36W	SW12
567009	Pebble Beach 6340	3S	36W	SE12
567010	Pebble Beach 6341	3S	36W	SE12
567011	Pebble Beach 6342	3S	35W	SW7
567012	Pebble Beach 6343	3S	35W	SW7
567013	Pebble Beach 6344	3S	35W	SE7
567014	Pebble Beach 6345	3S	35W	SE7
567015	Pebble Beach 6346	3S	35W	SW8
567016	Pebble Beach 6347	3S	35W	SW8
567017	Pebble Beach 6438	3S	36W	NW12
567018	Pebble Beach 6439	3S	36W	NW12
567019	Pebble Beach 6440	3S	36W	NE12
567020	Pebble Beach 6441	3S	36W	NE12
567021	Pebble Beach 6442	3S	35W	NW7
567022	Pebble Beach 6443	3S	35W	NW7
567023	Pebble Beach 6444	3S	35W	NE7
567024	Pebble Beach 6445	3S	35W	NE7
567025	Pebble Beach 6446	3S	35W	NW8
567026	Pebble Beach 6447	3S	35W	NW8
567035	Pebble Beach 6546	3S	35W	NW8
567036	Pebble Beach 6547	3S	35W	NW8
567045	Pebble Beach 6646	3S	35W	SW5
567046	Pebble Beach 6647	3S	35W	SW5
567047	Pebble Beach 6648	3S	35W	SE5
567048	Pebble Beach 6649	3S	35W	SE5
567049	Pebble Beach 6650	3S	35W	SW4
567050	Pebble Beach 6651	3S	35W	SW4
567051	Pebble Beach 6652	3S	35W	SE4
567052	Pebble Beach 6653	3S	35W	SE4
567053	Pebble Beach 6654	3S	35W	SW3
567054	Pebble Beach 6655	3S	35W	SW3
567055	Pebble Beach 6656	3S	35W	SW3,SE3
567064	Pebble Beach 6746	3S	35W	SW5
567065	Pebble Beach 6747	3S	35W	SW5
567066	Pebble Beach 6748	3S	35W	SE5
567067	Pebble Beach 6749	3S	35W	SE5
567068	Pebble Beach 6750	3S	35W	SW4
567069	Pebble Beach 6751	3S	35W	SW4
567083	Pebble Beach 6846	3S	35W	NW5

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
567084	Pebble Beach 6847	3S	35W	NW5
567085	Pebble Beach 6848	3S	35W	NE5
567086	Pebble Beach 6849	3S	35W	NE5
567087	Pebble Beach 6850	3S	35W	NW4
567088	Pebble Beach 6851	3S	35W	NW4
567102	Pebble Beach 6946	3S	35W	NW5
567103	Pebble Beach 6947	3S	35W	NW5
567104	Pebble Beach 6948	3S	35W	NE5
567105	Pebble Beach 6949	3S	35W	NE5
567106	Pebble Beach 6950	3S	35W	NW4
567107	Pebble Beach 6951	3S	35W	NW4
567841	Sill 5343	4S	35W	NE22
567842	Sill 5344	4S	35W	NE22
567843	Sill 5345	4S	35W	NW23
567844	Sill 5346	4S	35W	NW23
567845	Sill 5347	4S	35W	NE23
567855	Sill 5443	4S	35W	NE22
567856	Sill 5444	4S	35W	NE22
567857	Sill 5445	4S	35W	NW23
567858	Sill 5446	4S	35W	NW23
567859	Sill 5447	4S	35W	NE23
567860	Sill 5448	4S	35W	NE23
567869	Sill 5545	4S	35W	SW14
567870	Sill 5546	4S	35W	SW14
567871	Sill 5547	4S	35W	SE14
567872	Sill 5548	4S	35W	SE14
567873	Sill 5549	4S	35W	SW13
567881	Sill 5645	4S	35W	SW14
567882	Sill 5646	4S	35W	SW14
567883	Sill 5647	4S	35W	SE14
567884	Sill 5648	4S	35W	SE14
567885	Sill 5649	4S	35W	SW13
567886	Sill 5650	4S	35W	SW13
567893	Sill 5745	4S	35W	NW14
567894	Sill 5746	4S	35W	NW14
567895	Sill 5747	4S	35W	NE14
567896	Sill 5748	4S	35W	NE14
567897	Sill 5749	4S	35W	NW13
567898	Sill 5750	4S	35W	NW13
567905	Sill 5845	4S	35W	NW14
567906	Sill 5846	4S	35W	NW14

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
567907	Sill 5847	4S	35W	NE14
567908	Sill 5848	4S	35W	NE14
567909	Sill 5849	4S	35W	NW13
567910	Sill 5850	4S	35W	NW13
567911	Sill 5851	4S	35W	NE13
567917	Sill 5945	4S	35W	SW11
567918	Sill 5946	4S	35W	SW11
567919	Sill 5947	4S	35W	SE11
567920	Sill 5948	4S	35W	SE11
567921	Sill 5949	4S	35W	SW12
567922	Sill 5950	4S	35W	SW12
567923	Sill 5953	4S	34W	SW7
567927	Sill 6045	4S	35W	SW11
567928	Sill 6046	4S	35W	SW11
567929	Sill 6047	4S	35W	SE11
567930	Sill 6048	4S	35W	SE11
567931	Sill 6049	4S	35W	SW12
567932	Sill 6050	4S	35W	SW12
567933	Sill 6053	4S	34W	SW7
567937	Sill 6145	4S	35W	NW11
567938	Sill 6146	4S	35W	NW11
567939	Sill 6147	4S	35W	NE11
567940	Sill 6148	4S	35W	NE11
567941	Sill 6149	4S	35W	NW12
567942	Sill 6150	4S	35W	NW12
567943	Sill 6153	4S	34W	NW7
567944	Sill 6154	4S	34W	NW7
567947	Sill 6253	4S	34W	NW7
567948	Sill 6254	4S	34W	NW7
567949	Sill 6255	4S	34W	NE7
567951	Sill 6345	4S	35W	SW2
567952	Sill 6346	4S	35W	SW2
567953	Sill 6347	4S	35W	SE2
567954	Sill 6348	4S	35W	SE2
567955	Sill 6349	4S	35W	SW1
567956	Sill 6350	4S	35W	SW1
567957	Sill 6353	4S	34W	SW6
567958	Sill 6354	4S	34W	SW6
567959	Sill 6355	4S	34W	SE6
567960	Sill 6356	4S	34W	SE6
567961	Sill 6445	4S	35W	SW2

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
567962	Sill 6446	4S	35W	SW2
567963	Sill 6447	4S	35W	SE2
567964	Sill 6448	4S	35W	SE2
567965	Sill 6449	4S	35W	SW1
567966	Sill 6450	4S	35W	SW1
567967	Sill 6453	4S	34W	SW6
567968	Sill 6454	4S	34W	SW6
567969	Sill 6455	4S	34W	SE6
567970	Sill 6456	4S	34W	SE6
567971	Sill 6545	4S	35W	NW2
567972	Sill 6546	4S	35W	NW2
567973	Sill 6547	4S	35W	NE2
567974	Sill 6548	4S	35W	NE2
567975	Sill 6549	4S	35W	NW1
567976	Sill 6550	4S	35W	NW1
567977	Sill 6551	4S	35W	NE1
567978	Sill 6552	4S	35W	NE1
567979	Sill 6553	4S	34W	NW6
567980	Sill 6554	4S	34W	NW6
567981	Sill 6555	4S	34W	NE6
567982	Sill 6556	4S	34W	NE6
568175	Sill 8345	3S	35W	SW11
568176	Sill 8346	3S	35W	SW11
568177	Sill 8347	3S	35W	SE11
568178	Sill 8348	3S	35W	SE11
568255	Sill 8743	3S	35W	SE3
568256	Sill 8744	3S	35W	SE3

The name and address of the claim owner for the 417 claims (40 are 40 acre claims, all others are 160 acres MRTS claims) listed below is:

Northern Dynasty Mines, Inc.

Suite 604, 3201 C Street

Anchorage, Alaska 99503

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
638779	PEB 1	4 S	36 W	NW 22
638780	PEB 2	4 S	36 W	NE 22
638781	PEB 3	4 S	36 W	NW 23
638782	PEB 4	4 S	36 W	NE 23

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
638783	PEB 5	4 S	36 W	SW 22
638784	PEB 6	4 S	36 W	SE 22
638785	PEB 7	4 S	36 W	SW 23
638786	PEB 8	4 S	36 W	SE 23
638791	PEB 13	4 S	37 W	NE 25
638792	PEB 14	4 S	36 W	NW 30
638793	PEB 15	4 S	36 W	NE 30
638794	PEB 16	4 S	36 W	NW 29
638795	PEB 17	4 S	36 W	NE 29
638796	PEB 18	4 S	36 W	NW 28
638797	PEB 19	4 S	36 W	NE 28
638798	PEB 20	4 S	36 W	NW 27
638799	PEB 21	4 S	36 W	NE 27
638800	PEB 22	4 S	36 W	NW 26
638801	PEB 23	4 S	36 W	NWNE 26
638802	PEB 24	4 S	36 W	NENE 26
638807	PEB 29	4 S	37 W	SE 25
638808	PEB 30	4 S	36 W	SW 30
638809	PEB 31	4 S	36 W	SE 30
638810	PEB 32	4 S	36 W	SW 29
638811	PEB 33	4 S	36 W	SE 29
638812	PEB 34	4 S	36 W	SW 28
638813	PEB 35	4 S	36 W	SE 28
638814	PEB 36	4 S	36 W	SW 27
638815	PEB 37	4 S	36 W	SE 27
638816	PEB 38	4 S	36 W	SW 26
638821	PEB 43	4 S	37 W	NE 36
638822	PEB 44	4 S	36 W	NW 31
638823	PEB 45	4 S	36 W	NE 31
638824	PEB 46	4 S	36 W	NW 32
638825	PEB 47	4 S	36 W	NE 32
638826	PEB 48	4 S	36 W	NW 33
638827	PEB 49	4 S	36 W	NE 33
638828	PEB 50	4 S	36 W	NW 34
638829	PEB 51	4 S	36 W	NE 34
638830	PEB 52	4 S	36 W	NW 35
638835	PEB 57	4 S	37 W	SE 36
638836	PEB 58	4 S	36 W	SW 31
638837	PEB 59	4 S	36 W	SE 31
638838	PEB 60	4 S	36 W	SW 32
638839	PEB 61	4 S	36 W	SE 32

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
638840	PEB 62	4 S	36 W	SW 33
638841	PEB 63	4 S	36 W	SE 33
638842	PEB 64	4 S	36 W	SW 34
638843	PEB 65	4 S	36 W	SE 34
638844	PEB 66	4 S	36 W	SW 35
638848	PEB 70	5 S	37 W	NW 3
638849	PEB 71	5 S	37 W	NE 3
638850	PEB 72	5 S	37 W	NW 2
638851	PEB 73	5 S	37 W	NE 2
638852	PEB 74	5 S	37 W	NW 1
638853	PEB 75	5 S	37 W	NE 1
638854	PEB 76	5 S	36 W	NW 6
638855	PEB 77	5 S	36 W	NE 6
638856	PEB 78	5 S	36 W	NW 5
638857	PEB 79	5 S	36 W	NE 5
638858	PEB 80	5 S	36 W	NW 4
638862	PEB 84	5 S	37 W	SW 3
638863	PEB 85	5 S	37 W	SE 3
638864	PEB 86	5 S	37 W	SW 2
638865	PEB 87	5 S	37 W	SE 2
638866	PEB 88	5 S	37 W	SW 1
638867	PEB 89	5 S	37 W	SE 1
638868	PEB 90	5 S	36 W	SW 6
638869	PEB 91	5 S	36 W	SE 6
638870	PEB 92	5 S	36 W	SW 5
638871	PEB 93	5 S	36 W	SE 5
638872	PEB 94	5 S	36 W	SW 4
638873	PEB 95	5 S	36 W	SWSE 4
638874	PEB 96	5 S	36 W	SESE 4
638875	PEB 97	5 S	36 W	SWSW 3
638882	PEB 104	5 S	37 W	NW 10
638883	PEB 105	5 S	37 W	NE 10
638884	PEB 106	5 S	37 W	NW 11
638885	PEB 107	5 S	37 W	NE 11
638886	PEB 108	5 S	37 W	NW 12
638887	PEB 109	5 S	37 W	NE 12
638888	PEB 110	5 S	36 W	NW 7
638889	PEB 111	5 S	36 W	NE 7
638890	PEB 112	5 S	36 W	NW 8
638891	PEB 113	5 S	36 W	NE 8
638892	PEB 114	5 S	36 W	NW 9

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
638893	PEB 115	5 S	36 W	NE 9
640061	PEB N 1	4 S	37 W	SE 24
640062	PEB N 2	4S	36 W	SW 19
640063	PEB N 3	4 S	36 W	SE 19
640064	PEB N 4	4 S	36 W	SW 20
640065	PEB N 5	4 S	36 W	SE 20
640066	PEB N 6	4 S	36 W	SW 21
640067	PEB N 7	4 S	36 W	SE 21
640068	PEB N 8	4 S	37 W	NE 24
640069	PEB N 9	4 S	36 W	NW 19
640070	PEB N 10	4 S	36 W	NE 19
640071	PEB N 11	4 S	36 W	NW 20
640072	PEB N 12	4 S	36 W	NE 20
640073	PEB N 13	4 S	36 W	NW 21
640074	PEB N 14	4 S	36 W	NE 21
640075	PEB N 15	4 S	37 W	SE 13
640076	PEB N 16	4 S	36 W	SW 18
640077	PEB N 17	4 S	36 W	SE 18
640078	PEB N 18	4 S	36 W	SW 17
640079	PEB N 19	4 S	36 W	SE 17
640080	PEB N 20	4 S	36 W	SW 16
640081	PEB N 21	4 S	36 W	SE 16
640082	PEB N 22	4 S	36 W	SW 15
640083	PEB N 23	4 S	36 W	SE 15
640084	PEB N 24	4 S	36 W	SW 14
640085	PEB N 25	4 S	36 W	SE 14
640086	PEB N 26	4 S	37 W	NE 13
640087	PEB N 27	4 S	36 W	NW 18
640088	PEB N 28	4 S	36 W	NE 18
640089	PEB N 29	4 S	36 W	NW 17
640090	PEB N 30	4 S	36 W	NE 17
640091	PEB N 31	4 S	36 W	NW 16
640092	PEB N 32	4 S	36 W	NE 16
640093	PEB N 33	4 S	36 W	NW 15
640094	PEB N 34	4 S	36 W	NE 15
640095	PEB N 35	4 S	36 W	NW 14
640096	PEB N 36	4 S	36 W	NE14
642334	PEB EB A1	4 S	35 W	NWNW 2
642335	PEB EB A2	4 S	35 W	NENW 2
642336	PEB EB A3	4 S	35 W	NWNE 2
642337	PEB EB A4	4 S	35 W	NENE 2

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
642338	PEB EB 1	3 S	35 W	SW 35
642339	PEB EB 2	3 S	35 W	SE 35
642340	PEB EB 3	3 S	35 W	NW 35
642341	PEB EB 4	3 S	35 W	NE 35
642342	PEB EB 5	3 S	34 W	SW 31
642343	PEB EB 6	3 S	34 W	SE 31
642344	PEB EB 7	3 S	34 W	SW 32
642345	PEB EB 8	3 S	34 W	SE 32
642346	PEB EB 9	3 S	34 W	SW 33
642347	PEB EB 10	3 S	34 W	SE 33
642348	PEB EB 11	3 S	34 W	NW 31
642349	PEB EB 12	3 S	34 W	NE 31
642350	PEB EB 13	3 S	34 W	NW 32
642351	PEB EB 14	3 S	34 W	NE 32
642352	PEB EB 15	3 S	34 W	NW 33
642353	PEB EB 16	3 S	34 W	NE 33
642354	PEB EB 17	3 S	35 W	SW 26
642355	PEB EB 18	3 S	35 W	SE 26
642356	PEB EB 19	3 S	35 W	SW 25
642357	PEB EB 20	3 S	35 W	SE 25
642358	PEB EB 21	3 S	34 W	SW 30
642359	PEB EB 22	3 S	34 W	SE 30
642360	PEB EB 23	3 S	34 W	SW 29
642361	PEB EB 24	3 S	34 W	SE 29
642362	PEB EB 25	3 S	34 W	SW 28
642363	PEB EB 26	3 S	34 W	SE 28
642364	PEB EB 27	3 S	35 W	NW 26
642365	PEB EB 28	3 S	35 W	NE 26
642366	PEB EB 29	3 S	35 W	NW 25
642367	PEB EB 30	3 S	35 W	NE 25
642368	PEB EB 31	3 S	34 W	NW 30
642369	PEB EB 32	3 S	34 W	NE 30
642370	PEB EB 33	3 S	34 W	NW 29
642371	PEB EB 34	3 S	34 W	NE 29
642372	PEB EB 35	3 S	34 W	NW 28
642373	PEB EB 36	3 S	34 W	NE 28
642374	PEB EB 37	3 S	35 W	SW 24
642375	PEB EB 38	3 S	35 W	SE 24
642376	PEB EB 39	3 S	34 W	SW 19
642377	PEB EB 40	3 S	34 W	SE 19
642378	PEB EB 41	3 S	34 W	SW 20

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
642379	PEB EB 42	3 S	34 W	SE 20
642380	PEB EB 43	3 S	34 W	SW 21
642381	PEB EB 44	3 S	34 W	SE 21
642382	PEB EB 45	3 S	35 W	NW 24
642383	PEB EB 46	3 S	35 W	NE 24
642384	PEB EB 47	3 S	34 W	NW 19
642385	PEB EB 48	3 S	34 W	NE 19
642386	PEB EB 49	3 S	34 W	NW 20
642387	PEB EB 50	3 S	34 W	NE 20
642388	PEB EB 51	3 S	34 W	NW 21
642389	PEB EB 52	3 S	34 W	NE 21
642390	PEB EB 53	3 S	35 W	SW 13
642391	PEB EB 54	3 S	35 W	SE 13
642392	PEB EB 55	3 S	34 W	SW 18
642393	PEB EB 56	3 S	34 W	SE 18
642394	PEB EB 57	3 S	34 W	SW 17
642395	PEB EB 58	3 S	34 W	SE 17
642396	PEB EB 59	3 S	34 W	SW 16
642397	PEB EB 60	3 S	34 W	SE 16
642398	PEB EB 61	3 S	35 W	NW 13
642399	PEB EB 62	3 S	35 W	NE 13
642400	PEB EB 63	3 S	34 W	NW 18
642401	PEB EB 64	3 S	34 W	NE 18
642402	PEB EB 65	3 S	34 W	NW 17
642403	PEB EB 66	3 S	34 W	NE 17
642404	PEB EB 67	3 S	34 W	NW 16
642405	PEB EB 68	3 S	34 W	NE 16
642406	PEB EB 69	3 S	35 W	SW 12
642407	PEB EB 70	3 S	35 W	SE 12
642408	PEB EB 71	3 S	34 W	SW 7
642409	PEB EB 72	3 S	34 W	SE 7
642410	PEB EB 73	3 S	34 W	SW 8
642411	PEB EB 74	3 S	34 W	SE 8
642412	PEB WB 1	3 S	36 W	SW 33
642413	PEB WB 2	3 S	36 W	SE 33
642414	PEB WB 3	3 S	36 W	SW 34
642415	PEB WB 4	3 S	36 W	SE 34
642416	PEB WB 5	3 S	36 W	NW 33
642417	PEB WB 6	3 S	36 W	NE 33
642418	PEB WB 7	3 S	36 W	NW 34
642419	PEB WB 8	3 S	36 W	NE 34

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
642420	PEB WB 9	3 S	36 W	SW 28
642421	PEB WB 10	3 S	36 W	SE 28
642422	PEB WB 11	3 S	36 W	SW 27
642423	PEB WB 12	3 S	36 W	SE 27
642424	PEB WB 13	3 S	36 W	SW 26
642425	PEB WB 14	3 S	36 W	SE 26
642426	PEB WB 15	3 S	36 W	NW 28
642427	PEB WB 16	3 S	36 W	NE 28
642428	PEB WB 17	3 S	36 W	NW 27
642429	PEB WB 18	3 S	36 W	NE 27
642430	PEB WB 19	3 S	36 W	NW 26
642431	PEB WB 20	3 S	36 W	NE 26
642432	PEB WB 21	3 S	36 W	SE 21
642433	PEB WB 22	3 S	36 W	SW 22
642434	PEB WB 23	3 S	36 W	SE 22
642435	PEB WB 24	3 S	36 W	SW 23
642436	PEB WB 25	3 S	36 W	SE 23
642437	PEB WB 26	3 S	36 W	NW 22
642438	PEB WB 27	3 S	36 W	NE 22
642439	PEB WB 28	3 S	36 W	NW 23
642440	PEB WB 29	3 S	36 W	NE 23
642441	PEB WB 30	3 S	36 W	SW 15
642442	PEB WB 31	3 S	36 W	SE 15
642443	PEB WB 32	3 S	36 W	SW 14
642444	PEB WB 33	3 S	36 W	SE 14
642445	PEB WB 34	3 S	36 W	NW 14
642446	PEB WB 35	3 S	36 W	NE 14
642447	PEB WB 36	3 S	36 W	SW 11
642448	PEB WB 37	3 S	36 W	SE 11
642449	PEB WB 38	3 S	36 W	NW 11
642450	PEB WB 39	3 S	36 W	NE 11
643892	PEB SE A1	4 S	35 W	SESW31
643893	PEB SE A2	4 S	35 W	NESW31
643894	PEB SE A3	4 S	35 W	SENW31
643895	PEB SE A4	4 S	35 W	NWNW31
643896	PEB SE A5	4 S	35 W	NENW31
643897	PEB SE A6	4 S	35 W	SENW19
643898	PEB SE A7	4 S	35 W	NENW19
643899	PEB SE 1	4 S	35 W	SE31
643900	PEB SE 2	4 S	35 W	SW32
643901	PEB SE 3	4 S	35 W	SE32

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
643902	PEB SE 4	4 S	35 W	NE31
643903	PEB SE 5	4 S	35 W	NW32
643904	PEB SE 6	4 S	35 W	NE32
643905	PEB SE 7	4 S	35 W	SW30
643906	PEB SE 8	4 S	35 W	SE30
643907	PEB SE 9	4 S	35 W	SW29
643908	PEB SE 10	4 S	35 W	SE29
643909	PEB SE 11	4 S	35 W	SW28
643910	PEB SE 12	4 S	35 W	SE28
643911	PEB SE 13	4 S	35 W	NW30
643912	PEB SE 14	4 S	35 W	NE30
643913	PEB SE 15	4 S	35 W	NW29
643914	PEB SE 16	4 S	35 W	NE29
643915	PEB SE 17	4 S	35 W	NW28
643916	PEB SE 18	4 S	35 W	NE28
643917	PEB SE 19	4 S	35 W	SW19
643918	PEB SE 20	4 S	35 W	SE19
643919	PEB SE 21	4 S	35 W	SW20
643920	PEB SE 22	4 S	35 W	SE20
643921	PEB SE 23	4 S	35 W	SW21
643922	PEB SE 24	4 S	35 W	SE21
643923	PEB SE 25	4 S	35 W	NE19
643924	PEB SE 26	4 S	35 W	NW20
643925	PEB SE 27	4 S	35 W	NE20
643926	PEB SE 28	4 S	35 W	NW21
643927	PEB SE 29	4 S	35 W	SW33
643928	PEB SE 30	4 S	35 W	SE33
643929	PEB SE 31	4 S	35 W	NW33
643930	PEB SE 32	4 S	35 W	NE33
643931	PEB NW A1	3 S	36 W	NWNW12
643932	PEB NW A2	3 S	36 W	NENW12
643933	PEB NW A3	3 S	36 W	NWNE12
643934	PEB NW A4	3 S	36 W	NENE12
643935	PEB NW 1	3 S	36 W	SW2
643936	PEB NW 2	3 S	36 W	SE2
643937	PEB NW 3	3 S	36 W	SW1
643938	PEB NW 4	3 S	36 W	SE1
643939	PEB NW 5	3 S	36 W	NW2
643940	PEB NW 6	3 S	36 W	NE2
643941	PEB NW 7	3 S	36 W	NW1
643942	PEB NW 8	3 S	36 W	NE1

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
643943	PEB NW 9	2 S	36 W	SW35
643944	PEB NW 10	2 S	36 W	SE35
643945	PEB NW 11	2 S	36 W	SW36
643946	PEB NW 12	2 S	36 W	SE36
643947	PEB NW 13	2 S	36 W	NW35
643948	PEB NW 14	2 S	36 W	NE35
643949	PEB NW 15	2 S	36 W	NW36
643950	PEB NW 16	2 S	36 W	NE36
643951	PEB NW 17	2 S	36 W	SW26
643952	PEB NW 18	2 S	36 W	SE26
643953	PEB NW 19	2 S	36 W	SW25
643954	PEB NW 20	2 S	36 W	SE25
643955	PEB NW 21	2 S	36 W	NW26
643956	PEB NW 22	2 S	36 W	NE26
643957	PEB NW 23	2 S	36 W	NW25
643958	PEB NW 24	2 S	36 W	NE25
643959	PEB NW 25	2 S	36 W	SW23
643960	PEB NW 26	2 S	36 W	SE23
643961	PEB NW 27	2 S	36 W	SW24
643962	PEB NW 28	2 S	36 W	SE24
643963	PEB NW 29	2 S	36 W	NW23
643964	PEB NW 30	2 S	36 W	NE23
643965	PEB NW 31	2 S	36 W	NW24
643966	PEB NW 32	2 S	36 W	NE24
644196	PEB SE 33	4 S	35 W	SW22
644197	PEB SE 34	4 S	35 W	SE22
644198	PEB SE 35	4 S	35 W	SW23
644199	PEB SE 36	4 S	35 W	SE23
644200	PEB SE 37	4 S	35 W	NW27
644201	PEB SE 38	4 S	35 W	NE27
644202	PEB SE 39	4 S	35 W	NW26
644203	PEB SE 40	4 S	35 W	NE26
644204	PEB SE 41	4 S	35 W	SW27
644205	PEB SE 42	4 S	35 W	SE27
644206	PEB SE 43	4 S	35 W	SW26
644207	PEB SE 44	4 S	35 W	SE26
644208	PEB SE 45	4 S	35 W	NW34
644209	PEB SE 46	4 S	35 W	NE34
644210	PEB SE 47	4 S	35 W	NW35
644211	PEB SE 48	4 S	35 W	SW34
644212	PEB SE 49	4 S	35 W	SE34

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
644213	PEB SE 50	5 S	36 W	NW2
644214	PEB SE 51	5 S	36 W	NE2
644215	PEB SE 52	5 S	36 W	NW1
644216	PEB SE 53	5 S	36 W	NE1
644217	PEB SE 54	5 S	35 W	NW6
644218	PEB SE 55	5 S	35 W	NE6
644219	PEB SE 56	5 S	36 W	SW2
644220	PEB SE 57	5 S	36 W	SE2
644221	PEB SE 58	5 S	36 W	SW1
644222	PEB SE 59	5 S	36 W	SE1
644223	PEB SE 60	5 S	35 W	SW6
644224	PEB SE 61	5 S	35 W	SE6
644225	PEB SE A8	4 S	35 W	SENE23
644226	PEB SE A9	5 S	36 W	SESE4
644227	PEB SE A10	5 S	36 W	SWSW3
644228	PEB SE A11	5 S	36 W	SESW3
644229	PEB SE A12	5 S	36 W	SWSE3
644230	PEB SE A13	5 S	36 W	SESE3
644231	PEB EB 75	3 S	34 W	SW9
644232	PEB EB 76	3 S	34 W	SE9
644233	PEB EB 77	3 S	35 W	NW11
644234	PEB EB 78	3 S	35 W	NE11
644235	PEB EB 79	3 S	35 W	NW12
644236	PEB EB 80	3 S	35 W	NE12
644237	PEB EB 81	3 S	34 W	NW7
644238	PEB EB 82	3 S	34 W	NE7
644239	PEB EB 83	3 S	34 W	NW8
644240	PEB EB 84	3 S	34 W	NE8
644241	PEB EB 85	3 S	34 W	NW9
644242	PEB EB 86	3 S	34 W	NE9
644243	PEB EB 87	3 S	35 W	SW2
644244	PEB EB 88	3 S	35 W	SE2
644245	PEB EB 89	3 S	35 W	SW1
644246	PEB EB 90	3 S	35 W	SE1
644247	PEB EB 91	3 S	34 W	SW6
644248	PEB EB 92	3 S	34 W	SW4
644249	PEB EB 93	3 S	34 W	SE4
644250	PEB EB 94	3 S	35 W	NW2
644251	PEB EB 95	3 S	35 W	NE2
644252	PEB EB A5	3 S	35 W	NWSW11
644253	PEB EB A6	3 S	35 W	NESW11

ILIAMNA RECORDING DISTRICT		SEWARD MERIDIAN		
ADL No.	**Claim Name**	**Township**	**Range**	**Quarter Section**
644254	PEB EB A7	3 S	35 W	NWSE11
644255	PEB EB A8	3 S	35 W	NESE11
644256	PEB WB 40	4 S	36 W	NW4
644257	PEB WB 41	4 S	36 W	NE4
644258	PEB WB 42	4 S	36 W	NW3
644259	PEB WB 43	4 S	36 W	NE3
644260	PEB WB 44	4 S	36 W	NW2
644261	PEB WB 45	4 S	36 W	NE2
644262	PEB WB 46	4 S	36 W	SW4
644263	PEB WB 47	4 S	36 W	SE4
644264	PEB WB 48	4 S	36 W	SW3
644265	PEB WB 49	4 S	36 W	SE3
644266	PEB WB 50	4 S	36 W	SW2
644267	PEB WB 51	4 S	36 W	SE2
644268	PEB WB 52	4 S	36 W	NW9
644269	PEB WB 53	4 S	36 W	NE9
644270	PEB WB 54	4 S	36 W	NW10
644271	PEB WB 55	4 S	36 W	NE10
644272	PEB WB 56	4 S	36 W	NW11
644273	PEB WB 57	4 S	36 W	NE11
644274	PEB WB 58	4 S	36 W	SW9
644275	PEB WB 59	4 S	36 W	SE9
644276	PEB WB 60	4 S	36 W	SW10
644277	PEB WB 61	4 S	36 W	SE10
644278	PEB WB 62	4 S	36 W	SW11
644279	PEB WB 63	4 S	36 W	SE11
646604	Pebble Beach 5942	3 S	35 W	NWSW 18
646605	Pebble Beach 5943	3 S	35 W	NWSW 18
646606	PEB K 1	3 S	35 W	NW 36
646607	PEB K 2	3 S	35 W	NE 36
646608	PEB K 3	3 S	35 W	SW 36
646609	PEB K 4	3 S	35 W	SE 36
646610	PEB K 5	4 S	35 W	NWNW 1
646611	PEB K 6	4 S	35 W	NENW 1
646612	PEB K 7	4 S	35 W	NWNE 1
646613	PEB K 8	4 S	35 W	NENE 1
646614	PEB K 9	4 S	34 W	NWNW 6
646615	PEB K 10	4 S	34 W	NENW 6
646616	PEB K 11	4 S	34 W	NWNE 6
646617	PEB K 12	4 S	34 W	NENE 6
648906	PEB WB 64	3S	36W	NW35
648907	PEB WB 65	3S	36W	NE35
648908	PEB WB 66	3S	36W	SW35
648909	PEB WB 67	3S	36W	SE35

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT
Application for Water Right

South Fork Koktuli River

LEGAL ACCESS DOCUMENT

INSTRUCTION #3 – *Attach copy of legal access document (e.g., right-of-way, easement, permit) or application for legal access to water withdrawal point and transport route, if applicable, or copy of request for legal access to water withdrawal point.*

Not applicable.No legal access document is necessary. Water withdrawal points and transport routes will be within the claims block.

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT
Application for Water Right

South Fork Koktuli River

DRILLER'S LOG

INSTRUCTION #4 – *Attach driller's well log for drilled wells (if already drilled and available).*

Not applicable. Application is not for well water withdrawal.

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT

Application for Water Right

South Fork Koktuli River

INSTRUCTION #5 – *Attach sketch, photos, plans of water system, or project description (if applicable).*

BRIEF PROJECT DESCRIPTION

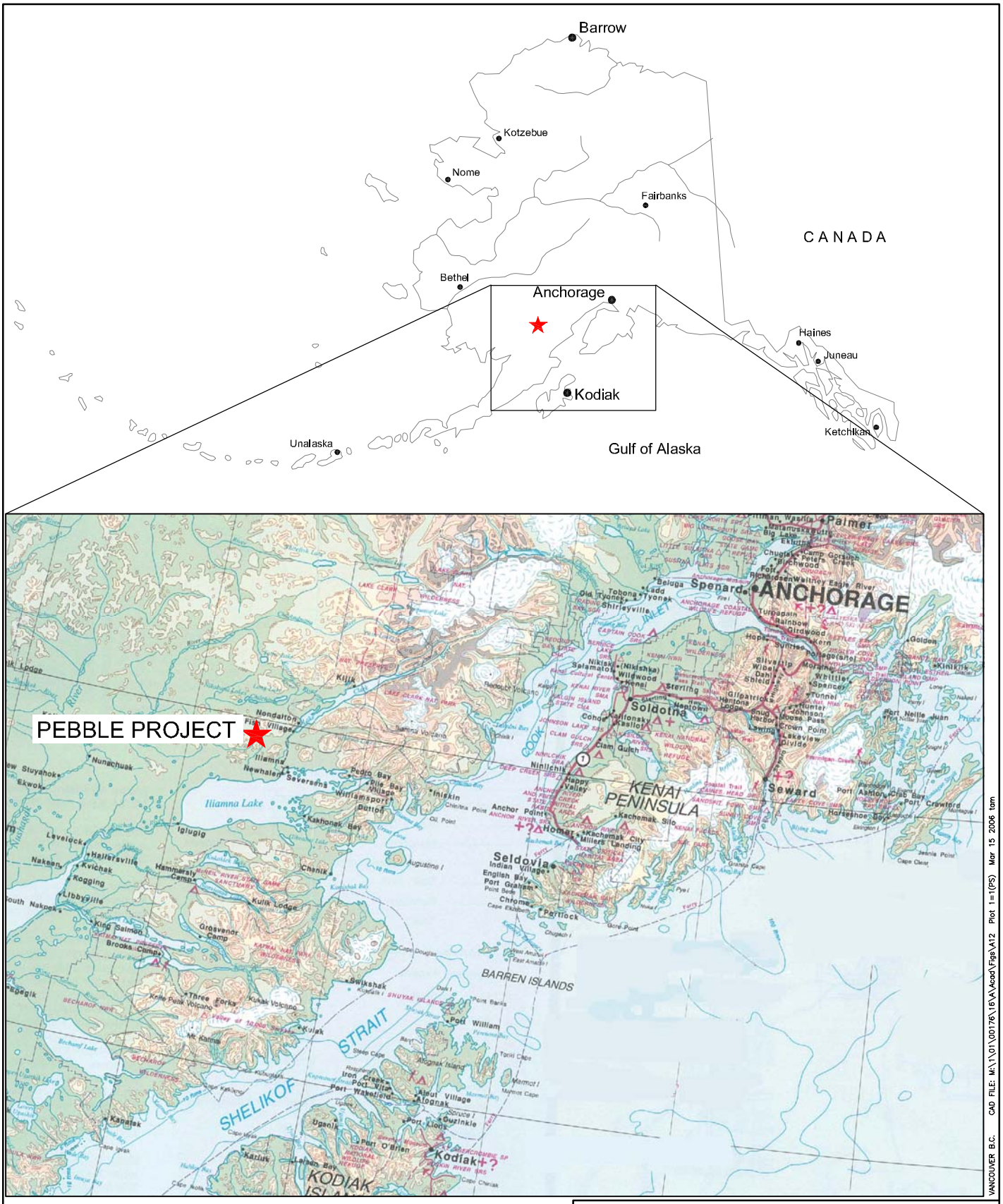
The Pebble Project will be a large open pit mine located 17 miles northwest of the community of Iliamna, on the north side of Lake Iliamna (Figure 1.1). Primary mine area facilities will consist of the open pit, ore conveyor, ore stockpile, a mill site (with associated offices, workshops, equipment repair and storage areas), tailing storage facilities, and a worker camp. Transportation facilities will include a mine area road network, and an approximately 100-mile road to a port facility on Cook Inlet. The primary port site facilities will include metal concentrates storage, fuel storage, a ship loading structure, barge landing, offices and worker housing.

DESCRIPTION OF IMPOUNDMENT FACILITIES

Following is a report describing the impoundment facilities that would be constructed and operated within the South Fork Koktuli River Drainage. This report contains the information required by 11 AAC 93.040(c)(8), more specifically:

> "a description of any impoundment, diversion, or withdrawal structures, including dimensions, construction materials, plans and specifications, and operation plans, and an application to construct or modify a dam, as defined in AS 46.17.900, if 11 AAC 93.171 requires an application;"

Specifically with respect to an application to construct and modify a dam, 11 AAC 93.040(c)(8) requires a person to submit an application to construct a dam if 11 AAC 93.171 requires an application. 11 AAC 93.171(a) requires a person to apply for a certificate of approval from the department prior to constructing a dam. As discussed herein, NDM is not prepared to construct a dam at the present time. Specific design and engineering information sufficient to begin construction of a dam is not available and will not be completed until NDM determines, through its continued exploration activities, the extent of the project. Thus, at the present time, NDM can not, and is not required to, submit an application to construct a dam. Once NDM develops the necessary information, such application will be submitted.



NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

PROJECT LOCATION

Knight Piésold CONSULTING

PROJECT/ASSIGNMENT NO.	REF. NO.
VA101-176/16	3

FIGURE 1.1 REV. 0

REV.	DATE	ISSUED FOR INFORMATION
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XREF FILE : -

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT

FACILITIES DESCRIPTION IN SUPPORT OF A WATER RIGHTS APPLICATION

SOUTH FORK KOKTULI RIVER

(REF. NO. VA101-00176/16-3)

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FIGURES

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Figure 1.2 Rev C Regional Site Plan

Figure 1.3 Rev B Tailings Storage Facility Site A – South Fork Koktuli Watershed

Figure 2.1 Rev B Tailings Storage Facility Site A - General Arrangement – Start-up

Figure 2.2 Rev B Tailings Storage Facility Site A - General Arrangement – Year 5

Figure 2.3 Rev B Tailings Storage Facility Site A - General Arrangement – Year 15

Figure 2.4 Rev B Tailings Storage Facility Site A - General Arrangement – Final

Figure 2.5 Rev B Tailings Storage Facility Site A – North Embankment – Section

Figure 2.6 Rev B Tailings Storage Facility Site A – Southwest Embankment – Section

Figure 2.7 Rev B Tailings Storage Facility Site A - Filling Schedule

SECTION 1.0 - INTRODUCTION

1.1 GENERAL

The Pebble Project is a proposed mining development of a large copper-gold-molybdenum deposit located in the Bristol Bay region of Southwestern Alaska. The Pebble Project property is centered at latitude 59° 53' 54" and longitude 155°17'44", approximately 238 mi southwest of Anchorage and 17 mi northwest of the Village of Iliamna. The project location is shown on Figure 1.1.

The deposit is situated on a drainage divide, with the Upper Talarik River draining to the east and south, and the North Fork and South Fork Koktuli rivers draining to the west and southwest, respectively. Mining of the ore deposit would result in an open pit mine located at the headwaters of the South Fork Koktuli Watershed and the Upper Talarik Watershed. The mine waste (tailings and waste rock) would be stored in two Tailings Storage Facilities (TSF) located in the South Fork Koktuli Watershed (TSF at Site A) and the North Fork Koktuli Watershed (TSF at Site G). A regional site plan of the watersheds for the respective water use facilities is shown on Figure 1.2.

1.2 SCOPE OF REPORT

The scope of this report is to provide details of the TSF located immediately south of the open pit (Site A) in the South Fork Koktuli Watershed in support of the Water Rights Application Process. The TSF located at Site A, and the water extraction limit for the South Fork Koktuli River, are shown on Figure 1.3. The design of the TSF is a work in progress and the technical details contained within this report are preliminary. Ongoing exploration continues to expand the deposit; the design and size of the TSF will be modified to be consistent with the ultimate Mine Plan.

A preliminary Water Management Plan is also included in this report. The main objective of the Water Management Plan is to control all water that originates within, or is brought into water extraction limits of the three watersheds, in an environmentally responsible manner. The water appropriated from upstream of the water extraction limits will be used for the following mining processes and beneficial uses:

- To collect water prior to mill start-up to ensure that there is sufficient water available to support the mine and mill operations through the initial years of operations, including during the winter months when ice development reduces the free water volume in the tailings pond.

- To provide the water required for the mining process (mine haul road dust suppression, equipment cooling, mill process, tailings slurry transport, concentrate slurry transport, etc).
- To ensure that there is sufficient water available in the system to offset the water that is lost to evaporation and sublimation, and the water that is permanently retained in the tailings voids.
- To provide potable water for daily use of the mine workers.
- To ensure that annual and seasonal fluctuations in the tailings pond do not impact the mining process.
- To protect the downstream aquatic resources by:
    - Submerging the potentially reactive waste materials deposited in the TSF to prevent oxidation and the potential development of acid drainage.
    - Promoting the saturation and/or flooding of tailings solids to prevent dust generation.
    - Controlling sediment.
    - Capturing and re-using process water that comes into contact with mineralized rock to ensure that the quality of the water for downstream fish and aquatic habitat is not adversely impacted by the mining operations.

SECTION 2.0 - TAILINGS STORAGE FACILITY

2.1 TAILINGS STORAGE FACILITY DESIGN AND OPERATION

2.1.1 General

The principal objectives of the design and operation of the TSF are to provide secure containment for tailings solids, potentially reactive waste rock and impounded process water. The design and operation of the TSF is integrated with the overall water management objectives for the entire mine development in that surface runoff from disturbed catchment areas is controlled, collected and contained on site. An additional requirement for the TSF is to allow effective reclamation of the tailings impoundment and associated disturbed areas at closure to meet land use objectives.

The TSF has been designed to store approximately 2 billion tons of tailings, approximately 900 million tons of potentially reactive waste rock, as well as mill process water, site runoff and the Probable Maximum Flood (PMF) event, in conformance with the Alaska Dam Safety Guidelines.

The tailings are the by-product of processing the Pebble Project ore. The flotation mill process will create two separate tailings streams; a bulk tailings stream (approximately 97% of the total tailings stream) and a pyritic tailings stream (approximately 3% of the total tailings stream). The bulk tailings, which testwork has shown to be non-reactive, will be discharged from delivery pipelines located along the embankment crests and adjacent high ground to facilitate beach development and separate the supernatant pond from the embankments. The pyritic tailings, which will be potentially reactive (i.e., potentially acid generating if allowed to oxidize), will be deposited below ponded water to prevent oxidation.

Waste rock will be extracted from the open pit in addition to the ore. Some of this waste is unmineralized rock or low grade rock adjacent to the ore, the remainder is material mined to maintain a safe geometry in the open pit mine. Testwork has shown that some of this waste

rock will be non-reactive, while the remainder will be potentially reactive. The non-reactive waste will be used for construction purposes at the site, particularly the construction of the TSF impoundment structures. The potentially reactive waste rock will be encapsulated within the tailings mass to prevent oxidation and acid generation.

The PMF event is the flow resulting from the most severe combination of Probable Maximum Precipitation (PMP) and basin hydrogeological conditions. The PMP is the precipitation which results from the worst possible metrological conditions. The PMF is a purely hypothetical event that is sufficiently large to ensure that it is never exceeded, yet at the same time not so excessively large that design requirements are unnecessarily conservative.

The preliminary level design of the TSF has taken into account the following requirements:

- Permanent, secure and total confinement of both tailings streams and the potentially reactive waste rock within an engineered disposal facility.
- Control, collection and removal of water from the TSF during operations for recycling as process water.
- Minimizing seepage from the facility and providing seepage collection and recovery from the impoundment structures.
- Diversion of undisturbed surface runoff from areas upstream of the TSF, open pit, mill site, and crusher.
- Inclusion of monitoring features for all aspects of the facility to monitor embankment stability and ensure the design criteria are met.

2.1.2 Tailings Storage Facility Components

The TSF will ultimately include earthfill/rockfill embankments at the north and south ends of the facility. The first stage of the TSF embankments will be built during the initial construction of the Pebble Project. This stage will provide the required capacity to store the tailings and potentially reactive waste rock produced during the first two years of mine operation, plus the supernatant pond and the PMF. The design also includes allowances for wave run-up, contingent freeboard and ice.

The TSF embankments will be raised in stages, with each stage providing the required capacity for that particular period until the next stage is completed. The approximate final dimensions of the TSF embankments would be:

Embankment	Length (ft)	Maximum Height (ft)
North	15,300	700
Southeast	6,900	710
Southwest	16,000	740

The final facility covering approximately 6.6 mi2 (17 km2)

The staged development of the TSF is shown on Figure 2.1 (Start-up), Figure 2.2 (Year 5), Figure 2.3 (Year 15), and Figure 2.4 (Final). A typical embankment section through the North Embankment is shown on Figure 2.5 with a typical embankment section through the South Embankment shown on Figure 2.6.

The main components of the TSF are as follows:

- **Face Liner - HDPE Geomembrane Liner**

  A synthetic High Density Polyethylene (HDPE) geomembrane liner will be included along the upstream face of the initial embankments to control embankment seepage prior to development of low permeability tailings beaches. The liner will tie into the grout curtain at the South Embankments and into low permeability lacustrine silts and silty glacial till materials at the North Embankment. The 80 mil thick HDPE liner will be placed on low permeability core zone material (Zone S) which serves as a bedding layer for the liner and provides an added level of seepage control in that the combined HDPE liner and Zone S material behaves as a compound liner. The HDPE liner will not be required once the low permeability tailings beaches have been developed and the supernatant pond is maintained in the center portion of the facility away from the embankments.

- **Core Zone/ Low Permeability Blanket - Zone S**

  The core zone/ low permeability till blanket (Zone S) will be constructed with low permeability glacial till excavated from the pit. The core zone combined with the HDPE liner will behave as a compound liner and serve as the primary seepage control zone for the initial embankment stages, until tailings beaches are established for additional seepage control. The core zone will provide the primary embankment seepage control feature (along with the tailings) for the upper section of the embankments. This material will also be used to provide a low permeability till blanket beneath the downstream shell zone of the North and South Embankments to collect rainfall that percolates through the shell zone materials. The foundation will be graded such that infiltration reports to the downstream seepage collection sumps for recycle back to the TSF.

- **Transition Zone - Zone F/T**

  The filter and transition zones (Zone F/T) will be incorporated to ensure internal stability between embankment zones and will act to prevent the migration of fines from the core zone into the adjacent pervious shell zone materials. The transition zone will comprise both a specified sand filter adjacent to the core zone and a coarser gravelly sand transition zone between the filter sand and the downstream shell zone (C1).

- **Shell Zone - Zone C1(NR)**

  The downstream shell zone (C1), adjacent to the transition zone, will be constructed in controlled compacted layers comprising well graded non-reactive waste rock and overburden from the open pit.

- **Shell Zone – Zone C2(NR)**

  The downstream shell zone (C2), downstream of shell zone (C1), will be constructed with similar to Zone C1, but will typically incorporate non-reactive coarse rockfill material from the open pit.

- **Shell Zone - Zone C(PR)**

  The upstream embankment shell will also be constructed from mine waste rock. This zone will be within the TSF impoundment and it could selectively incorporate potentially reactive waste rock as it will be fully encapsulated within saturated non-reactive materials.

- **Seepage Cutoff Measures**

  Embankments will be keyed into low permeability foundation materials to reduce seepage from the TSF. The North embankment will be keyed into a low permeability lacustrine layer, which underlies the northern part of the TSF. Abutment areas will be keyed into the underlying bedrock, where grout injection will be used to form a seepage control curtain.

  The cutoff at the South embankments will involve excavation to the underlying bedrock and injecting grout to form a seepage control curtain.

- **Embankment Toe Drain**

  A toe drain will be constructed along the upstream toe of the embankments to capture potential seepage through or beneath the grout curtain and the lacustrine layer to enhance the stability of the embankments. The toe drain will drain into the seepage collection sumps for recycle back to the TSF.

- **Longitudinal Drain**

  A longitudinal drain will be installed within the upper sections of the embankments once the tailings beaches are developed and the HDPE liner is no longer required to form a compound liner system with the core zone. This longitudinal drain will collect seepage from the upper portions of the embankments and will drain into the seepage collection sumps located on the abutments prior to recycle back to the TSF.

- **Seepage Collection Sumps**

  The seepage collection sumps will be located at the downstream toe of the embankments and on the abutments. The sumps located at the downstream toes of the embankments will collect water from the embankment toe drains and from the low permeability till blanket at the North and South Embankments. The sumps located on the abutments will collect water from the embankment longitudinal drains. Drainage collected in the seepage collection sumps will be pumped back to the TSF.

- **Groundwater Monitoring Wells**

  Groundwater monitoring wells will be installed downstream of all embankments to provide on-going groundwater quality data.

2.1.3 Foundation Preparation and Excavation Requirements

North Embankment

All organics, including the thick peat layer along the valley bottom, will be removed from the embankment footprint prior to foundation preparation. This material will be stockpiled for reclamation at closure.

A layer of higher permeability sand and gravel with some silt underlies the organics. This material will be removed from under the embankment core zone during foundation preparation and suitable materials will be used for random fill in shell zone (C1). Where these deposits exist within the footprint of the shell zones (C1 and C2), they will be contoured and compacted, if necessary, to provide a stable foundation.

A lacustrine layer, comprised of silt and clay, underlies the North Embankment and forms a natural low permeability layer. This layer provides a natural geologic barrier for controlling basin seepage from the TSF, particularly in the initial years of operations, before the tailings beaches are well developed. The HDPE liner and the Zone S core zone will be keyed into the lacustrine layer to provide seepage control.

The excavation at the North Embankment will extend between 20 to 30 ft. below the existing ground surface and below the groundwater table. Active dewatering will be required during initial construction to allow excavation to the lacustrine layer and subsequent construction of embankment zones.

South Embankments

All organics and overburden from below the upstream zones of the embankments will be stripped and excavated to bedrock. The organics will be stockpiled for future reclamation, as with the North Embankment. The stripping and overburden excavation will result in an approximately 100 ft deep trench along the Southeast Embankment and an approximately 140 ft deep trench along the Southwest Embankment. Grout will be injected into the underlying bedrock to form a seepage control curtain, which will tie into the face liner of the embankment. A secondary trench, perpendicular to the dam axis, will be excavated to allow gravity flow of seepage collected in the upstream toe drain to the sump located outside the final downstream embankment toe. The depth of the secondary trench will range from 20 to 60 ft on the Southeast Embankment and 100 to 140 ft on the Southwest Embankment.

2.2 TAILINGS PHYSICAL PROPERTIES

The tailings particle size distribution test results indicate that the bulk tailings are uniformly graded, consisting predominantly of silt-sized particles. The bulk tailings were classified as a low plasticity silt (ML), using the Unified Soil Classification System. There was little variation in the particle size distribution test results for the different bulk tailings samples.

Laboratory consolidation testing of the bulk tailings at low stresses indicates that the permeability will initially be around 3 x10^{-7} ft/s (1 x 10^{-5} cm/s) at a confining pressure of less than 6 x 10^{-1} psi (4 kPa); however, the permeability will reduce over time, as the tailings consolidate, to roughly 2 x 10^{-8} ft/s (5 x 10^{-7} cm/s) at a confining pressure of approximately 390 psi (2,700 kPa).

The predicted behavior of the bulk tailings can be summarized as follows:

- **Water Production**
  Lab testing has indicated that with a tailings slurry containing 32% solids, as much as 60% of the initial water volume will be released as supernatant. Based on this testwork, approximately 50 to 55% of the solution in the tailings slurry will be available for recycle to the mill from the TSF pond after allowing for evaporation losses and water retained in tailings. The volume of supernatant released will vary depending on the tailings type and the moisture content of the underlying tailings.

- **Tailings Density**
  The laboratory test results and operating experience at other similar copper mines indicate that final dry density will be in the order of 90 lb/ft3 (1.44 metric t/m3).

- **Pumping and Viscosity**
  The tailings streams will flow by gravity in pipelines from the process plant to the TSF for the initial several years of operations. The solids contents of the bulk and pyritic tailings streams will be approximately 32% and 50%, respectively. The critical solids content (i.e., the solids content at which the viscosity increases significantly) of tailings slurries, based on experience with similar copper-gold porphyry deposits and flotation mill processes, is typically about 65%. Pumping systems will be installed once the TSF

embankments are raised to the point where the driving head from the plant site is insufficient for gravity flow.

2.3 TSF CONSTRUCTION

The embankments will be developed in stages throughout the life of the project using low permeability glacial till, overburden and waste rock materials obtained from mining operations at the open pit.

The starter embankments will be constructed in two stages, Stage 1a and Stage 1b. Construction of Stage 1a will commence approximately 2 years prior to process plant start-up. The starter embankments will consist of zoned earthfill dams with an HDPE liner installed on the upstream face. The Stage 1a embankments will provide 1.5 years of storage for tailings and potentially reactive waste materials, while the raise to the Stage 1b crest elevation will allow for approximately 2 years of storage. The filling schedule and staged construction sequence of the TSF are shown on Figure 2.7.

The staged construction of the TSF will directly integrate waste materials from the pit. The scheduled placement of fill within the downstream shell zone can accommodate fluctuating quantities of non-reactive mine waste to coincide with the mine plan. Some of the finer grained overburden material produced from the pit development will be stockpiled, as the majority of the overburden will be mined early on in the mine life but will be required at various later periods during ongoing staged expansion of the TSF. The staged design of the embankments will be reviewed annually and refined, as required, to accommodate the availability of construction materials and to incorporate experience gained with local conditions and constraints.

2.4 RECLAIM WATER SYSTEM

A process water reclaim system is required to return sufficient water on a continuous basis from the TSF supernatant pond to the mill for use in the process. The water recovered will be routed through the Process Water Pond (PWP), which will be located near the process plant site.

Water for the process will be reclaimed from the TSF supernatant pond using pumps mounted on two barges. The barge-mounted pump-stations will be prefabricated units, naval architect designed and suitable for all anticipated weather conditions. Additional requirements include barge anchoring to cope with windy conditions, de-icing mechanisms to keep the unit free from surface ice, enclosure heating and ventilation, year round walkway access and sufficient water around the barge to minimize solids entrainment into the pipeline. Pipeline connections from the barge to shore will incorporate flexible joints to accommodate the rise and fall in pond elevation.

2.5 SEISMICITY AND EMBANKMENT STABILITY

Alaska is the most seismically active state in the U.S. and in 1964 experienced the second largest earthquake ever recorded worldwide. Both crustal earthquakes in the continental North American Plate and subduction earthquakes affect the Alaska region. Historically, the level of seismic activity is highest along the south coast, where earthquakes are generated by the Pacific Plate subducting under the North American plate. This seismic source region, known as the Alaska-Aleutian megathrust, has been responsible for several of the largest earthquakes

recorded, including the 1964 Prince William Sound magnitude 9.2 (M9.2) earthquake. There is potential for a future large subduction earthquake (M9.2+) along the southern coast of Alaska, and this seismic source zone is located approximately 125 mi from the project site.

Several major active faults in Alaska have generated large crustal earthquakes within the last century. A magnitude 7.9 earthquake occurred along a part of the Denali fault in 2002, approximately 44 mi south of Fairbanks. The western portion of the Denali Fault trends in a NE-SW direction, approximately 125 mi north of the project site. Approximately 19 mi northeast of the project site is the western end of the NE-SW trending Castle Mountain Fault, which terminates approximately at the northwest end of Lake Clark. A magnitude 7.0 earthquake associated with this fault occurred in 1933. The Denali and Castle Mountain faults are capable of generating large earthquakes with magnitudes in the range of M7.5 to M8.0.
Consistent with current design philosophy for geotechnical structures such as dams, two levels of design earthquake have been considered: the Operating Basis Earthquake (OBE) for normal operations; and the Maximum Design Earthquake (MDE) for extreme conditions (ICOLD, 1995). Values of maximum ground acceleration and design earthquake magnitude have been determined for both the OBE and MDE.

Appropriate OBE and MDE events for the facilities are determined based on a hazard classification of the facility, with consideration of the consequences of failure. The hazard classification was carried out using the criteria provided by the document “Guidelines for Cooperation with the Alaska Dam Safety Program” (2003). Classification of the facilities is carried out by considering the potential consequences of failure, including loss of life, economic loss and environmental damage. The hazard classification has been assessed as at least Class II (Significant). The OBE and MDE are selected based on the dam hazard classification and an appropriate earthquake return period, as defined by the “Guidelines for Cooperation with the Alaska Dam Safety Program” (2003).

For a Class II hazard classification, the OBE is selected from a range of return periods from 70 to 200 years, depending on the operating life of the facility, the frequency of regional earthquakes and the difficulty of quickly assessing the site for repairs. The impoundment would be expected to remain functional during and after the OBE and any resulting damage should be easily repairable in a limited period of time.

The MDE is typically selected from a range of return periods from 1000 to 2500 years for a Class II hazard classification. However, the MDE for the Pebble TSF has been conservatively based on a Class I hazard classification making it equivalent to the Maximum Credible Earthquake (MCE), which has a bedrock acceleration of 0.30 g corresponding to a magnitude M7.8 earthquake, occurring along the nearby Castle Mountain Fault system. The MCE is considered to be the seismic event with the highest possible maximum ground acceleration at the project site. Although a M9.2+ megathrust earthquake does not impose the highest maximum ground acceleration at the Pebble site (predicted maximum acceleration of 0.17 g), the event was considered as well in the seismic design analyses because of the very long duration of ground shaking associated with earthquakes of this magnitude.

The TSF embankments will be designed to meet or exceed the Alaska Dam Safety requirements to ensure the embankment will remain stable without release of tailings or process water for all loading cases, including the MDE and the M9.2+ megathrust event. Limited deformation of the facility is acceptable under seismic loading from the MDE, provided that the overall stability and integrity of the facility is maintained and that there is no release of stored tailings or water (ICOLD, 1995).

2.6 WATER MANAGEMENT PLAN

2.6.1 General

A Water Management Plan has been prepared consistent with the proposed mining plan for the Pebble Project. The main objective of the Water Management Plan is to control all water that originates within, or is brought into the project area, in an environmentally responsible manner. This will include the control of surface water runoff, seepage, sediment transport, open pit groundwater and tailings process water during pre-production, operations, and post closure. The water requirements of the milling process and related mining activities will be supplied to the maximum extent from available water sources within the project area. The water management plan is based on the layout and design of the project facilities and processes, the project area topography and hydrometeorology, the start-up and ongoing mill water requirements, and the environmental mitigation requirements. This section describes the water management plan during pre-production and during operations.

2.6.2 Site Water Flow

Water Management and Sediment Control – Pre-production

The pre-production water management plan consists of the following:

- Establishment of sediment control measures prior to construction of all project facilities, including the TSF embankments and the initial development of the pit. Control measures to remove sediment will include both natural and constructed ponds.
- Construction of cofferdams to provide sediment control for the construction activities at the North Embankment, dewatering of the foundation for the construction of the Southeast Embankment, and provision of the initial storage capacity within the TSF basin for the collection of runoff required for mill start-up.
- Collection and storage of all runoff within the TSF catchment area in the start-up pond, upstream of the cofferdams.
- A potable water source for the mill, camp and associated facilities from a local well field.

Cofferdams will impound water in the start-up pond until the upstream face of the Stage 1a embankments have been lined with HDPE. The cofferdam will then be inundated and the TSF pond will expand to the entire footprint of the Stage 1a TSF. The TSF pond will contain approximately 1.7 billion ft^3 (48 million m^3) of water, based on a long term average discharge rate of 36 ft^3/s (1 m^3/s) for the TSF catchment area over a period of about 1.5 years of construction prior to operations.

Once operations are underway the TSF will continue to intercept and contain all precipitation and runoff that occurs upstream of the water extraction limit.

Water Management and Sediment Control – Operations

The water management and sediment control plan during operations consists of the following:

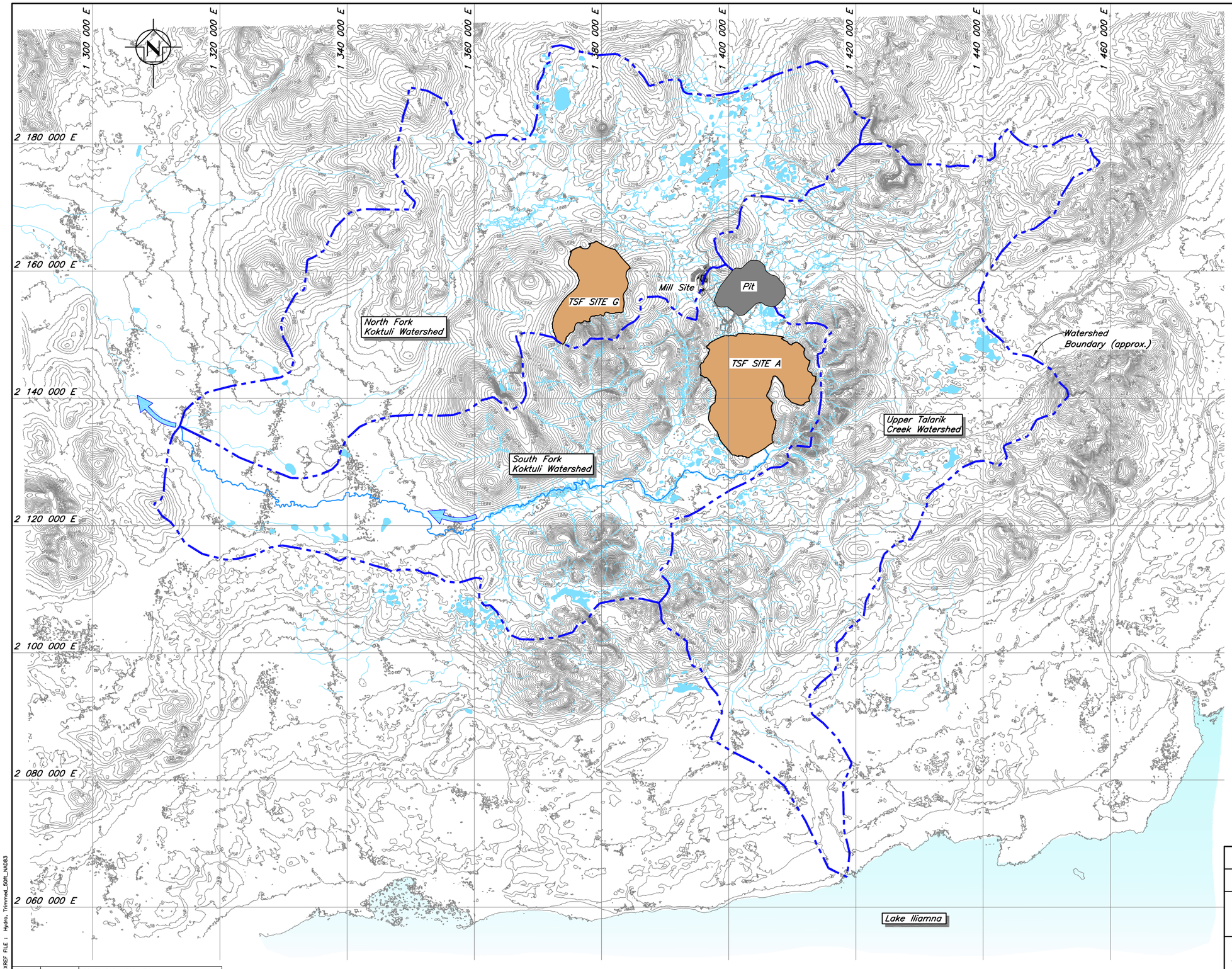
- All runoff within the TSF catchment area will be collected and stored in the TSF.
- The sediment control measures established during the pre-production construction period will be maintained and managed during operations.
- Groundwater and undiverted runoff from the pit will be collected and pumped to a series of surface sumps, which eventually will be pumped into the PWP or TSF.
- Process water will be discharged into the TSF with the bulk and pyritic tailings slurries. Tailings supernatant water will be pumped back to the mill for re-use in the mill processing.
- A tailings deposition strategy will be implemented to optimize the TSF supernatant pond volume, to compensate for ice development within the pond, and to prevent wind blown dust generation.
- Seepage from the TSF and rainfall infiltration into the downstream face of the embankments will be collected in seepage sumps and pumped back to the TSF.
- Groundwater monitoring wells will be used to verify the performance of the TSF.

SECTION 3.0 - REFERENCES

ICOLD – International Commission on Large Dams, (1995), “Tailings Dams and Seismicity: Review and Recommendations,” Bulletin 98.

Alaska Department of Natural Resources (Sept. 2003). Guidelines for Cooperation with the Alaska Dam Safety Program (2003).

This report was prepared by Knight Piésold Ltd. for the account of Northern Dynasty Mines Inc. The material in it reflects Knight Piésold’s best judgment in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, is the responsibility of such third parties. Knight Piésold Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions, based on this report. This numbered report is a controlled document. Any reproductions of this report are uncontrolled and may not be the most recent revision.



NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

REGIONAL SITE PLAN

Knight Piésold CONSULTING

PROJECT/ASSIGNMENT NO.	REF. NO.
VA101-176/16	3

FIGURE 1.2

REV. C

REV.	DATE	DESCRIPTION
C	31MAY'06	ISSUED FOR INFORMATION

XREF FILE : Hydro, Trimmed_50ft_NAD83

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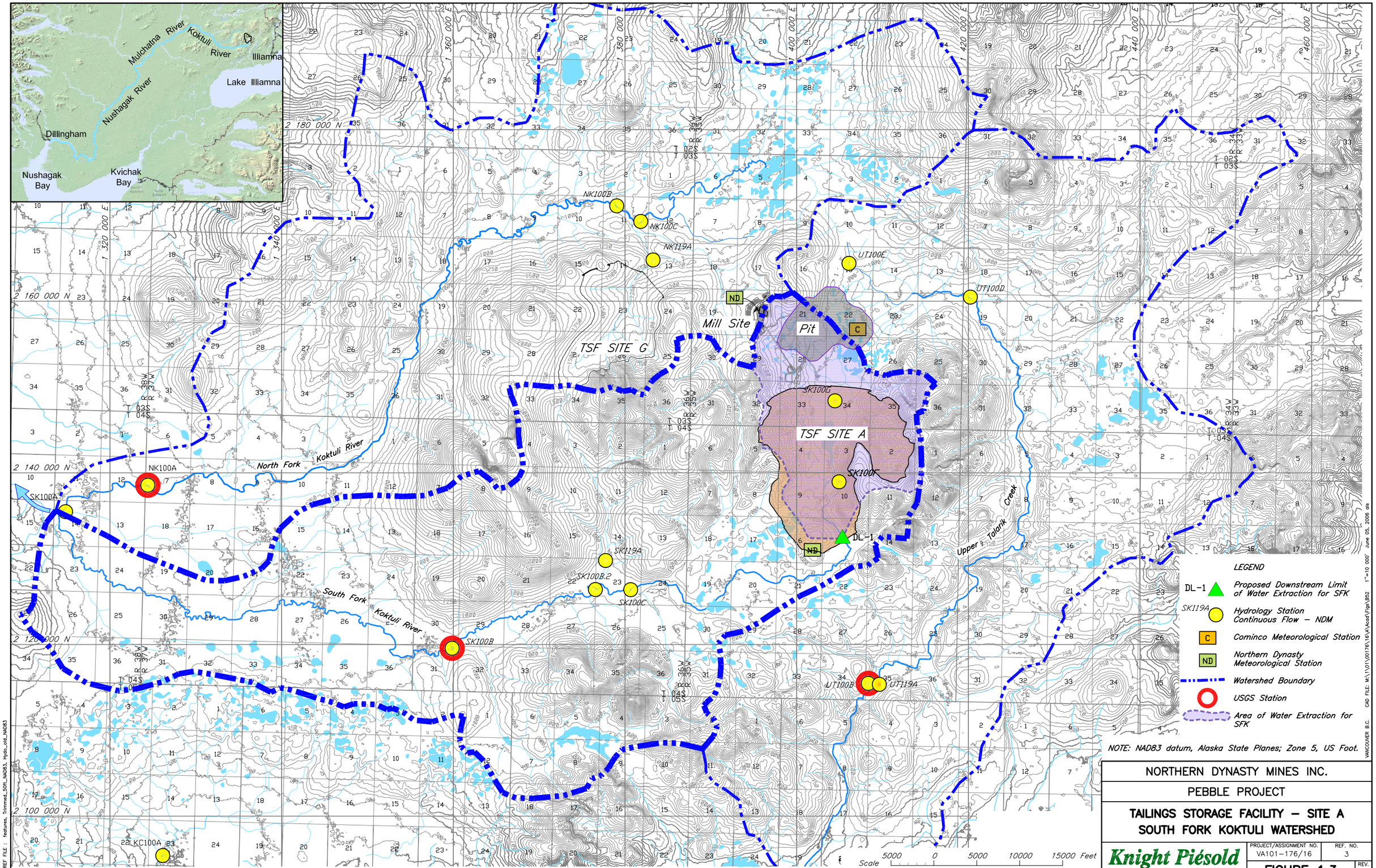
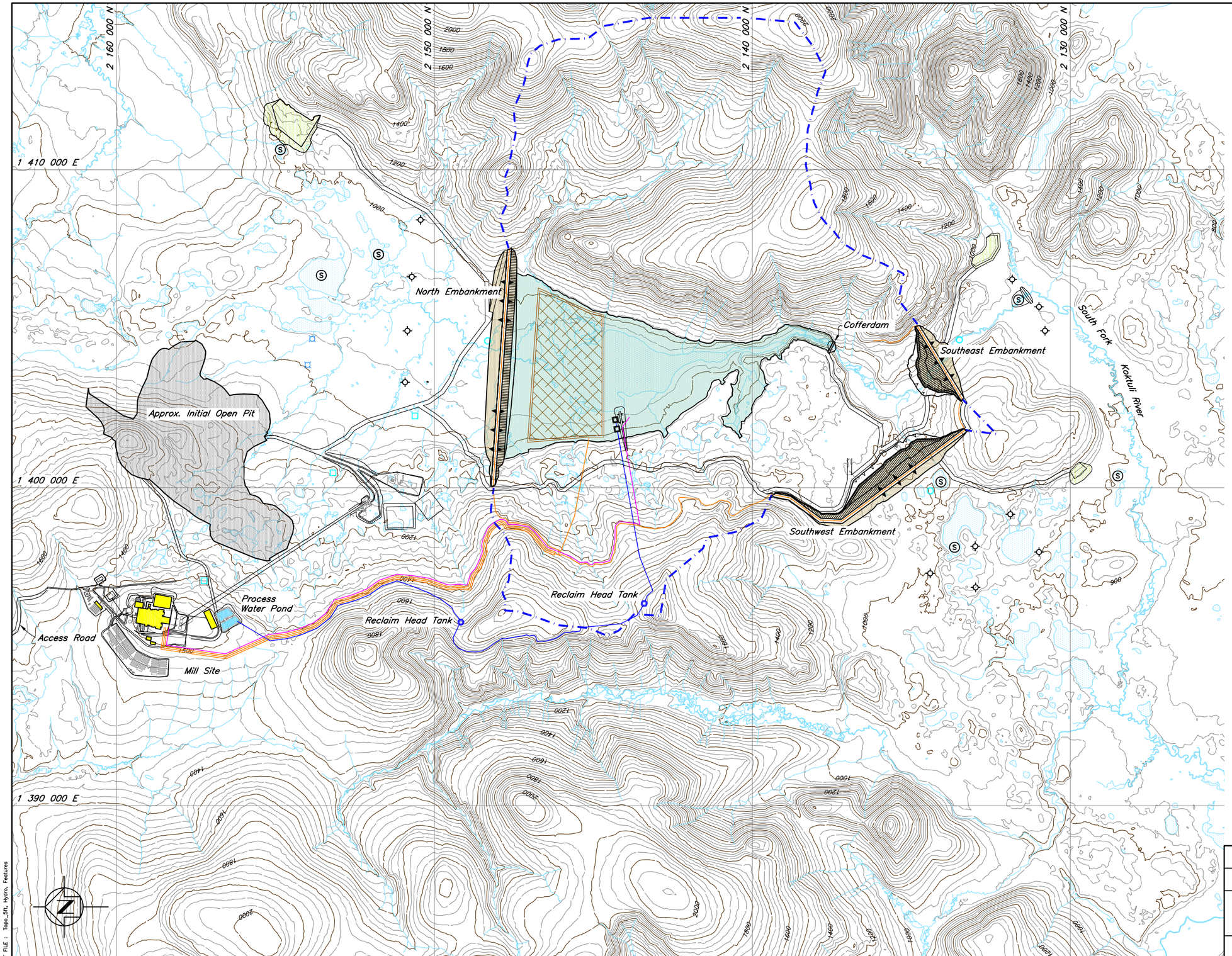

Mulchatna River
Koktuli River
Illiamna
Lake Illiamna
Nushagak River
Dillingham
Nushagak Bay
Kvichak Bay
NK100B
NK100C
NK119A
UT100E
UT100D
ND
Mill Site
Pit
C
TSF SITE G
SK100G
TSF SITE A
SK100F
North Fork
Koktuli River
NK100A
SK100A
DL-1
Upper Talarik Creek
SK119A
SK100B.2
SK100C
South Fork Koktuli River
SK100B
UT100B
UT119A
KC100A
LEGEND
DL-1 Proposed Downstream Limit of Water Extraction for SFK
SK119A Hydrology Station Continuous Flow – NDM
C Cominco Meteorological Station
ND Northern Dynasty Meteorological Station
Watershed Boundary
USGS Station
Area of Water Extraction for SFK
NOTE: NAD83 datum, Alaska State Planes; Zone 5, US Foot.
Scale 5000 0 5000 10000 15000 Feet
NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT
TAILINGS STORAGE FACILITY – SITE A
SOUTH FORK KOKTULI WATERSHED
Knight Piésold CONSULTING
PROJECT/ASSIGNMENT NO. VA101-176/16
REF. NO. 3
FIGURE 1.3
REV. B
REV. B 26MAY'06 ISSUED FOR INFORMATION
XREF FILE : features, Trimmed_50ft_NAD83, Hydro_old_NAD83
CAD FILE: M:\1\01\00176\16\A\Acad\Figs\B52
1"=10 000' June 05, 2006 ds
VANCOUVER B.C.



LEGEND

- Startup Pond
- Non-reactive Mine Rock
- HDPE Geomembrane Lined Embankment Face
- Potentially Reactive Waste Rock
- TSF Catchment Boundary
- Bulk Tailings Pipeline
- Pyritic Tailings Pipeline
- Reclaim Pipeline
- Roads
- Monitoring Well
- Potable Water Well
- Sediment Control
- Seepage Collection Sump
- Surface Runoff Collection Sump
- Topsoil Stockpile
- Barge Mounted Pump Station

NOTE

1. Mine site topography information is in NAD83 Alaska State Plane Zone 5 Foot. Outer stream/lake features have been incorporated from NAD27 information. Contour interval shown is 25 ft. Information provided by Eagle Mapping, Nov. 2004.

DRAFT

FOR DISCUSSION ONLY

Scale 1500 0 1500 3000 4500 Feet

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

TAILINGS STORAGE FACILITY – SITE A
GENERAL ARRANGEMENT
STARTUP

Knight Piésold CONSULTING

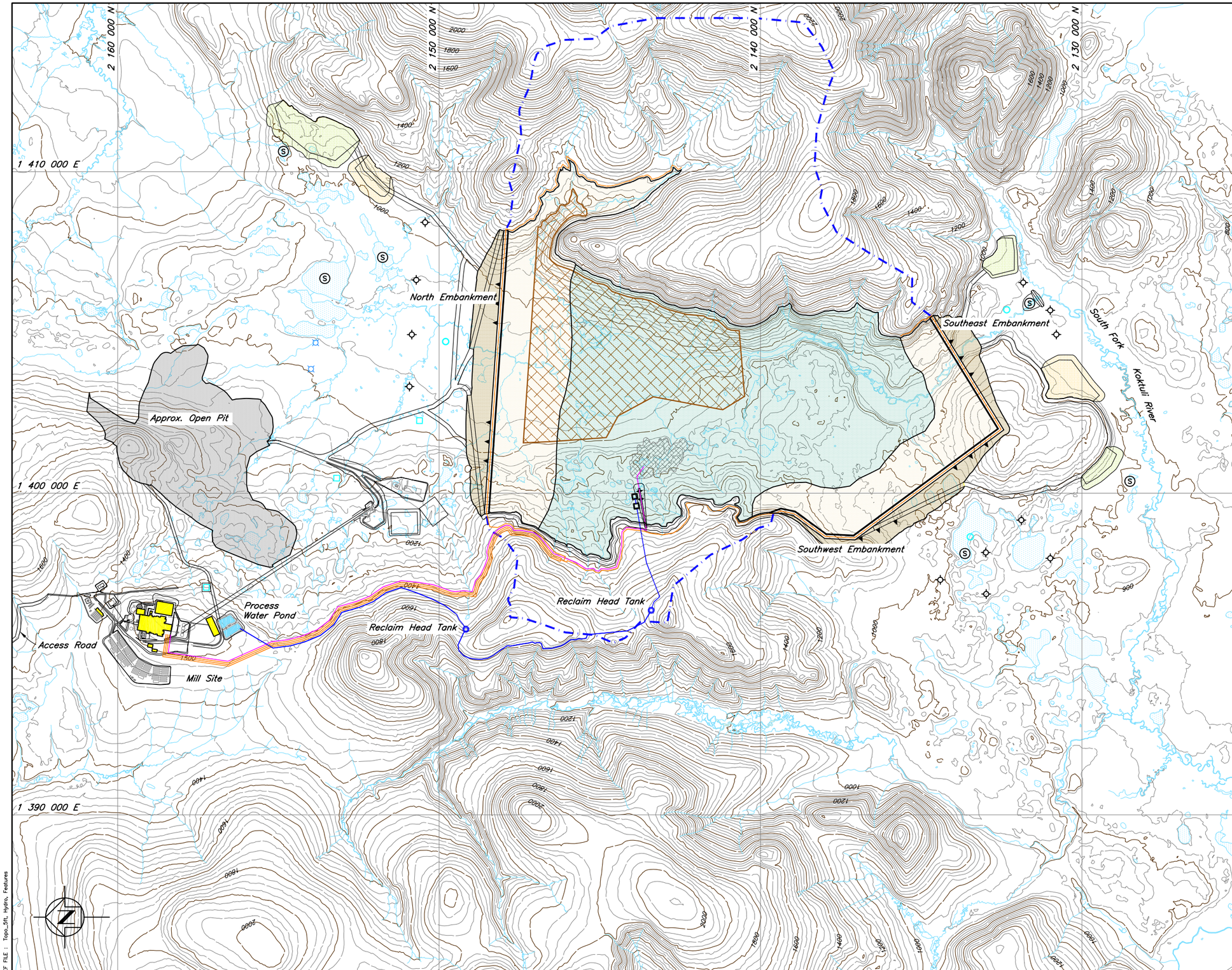
PROJECT/ASSIGNMENT NO.	REF. NO.
VA101-176/16	3

FIGURE 2.1 REV. C

REV.	DATE	ISSUED FOR
C	01JUN'06	INFORMATION

XREF FILE : Topo_Sft, Hydro, Features

VANCOUVER B.C. CAD FILE: M:\1\01\00176\16\A\Acad\Figs\B50 1"=3000' Plot 1=1(PS) June 13, 2006 tom



LEGEND

- Tailings Beach
- Supernatant Pond
- Non-reactive Mine Rock
- Potentially Reactive Waste Rock
- Pyrite Tailings
- TSF Catchment Boundary
- Bulk Tailings Pipeline
- Pyritic Tailings Pipeline
- Reclaim Pipeline
- Roads
- Monitoring Well
- Potable Water Well
- Sediment Control
- Seepage Collection Sump
- Surface Runoff Collection Sump
- Topsoil Stockpile
- Zone S (Core) Stockpile
- Barge Mounted Pump Station

NOTE

1. Mine site topography information is in NAD83 Alaska State Plane Zone 5 Foot. Outer stream/lake features have been incorporated from NAD27 information. Contour interval shown is 25 ft. Information provided by Eagle Mapping, Nov. 2004.

DRAFT

FOR DISCUSSION ONLY

Scale 1500 0 1500 3000 4500 Feet

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

TAILINGS STORAGE FACILITY – SITE A
GENERAL ARRANGEMENT
YEAR 5

Knight Piésold CONSULTING

PROJECT/ASSIGNMENT NO.	REF. NO.
VA101-176/16	3

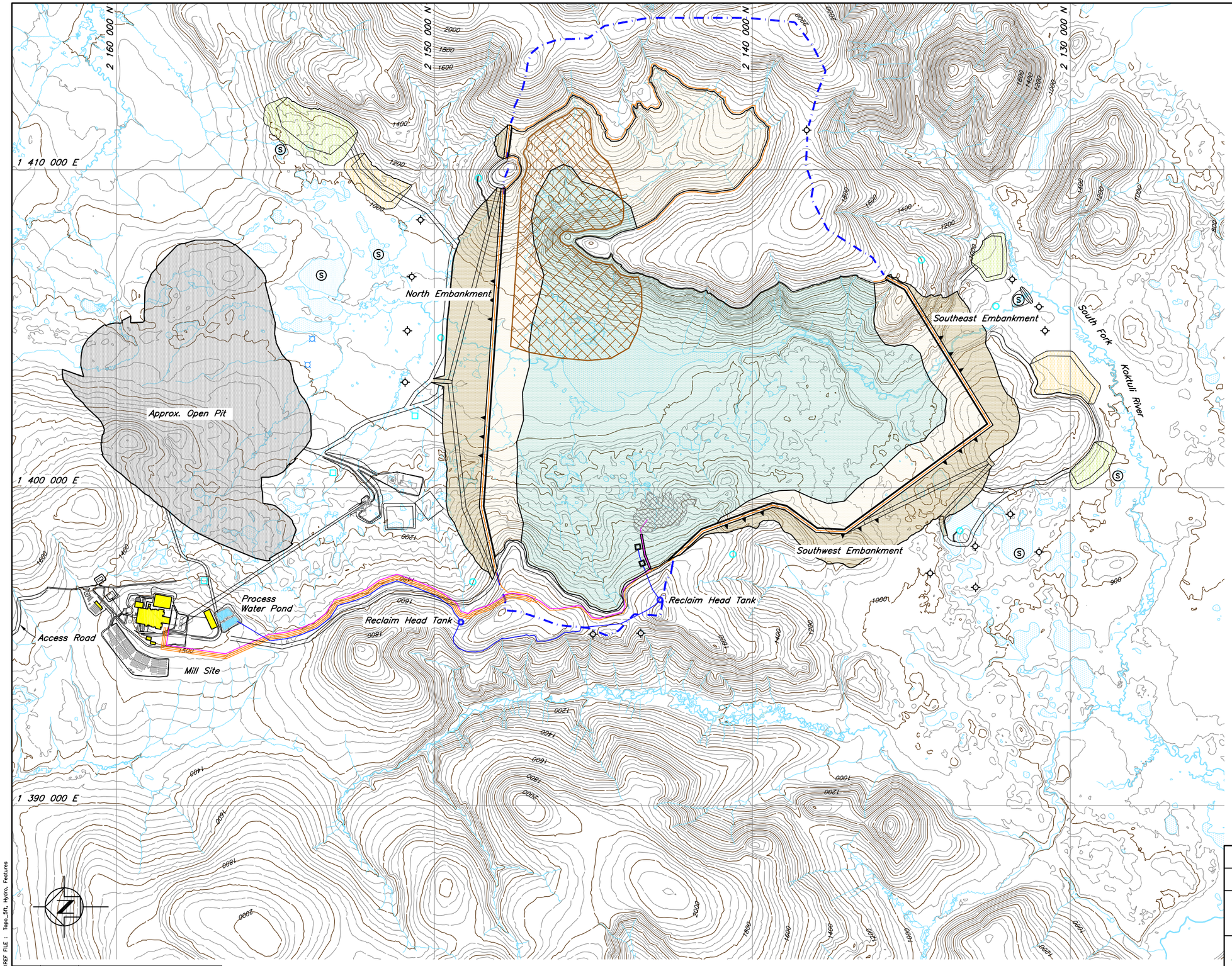
FIGURE 2.2

REV. C

REV.		
C	01JUN'06	ISSUED FOR INFORMATION

XREF FILE : Topo_5ft, Hydro, Features

VANCOUVER B.C. CAD FILE: M:\1\01\00176\16\A\Acad\Figs\B53 1"=3000' Plot 1=1(PS) June 13, 2006 tam



LEGEND

- Tailings Beach
- Supernatant Pond
- Non-reactive Mine Rock
- Potentially Reactive Waste Rock
- Pyrite Tailings
- TSF Catchment Boundary
- Bulk Tailings Pipeline
- Pyritic Tailings Pipeline
- Reclaim Pipeline
- Roads
- Monitoring Well
- Potable Water Well
- Sediment Control
- Seepage Collection Sump
- Surface Runoff Collection Sump
- Topsoil Stockpile
- Zone S (Core) Stockpile
- Barge Mounted Pump Station

NOTE

1. Mine site topography information is in NAD83 Alaska State Plane Zone 5 Foot. Outer stream/lake features have been incorporated from NAD27 information. Contour interval shown is 25 ft. Information provided by Eagle Mapping, Nov. 2004.

DRAFT

FOR DISCUSSION ONLY

Scale 1500 0 1500 3000 4500 Feet

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

TAILINGS STORAGE FACILITY – SITE A
GENERAL ARRANGEMENT
YEAR 15

Knight Piésold CONSULTING

PROJECT/ASSIGNMENT NO.	REF. NO.
VA101-176/16	3

FIGURE 2.3 REV. C

REV.	DATE	ISSUED FOR
C	01JUN'06	INFORMATION

XREF FILE : Topo_Sft, Hydro, Features

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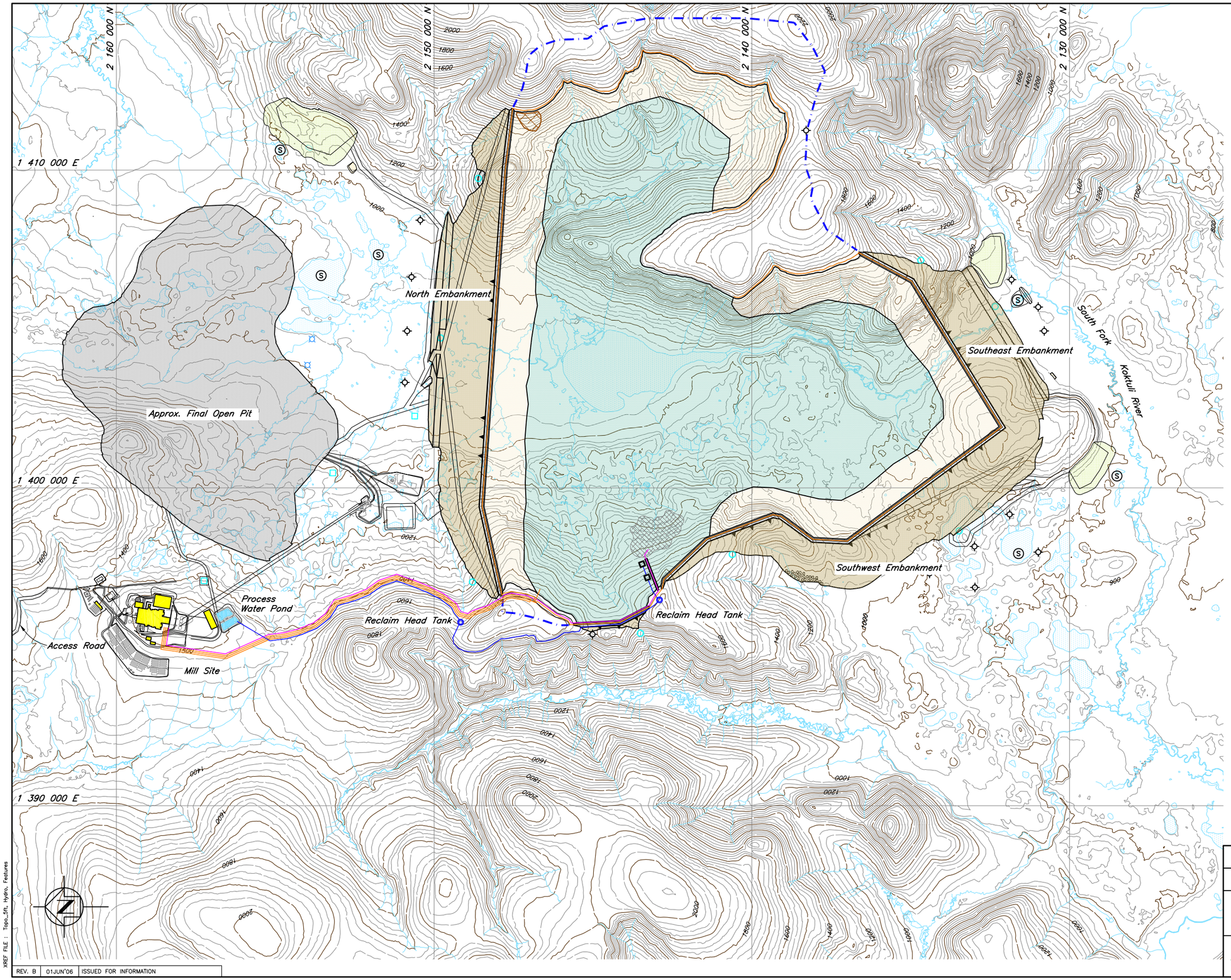


LEGEND

- Tailings Beach
- Supernatant Pond
- Non-reactive Mine Rock
- Potentially Reactive Waste Rock
- Pyrite Tailings
- TSF Catchment Boundary
- Bulk Tailings Pipeline
- Pyritic Tailings Pipeline
- Reclaim Pipeline
- Roads
- Monitoring Well
- Potable Water Well
- Sediment Control
- Seepage Collection Sump
- Surface Runoff Collection Sump
- Topsoil Stockpile
- Zone S (Core) Stockpile
- Barge Mounted Pump Station

NOTE

1. Mine site topography information is in NAD83 Alaska State Plane Zone 5 Foot. Outer stream/lake features have been incorporated from NAD27 information. Contour interval shown is 25 ft. Information provided by Eagle Mapping, Nov. 2004.

DRAFT

FOR DISCUSSION ONLY

Scale 1500 0 1500 3000 4500 Feet

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

TAILINGS STORAGE FACILITY – SITE A
GENERAL ARRANGEMENT
FINAL

Knight Piésold CONSULTING

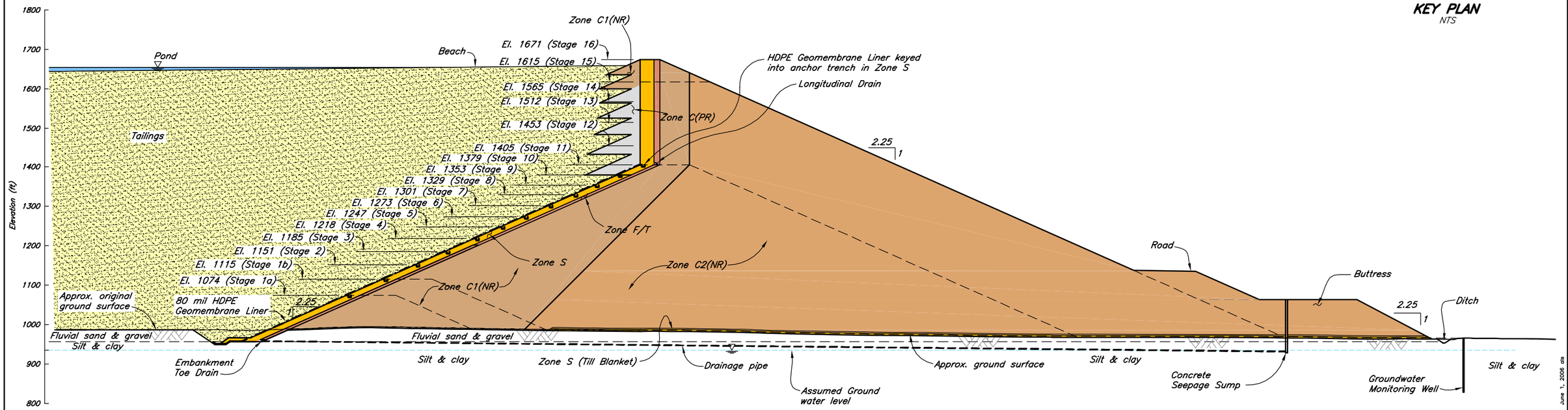
PROJECT/ASSIGNMENT NO.	REF. NO.
VA101-176/16	3

FIGURE 2.4 REV. B

REV.	DATE	ISSUED FOR
B	01JUN'06	INFORMATION

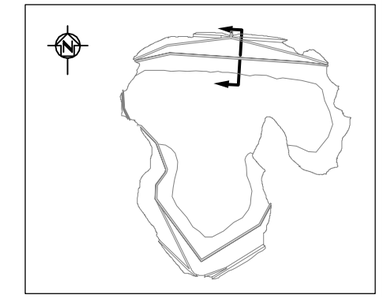
XREF FILE : Topo_5ft, Hydro, Features

VANCOUVER B.C. CAD FILE: M:\1\01\00176\16\A\Acad\Figs\B55 1"=3000' Plot 1=1(PS) June 05 2006 tam



NORTH EMBANKMENT SECTION

Scale A



KEY PLAN

NTS

DRAFT

FOR DISCUSSION ONLY

Scale A 125 0 125 250 375 Feet

NORTHERN DYNASTY MINES INC.	
PEBBLE PROJECT	
TAILINGS STORAGE FACILITY – SITE A NORTH EMBANKMENT SECTION	
Knight Piésold CONSULTING	PROJECT/ASSIGNMENT NO. VA101–176/16 · REF. NO. 3
	FIGURE 2.5 · REV. B

REV.	DATE	ISSUED FOR
B	01JUN'06	INFORMATION

VANCOUVER B.C. CAD FILE: M:\1\01\00176\16\A\Acad\Figs\B56 1"=250' Plot 1=1(PS) June 1, 2006 ds

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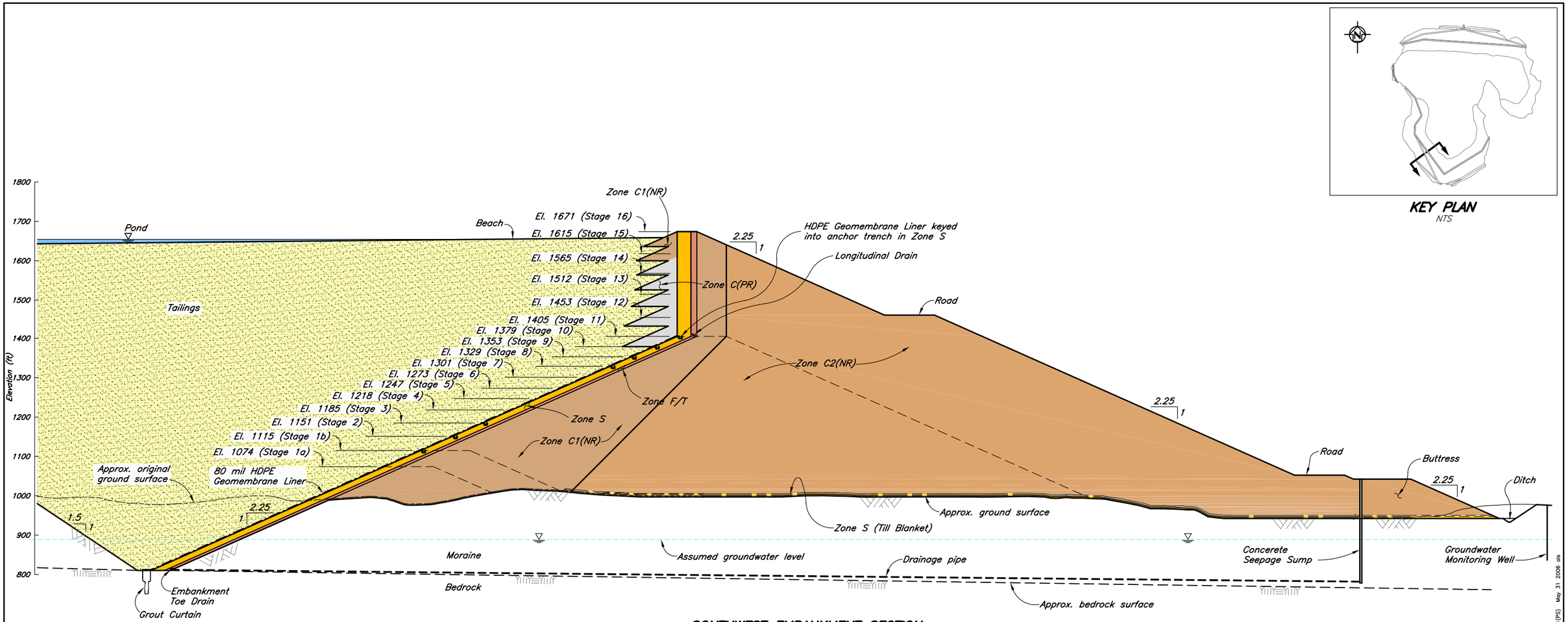


SOUTHWEST EMBANKMENT SECTION
Scale A

DRAFT

FOR DISCUSSION ONLY

Scale A 125 0 125 250 375 Feet

VANCOUVER B.C. CAD FILE: M:\1\01\00176\16\A\Acad\Figs\B57 1"=250' Plot 1=1(PS) May 31 2006 ais

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

TAILINGS STORAGE FACILITY – SITE A
SOUTHWEST EMBANKMENT
SECTION

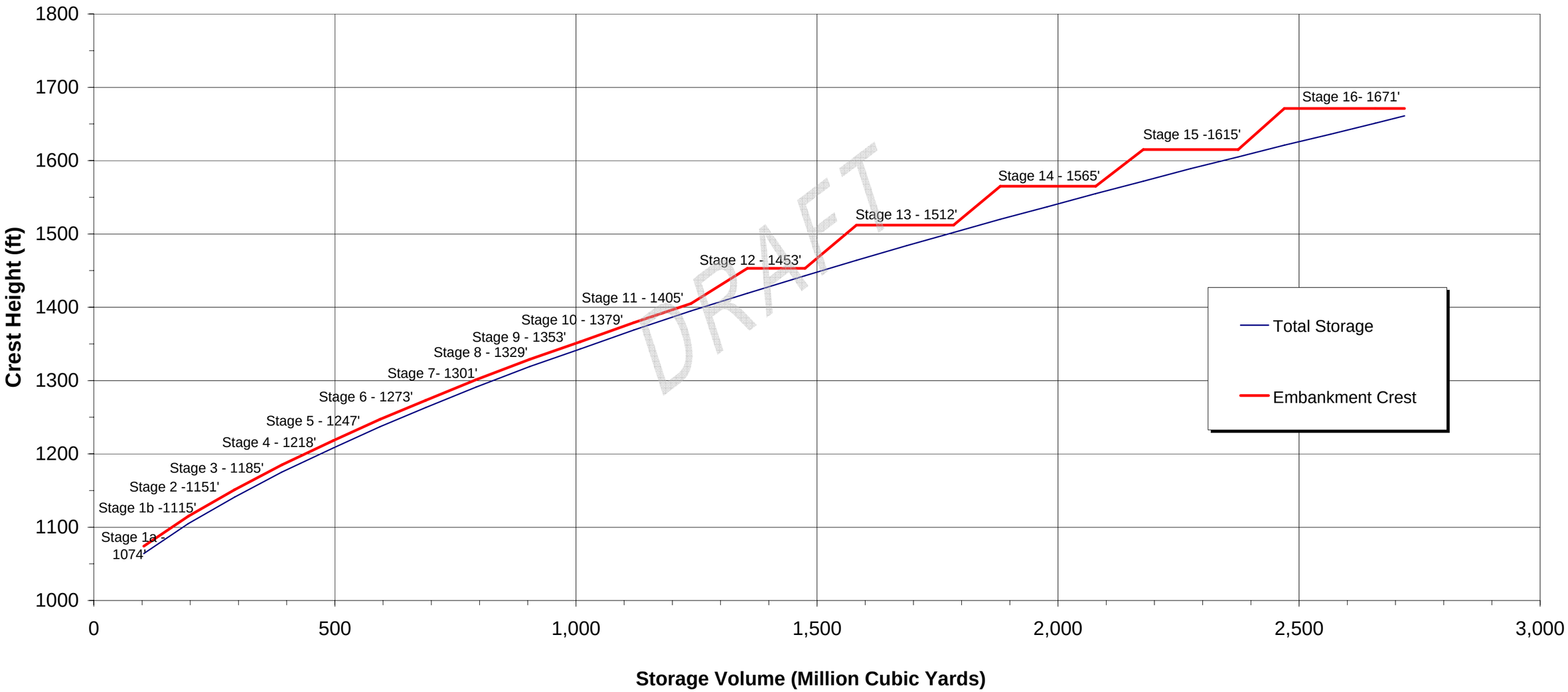
Knight Piésold CONSULTING

PROJECT/ASSIGNMENT NO.	REF. NO.
VA101-176/16	3

FIGURE 2.6 REV. B

XREF FILE : –

REV. B	01JUN'06	ISSUED FOR INFORMATION



NOTES:
1) Total Storage Volume Includes PR Waste, Tailings, Supernatant Pond and Storm Containment
2) Embankment Crest Elevation Includes 10 ft. freeboard

NORTHERN DYNASTY MNES INC.		
PEBBLE PROJECT		
TAILINGS STORAGE FACILITY SITE A FILLING SCHEDULE		
Knight Piésold CONSULTING	PROJECT / ASSIGNMENT NO. VA101-176/16	REF NO. 3
	FIGURE 2.7	REV. B

Rev B - Issued for Information

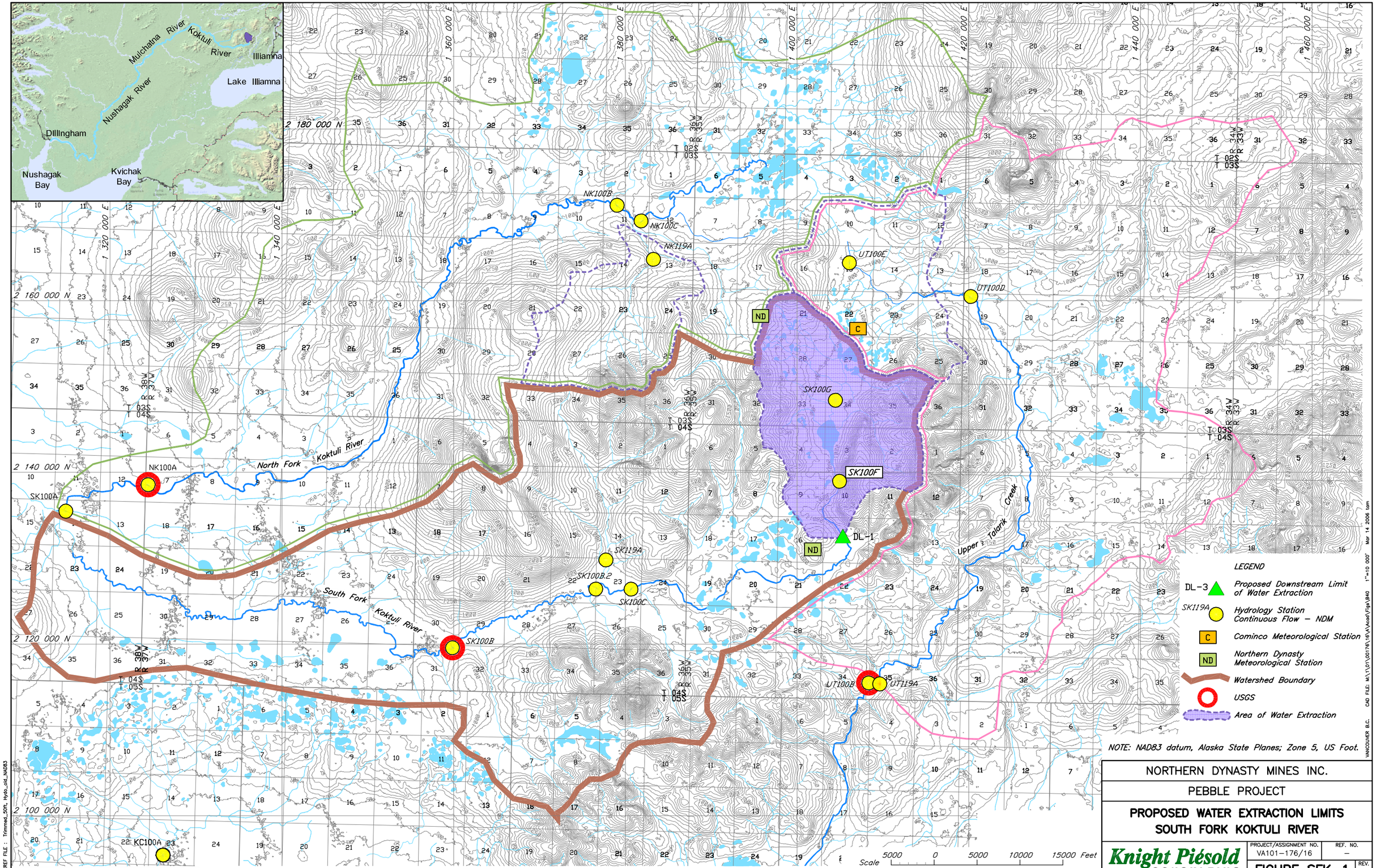
NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT
Application for Water Right

South Fork Koktuli River

MAP

INSTRUCTION #6 – *Attach legible map that includes meridian, township, range, and section lines such as a subdivision plat, USGS topographical quadrangle, or borough tax map. Indicate location of water withdrawal, route of water transmission, water use area boundary, points of water use within boundary, and point of water return flow (if applicable).*

The following map (Figure SFK-1), originally introduced behind the Application Attachments tab, shows the township, range, and section lines for the location of water withdrawal, transmission of water, and the water use area boundary. The specific points of water use all will be within the boundary shown, primarily in the resource extraction area, the tailings solids facility, and the mill. Specific locations of water withdrawal points such as dewatering wells, and transmission routes, will be identified during the detailed design phase. At this time no return flow or discharge of water is anticipated.



REV.		
B	14MAR'06	ISSUED FOR INFORMATION

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

PROPOSED WATER EXTRACTION LIMITS
SOUTH FORK KOKTULI RIVER

Knight Piésold CONSULTING

PROJECT/ASSIGNMENT NO.	REF. NO.
VA101-176/16	–

FIGURE SFK-1 REV. B

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT
Application for Water Right

South Fork Koktuli River

ADEC WASTEWATER SYSTEM CERTIFICATE

INSTRUCTION #7 – *Attach copy of approved ADEC water and wastewater system certificate (if applicable).*

Not applicable. No wastewater system is being applied for at this time.

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT
Application for Water Right

South Fork Koktuli River

ADNR FISH HABITAT PERMIT

INSTRUCTION #8 – *Attach copy of ADNR fish habitat permit (if applicable).*

Not applicable. No activities requiring a fish habitat permit are being applied for at this time.

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT

Application for Water Right

South Fork Koktuli River

STATEMENT OF BENEFICIAL USE

INSTRUCTION #9 – *Attach notarized Statement of Beneficial Use of Water form and associated fee, if water system and water use are fully developed, and total water use does not exceed 500 gallons of water per day.*

Not applicable. No water system or water use has been established at this time.

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT
Application for Water Right

South Fork Koktuli River

COASTAL PROJECT QUESTIONNAIRE

INSTRUCTION #10 – *Attach completed Coastal Project Questionnaire (if applicable).*

Following is a Coastal Project Questionnaire (CPQ) as required by regulation. Both the overall water right application and this CPQ will be reviewed by a single agency, the Department of Natural Resources (DNR). While NDM currently has insufficient information to describe in detail the entire Pebble Project for which it will ultimately seek permits and authorizations (including a permit to construct a dam), it does know now that it will need the water rights requested for the beneficial uses identified. Thus, while this CPQ addresses the entire project as presently envisioned, this application is only for a water right. Pursuant to AS 46.40.094, NDM believes DNR should phase its review of the Pebble Project under the Alaska Coastal Zone Management Act, the water right application being the first phase of the entire project.

NDM is continuing its exploration activities to determine the location and extent of the reserves that it ultimately may develop. In addition, NDM is gathering other data for determining the best means to develop the mineral resource confirmed during exploration. If the current drilling program verifies expectations, a definitive determination as to the economic viability of the Eastern Zone likely will require a two-year underground exploration program including a $100+ million underground shaft. This will be needed to provide information to evaluate the feasibility of underground mining and to determine development options for the entire project. Although there is insufficient information now for DNR to assess future impacts from exploration and development, all such activities will be subject to detailed independent permitting requirements and future consistency review.

South Fork Koktuli

Coastal Project Questionnaire and Certification Statement

All questions must be answered. **If you answer "Yes" to any of the questions, please call that specific department for further instructions to avoid delay in processing your application**. Maps and plan drawings must be included with your packet.

An incomplete packet will be returned.

■ APPLICANT INFORMATION

1. Northern Dynasty Mines Inc.
   Name of Applicant
   3201 C Street, Suite 604
   Address
   Anchorage, AK 99503
   City/State/Zip
   (907) 339-2600
   Daytime Phone
   (907) 339-2601
   Fax Number E-mail Address

2.
   Agent (or responsible party if other than applicant)
   Address
   City/State/Zip State Zip Code
   Daytime Phone
   Fax Number E-mail Address

■ PROJECT INFORMATION

	Yes	No
1. This activity is a: ☐ new project ☒ modification or addition to an existing project If this is a modification, do you currently have any State, federal or local approvals for this activity?	☒	☐

Note: Approval means any form of authorization. If "yes," please list below:

Approval Type		Approval #		Issuance Date		Expiration Date
Multi-year Miscellaneous Land Use Permit		A026118		2002		2006

2. If this is a modification, was this project reviewed for consistency with Alaska Coastal Management? ☒ ☐

   Previous State I.D. Number: AK A022118

   Previous Project Name Pebble Project

■ PROJECT DESCRIPTION

1. Provide a brief description of your entire project and ALL associated facilities and land use conversions.

   See Attached

   Proposed starting date for project: Project has been underway since the 1980s. NDM has been actively drilling on the property since 2002, and will continue in 2006. Actual start of development will depend on 2006 drill results and length of permitting process.

Proposed ending date for project: Unknown

2. Attach the following: • a detailed project description, all associated facilities, and land use conversions, etc. (Be specific, including access roads, caretaker facilities, waste disposal sites, etc.); • a project timeline for completion of all major activities; • a site plan depicting project boundary with all proposed actions; • other supporting documentation to facilitate project review. Note: If the project is a modification, identify existing facilities and proposed changes on the site plan.

■ PROJECT LOCATION

1. Attach a copy of the topographical and vicinity map clearly indicating the location of the project. Please include a map title and scale.

2. The project is located in which region (see attached map): ☐ Northern ☐ Southcentral ☐ Southeast ☒ Southwest ☐ within or associated with the Trans-Alaska Pipeline corridor

3. Location of project (Include the name of the nearest land feature or body of water.) See attached list of townships.

   Township _____ Range _____ Section _____ Meridian _____ Latitude/Longitude _____ / _____

   USGS Quad Map Iliamna 1:250,000

4. Is the project located in a coastal district? Yes ☒ No ☐ If yes, identify: Lake and Peninsula Borough, and Kenai Peninsula Borough

   (Coastal districts are a municipality or borough, home rule or first class city, second class with planning, or coastal resource service area.) Note: A coastal district is a participant in the State's consistency review process. It is possible for the State review to be adjusted to accommodate a local permitting public hearing. Early interaction with the district is important; ***please contact the district representative listed on the attached contact list.***

5. Identify the communities closest to your project location: Iliamna, Newhalen, Nondalton and Pedro Bay

6. The project is on: ☒ State land or water* ☐ Federal land ☒ Private land ☐ Municipal land ☐ Mental Health Trust land

   **State land can be uplands, tidelands, or submerged lands to 3 miles offshore. See Question #1 in DNR section.*
   Contact the applicable landowner(s) to obtain necessary authorizations.

■ DEPARTMENT OF ENVIRONMENTAL CONSERVATION (DEC) APPROVALS

	Yes	No
1. Will a discharge of wastewater from industrial or commercial operations occur?	☒	☐
Will the discharge be connected to an approved sewer system?	☐	☒
Will the project include a stormwater collection/discharge system?	☒	☐
2. Do you intend to construct, install, modify, or use any part of a wastewater (sewage or greywater) disposal system?	☒	☐
a) If the answer is yes, will the discharge be 500 gallons per day or greater?	☒	☐
b) If constructing a domestic wastewater treatment or disposal system, will the system be located within fill material requiring a COE permit?	☐	☒

If you answered yes to a) or b), answer the following:

1) What is the distance from the bottom of the system to the top of the subsurface water table? Undetermined at this time.

2) How far is any part of the wastewater disposal system from the nearest surface water? Undetermined at this time.

3) Is the surrounding area inundated with water at any time of the year? ..... ☐ ☒

4) How big is the fill area to be used for the absorption system? Not applicable.
(Questions 1 & 2 will be used by DEC to determine whether separation distances are being met; Questions 3 & 4 relate to the required size of the fill if wetlands are involved.)

	Yes	No
3. Will your project require a mixing zone? ..... *(If your wastewater discharge will exceed Alaska water quality standards, you may apply for a mixing zone. If so, please contact DEC to discuss information required under 18 AAC 70.032.)*	☐	☒
4. a) Will your project result in construction, operation, or closure of a facility for solid waste disposal? ..... *(Note: Solid waste means drilling wastes, household garbage, refuse, sludge, construction or demolition wastes, industrial solid waste, asbestos, and other discarded, abandoned, or unwanted solid or semi-solid material, whether or not subject to decomposition, originating from any source. Disposal means placement of solid waste on land.)*	☒	☐
b) Will your project result in treatment of solid waste at the site? ..... *(Examples of treatment methods include, but are not limited to: incineration, open burning, baling, and composting.)*	☒	☐
c) Will your project result in storage or transfer of solid waste at the site?	☒	☐
d) Will the project result in storage of more than 50 tons of materials for reuse, recycling, or resource recovery?	☒	☐
e) Will any sewage solids or biosolids be disposed of or land-applied to the site? ..... *(Sewage solids include wastes that have been removed from a wastewater treatment plant system, such as a septic tank, lagoon dredge, or wastewater treatment sludge that contain no free liquids. Biosolids are the solid, semi-solid, or liquid residues produced during the treatment of domestic septage in a treatment works which are land applied for beneficial use.)*	☒	☐
5. Will your project require application of oil, pesticides, and/or any other broadcast chemicals?	☐	☒
6. a) Will you have a facility with industrial processes that are designed to process no less than *five tons per hour* and needs air pollution controls to comply with State emission standards?	☒	☐
b) Will you have stationary or transportable fuel burning equipment, including flares, with a total fuel consumption capacity no less than 50 million Btu/hour?	☒	☐
c) Will you have a facility with incinerators having a total charging capacity of no less than 1,000 pounds per hour?	☒	☐
d) Will you have a facility with equipment or processes that are subject to Federal New Source Performance Standards or National Emission Standards for hazardous air pollutants?	☒	☐
i) Will you propose exhaust stack injection?	☒	☐
e) Will you have a facility with the potential to emit no less than 100 tons per year of any regulated air contaminant?	☐	☒
f) Will you have a facility with the potential to emit no less than 10 tons per year of any hazardous air contaminant or 25 tons per year of all hazardous air contaminants?	☐	☒
g) Will you construct or add stationary or transportable fuel burning equipment of no less than 10 million Btu/hour in the City of Unalaska or the City of St. Paul?	☐	☒
h) Will you construct or modify in the Port of Anchorage a volatile liquid storage tank with a volume no less than 9,000 barrels, or a volatile liquid loading rack with a design throughput no less than 15 million gallons?	☐	☒
i) Will you be requesting operational or physical limits designed to reduce emissions from an existing facility in an air quality nonattainment area to offset an emission increase from another new of modified facility?	☐	☒
7. Do you plan to develop, construct, install, or alter a public water system?	☒	☐

8. a) Will your project involve the operation of waterborne tank vessels or oil barges that carry crude or non-crude oil as bulk cargo, or the transfer of oil or other petroleum products to or from such a vessel or a pipeline system? ..... ☒ ☐

   b) Will your project require or include onshore or offshore oil facilities with an effective aggregate storage capacity of greater than 5,000 barrels of crude oil or greater than 10,000 barrels of non-crude oil? ..... ☒ ☐

	Yes	No
c) Will you operate facilities on land or water for exploration or production of hydrocarbons?	☐	☒

If you answered "No" to ALL questions in this section, continue to next section.
If you answered "Yes" to ANY of these questions, contact the DEC office nearest you for information and application forms. Please be advised that all new DEC permits and approvals require a 30-day public notice period. DEC Pesticide permits take effect no sooner than 40 days after the permit is issued.

Based on your discussion with DEC, please complete the following:

Types of project approvals or permits needed and name of individual you contacted.	Date application submitted
Only preliminary discussions to date.	

9. Does your project qualify for a general permit for wastewater or solid waste? ..... ☐ ☒
   Note: A general permit is an approval issued by DEC for certain types of routine activities.

If you answered "Yes" to any questions in this section and are not applying for DEC permits, indicate reason:

☐ **_____ (DEC contact) told me on _____ that no DEC approvals are required on this project because _____**

☐ **Other: _____**

■ DEPARTMENT OF FISH AND GAME (DFG) APPROVALS

	Yes	No
1. Is your project located in a designated State Game Refuge, Critical Habitat Area or State Game Sanctuary?	☐	☒
2. Does your project include construction/operation of a salmon hatchery?	☐	☒
3. Does your project affect, or is it related to, a previously permitted salmon hatchery?	☐	☒
4. Does your project include construction of an aquatic farm?	☐	☒

If you answered "No" to ALL questions in this section, continue to next section.
If you answered "Yes" to ANY questions under 1-4, contact the ADF&G Commercial Fisheries Division headquarters for information and application forms

Based on your discussion with ADF&G, please complete the following:

Types of project approvals or permits needed.	Date application submitted

If you answered "YES" to any questions in this section and are not applying for ADF&G permits, indicate reason:

☐ **_____ (ADF&G contact) told me on _____ that no ADF&G approvals are required on this project because _____**

☐ **Other: _____**

■ DEPARTMENT OF NATURAL RESOURCES (DNR) APPROVALS

	Yes	No
1. Is the proposed project on State-owned land or water or will you need to cross State-owned land for access? ("Access" includes temporary access for construction purposes. *Note: In addition to State-owned uplands, the State owns almost all land below the ordinary high water line of navigable streams, rivers and lakes, and below the mean high tide line seaward for three miles.)*	☒	☐
a) Is this project for a commercial activity?	☒	☐
2. Is the project on Alaska Mental Health Trust land (AMHT) or will you need to cross AMHT land? *Note: Alaska Mental Health Trust land is not considered State land for the purpose of ACMP reviews.*	☐	☒
3. Do you plan to dredge or otherwise excavate/remove materials on State-owned land?	☒	☐

Location of dredging site if different than the project site: Specific locations will be identified when the detailed design phase is completed.

Township _____ Range _____ Section _____ Meridian _____ USGS Quad Map _____

4. Do you plan to place fill or dredged material on State-owned land?	☐	☐

Location of fill disposal site if other than the project site: Specific locations will be identified when the detailed design phase is completed.

Township _____ Range _____ Section _____ Meridian _____ USGS Quad Map _____

Source is on: ☐ State Land ☐ Federal Land ☐ Private Land ☐ Municipal Land

5. Do you plan to use any of the following State-owned resources:	☒	☐

☐ ***Timber***: Will you harvest timber? Amount: _____

☒ ***Materials such as rock, sand or gravel, peat, soil, overburden, etc.:***

Which material? Gravel Amount: Undetermined at this time.

Location of source: ☐ Project site ☐ Other, describe: Specific locations will be identified when the detailed design phase is completed.

Township _____ Range _____ Section _____ Meridian _____ USGS Quad Map _____

6. Do you plan to divert, impound, withdraw, or use any fresh water, except from an existing public water system or roof rain catchment system (regardless of land ownership)?	☒	☐

Amount (maximum daily, not average, in gallons per day): See Page 3 of Application for Water Right.

Source: See Page 2 of Application for Water Right. Intended Use: See Page 3 of Application for Water Right.

If yes, will your project affect the availability of water to anyone holding water rights to that water?	☐	☒
7. Do you plan to build or alter a dam (regardless of land ownership)?	☒	☐

8. Do you plan to drill a geothermal well (regardless of land ownership)? ..... ☐ ☒

9. At any one site (regardless of land ownership), do you plan any of the following? ..... ☒ ☐

☒ Mine five or more acres over a year's time
☒ Mine 50,000 cubic yards or more of materials (rock, sand or gravel, soil, peat, overburden, etc.) over a year's time
☒ Have a cumulative unreclaimed mined area of five or more acres

If yes to any of the above, contact DNR about a reclamation plan.

	Yes	No
If you plan to mine less than the acreage/amount stated above and have a cumulative unreclaimed mined area of less than five acres, do you intend to file a voluntary reclamation plan for approval?	☐	☐

10. Do you plan to explore for or extract coal? ..... ☐ ☒

11. a) Will you explore for or produce oil and/or gas? ..... ☐ ☒
b) Will you conduct surface use activities on an oil and/or gas lease or within an oil and/or gas unit? ..... ☐ ☒

12. Will you investigate, remove, or impact historical or archaeological or paleontological resources (anything over 50 years old) on State-owned land? ..... ☒ ☐

13. Is the proposed project located within a known geophysical hazard area? ..... ☒ ☐
Note: 6 AAC 80.900(9) defines geophysical hazard areas as "those areas which present a threat to life or property from geophysical or geological hazards, including flooding, tsunami run-up, storm surge run-up, landslides, snowslides, faults, ice hazards, erosion, and littoral beach process." "known geophysical hazard area" means any area identified in a report or map published by a federal, state, or local agency, or by a geological or engineering consulting firm, or generally known by local knowledge, as having known or potential hazards from geologic, seismic, or hydrologic processes.

14. Is the proposed project located in a unit of the Alaska State Park System? ..... ☐ ☒

15. Will you work in, remove water or material from, or place anything in, a stream, river or lake? (This includes work or activities below the ordinary high water mark or on ice, in the active flood plain, on islands, in or on the face of the banks, or, for streams entering or flowing through tidelands, above the level of mean lower low tide.)
Note: If the proposed project is located within a special flood hazard area, a floodplain development permit may be required. Contact the affected city or borough planning department for additional information and a floodplain determination.) ..... ☒ ☐

Name of waterbody: Several waterbodies (see attached topo map under "Project Location.")

16. Will you do any of the following: ..... ☒ ☐
Please indicate below:

☒ Build a dam, river training structure, other instream impoundment, or weir
☒ Use water
☒ Pump water into or out of stream or lake (including dry channels)
☒ Divert or alter a natural stream channel
☒ Change water flow or the stream channel
☒ Introduce silt, gravel, rock, petroleum products, debris, brush, trees, chemicals, or other organic/inorganic material, including waste of any type, into water
☒ Alter, stabilize or restore banks of a river, stream or lake (provide number of linear feet affected along the bank(s)
☒ Mine, dig in, or remove material, including woody debris, from beds or banks of a waterbody
☒ Use explosives in or near a waterbody
☒ Build a bridge (including an ice bridge)
☒ Use a stream, lake or waterbody as a road (even when frozen), or cross a stream with tracked or wheeled vehicles, log-dragging or excavation equipment (backhoes, bulldozers, etc.)
☒ Install a culvert or other drainage structure
☒ Construct, place, excavate, dispose or remove any material below the ordinary high water of a waterbody

☒ Construct a storm water discharge or drain into a waterbody
☒ Place pilings or anchors
☒ Construct a dock
☒ Construct a utility line crossing
☐ Maintain or repair an existing structure
☒ Use an instream in-water structure not mentioned here

If you answered "No" to ALL questions in this section, continue to next section.
If you answered "Yes" to ANY questions under 1-16, contact the Area DNR, office for information and application forms.

Based on your discussion with DNR, please complete the following:

Types of project approvals or permits needed.	Date application submitted
Only preliminary discussions to date.	

If you answered "Yes" to any questions in this section and are not applying for DNR permits, indicate reason:

☐ **_____ (DNR contact) told me on _____ that no DNR approvals are required on this project because _____**

■ FEDERAL APPROVALS

	Yes	No
U.S. Army Corps of Engineers (COE)		
1. Will you dredge or place structures or fills in any of the following: tidal (ocean) waters? streams? lakes? wetlands*?	☒	☐
If yes, have you applied for a COE permit?	☐	☒
Date of submittal: _____		
Name of COE contact: _____		
(Note: Your application for this activity to the COE also serves as application for DEC Water Quality Certification.)		
***If you are not certain whether your proposed project is in a wetlands (wetlands include muskegs), contact the COE, Regulatory Branch at 907-753-2712 for a wetlands determination (outside the Anchorage area call toll free 1-800-478-2712)*		
Bureau of Land Management (BLM)		
2. Is the proposed project located on BLM land, or will you need to cross BLM land for access?	☐	☒
If yes, have you applied for a BLM permit or approval?	☐	☐
Date of submittal: _____		
Name of BLM contact: _____		
U.S. Coast Guard (USCG)		
3. a) Do you plan to construct a bridge or causeway over tidal (ocean) waters, or navigable rivers, streams or lakes?	☒	☐
b) Does your project involve building an access to an island?	☐	☒
c) Do you plan to site, construct, or operate a deepwater port?	☒	☐
If yes, have you applied for a USCG permit?	☐	☒
Date of submittal: _____		
Name of USCG contact: _____		

U.S. Environmental Protection Agency (EPA)

4. a) Will the proposed project have a discharge to any waters? ☒ ☐
   b) Will you dispose of sewage sludge (contact EPA at 206-553-1941)? ☒ ☐
   If you answered yes to a) or b), have you applied for an EPA National Pollution Discharge Elimination System (NPDES) permit? ☐ ☒

   Date of submittal: _____

   Name of EPA contact: _____
   (Note: For information regarding the need for an NPDES permit, contact EPA at 1-800-424-4372)

		Yes	**No**
c)	Will construction of your project expose 1 or more acres of soil? *(This applies to the total amount of land disturbed, even if disturbance is distributed over more than one season, and also applies to areas that are part of a larger common plan of development or sale.)*	☒	☐
d)	Is your project an industrial facility that will have stormwater discharge directly related to manufacturing, processing, or raw materials storage areas at an industrial plant?	☒	☐

If you answered yes to c) or d), your project may require an NPDES Stormwater permit. Contact EPA at 206-553-8399.

Federal Aviation Administration (FAA)

5. a) Is your project located within five miles of any public airport? ☐ ☒
   b) Will you have a waste discharge that is likely to decay within 5,000 feet of any public airport? ☐ ☒
   If yes, please contact the Airports Division of the FAA at 907-271-5438.

Federal Energy Regulatory Commission (FERC)

6. a) Does the project include any of the following:
   1) a non-federal hydroelectric project on any navigable body of water ☐ ☒
   2) a location on federal land (including transmission lines) ☐ ☒
   3) utilization of surplus water from any federal government dam ☐ ☒
   b) Does the project include construction and operation, or abandonment of natural gas pipeline facilities under sections (b) and (c) of the Federal Power Act (FPA)? ☐ ☒

   c) Does the project include construction for physical interconnection of electric transmission facilities under section 202 (b) of the FPA? ☒ ☐
   If you answered yes to any questions under number 6, did you apply for a permit from FERC? ☐ ☒

   Date of submittal: _____

   Name of FERC contact: _____
   (*Note: For information, Div. Hydropower-Environment and Engineering contact: Vince Yearek 202-502-6174 or Mike Henry 503-944-6762, 202-502 8700; (for Natural Gas Projects) Division of Pipeline Certificate 202-502-8625; for Alaska projects contact Richard Foley – 202-502-8955)*

U.S. Forest Service (USFS)

7. a) Does the proposed project involve construction on USFS land? ☐ ☒
   b) Does the proposed project involve the crossing of USFS land with a water line? ☐ ☒
   If the answer to either question is yes, did you apply for a USFS permit or approval? ☐ ☐

   Date of submittal: _____
   Name of USFS contact: _____

8. Have you applied for any other federal permits or authorizations? ☐ ☒

AGENCY	APPROVAL TYPE	DATE SUBMITTED

Please be advised that the CPQ identifies permits subject to a consistency review. You may need additional permits from other agencies or the affected city and/or borough government to proceed with your activity.

Certification Statement

The information contained herein is true and complete to the best of my knowledge. I certify that the proposed activity complies with, and will be conducted in a manner consistent with, the Alaska Coastal Management Program.

Signature of Applicant or Agent _____ July 7, 2006 Date

Note: Federal agencies conducting an activity that will affect the coastal zone are required to submit a federal consistency determination, per 15 CFR 930, Subpart C, rather than this certification statement. ACMP has developed a guide to assist federal agencies with this requirement. Contact ACMP to obtain a copy.

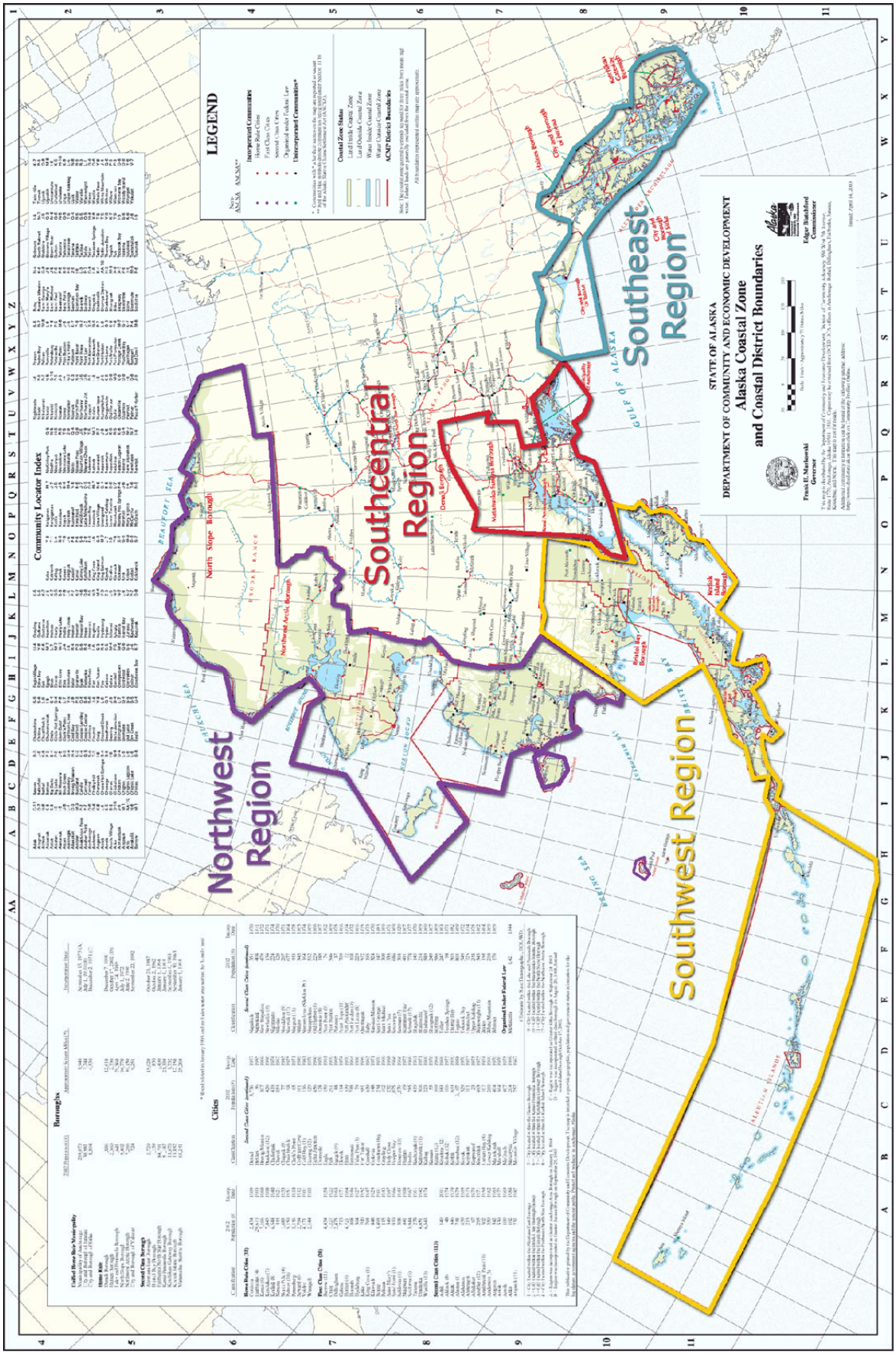
This certification statement will not be complete until all required State and federal authorization requests have been submitted to the appropriate agencies.

- **To complete your packet, please attach your State permit applications and copies of your federal permit applications to this questionnaire.**

Page Break

Attachment:
Regional
Map

Attachment: Regional Map



NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT

Application for Water Right

South Fork Koktuli River

Coastal Project Questionnaire

ATTACHMENTS

PROJECT DESCRIPTION

1. **Brief description of entire project**

   The Pebble Project will be a large open mine. Primary mine area facilities will consist of the open pit, ore conveyor, ore stockpile, a mill site (with associated offices, workshops, equipment repair and storage areas), tailing storage facilities, and a worker camp. Transportation facilities will include a mine area road network, and an approximately 100-mile road to a port facility on Cook Inlet. The primary port site facilities will include metal concentrates storage, fuel storage, a ship loading structure, barge landing, offices and worker housing.

2. **Attachments**

   - ***Detailed project description***

     A detailed project description will be available after the detailed design phase of the project is completed.

   - ***Project timeline***

     The project timeline will depend on the results of 2006 drilling program and follow up analysis, and the length of the permitting and NEPA processes. The estimated timeline is as follows:

     - Permit applications January 2008
     - NEPA process January 2008 through June 2010
     - Construction June 2010 through June 2012
     - Operations Late 2012

   - ***Site plan***

     The following figure (see Project Location topographical map, item # 1, below), titled "Pebble Project Location," shows the geographic scope of the project, and more specifically the locations of the major proposed water use facilities (the two tailings storage facilities, mine pit, and mill site).

Figure SFK-2, first introduced behind Tab # 5 (Project Description), is titled Tailings Storage Facility A, South Fork Koktuli River. This figure shows the location of the tailings facility (TSF A) impoundment as well as the other major locations (pit, and mill site) where the water would be beneficially used. The shaded area shows the proposed limits of water extraction.

A site plan depicting locations of lesser facilities will be available after the detailed design phase of the project.

- ***Other supporting documentation***

  See the remainder of the Application for Water Right in this binder within which this Coastal Project Questionnaire is located.

PROJECT LOCATION

1. **Topographical map** – See attached figure “Pebble Project Location”

3. **Location of project**

The proposed mine site is located 17 miles northwest of the community of Iliamna, on the north side of Lake Iliamna. An access road would extend approximately 100 miles from the mine site along the north side of Lake Iliamna to a possible port site on Cook Inlet (See attached figure “Pebble Project Location”).

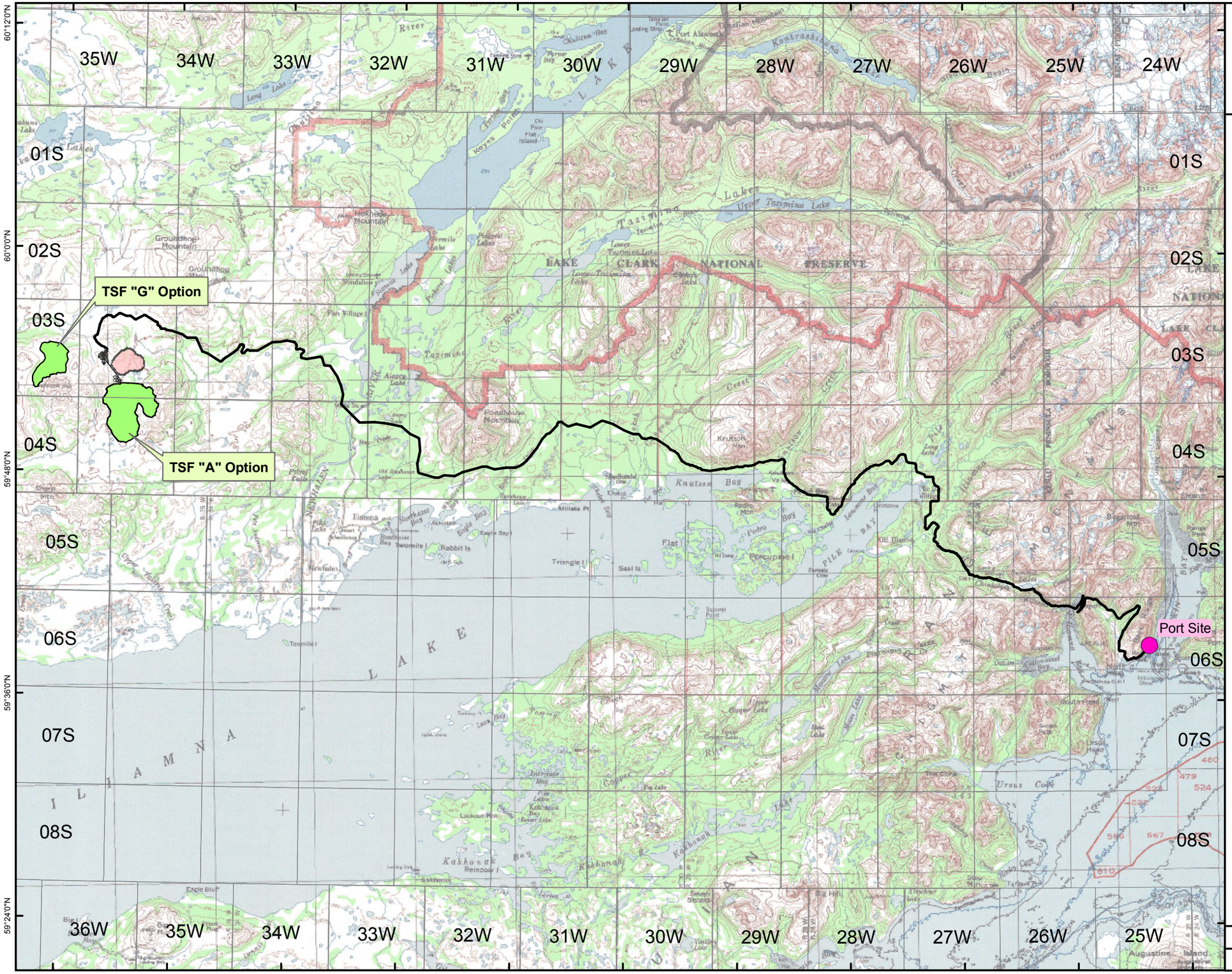
Various project facilities, including the road and port, would be located in the following townships and ranges, all within the Seward Meridian.

T3S, 36W	T4S, 30W	T5S, 33W
35W	29W	28W
34W	28W	27W
33W	27W	26W
T4S, 36W	26W	24W
35W	25W	23W
33W	24W	T6S, 26W
32W	23W	25W
31W	22W	24W

Pebble Project

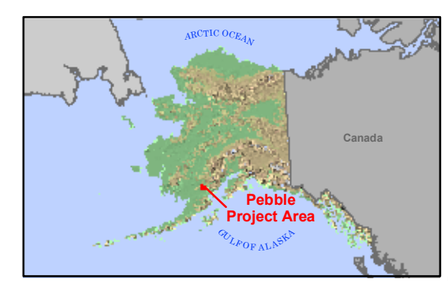
NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT LOCATION



Legend

- Possible Port Site
- Possible Access Road
- Open Pit
- (TSF) "A" & "G" Options



0 3 6 9 12 15 Miles

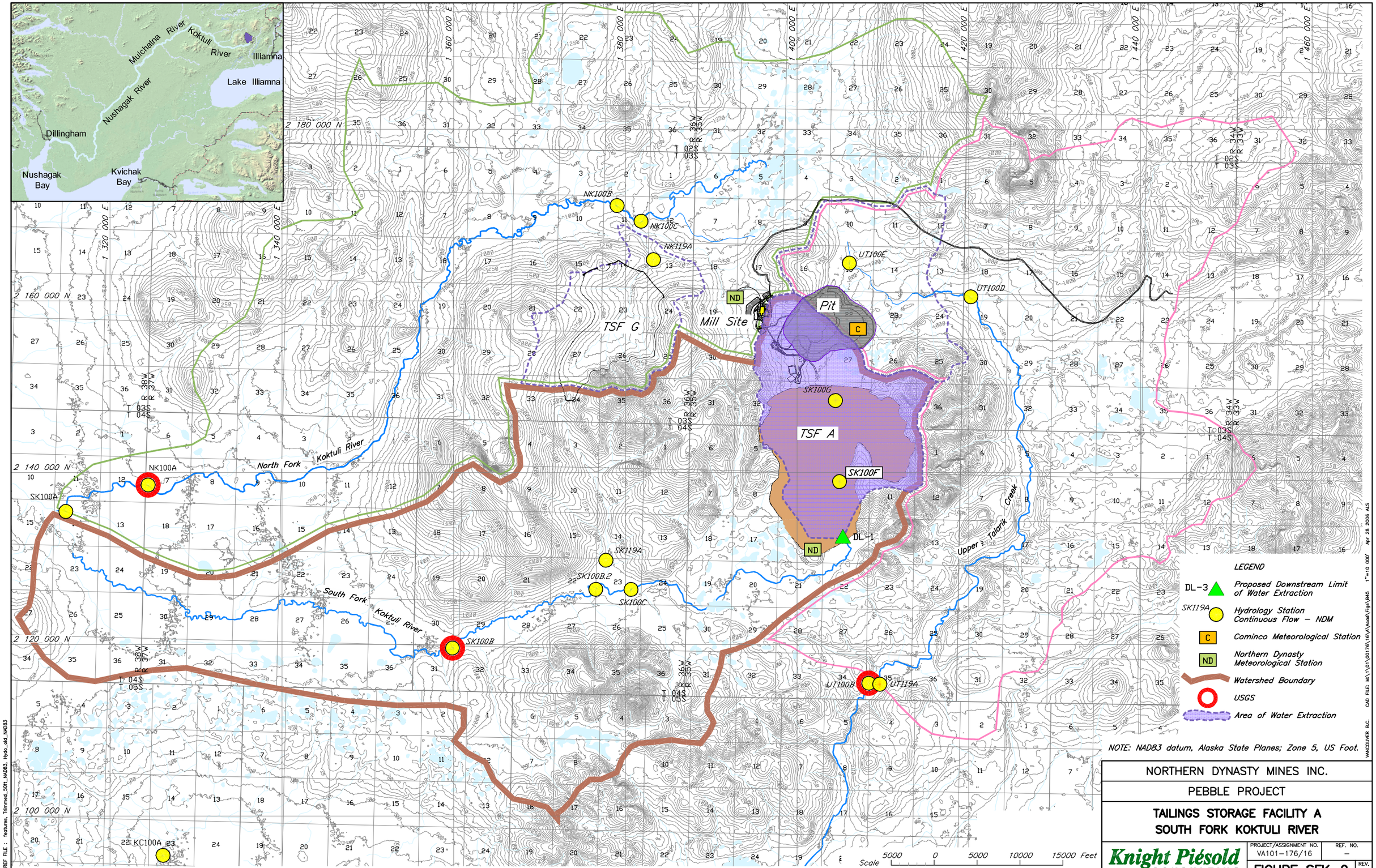
0 5 10 15 20 Kilometers

N

Scale 1:380,000

Alaska State Plane Zone 5 (units feet)
1983 North American Datum

File: RDI_ND_PebProjArea_11x17L_1of1_D01.mxd	Date: March 13, 2006
Version: 1	Author: RDI-DWR



REV.	DATE	ISSUED FOR
A	28APR'06	INFORMATION

NORTHERN DYNASTY MINES INC.

PEBBLE PROJECT

TAILINGS STORAGE FACILITY A
SOUTH FORK KOKTULI RIVER

Knight Piésold CONSULTING

PROJECT/ASSIGNMENT NO.	REF. NO.
VA101-176/16	–

FIGURE SFK-2 REV. A

NORTHERN DYNASTY MINES INC.
PEBBLE PROJECT
Application for Water Right

South Fork Koktuli River

APPLICATION FEE

INSTRUCTION #11 – *Submit non-refundable fee.*

Below is a copy of the check submitted with this application.

NORTHERN DYNASTY MINES, INC.
3201 C ST., SUITE 604
ANCHORAGE, AK 99503

1398
89-5/1252 5907
7380514120

DATE 7/7/06

PAY TO THE ORDER OF State of Alaska - Dept. of Natural Resources $ 900.00

Nine hundred & no/100 DOLLARS

Security Features Details on Back.

WELLS FARGO
Wells Fargo Bank, N.A.
Alaska
wellsfargo.com

FOR South Fork Koktuli - water appl. Tamya L. Harpal

⑈0000001398⑈ ⑆125200057⑆ 7380514120⑈

STYLE XPP