

## **TECHNICAL REPORT**

### **ROCK CREEK AND BIG HURRAH PROJECT**

Submitted to:  
**NOVAGOLD RESOURCES INC.**

Date:  
**FEBRUARY 21, 2008**

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**NORWEST**  
C O R P O R A T I O N

**1 TITLE PAGE**

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### **3 SUMMARY**

Alaska Gold Company (AGC) is a wholly owned subsidiary of NovaGold Resources Inc. (NovaGold). NovaGold is a precious metals company focused on the exploration and development of mineral assets in North America, with its head office in Vancouver, Canada. NovaGold has interests in several gold projects in Alaska and Canada at varying stages of development, including the Rock Creek, Big Hurrah, Nome Gold, Donlin Creek, and Ambler projects in Alaska and the Galore Creek project in British Columbia, as well as a portfolio of early-stage exploration projects in Alaska and British Columbia.

The 2008 feasibility study evaluates the development of a mining and milling facility at the Rock Creek project site north of Nome Alaska. In addition, the evaluation of a satellite ore deposit, called Big Hurrah, located about 80 km (50 mi) east of the Rock Creek site, is considered in the supply of additional mill feed for the Rock Creek processing plant.

The feasibility study has been developed from drilling and resource evaluation to mid-2007 using a base case gold price of \$US500 per ounce for pit design and mine planning. The effect of the use of higher gold prices on the mine plan and additional drilling completed in 2007 have not been included in this analysis. In addition, NovaGold holds other properties in the area on which exploration has been carried out or is planned but the potential for additional ore tonnage from these sites has not been included in this study.

Economic analyses were carried out using a gold price of \$US750/oz as a base case. This price exceeds the base case price of \$500/oz used for pit design. Consequently, economics are not optimized for the base case evaluation.

#### **3.1 PROJECT OVERVIEW**

The Rock Creek project is located on the Seward Peninsula along the west coast of Alaska, north of Norton Sound. The project area lies about 10 km north of Nome and is accessed via state maintained roads (see Figure 3.1).

The Big Hurrah deposit is located on the Seward Peninsula and lies about 80 km east of Nome and is also accessed via state-maintained roads in the summer months. Figure 3.2 shows the location of the Big Hurrah property.

Development at the Rock Creek site is well advanced with the following milestones having been achieved as of the end of 2007:

- Completion and initial wet testing of the processing plant
- Completion of infrastructure including access roads, buildings and power distribution
- Mining of waste within the pit area for use in haulroad and tailings dam construction
- Approval of permits to allow full project development
- Completion of equipment purchases for mining operations

Development of the Big Hurrah property is proceeding however no mining activity had occurred at that property as of year end 2007.

### **3.2 GEOLOGY**

The geology and resource estimates for Rock Creek and Big Hurrah were completed by Norwest. This section provides an overview of the deposit geology and the reader can refer to the geological reports for more detailed information.

Rock Creek has been explored by reverse circulation (RC) and core holes over a 16-year period. Currently, there are 25,427 m of core drilling in 261 holes and 16,686 m of RC drilling in 294 holes. There are also 1490 m of trenching, predominantly in zone 99. With the completion of the 2007 drilling program, the main mineralized zones of the Rock Creek gold occurrence have been delineated RC and core holes on roughly a 25 m grid, which is adequate to permit the interpretation of mineralized zones having similar grade or structural regime. This grid is considered adequate to permit interpretation of mineralized zones having similar grade or structural regime.

Resource modeling was performed using ordinary kriging, with validation models being prepared using a nearest neighbour approach. The base-case model was constructed using composites adjusted to core datum (AUCO). This model was tuned to give coefficients of variation (CVs) for 10x5x5 m blocks that are similar to those expected for 10x10x5 m selective mining units (SMUs); these were chosen by AGC for an envisioned 7,000 tpd open-pit operation.

Resources were classified according to hole spacings in the vicinity of a block. In general, the area drilled on a 30 m grid is considered Indicated. The remainder is considered Inferred resources and were not included in the mineable reserve estimates.

Mineralization in the Big Hurrah deposit occurs mainly in steeply dipping fissure zones that range from one to fifteen meters wide. Additional mineralization is present in low angle structural zones. Mineralization may expand considerably at the intersection of low and high angle structures.

Sectional polygons of mineralization based on drill hole logging of shearing, stock work, quartz veining, and gold grade were used to construct six distinct three-dimensional units. The units trend north-south (relative to the rotated mine grid) and have varying thicknesses and dip angles in the cross strike direction. Most of the units or zones are between 5m and 15m thick. All of the zones dip to the west (mine grid) except zone 4, which dips steeply to the east (mine grid).

The resource estimate is based on the sample results from a total of 201 diamond drill (DD) holes, 139 reverse circulation (RC) holes and 68 trenches. The results from 10 small trenches which have been deemed unreliable were excluded from the resource estimations.

Based on an analysis of the frequency distribution of the sample gold values and the spatial continuity of higher grades, a cap value of 70g/t was applied to samples. The sixteen composite samples with grades greater than 32g/t after the cap was applied to individual samples were allowed to influence grade estimates only in the block where they occurred.

### **3.3 LAND HOLDINGS**

The Rock Creek project occurs partly on patented mining claims owned 100% by AGC and partly on land controlled by the Bering Straits Native Corporation (BSNC), who own the subsurface mineral rights and Sitnasuak Native Corporation who own the surface rights (see Figure 3.3). The Bering Straits agreement involves escalating annual payments up to production, a 2.5% Net Smelter Return (NSR) royalty and a 5% Net Profits Interest from production from BSNC lands. Other patented claims in the immediate area for which AGC does not retain surface rights are MS 447. These areas are not currently disturbed by project facilities, although they may be required in the future and NovaGold is in discussion with the land owner.

The Big Hurrah project occurs within patented land owned 100% by AGC, with the remainder of the surrounding area within Solomon Native Corporation Lands. All of the mining and related facilities are located on AGC owned land (see Figure 3.4).

### **3.4 MINING**

The Rock Creek project will entail the development of two open pit mining operations; the Rock Creek pit and the Big Hurrah pit. Mining at Big Hurrah will commence shortly after Rock Creek and both pits will be mined out within the same year.

The Rock Creek pit is the larger of the two mining operations and will operate year round to supply ore feed to the Rock Creek mill (see Figure 3.4). The mine plan is based upon operating for approximately nine months of the year at full capacity at Rock Creek with a three month summer campaign at Big Hurrah (see Figure 3.5). In a typical year, 87% of the ore would come from the Rock Creek pit and 13% from the Big Hurrah pit. Ore from the Rock Creek pit will

consist of two rock types; Albion shear vein ore and Tension Vein ore while Big Hurrah consist of only one ore type.

Prior to developing the pit designs, the pit size and shape has been optimized using the Lerchs-Grossmann (LG) algorithm, within the MineSight® software suite. The LG algorithm uses estimated gold prices, mining and processing costs, ore recovery parameters, and pit slope criteria, and applying these parameters against the block grade model. This then forms the basis for the detailed pit design, which incorporates ramps and other operating features.

For each of the two pits, an estimate has been made for the mineable reserves as summarized in Tables 3.1 through 3.3. Table 3.1 provides an overall summary of reserve and resource tonnages by pit.

**TABLE 3.1**  
**SUMMARY OF RESERVE AND RESOURCE ESTIMATES**

<b>Reserve Estimates</b>			
<i>Probable</i>	<i>Tonnage</i>	<i>Grade (g/t)</i>	<i>Au(oz)</i>
Rock Creek (COG = 0.60g/t)	7,790,000	1.30	324,400
Big Hurrah (COG = 1.33g/t)	1,193,000	4.82	185,000
Total	8,983,000	1.76	509,400
<b>Resource Estimates exclusive of Reserve Tonnage*</b>			
<i>Indicated</i>	<i>Tonnage</i>	<i>Grade (g/t)</i>	<i>Au (t.oz)</i>
Rock Creek (COG = 0.60g/t)	4,567,000	1.16	170,300
Big Hurrah (COG = 1.00g/t)	887,000	2.68	76,400
Total	5,454,000	1.41	246,700
<i>Inferred</i>	<i>Tonnage</i>	<i>Grade (g/t)</i>	<i>Au (t.oz)</i>
Rock Creek (COG = 0.60g/t)	2,023,000	1.08	70,200
Big Hurrah (COG = 1.00g/t)	168,000	2.97	16,100
Total	2,191,000	1.23	86,300

\* Resource estimates are stated at the respective cut off grades and exclusive of any proven and probable reserves tonnage and inclusive of inferred resources contained within the pit and indicated resources within the pit which are below the stated reserve mill cut off grade.



**TABLE 3.2**  
**ROCK CREEK PIT RESERVE ESTIMATES**

COG = 0.60 gpt Au	Total all Zones		
	<i>Tonnes</i>	<i>Grade (g/t)</i>	<i>Au (t.oz)</i>
<b>Ore</b>			
Probable	7,790,000	1.30	324,4000
<b>Waste</b>			
Waste Rock	14,282,000		
Surficial Overburden (2t/m3)	1,530,000		
Total Waste	15,812,000		
Strip Ratio	2.03		

**TABLE 3.3**  
**BIG HURRAH PIT RESERVE ESTIMATES**

COG = 1.33 gpt Au	Total all Zones		
	<i>Tonnes</i>	<i>Grade (g/t)</i>	<i>Au (t.oz)</i>
<b>Ore</b>			
Probable	1,193,000	4.82	185,000
<b>Waste</b>			
Waste Rock	3,856,000		
Surficial Overburden (2t/m3)	604,000		
Total Waste	4,460,000		
Strip Ratio	3.73		

Based on the 7,000 tpd milling rate, the combined mine life is four years excluding the reclamation and closure work required after operations cease.

### 3.5 PROCESSING

The main Rock Creek ore body consists of two distinct mineralization types, Albion Shear Veins and Tension Vein ores. The Albion material is a more complex ore type and drives the process scenario required at Rock Creek. The host rocks for mineralization at Big Hurrah are carbonaceous metamorphic rocks of the Nome Schist Group.

Table 3.4 summarizes the results of the test work performed on the three ore types when the gravity-flotation-cyanide leach circuit is utilized.

**TABLE 3.4**  
**GOLD RECOVERY BY DESIGNATED**  
**METALLURGICAL PROCESS AT A P80 OF 212 MICRONS**

<b>Ore Type</b>	<b>Gravity Gold Recovery (%)</b>	<b>Flotation Gold Recovery (%)</b>	<b>Leach Gold Recovery (%)</b>	<b>Combined Process Gold Recovery (%)</b>
Tension Vein	93.0	71.6	74.9	96.8
Albion Shear	54.5	55.5	87.3	76.5
Big Hurrah	75.8	38.4	92.4	84.4

Gold recovery was found to be optimal on the Tension Vein material at a coarse grind of 212 microns. Since the Tension Vein material makes up approximately 75% of the ores to be treated at Rock Creek, this became the target grind for future test work. However, testing results on the Albion ore, and later on the Big Hurrah ore, gave recoveries that were slightly lower than predicted at this target grind. Gold recoveries for the Albion material responded well at 212 microns, but were somewhat improved at finer grinds (76.5% recovery versus 81.5% for 212 microns and 145 microns). This was also true for the Big Hurrah ores as recoveries improved from 84.4% to 91.6% by decreasing the grind size from 212 microns to 145 microns.

After gold extraction is complete, the tailings will be directed through a deep cone thickener to produce paste for placement in the tailings storage facility (TSF).

### **3.6 CAPITAL COSTS**

Project capital, including working capital, owners cost and capitalized ore mining costs, is \$157.8 million on the following schedule:

- Total expenditures to year end 2007 project estimated at \$141M;
- Estimated expenditure to complete project in 2008 is \$157.8M.

### **3.7 OPERATING COSTS**

The operating costs were developed from zero-base budgeting using site labour rates and estimates for equipment productivities.

The overall direct mine operating costs vary over the project's life and will range from a high of \$2.79/t-mined in the final year of production due to lower volumes to a low of \$1.49/t-mined in the second quarter of 2008. Mine operating costs will average \$1.81/t-mined or \$3.34/t ore over the project's life.

The haulage of ore from Big Hurrah to Rock Creek is estimated at \$16/t ore using 35t capacity highway trucks based on a contractor quote and amounts to an annual cost of approximately \$4.5 million per year. Based on a haul distance of 80 km, the trucking cost is about \$0.20/t-km.

The mill operating costs have been determined based on manpower, grinding media and liners, electric power, miscellaneous costs, and maintenance supplies. The mill operating costs averages \$10.56/t of ore milled over the project's life.

It is assumed that AGC will have an administration office at the Rock Creek site. The mine site office will be staffed by personnel directly and solely involved in the Rock Creek and Big Hurrah operation. Big Hurrah will have limited office facilities at site since a 3-4 month seasonal mining operation is envisioned there. The administration cost per tonne of ore milled averages \$1.77/t ore over the mine life. Table 3.5 summarizes the operating costs.

**TABLE 3.5**  
**OPERATING COST SUMMARY**

Item	\$/tonne of Material Mined	\$/tonne of Ore Processed	Weighted \$/tonne of Ore Processed
Mining Costs	\$1.81	\$3.34	\$3.34
Truck Haul (Big Hurrah)		\$16.00	\$2.12
Milling Costs			\$10.56
General and Admin			\$1.77
Other Costs			\$0.18
<b>Total Average Cost</b>			<b>\$17.97</b>

\* Excludes refining, treatment and royalties.

### 3.8 FINANCIAL ANALYSIS

Project cash flows have been determined using a base case gold price of \$750/oz. Sensitivities for gold prices ranging up to \$909/oz (February 7<sup>th</sup>, 2008 New York closing price) have also been examined.

The project's economics are determined on both a before and after tax stand alone project basis. Royalties from Alaskan Native Corporation controlled lands and state mining taxes have also been calculated.

All revenues and costs are in Q4 2007 constant US dollars. Cash flows are discounted at after tax discount rates of 0% and 5%, which are the rates NovaGold specified to Norwest. Base case

economic results are determined on a go-forward basis for capital expenditures as of January 1, 2008. A total project base case which includes capital items already purchased or committed to as of January 1, 2008 was also analysed. Total capital committed to year end 2007 is estimated at \$141 million.

NovaGold requested this type of analysis. The results presented in this manner may then allow management to consider project economics from the start of capital investment in the project and assess the recovery of that investment to date with future project cash flows. As well, go forward economics will allow management to consider the risk/reward potential of going ahead with the project if the investments to date are considered as “sunk capital” not influencing project economics.

Operating costs including the BSNC royalty and gold refining costs, range between approximately \$330/oz and \$527/oz, varying primarily with the strip ratio and the average grade. The average cost during the full production period from the third quarter of 2008 to 2011 is \$467/oz.

Results for the analysis of project economics are shown in Table 3.6 with a gold price of \$750/oz from January 1, 2008 forward for the full life of the project.

**TABLE 3.6**  
**PROJECT ECONOMIC SUMMARY (\$750/oz)**

	<b>Go Forward</b>	<b>Go Forward</b>
Discount Rate (%)	0%	5%
NPV Before Tax (\$M)	\$107.3	\$92.5
NPV After Tax (\$M)	\$107.2	\$92.4
IRR (%) Before Tax	180%	180%
IRR (%) After Tax	180%	180%

Note: NPV = net present value.

IRR = internal rate of return.

Using the go forward case, the payback period for the project is approximately one year.

If sunk costs are included in the economic analysis for a total project basis using a 5% discount rate then the net present value decreases to -\$42.8 million on an after-tax basis. If a 0% discount rate is used the total project shows an NPV of -\$26.4 million. Using a 0% discount rate, the total project case achieves a break-even point on an after-tax basis at a gold price of approximately \$835/oz.

## **4 INTRODUCTION AND TERMS OF REFERENCE**

### **4.1 TERMS OF REFERENCE**

Alaska Gold Company (AGC) is a wholly owned subsidiary of NovaGold Resources Inc. (NovaGold). NovaGold is a precious metals company focused on the exploration and development of mineral assets in North America. NovaGold is actively advancing several projects in Alaska including Rock Creek, Big Hurrah, Donlin Creek, and the Ambler project.

The 2008 Norwest feasibility study is an updated economic review that evaluates the development of a mining and milling facility at the Rock Creek project site north of Nome Alaska. In addition, a satellite ore deposit called Big Hurrah, is located about 80 km (50 mi) east of the Rock Creek site and will also supply high grade mill feed for the Rock Creek plant.

This feasibility study is based on a mining plan developed from drilling and resource evaluation to mid-2007 using a base gold price of \$500 per ounce. All dollar amounts shown in this report are US dollars.















Subsequent additional drilling and the potential mine plan that may be developed from that drilling, and the effect of the use of higher gold price on the mine plan, have not been included in this analysis. In addition, NovaGold holds other properties in the area on which exploration has been carried out or is planned but the potential for additional ore tonnage from these sites has not been included in this study.

### **4.2 SOURCES OF INFORMATION**

This feasibility study has been compiled for NovaGold under the coordination of Norwest. Technical consultants subcontracted to AGC were responsible for completing various aspects of the project as listed in the following summary table (Table 4.1). Based on the advanced status of the project's construction and development and the fact that regulatory permits required for mine development have been received, Norwest judges that review or update of the work of the majority of third-party consultants is not merited. The only third-party from whom an updated review of cost estimates was requested is WJP-Pennstrom Consulting, who were responsible for the process plant systems.

The following table summarizes the various technical disciplines and the responsible party in order to provide a listing of those involved in the project's design and development.

**TABLE 4.1**  
**SUMMARY OF PROJECT CONSULTANTS**

	Overall study coordination, project management, and report preparation	Norwest Corporation (Calgary, AB)
	Rock Creek geology, ore body modelling, and resource estimate	Norwest Corporation (Denver, CO))
	Big Hurrah geology, ore body modelling, and resource estimate	Norwest Corporation (Denver, CO)
	Rock Creek pit slope geotechnical design, initial site investigations.	Golder Associates (Anchorage, AK)
	Big Hurrah pit slope geotechnical design	Jim Swaisgood (Denver, CO)
	RC and BH Mineable reserve estimates, mine design, and production scheduling	Norwest Corporation (Vancouver, AB)
	Tailings design, rock dumps design, site earthworks design, geotechnical investigations, earthworks costing	Smith-Williams Consultants, Inc (Denver, CO)
	Metallurgical test work, flowsheet design, mill design, operating costs.	Pennstrom Consulting (Denver, CO)
	Infrastructure design, piping layouts	Samuel Engineering, Inc. (Colorado)
	Environmental management, permitting	Bristol Environmental & Engineering Services Corp. (Anchorage, AK)
	Geochemistry, water quality predictions, permitting	Water Management Consultants Inc. (Denver, CO)
	Water management, water balances, groundwater modelling, permitting	Water Management Consultants Inc. (Vancouver, BC)
	Capital cost compilation, building layouts, general arrangement drawings	Samuel Engineering, Inc. (Colorado)
	Project execution scheduling	Samuel Engineering, Inc. (Colorado)
	Financial analysis, sensitivity analysis, risks and opportunities	Norwest Corporation (Calgary, AB)

### 4.3 SITE VISIT

Ken Kuchling, P.Eng., a qualified person as defined in NI 43-101, has visited both the Rock Creek and Big Hurrah properties. The dates of his visits were April 22-24, 2003 and June 9-11, 2004. His qualification letter is included in Section 24.

### 4.4 ABBREVIATIONS AND TERMINOLOGY

AGC	Alaska Gold Company (subsidiary of NovaGold Resources Inc.)
ANFO	Ammonium Nitrate/Fuel Oil
AUCO	Composites Adjusted to Core Data
BCM	Bank Cubic Meters
BSNC	Bering Straits Native Corporation
CIMM	Canadian Institute of Mining and Metallurgy
COG	Cut-off Grade
CV	Coefficient of Variation
DD	Diamond drilling
g/t	grams per tonne (31.1 grams = 1 troy oz)
HDPE	High Density Polyethylene
ID2	Inverse Distance Squared
IRR	Internal Rate of Return
LG	Lerch-Grossmann (pit optimizer)
masl	Metres above sea level
mil	Thousands of an inch
Mtonne	Million tonnes
NAG	Non-acid generating rock
NJUS	Nome Joint Utility System (electric power supply)
NN	Nearest Neighbour
NOH	Net Operating Hour
NovaGold	NovaGold Resources Inc.
NPV	Net Present Value
NSR	Net Smelter Return
OK	Ordinary Kriging
PAG	Potentially acid generating
RC	Reverse Circulation drilling
RQD	Rock Quality Determination
RMR	Rock Mass Rating
SMU	Selective Mining Unit
TSF	Tailings storage facility (Rock Creek only)
TV	Tension Vein ore type (Rock Creek only)
t	tonnes

## **5      DISCLAIMER & RELIANCE ON OTHER EXPERTS**

This report is intended to conform to the NI 43-101 standard for technical reports on precious metal reserves. The reporting nomenclature and formats are consistent with NI 43-101 standards. The Rock Creek property is an advanced development property with ore production expected within the first quarter of 2008 and gold production within the second quarter of 2008.

Ore reserves were estimated for the Rock Creek and Big Hurrah properties based on current landholdings including landholdings where royalty agreements are in place. Norwest has been provided with documents providing legal opinion on the current landholdings and accepts these as valid. Details of the documents are provided in Section 6.2.



## **6 PROPERTY DESCRIPTION AND LOCATION**

### **6.1 PROPERTY DESCRIPTION AND LOCATION**

#### **6.1.1 Rock Creek**

The Rock Creek project is located on the Seward Peninsula along the west coast of Alaska, north of Norton Sound. The project area lies about 10 km north of Nome and is accessed via state maintained roads, as shown in Figure 3.1. A site layout is provided in Figure 3.2. The site is located at latitude 64° 34' north and longitude 165° 23'.

The terrain is fairly hilly with broad and narrow valleys. Nome is located at sea level while the Rock Creek plant site would be at an elevation of about 80 masl ("metres above sea level"). The mine area is higher, at elevations ranging from 100 masl to 150 masl.

Vegetation at the site consists mainly of low shrubs and tundra grasses. Forested areas and trees are non-existent in the mine area.

The nearest area to the Rock Creek prospect that is closed to mineral entry is the Bering Land Bridge National Preserve which is over 100km northeast of the Rock Creek prospect at its closest point. There currently are no unusual social, political or environmental encumbrances to exploration, development or production on the prospect. A royalty agreement is in place for the portions of the pit which lie outside of the claims held by AGC. Norwest understands that the property rights for the Rock Creek property are as described in the 2006 Technical Report titled "Technical Report of the Rock Creek Property" dated September 10, 2006 and prepared by AMEC. This report is available on NovaGold's website at [www.novagold.net](http://www.novagold.net) and on the SEDAR website at [www.sedar.com](http://www.sedar.com).

#### **6.1.2 Big Hurrah Deposit**

The Big Hurrah deposit is located on the Seward Peninsula along the west coast of Alaska, north of Norton Sound. The project area lies about 80 km east of Nome and is accessed via state maintained roads in the summer months, as shown in Figure 3.3. A site layout is provided in Figure 3.4. The property is located at latitude 64°38' north and longitude 164°14' west.

The terrain is fairly hilly with narrow valleys. The mine area is at an elevation of about 100 masl.

Vegetation at the site consists mainly of low shrubs and tundra grasses. Forested areas and trees are non-existent in the mine area.

There currently are no unusual social, political or environmental encumbrances to exploration, development or production on the prospect. Norwest understands that the property rights for the Big Hurrah property are as described in the 2006 Technical Report titled “Big Hurrah Technical Report, Seward Peninsula, Alaska” dated August 25, 2006 and prepared by Resource Modeling Inc. This report is available on NovaGold’s website at [www.novagold.net](http://www.novagold.net) and on the SEDAR website at [www.sedar.com](http://www.sedar.com).

## 6.2 CLAIM STATUS

The Rock Creek project occurs partly on patented mining claims owned 100% by AGC and partly on land controlled by the BSNC, who own the subsurface mineral rights and Sitnasuak Native Corporation who own the surface rights. The Bering Straits agreement involves escalating annual payments up to production, a 2.5% Net Smelter Return (NSR) royalty and a 5% Net Profits Interest from production from BSNC lands. Other patented claims in the immediate area for which AGC does not retain surface rights are MS 447. These areas are not currently disturbed by project facilities, although they may be required in the future and NovaGold is in discussion with the land owner. Table 6.1 summarizes the claims held by AGC.

**TABLE 6.1**  
**ROCK CREEK CLAIMS SUMMARY**

Claim Name	Patent Number
Francisco	316745
No. 1 Above Francisco	316745
No. 2 Above	316745
No. 3 Above	316745
No. 1 Sophie Gulch	316745
No. 4 Above	316745
Fractional Claim No. 4 ½ on Rock Creek	316745
No. 5 Above	316745
No. 6 Above Right Hand Branch	316745
Rock Creek Bench No.4 Above	316746

A legal opinion on the land status of the Rock Creek property was provided to NovaGold by J.P. Tangen, attorney at law of Anchorage, Alaska in a letter report dated April 24, 2007. This report was titled “Limited Supplemental Land Status and Title Report – Rock Creek Pit Area” and is an update to the August 2006 legal opinion on the land status provided by Guess & Rudd. The Tangen report states that their examination of the public records and other documents show that Parcel I (as described in the 2006 AMEC Technical Report) is vested in AGC and title to the surface of Parcel II (as described in the 2006 AMEC Technical Report) is vested in Sitnasuak

Native Corporation. The title to the subsurface of Parcel II is vested in BSNC. Norwest has been provided with copies of documents showing agreements signed between AGC and the Sitnasuak Native Corporation (dated May 26, 2006) and Golden Glacier Inc. (dated March 13, 2002) which are described in the 2006 AMEC Rock Creek Technical Report and accepts these agreements as valid.

The Big Hurrah project occurs within patented land owned 100% by AGC with the remainder of the surrounding area within Solomon Native Corporation Lands. All of the mining and related facilities are located on AGC owned land. Table 6.2 summarizes the claims held by AGC for the Big Hurrah property.

**TABLE 6.2**  
**BIG HURRAH CLAIMS SUMMARY**

<b>Claim Name</b>	<b>Acres Surveyed)</b>	<b>Hectares (Calculated)</b>
Dewey	18.322	7.42
Elmer S.	18.438	7.47
Josephine	18.961	7.68
July Fraction	6.484	2.63
King Solomon	14.365	5.82
King Solomon No. 1	18.002	7.29
King Solomon No. 2	18.614	7.54
King Solomon No. 3	18.738	7.59
King Solomon No. 4	20.186	8.18
King Solomon No. 5	20.088	8.14
King Solomon No. 6	19.484	7.89
October Fraction	2.445	0.99
Potazuba Fraction	7.611	3.08
Queana	20.124	8.15
Sour Dough	20.133	8.15
Total Area	241.995	98.02

See Figure 3.3 for landholding information.

## **7 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY**

### **7.1 ACCESS**

The city of Nome (population 4,000) is situated on the Bering Sea coast and serves as the logistical and administrative center for this portion of western Alaska. Nome has daily commercial jet service from Anchorage and has large container barge service from June through October.

The Rock Creek project is accessible via the Glacier Creek Road and the state maintained Teller-Nome Highway, an all-weather paved and gravel road. The State of Alaska has constructed the Glacier Creek Road By-Pass road, which facilitates direct road access between the proposed minesite and the town of Nome.

### **7.2 CLIMATE**

The Nome area is characterized by cool summers and cold winters. Summer temperatures range around +15°C and winter temperatures average around -15°C. Figure 7.1 provides a chart of seasonal air temperatures, showing mean, and average high and low temperatures.

Limited site specific climate data is available however, based on characterization work carried out by Water Management Consultants (2005), the Rock Creek site is estimated to have an annual precipitation rate approximately 2.5 times the rate at Nome. The annual precipitation rate for the site is estimated to be in the range of 1050mm. Monthly average precipitation rates for Nome are shown in Figure 7.1.

Since the Rock Creek and Big Hurrah projects are located inland and at higher elevation than Nome, climatic conditions there may be slightly different than in Nome. Possible differences are described in the water management plans for each site.

### **7.3 LOCAL INFRASTRUCTURE**

The city of Nome has provided electricity to past placer mining operations and has offered that service for future mining operations if necessary. Current generating capacity is about 18 MW, based on the recent commissioning of two new 5.2 MW generator sets. The current local power consumption in Nome is in the range of 4 MW to 6 MW.

No camp facilities are required at the Rock Creek project due to its close proximity to Nome, which is well serviced with accommodations. Big Hurrah can be easily accessed from Nome via a well-maintained seasonal road and none of the work force would reside in that area.

## **8 HISTORY**

The history for each property is described in detail in the 2006 Technical Reports submitted on each property:

“Technical Report of the Rock Creek Property” dated September 10, 2006 and prepared by AMEC. This report is available on NovaGold’s website at [www.novagold.net](http://www.novagold.net) and on the SEDAR website at [www.sedar.com](http://www.sedar.com).

“Big Hurrah Technical Report, Seward Peninsula, Alaska” dated August 25, 2006 and prepared by Resource Modeling Inc. This report is available on NovaGold’s website at [www.novagold.net](http://www.novagold.net) and on the SEDAR website at [www.sedar.com](http://www.sedar.com).

## **9 GEOLOGICAL SETTING**

The geological setting for each property is described in detail in the 2006 Technical Reports submitted on each property:

“Technical Report of the Rock Creek Property” dated September 10, 2006 and prepared by AMEC. This report is available on NovaGold’s website at [www.novagold.net](http://www.novagold.net) and on the SEDAR website at [www.sedar.com](http://www.sedar.com).

“Big Hurrah Technical Report, Seward Peninsula, Alaska” dated August 25, 2006 and prepared by Resource Modeling Inc. This report is available on NovaGold’s website at [www.novagold.net](http://www.novagold.net) and on the SEDAR website at [www.sedar.com](http://www.sedar.com).

## **10 DEPOSIT TYPES**

The description of deposit types is described in detail in the 2006 Technical Reports submitted on each property:

“Technical Report of the Rock Creek Property” dated September 10, 2006 and prepared by AMEC. This report is available on NovaGold’s website at [www.novagold.net](http://www.novagold.net) and on the SEDAR website at [www.sedar.com](http://www.sedar.com).

“Big Hurrah Technical Report, Seward Peninsula, Alaska” dated August 25, 2006 and prepared by Resource Modeling Inc. This report is available on NovaGold’s website at [www.novagold.net](http://www.novagold.net) and on the SEDAR website at [www.sedar.com](http://www.sedar.com).



## 11 MINERALIZATION

### 11.1 ROCK CREEK

The Rock Creek geologic model has been updated from existing mineral domains using the 2006-2007 drilling data. John Odden, AGC project geologist, reviewed the existing interpretation and updated sectional polygons when necessary. Some alteration of the zone shapes occurred but the mineral zone solids are generally similar to the configuration for the last published resource estimate (AMEC, 2006). The mineral zones are described in Table 11.1 below

**TABLE 11.1**  
**MINERAL ZONES**

<b>Zone Number</b>	<b>Name or Nominal Grade Threshold</b>	<b>Description</b>
1	+0.5 g/t	Tension veining generally east of the Albion Shear
2	+0.5 g/t	Weak mineralization on either side of the Albion Shear
3	Walsh	Interpreted by Stan Dodd
10	Albion Shear	From AGC interpretation and unaltered by AMEC or Norwest
99	Miscellaneous Mineralization	All other mineralization outside of the other zones

An isometric view of the model mineral zones, clipped to the surface topography, is presented in Figure 11.1.

### 11.2 BIG HURRAH

#### 11.2.1 Mineral Zones

Mineralization in the Big Hurrah deposit occurs mainly in steeply dipping fissure zones that range from one to fifteen meters wide. Additional mineralization is present in low angle or bedded units in proximity to high angle structures. At the intersection of low and high angle structures the zone of mineralization may expand considerably.

Sectional polygons of mineralization based on drill hole logging of shearing, stock work, quartz veining, and gold grade were used to construct six distinct three-dimensional units. The units trend north-south (relative to the rotated mine grid) and have varying thicknesses and dip angles in the cross strike direction. Most of the units or zones are between 5m and 15m thick. All of the zones dip to the west (mine grid) except zone 4, which dips steeply to the east (mine grid).

The six mineral zones were intersected with the northeast (mine grid) trending Hurrah and West Hill faults located at the south and north ends of the mineralized shear zones, respectively. The shear zone shapes were clipped with the faults so that the zones did not extend south of the Hurrah or north of the West Hill faults. The surrounding low-grade material around the six domains is split into two additional domains based on the general trend of the mineralization; the eastern side dipping east (zone = 98) and the western side dipping west (zone=99). Finally, overburden material, which locally contains minor gold grades is coded zone=97.

The domains are summarized in Table 11.2.

**TABLE 11.2**  
**SUMMARY OF BIG HURRAH MINERALIZED DOMAINS**

Domain	Code#	Description
Zone 1	1	Main zone containing majority of resource. (NS -30W)
Zone 2	2	Patchy grade distribution (NS -40W)
Zone 3	3	FW side of zone 2, thinner and lower grade (NS -50W)
Zone 4	4	New area, focus of majority of drilling since 2005. East dip (NS -70E)
Zone 5	5	Small zone near south end zone 1 (NS -30W)
Zone 6	6	Patchy interpretation between zones 1 and 2. High grade (NS -35W)
Zone 97	97	Overburden
Zone 98	98	Surrounding primarily low-grade zone, east side (trend dip E). Mineralization which should be N extension of zone 4 occurs in this domain.
Zone 99	99	Surrounding low-grade zone, west side (trend dip W)

An isometric view of the model mineral zones, clipped to the surface topography, is presented in Figure 11.2.

## **12 EXPLORATION**

Exploration work carried out up to 2006 is described in detail in the previous 2006 technical reports.

“Technical Report of the Rock Creek Property” dated September 10, 2006 and prepared by AMEC. This report is available on NovaGold’s website at [www.novagold.net](http://www.novagold.net) and on the SEDAR website at [www.sedar.com](http://www.sedar.com).

“Big Hurrah Technical Report, Seward Peninsula, Alaska” dated August 25, 2006 and prepared by Resource Modeling Inc. This report is available on NovaGold’s website at [www.novagold.net](http://www.novagold.net) and on the SEDAR website at [www.sedar.com](http://www.sedar.com).

Exploration drilling programs at Rock Creek continued in 2006 and 2007 resulting in the extension and expansion of the existing mineral zones described in section 11. The holes added since the previous resource estimates are shown in Figure 12.1 for Rock Creek and Figure 12.2 for Big Hurrah.

## **13 DRILLING**

The description of drilling given in the 2006 technical reports remains valid. The distribution of sample data is shown by sample type in plan in Figure 13.1. The distribution of sample data added at Rock Creek since the previous resource model in September 2006 is shown in Figure 12.1. Note that the majority of the new drilling is located around the periphery of the deposit.

The total length of DD holes is 30,617m of which 30,362m has been analyzed for gold. The total length of RC drilling is 11,040m of which 9,483m has been analyzed for gold. There are 950m of trenches with 930m of samples.

Over 98% of RC samples are 1.5m in length. DD samples vary in length with 95% of the samples less than or equal to 1.5m in length. Approximately 25% of trench samples are 1m in length and the remaining 75% are in 2m sample intervals.

The resource estimate is based on the sample results from a total of 201 DD holes, 139 RC holes and 68 trenches. The results from 10 small trenches, which have been deemed unreliable, were excluded from the resource estimations. The gold grades from select intervals in 5 RC holes were assigned a grade of 0.025g/tAu as a result of suspected contamination during drilling. The distribution of drill holes is shown in plan in Figure 13.2.

Exploration programs at Big Hurrah continued in 2006 and 2007. The total length of DD holes at Big Hurrah is 11,734m of which 10,955m has been analyzed for gold. The total length of RC drilling is 7,798m of which 7,617m has been tested for gold. There are 2,828m of trenches with 2,555m of samples. The location of drillholes at the property is shown in Figure 13.3.

## **14 SAMPLING METHOD AND APPROACH**

The descriptions of sampling provided in the 2006 technical reports remain valid.

“Technical Report of the Rock Creek Property” dated September 10, 2006 and prepared by AMEC. This report is available on NovaGold’s website at [www.novagold.net](http://www.novagold.net) and on the SEDAR website at [www.sedar.com](http://www.sedar.com).

“Big Hurrah Technical Report, Seward Peninsula, Alaska” dated August 25, 2006 and prepared by Resource Modeling Inc. This report is available on NovaGold’s website at [www.novagold.net](http://www.novagold.net) and on the SEDAR website at [www.sedar.com](http://www.sedar.com).

## **15 SAMPLE PREPARATION, ANALYSIS AND SECURITY**

### **15.1 ROCK CREEK SAMPLING**

Sample preparation differed according to sampling campaigns through the years. The protocols all involved taking either whole or half core or a large split of the RC cuttings, an initial crush to 10 mesh followed by pulverization to 150 to 200 mesh. For some campaigns either 30 or 50 g of pulp material was assayed by fire assay. Most assays were based on a metallic screen, fire assay procedure of the whole pulverized aliquot.

AMEC conducted an extensive review of the sample preparation procedures and quality control in 2006 (AMEC, 2006). Subsequently, NovaGold conducted an extensive review (Zack, 2007) of assay quality assurance results. Norwest has reviewed the previous work and conducted checks on the information used to develop the published conclusions. In the opinion of Norwest, the sampling and assay quality is sufficiently accurate and precise to permit resource estimation.

### **15.2 BIG HURRAH SAMPLING**

Sample preparation and related protocols are described in detail in the 2006 technical report.

“Big Hurrah Technical Report, Seward Peninsula, Alaska” dated August 25, 2006 and prepared by Resource Modeling Inc. This report is available on NovaGold’s website at [www.novagold.net](http://www.novagold.net) and on the SEDAR website at [www.sedar.com](http://www.sedar.com).

## **16 DATA VERIFICATION**

The drill hole location survey verification recommended by AMEC (AMEC, 2006) was conducted. No marked discrepancies in re-surveyed locations from the original locations were found.

Recommendations for data verification and validation made by AMEC were carried out by AGC personnel. Norwest conducted an audit of six randomly selected holes from the pre-2003 drilling that had been questioned. Items checked against original sources included collar location, down-hole survey, assay results, and sample intervals. No errors were found. Norwest concludes the assay and survey databases are sufficiently free of error to permit resource estimation. Review of samples and field sampling sites was conducted during the site visit. Samples appear to be a legitimate reflection of the in place material.

## **17 ADJACENT PROPERTIES**

NovaGold and its subsidiary AGC currently hold additional mineral claims in the vicinity of the Rock Creek and Big Hurrah properties. As of the time of preparation of this technical report, these properties have no relevance to the mineralization on either the Rock Creek or Big Hurrah properties.



## **18 MINERAL PROCESSING AND METALLURGICAL TESTING**

The documentation for the metallurgical work and process design basis is included in Pennstrom (2005). Much of the test work has been performed through June, 2005 under the supervision of Pennstrom Consulting.

This process design included several activities, which are:

- review of the historical metallurgical work previously performed on Rock Creek and Big Hurrah ores;
- development of a project definitive test work program;
- analysis of the program and current test work results;
- incorporation of all of the results into a process flow sheet and plant design; and
- incorporating the information into a feasibility level project study.

The design report Pennstrom (2005) includes a discussion on past and recent metallurgical test programs, an analysis of the impacts to process options and costs, and a presentation on the development of a proposed process plant. Since the publication of that report, the development of the property has progressed substantially.

The process plant is now completed at the Rock Creek site and the crusher system has been commissioned. Water testing of the process plant has been partially completed. Full commissioning of the total processing system is expected sometime in February 2008 and ore processing is expected to occur before the end of the first calendar quarter of 2008.

### **18.1 ORE TYPES**

The main Rock Creek ore body consists of two distinct mineralization types, Albion Shear Veins and Tension Vein ores. The Albion Shear Veins are best described as sheared quartz vein, breccias with crushed and broken material in the shear. The Tension Veins are tensional quartz veins adjacent to the shear veins. The Albion veins contain fine grained sulfides and sulfosalts, while the Tension stockwork veins have a relatively simple mineralogy of quartz, iron carbonates, sulfides and free gold. The Albion material is the most difficult ore type present at Rock Creek and drives the process scenario required at Rock Creek. Slightly finer grinding of Albion ore is required to optimise the liberation of gold.

During the course of this study, the Big Hurrah satellite deposit was reviewed and brought into the overall suite of ores that would be processed at the Rock Creek facility. The host rocks for

mineralization at Big Hurrah are carbonaceous metamorphic rocks of the Nome Schist Group. Gold occurs primarily in its native state and is found in quartz veins encased in northwest striking and moderately southwest dipping thrust fault zones. The major difference between the Rock Creek ores and the Big Hurrah ore is the presence of organic carbon.

In all of the ore types previously discussed, the vast majority of the gold present exists as free gold and is not refractory.

## **18.2 HISTORICAL TEST WORK**

Historical metallurgical studies have been completed over several phases in support of the level of investigation that was taking place at the time. Most recently the metallurgical work has been performed in support of a feasibility level study, to an accuracy that satisfies the needs of the report.

Test work was initiated on Rock Creek ores in the mid 1980's by Newmont Mining Company and Placer Dome Inc. who began with simple in house cyanidation tests of samples collected at surface. The most important test work that was performed prior to this investigation was that work performed by McClelland Laboratories Incorporated in Reno, Nevada. This work followed up previous tests with larger, more representative samples of the Rock Creek ore types. McClelland's focus was on treating the whole ore with cyanidation, and gravity followed by whole ore cyanide leaching of the gravity tails. This work clearly indicated that the Rock Creek ores were amenable to gravity and cyanide leaching.

The current test work program focused on obtaining sufficient test work data to develop a process flow sheet that would have the highest financial return for Rock Creek ores. Big Hurrah ores were also sampled and tested in this program.

High Nome power costs coupled with high freight costs directed the testing program to examine minimized grinding requirements and reagent needs. A test work flowsheet was developed to focus on a coarse grind gravity and flash flotation circuit that would be followed by on site concentrate treatment. The concentrate treatment test work focused on methods to remove the gold from the concentrates in order to produce a doré product suitable for shipment to a precious metals refinery. This most recent program was performed by Process Research Associates in Vancouver, British Columbia, and Resource Development Inc. in Wheat Ridge, Colorado.

Test work on the Albion zone, Tension Vein, and Big Hurrah materials show a high recovery can be obtained by using a combination of gravity concentration and flotation. The gravity middlings and the flotation concentrate can then be effectively leached using a weak cyanide solution in a 40% to 50% solids slurry. Due to the presence of organic carbon in the Big Hurrah ore, the

cyanide leaching for this ore type was observed to give highest results when leaching occurred in the presence of activated carbon. Table 18.1 summarizes the results of the test work performed on the three ore types when the gravity-flotation-cyanide leach circuit was utilized.

**TABLE 18.1**  
**GOLD RECOVERY BY DESIGNATED METALLURGICAL PROCESS AT A P80 OF 212 MICRONS**

Ore Type	Gravity Gold Recovery (%)	Flotation Gold Recovery (%)	Leach Gold Recovery (%)	Combined Process Gold Recovery (%)
Tension Vein	93.0%	71.6%	74.9%	96.8%
Albion Shear	54.5%	55.5%	87.3%	76.5%
Big Hurrah	75.8%	38.4%	92.4%	84.4%

Gold recovery was found to be optimal on the Tension Vein material at a grind of 212 microns. Since the Tension Vein material makes up approximately 75% of the ores treated at Rock Creek, this became the target grind for future test work. However, test work results on the Albion zone ore, and later on the Big Hurrah ore, were slightly lower than predicted at this target grind. Gold recoveries for the Albion zone material responded well at 212 microns, but were somewhat improved at finer grinds of 145 microns (76.5% recovery versus 81.5%). This was also true for the Big Hurrah ores as recoveries improved from 84.4% to 91.6% by decreasing the grind size from 212 microns to 145 microns.

If the mine plan allows, stockpiled Albion zone material and Big Hurrah ore could be processed separately from Tension Vein ore. This would allow plant operators to decrease the grind size for both of these ores resulting in improved recoveries. It is expected that additional metallurgical optimization will occur during operations to determine if the projected increased gold recovery would offset the anticipated higher operating costs.

### 18.3 ORE PROCESSING

Early in the design phase of the project, an economic analysis was performed to determine the optimum throughput milling rate at Rock Creek. That study showed a throughput rate of 7,000 tpd optimized the project economics. The throughput rate appeared to be more a function of the average head grade, than any other parameter. The current operations plan calls for running the plant at the throughput rate of 7,000 tpd in order to maximize tonnage processed while accepting somewhat lower recovery for some ore types. As noted above, if opportunities present themselves for running the Albion and Big Hurrah ores at the finer grind without adversely affecting overall mine production then plant operations staff can decide if the change is warranted.

Since Tension Vein ores are the majority of the ores processed at Rock Creek, and since gold recovery was found to be optimal on the Tension Vein material at a grind of 212 microns, the proposed process plant designed for this study was set to meet this target grind. This target grind also minimizes the power requirements for grinding. The process plant includes a gravity circuit to capture coarse gold, flotation cells to capture the finer gold associated with sulphides, and a carbon-in-leach circuit to produce a doré bar on site. A simplified flow sheet and material balance depicting the proposed process is shown in Figure 18.1. The goal of minimizing reagent consumption is met by designing the process to only leach the concentrates, which is approximately 15% of the total ore stream tonnage fed to the mill. The general arrangement of the process plant is shown in Figure 18.2 and the schematic flowsheet in Figure 18.3.

## **19 MINERAL RESOURCE AND MINERAL RESERVE ESTIMATES**

### **19.1 INTRODUCTION**

The mineral resource estimates for the Rock Creek deposit were prepared by Robert Sim P.Geo and Bruce Davis FAusIMM. Estimations are made from 3-dimensional block models based on geostatistical applications using commercial mine planning software (MineSight®). The project limits area based on a local grid coordinate system using a nominal block size of 5x10x5m. The geologic domains, originally derived for the 2004 resource model prepared by AMEC and updated based on current drilling results, have been produced by NovaGold geological personnel representing the distribution of mineralization in relation to observed structural and alteration features.

The resource estimate has been generated from drill hole and trench sample assay results and the interpretation of a geologic model which relates to the spatial distribution of gold. Individual domains, reflecting distinct zones or types of mineralization, have been outlined and individual interpolation characteristics have been defined based on the geology, drill hole spacing and geostatistical analysis of the data. The resources have been classified by their proximity to the sample locations and are reported, as required by NI 43-101, according to the CIM standards on Mineral Resources and Reserves.

### **19.2 GEOLOGIC MODEL, DOMAINS AND CODING**

The geologic model has been updated from existing mineral domains using the 2006-2007 drill data. John Odden, AGC project geologist, reviewed the existing interpretation and updated sectional polygons when necessary. Some alteration of the zone shapes occurred but the mineral zone solids are generally similar to the configuration for the last published resource estimate (AMEC, 2006). The mineral zones are described in Table 11.1 above.

A view of the model mineral zones is given in Figure 11.1 in Section 11.

### **19.3 AVAILABLE DATA**

#### **19.3.1 Sample data**

The original sample data contains collar locations in UTM coordinates. In order to be consistent with previous work, these locations were translated and rotated into a local, Mine-grid system. The relationship between UTM and Mine-grid is listed below.

UTM 479443E, 7165469N = 0 E, 0 N Rock Creek Mine Grid. Original survey data is rotated so that Mine Grid north is oriented at a true azimuth of 50 degrees.

The resource estimate is based on the sample results from a total of 261 DD holes, 294 RC holes and 22 trenches. The gold grades from a total of 242 intervals in 29 RC holes were rejected due to suspected contamination during drilling. A total of 1724 DD core intervals were also rejected because the core recoveries were less than 60%. The distribution of sample data is shown by sample type in plan in Figure 13.1. The distribution of sample data added at Rock Creek since the previous resource model in September 2006 is shown in Figure 12.1.

The total length of DD holes is 30,617m of which 30,362m has been analyzed for gold. The total length of RC drilling is 11,040m of which 9,483m has been analyzed for gold. There are 950m of trenches with 930m of samples.

Over 98% of RC samples are 1.5m in length. DD samples vary in length with 95% of the samples less than or equal to 1.5m in length. Approximately 25% of Trench samples are 1m in length and the remaining 75% are in 2m sample intervals.

Other information carried in the sample database includes lithology codes (8 codes), campaign vintage designation and recovery information.

Resource modeling has been conducted using the commercial mine design software system, MineSight® v3.6 developed by Mintec, Inc.

### **19.3.2 Topography**

Topography was originally derived from a 3-dimensional AutoCAD® drawing files of 2004 vintage. A 3-dimensional surface has been triangulated from the 1m contour lines. The surveyed drillhole collars match well with this surface.

## **19.4 COMPOSITING**

Compositing of drill hole samples is carried out in order to standardize the database for further statistical evaluation. This step eliminates any effect related to the sample length which may exist in the data.

The original sample data has been composited into standard 5m lengths. Composites are length-weighted and have been generated “down-the-hole” meaning that composites begin at the top of each hole and are generated at 5m intervals down the length of the hole. Intervals less than 1.5m in length have been merged into the previous interval. Composited intervals honour the zone domain boundaries.

Several holes were randomly selected and the composited values were checked for accuracy. No errors were found.

## **19.5 EXPLORATORY DATA ANALYSIS**

Exploratory data analysis involves the statistical evaluation of the database in order to quantify the characteristics of the data. One of the main purposes of this exercise is to determine if there is evidence of spatial distinctions in grade which may require the separation and isolation of domains during interpolation. The application of separate domains prevents unwarranted mixing of data during interpolation and the resulting grade model will better reflect the unique properties of the deposit. However, applying domain boundaries in areas where the data is not statistically unique may impose a bias in the distribution of grades in the model.

A domain boundary, which segregates the data during interpolation, is typically applied if the average grade in one domain is significantly different from that of another domain. A boundary may also be applied where there is evidence that there is a significant change in the grade distribution across the contact.

### **19.5.1 Conclusions and Modeling Implications**

Based on the results from boxplots and contact profiles “hard” boundaries are used between all zone domains (see Figures 19.1 to 19.3).

## **19.6 BULK DENSITY DATA**

The density of 2.71 g/cm<sup>3</sup> applied in previous estimates of the Rock Creek resource was retained for the current model. This value was based on study work by Golder Associates and adjusted for the presence of gouge and shears in the deposit.

## **19.7 EVALUATION OF OUTLIER GRADES**

Gold metal assessed to be at risk was removed using the outlier restriction method during grade interpolation. No raw assay or composite data were capped. Table 19.1 summarizes the percentage of metal removed from the base case model compared to no restrictions for outliers. Outlier restriction is a method that restricts the influence of grades above a threshold to blocks within a distance smaller than the regular search parameters.

**TABLE 19.1**  
**METAL-AT- RISK REMOVED**

Mineral Zone	Model KOzs no Metal Removed	Model KOzs Metal Removed	Outlier Grade (g/t)	Outlier distance (m)	% Metal Removed
1	282	269	8.00	12.50	4.6
2	208	198	7.00	12.50	5.0
3	48	42	10.00	15.00	12.9
10	262	246	12.00	12.50	6.1

In zone 99 a factor of 0.7 was applied to the higher grade portion of the estimate which resulted in an ounce reduction of 7.9%.

## 19.8 VARIOGRAPHY

The degree of spatial variability in a mineral deposit depends on both the distance and direction between points of comparison. Typically, the variability between samples increases as the distance between samples also increases. If the degree of variability is related to the direction of comparison, then the deposit is said to exhibit anisotropic tendencies which can be summarized as an ellipsoid. The semi-variogram is a common function used to measure the spatial variability of grade within a deposit.

The spatial evaluation of the data in this report has been conducted using a correlogram rather than the traditional variogram. The correlogram is normalized to the variance of the data and is less sensitive to outlier values, generally giving better results.

Correlograms were generated using the commercial software package Sage 2001© developed by Isaaks & Co. Multidirectional correlograms were generated for gold in each domain. The results are summarized in Table 19.2.



**TABLE 19.2**  
**CORRELOGRAM PARAMETERS - GOLD**

Domain	Nugget	S1	S2	1 <sup>st</sup> Structure			2 <sup>nd</sup> Structure		
				<u>Range</u> (m)	<u>AZ</u>	<u>Dip</u>	<u>Range</u> (m)	<u>AZ</u>	<u>Dip</u>
Zone 1	0.671	0.321	0.0	29	90	-75			
				38	0	0			
				14	90	15			
Zone 2	0.631	0.369	0.0	54	90	-75			
				67	0	0			
				27	90	15			
Zone 3	0.478	0.522	0.0	42	90	-75			
				125	0	0			
				78	90	15			
Zone 10	0.368	0.632	0.0	37	90	-75			
				49	0	0			
				16	90	15			
Zone 99 < 0.4 g/t	0.650	0.268	0.082	46	90	-75	2192	90	75
				13	0	0	244	0	0
				47	90	15	87	270	15
> 0.4g/t	0.800	0.200	0.0	10	0	0			
				10	0	0			
				10	0	0			
0.4 indicator	0.500	0.500	0.0	14	90	-75			
				27	0	0			
				12	90	15			

(All models are exponential with practical range.)

## 19.9 MODEL SETUP AND LIMITS

A block model was initialized in MineSight® as per the dimensions defined in Table 19.3. The selection of a nominal block size measuring 5x10x5m was done for consistency purposes with the previous resource model. This block size is a likely SMU for an operation of this size and scale.

**TABLE 19.3**  
**BLOCK MODEL LIMITS (ROCK CREEK MINE GRID)**

Direction	Minimum	Maximum	Block size (m)	# Blocks
East	0	1000	5	200
North	-100	1500	10	160
Elevation	-100	200	5	60

Blocks in the model have been coded using the 3-dimensional zone domain solids on a majority basis. During this stage, blocks are assigned specific domain codes if greater than 50% of the block occurs within the boundaries of the domain. The designation of domain codes throughout the model allows for domain code matching with the drill hole composites during grade interpolation.

The proportion of blocks which occur below the topographic surface is also generated and stored within the model as individual percentage items. These values are utilized as a weighting factor in determining the in-situ resources for the deposit.

#### **19.10 INTERPOLATION PARAMETERS**

The block model grade interpolation in zones 1, 2 and 3 were produced using ordinary kriging (OK) and the grades in zone 10 were produced using the inverse distance to the power of three (ID3) estimation method. All estimations were conducted using zone domain-code matching. The results of the estimations were compared with the Hermitian (Herco) polynomial change of support model (also referred to as the Discrete Gaussian correction). A nearest neighbour (NN) distribution of grades was also produced to provide a declustered distribution for comparison purposes.

The Rock Creek grade models have been generated with a relatively limited number samples in order to match the change of support or Herco grade distribution. This approach reduces the amount of smoothing (averaging) in the model and, while there may be some uncertainty on a localized scale, this approach produces reliable estimations of the recoverable grade and tonnage for the overall deposit.

Outlier limitations were used to localize the effects of higher-grade samples present in the database. Samples above a defined threshold are limited to a maximum distance of influence during block grade estimations.

Grade estimations were conducted in three passes. The first pass used a minimum of a single composite to estimate the grade of a block – a step to ensure that sufficient inferred blocks, at a

distance from the drilling data, receive gold grade estimations. A second pass requiring the input from multiple drill holes recalculates the block grades closer to the drill data. The first two passes use only drill hole sample data with a larger search ellipse. A third pass recalculates the blocks proximal to the trench data using a 15x15x2.5m search ellipse and includes data from drill holes and trenches. Block grade estimates have been weighted by the composite length.

The interpolation parameters are summarized by zone in the table below.

**TABLE 19.4**  
**INTERPOLATION PARAMETERS FOR OK MODEL - BY ZONE**

Domain	Search Ellipse Orientation			# Composites			Other
	Az	Dip	DipE	Min/block	Max/block	Max/hole	
Zone 1	0	0	0	3	8	2	O/L >8g/tAu to 12.5m
Zone 2	0	0	0	3	6	2	O/L >7g/tAu to 12.5m
Zone 3	0	0	0	2	6	2	O/L >10g/tAu to 15m
Zone 10	270	-75	0	3	8	2	O/L >12g/tAu to 12.5m
Zone 99L	270	-75	0	2	8	2	
Zone 99G	270	-75	0	2	8	2	
Zone 99 Ind	270	-75	0	2	12	2	

(Zones 1,3 and 3 use a 50x50x50m search ellipse, zone 10 uses a 50x50x10m ellipse. Zone 99 uses a 50x50x25m search ellipse)

The OK estimation in zone 99 has been done using an indicator approach. Composites in these domains have been assigned indicator values defined at a 0.4g/tAu threshold. Indicator probabilities are then estimated in the model using OK. Blocks are flagged with codes based on a 50% probability threshold and these flagged blocks are used to recode the DH composite samples (i.e. blocks with <50% probability will recode composites intervals as “low-grade” samples). Both high (AuHI) and low-grade (AuLO) gold estimations are then made in each block within zone 99 using the appropriately flagged composites. The final block estimates are calculated using the formula:

$$\text{Block Grade} = (\text{AuHI} * \text{Prob}) + ((1-\text{Prob}) * \text{AuLO})$$

## 19.11 VALIDATION

The results of the modeling process were validated through several applications. This includes a thorough visual review of the results, comparisons with the change of support model, comparisons with other methods and grade distribution comparisons using swath plots.

### **19.11.1 Visual Inspection**

Detailed visual inspection of the block model has been conducted in both section and plan to ensure the desired results following interpolation. This includes confirmation of the proper coding of blocks within the respective domains and below the topographic surface. The distribution of block grades was also compared relative to the drill hole samples in order to ensure the proper representation in the model. The effects of the hard-boundary limitations were also confirmed during this evaluation process. The distribution of gold in the model tends to be somewhat patchy in many areas.

### **19.11.2 Model Checks for Change of Support**

The relative amount of smoothing or averaging in the block model estimates were evaluated using the Discrete Gaussian or Hermitian Polynomial Change of Support method (described by Journel and Huijbregts, Mining Geostatistics, 1978). With this method, the distribution of the hypothetical block grades can be directly compared to the estimated (OK) model through the use of pseudo-grade-tonnage curves (see Figure 19.4). Adjustments are made to the block model interpolation parameters until an acceptable match is made with the Herco distribution. In general, the estimated model should be slightly higher in tonnage and slightly lower in grade when compared to the Herco distribution at the projected cut-off grade. These differences account for selectivity and other potential ore-handling issues which commonly occur during mining.

The Herco distribution is derived from the declustered composite grades which have been adjusted to account for the change in support as one goes from smaller drill hole composite samples to the large blocks in the model. The transformation results in a less skewed distribution but with the same mean as the original declustered samples.

The model curves track the change of support grade tonnage curves well except in zone 3 where there are not enough composite samples to limit the amount of smoothing in the estimates. For zone 3 the change of support model indicates the grade above likely cutoff values may be better than what is represented in the model. There are simply not enough composites in the zone at this time to improve the estimate.

### **19.11.3 Comparison of Interpolation Methods**

For comparison purposes, models were generated using the ID2, NN and OK interpolation methods. There is very good correlation between the OK and ID2 models with only local deviation with the NN model. Reproduction of the model using different methods tends to increase the confidence in the overall resource.

#### **19.11.4 Swath Plots (Drift Analysis)**

A swath plot is a graphical display of the grade distribution derived from a series of bands, or swaths, generated in several directions through the deposit. Grade variations from the OK model are compared using the swath plot to the distribution derived from the declustered (NN) grade model.

On a local scale, the NN model does not provide reliable estimations of grade but, on a much larger scale, it represents an unbiased estimation of the grade distribution based on the underlying data. Therefore, if the OK model is unbiased, the grade trends may show local fluctuations on a swath plot but, the overall trend should be similar to the NN distribution of grade.

Swath plots have been generated for the gold distributions in the model as shown in Figure 19.5. Generally, there is good correlation between models. Deviations tend to occur for two reasons. First, reduced tonnage near the edges of the deposit tends to accentuate the differences in grade between models. Second, differences in grade become more apparent in the lower-grade areas – these typically are the flanks of the deposit where the density of drilling decreases and material tends to be classified as Inferred resources.

### **19.12 RESOURCE CLASSIFICATION**

Classification parameters were derived from previous work for comparison purposes. Review of the resulting distribution of inferred and indicated resources gives appropriate results with respect to the definitions outlined by the Canadian Institute of Mining and Metallurgy (CIMM). Due to the apparent variability in the distribution of gold at the current average drill hole spacing, there are no resources currently classified in the measured category.

The approach to classification of the model was retained, for comparison purposes, from the method derived by AMEC in Sept 2006. The criteria are listed in Table 19.5.

**TABLE 19.5**  
**INDICATED RESOURCE CRITERIA**

Zone	# Drill Holes	Max. distance to Composite (m)	Distance to closest Composite (m)
1, 3 and 10	3 or more	45	0 to 23
	2 or more	33	0 to 15
	1	10	0 to 10
2	3 or more	35	0 to 18
	2 or more	25	0 to 13
	1 or more	10	0 to 10

All estimated blocks that were not classified as Indicated resources were classified as Inferred resources.

### 19.13 MINERAL RESOURCES

The mineral resources are listed in the table below. The “base case” model based on the data constraints and restrictions previously defined by AMEC is highlighted in the table.

**TABLE 19.6**  
**ROCK CREEK MINERAL RESOURCES**  
**(MODEL 4 IS THE BASE CASE RECOMMENDED FOR PLANNING)**

Cut-off (Aug/t)	Model	Indicated			Inferred		
		Mtonnes	Au(g/t)	kozAu	Mtonnes	Au(g/t)	kozAu
0.1	1	29,625	0.83	792	45,127	0.27	395
	2	29,611	0.78	741	45,024	0.25	369
	3	29,449	0.76	716	45,022	0.27	386
	<b>4</b>	<b>29,435</b>	<b>0.71</b>	<b>672</b>	<b>44,920</b>	<b>0.25</b>	<b>360</b>
	5	29,856	0.90	862	45,247	0.28	404
	6	29,847	0.84	804	45,145	0.26	377
0.2	1	26,711	0.91	777	20,339	0.43	279
	2	26,639	0.85	726	19,554	0.40	249
	3	25,942	0.84	699	20,057	0.42	269
	<b>4</b>	<b>25,883</b>	<b>0.79</b>	<b>655</b>	<b>19,270</b>	<b>0.39</b>	<b>240</b>
	5	27,576	0.96	851	20,847	0.43	290
	6	27,511	0.90	793	20,064	0.40	259

Cut-off (Aug/t)	Model	Indicated			Inferred		
		Mtonnes	Au(g/t)	kozAu	Mtonnes	Au(g/t)	kozAu
0.3	1	22,990	1.01	748	10,093	0.62	200
	2	22,850	0.95	696	8,791	0.59	166
	3	21,816	0.95	666	9,789	0.61	191
	4	<b>21,695</b>	<b>0.89</b>	<b>621</b>	<b>8,488</b>	<b>0.57</b>	<b>157</b>
	5	24,254	1.06	824	10,672	0.62	211
	6	24,130	0.99	766	9,373	0.59	177
0.4	1	19,665	1.12	710	6,660	0.76	162
	2	19,433	1.05	658	5,331	0.75	128
	3	18,282	1.07	626	6,353	0.75	153
	4	<b>18,082</b>	<b>1.00</b>	<b>581</b>	<b>5,027</b>	<b>0.73</b>	<b>118</b>
	5	21,053	1.17	789	6,988	0.76	170
	6	20,843	1.09	729	5,661	0.74	136
0.5	1	16,720	1.24	668	4,726	0.88	134
	2	16,421	1.16	614	3,370	0.92	100
	3	15,094	1.20	580	4,410	0.88	125
	4	<b>14,819</b>	<b>1.12</b>	<b>534</b>	<b>3,058</b>	<b>0.92</b>	<b>90</b>
	5	18,291	1.27	749	4,928	0.89	141
	6	18,021	1.19	688	3,572	0.92	106
0.6	1	14,074	1.37	621	3,167	1.05	107
	2	13,715	1.28	567	2,333	1.09	82
	3	12,560	1.33	536	2,979	1.04	100
	4	<b>12,211</b>	<b>1.24</b>	<b>488</b>	<b>2,149</b>	<b>1.08</b>	<b>74</b>
	5	15,694	1.39	703	3,327	1.05	113
	6	15,357	1.30	641	2,494	1.08	87
0.7	1	11,994	1.50	578	2,176	1.24	87
	2	11,578	1.40	522	1,759	1.23	70
	3	10,591	1.45	495	2,040	1.22	80
	4	<b>10,165</b>	<b>1.36</b>	<b>445</b>	<b>1,625</b>	<b>1.22</b>	<b>64</b>
	5	13,381	1.52	655	2,304	1.24	92
	6	12,988	1.42	592	1,893	1.22	74

## 19.14 COMPARISON WITH PREVIOUS ESTIMATES

The current resource is compared to the previous (September 2006) resource estimation for all models at a 0.6g/tAu cut-off grade in Table 19.7. With some exceptions, the difference in the resource between AMEC's 2006 resource estimate and the current model is due to an upgrading of Inferred to the Indicated resource class as a result of additional drilling.

Overall, the additional drilling information has added a total of approximately 30,000 ounces of contained gold to the indicated resources at a 0.6g/tAu cut-off. The average gold grade of the total (indicated plus inferred) resource has increased marginally since 2006.

**TABLE 19.7**  
**ROCK CREEK - SUMMARY OF MINERAL RESOURCES**  
**(0.6G/T CUTOFF GRADE AND INCLUSIVE OF MINERAL RESERVES)**

Model	Norwest Oct 2007			AMEC Sept 2006		
	<i>Ktonnes</i>	<i>Aug/t</i>	<i>kozAu</i>	<i>ktonnes</i>	<i>Aug/t</i>	<i>kozAu</i>
Indicated Resources						
1	14,074	1.37	621	12,656	1.43	582
2	13,715	1.28	567	12,341	1.31	520
3	12,560	1.33	536	11,369	1.39	508
<b>4</b>	<b>12,211</b>	<b>1.24</b>	<b>488</b>	<b>11,040</b>	<b>1.28</b>	<b>454</b>
5	15,694	1.39	703	14,052	1.45	655
6	15,357	1.30	641	13,783	1.34	594
Inferred Resources						
1	3,167	1.05	107	4,751	1.03	157
2	2,333	1.09	82	3,727	1.01	121
3	2,979	1.04	100	4,608	1.03	153
<b>4</b>	<b>2,149</b>	<b>1.08</b>	<b>74</b>	<b>3,583</b>	<b>1.00</b>	<b>115</b>
5	3,327	1.05	113	4,938	1.03	164
<b>6</b>	<b>2,494</b>	<b>1.08</b>	<b>87</b>	<b>3,918</b>	<b>1.00</b>	<b>126</b>

## 19.15 BIG HURRAH

The mineral resource estimates for the Big Hurrah deposit were prepared by Robert Sim P.Geo and Bruce Davis FAusIMM. Estimations are made from 3-dimensional block models based on geostatistical applications using commercial mine planning software (MineSight®). The project limits area based on a local grid coordinate system using a nominal block size of 2.5x2.5x2.5m.



The geologic domains, originally derived for the 2005 resource model and updated based on current drilling results, have been produced by Nova Gold geological personnel representing the distribution of mineralization in relation to observed structural and alteration features.

The resource estimate has been generated from drill hole and trench sample assay results and the interpretation of a geologic model which relates to the spatial distribution of gold. Individual domains, reflecting distinct zones or types of mineralization, have been outlined and individual interpolation characteristics have been defined based on the geology, drill hole spacing and geostatistical analysis of the data. The resources have been classified by their proximity to the sample locations and are reported, as required by NI 43-101, according to the CIMM standards on Mineral Resources and Reserves.

## **19.16 GEOLOGIC MODEL, DOMAINS AND CODING**

### **19.16.1 Geologic Model**

The geologic model has been produced through an east-west sectional interpretation of the presence of shearing, stockworks and quartz veining (shear zones). There are six individual north-south trending zones ranging in thickness from 5-15m. All zones dip to the west except for zone 4 which dips steeply to the east. These main shear zone domains are truncated to the north and south by two faults.

The current shear zone domains tend to be somewhat generalized with respect to grade. Zone 6 occurs as a series of separate polygons about drill hole intervals – this is probably a valid zone, but it should eventually be brought together as a single coherent domain. Zone 4 has had considerably more drilling since 2005. Some updates to the domain have taken place; however, good gold intersections continue to the north of the limits of zone 4. As more information becomes available it is expected that the wireframe for zone 4 will encompass this area (the higher grade intersections that are apparently on trend now occur as part of zone 98).

An isometric view of the model zones clipped to the surface topography are presented in Figure 11.2.

### **19.16.2 Summary of Domains and Coding**

The resulting domains are summarized in Table 19.8.

**TABLE 19.8**  
**SUMMARY OF DOMAINS SELECTED FOR STATISTICAL EVALUATION**

Domain	Code#	Description
Zone 1	1	Main zone containing majority of resource. (NS -30W)
Zone 2	2	Patchy grade distribution (NS -40W)
Zone 3	3	FW side of Zone 2, thinner and lower grade (NS -50W)
Zone 4	4	New area, focus of majority of drilling since 2005. East dip (NS -70E)
Zone 5	5	Small zone near south end Zone 1 (NS -30W)
Zone 6	6	Patchy interpretation between Zones 1 and 2. High grade (NS -35W)
Zone 97	97	Overburden
Zone 98	98	Surrounding primarily low-grade zone, east side (trend dip E). Mineralization which should be N extension of Zone 4 occurs in this domain.
Zone 99	99	Surrounding low-grade zone, west side (trend dip W)

## 19.17 AVAILABLE DATA

### 19.17.1 Sample data

The original sample data contains collar locations in UTM coordinates. In order to be consistent with previous work, these locations were translated and rotated into a local, Mine-grid system. The relationship between UTM and Mine-grid is listed below.

UTM 536354.666E, 7169244.3225N = 0 E,0 N Big Hurrah Mine Grid

Original survey data are rotated so that Mine Grid north is oriented at a true azimuth of 49.096 degrees.

The resource estimate is based on the sample results from a total of 201 DD holes, 139 rotary (RC) holes and 68 trenches. The results from 10 small trenches which have been deemed unreliable, were excluded from the resource estimations. The gold grades from select intervals in 5 RC holes were assigned a grade of 0.025g/tAu as a result of suspected contamination during drilling. The distribution of drill holes is shown in plan in Figure 13.3.

The total length of DD holes is 11,734m of which 10,955m has been analyzed for gold. The total length of RC drilling is 7,798m of which 7,617m has been tested for gold. There are 2,828m of trenches with 2,555m of samples.

Over 99% of RC samples are 1.5m in length. DD samples vary in length with about 70% of the samples less than or equal to 2m in length. Trench samples are variable with 80% of the samples less than or equal to 3m in length.

Other information carried in the sample database includes lithology codes (eight codes) and campaign vintage designation.

Resource modeling has been conducted using the commercial mine design software system, MineSight® developed by Mintec, Inc.

#### **19.17.2 Topography**

Topography was originally derived from a 3-dimensional AutoCAD drawing files of 2004 vintage. A 3-dimensional surface has been triangulated from the 1m contour lines. The surveyed drill hole collars match well with this surface.

#### **19.17.3 Underground Workings**

In 2005, NovaGold provided digital data representing the Big Hurrah shaft, four development levels (60, 70, 150, and 250) and a series of east west sectional polygons representing stope margins. This data was digitized from old sections and plan maps.

The development levels and shaft had been wireframed into 3-dimensional solids which, assuming an average bulk density of  $2.66\text{t/m}^3$ , yield a total of approximately 47ktonnes of ore.

The location and volume estimates of the Big Hurrah underground workings are approximations as complete, detailed maps were unavailable. According to several sources (Obolewicz and Hawley, 1983) and (Keewatin, 1989), the Big Hurrah mine produced about 50,000 short tons of ore. Based on that information, the development tonnages derived from the 3-dimensional underground model appear to represent the total actual mine production.

### **19.18 COMPOSITING**

Compositing of drill hole samples is carried out in order to standardize the database for further statistical evaluation. This step eliminates any effect related to the sample length which may exist in the data.

The original sample data have been composited into standard 2.5m lengths. Composites are length-weighted and have been generated “down-the-hole” meaning that composites begin at the top of each hole and are generated at 2.5m intervals down the length of the hole. Intervals less than 1.25m in length have been merged into the previous interval. Composited intervals honour the zone domain boundaries.

Several holes were randomly selected and the composited values were checked for accuracy. No errors were found.

## 19.19 EXPLORATORY DATA ANALYSIS

### 19.19.1 Conclusions and Modeling Implications

From the results of the data analysis (refer to Figures 19.6 through 19.8) hard boundaries were imposed between all zone domains.

## 19.20 BULK DENSITY DATA

NovaGold sent 50 core samples to Alaska Assay Labs for density determinations. These samples were collected from several of the primary ore host lithologies and some of the waste lithologies. The samples were weighed, dried, weighed in air, and then weighed in water. The bulk density calculations were made and the results are summarized in Table 19.9.

**TABLE 19.9**  
**BULK DENSITY RESULTS**

Lithology	Description	Dry Weight (g)	Weight in H2O (g)	Bulk Density (g/cm3)	No. Samples
GCS	Graphitic carbonate schist	1,445.7'	539.3	2.68	7
GMS	Graphitic mica schist	1,943.9	718.6	2.71	10
GMU	Undifferentiated graphitic mica schist	640.7	238.1	2.69	3
MBL	Marble	376.8	153.2	2.46	2
MCS	Micaceous carbonate schist	1,013.2	383.9	2.64	5
QGS	Graphitic quartzite schist	2,293.4	858.9	2.67	11
QMS	Quartz mica schist	184.4	75.3	2.45	1
SWX	Stockworks (usually mineralized)	909.9	334.4	2.72	4
SZN	Shear zone (often mineralized)	1,527.5	582.4	2.62	7
SWX + SZN	Stockworks + shear zone (mainly ore)	2,437.4	916.8	2.66	11
Grand Total	All units	10,335.5	3,884.1	2.66	50

Although there are relatively few bulk density samples for each of the lithologic units, the more common units have similar results. The results in the table above are consistent with published values for similar rock types and similar to the bulk density that is being used at NovaGold's nearby Rock Creek deposit (i.e. 2.71g/cm<sup>3</sup>). Based on the weighted averages of the eleven shear zone and stockwork samples, it was decided to use a bulk density of 2.66 t/m<sup>3</sup> as the default for the resource estimate. A bulk density of 2.66t/m<sup>3</sup> has been assigned to all rock in the model and 2.0t/m<sup>3</sup> assigned to overburden blocks.

### **19.21 EVALUATION OF OUTLIER GRADES**

Assays were "cut" to 70g/t gold prior to compositing. This has resulted in a reduction of 10% in contained gold. Note that additional restrictions to higher-grade composite samples were used during block grade interpolations which have resulted in the reduction of an additional 4% in contained metal.

### **19.22 VARIOGRAPHY**

The degree of spatial variability in a mineral deposit depends on both the distance and direction between points of comparison. Typically, the variability between samples increases as the distance between samples also increases. If the degree of variability is related to the direction of comparison, then the deposit is said to exhibit anisotropic tendencies which can be summarized as an ellipsoid. The semi-variogram is a common function used to measure the spatial variability of grade within a deposit.

The spatial evaluation of the data in this report has been conducted using a correlogram rather than the traditional variogram. The correlogram is normalized to the variance of the data and is less sensitive to outlier values, generally giving better results.

Correlograms were generated using the commercial software package Sage 2001© developed by Isaaks & Co. Multidirectional correlograms were generated for gold in each domain except for 97, 98 and 99 which were combined. The results are summarized in Table 19.10.

**TABLE 19.10**  
**CORRELOGRAM PARAMETERS - GOLD**

Domain	Nugget	S1	S2	1st Structure			2nd Structure		
				Range (m)	AZ	Dip	Range (m)	AZ	Dip
Zone 1	0.392	0.251	0.357	24	123	24	255	8	-1
				11	51	-35	32	98	20
				10	6	46	9	281	70
Zone 2	0.316	0.216	0.467	20	208	43	80	356	55
				17	6	44	41	193	34
				7	107	11	5	98	8
Zone 3	0.260	0.610	0.130	62	164	-5	94	2	26
				11	78	39	41	217	59
				4	247	51	8	100	16
Zone 4	0.199	0.652	0.149	11	51	-6	127	202	37
				6	319	-11	40	58	48
				3	349	77	9	127	-18
Zone 5	0.123	0.156	0.722	10	69	-67	85	94	9
				7	45	21	24	3	5
				2	318	-9	12	244	79
Zone 6	0.584	0.115	0.301	5	130	7	64	140	-8
				2	222	19	26	224	34
				2	22	69	25	62	55
Zone 97, 98, 99	0.396	0.284	0.320	44	94	-4	102	17	-2
				5	14	68	28	108	-10
				5	182	21	11	96	79

(Correlograms conducted on 2.5m DH composite data. All models spherical)

### 19.23 MODEL SETUP AND LIMITS

A block model was initialized in MineSight the dimensions defined in Table 19.11. The selection of a nominal block size measuring 2.5x2.5x2.5m was done for consistency purposes with the previous resource model. It is felt that this block size is smaller than the likely SMU of an operation of this size and scale; however, the small blocks are used to fit the sometimes narrow configuration of the mineralized zones.

**TABLE 19.11**  
**BLOCK MODEL LIMITS (BIG HURRAH MINE GRID)**

Direction	Minimum	Maximum	Block size (m)	# Blocks
East	0	500	2.5	200
North	0	800	2.5	320
Elevation	-100	125	2.5	90

Blocks in the model have been coded using the 3-dimensional zone domain solids on a majority basis. During this stage, blocks are assigned specific domain codes if >50% of the block occurs within the boundaries of the domain. The designation of domain codes throughout the model allows for domain code matching with the drill hole composites during grade interpolation.

The proportion of blocks which occur below the topographic surface is also generated and stored within the model as individual percentage items. These values are utilized as a weighting factor in determining the in-situ resources for the deposit.

## **19.24 INTERPOLATION PARAMETERS**

The block model grade interpolation, by inverse distance weighting to the power of two (ID2), was conducted using zone domain-code matching. The results of the ID2 estimation were compared with the Herco polynomial change of support model (also referred to as the Discrete Gaussian correction). This method is described in more detail in Section 19.25. For comparison purposes, a nearest neighbour (NN) distribution and a model built using ordinary kriging (OK) were developed.

The Big Hurrah ID2 and OK models have been generated with a relatively limited number of samples in order to match the change of support or Herco grade distribution. This approach reduces the amount of smoothing (averaging) in the model and, while there may be some uncertainty on a localized scale, this approach produces reliable estimations of the recoverable grade and tonnage for the overall deposit.

Outlier limitations were used to localize the effects of higher-grade samples present in the database. Samples above a defined threshold are limited to a maximum distance of influence during block grade estimations.

Grade estimations were conducted in two passes. The first pass used a minimum of a single composite to estimate the grade of a block – a step to ensure that sufficient inferred blocks, at a distance from the drilling data, receive gold grade estimations. A second pass requiring the input

from multiple drill holes recalculates the block grades closer to the drill data. Block grade estimates have been weighted by the composite length.

The interpolation parameters are summarized by zone in the tables below.

**TABLE 19.12**  
**INTERPOLATION PARAMETERS FOR ID2 MODEL - BY ZONE**

Domain	Search Ellipse Orientation			# Composites			Other
	<i>Az</i>	<i>Dip</i>	<i>DipE</i>	<i>Min/block</i>	<i>Max/block</i>	<i>Max/hole</i>	
Zone 1	270	-30	0	3	6	2	O/L >32g/tAu to 3m
Zone 2	270	-40	0	2	3	1	O/L >32g/tAu to 3m
Zone 3	270	-50	0	2	3	1	O/L >32g/tAu to 3m
Zone 4	90	-70	0	2	3	1	O/L >32g/tAu to 3m
Zone 5	270	-30	0	4	9	3	O/L >32g/tAu to 3m
Zone 6	270	-35	0	3	6	2	O/L >32g/tAu to 3m
Zone 97	0	0	0	7	15	3	O/L >3g/tAu to 3m
Zone 98	90	-70	0	7	15	3	O/L >15g/tAu to 3m
Zone 99	270	-40	0	7	15	3	O/L >15g/tAu to 3m

(Estimates use a 50x50x6m search ellipse)

**TABLE 19.13**  
**INTERPOLATION PARAMETERS FOR OK MODEL - BY ZONE**

Domain	Search Ellipse Orientation			# Composites			Other
	<i>Az</i>	<i>Dip</i>	<i>DipE</i>	<i>Min/block</i>	<i>Max/block</i>	<i>Max/hole</i>	
Zone 1	270	-30	0	3	5	2	O/L >32g/tAu to 3m
Zone 2	270	-40	0	2	3	1	O/L >32g/tAu to 3m
Zone 3	270	-50	0	2	3	1	O/L >32g/tAu to 3m
Zone 4	90	-70	0	2	3	1	O/L >32g/tAu to 3m
Zone 5	270	-30	0	4	9	3	O/L >32g/tAu to 3m
Zone 6	270	-35	0	4	9	3	O/L >32g/tAu to 3m
Zone 97	0	0	0	7	12	3	O/L >3g/tAu to 3m
Zone 98	90	-70	0	7	15	3	O/L >15g to 3m.
Zone 99	270	-40	0	7	15	3	Indicator estimates (see below)

(estimates use a 55x55x6m search ellipse)



The OK estimation in zones 98 and 99 has been done using an indicator approach. Composites in these domains have been assigned indicator values defined at a 0.5g/tAu threshold. Indicator probabilities are then estimated in the model using ID2. Blocks are flagged with codes based on a 50% probability threshold and these flagged blocks are used to recode the DH composite samples (i.e. blocks with <50% probability will recode composites intervals as “low-grade” samples). Both high (AuHI) and low-grade (AuLO) gold estimations are then made in each block within zone 98 and 99 using the appropriated flagged composites. The final block estimates are calculated using the formula:

$$\text{Block Grade} = (\text{AuHI} * \text{Prob}) + ((1-\text{Prob}) * \text{AuLO})$$

## **19.25 VALIDATION**

The results of the modeling process were validated through several applications. This includes a thorough visual review of the results, comparisons with the change of support model, comparisons with other methods and grade distribution comparisons using swath plots.

### **19.25.1 Visual Inspection**

Detailed visual inspection of the block model has been conducted in both section and plan to ensure the desired results following interpolation. This includes confirmation of the proper coding of blocks within the respective domains and below the topographic surface. The distribution of block grades were also compared relative to the drill hole samples in order to ensure the proper representation in the model. The effects of the hard-boundary limitations were also confirmed during this evaluation process. The distribution of gold in the model tends to be somewhat patchy in many areas.

### **19.25.2 Model Checks for Change of Support**

The relative amount of smoothing or averaging in the block model estimates were evaluated using the Discrete Gaussian or Hermitian Polynomial Change of Support method (described by Journel and Huijbregts, Mining Geostatistics, 1978). With this method, the distribution of the hypothetical block grades can be directly compared to the estimated (OK) model through the use of pseudo-grade-tonnage curves (see Figure 19.9). Adjustments are made to the block model interpolation parameters until an acceptable match is made with the Herco distribution. In general, the estimated model should be slightly higher in tonnage and slightly lower in grade when compared to the Herco distribution at the projected cut-off grade. These differences account for selectivity and other potential ore-handling issues which commonly occur during mining.

The Herco distribution is derived from the declustered composite grades which have been adjusted to account for the change in support as one goes from smaller drill hole composite samples to the large blocks in the model. The transformation results in a less skewed distribution but with the same mean as the original declustered samples.

The correspondence between the ID2 and change of support models is reasonable. The correspondence between the OK and Herco models shows the OK models tend to be smoother or have a bit more averaging than is desirable. This is due to the small block size used for modeling. Since mining selection is likely to take place at a larger scale the lack of correspondence with the OK models is not a significant problem.

### **19.25.3 Comparison of Interpolation Methods**

For comparison purposes, models were generated using the ID2, NN and OK interpolation methods. There is very good correlation between the OK and ID2 models with only local deviation with the NN model. Reproduction of the model using different methods tends to increase the confidence in the overall resource.

### **19.25.4 Swath Plots (Drift Analysis)**

A swath plot is a graphical display of the grade distribution derived from a series of bands, or swaths, generated in several directions through the deposit. Grade variations from the OK model are compared using the swath plot to the distribution derived from the declustered (NN) grade model.

On a local scale, the NN model does not provide reliable estimations of grade but, on a much larger scale, it represents an unbiased estimation of the grade distribution based on the underlying data. Therefore, if the OK model is unbiased, the grade trends may show local fluctuations on a swath plot but the overall trend should be similar to the NN distribution of grade.

Swath plots have been generated for the gold distributions in the model (see Figure 19.10 for example). Overall there is good correlation between models. Deviations tend to occur for two reasons. First, reduced tonnage near the edges of the deposit tend to accentuate the differences in grade between models. Second, differences in grade become more apparent in the lower-grade areas – these typically are the flanks of the deposit where the density of drilling decreases and material tends to be classified as Inferred resources.

### **19.25.5 Resource Classification**

Classification parameters derived from previous work for comparison purposes. Review of the resulting distribution of inferred and indicated resources gives appropriate results with respect to the definitions outlined by the CIMM. Due to the apparent variability in the distribution of gold

at the current average drill hole spacing, there are no resources currently classified in the measured category.

- **Indicated Resources** – Model blocks in which a minimum of two drill holes occur within a maximum distance of 23 metres.
- **Inferred Resources** – Model blocks which do not meet the criteria for Indicated resources but have a minimum of one drill hole within a maximum distance of 50 metres.

Note that reference to “drillhole” in the classification parameters includes Trench sample data.

## 19.26 MINERAL RESOURCES

The mineral resources based on the new geological model are listed in the table below.

**TABLE 19.14**  
**BIG HURRAH - SUMMARY OF MINERAL RESOURCES**  
**(INCLUSIVE OF MINERAL RESERVES)**

Cut-off Grade (Aug/t)	Indicated			Inferred		
	Mtonnes	Au(g/t)	kozAu	Mtonnes	Au(g/t)	kozAu
0.5	2,862	3.04	279.5	336	1.83	19.8
<b>1.0</b>	<b>2,080</b>	<b>3.91</b>	<b>261.4</b>	<b>168</b>	<b>2.97</b>	<b>16.1</b>
1.5	1,645	4.62	244.2	124	3.60	14.4
2.0	1,317	5.33	225.8	96	4.14	12.8

\* “base case” cut-off grade of 1g/tAu highlighted in table

**TABLE 19.15**  
**MINERAL RESOURCES BY ZONE**

Zone	Indicated			Inferred		
	Mtonnes	Au(g/t)	kozAu	Mtonnes	Au(g/t)	kozAu
1	774	4.11	102.2	22	1.94	1.4
2	270	4.30	37.4	0.2	1.59	0.0
3	434	3.14	43.8	47	3.44	5.2
4	247	3.18	25.2	22	3.78	2.7
5	88	4.14	11.7	0.7	8.06	0.2
6	95	8.73	26.8	1.1	1.87	0.1
99	172	2.60	14.4	75	2.72	6.5
<b>Total</b>	<b>2,080</b>	<b>3.91</b>	<b>261.4</b>	<b>168</b>	<b>2.97</b>	<b>16.1</b>

(resources by zone listed at 1g/tAu cut-off grade)

## 19.27 COMPARISON WITH PREVIOUS ESTIMATES

The previous resource estimate for the Big Hurrah deposit was published in May 2005. A comparison between this estimate and the current resources is listed at a series of cut-off grades in Tables 19.16 and 19.17.

**TABLE 19.16**  
**COMPARISON OF INDICATED MINERAL RESOURCES – 2007 vs 2005**

Cut-off Grade (Aug/t)	Nov 2007			May 2005		
	Mtonnes	Au(g/t)	kozAu	Mtonnes	Au(g/t)	kozAu
0.5	2,862	3.04	279.5	1,661	3.51	187.4
<b>1.0</b>	<b>2,080</b>	<b>3.91</b>	<b>261.4</b>	<b>1,307</b>	<b>4.26</b>	<b>179.0</b>
1.5	1,645	4.62	244.2	1,062	4.96	169.4
2.0	1,317	5.33	225.8	882	5.62	159.4

(\* "base case" cut-off grade of 1g/tAu highlighted in table)

**TABLE 19.17**  
**COMPARISON OF INFERRED MINERAL RESOURCES – 2007 vs 2005**

Cut-off Grade (Aug/t)	Nov 2007			May 2005		
	Mtonnes	Au(g/t)	kozAu	Mtonnes	Au(g/t)	kozAu
0.5	336	1.83	19.8	1,305	1.65	69.2
<b>1.0</b>	<b>168</b>	<b>2.97</b>	<b>16.1</b>	<b>667</b>	<b>2.57</b>	<b>55.1</b>
1.5	124	3.60	14.4	427	3.33	45.7
2.0	96	4.14	12.8	289	4.10	38.1

(\* "base case" cut-off grade of 1g/tAu highlighted in table)

The results above show that a significant portion of the previous inferred resources have been upgraded to the Indicated category through the additional drill hole coverage of the deposit. Overall, the additional drilling information has added a total of approximately 300ktonnes of Indicated and Inferred resources at a 1g/tAu cut-off. The average gold grade of the total (Indicated plus Inferred) resource has increased by approximately 4% since 2005.

## 19.28 PIT RESERVE ESTIMATE

For each of the two pit designs, an estimate has been made for the mineable resource in each pit.

### 19.28.1 Rock Creek Pit Reserve

Table 19.18 summarizes the pit reserve at a cut-off grade of 0.60 g/t and the resource tonnage estimates exclusive of the ore resource tonnage converted to reserves. The total ore tonnage in

the Measured and Indicated categories is about 7.8 Mtonne, with a contained gold content of approximately 324,400 oz in-situ. With a process recovery of 76.5% for the Albion zone and 96.8% for the Tension zone the recovered gold is approximately 291,000 oz. The LG pit shell contained about 313,600 oz indicating that all of the gold within the LG pit shell was successfully recovered.

The total waste quantity at Rock Creek, including inferred ore, is approximately 16.1 Mtonne, with a strip ratio of 2.0:1 (tonnes waste/tonnes ore).

**TABLE 19.18**  
**ROCK CREEK PIT RESERVE ESTIMATES**

COG = 0.60 gpt Au	Total all Zones		
	Tonnes	Grade (g/t)	Au (t.oz)
<b>Ore</b>			
Probable	7,790,000	1.30	324,4000
<b>Waste</b>			
Waste Rock	14,282,000		
Surficial Overburden (2t/m3)	1,530,000		
Total Waste	15,812,000		
Strip Ratio	2.03		

### 19.28.2 Big Hurrah Pit Reserve

Table 19.19 summarizes the pit reserve at a cut-off grade of 1.33 g/t and the resource tonnage estimates exclusive of the ore resource tonnage converted to reserves. The total ore tonnage is about 1.2 Mtonne, with a contained gold content of approximately 185,000 oz in-situ. With a process recovery of 84.4% for all mineral zones, the recovered gold is approximately 156,000 oz. The LG pit shell contained about 231,000 oz which is a significant difference from the final designed pit. The primary cause of this difference is the geometry of the ore body with many high grade “pods” that are uneconomic to access with our current design gold price.

The total waste quantity at Big Hurrah, including inferred ore, is about 4.5 Mtonne, with a strip ratio of 3.7:1 (tonnes waste/tonnes ore).

**TABLE 19.19**  
**BIG HURRAH PIT RESERVE ESTIMATES**

COG = 1.33 gpt Au	Total all Zones		
	Tonnes	Grade (g/t)	Au (t.oz)
<b>Ore</b>			
Probable	1,193,000	4.82	185,000
<b>Waste</b>			
Waste Rock	3,856,000		
Surficial Overburden (2t/m3)	604,000		
Total Waste	4,460,000		
Strip Ratio	3.73		

Table 19.20 provides a summary of reserve and resource estimates for both pits.

**TABLE 19.20**  
**SUMMARY OF RESERVE AND RESOURCE ESTIMATES**

<b>Reserve Estimates</b>			
<i>Probable</i>	<i>Tonnage</i>	<i>Grade (g/t)</i>	<i>Au(oz)</i>
Rock Creek (COG = 0.60g/t)	7,790,000	1.30	324,400
Big Hurrah (COG = 1.33g/t)	1,193,000	4.82	185,000
Total	8,983,000	1.76	509,400
<b>Resource Estimates exclusive of Reserve Tonnage*</b>			
<i>Indicated</i>	<i>Tonnage</i>	<i>Grade (g/t)</i>	<i>Au (t.oz)</i>
Rock Creek (COG = 0.60g/t)	4,567,000	1.16	170,300
Big Hurrah (COG = 1.00g/t)	887,000	2.68	76,400
Total	5,454,000	1.41	246,700
<i>Inferred</i>	<i>Tonnage</i>	<i>Grade (g/t)</i>	<i>Au (t.oz)</i>
Rock Creek (COG = 0.60g/t)	2,023,000	1.08	70,200
Big Hurrah (COG = 1.00g/t)	168,000	2.97	16,100
Total	2,191,000	1.23	86,300

\* Resource estimates are stated at the respective cut off grades and exclusive of any proven and probable reserves tonnage and inclusive of inferred resources contained within the pit and indicated resources within the pit which are below the stated reserve mill cut off grade.

## **20 OTHER RELEVANT DATA AND INFORMATION**

Norwest is not aware of other relevant data or information which is material to the technical report as of the time of preparation of this document.

## **21 INTERPRETATION AND CONCLUSIONS**

This report documents the work carried by Norwest to complete a feasibility study for NovaGold Resources Inc.'s Rock Creek project.

Norwest has completed a feasibility study which shows the project to have favourable economics on a "go-forward" basis treating capital cost incurred prior to 2008 as sunk costs and using the assumed gold price and with the estimated and actual capital and operating costs. Based on the positive economic results, the portion of the "indicated" resources defined in this report for the Rock Creek and Big Hurrah properties which are contained within Norwest's pit limits for each site can be classified as "probable" reserves under NI 43-101 guidelines. The resource and reserve quantities are listed in Section 19 of this report.



## **22 RECOMMENDATIONS**

The Rock Creek property is currently in pre-production with site infrastructure and the process plant essentially complete and gold production expected in the first quarter of 2008. Development and mining at the Big Hurrah property is expected to take place during the summer of 2008. The feasibility study completed by Norwest for the project indicates that on a go forward basis treating the capital costs incurred to year end 2007 as sunk costs, the project shows positive economics at a gold price of \$750/oz. Sensitivity analyses of the project economics also show that for the total project basis including all capital costs in the economic analyses indicate the project approaches a break-even point at gold prices above \$835/oz on a zero discount rate basis.

Norwest understands that NovaGold is examining options related to the development of the project in order to enhance the project economics and increase return on capital invested. Based on our current knowledge of the project and its state of development, Norwest makes the following recommendations related to the continued development of the Rock Creek and Big Hurrah properties:

- Evaluation of the current pit limits and mining plans using higher base case gold prices: Current gold prices are well above the base case gold price of \$500/oz used in the original pit optimization. A re-evaluation of the pit limits and mining plans using higher gold prices is recommended in order to examine the potential economic benefits to the project. This work should be carried out in a timely manner in order to prevent potential pit expansions from being constrained by current mining activities.
- Delineation of additional sources of ore: NovaGold has additional property holdings in the area including its Nome Gold property which may have the potential to provide sources of additional ore to feed the Rock Creek processing plant. NovaGold should continue to explore and evaluate these properties to determine their potential. Development of the Nome Gold placer project or other nearby properties could allow for future distribution of capital and operating costs between two projects. This could improve the overall economics for NovaGold's developments in the area.
- Alternative ore transport options from Big Hurrah: The unit cost of ore transport from the Big Hurrah property to the Rock Creek process plant is the major portion of the ore cost from that property. Potential opportunities for decreasing the ore transport cost should be examined including increasing truck capacity or evaluating possible barge transport for a segment of the transport distance.
- Evaluation of expanded tailings containment facilities: If additional ore tonnage is developed either at the two existing properties or from other potential sources of ore,

there will be a requirement for additional tailings storage capacity at Rock Creek. Preliminary evaluation of expanded tailings containment options should be undertaken in order to determine what permitting and/or development activities would be required to support the capacity expansion.

## **23 REFERENCES**

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AMEC, September 10, 2006. “Technical Report of the Rock Creek Property”. This report is available on NovaGold’s website at [www.novagold.net](http://www.novagold.net) and on the SEDAR website at [www.sedar.com](http://www.sedar.com).

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Resource Modeling Inc., August 25, 2006. “Big Hurrah Technical Report, Seward Peninsula, Alaska”. This report is available on NovaGold’s website at [www.novagold.net](http://www.novagold.net) and on the SEDAR website at [www.sedar.com](http://www.sedar.com).

Roberts & Schaefer Co. (2005), “Rock Creek and Big Hurrah Engineering and Estimating Study” July 15, 2005

Smith Williams Consultants, Inc. (2005), “Rock Creek Project Feasibility Design Report”, June 17, 2005.

Swaigood, James R (2006), “Report on Pit Slope Design for the Big Hurrah Mine, Alaska”, January 2006.

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Water Management Consultants Inc. (2005a), “Rock Creek Mine Project Water Management Report”, May 2005.

Water Management Consultants Inc. (2005b), “Big Hurrah Mine Project Water Management Plan”, letter report, May 30, 2005.

Zack, M. (2007) Rock Creek Area Quality Assurance and Quality Control (QAQC) Report, NovaGold Memo, November 8, 2007.

## **24 CERTIFICATION AND DATE**

Letter and forms to be included from:

- Sean Ennis
- Bruce Davis
- Ken Kuchling
- Bill Pennstrom
- Ken Shinya

### **CERTIFICATE of AUTHOR**

## CERTIFICATE OF QUALIFICATIONS

I, Sean Ennis, P.Eng., P.E., do hereby certify that:

1. I am currently employed as Manager, Mining by:

*Norwest Corporation  
Suite 830, 1066 West Hastings St.,  
Vancouver, British Columbia, Canada  
V6E 3X2*

2. I graduated with a Bachelor of Science degree in Mining Engineering from the University of Alberta in 1991 and with a Master's of Engineering Degree in Geo-environmental Engineering from the University of Alberta in 1997.
3. I am a member of the Association of Professional Engineers, Geologists and Geophysicists of British Columbia, (Member #24279) and the Association of Professional Engineers and Geoscientists of Alberta, (Member #M52576).
4. I have worked as a mining engineer for 15 years.
5. I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional associations (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
6. I am responsible for the preparation of Sections 4 to 7, 17, 20 to 22 and portions of Sections 3, 4, and 25 of the report titled "Technical Report – Rock Creek and Big Hurrah" dated February 21, 2008. I have also reviewed the entire report on behalf of Norwest Corporation.
7. I am not aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in the Technical Report, the omission to disclose which makes the Technical Report misleading.
8. I am independent of the issuer applying all of the tests in Section 1.5 of National Instrument 43-101.
9. I have read National Instrument 43-101, and the Technical Report has been prepared in compliance with that instrument.

Dated this 22<sup>nd</sup> day of February, 2008.

**“ORIGINAL SIGNED AND SEALED BY AUTHOR”**

---

Sean Ennis, P.Eng.  
Manager, Mining

**CERTIFICATE of AUTHOR**

I, Bruce M. Davis, Ph.D., do hereby certify that:

1. I am currently employed as Geostatistician by BD Resource Consulting, Inc., 4253 Cheyenne Drive, Larkspur, Colorado 80118.
2. I graduated with a Doctor of Philosophy degree from the University of Wyoming in 1978.
3. I am a Fellow of the Australasian Institute of Mining and Metallurgy (Registration No. 211185).
4. I have worked as a Geostatistician for a total of 30 years since my graduation from university.
5. I have read the definition of “qualified person” set out in National Instrument 43-101 (“NI 43-101”) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
6. I am responsible for the preparation of Section 19 of the report titled “Technical Report – Rock Creek and Big Hurrah” dated February 21, 2008.
7. I am not aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in the Technical Report, the omission to disclose which makes the Technical Report misleading.
8. I am independent of the issuer applying all of the tests in Section 1.5 of National Instrument 43-101.
9. I have read National Instrument 43-101, and the Technical Report has been prepared in compliance with that instrument.

Dated this 22<sup>nd</sup> day of February, 2008.

**“ORIGINAL SIGNED AND SEALED BY AUTHOR”**

Bruce M. Davis, FAusIMM

## CERTIFICATE OF QUALIFICATIONS

I, Ken Kuchling, P.Eng, do hereby certify that:

1. I am currently employed as a mining consultant by:

*KJ Kuchling Consulting Ltd.  
84 Sundown Way SE.,  
Calgary, Alberta, Canada  
T2X 3B6*

2. I graduated with a Bachelor of Engineering (Mining) degree from McGill University in 1980. I graduated with a Masters of Engineering (Mining) degree from UBC in 1984.
3. I am a member of the Association of Professional Engineers, Geologists and Geophysicists of Alberta, (Member #50275).
4. I have worked as an engineer for twenty five years since my graduation from university.
5. I have read the definition of “qualified person” set out in National Instrument 43-101 (“NI 43-101”) and certify that by reason of my education, affiliation with a professional associations (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
6. I visited the Rock Creek and Big Hurrah Properties in Alaska twice, on April 22-24, 2003 and June 9-11, 2004.
7. I have had no personal involvement in the completion of the study titled “Technical Report Rock Creek Project”.
8. I am independent of the issuer applying all of the tests in Section 1.5 of National Instrument 43-101.

Dated this 8<sup>th</sup> Day of February, 2008.

**“ORIGINAL SIGNED AND SEALED BY AUTHOR”**

---

Ken Kuchling, P.Eng.  
Mining Consultant



**William J. Pennstrom, Jr.**  
2728 Southshire Road  
Highlands Ranch, CO 80126 USA  
Telephone: 303-683-9227  
Fax: 303-638-5188  
Email: bpennstrom@aol.com

**CERTIFICATE of AUTHOR**

I, William J. Pennstrom, Jr., Qualified Professional in Metallurgy, do hereby certify that:

1. I am self employed as a Consulting Process Engineer and own:  
  
Pennstrom Consulting  
2728 Southshire Road  
Highlands Ranch, CO 80126  
USA
2. I graduated in 2001, with a Master of Arts degree in Management from Webster University, St. Louis, Missouri.
3. I graduated in 1983 with a Bachelors of Science degree in Metallurgical Engineering from the University of Missouri – Rolla, Rolla, Missouri.
4. I am a Founding Registered Member of the Society for Mining, Metallurgy, and Exploration (SME).
5. I am a recognized Qualified Professional (QP) Member, with expertise in Metallurgy, of the Mining and Metallurgical Society of America (MMSA).
6. I have worked in the Mineral Processing Industry for a total of 30 years since before, during, and after my attending the University of Missouri.
7. I have read the definition of “qualified person” set out in National Instrument 43-101 (“NI 43-101”) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
8. I am responsible for the process and operating costs sections of the technical report titled “Technical Report - Rock Creek and Big Hurrah Project”, dated February 21, 2008. I visited the Project site on numerous occasions and most recently during November of 2007.
9. I have had prior involvement with the property that is the subject of this Technical Report. The nature of my prior involvement is as a contributing author to prior Technical Reports developed on the Rock Creek Project, while owner of Pennstrom Consulting.
10. I am independent of the issuer in accordance with section 1.5 of National Instrument 43-101.
11. I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.

12. I also certify that as of the date of this certificate, to the best of my knowledge, information and belief, that I am not aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in the Technical Report, the omission to disclose which would make the Technical Report misleading.
13. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

Dated this 22<sup>nd</sup> day of February, 2008.

**“ORIGINAL SIGNED AND SEALED BY AUTHOR”**

William J. Pennstrom, Jr.

## CERTIFICATE OF QUALIFICATIONS

I, Ken Shinya, P.Eng., do hereby certify that:

1. I am a Senior Associate at::

*Norwest Corporation  
Suite 2700, 411 -1st Street SE.,  
Calgary, Alberta, Canada  
T2G 4Y5*

2. I graduated with a Bachelor of Engineering (Mining) and an M.B.A. in Finance and Management Science, both from McGill University of Montreal, Quebec, Canada.
3. I am a member of the Professional Engineers Ontario, (Member #42141010).
4. I have been employed in various capacities in the mining industry since 1973 and have held senior management and executive positions in the Canadian mining industry.
5. I have read the definition of “qualified person” set out in National Instrument 43-101 (“NI 43-101”) and certify that by reason of my education, affiliation with a professional associations (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
6. I was involved in the preparation of portions of Sections 3 and 25 related to the economic analyses for the report titled “Technical Report – Rock Creek and Big Hurrah” dated February 21, 2008.
7. I am not aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in the Technical Report, the omission to disclose which makes the Technical Report misleading.
8. I am independent of the issuer applying all of the tests in Section 1.5 of National Instrument 43-101.
9. I have read National Instrument 43-101, and the Technical Report has been prepared in compliance with that instrument.

Dated this 22<sup>nd</sup> day of February, 2008.

**“ORIGINAL SIGNED AND SEALED BY AUTHOR”**

---

Ken Shinya, P.Eng.  
Senior Associate

## **CONSENT of AUTHOR**

## **CONSENT of AUTHOR**

**TO:** Commission des Valeurs Mobilières du Québec  
Ontario Securities Commission  
Manitoba Securities Commission  
Saskatchewan Financial Services Commission – Securities Division  
Alberta Securities Commission  
British Columbia Securities Commission

I, Sean Ennis, do hereby consent to the public filing of the Technical Report titled “Technical Report – Rock Creek and Big Hurrah Project” dated February 21, 2008 (the “Technical Report”).

Dated this 22<sup>nd</sup> Day of February, 2008.

**“ORIGINAL SIGNED AND SEALED BY AUTHOR”**

\_\_\_\_\_  
Signature of Qualified Person

Sean Ennis, P. Eng.  
\_\_\_\_\_  
Print name of Qualified Person

**FILED BY SEDAR**

February 22, 2008

Ontario Securities Commission  
British Columbia Securities Commission  
Alberta Securities Commission  
Autorité des marchés financiers (Quebec)  
Manitoba Securities Commission  
New Brunswick Securities Administration Branch  
Securities Commission of Newfoundland and Labrador  
Nova Scotia Securities Commission  
Saskatchewan Financial Services Commission  
Prince Edward Island Securities Office

Dear Sirs/Mesdames:

**RE: NovaGold Resources Inc. Rock Creek Project**

Pursuant to Section 8.3 of National Instrument 43-101, this letter is being filed as the consent of William J. Pennstrom, Jr., Pennstrom Consulting, to the filing of the process and operating costs section of the technical report (the "Report") dated February 21, 2008 relating to the "Technical Report - Rock Creek and Big Hurrah Project."

I hereby confirm that I have read the process and operating costs sections of the Report and have no reason to believe that there are any misrepresentations in the information contained therein.

Sincerely,

**"ORIGINAL SIGNED AND SEALED BY AUTHOR"**

William J. Pennstrom, Jr.  
Senior Consultant and Metallurgical QP  
Pennstrom Consulting

## **CONSENT of AUTHOR**

**TO:** Commission des Valeurs Mobilières du Québec  
Ontario Securities Commission  
Manitoba Securities Commission  
Saskatchewan Financial Services Commission – Securities Division  
Alberta Securities Commission  
British Columbia Securities Commission

I, Bruce Davis, do hereby consent to the public filing of the Technical Report titled “Technical Report – Rock Creek and Big Hurrah Project” dated February 21, 2008 (the “Technical Report”).

Dated this 22<sup>nd</sup> Day of February, 2008.

**“ORIGINAL SIGNED AND SEALED BY AUTHOR”**

---

Signature of Qualified Person

Bruce M. Davis, FAusIMM  
Print name of Qualified Person

## **CONSENT of AUTHOR**

**TO:** Commission des Valeurs Mobilières du Québec  
Ontario Securities Commission  
Manitoba Securities Commission  
Saskatchewan Financial Services Commission – Securities Division  
Alberta Securities Commission  
British Columbia Securities Commission

I, Ken Shinya, do hereby consent to the public filing of the Technical Report titled “Technical Report – Rock Creek and Big Hurrah Project” dated February 21, 2008 (the “Technical Report”).

Dated this 22<sup>nd</sup> Day of February, 2008.

**“ORIGINAL SIGNED AND SEALED BY AUTHOR”**

---

Signature of Qualified Person

Ken Shinya, P. Eng.  
Print name of Qualified Person



## **25 ADDITIONAL REQUIREMENTS FOR TECHNICAL REPORTS ON DEVELOPMENT PROPERTIES AND PRODUCTION PROPERTIES**

### **25.1 OVERVIEW**

The Rock Creek project will entail the development of two open pit mining operations; the Rock Creek Pit and the Big Hurrah Pit. Both pits will be developed at roughly the same time and mined out at the same time, albeit at different mining rates.

The Rock Creek pit is the larger of the two mining operations and will operate year round to supply ore feed to the Rock Creek mill. Of the planned 2.5 million tonne per year milling rate, about 85% will originate from the Rock Creek mine with the remaining 15% coming from the Big Hurrah mine.

The Big Hurrah pit is located about 80 km away from the Rock Creek mill site. Big Hurrah will be mined on a seasonal basis with approximately 3 months of mining operations per year (typically June through August) using equipment and crews temporarily relocated from the Rock Creek mine. Stockpiled ore will be delivered while road access is feasible (May – November) from Big Hurrah to the Rock Creek site. When the Big Hurrah pit is in operation up to 3,000tpd of the 7,000 tpd plant capacity will be provided from Big Hurrah.

Ore from the Rock Creek pit will consist of two rock types; Albion shear vein ore and Tension Vein ore. It is anticipated that Big Hurrah and Albion ore may be campaigned through the mill together due to metallurgical similarities.

### **25.2 MINE DESIGN CRITERIA**

Various design parameters and planning assumptions have been used to develop the pit designs and mining schedules. These are described in the following sections.

#### **25.2.1 Pit Slope Geotechnical Studies**

##### **25.2.1.1 Rock Creek Pit Slopes**

Pit slope angles have been evaluated under the direction of Golder Associates (Golder) and documented in Golder (2004).

Geotechnical field review focused on structural orientations and geotechnical data exposed in the limited outcrops and dozer cuts in the project area. Four oriented core holes were drilled in the vicinity of the proposed pit during September and October of 2003.

Geotechnical testing undertaken on rock samples included point load testing, unconfined compression testing, and triaxial tests. Discontinuity surfaces were tested with direct shear tests.

Table 25.1 summarizes the pit slope design criteria developed by Golder.

**TABLE 25.1**  
**ROCK CREEK PIT SLOPE CRITERIA**

Design Sector UTM Grid	Design Sector Mine Grid	Inter-ramp Angle	Bench Face Angle	Bench Configuration (10m)	Catch Bench Width (m)
000° to 160°	310° to 110°	49° to 52°	70°	Double (20m)	10.0
160° to 270°	110° to 220°	40°	70°	Single (10m)	8.3
270° to 298°	220° to 248°	38°	70°	Single (10m)	9.2
298° to 360	248° to 310°	38° to 41°	65°	Single (10m)	8.0

Currently pit slopes have been developed on the eastern portion of the pit using a combination of 5m and 10m bench heights. Performance of the slopes to date has been satisfactory. A field mapping program to confirm the Golder interpretation and to gain additional rock mass data is recommended.

#### **25.2.1.2 Big Hurrah Pit Geotechnical**

The Big Hurrah pit slope design criteria have been developed by Jim Swaisgood (2006).

Nine oriented core holes for slope design purposes have been drilled as part of the geotechnical program.

Based on the analysis, slopes in the range of 45° would be free of extensive slides. Slopes of up to 50° could be excavated with a slightly greater, but not unreasonable, risk. Pit slopes of 45° have been used for this design.

### **25.2.2 Pit Hydrogeology**

#### **25.2.2.1 Rock Creek Hydrogeology**

Groundwater and surface hydrology have been evaluated under the direction of Water Management Consultants Inc. (WMC)

During pit operation the water table will be drawn down to a level that remains below the bottom of the pit. Groundwater recharge and storage; therefore, are expected to be the main sources of pit

inflows at the Rock Creek site. As the mine life increases, the pit will become progressively deeper. In order to keep excess water from flowing into the pit, the water table will be kept below the bottom of the pit with perimeter wells as required.

#### **25.2.2.2 Big Hurrah Hydrogeology**

The degree of hydrogeological investigation completed at Big Hurrah is limited however, based on historical experience with underground workings at Big Hurrah, some higher permeability zones may be encountered in the pit. Therefore, during pit operation the water table will be drawn down to a level that remains below the bottom of the pit with pit interceptor wells as required.

As the mine life increases, the pit will become progressively deeper and in order to keep excess water from flowing into the pit, the water table will be kept below the pit floor.

### **25.3 OTHER MINE PLANNING CRITERIA**

#### **25.3.1.1 Rock Creek Criteria**

Mining Bench Height: 5m(ore) to 10m(waste), double benching  
Inpit Ramp Grade: 8% in main body of pit, increasing to 10% for bottom benches  
Inpit Ramp Width: 27m (includes 18m dual lane travel way, 6m width for safety berm, 3m toe ditch), decreasing to 20m for bottom benches

#### **25.3.1.2 Big Hurrah Criteria**

Mining Bench Height: 5m(ore) to 10m (waste), double benching  
Inpit Ramp Grade: 8% in main body of pit, increasing to 10% for bottom benches  
Inpit Ramp Width: 27m (includes 18m dual lane travel way, 6m width for safety berm, 3m toe ditch), decreasing to 20m for bottom benches

### **25.4 DILUTION AND ORE LOSSES**

Dilution can be sub-divided into two categories: internal dilution and external dilution.

1. Internal dilution is incorporated in the block modeling process. Drill hole assay intervals that are below cut-off grades are included in the fixed length compositing process, thus the composites are diluted prior to interpolating grades into the model blocks.
2. External dilution occurs due to the planned or unplanned introduction of waste from outside the ore zones. The modelling process smoothes the gold grades of the blocks around the perimeter of the ore body effectively including some external dilution in

each block. This inherent external dilution is considered to be similar to what we might see in practice given the small benches and tight drilling program proposed in the ore zones.

Section 25.8.1 describes the grade control procedures that are envisioned at the two mines.

No ore loss factors are applied to the resource or reserve estimates.

## **25.5 PIT OPTIMIZATION**

Prior to developing the pit designs, the pit size and shape was optimized using the Lerch-Grossmann (LG) algorithm, within the MineSight® software suite. The LG algorithm uses estimated market commodity prices, mining and processing costs, ore recovery parameters, and pit slope criteria, applies these parameters against the block grade model. A pit shell is generated which contains the maximum net value for these parameters, referred to as an optimized pit shell. This then forms the basis for the pit design incorporating ramps and other operating features.

For the purpose of calculating mineable tonnages in this study, a cut-off grade of 0.6g/t is used at the Rock Creek pit and 1.33g/t at Big Hurrah. The basis for the cut-off grade is a gold price of \$500/oz and the costs shown in Table 25.2 and described in Section 25.3.3.

### **25.5.1 Rock Creek LG Pit Shell**

Table 25.2 summarizes the parameters used in the Rock Creek pit optimization. The resource has been classified into Measured, Indicated, and Inferred categories. For the purposes of pit optimization, only the Measured and Indicated resources are used to determine the LG pit shell. The Inferred resource is considered as waste in the LG analysis.

The Rock Creek pit resource resulting from the LG analysis is summarized in Table 25.3. The total amount of ore in the LG shell is about 7.4 Mtonne, with a contained gold content of approximately 318,000 oz in-situ. Figure 25.1 provides a plan view of the design pit based on the LG shell with Figure 25.2 showing the cross-sections through the pit and the ore blocks colored by grade.

**TABLE 25.2**  
**ROCK CREEK PIT OPTIMIZATION INPUT PARAMETERS**

	Units	Albion Ore	Tension Ore
Gold Prices	\$/oz	\$500	\$500
Mining Cost	\$/t mined	\$1.75	\$1.75
Milling Cost	\$/t milled	\$10.0	\$10.0
<b>Total Ore Cost</b>	<b>\$/t milled</b>	<b>\$11.75</b>	<b>\$11.75</b>
Mill Recovery	%	76.5	96.8%
Pit Slopes	deg	see design sectors in Section 25.2.1.1	
% of ore type		25%	75%
% Recovery		76.5%	96.8%
Mill COG	g/t	0.60	0.60

The pit optimization uses an estimated unit ore cost of \$11.75/t to mine and process a tonne of ore, exclusive of waste stripping. The results of the feasibility study indicate a cutoff grade of approximately 0.5g/t. These costs are acceptable for pit optimization purposes.

**TABLE 25.3**  
**ROCK CREEK LERCHS-GROSSMANN PIT RESOURCE**

COG = 0.60 g/t Au	Albion		Tension Vein		Total	
	Tonnes	Au, g/t	Tonnes	Au, g/t	Tonnes	Au, g/t
<b>Ore</b>						
Measured	0	0.000	0	0.000	0	0.000
Indicated	1,673,000	2.02	5,663,000	1.135	7,335,000	1.33
<b>Total M &amp; I</b>	<b>1,673,000</b>	<b>2.02</b>	<b>5,663,000</b>	<b>1.135</b>	<b>7,335,000</b>	<b>1.33</b>
<i>Contained ounces</i>	<i>108,700</i>		<i>206,600</i>		<i>313,600</i>	
<b>Waste</b>						
Waste					9,708,000	
Inferred Ore	17,000	1.58	48,000	0.940	65,000	1.11
<b>Total Waste</b>					<b>9,773,000</b>	
<b>Strip ratio (t.wst/ t.ore)</b>					<b>1.33</b>	

### 25.5.2 Big Hurrah LG Pit Shell

Table 25.4 summarizes the parameters used in the Big Hurrah pit optimization.

The in-situ mineral resource has been classified into Measured, Indicated, and Inferred categories. For the purposes of pit optimization, only the Measured and Indicated resources are used to determine the LG pit shell. The Inferred resource is considered as waste in the LG analysis.

The resulting Big Hurrah pit resource resulting from the LG analysis is summarized in Table 25.5. The total amount of ore is about 1.5 Mtonne, with a contained gold content of approximately 231,000 oz in-situ. Figure 25.3 shows the plan view of the pit design based on the LG pit shell with Figure 25.4 showing the cross-sections through the pit and the ore blocks coloured by grade.

**TABLE 25.4**  
**BIG HURRAH PIT OPTIMIZATION PARAMETERS**

	Units	Cost or Value
Gold Price	\$US/oz	\$500
Mining Cost	\$US/t mined	\$1.75
Ore transport Cost	\$US/t hauled	\$14.25
Milling Cost	<b>\$US/t milled</b>	\$10.00
<b>Total Ore Cost</b>	<b>\$US/t milled</b>	<b>\$26.00</b>
Mill Recovery	%	<b>84.4</b>
Pit Slopes	deg	45
% of ore type	All zones	100%
<b>Cut-Off Grade Criteria</b>		
<i>Mill COG</i>	g/t	1.33

For Big Hurrah, the calculated mill cut-off grade, based on a gold price of US \$750/oz, is estimated to be 1.32 g/t. The mill cut-off grade used for the initial pit shells was 1.33 g/t which is acceptable for a feasibility level pit optimization.

**TABLE 25.5**  
**BIG HURRAH LERCHS-GROSSMANN PIT RESOURCE**

COG = 1.33 g/t Au	Total All Zones	
	Tonnes	Au, g/t
<b>Ore</b>		
Measured	0	0.000
Indicated	1,543,000	4.65
<b>Total M &amp; I</b>	<b>1,543,000</b>	<b>4.65</b>
<i>Contained ounces</i>	<i>230,900</i>	
<b>Waste</b>		
Waste	5,579,000	
Inferred Ore	13,000	5.50
<b>Total Waste</b>	<b>5,593,000</b>	
<b>Strip Ratio (t.wst / t.ore)</b>	3.63	

## **25.6 PIT DESIGNS**

Separate pit designs have been developed for both Rock Creek and Big Hurrah. These pit designs should be considered preliminary and further engineering will be required to optimize the ramp locations and phasing approaches. In addition, access to the rock dumps can be further optimized with respect to the location of exit ramps and the timing of stripping operations.

### **25.6.1 Rock Creek Pit**

As shown by the LG pit optimizer described in Section 25.3, a single pit was identified. However, in order to smooth waste volumes and provide a steady feed to the mill some selectivity in mining is required. The primary constraint on the mine plan is the mill capacity. A secondary constraint for the early mining period is the requirement for 3,135,000BCM of waste required to construct the tailings impoundment.

Figure 25.5 illustrates the ultimate pit layout. The deepest mining elevation is -5 masl in the south area while the maximum crest elevation is about +150 masl.

Figures 25.6 to 25.9 illustrate the progression of mining in the Rock Creek project area to final reclamation.

### **25.6.2 Big Hurrah Pit**

The Lerchs-Grossmann pit optimizer indicates that a single pit area was identified. There are two primary phases in the mining of the Big Hurrah pit driven by the need to divert the large drainage that passes through the planned pit. Phase 1 involves constructing a diversion ditch to along the south side of the phase 1 pit. Once the phase 1 pit has been completed, work will begin on the phase 2 portion of the pit which will mine out the diversion in the last year of operation. When the diversion is removed, the drainage will be allowed to flood the phase 1 pit.

At the conclusion of mining in the Big Hurrah pit, PAG waste stockpiled on the surface will be backfilled into the phase 1 pit. The pit development sequence is shown in Figures 25.10 to 25.14. The deepest mining elevation is +15 masl while the maximum crest elevation is about +100 masl.

## 25.7 PRODUCTION SCHEDULE

The project mining production schedule is based on the following parameters:

Mill Start-up:	second quarter 2008
Mill Throughput:	7,000 tpd, (2.5 Mtonne/year)
Mill Ramp Up:	second quarter 2008 =60%, third quarter 2008 = 100%
Rock Creek mining:	nine months per year full fleet, three months with partial fleet
Big Hurrah mining:	three months per year partial fleet
Big Hurrah ore transport:	up to 6 months/year, 24 hours/day during summer
Mining operations:	24 hours/day, two-12 hour shifts

### 25.7.1 Production Profile

The annual combined Rock Creek and Big Hurrah production profile is shown in Table 25.6. The planned production life of the two properties is four years ending in 2011. A year of reclamation activities following active production takes place in 2012. Development work and construction taking place prior to ore production in 2008 is not included as part of the four year project life.

Based on the 7,000 tpd milling rate, the combined mine life is about three and a half years. When Big Hurrah pit is not operating the average daily mill feed will consist of the following ore types:

- Rock Creek Albion ore: 25%
- Rock Creek Tension Vein ore: 75%

When Big Hurrah pit is operating the average daily mill feed will consist of the following ore types:

- Rock Creek Albion ore: 14%
- Rock Creek Tension Vein ore: 43%
- Big Hurrah ore: 43%



**TABLE 25.6**  
**PRODUCTION PROFILE**

Year		2007	2008				2009				2010				2011	Totals
Quarter/Year			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
Rock Creek																
Overburden Mined	MBCM	0.165	0.169	0.135	0.007	0.073	0.092	0.061	0.041	0.020	0.002	0.000	0.000	0.000	0.000	0.765
Waste Mined	MBCM	0.523	0.177	0.664	0.295	0.564	0.598	0.264	0.449	0.378	0.375	0.100	0.195	0.226	0.451	5.259
Backhoe Waste Mined	MBCM	0.00	0.000	0.002	0.00	0.00	0.002	0.000	0.003	0.000	0.001	0.000	0.000	0.000	0.003	0.011
-																
Tension Ore																
Ore Mined	Mt	0.026	0.045	0.094	0.262	0.334	0.411	0.372	0.402	0.522	0.546	0.295	0.458	0.521	1.438	5.726
Backhoe Ore Mined	Mt	0.00	0.00	0.040	0.000	0.000	0.014	0.000	0.000	0.004	0.011	0.000	0.000	0.007	0.071	0.147
Grade	g/t	0.790	1.569	1.939	1.084	1.117	1.060	1.100	1.009	1.094	1.031	1.156	1.121	1.174	1.063	1.107
Insitu Gold	g	20440	70612	259888	284038	373037	450495	409182	405432	575314	574226	341071	513208	619768	1604137	6,500,848
Insitu Gold	oz	657	2,270	8,355	9,132	11,993	14,483	13,155	13,035	18,496	18,461	10,965	16,500	19,926	51,573	209,002
Recovery	%		96.8%	96.8%	96.8%	96.8%	96.8%	96.8%	96.8%	96.8%	96.8%	96.8%	96.8%	96.8%	96.8%	96.8%
Recov Gold	oz		2,834	8,088	8,840	11,609	14,020	12,734	12,618	17,904	17,871	10,615	15,972	19,288	49,923	202,314
-																
Albion Ore																
Ore Mined	Mt	0.00	0.014	0.240	0.106	0.275	0.218	0.090	0.081	0.118	0.095	0.100	0.150	0.112	0.238	1.837
Backhoe Ore Mined	Mt	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.046	0.000	0.000	0.000	0.000	0.002	0.032	0.080
Grade	g/t	0.000	0.915	2.071	1.455	1.879	1.777	1.998	2.007	1.733	1.608	2.013	1.892	1.730	2.027	1.954
Insitu Gold	g		12807	497009	154278	516760	387333	179837	254919	204544	152718	201288	283736	197254	547262	3,589,745
Insitu Gold	oz	-	412	15,979	4,960	16,614	12,453	5,782	8,196	6,576	4,910	6,471	9,122	6,342	17,594	115,410
Recovery	%	76.5%	76.5%	76.5%	76.5%	76.5%	76.5%	76.5%	76.5%	76.5%	76.5%	76.5%	76.5%	76.5%	76.5%	76.5%
Recov Gold	oz	-	315	12,224	3,794	12,710	9,526	4,423	6,270	5,031	3,756	4,951	6,978	4,851	13,460	88,289
-																
Big Hurrah																
Overburden Mined	MBCM				0.170			0.034				0.093			0.005	0.3020
Waste Mined	MBCM				0.332			0.379	0.240			0.300	0.035		0.130	1.4160
Waste backhauled	MBCM				0.000	-		-				0.000			0.450	0.4500
Backhoe Waste Mined	MBCM				0.000	-		-				0.000			0.007	0.0070
Ore Mined	Mt				0.264			0.182	0.100			0.236	0.030		0.307	1.119
Backhoe Ore Mined	Mt								0.012			0.010	0.003		0.049	0.0740
Grade	g/t				4.564			5.234	5.235			4.614	4.615		4.843	4.8244
Insitu Gold	g				1204766			952661	586320			1135157	152295		1724275	5,755,474
Insitu Gold	oz (troy)				38,733	-	-	30,628	18,850	-	-	36,495	4,896	-	55,435	185,038
Recovery	%	84.4%	84.4%	84.4%	84.4%	84.4%	84.4%	84.4%	84.4%	84.4%	84.4%	84.4%	84.4%	84.4%	84.4%	84.4%
Recov Gold	oz	-	-		32,691	-	-	25,850	15,910	-	-	30,802	4,132	-	46,788	156,172
Total Waste Tonnes	Mt	1.75	0.82	2.07	2.05	1.67	1.81	1.93	1.96	1.06	1.02	1.27	0.62	0.61	1.61	20.27
Total Ore Tonnes	Mt	0.026	0.059	0.374	0.632	0.609	0.643	0.644	0.641	0.644	0.652	0.641	0.641	0.642	2.135	8.983
Strip Ratio		67.53	13.86	5.55	3.25	2.75	2.81	3.00	3.05	1.65	1.57	1.98	0.97	0.95	0.75	2.26
Recovered Gold	oz		3,785	20,312	45,325	24,319	23,546	43,007	34,797	22,935	21,627	46,367	27,083	24,139	110,170	446,776

## **25.7.2 Overburden and Development Rock Disposal**

### **25.7.2.1 Rock Creek**

Overburden and development rock at Rock Creek will be placed into two rock dumps located south and north of the pit area. Overburden and organic soils will be segregated if feasible or mixed in with the waste rock if non-separable. No segregation of waste rock is required due to favourable geochemistry.

Typical annual waste stripping volumes will range from 2.5 Mtonne to 5.5 Mtonne/year, excluding the pre-production period.

### **25.7.2.2 Big Hurrah**

Overburden and development rock at Big Hurrah will be placed into one rock dump located south of the pit area. Overburden and organic soils will be segregated if feasible or mixed in with the waste rock if non-separable. In the first 2 years of operation potentially acid generating rock will be segregated and stockpiled separately. In the last 2 years of mining PAG waste will be dumped directly into the completed phase 1 pit. At the completion of mining externally stockpiled PAG waste will be placed back into the pit and eventually flooded.

## **25.7.3 Description of Mining Sequence**

### **25.7.3.1 Rock Creek**

The Rock Creek pit will be mined to provide an average mill feed rate of 7,000 tpd at full production. Rock Creek will be mined with a full equipment fleet for nine months of the year and with a partial equipment fleet for the remaining three months of each year, when a major portion of the fleet is relocated temporarily to the Big Hurrah mine site. Mining at Rock Creek will be reduced to approximately 4,000 tpd while mining is ongoing at Big Hurrah.

The Rock Creek pit will generally be mined from the top down with some temporary mining of the lower strip ratio portions of the pit to maintain mill feed when mining is carried out at Big Hurrah. Mining at a higher strip ratio in the early years is important in order to provide adequate waste for construction of the tailings dam.

- **2006-2007 (Pre-Production Work Completed)**

Work completed to date includes completion of earthworks for the plantsite and construction of the majority of facilities. Haulroad access has been developed to the east side of the pit and construction of the tailings dam is underway. Approximately 1.8 million tonnes of material has been mined to date primarily used for tailings dam construction.

- **2008**

Mill start-up is scheduled for 2nd quarter of 2008, with the mill feed rate being ramped up to the full 7,000 tpd over the first three months. The ore stockpiled during pre-production will be milled during this period leaving only a small ore stockpile maintained for covering mine delays. Mining carried out along surface contour with no in-pit ramps required.

All of the waste rock mined in this period is used to construct the tailings dam. All overburden materials are placed in the East and West Dumps.

Soil stripping of the tailings pond and dump footprints will be completed in this year with soil stockpiles constructed.

- **2009**

Mining progresses at full rate production generating enough waste rock to complete the tailings impoundment. In-pit ramps are established with mining reaching the 60m bench.

- **2010**

Mining at Rock Creek begins to wind down with the tailings dam complete and the strip ratio decreasing. The number of mine operations crews can be reduced from three to two. Mill production remains at 7,000tpd. Mining reaches the 45m bench.

- **2011**

Pit operations are completed and resloping of waste dumps begins. Plant is decommissioned. Tailings pond completed.

- **2012**

Reclamation activities completed. Site abandoned.

#### **25.7.3.2 Big Hurrah**

The Big Hurrah pit will be mined to provide the Rock Creek mill with an average feed rate of 3,000 tpd while in operations. Big Hurrah will be mined over a three-month period, primarily the second quarter of each year, with part of the equipment fleet required to be temporarily relocated from Rock Creek during this period. Space for significant stockpiles has been allowed for at Big Hurrah to cover delays in trucking of the ore to Rock Creek. At the trucking rate recently provided by NovaGold no stockpiles should be required.

The Big Hurrah pit is divided into two phases using the natural configuration of the pit.

Phase 1 consists of mining out the main portion of the pit down to the ultimate depth. A diversion ditch for Big Hurrah creek will be constructed during this phase to divert water around the pit.

Phase 2 consists of mining to the south of the diversion ditch. The last benches of the phase 2 pit remove the diversion ditch leaving the creek to flow into the main pit.

- **2008**

Mining is initiated in the phase 1 pit in the 3rd quarter with initial site setup and pioneering carried out in the 2<sup>nd</sup> quarter. Mining is completed down to the 60m bench. By the end of 2008 the diversion ditch for the Big Hurrah Creek is to be constructed. Ore will be stockpiled in the North and Middle Ore Stockpiles for transport by contractors to the Rock Creek Mill. Waste will be hauled to the Big Hurrah dump to the south with the PAG waste placed in the most northerly portion of the dump for later backfilling in the pit.

All soil stripping will be completed during this year and soil stockpiles will be created for reclamation at mine closure.

- **2009**

Mining in the phase 1 pit is completed down to the 40m bench with ore hauled to the Middle ore stockpile and waste taken to the Big Hurrah Dump. The North Ore Stockpile is decommissioned and is available for reclamation. PAG waste is placed in the most northerly portion of the dump for later backfilling in the pit.

- **2010**

Mining is completed in the phase 1 pit and the phase 2 pit is mined down to the 70m bench. By the end of this period the Big Hurrah Creek diversion is decommissioned and water is allowed to flow back into the phase 1 pit. Ore mined in 2010 is hauled to the Middle Ore stockpile and PAG waste is hauled to the phase 1 pit for backfill. NAG waste is hauled to the Big Hurrah Dump.

- **2011**

Pit operations are concluded in 2011. Ore mined in this year is hauled to the Middle Ore stockpile and PAG waste is hauled to the phase 1 pit for backfill. NAG waste is hauled to the Big Hurrah Dump. PAG waste mined in earlier years is backfilled into the final pit after the completion of mining. If personnel and equipment permit some of the pit backfilling may be done on the waste backhaul to reduce costs from current assumptions. Resloping and reclamation of the dumps begins this year.

- **2012**  
Reclamation is completed and the sites are decommissioned.

## **25.8 MINE OPERATIONS**

### **25.8.1 Grade Control**

Grade control at Rock Creek and Big Hurrah will utilize blasthole drilling cuttings and geologic observations. Blasthole depth will be 5.75 m (5 m bench plus 0.75 m subdrill) drill hole spacing will be 3.8 m. Blasthole patterns will be laid out in such a manner to minimize the risk of over or under sampling mineralization. By utilizing blastholes there will be four samples collected per Selective Mining Unit (SMU) (SMU = 5 m x 10 m x 5 m).

Gold content of the sample will be determined with a combination of gravity separation and fire assay. The interpretation of blasthole data would most likely involve the use of inverse distance modeling methods.

Big Hurrah has been mined in the past using underground mining methods. These old workings will be intercepted by the surface operations and care must be taken to prevent ore loss.

### **25.8.2 Drilling and Blasting**

The same drilling and blasting procedures are assumed for both Rock Creek and Big Hurrah. Blasting in the ore and waste will use different hole spacings and powder factors. A denser drilling pattern has been assumed in the ore to provide for increased grade control.

The drill and blast operation is based on an estimated powder factor of 0.15 kg/t in ore and 0.25 kg/t in waste. The powder factor is in line with blasting practices at other Alaskan mining operations in similar rock types. It is assumed that most holes in the permafrost will be dry and that ANFO can be used. If wet holes are encountered then plastic liners are an option or an emulsion blasting agent can be used. It is assumed that 10% of blastholes will be loaded with emulsion due to wet holes or harder ground. A blasting truck and ANFO truck have been purchased and are operated by a contractor crew. Drill and blast designs are very sensitive to local variation and it is expected that the design will change with operational experience. Table 25.7 provides a summary of the parameters used in this report.

**TABLE 25.7**  
**DRILL AND BLAST PARAMETERS**

		<b>Ore</b>	<b>Waste</b>
Hole Diameter	mm	114	114
Bench Height	m	5.0	10.0
Subdrilling	m	0.75	1.0
Burden	m	2.5	3.4
Spacing	m	3.8	5.2
ANFO	\$/t	1260	
Emulsion	\$/lb	0.97	
Accessories	\$/t blasted	0.06	0.02

Two blastholes drills, equivalent to the Ingersoll DM30 have been purchased.

### **25.8.3 Loading Equipment**

Due to limited production requirement and the need for operating flexibility, the Rock Creek project is well suited as a front-end loader operation. A 12 m<sup>3</sup> front end loader, equivalent to a CAT 992 loader, will provide sufficient capacity for the ore and development rock loading operations. A second CAT 992 loader has been acquired by Nova Gold and will serve as a backup loader at Rock Creek site and move to Big Hurrah as the primary loading equipment during operations there. Loader availability is assumed to be 85% at Rock Creek but reduced to 80% at Big Hurrah due to the remote location.

A third small (CAT 966 class) loader has been specified to support the mill. The mill feed bin is of very limited capacity and will need to be continually fed. The spare CAT 992 is far oversized for this task.

A Hitachi EX1100 (6-8 yd<sup>3</sup>) hydraulic excavator will also be available at site and can be used as a loading unit on an emergency basis.

### **25.8.4 Hauling Equipment**

The target for sizing the truck fleet is to operate with a fleet of four 100ton trucks with a fifth truck provided to cover down time and to support soil stripping and reclamation activities. During mining at Big Hurrah the fleet will be split with three trucks operating at Big Hurrah and two operating at Rock Creek to provide a minimum plant feed.

Five trucks have been purchased and are currently on site. The fleet is made up of 4 CAT777D and 1 Hitachi EH1700 100ton haul trucks.

#### **25.8.5 Ore Transport Equipment**

In order to transport ore from the Big Hurrah site to the Rock Creek mill, a contractor will be selected to load and haul the ore. These operations will be conducted on a 24h shift schedule in the summer and during the day in the fall. The road is expected to be closed in winter and early spring.

#### **25.8.6 Support Equipment**

Various support equipment will be required to assist the mining operations. These will include items such as dozers, graders, service vehicles, etc.

Table 25.8 summarizes the expected major and support equipment fleet.

Due to the short mine life, it is anticipated that no equipment replacements or fleet additions will be required during the project life.

**TABLE 25.8**  
**MINING EQUIPMENT REQUIREMENTS**

Item Description	Type	Quantity
<b>Major Mining Equipment</b>		
Front End Loaders 12 m <sup>3</sup>	Used	2
Haul Trucks 90 t	Used	5
Blasthole Drill 114 mm	Used	2
<b>Support Equipment</b>		
Dozers 228kW (D8R)	Used	1
Dozers 425kW (D10R)	Used	1
Front End Loader (CAT 966)	Used	1
Grader 14H	Used	1
Grader 16H	Used	1
Excavator EX1100 (6 yd <sup>3</sup> )	Used	1
Water Truck	Used	1
General Support (fleet buyout)	Used	1
Fuel and Lube truck, 650USG	Used	2
Service Truck w Crane	Used	1
Pickup trucks 4x4 1t	New	9
AN/FO truck, 9,000 kg	New	1
Light Plants	New	3
Float trailer and tractor	Used	1
Hitachi LW270 Excavator (2 yd <sup>3</sup> )	Used	1

## 25.9 PROCESSING

The main Rock Creek ore body consists of two distinct mineralization types, Albion Shear Veins and Tension Vein ores. The Albion material is a more complex ore type and drives the process scenario required at Rock Creek. The host rocks for mineralization at Big Hurrah are carbonaceous metamorphic rocks of the Nome Schist Group.

Metallurgical test work on the Albion zone, Tension Vein, and Big Hurrah materials show that a high recovery can be obtained by using a combination of gravity concentration and flotation. The gravity middlings and the flotation concentrate can then be effectively leached using a weak cyanide solution in a 40% to 50% solids slurry. Due to the presence of organic carbon in the Big Hurrah ore, the cyanide leaching for this ore type was observed to give the best recovery when leaching occurred in the presence of activated carbon. Table 25.9 summarizes the results of the



test work performed on the three ore types when the gravity-flotation-cyanide leach circuit is utilized.

**TABLE 25.9**  
**GOLD RECOVERY BY DESIGNATED**  
**METALLURGICAL PROCESS AT A P80 OF 212 MICRONS**

Ore Type	Gravity Gold Recovery (%)	Flotation Gold Recovery (%)	Leach Gold Recovery (%)	Combined Process Gold Recovery (%)
Tension Vein	93.0	71.6	74.9	96.8
Albion Shear	54.5	55.5	87.3	76.5
Big Hurrah	75.8	38.4	92.4	84.4

Gold recovery was found to be optimal on the Tension Vein material at a coarse grind of 212 microns. Since the Tension Vein material makes up approximately 75% of the ores to be treated at Rock Creek, this became the target grind for future test work. However, testing results on the Albion zone ore, and later on the Big Hurrah ore, gave recoveries that were slightly lower than predicted at this target grind. Gold recoveries for the Albion zone material responded well at 212 microns, but were somewhat improved at finer grinds (76.5% recovery versus 81.5% for 212 microns and 145 microns). This was also true for the Big Hurrah ores as recoveries improved from 84.4% to 91.6% by decreasing the grind size from 212 microns to 145 microns.

After gold extraction is complete, the tailings will be directed through a deep cone thickener to produce paste for placement in the TSF. A decision was made to utilize a deep cone thickener to extract as much process solution/water out of the tailings as possible prior to deposition within the TSF. Water extracted during the deep cone thickener phase of the process will be returned to the gravity circuit for reuse. The creation of paste tailings is considered a viable transportation option compared to a dry stack facility since minimal free water is impounded in the facility.

The TSF embankment consists of a homogeneous rockfill structure with a 60 mil geomembrane liner on its upstream face. The liner has been designed to limit seepage through the embankment.

## **25.10 INFRASTRUCTURE**

The following is a description of the infrastructure completed for the Rock Creek site:

- electric power supply and distribution;
- process water supply;
- potable water supply;
- site access;

- fuel storage facility;
- administration offices;
- shops and warehouses;
- explosive storage facility;
- fire control system;
- refuse disposal system;
- sewage disposal system;
- communications system; and
- security.

Big Hurrah requires limited infrastructure due to its only being operated for a small portion of the year and therefore facilities constructed at that site will be built to allow for short-term usage or future relocation at the end of the pit life. No infrastructure development at Big Hurrah has been completed to date.

## 25.11 HUMAN RESOURCES

The Rock Creek project organization will be divided into three operating divisions. The total manpower is estimated to average about 145 persons.

1. administration and technical support;
2. mining operations and;
3. milling operations.

**TABLE 25.10**  
**MANPOWER SUMMARY (AVERAGE)**

Administration and Technical Staff	28
Mining – Operating and Maintenance	61
Milling – Operating and Maintenance	56
<b>Total Personnel</b>	<b>145</b>

The Rock Creek project will be operated 12 months of the year, 24 hours/day. Administration and certain dayshift positions will work a 40-hour week, Monday through Friday.

Operating staff and operating crews in the mine and mill will work 12 hour shifts on a 2 week in/1 week out rotation. Three crews will be required to support the shift schedule, with two crews working and one crew off.

## **25.12 ENVIRONMENTAL**

Development of the Rock Creek project required the granting of a range of permits. The following is a list of the approvals received:

- Wetlands Permit;
- Air Quality Construction Permit;
- Water Withdrawal Permit;
- Stream Crossings Permit;
- Land Application of pit-water Permit;
- Class V Injection Well Permit;
- Solid Waste Permit;
- EPA Stormwater Discharge Permit;
- Coastal Zone Management Permit;
- Telecommunications Permits; and
- Fire Marshall Permit.

The geochemistry results at Rock Creek suggest that the host rocks are non-acid generating and therefore no segregation of rocks types is required based on geochemistry. Run-off and seepage from development rock facilities is predicted to meet applicable standards for both operations and closure. Tailings run-off and seepage will require collection and routing to the plant water circuit during mine operations. Water collected from the open pit during operations will be routed to the plant water circuit for use in the process. After mine operations cease, the pit will become a flow-through lake. The lake water is predicted to meet the background water quality levels of Rock Creek.

The geochemistry results at Big Hurrah suggest that some segregation of rocks types is required. Development rock designated as potentially acid generating (PAG) will be stockpiled and the material showing the highest potential for acid generation will be placed back into the Big Hurrah pit at the completion of mining after which the pit will be flooded to provide a water cap over the material. The capacity of the pit is limited and waste rock will still remain in the external rock dump therefore monitoring of the seepage will be required to determine if it meets acceptable water quality criteria.

## **25.13 PROJECT EXECUTION**

AGC acts as General Contractor and Construction Manager for the mine, tailings and site civil work at both the Rock Creek and Big Hurrah sites.

### **25.13.1 Project Management**

AGC expanded its existing project management group through detailed design leading up to full operations.

### **25.13.2 Project Detailed Design Engineering and Procurement**

AGC subcontracted detailed design, engineering for the mill facility to Samuel Engineering, Inc., Smith Williams Consulting continues to provide detailed design for the tailings facility. Samuel Engineering, Inc. provided assistance in procurement and logistics during construction.

### **25.13.3 Construction Management**

AGC is carrying out the following tasks as part of project construction management:

- procurement of all necessary construction permits;
- procurement of mining equipment and miscellaneous other equipment and materials;
- construction of general earthworks; and mine pre-stripping work; and
- construction of the tailings facility.

The project design and construction management teams assisted AGC in the execution of the above tasks as required.

AGC is performing all of the initial earthworks relating to the Project by utilizing the mine fleet. They have also performed the final grading and final construction of earthwork related facilities such as dams, haul roads, berms and ditches, etc. Additional excavation in the tailings dam footprint will be carried out by contractors in order to free up the mining equipment for production.

The ramp up period is the time it takes for the plant to reach its ultimate design capacity, both in terms of quantity and quality of product, from the end of start-up. As tonnage is gradually increased, bottlenecks will appear in various areas of the plant. De-bottlenecking activities will occur during the ramp up period. This period is anticipated to take three months as the plant's throughput progresses from 50% to 100% of design capacity with an average of 60% capacity for the quarter.

## **25.14 CAPITAL COSTS**

Project capital, including working capital, owners cost and capitalized ore mining costs, is \$157.8 million on the following schedule:

- Total expenditures to year end 2007 project estimated at \$141M;
- Estimated expenditure to complete project in 2008 is \$157.8M.

Table 25.11 summarizes combined capital expenditures.

**TABLE 25.11**  
**CAPITAL SUMMARY**

Item	Cost (\$millions)
Direct & Indirect Costs	
Development Capital	\$134.1
Owner's Cost	\$3.3
Incident Cost	\$2.9
<b>Sub-total</b>	<b>\$140.3</b>
Contingency	\$7.1
Owner's Cost	\$0.6
Capitalized Mining Ore	\$1.1
Working Capital	\$8.7
<b>Total To Commercial Production</b>	<b>\$157.8</b>

\* Note: Working capital is assumed recovered in the last year of the project.

## 25.15 OPERATING COSTS

The operating costs were developed from zero-base budgeting using site labour rates and estimates for equipment productivities.

The operating costs are sub-divided into four main cost areas, which in turn are divided into specific activities when building up the cost estimate. Costs are summarized in Table 25.12.

The main cost areas are:

- mining;
- contract truck haul from Big Hurrah;
- milling; and
- administration and technical services.

Key components common to all cost areas are as follows:

- all costs are in Q4 2007 \$US;
- labour rates and fringes
- diesel fuel price assumed is \$3.60/US gal. (delivered to Rock Creek site); and
- electric power cost is \$0.280/kWh provided by the Nome Joint Utility System.

**TABLE 25.12**  
**OPERATING COST SUMMARY**

Item	\$/tonne of Material Mined	\$/tonne of Ore Processed	Weighted \$/tonne of Ore Processed
Mining Costs	\$1.81	\$3.34	\$3.34
Truck Haul (Big Hurrah)		\$16.00	\$2.12
Milling Costs			\$10.56
General and Admin			\$1.77
Other Costs			\$0.18
<b>Total Average Cost</b>			<b>\$17.97</b>

\* Excludes refining, treatment and royalties.

The overall direct mine operating costs vary over the project's life and will range from a high of \$2.79/t-mined in the final year of production due to lower volumes to a low of \$1.49/t-mined in the second quarter of 2008. Mine operating costs will average \$1.81/t-mined or \$3.34/t ore over the project's life.

The haulage of ore from Big Hurrah to Rock Creek is estimated at \$16/t ore using 35t capacity highway trucks based on a contractor quote and amounts to an annual cost of approximately per \$4.5 million per year. Based on a haul distance of 80 km, the trucking cost is about \$0.20/t-km.

The mill operating costs have been determined based on manpower, grinding media and liners, electric power, miscellaneous costs, and maintenance supplies. The mill operating costs averages \$10.56/t of ore milled over the project's life.

It is assumed that AGC will have an administration office at the Rock Creek site. The mine site office will be staffed by personnel directly and solely involved in the Rock Creek and Big Hurrah operation. Big Hurrah will have limited office facilities at site since a 3-4 month seasonal mining operation is envisioned there. The administration cost per tonne of ore milled averages \$1.77/t ore over the mine life.

## **25.16 FINANCIAL ASSUMPTIONS**

Project cash flows have been determined using a gold price of \$750/oz as specified by NovaGold. Sensitivities for gold prices ranging up to \$909/oz (February 7<sup>th</sup>, 2008 New York closing price) have also been examined.

The milling rate is 7,000 tpd or about 2.5 Mtonne/year providing annual saleable gold output in the range of 124,000 oz/year excluding the partial years of start-up and closure.

Royalties from Bering Straits Native Corporation controlled lands and state mining taxes have been calculated.

### **25.16.1 Projections**

All revenues and costs are in Q4 2007 constant US dollars. Cash flows are discounted at after tax discount rates of 0% and 5%, which are the rates NovaGold specified to Norwest. Base case economic results are determined on a go-forward basis for capital expenditures as of January 1, 2008. A total project base case which includes capital items already purchased or committed to as of January 1, 2008 was also analysed. The discounting period for the analysis in all cases begins as of October 1, 2007 in order to include operational costs related to waste stripping during this period.

NovaGold requested this type of analysis. The results presented in this manner may then allow management to consider project economics from the start of capital investment in the project and assess the recovery of that investment to date with future project cash flows. As well, go forward economics will allow management to consider the risk/reward potential of going ahead with the project if the investments to date are considered as “sunk capital” not influencing project economics.

### **25.16.2 Net Smelter Returns**

The Rock Creek project will produce doré bars on site.

Doré bars refined on site are assumed to incur a charge of 1% of the gold price to cover transportation, insurance, refinery deductions, etc. to point of sale.

### **25.16.3 Royalties and State Mining Tax**

Production from land controlled by the BSNC is subject to an NSR royalty of 2.5% and a 5% Net Profits Interest payment. It is assumed that the net profits definition is the same as for the State of Alaska’s Mining License Tax.

The actual production from BSNC lands has been determined on an annual basis for this evaluation.

Since the remainder of production is from patented mining claims owned by AGC, it is assumed that no production is from State land and so the Alaska Production Royalty on production does not apply.

All mining income in Alaska is subject to the Mining License Tax. This is a graduated tax based on the level of net income, reaching 7% above \$100,000. As a new mine, Rock Creek should qualify for the three and a half year new mine exemption from the Mining License Tax. This has been assumed in the analysis.

#### **25.16.4 Income Taxes**

Federal and State income taxes have been calculated on a project basis. It is assumed that tax losses incurred in the early years are carried forward and tax credits available after 2011 (end of mine life), until project depreciation terminates, are not included in the cash flow. NovaGold may want to determine the effect of possible tax losses or incentives that might be applied to Rock Creek on a corporate basis both at the start of and at the end of the project.

Mining companies qualify for a depletion deduction. It is assumed that the percentage method will provide a greater benefit than the cost method for Rock Creek, therefore this method is used. For gold mines the rate is 15%. The actual depletion deduction is limited. It will be the minimum of 15% of gross income before depletion or 50% of taxable income before depletion.

For regular tax calculations, 70% of exploration and development costs are deducted from income tax in the year incurred and the remainder over a 60-month period. Alternatively, costs may be amortized over ten years. Development may also be amortized using the unit of production method. For the alternative minimum tax, the 70% option is not allowed for development costs. AGC has assumed that the unit of production basis will be used where appropriate.

Other mine capital is depreciated over periods ranging from five to 39 years. Mining assets qualify for Modified Accelerated Cost Recovery System (MACRS). For regular tax it can be depreciated on a 200% declining "basis" under the alternative minimum tax, it is at 150%. Unit of production basis depreciation may also be used for both regular and alternative minimum tax calculations. AGC has assumed that the unit of production method will be used.

Alaska income tax will also be reduced by an exploration incentive tax credit. It is assumed that exploration conducted by the company since 2003 would qualify for this tax credit, but is not included in the analysis.



#### **25.16.5 Working Capital**

Working capital is included in the cash flow analysis since consumables, power, and supply expenditures will be incurred for a brief period before revenues are realized. This does not include initial fills, which are included in project start-up capital.

The working capital allowance of \$8.7 million (includes \$7.4 million incurred prior to 2008) is included in the go forward cashflow analysis as this working capital represents consumables and reagents purchased for mine operations in 2008 (exclusive of first fill costs). This amount is recovered in the final year when working capital can be liquidated. It is assumed that 100% of the working capital is recovered.

#### **25.16.6 Salvage Value and Reclamation**

The evaluation assumes there is no net salvage value for the equipment. It assumes that any post-mining dismantling and reclamation costs will be covered by the proceeds from asset dispositions.

### **25.17 COST PROFILE**

Project cash flows have been determined using a base case gold price of \$750/oz.

The project's economics are determined on both a before and after tax stand alone project basis.

Royalties from Native Alaskan Corporations controlled lands and state mining taxes have also been calculated.

Operating costs including the BSNC royalty and gold refining costs, range between approximately \$330/oz and \$519/oz, varying primarily with the strip ratio and the average grade. The average during the full production period from the third quarter of 2008 to 2011 is \$467/oz.

### **25.18 CAPITAL COST PROFILE**

Total capital committed to year end 2007 is estimated at \$141 million including \$7.4 million of working capital. Capital expenditures remaining in 2008 are estimated at \$16.8 million including \$1.3 million of working capital.

### **25.19 PROJECT ECONOMICS**

Results for the analysis of project economics on a "go-forward" basis at discount rates of 0% and 5% are shown in Table 25.13 with a gold price of \$750/oz.

**TABLE 25.13**  
**PROJECT ECONOMIC SUMMARY (\$750/oz)**

	<b>Go Forward</b>	<b>Go Forward</b>
<b>Discount Rate (%)</b>	<b>0%</b>	<b>5%</b>
NPV Before Tax (\$M)	\$107.3	\$92.5
NPV After Tax (\$M)	\$107.2	\$92.4
IRR (%) Before Tax	180%	180%
IRR (%) After Tax	180%	180%

Note: NPV = net present value.  
IRR = internal rate of return.

Table 25.14 details the cashflow by quarter and annually over the project's life for the go-forward case.

TABLE 25.14  
CASHFLOW FOR BASE CASE OF \$750/oz GOLD AND 5% DISCOUNT

Quarter/Year			2007	2007	2007		2007	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Yr	Yr	Total			
Year			-3	-2	-1		1	2008	2008	2008	2008	2009	2009	2009	2009	2010	2010	2010	2010	2011	2012				
Project Period	Data	Units					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15				
Percent of Full Year of Production																									
Production							100%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	100%	100%				
Ore		Mt					0.026	0.059	0.374	0.632	0.609	0.643	0.644	0.641	0.644	0.652	0.641	0.641	0.642	2.135		8.98			
Waste		Mt					0.00	0.00	0.00	1.80	0.87	2.12	2.11	1.70	1.84	1.96	1.97	1.07	1.02	1.30		17.75			
Ore Milled																									
Albian Shear Vein Ore		Mt					0.000	0.000	0.254	0.106	0.275	0.218	0.090	0.127	0.118	0.095	0.100	0.150	0.114	0.270					
Tension Vein Ore		Mt					0.000	0.000	0.134	0.274	0.369	0.425	0.372	0.402	0.526	0.557	0.295	0.458	0.528	1.533					
Big Hurrah Ore		Mt					0.000	0.000	0.000	0.264	0.000	0.000	0.182	0.112	0.000	0.000	0.246	0.033	0.000	0.356					
Total		Mt					0.000	0.000	0.388	0.644	0.644	0.643	0.644	0.641	0.644	0.652	0.641	0.641	0.642	2.159					
Recovery																									
Albian Shear Vein Ore		%					76.5%	76.5%	76.5%	76.5%	76.5%	76.5%	76.5%	76.5%	76.5%	76.5%	76.5%	76.5%	76.5%	76.5%					
QMC Tension Vein Ore		%					96.8%	96.8%	96.8%	96.8%	96.8%	96.8%	96.8%	96.8%	96.8%	96.8%	96.8%	96.8%	96.8%	96.8%					
Big Hurrah Ore		%					84.4%	84.4%	84.4%	84.4%	84.4%	84.4%	84.4%	84.4%	84.4%	84.4%	84.4%	84.4%	84.4%	84.4%					
Gold Recovered																									
		oz					0	0	21,263	45,620	25,686	23,546	43,007	34,797	22,935	21,627	46,367	27,083	24,139	111,342		447,412			
Revenue																									
Gross Revenue (From Dore )	\$750/oz	k\$					0	0	15,947	34,215	19,264	17,660	32,256	26,098	17,201	16,220	34,775	20,312	18,105	83,506		335,559			
Refining, treatment	\$7.50/oz	k\$					0	0	159	342	193	177	323	261	172	162	348	203	181	835		3,356			
Net Smelter Revenue		k\$					0	0	15,788	33,873	19,072	17,483	31,933	25,837	17,029	16,058	34,428	20,109	17,923	82,671		332,203			
NSR Royalty From BSNC Lands	2.50%	k\$					0	0	12	27	15	14	25	20	13	13	27	16	14	65		262			
Net Revenue		k\$					\$0	\$0	\$15,775	\$33,846	\$19,057	\$17,469	\$31,908	\$25,816	\$17,016	\$16,045	\$34,400	\$20,093	\$17,909	\$82,606		\$331,941			
Percentage Revenue BSNC Lands	3.16%						3.16%	3.16%	3.16%	3.16%	3.16%	3.16%	3.16%	3.16%	3.16%	3.16%	3.16%	3.16%	3.16%	3.16%					
Percentage Revenue State Lands	0%						0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%					
Sensitivity Factor																									
Operating Costs																									
Mining and Physical Reclamation Operation		k\$					3,784	1,942	3,786	4,458	3,855	3,893	4,233	4,159	3,014	3,004	3,037	2,481	2,459	10,477	5,396	59,977			
Seeding and Planting	\$7,000/ha	k\$																			2,016	2,016			
Truck Haul Big Hurrah	\$16.00/t mined	k\$					0	0	0	4,224	0	0	2,912	1,792	0	0	3,936	528	0	5,696	0	19,088			
Equipment Movement to and From Big Hurrah		k\$					0	0	0	50	0	0	25	25	0	0	50	0	0	50	0	200			
Milling	\$10.56/t milled	k\$					0	0	4,096	6,799	6,797	6,788	6,799	6,767	6,799	6,883	6,767	6,767	6,778	22,792	0	94,832			
Mine Indirect	\$206,000 /yr	k\$					206	52	52	52	52	52	52	52	52	52	52	52	52	206	206	1,236			
Water Treatment	\$41	k\$					5	10	10	10	10	10	10	10	10	10	10	10	10	41	41	208			
Admin G&A		k\$					6,150	1,469	1,469	1,469	1,469	1,469	1,469	1,469	1,469	1,469	1,469	1,469	1,469	5,876	2,095	31,747			
Total Operating Costs		k\$					\$10,144	\$3,473	\$9,412	\$17,061	\$12,183	\$12,212	\$15,500	\$14,273	\$11,343	\$11,417	\$15,320	\$11,306	\$10,767	\$45,138	\$9,754	\$209,305			
Operating Cash Flow Before Taxes		k\$					-10,144	-3,473	6,363	16,785	6,873	5,258	16,408	11,543	5,673	4,628	19,080	8,787	7,142	37,468	-9,754	122,637			
Net Profits Mining License Tax		k\$						0	0	0	0	0	0	0	0	0	0	0	0	653	0	653			
Net Profits Production Royalty		k\$						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Total State Mining Tax		k\$						0	0	0	0	0	0	0	0	0	0	0	0	653	0	653			
BSNC Net Proceeds Royalty		k\$					0	0	86	679	325	245	797	556	267	214	931	422	341	1,772	0	6,635			
Operating Cash Flow Before Capital and Income Tax		k\$					-\$10,144	-\$3,473	\$6,277	\$16,106	\$6,548	\$5,013	\$15,611	\$10,987	\$5,406	\$4,414	\$18,149	\$8,364	\$6,801	\$35,043	-\$9,754	\$115,349			
Sensitivity Factor																									
Working Capital								1,300													-8,695	-7,395			
Project Capital								8,642	4,240	2,610	0	0	0	0	0	0	0	0	0	0	0	15,492			
Capital		k\$					0	9,942	4,240	2,610	0	0	0	0	0	0	0	0	0	0	-8,695	8,097			
Sunk Capital Schedule																									
Working Capital																									
Project Capital																									
Capital		k\$					\$18,139	\$19,806	\$7,395	\$15,992															
Net Cash Flow Before Income Tax		k\$					\$0	\$0	\$0	-\$10,144	-\$13,414	\$2,037	\$13,496	\$6,548	\$5,013	\$15,611	\$10,987	\$5,406	\$4,414	\$18,149	\$8,364	\$6,801	\$35,043	-\$1,059	\$107,252
Discount Rate																									
Net Present Value Calculation - Pre-Tax at Oct 1, 2007	5.00%	1.23%																							
Internal Rate of Return - Pre-Tax at Oct 1, 2007																									
Net Present Value Calculation - Pre-Tax Including Sunk Capital																									
Internal Rate of Return - Pre-Tax Including Sunk Capital																									
Federal Income Tax		k\$						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
State Income Tax		k\$						0	0	0	0	0	0	0	0	0	0	0	0	0	0	57	57		
Total Income Tax		k\$						\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$57		\$57		
Net Present Value Calculation - AfterTax at Oct 1, 2007																									
Internal Rate of Return - After-Tax at Oct 1, 2007																									
Net Present Value Calculation - After-Tax Including Sunk Capital																									
Internal Rate of Return - After-Tax Including Sunk Capital																									
Net Cash Flow After Income Tax		k\$					-\$10,144	-\$13,414	\$2,037	\$13,496	\$6,548	\$5,013	\$15,611	\$10,987	\$5,406	\$4,414	\$18,149	\$8,364	\$6,801	\$35,043	-\$1,117	\$107,195			
Unit Costs		\$/oz																							
Operating Margin per Ounce Produced	\$750.00/oz	\$/oz																							

If sunk costs are included in the economic analysis for a total project basis using a 5% discount rate then the net present value decreases to -\$42.8 million and the internal rate of return is -6.3% on an after-tax basis. If a 0% discount rate is used the total project shows an NPV of -\$26.4 million. Using a 0% discount rate, the total project economics achieve a break-even point on an after-tax basis at a gold price of approximately \$835/oz.

## **25.20 PAYBACK PERIOD**

The time required for project payback using the go forward case is approximately one year. The total project case including sunk costs does not achieve payback within the current four year lifespan of the project.

## **25.21 SENSITIVITY ANALYSIS**

Sensitivity analyses were carried out to examine the impact on the project economics for the following cases:

- Variation in operating costs of +/-10%
- Increase in capital costs (go forward case only) of +10%
- Increase in final year closure cost of +25%
- Increase in gold price to current spot market price (Feb. 7, 2008 NY = \$909/oz)
- Decrease in gold price -10% from base case (\$750/oz reduced to \$675/oz)

Table 25.15 summarizes the results of the sensitivity cases using a 5% discount rate for the go forward case on an after tax basis.

As expected the sensitivity analyses show the project is most sensitive to changes in the gold price with a decrease in gold price of 10% causing a drop in the NPV of the project of approximately \$28 million while using a recent market gold price of \$909/oz boosts the NPV by \$44 million. Variations in operating costs of +/-10% cause the NPV value for the project to shift by +16% for lower costs and -20% for higher costs. The range of this variation highlights the need for NovaGold to closely monitor and control operating costs at the site to avoid adverse effects on the project's economics.

The overall project economics for the go forward case are relatively insensitive to minor increases in capital costs as the outstanding capital expenditures moving forward are relatively minor. Similarly an increase in the closure costs of 25% in the final year of the project have only a minor impact on the economics which indicates that unless closure conditions vary dramatically from those estimate the project's economics should not be affected by changes in closure requirements.

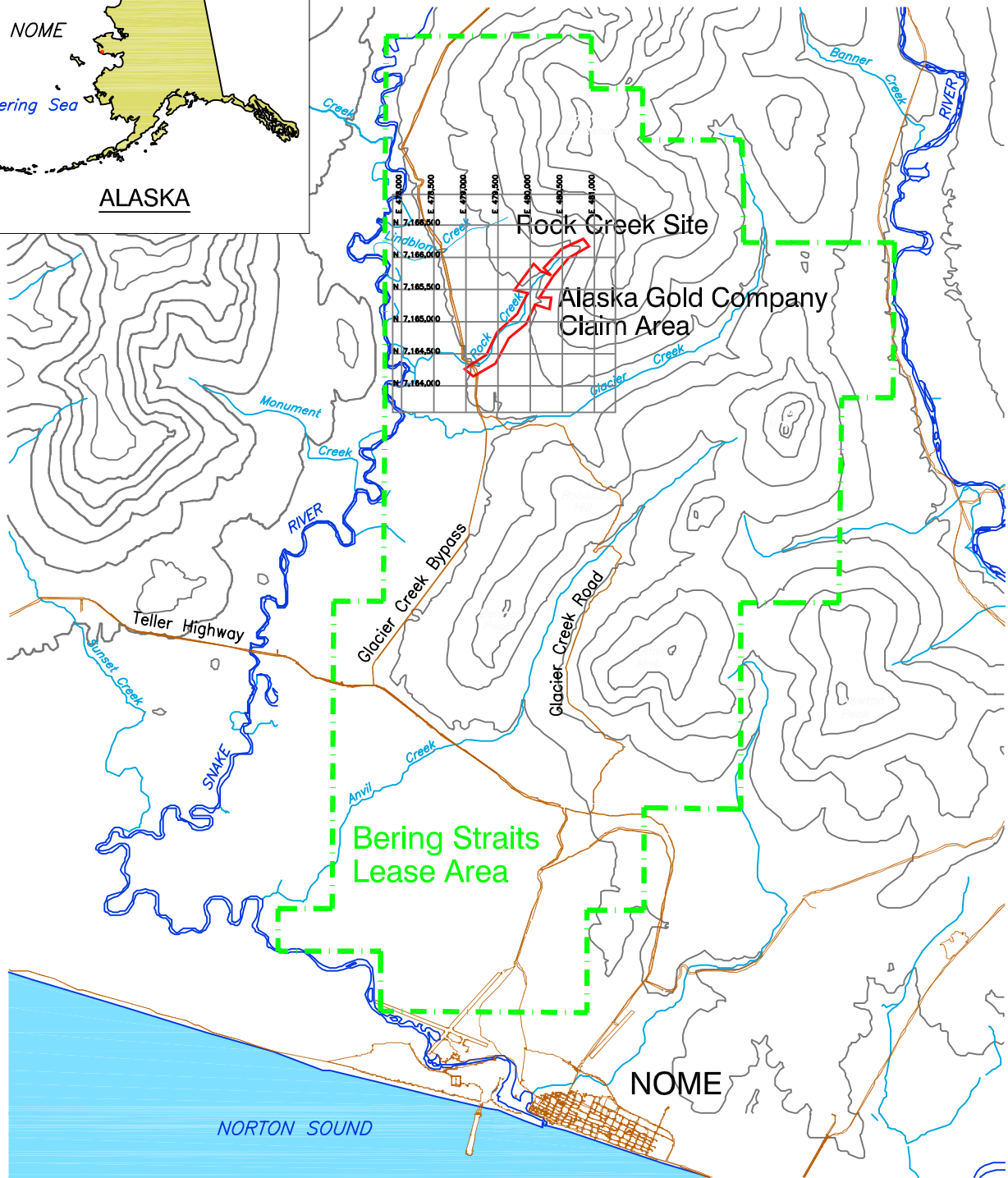
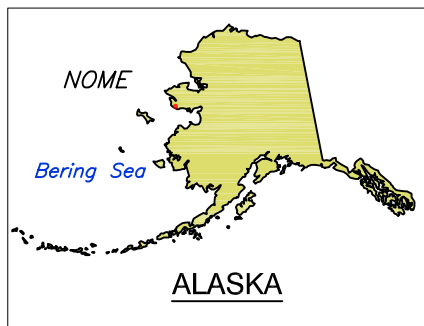
**TABLE 25.15**  
**SENSITIVITY ECONOMIC CASHFLOW ANALYSES**

<b>Sensitivity Case</b>	<b>NPV after tax 0% discount rate (\$M)</b>	<b>NPV after tax 5% discount rate (\$M)</b>	<b>IRR after tax (%)</b>
+10% Op Cost	\$87.4	\$74.7	137%
-10% Op Cost	\$127.2	\$106.6	227%
+10% Capital	\$105.6	\$90.8	168%
+25% Closure	\$104.8	\$90.5	180%
\$909/oz gold price	\$156.7	\$136.2	265%
\$675/oz gold price	\$75.8	\$64.6	123%
\$825/oz gold price	\$129.2	\$112.0	224%

## **26 ILLUSTRATIONS**

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- Figure 25-13 Big Hurrah Pit: End Of Mining (2011)
- Figure 25-14 Big Hurrah Pit: Reclamation Plan



Rock Creek Feasibility Study

# ROCK CREEK PROJECT LOCATION MAP

FIGURE 3-1

DRAWN BY: PP  
DATE: 13-Feb-08  
REV: 00

**NORWEST**

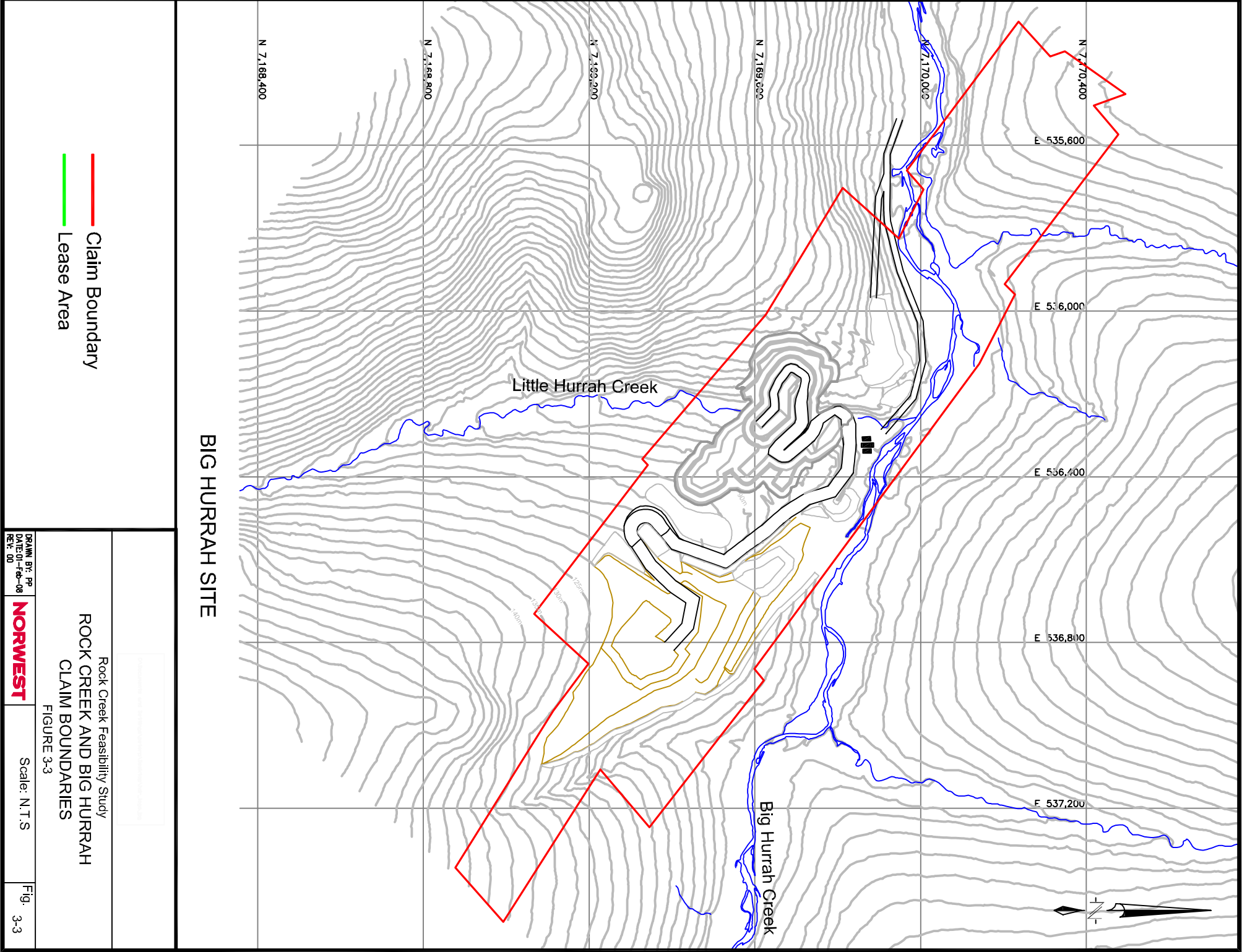
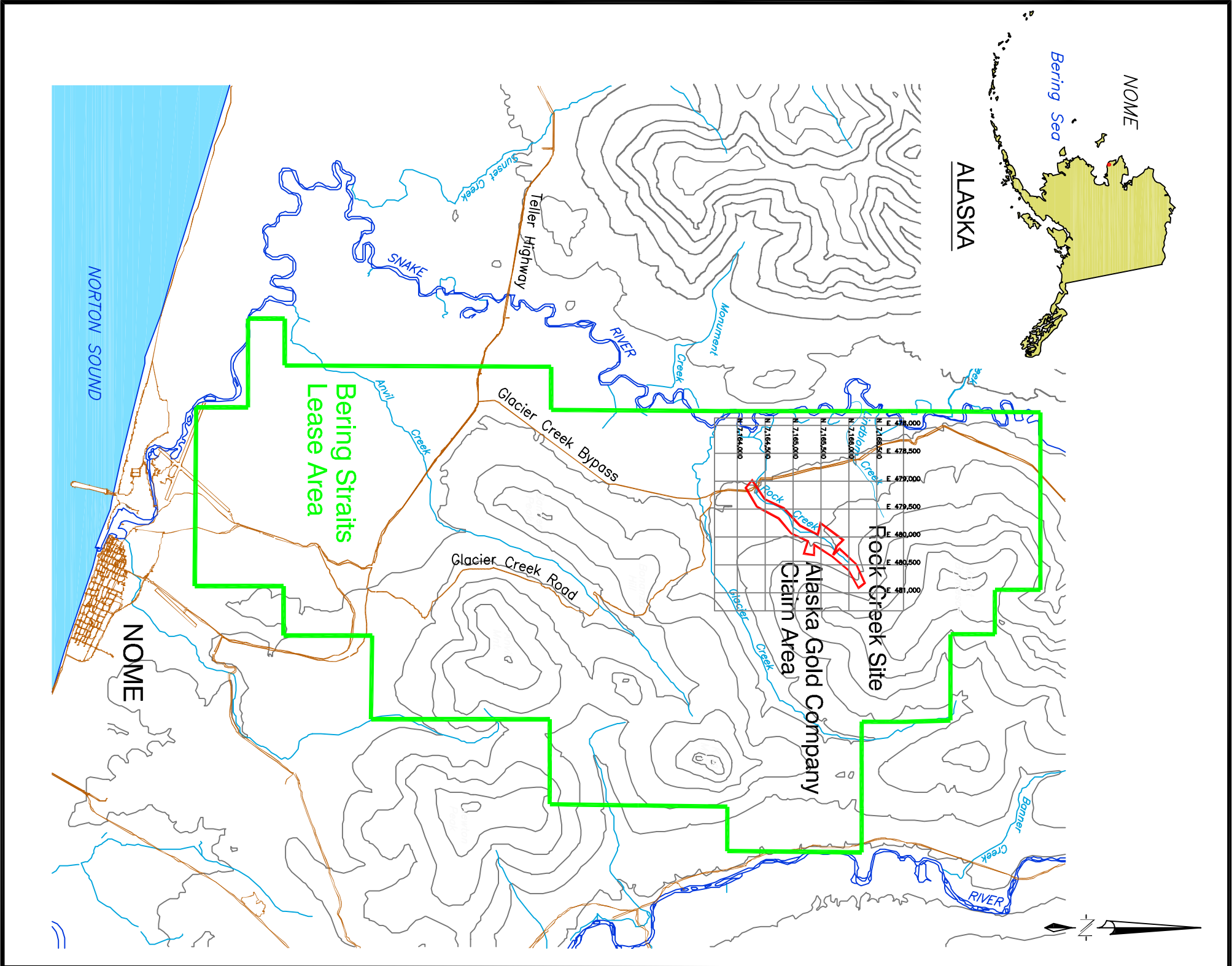
Scale: N.T.S.

Fig. 3-1

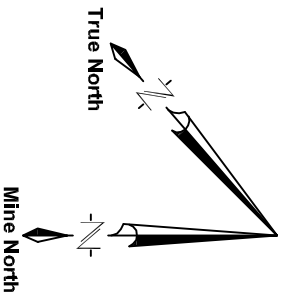
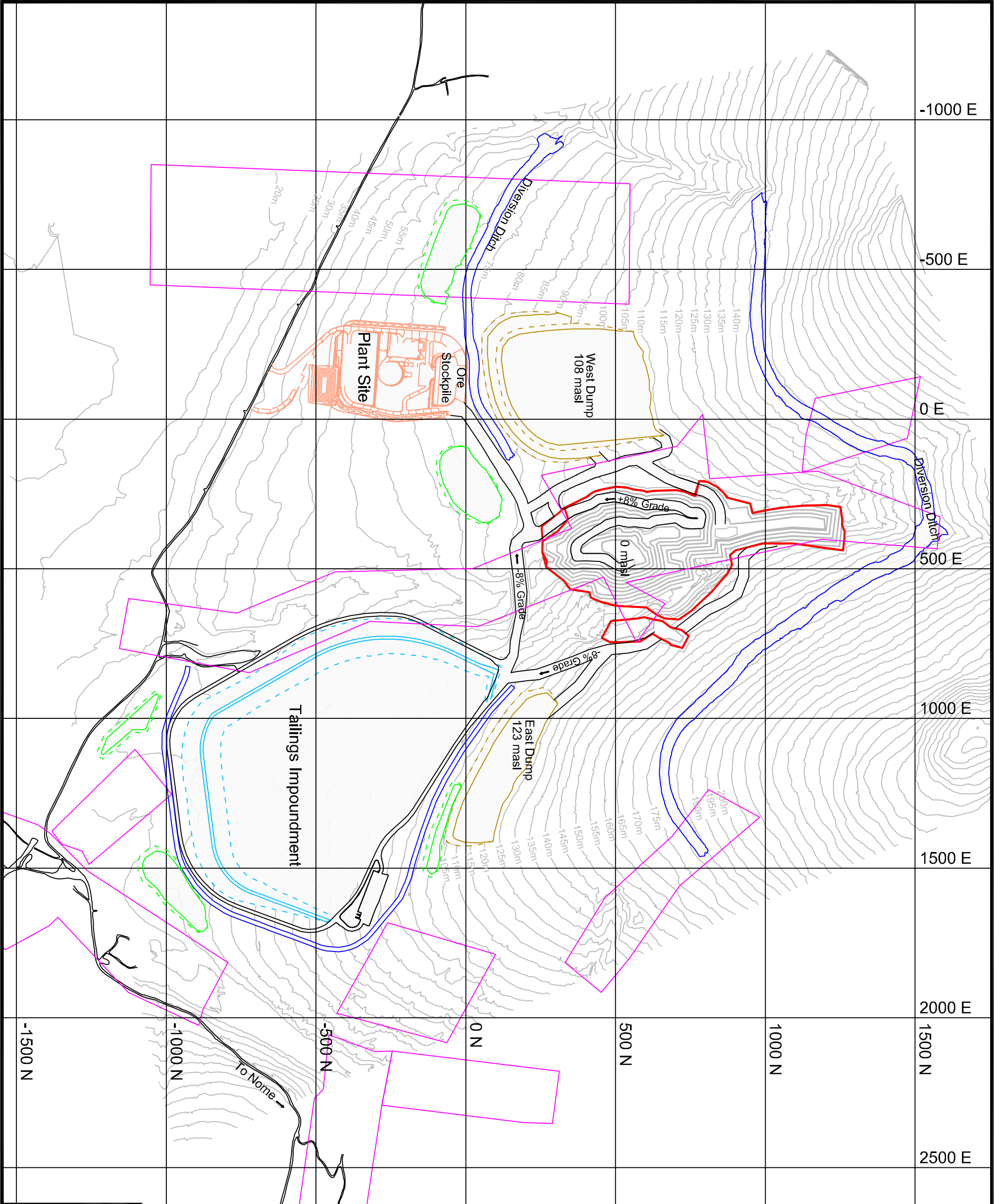




 Rock Creek Feasibility Study BIG HURRAH DEPOSIT LOCATION MAP FIG. RES2			
Drawn by: M Date: 11-16-01 Rev: 00	<b>NORWEST</b>	Scale: N.T.S.	Fig. 3-2







NOTE: Tailings Dam shown in its final configuration.

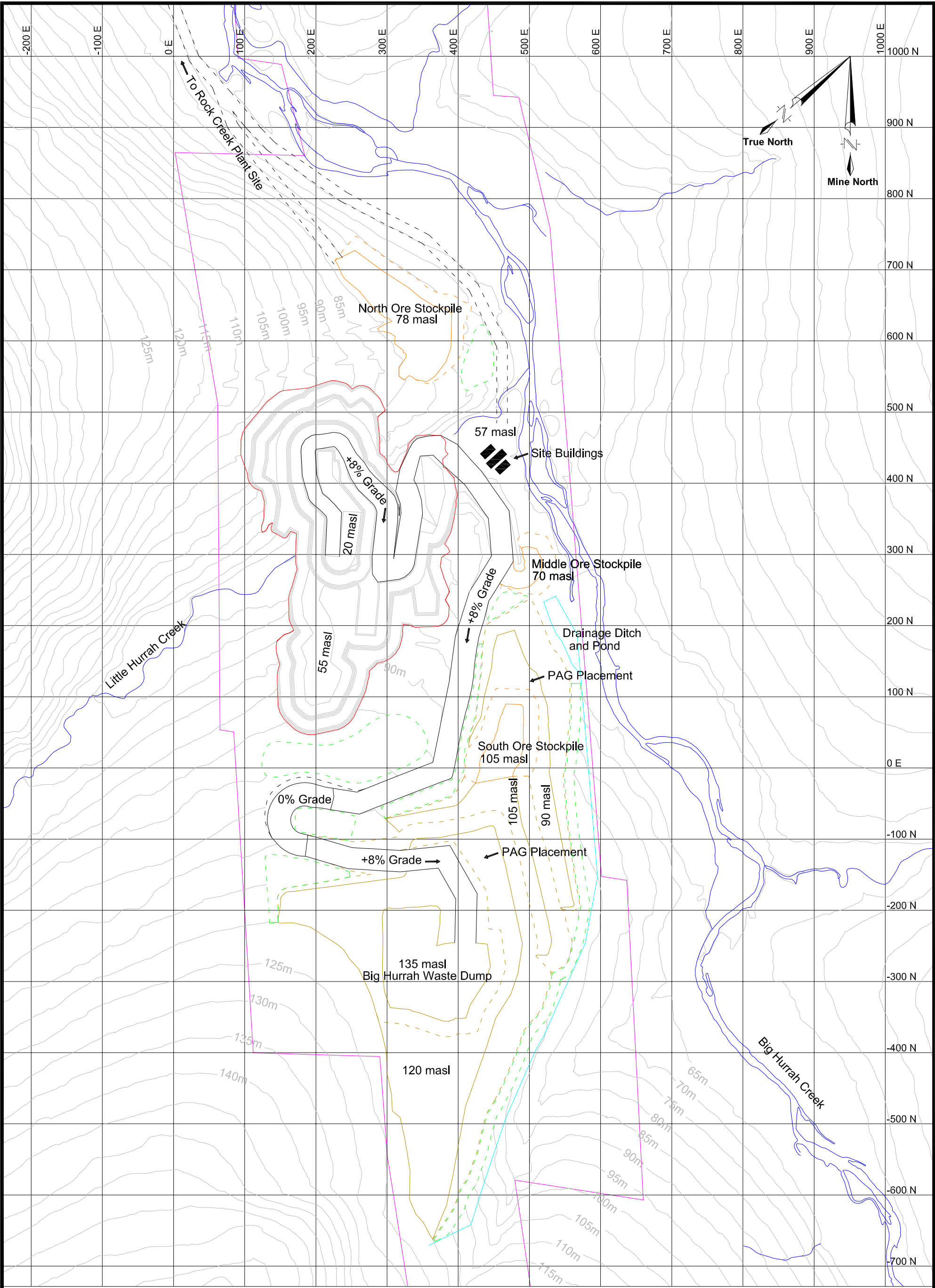
Legend

- Claim Boundary
- Waste Dumps
- Tailings Dam
- Pit Boundary
- 5m Contours (2004 Survey)
- Transportation Roads
- Diversion Ditches
- Soil Stockpile



Rock Creek Feasibility Study			
ROCK CREEK PIT: END OF 2011			
FIGURE 3-4		Scale: As Shown	Fig. 3-4
DRAWN BY: PP DATE: 01-Feb-08 REV: 00	<b>NORWEST</b>		Coordinates in Mine Grid

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Legend

- |                                       |                           |
|---------------------------------------|---------------------------|
| Property Boundary                     | Streams and Rivers        |
| Waste Dumps                           | Ore Stockpile             |
| Pit Boundary                          | 5m Contours (2004 Survey) |
| Surface Water Drainage and Collection | Transportation Roads      |
| Soil Stockpiles                       |                           |



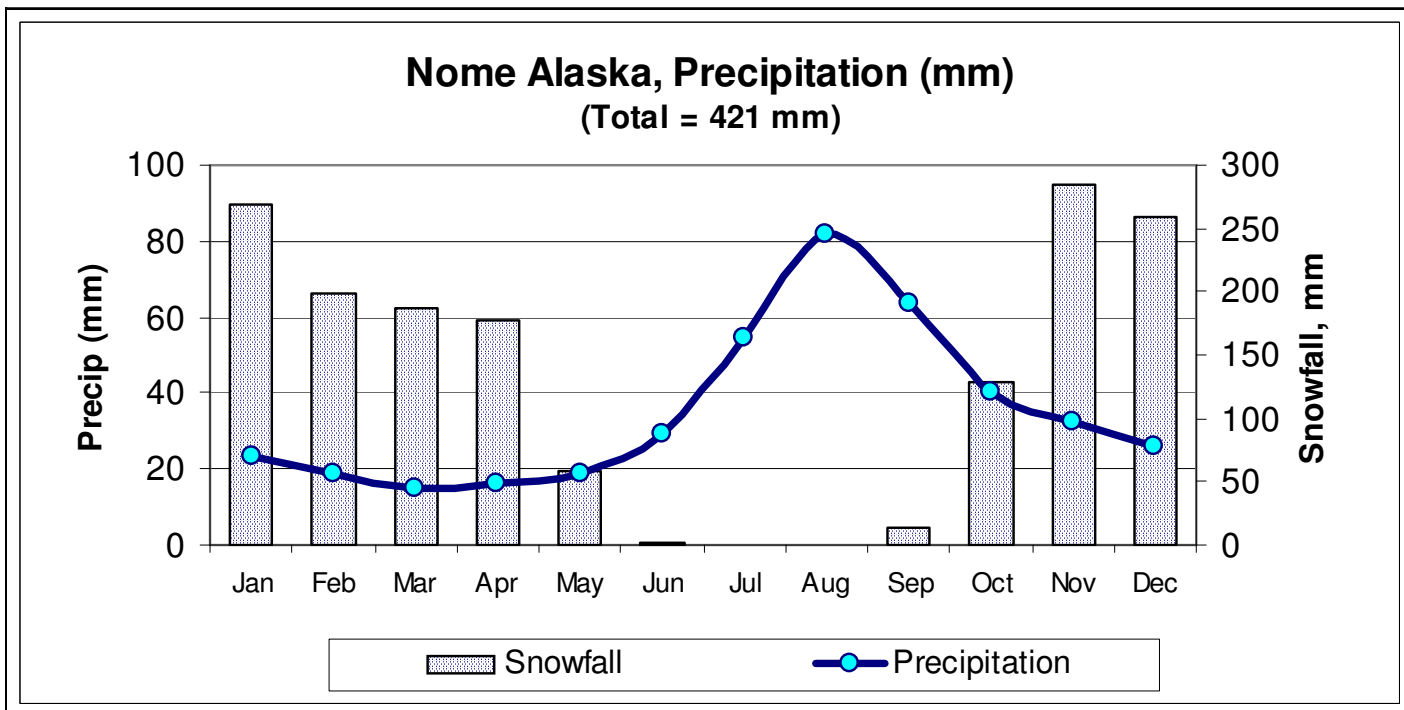
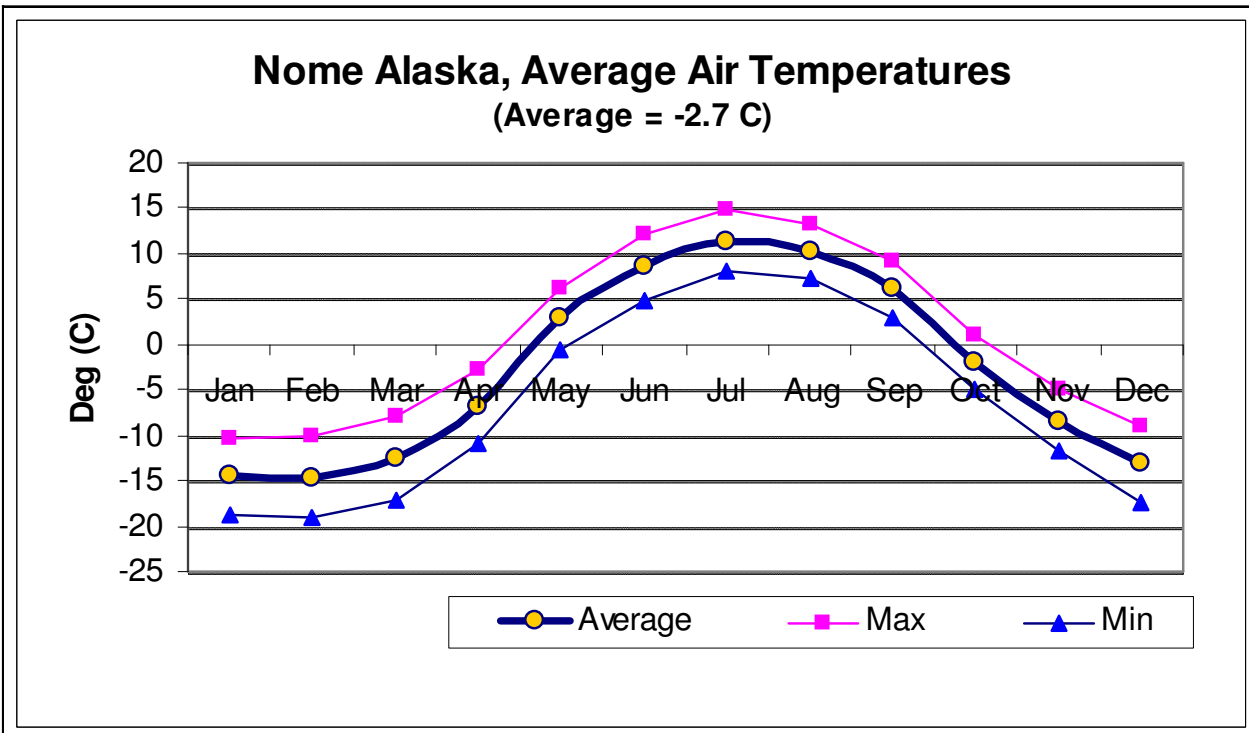
Rock Creek Feasibility Study  
BIG HURRAH PIT: FINAL FOOTPRINT  
WITHOUT BACKFILL  
FIGURE 3-5

DRAWN BY: PP  
DATE: 24-Jan-08  
REV: 00

**NORWEST**

Scale: As Shown  
Coordinates in Mine Grid

Fig. 3-5



NOTE: ESTIMATED PRECIPITATION  
AT ROCK CREEK IS  
APPROXIMATELY 2x NOME  
ANNUAL PRECIPITATION



Rock Creek Feasibility Study  
NOME AVERAGE AIR TEMPERATURE AND  
PRECIPITATION  
FIGURE 7-1

DRAWN BY: PP  
DATE: 13-Feb-08  
REV: 00

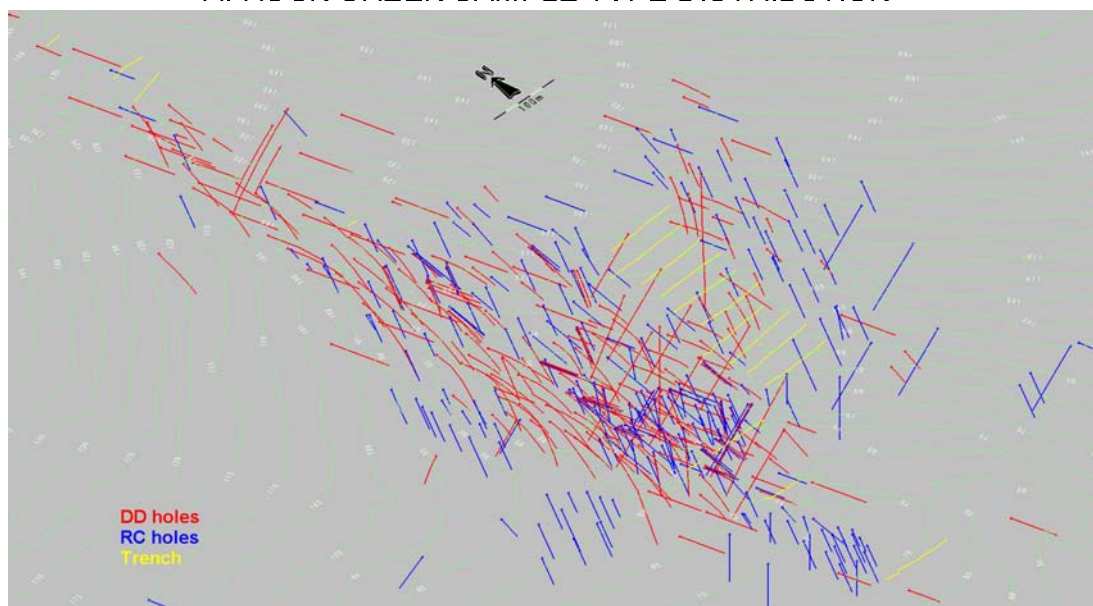
**NORWEST**

Scale: N.T.S.

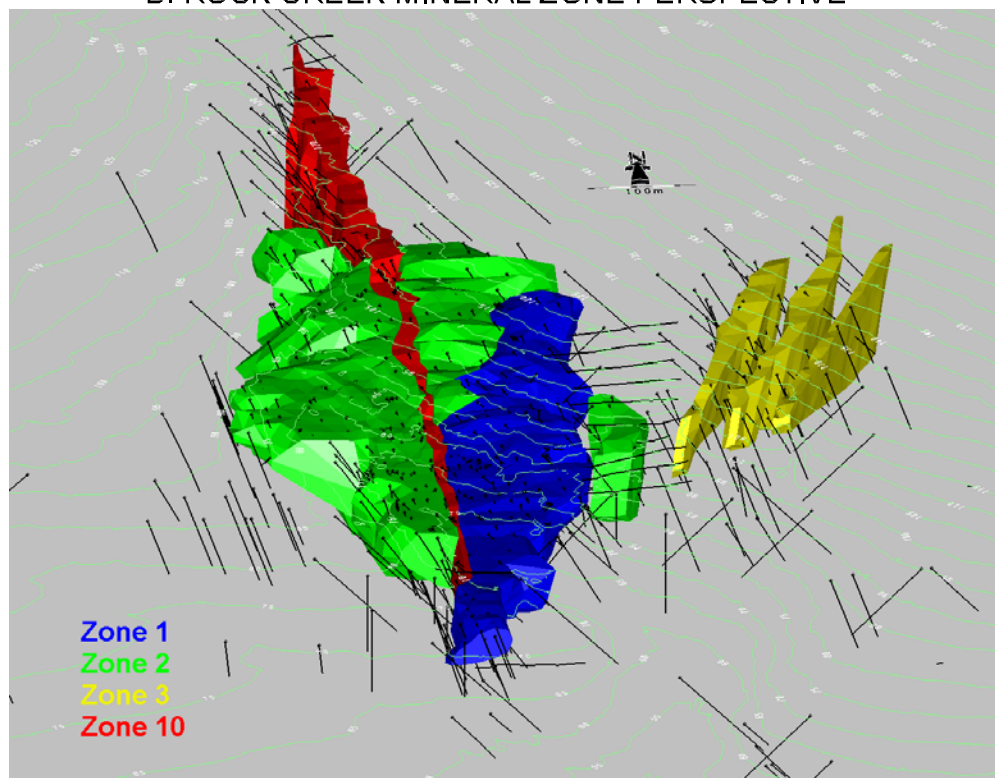
Fig. 7-1



A: ROCK CREEK SAMPLE TYPE DISTRIBUTION



B: ROCK CREEK MINERAL ZONE PERSPECTIVE



### Legend

ZONE 1 - TENSION  
ZONE 2 - TENSION  
ZONE 3 - TENSION  
ZONE10 - ALBION SHEAR



Rock Creek Feasibility Study

### ROCK CREEK SAMPLE TYPE DISTRIBUTION AND MINERAL ZONE PERSPECTIVE FIGURE 11-1

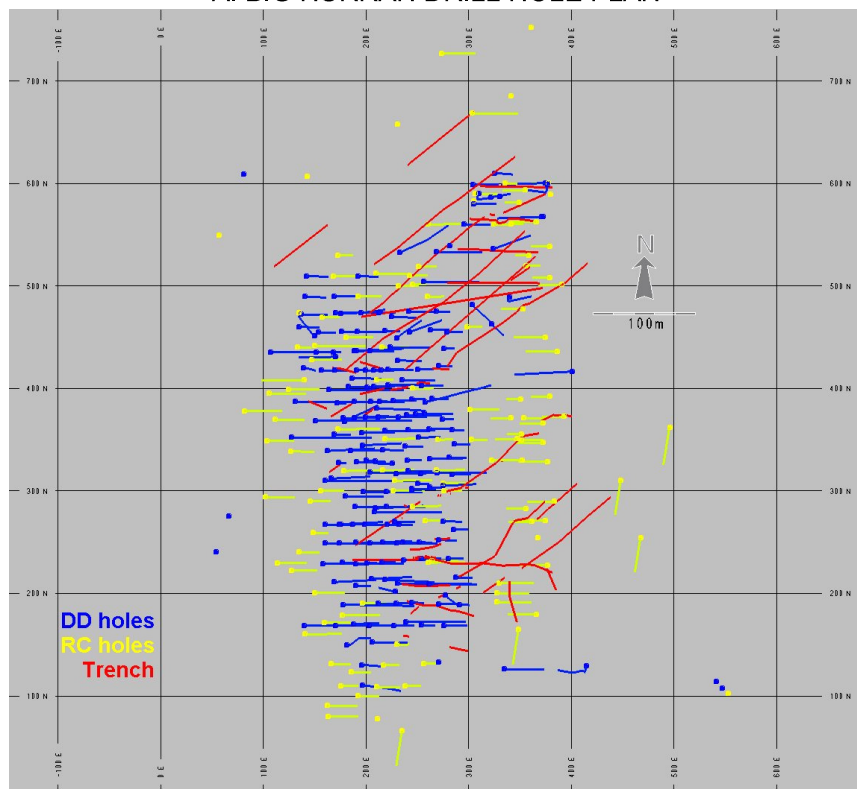
DRAWN BY: PP  
DATE: 13-Feb-08  
REV: 00

**NORWEST**

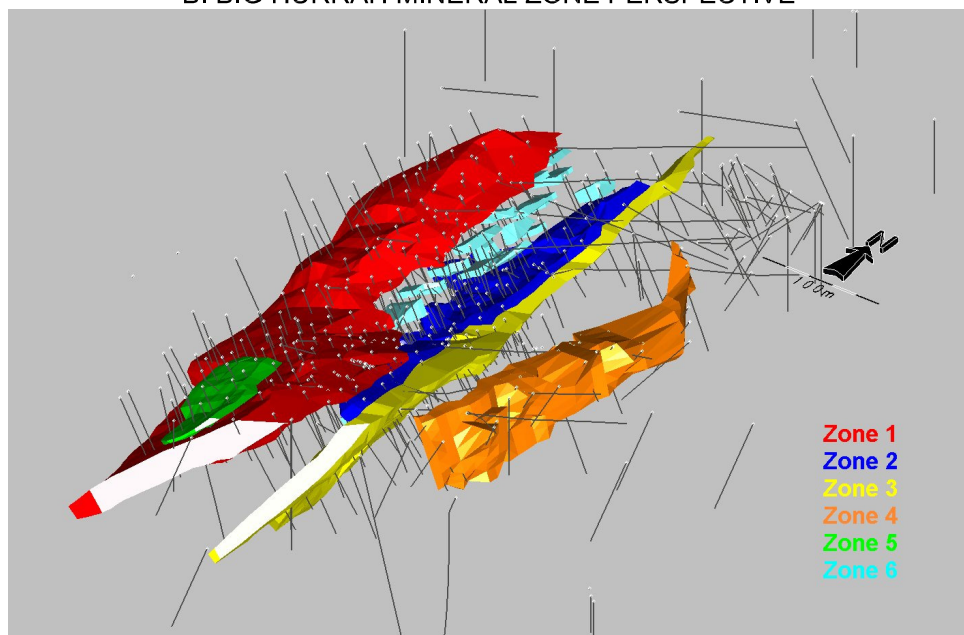
Scale: N.T.S.

Fig. 11-1

A: BIG HURRAH DRILL HOLE PLAN



B: BIG HURRAH MINERAL ZONE PERSPECTIVE



Rock Creek Feasibility Study  
BIG HURRAH DRILL HOLE PLAN AND  
MINERAL ZONE PERSPECTIVE  
FIGURE 11-2

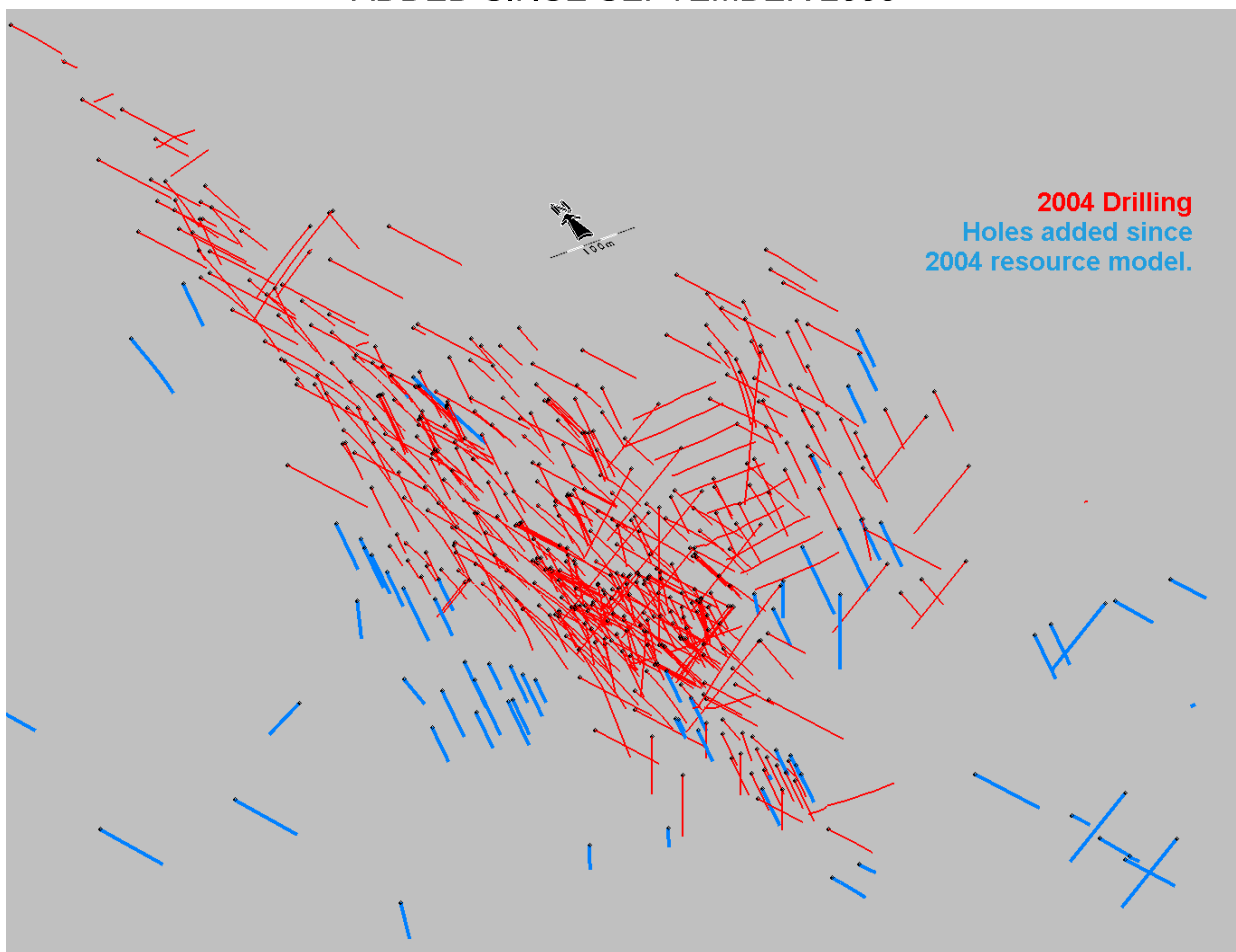
DRAWN BY: PP  
DATE: 13-Feb-08  
REV: 00

**NORWEST**

Scale: N.T.S.

Fig. 11-2

## ROCK CREEK ISOMETRIC VIEW SHOWING DRILLING ADDED SINCE SEPTEMBER 2006



Rock Creek Feasibility Study

ROCK CREEK ISOMETRIC VIEW SHOWING  
DRILLING ADDED SINCE SEPTEMBER 2006

FIGURE 12-1

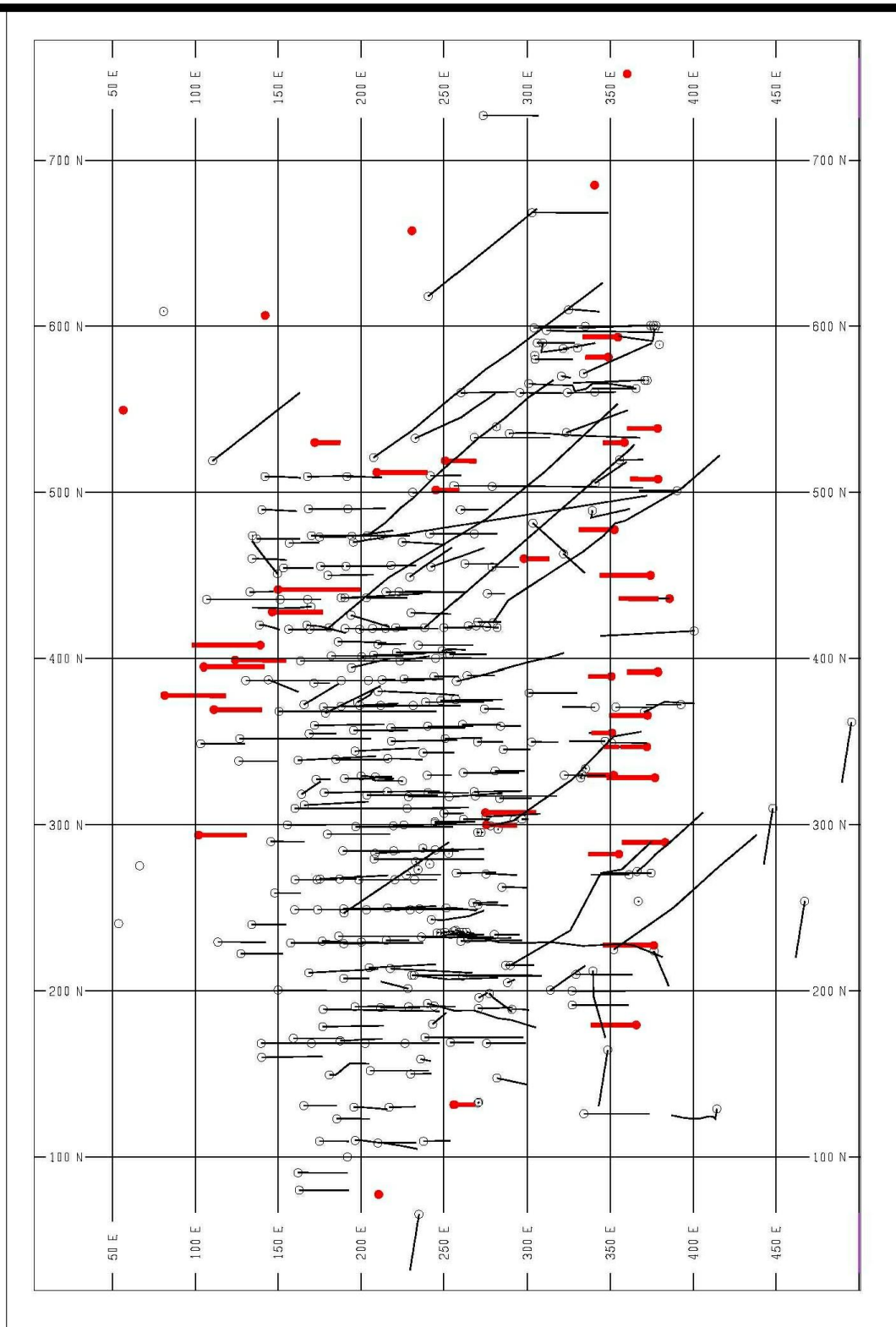
DRAWN BY: PP  
DATE: 13-Feb-08  
REV: 00

**NORWEST**

Scale: N.T.S.

Fig.  
12-1





**Legend:**

- 2006 Drill Holes
- Pre-2006 Drill Holes



Rock Creek Feasibility Study

**BIG HURRAH DRILL HOLE LOCATION**

**FIGURE 12-2**

DRAWN BY: PP  
DATE: 13-Feb-08  
REV: 00

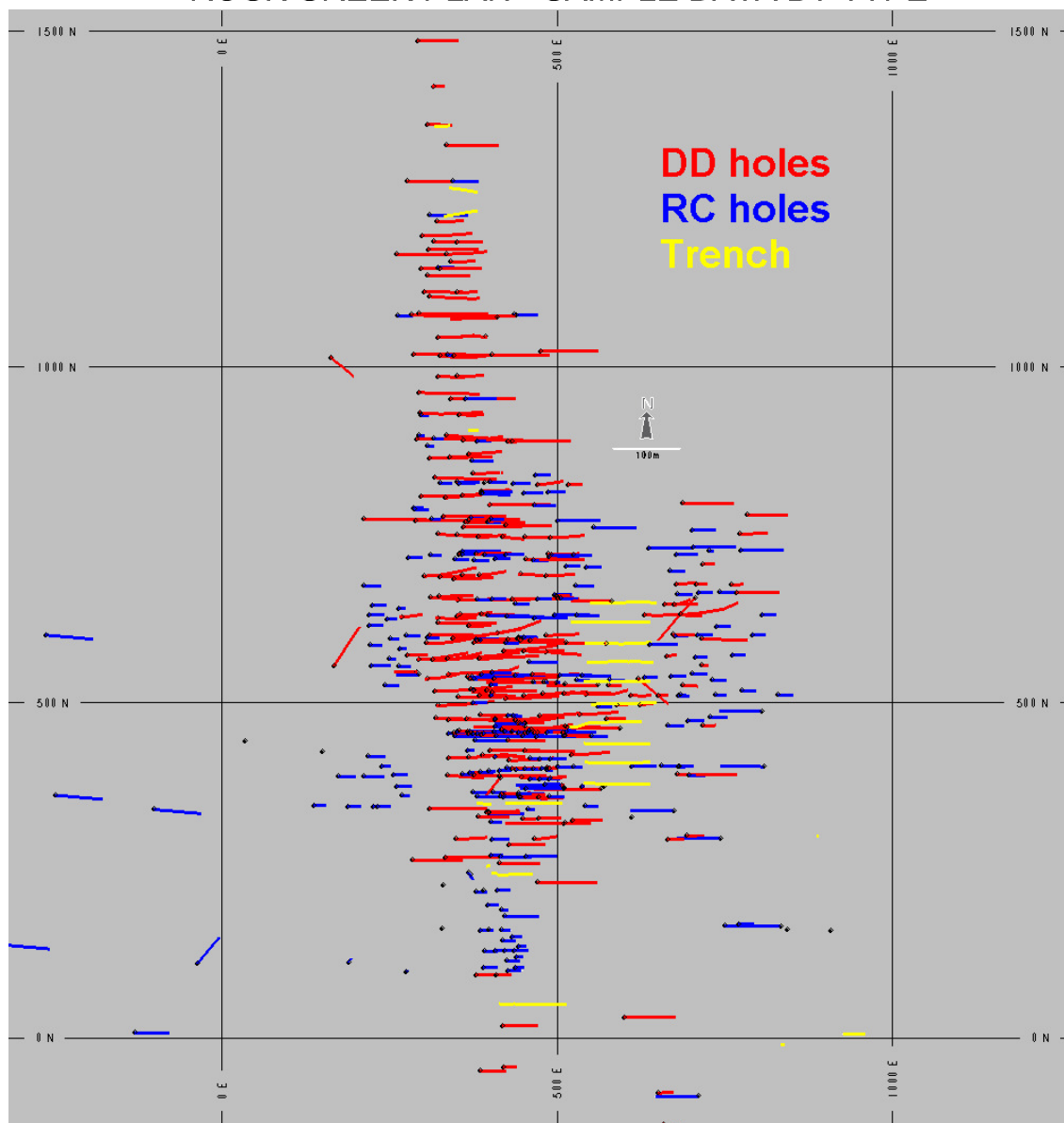
**NORWEST**

Scale: N.T.S.

Fig. 12-2

FILE: I:\NovaGold\07-3129 Rock Creek-Big Hurrah Feasibility Updatte\Rock Creek Engineering\Drafting\Charts and Graphs\RC Sample data and Drilling since Spet.2006.dwg

## ROCK CREEK PLAN - SAMPLE DATA BY TYPE



Rock Creek Feasibility Study

### ROCK CREEK PLAN - SAMPLE DATA BY TYPE

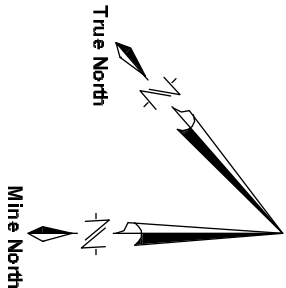
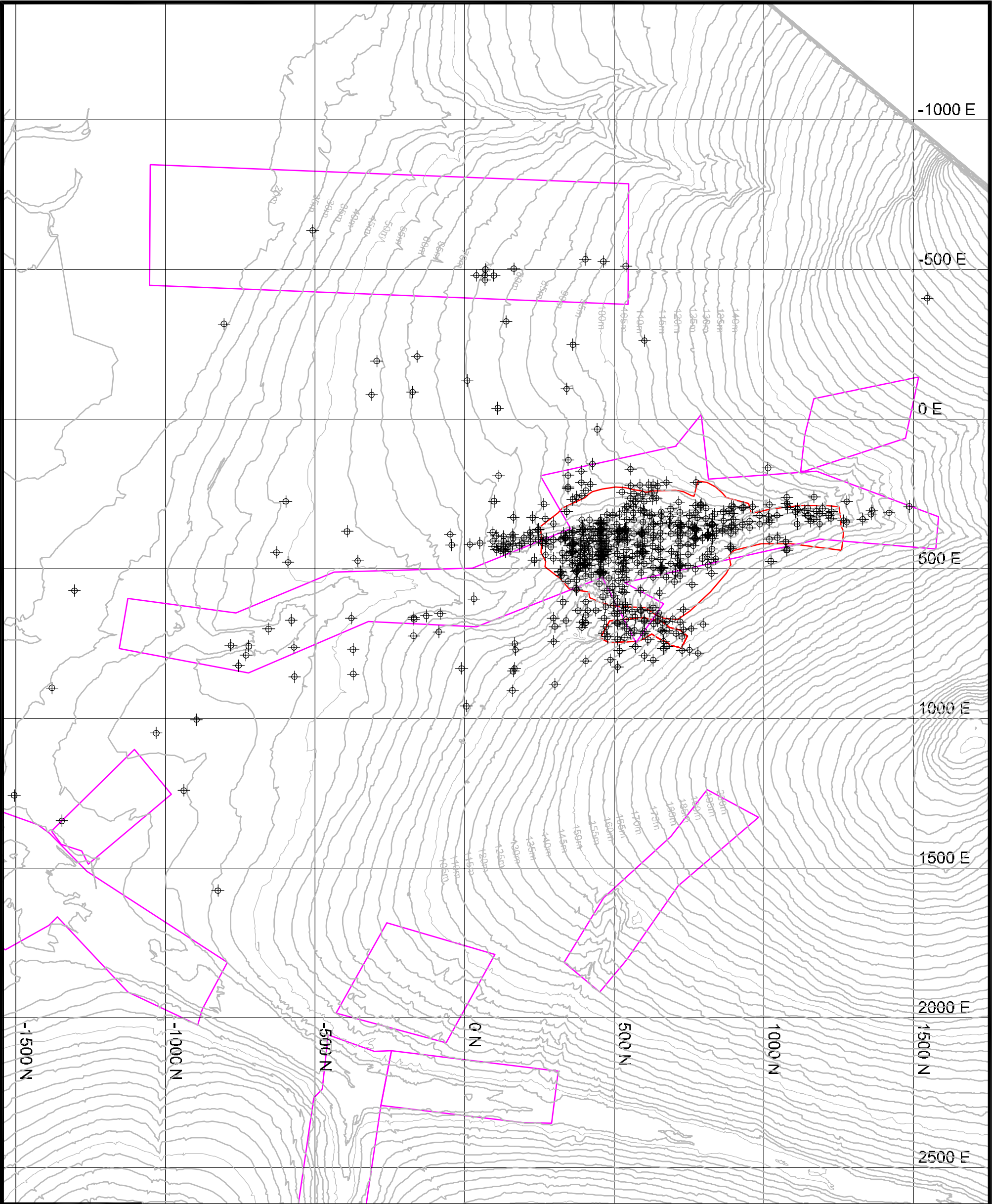
FIGURE 13-1

DRAWN BY: PP  
DATE: 13-Feb-08  
REV: 00

**NORWEST**

Scale: N.T.S.

Fig. 13-1



- Legend**
- Claim Boundary
  - Pit Boundary
  - 5m Contours (2004 Survey)
  - Drill Holes

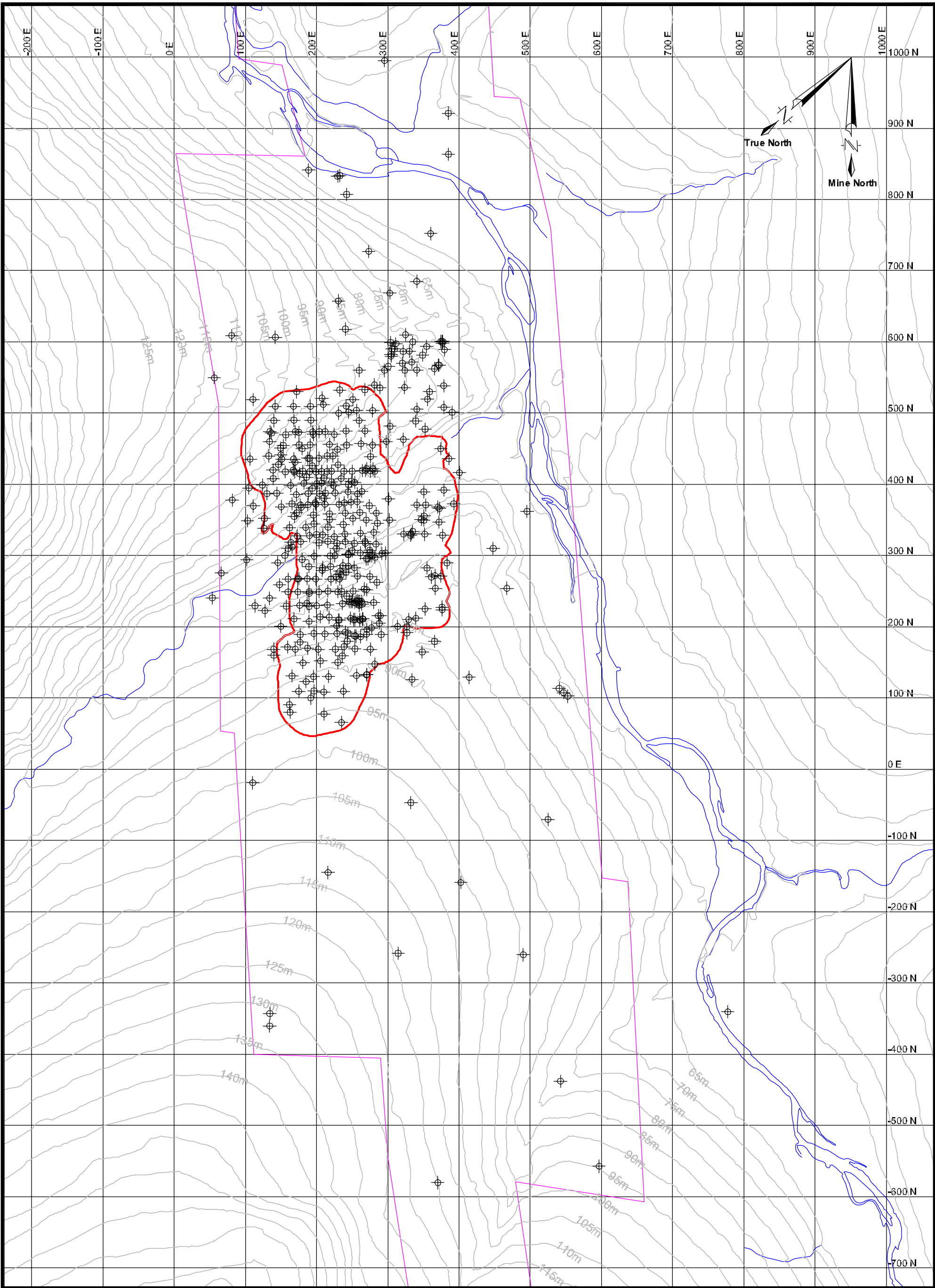


Rock Creek Feasibility Study

ROCK CREEK PIT: DRILL HOLE LAYOUT

FIGURE 13-2

FILE: I:\NovaGold\07-3129 Rock Creek-Big Hurrah Feasibility Updte\Big Hurrah Engineering\Drafting\Phasing\Drill Hole.dwg



Legend

- Property Boundary
- 5m Contours (2004 Survey)
- Pit Boundary
- Drill Holes



SCALE 1:5000



Rock Creek Feasibility Study

BIG HURRAH PIT: DRILL HOLE LAYOUT

FIGURE 13-3

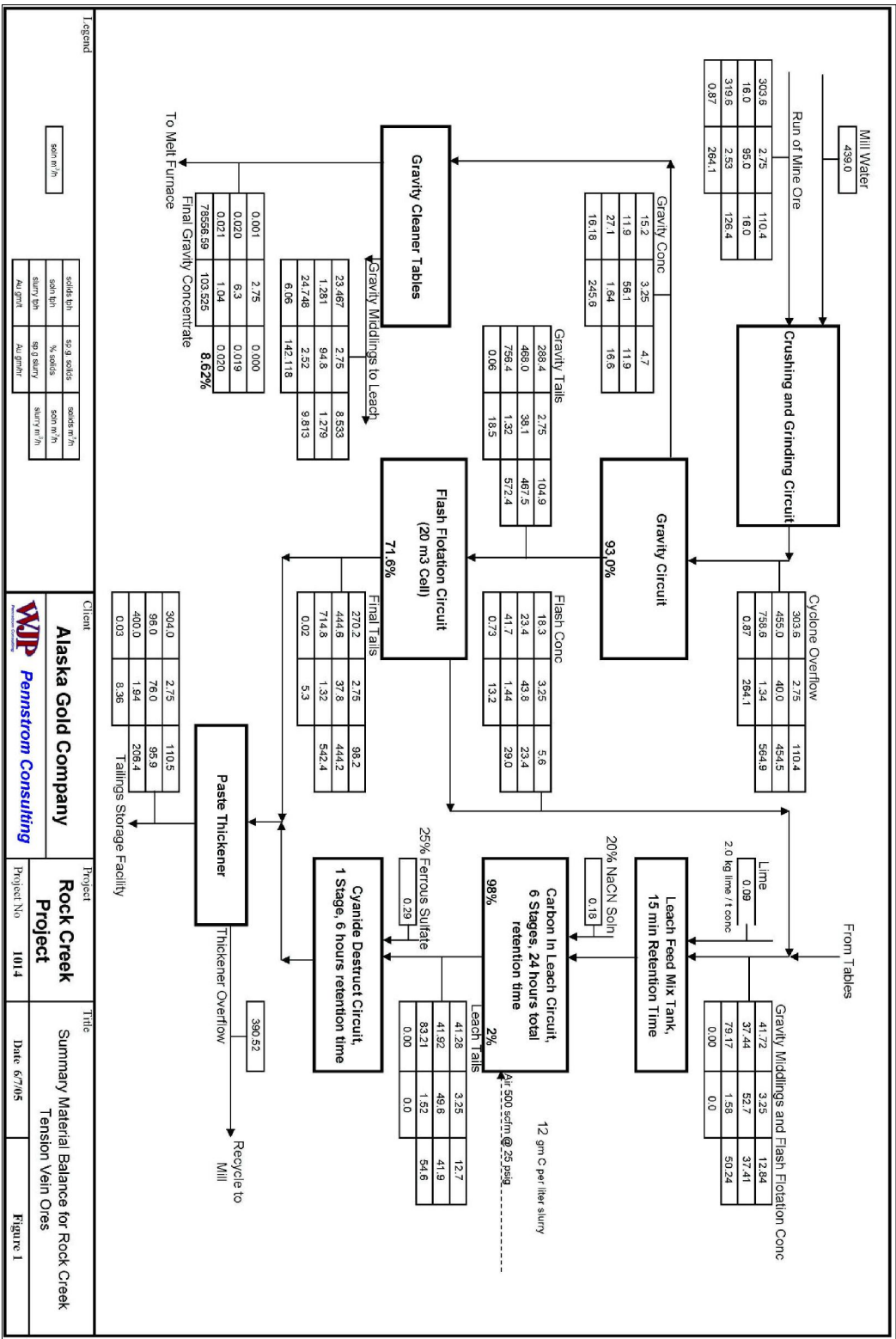
DRAWN BY: PP  
DATE: 24-Jan-08  
REV: 00

**NORWEST**

Scale: As Shown  
Coordinates in Mine Grid

Fig. 13-3





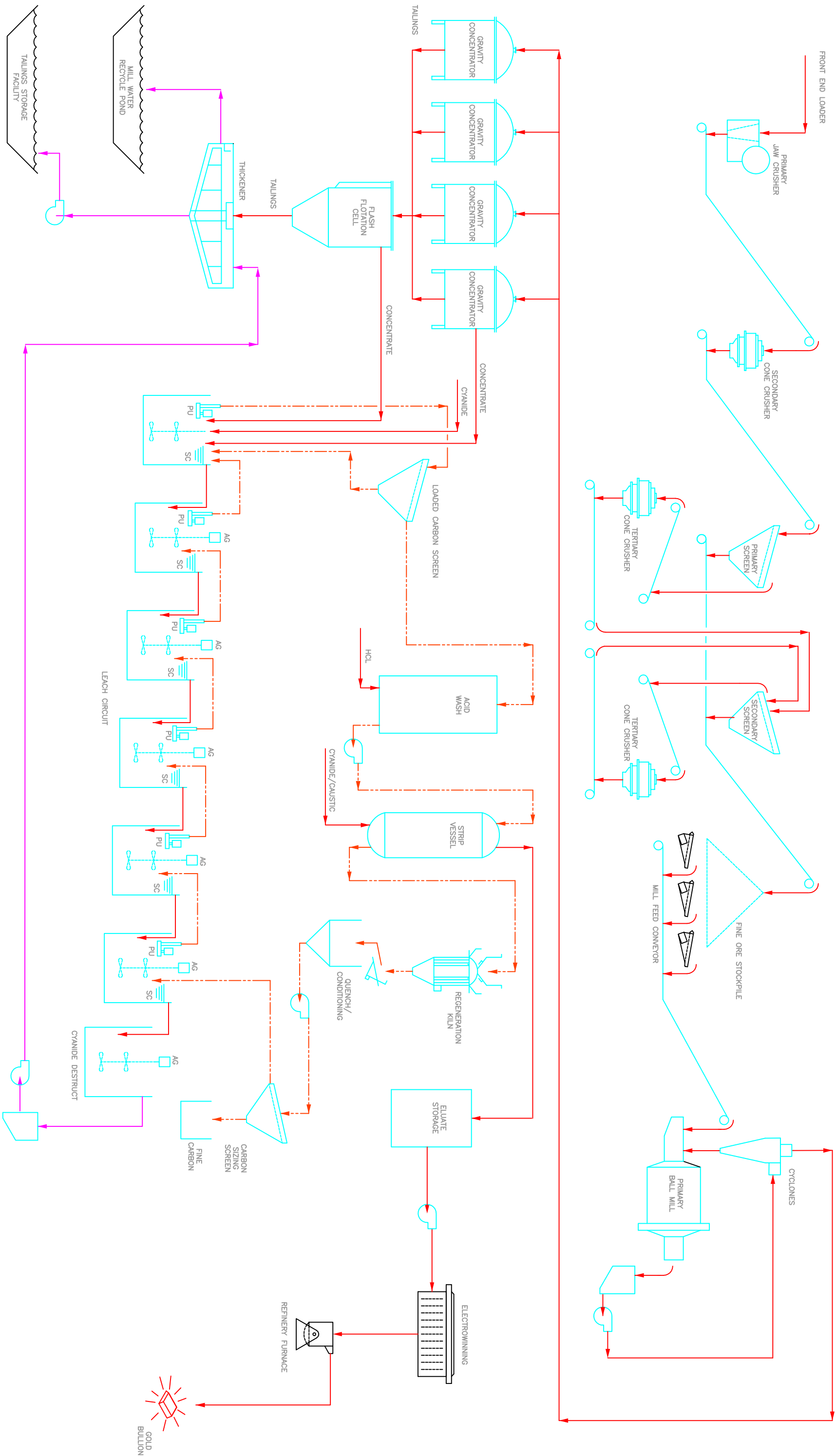
Rock Creek Feasibility Study

ROCK CREEK MATERIAL BALANCE

FIGURE 18-1

Scale: N.T.S.





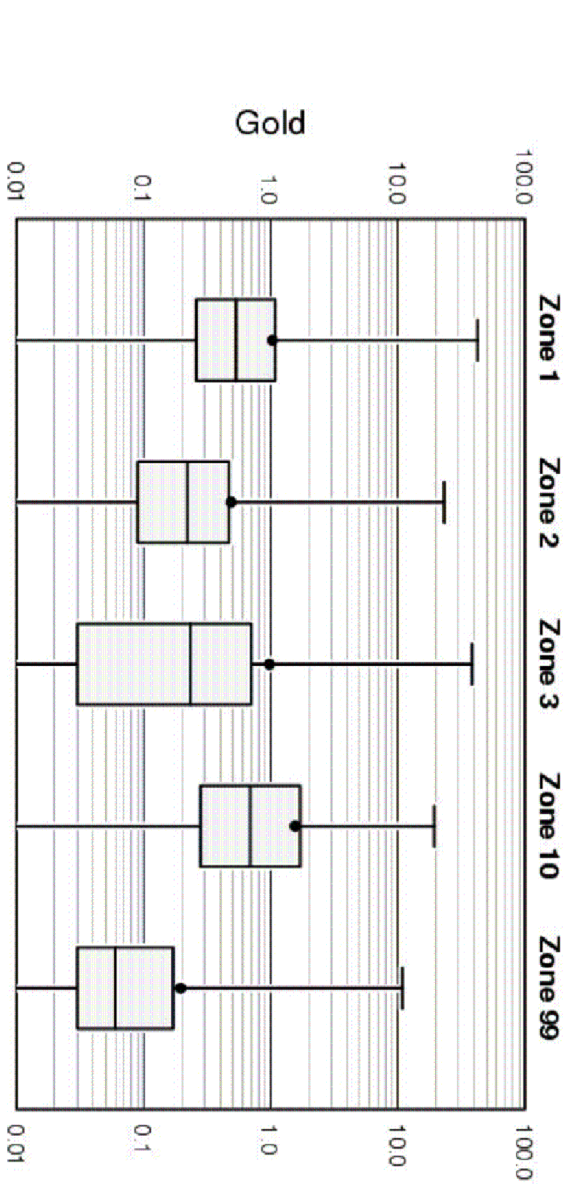
*FINAL STUDY ISSUE*

[illegible]

**NORWEST** 2007 Rock Creek Feasibility Study Figure 18-3



# Rock Creek : Zones



Number of data  
Mean  
Variance  
Skewness  
Coef of Variation  
Maximum  
Upper quartile  
Median  
Lower quartile  
Minimum

2108  
1.033  
3.537  
8.915  
1.82  
42.27  
1.08  
0.53  
0.26  
0.0

1993  
0.486  
1.001  
9.718  
2.059  
23.19  
0.47  
0.22  
0.09  
0.0

248  
0.976  
11.689  
8.375  
3.503  
38.44  
0.704  
0.233  
0.03  
0.0

873  
1.553  
6.288  
3.829  
1.615  
19.35  
1.71  
0.69  
0.28  
0.0

3855  
0.195  
0.238  
9.532  
2.505  
10.8  
0.17  
0.06  
0.03  
0.0



Rock Creek Feasibility Study

ROCK CREEK BOX-PLOTS FOR MINERAL ZONES

FIGURE 19-1

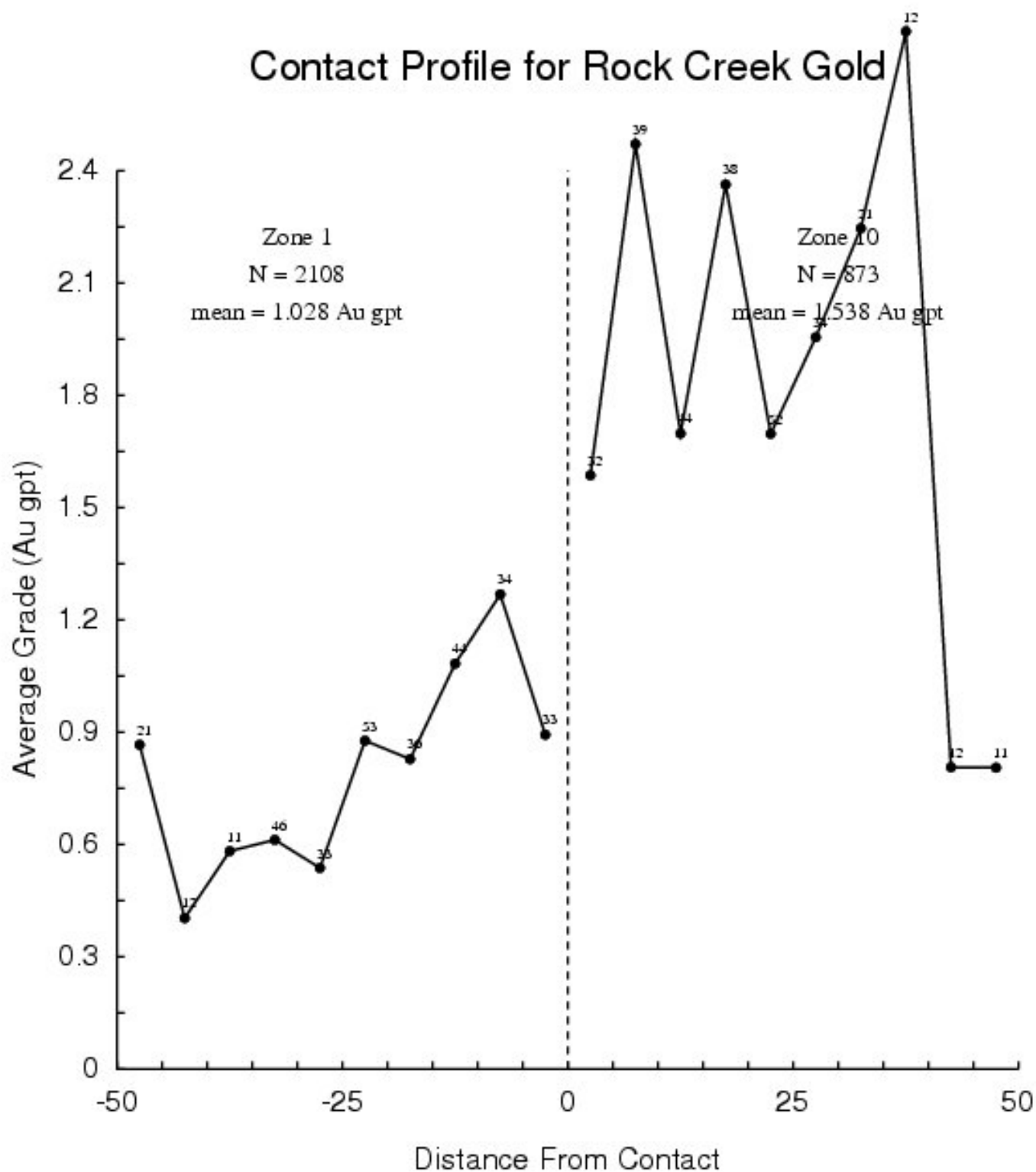
DRAWN BY: OC  
DATE: 14-Feb-08  
REV: 00

NORWEST

SCALE: NTS

Fig. 19-1





Rock Creek Feasibility Study

### ROCK CREEK CONTACT PROFILE GRAPH

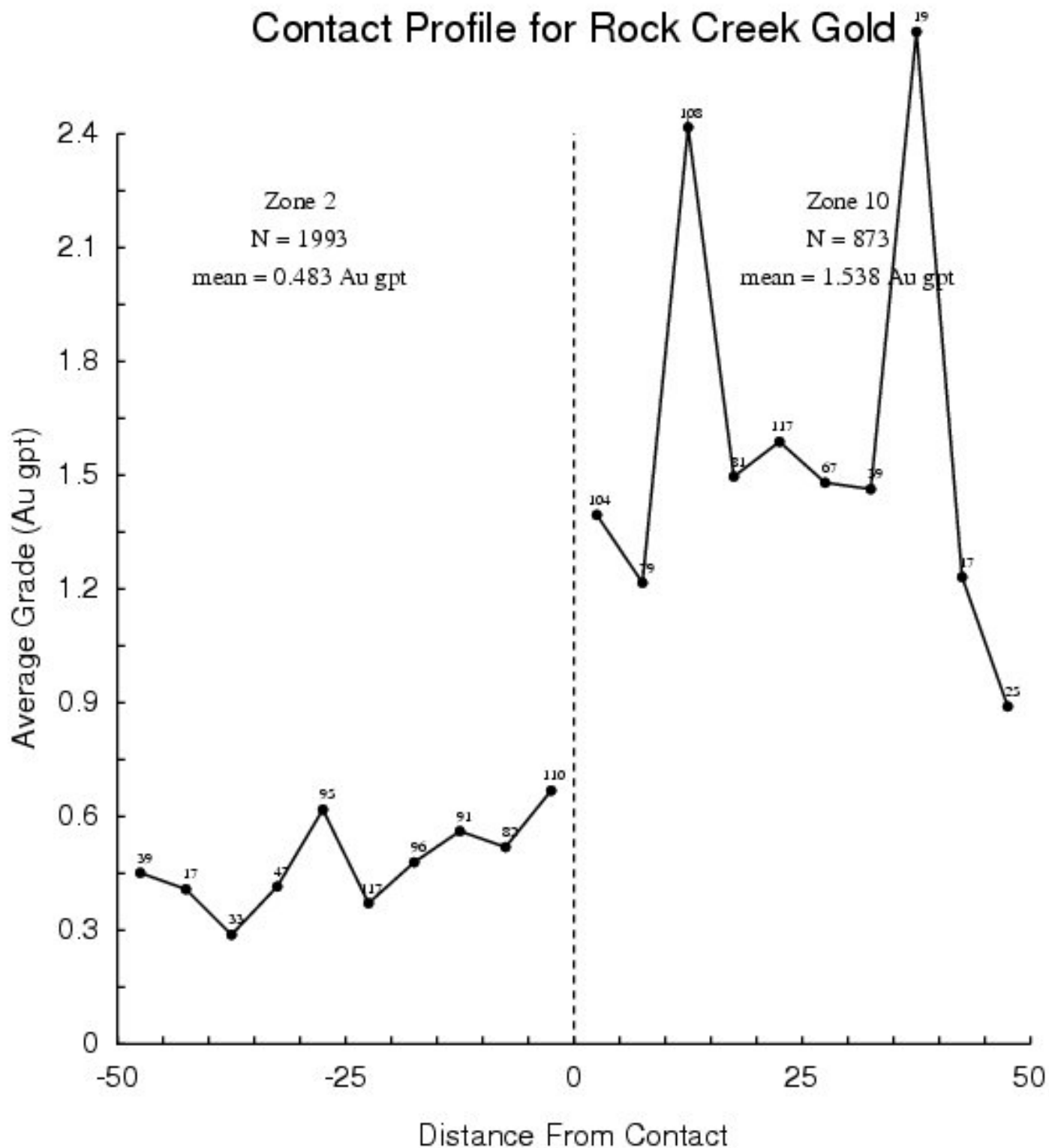
FIGURE 19-2

DRAWN BY: GC  
DATE: 13-Feb-08  
REV: 00

**NORWEST**

Scale: N.T.S.

Fig. 19-2



Rock Creek Feasibility Study

### ROCK CREEK CONTACT PROFILE

FIGURE 19-3

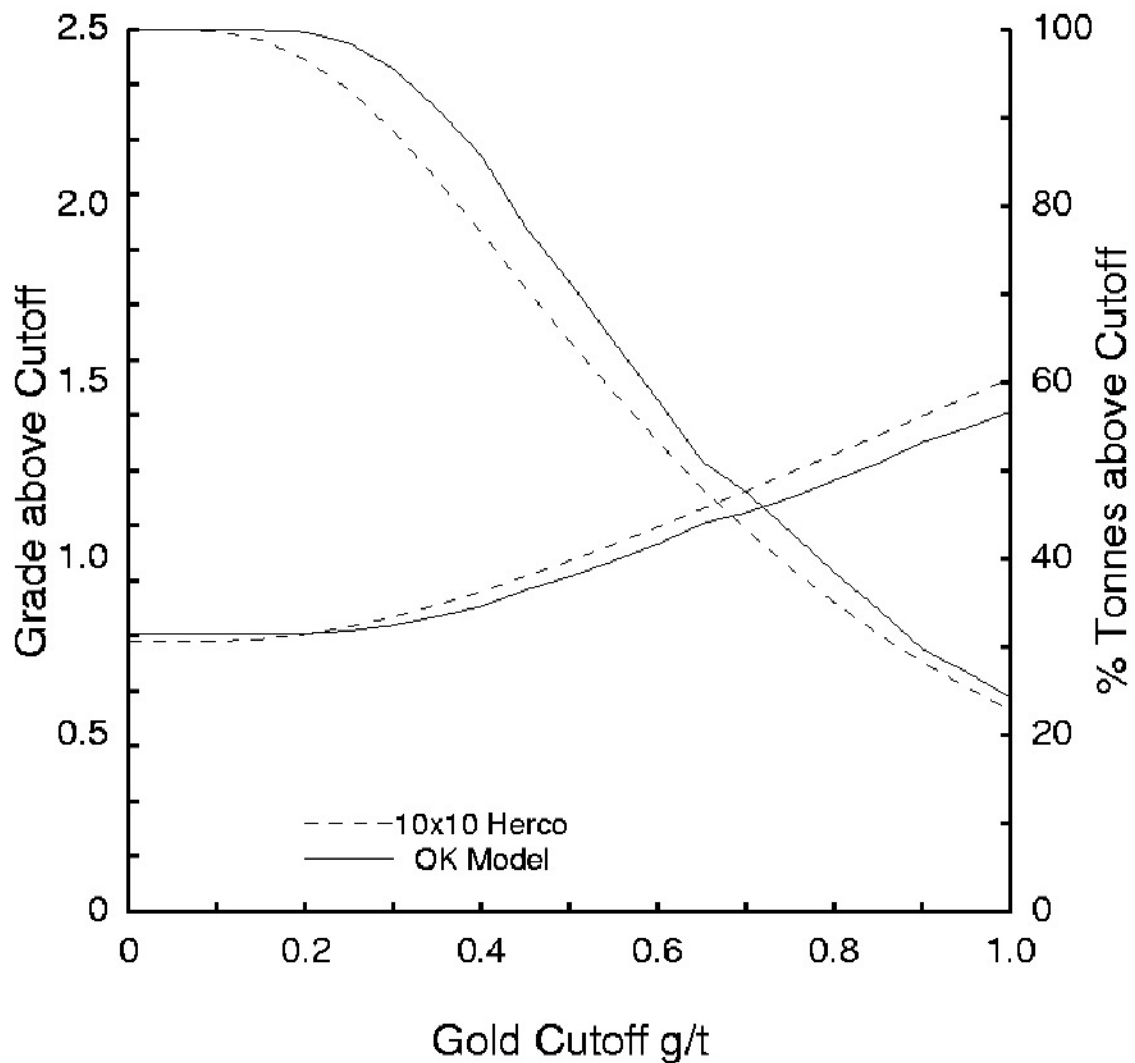
DRAWN BY: GC  
DATE: 13-Feb-08  
REV: 00

**NORWEST**

Scale: N.T.S.

Fig. 19-3

# Rock Creek Recovered Gold Zone 1 Restricted



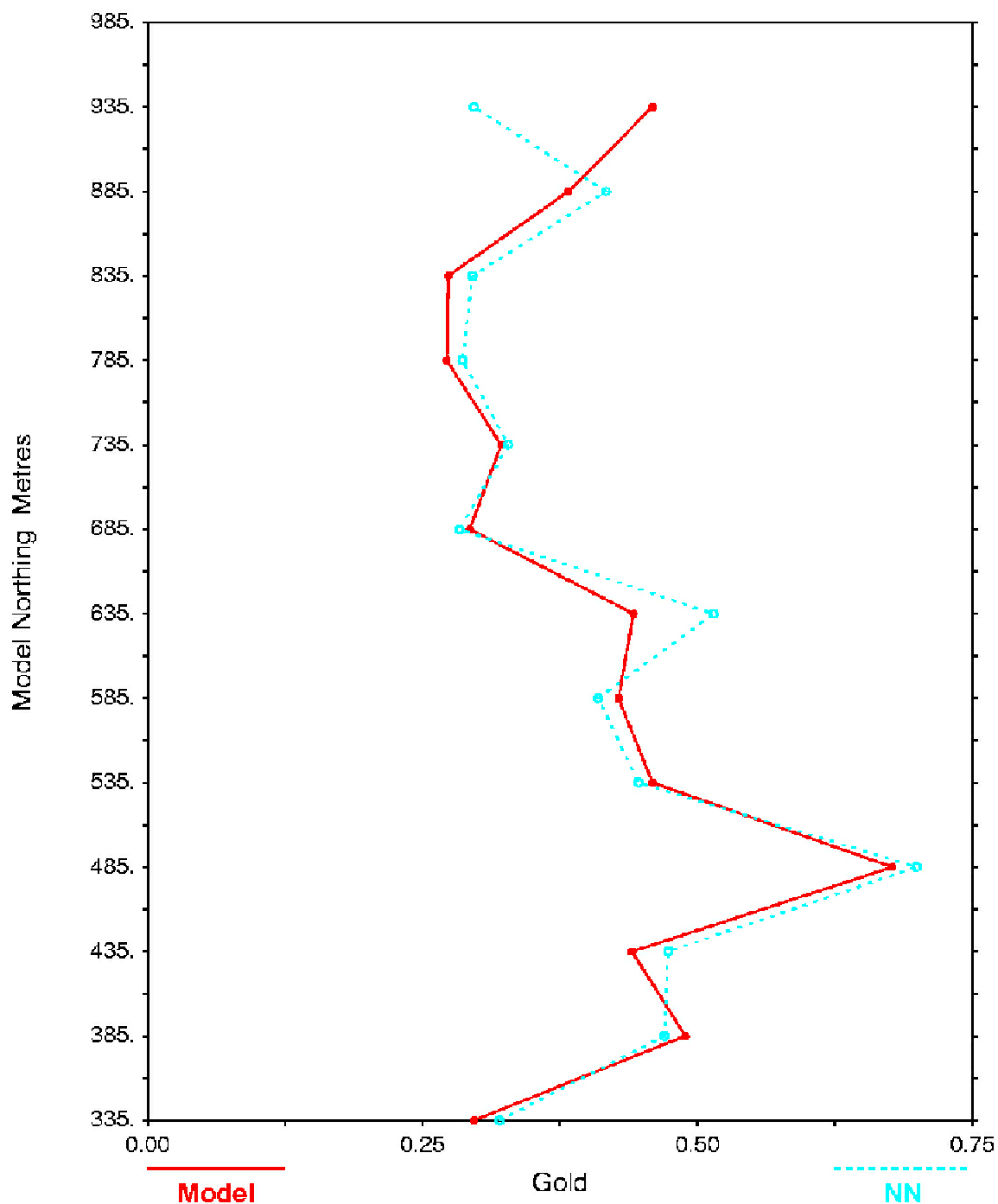
Rock Creek Feasibility Study  
ROCK CREEK EXAMPLE  
CHANGE OF SUPPORT COMPARISON  
FIGURE 19-4

DRAWN BY: PP  
DATE: 13-Feb-08  
REV: 00

**NORWEST**

Scale: N.T.S.

Fig.  
19-4



Rock Creek Feasibility Study

# ROCK CREEK GOLD EXAMPLE SWATH PLOT

FIGURE 19-5

DRAWN BY: PP  
DATE: 13-Feb-08  
REV: 00

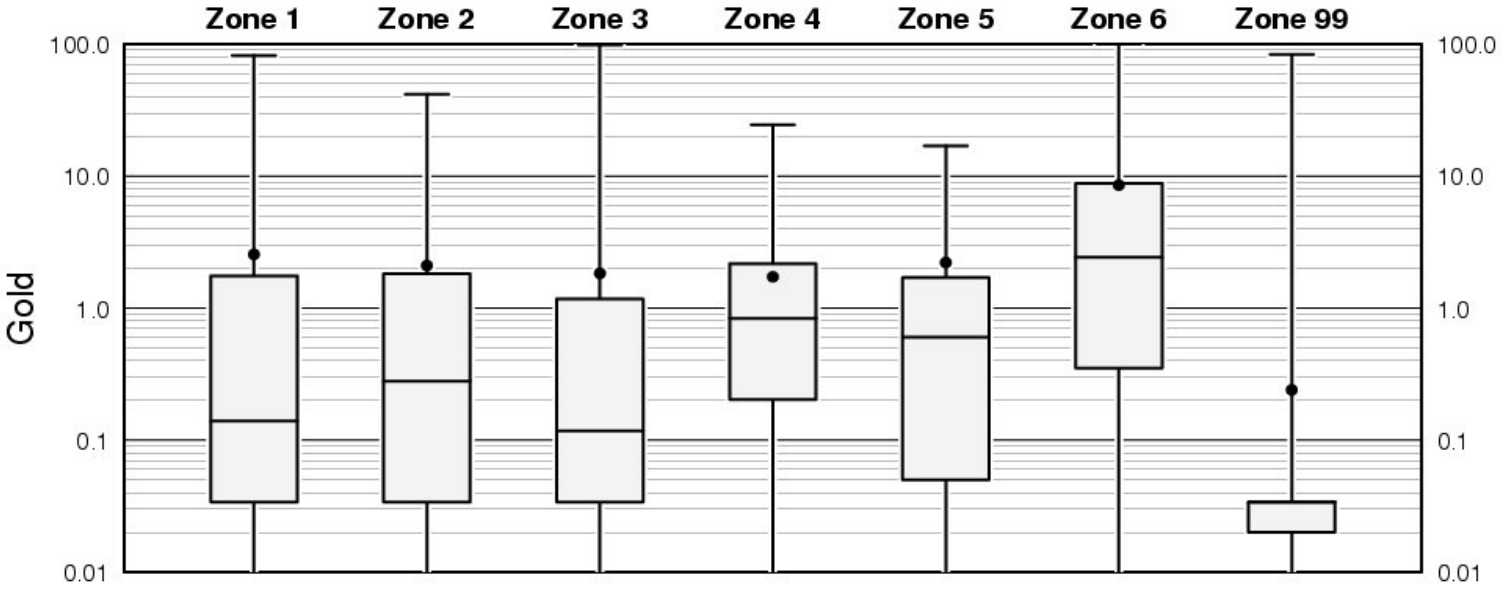
**NORWEST**

Scale: N.T.S.

Fig.  
19-5

FILE: I: \NovaGold\07-3129 Rock Creek-Big Hurrah Feasibility Update\Big Hurrah Engineering\Drafting\Big Hurrah Geological Figures1.dwg

*Big Hurrah : Zones*



Number of data	975	404	613	310	54	92	6034	Number of data
Mean	2.551	2.101	1.834	1.727	2.214	8.551	0.24	Mean
Variance	38.814	24.372	48.64	8.31	15.877	236.504	3.056	Variance
Skewness	5.143	4.35	10.057	4.808	2.515	3.636	20.369	Skewness
Coef of Variation	2.442	2.35	3.802	1.67	1.799	1.798	7.3	Coef of Variation
Maximum	82.081	41.793	98.78	24.418	16.984	99.724	83.281	Maximum
Upper quartile	1.757	1.824	1.17	2.171	1.702	8.835	0.034	Upper quartile
Median	0.14	0.28	0.117	0.833	0.602	2.437	0.034	Median
Lower quartile	0.034	0.034	0.034	0.203	0.05	0.351	0.02	Lower quartile
Minimum	0.001	0.002	0.002	0.002	0.002	0.003	0.002	Minimum



Rock Creek Feasibility Study

BIG HURRAH BOX-PLOTS FOR MINERAL ZONES

FIGURE 19-6

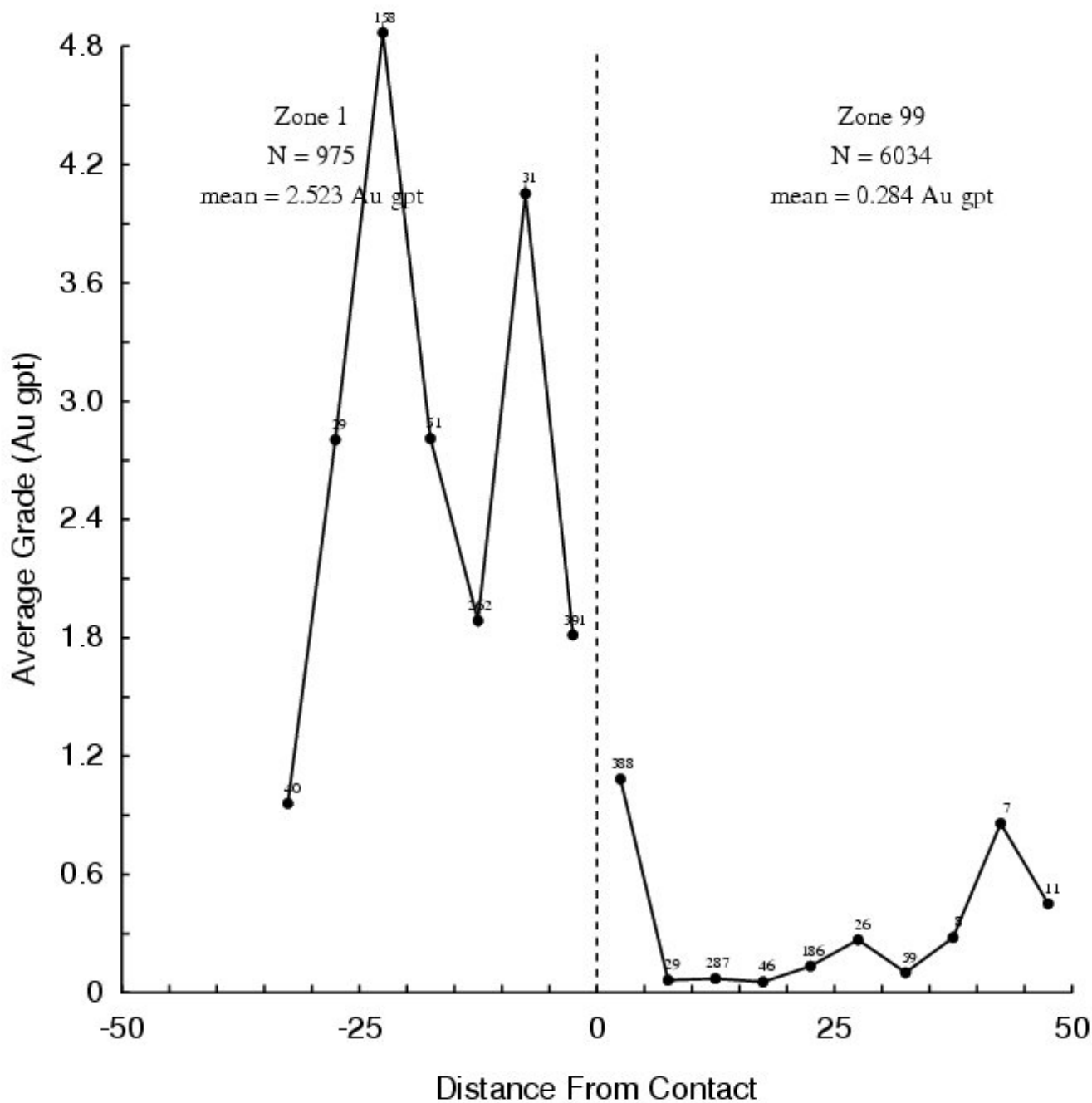
DRAWN BY: GC  
DATE: 13-Feb-08  
REV: 00



Scale: N.T.S.

Fig. 19-6

# Contact Profile for Big Hurrah Gold



Rock Creek Feasibility Study

## BIG HURRAH CONTACT PROFILE

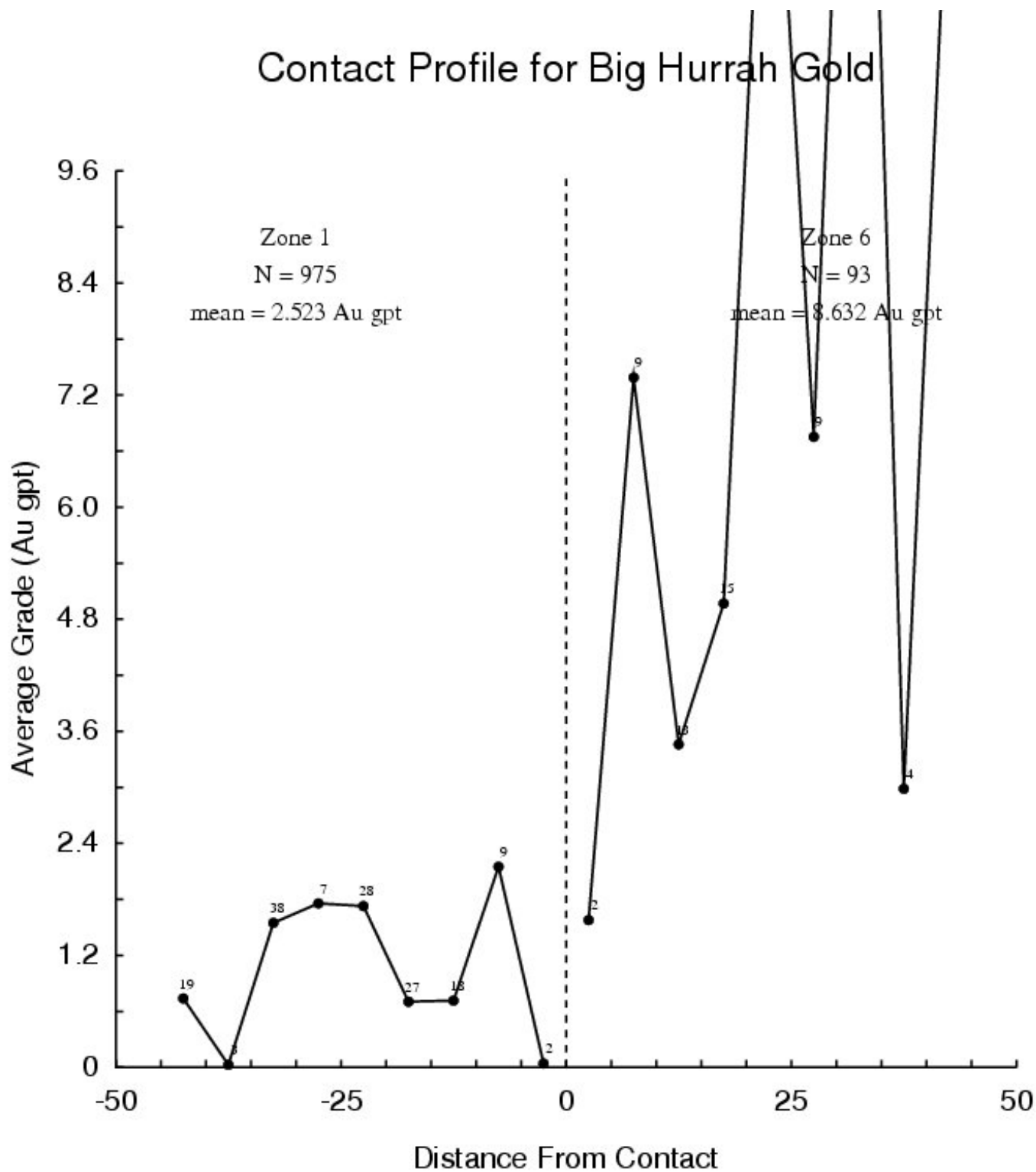
FIGURE 19-7

DRAWN BY: GC  
DATE: 13-Feb-08  
REV: 00

**NORWEST**

Scale: N.T.S.

Fig. 19-7



Rock Creek Feasibility Study

### BIG HURRAH CONTACT PROFILE

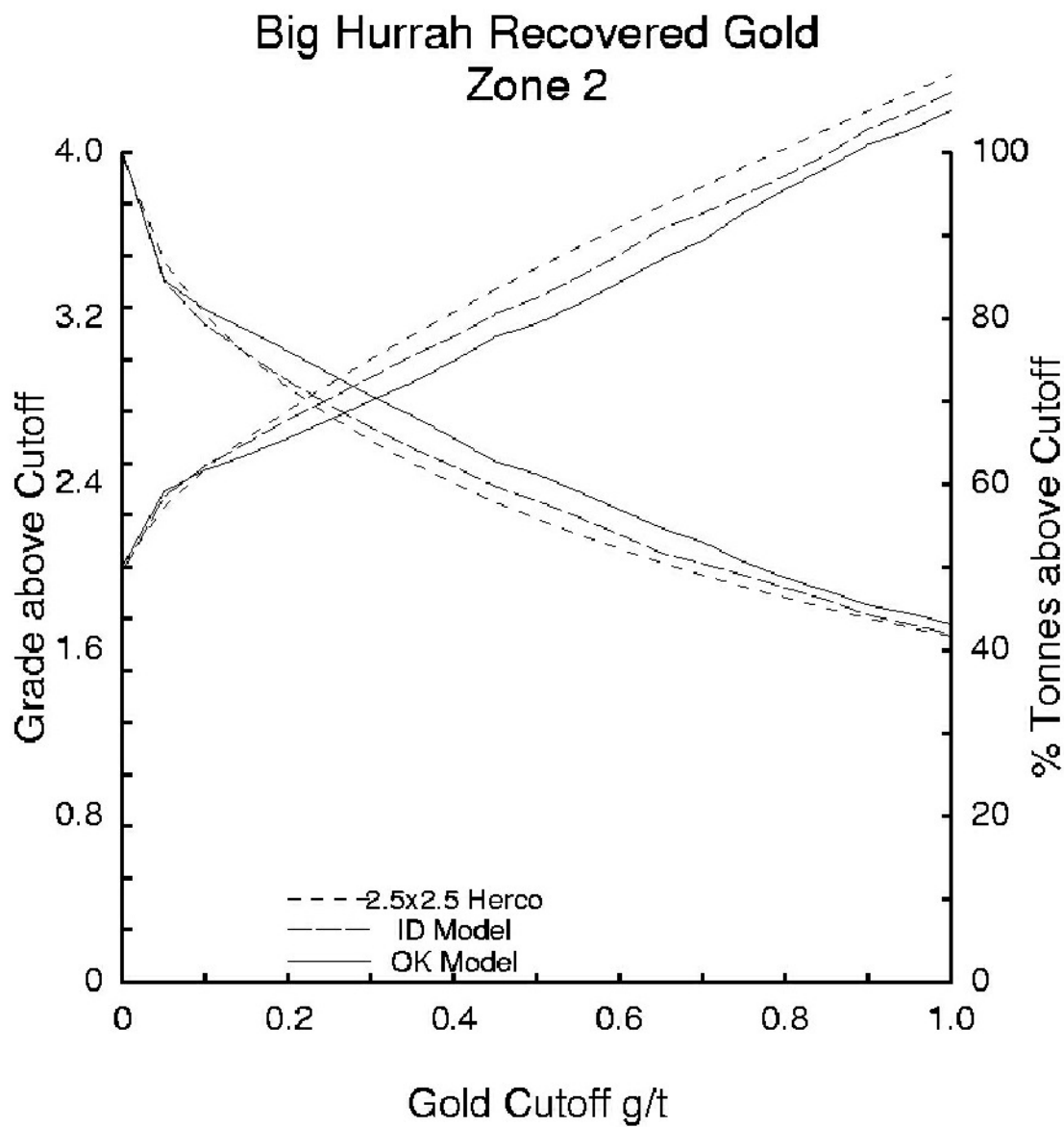
FIGURE 19-8

DRAWN BY: GC  
DATE: 13-Feb-08  
REV: 00

**NORWEST**

Scale: N.T.S.

Fig. 19-8



Rock Creek Feasibility Study  
BIG HURRAH EXAMPLE  
CHANGE OF SUPPORT COMPARISON  
FIGURE 19-9

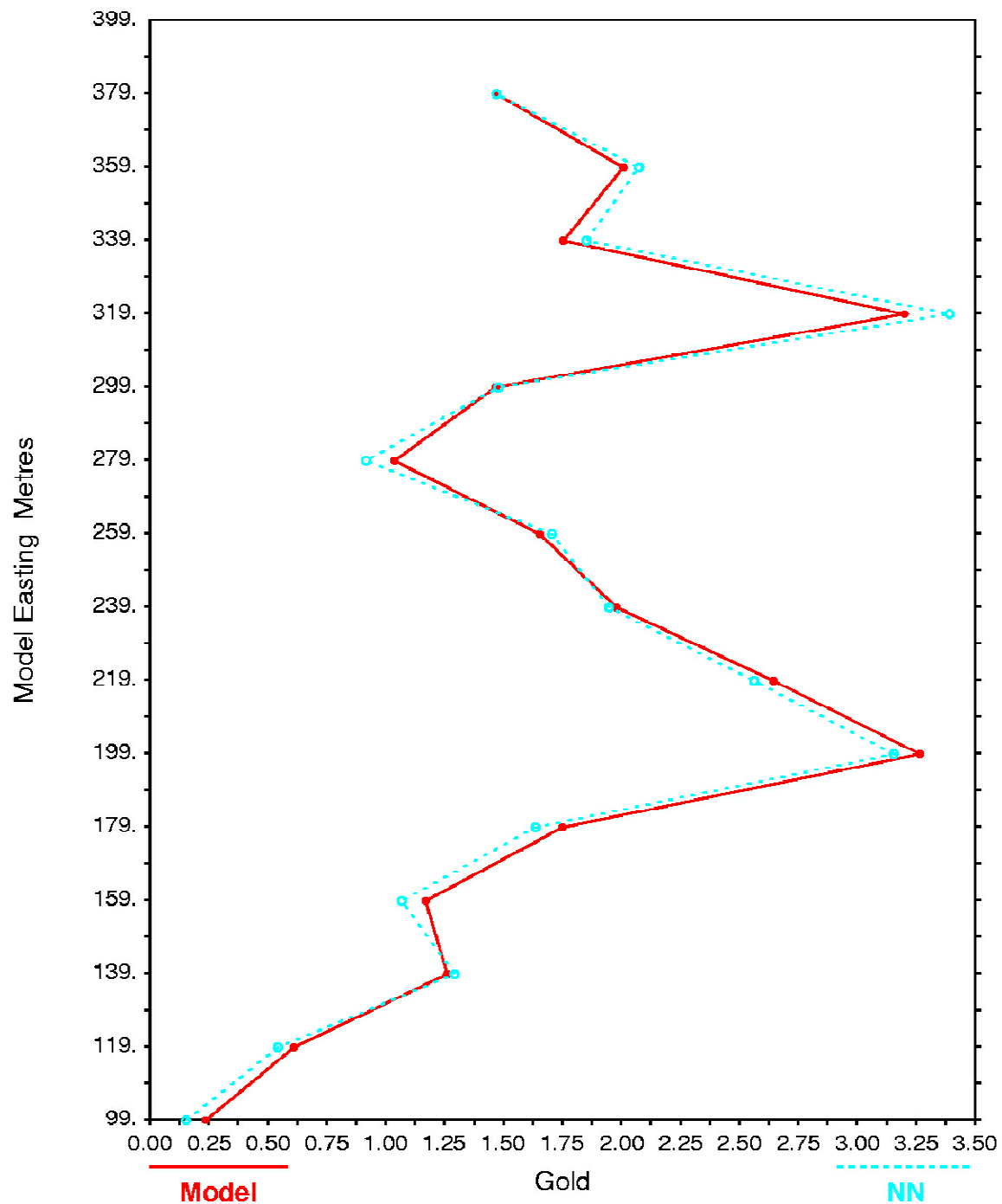
DRAWN BY: PP  
DATE: 13-Feb-08  
REV: 00

**NORWEST**

Scale: N.T.S.

Fig.  
19-9





Rock Creek Feasibility Study

## BIG HURRAH EXAMPLE SWATH PLOT

FIGURE 19-10

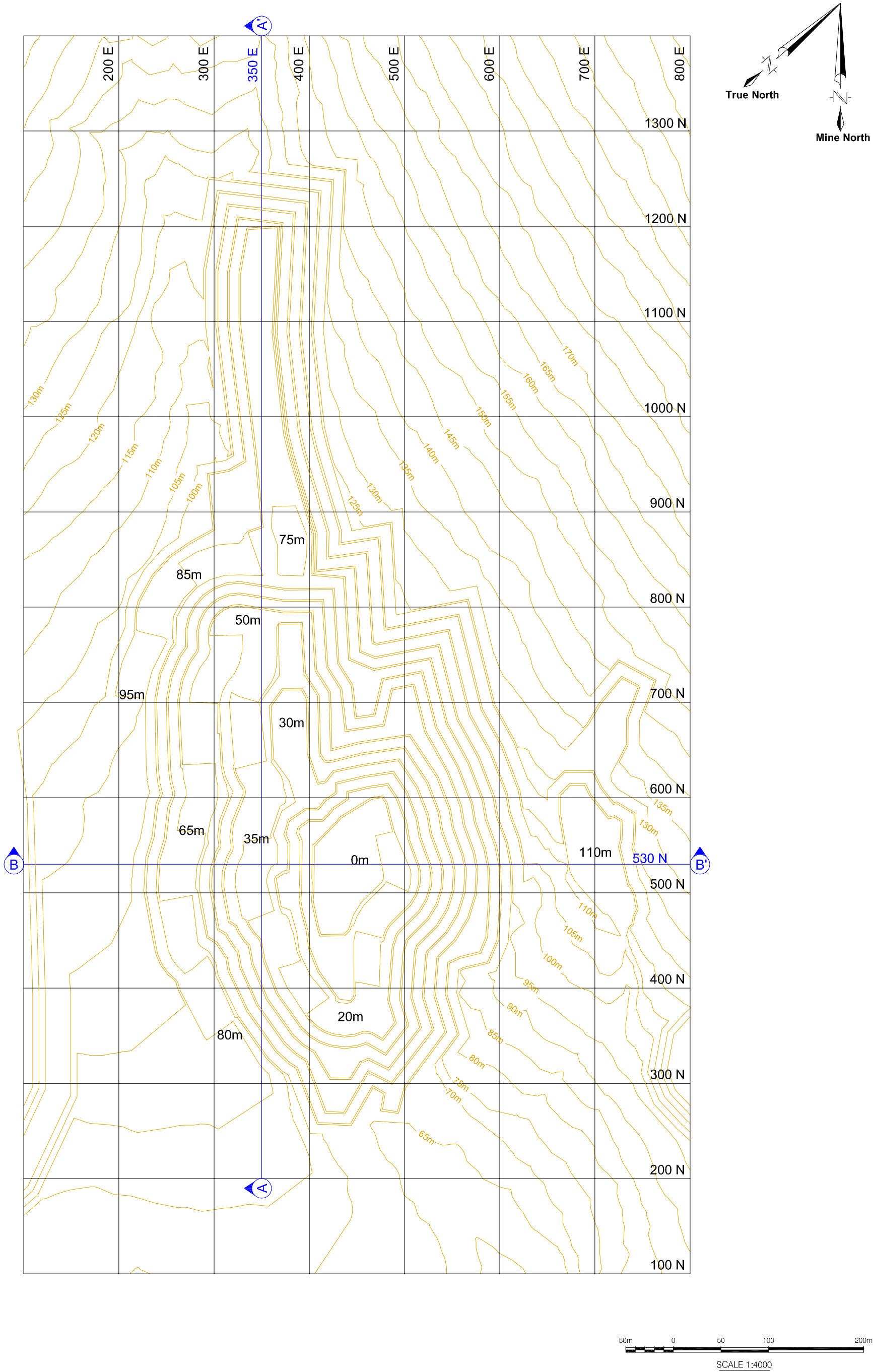
DRAWN BY: PP  
DATE: 13-Feb-08  
REV: 00


**NORWEST**

Scale: N.T.S.

Fig.  
19-10

FILE: I: \NovaGold\07-3129 Rock Creek-Big Hurrah Feasibility Upadte\Rock Creek Engineering\Drafting\Rock Creek Design Pit Sections\Rock Creek Section Overview for print PETE.dwg





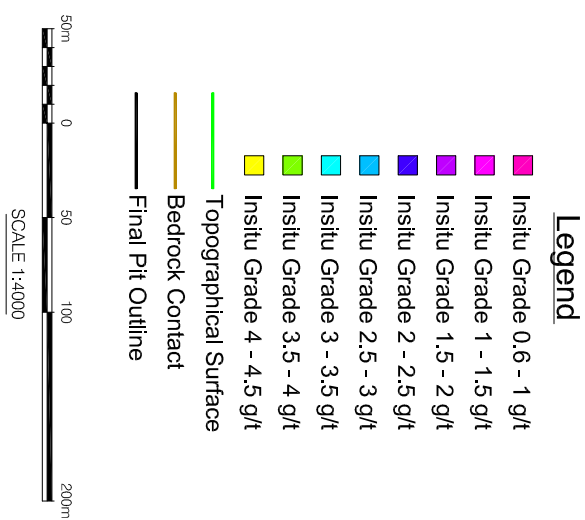
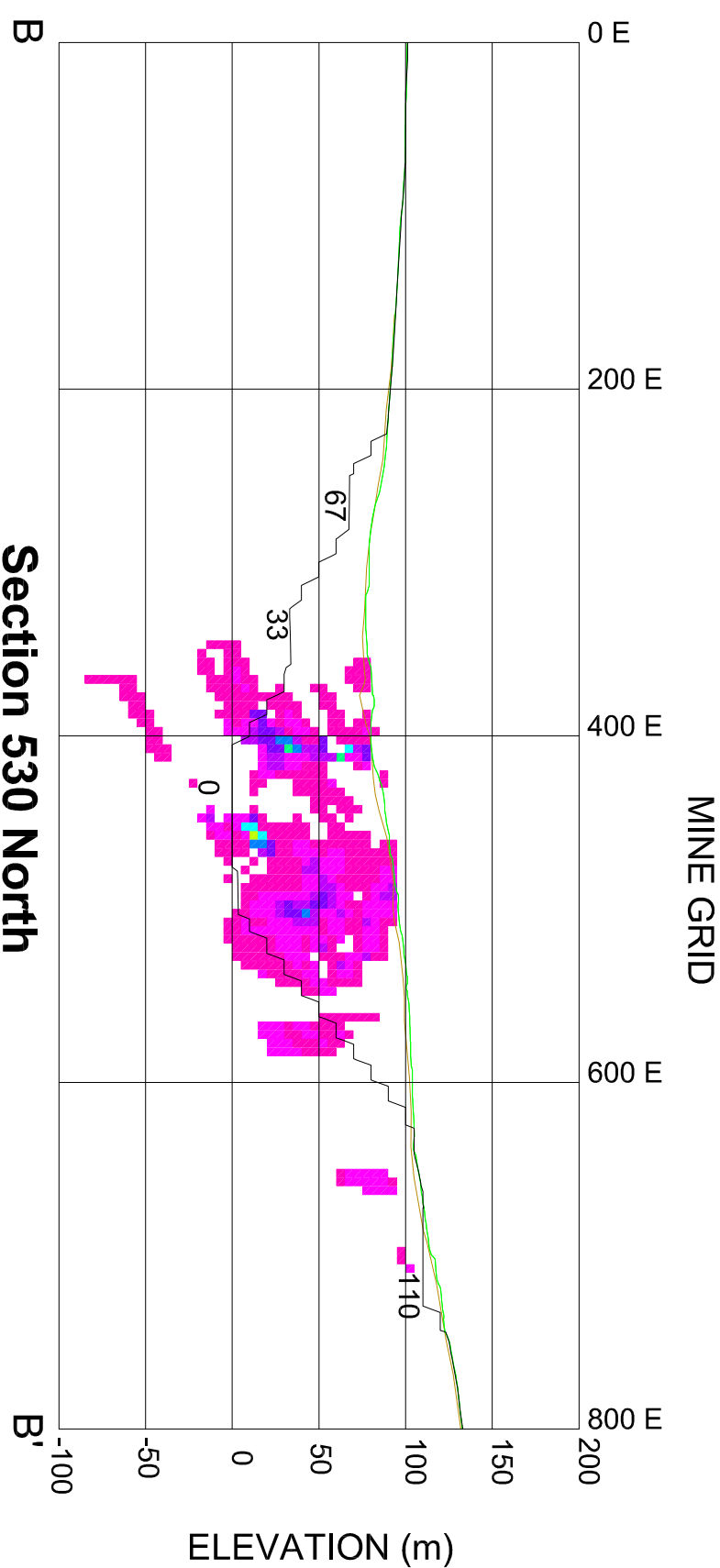
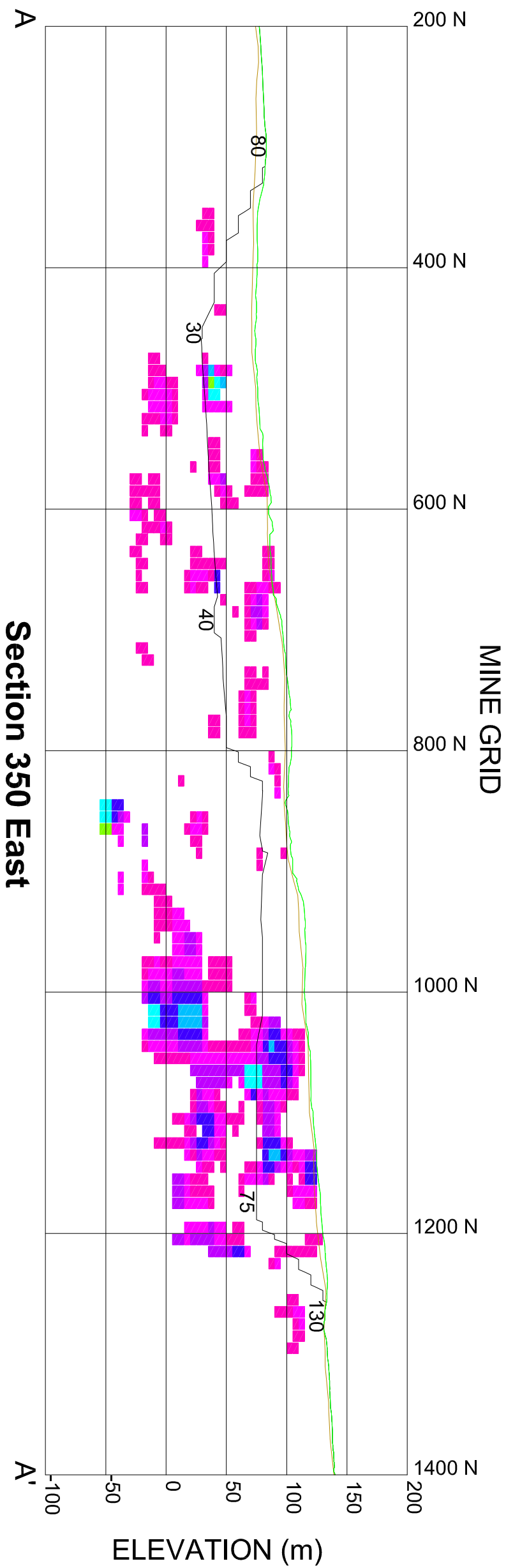
NovaGold  
RESOURCES INC.

Rock Creek Feasibility Study

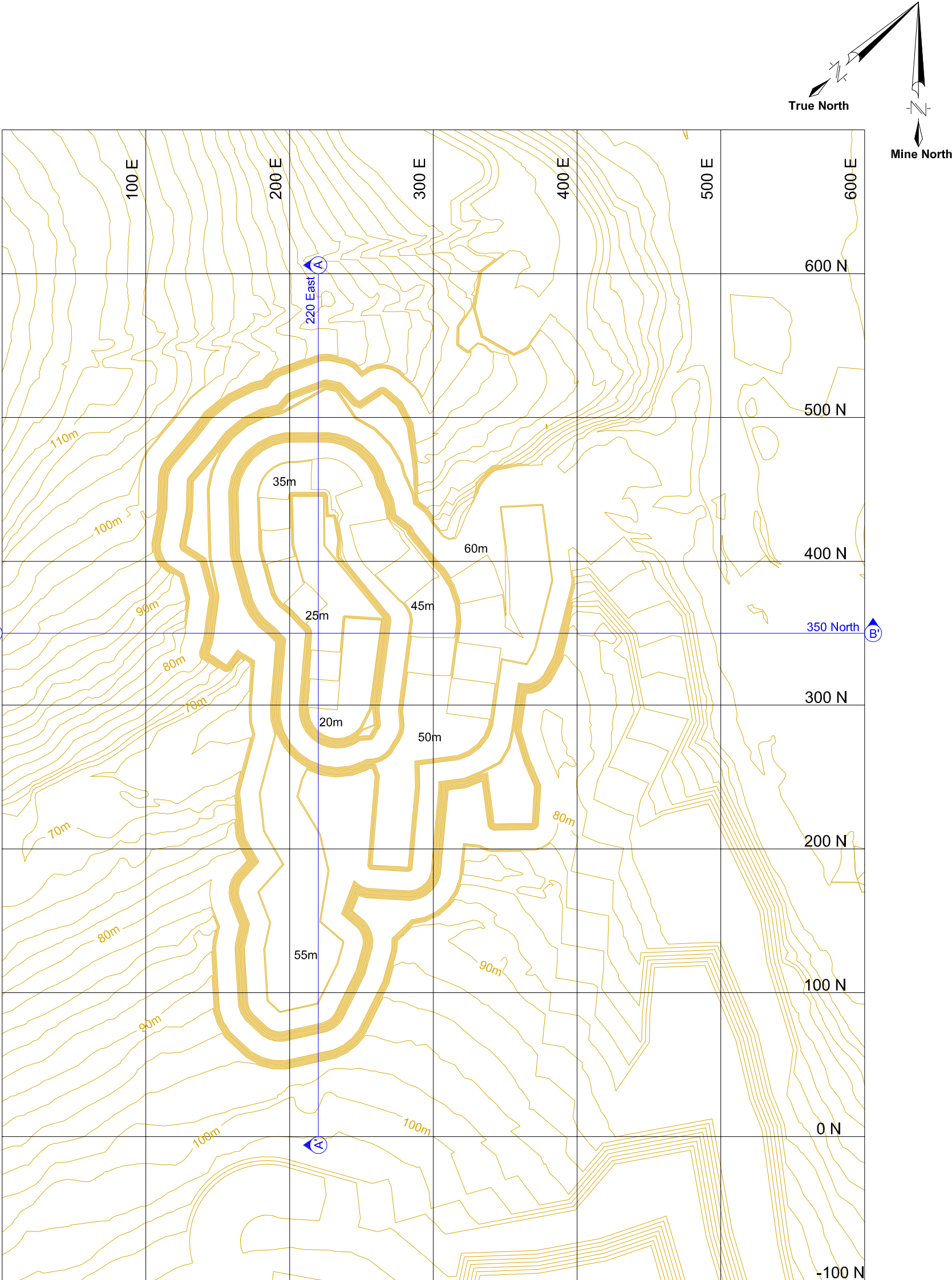
ROCK CREEK PIT PLAN WITH CROSS SECTIONS

FIGURE 25-1


DRAWN BY: GC DATE: 13-Feb-08 REV: 00	<b>NORWEST</b>	Scale: As Shown Coordinates in Mine Grid	Fig. 25-1
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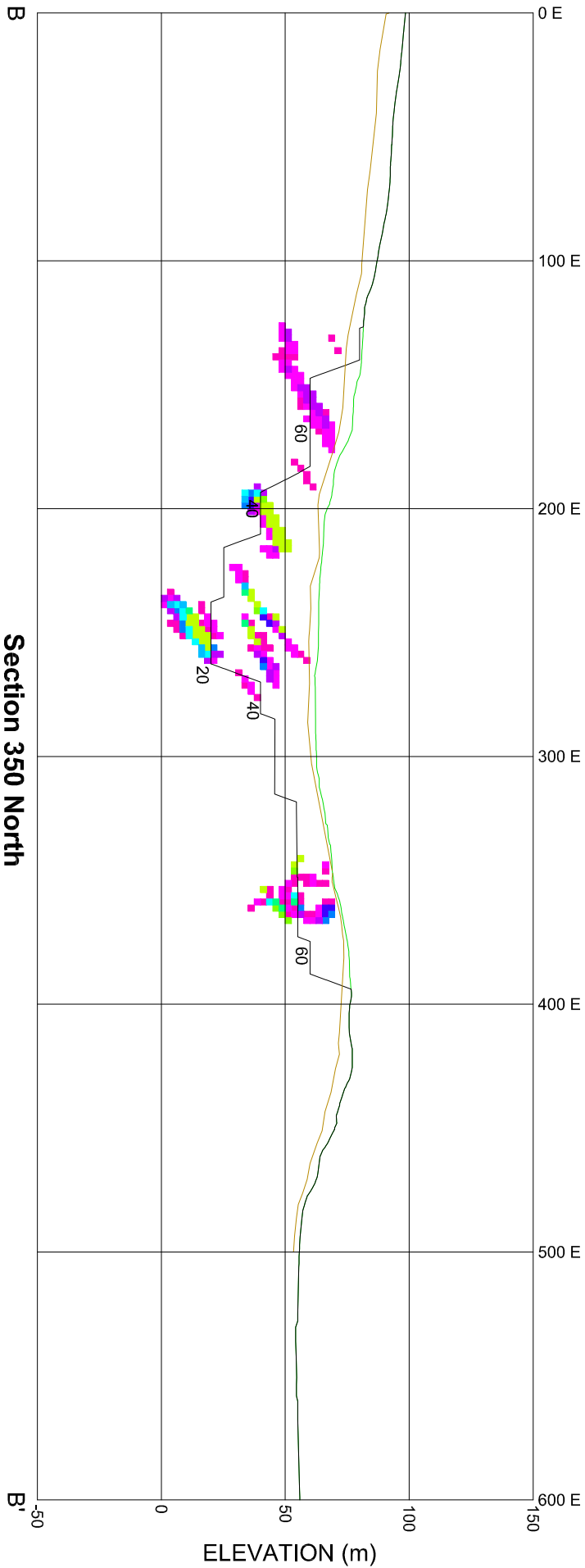
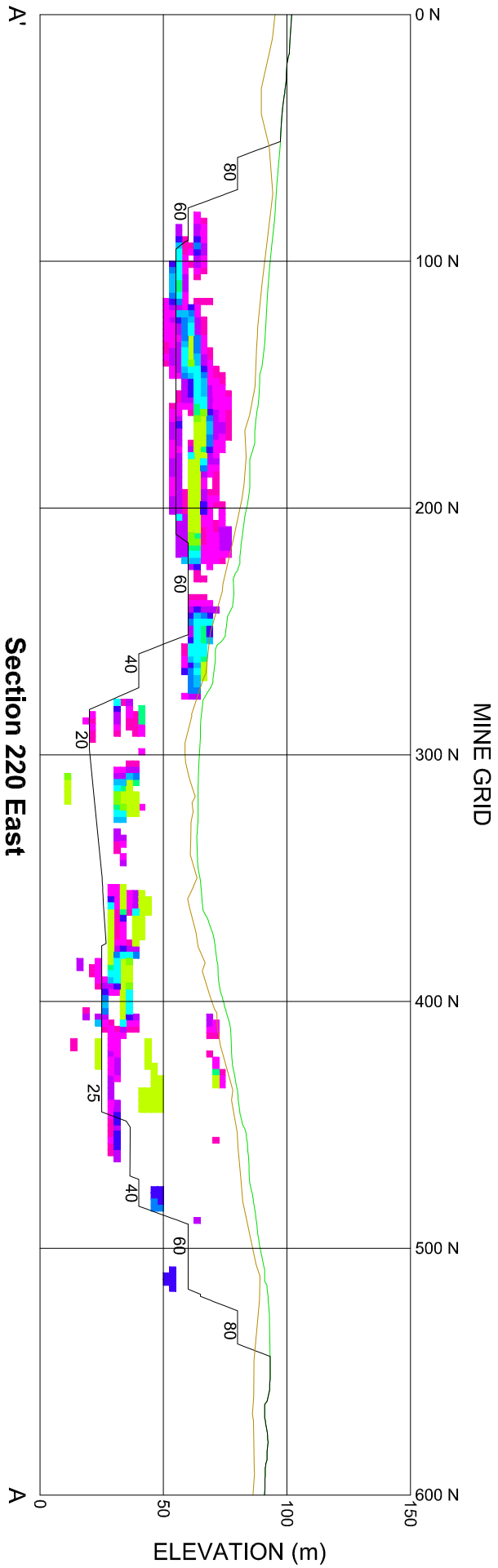


FILE: I:\NovaGold\07-3129 Rock Creek-Big Hurrah Feasibility Update\Big Hurrah Engineering\Drafting\Sections for Final Pit Design\BH Final Section Overview for print PETE.dwg



SCALE 1:3000

 Rock Creek Feasibility Study		
BIG HURRAH PIT PLAN WITH CROSS SECTIONS		
FIGURE 25-3		
<small>DRAWN BY: GC DATE: 13-Feb-08 REV: 00</small>	<b>NORWEST</b>	<small>Scale: As Shown Coordinates in Mine Grid</small>
		<small>Fig. 25-3</small>



Legend

- Insitu Grade 1.33 - 1.5 g/t
- Insitu Grade 1.5 - 2 g/t
- Insitu Grade 2 - 2.5 g/t
- Insitu Grade 2.5 - 3 g/t
- Insitu Grade 3 - 3.5 g/t
- Insitu Grade 3.5 - 4 g/t
- Insitu Grade 4 - 4.5 g/t
- Insitu Grade 4.5 - 5 g/t
- Insitu Grade 5 - 5.5 g/t
- Insitu Grade 5.5 - 6 g/t
- Insitu Grade 6 - 6.5 g/t
- Insitu Grade 6.5 - 7 g/t
- Insitu Grade 7 - 7.5 g/t
- Old Underground Workings
- Topographical Surface
- Bedrock Contact
- Final Pit Outline



Rock Creek Feasibility Study  
BIG HURRAH PIT 220 EAST  
AND 350 NORTH SECTIONS

FIGURE 25-4

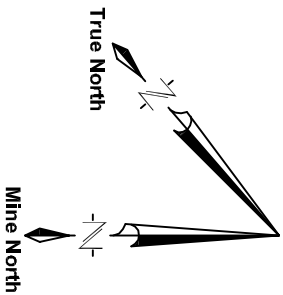
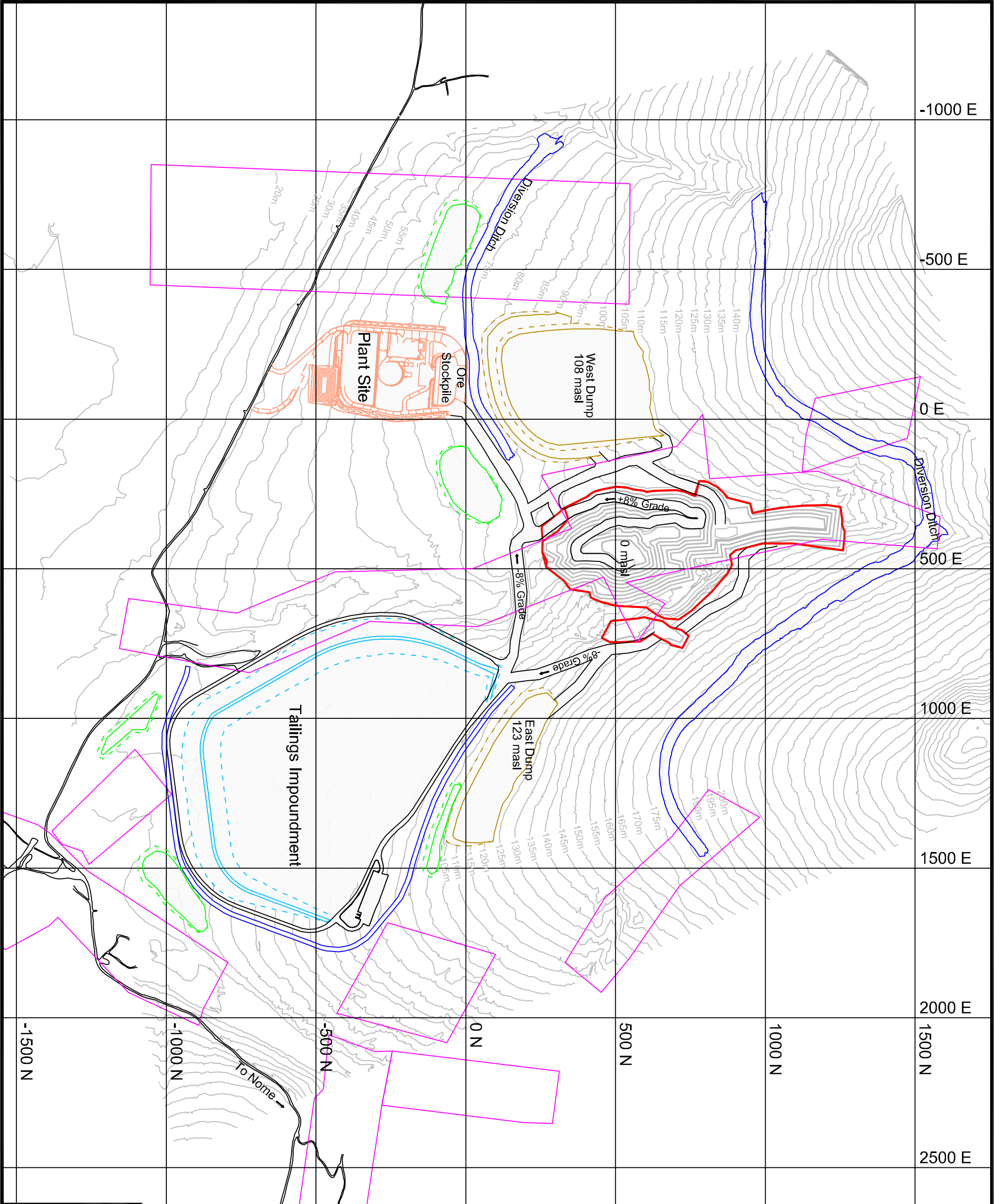
DRAWN BY: CC  
DATE: 14-Feb-08  
REV: 00

**NORWEST**

Scale: As Shown  
Coordinates in Mine Grid

Fig. 25-4



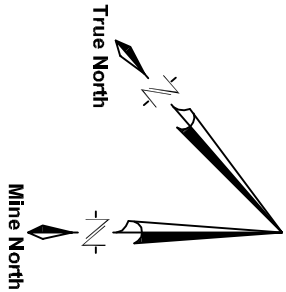
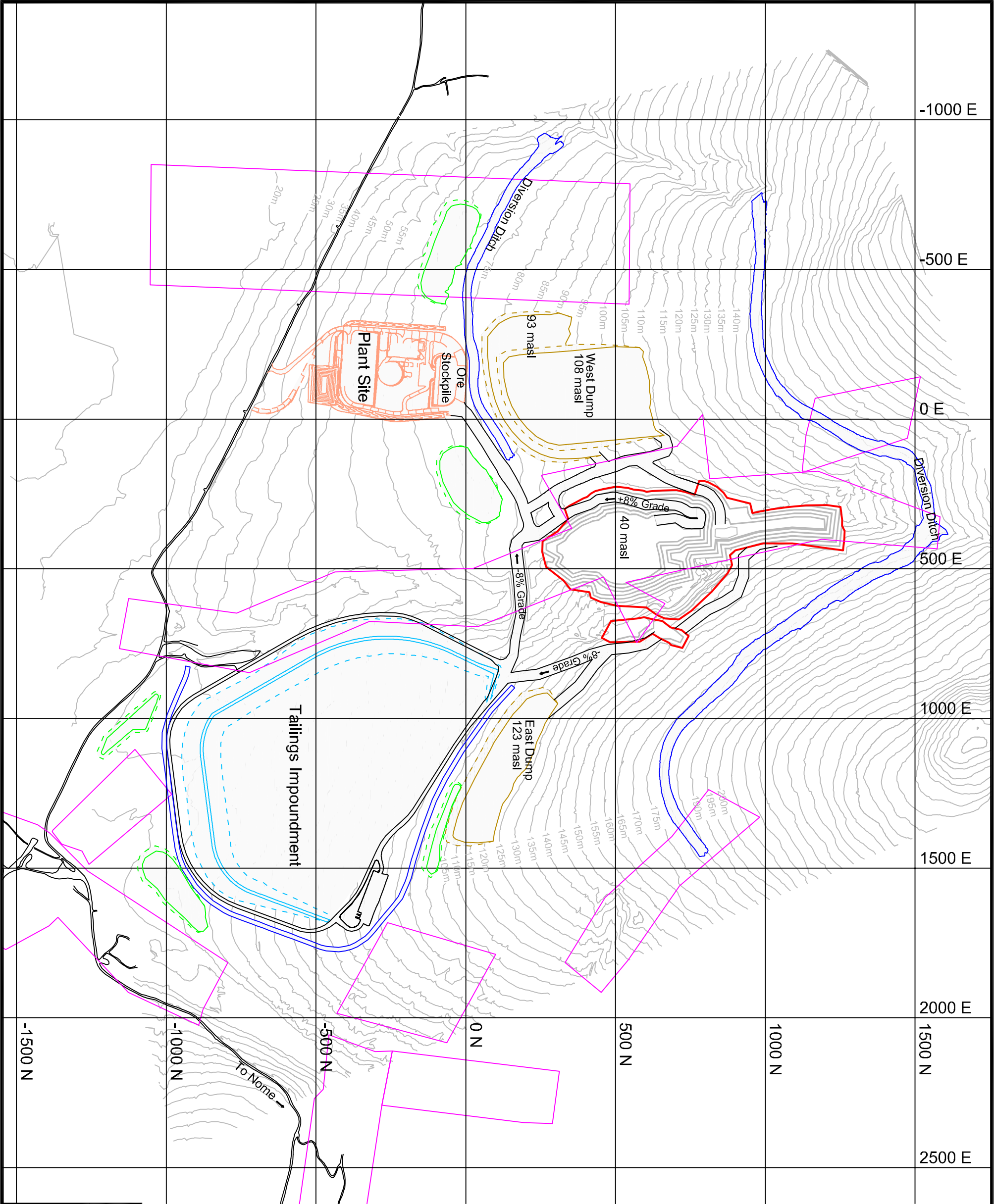


NOTE: Tailings Dam shown in its final configuration.

- Legend**
- Claim Boundary
  - Waste Dumps
  - Tailings Dam
  - Pit Boundary
  - 5m Contours (2004 Survey)
  - Transportation Roads
  - Diversion Ditches
  - Soil Stockpile



Rock Creek Feasibility Study			
ROCK CREEK PIT: END OF 2011			
FIGURE 25-5		Scale: As Shown	Fig. 25.5
DRAWN BY: PP CHECKED: PP-08 REV: 00	<b>NORWEST</b>		Coordinates in Mine Grid



NOTE: Tailings Dam shown in its final configuration.

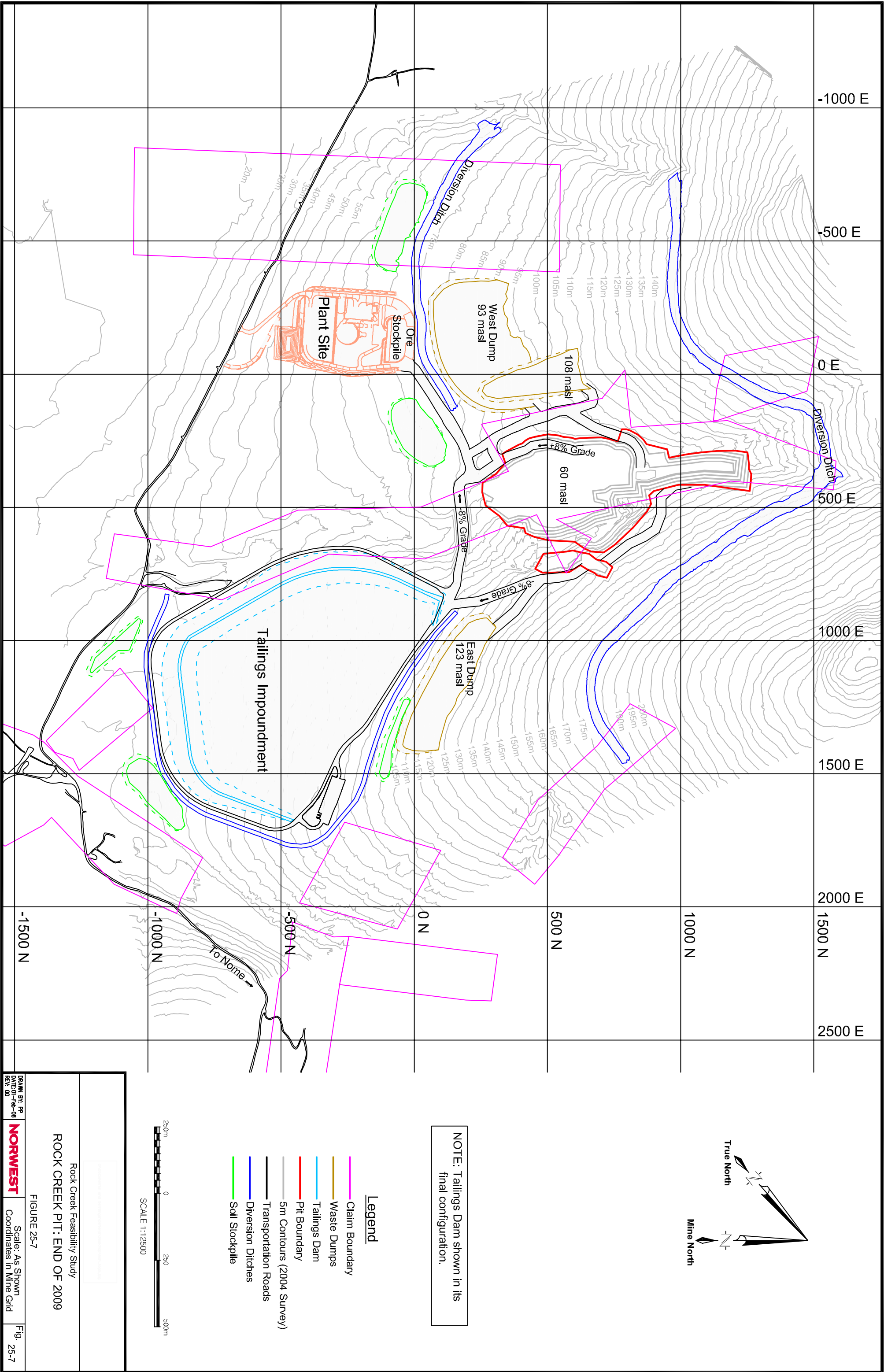
Legend

- Claim Boundary
- Waste Dumps
- Tailings Dam
- Pit Boundary
- 5m Contours (2004 Survey)
- Transportation Roads
- Diversion Ditches
- Soil Stockpile

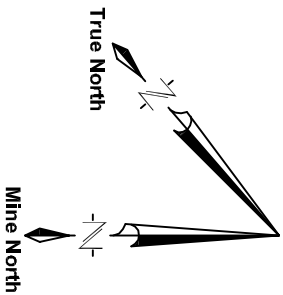
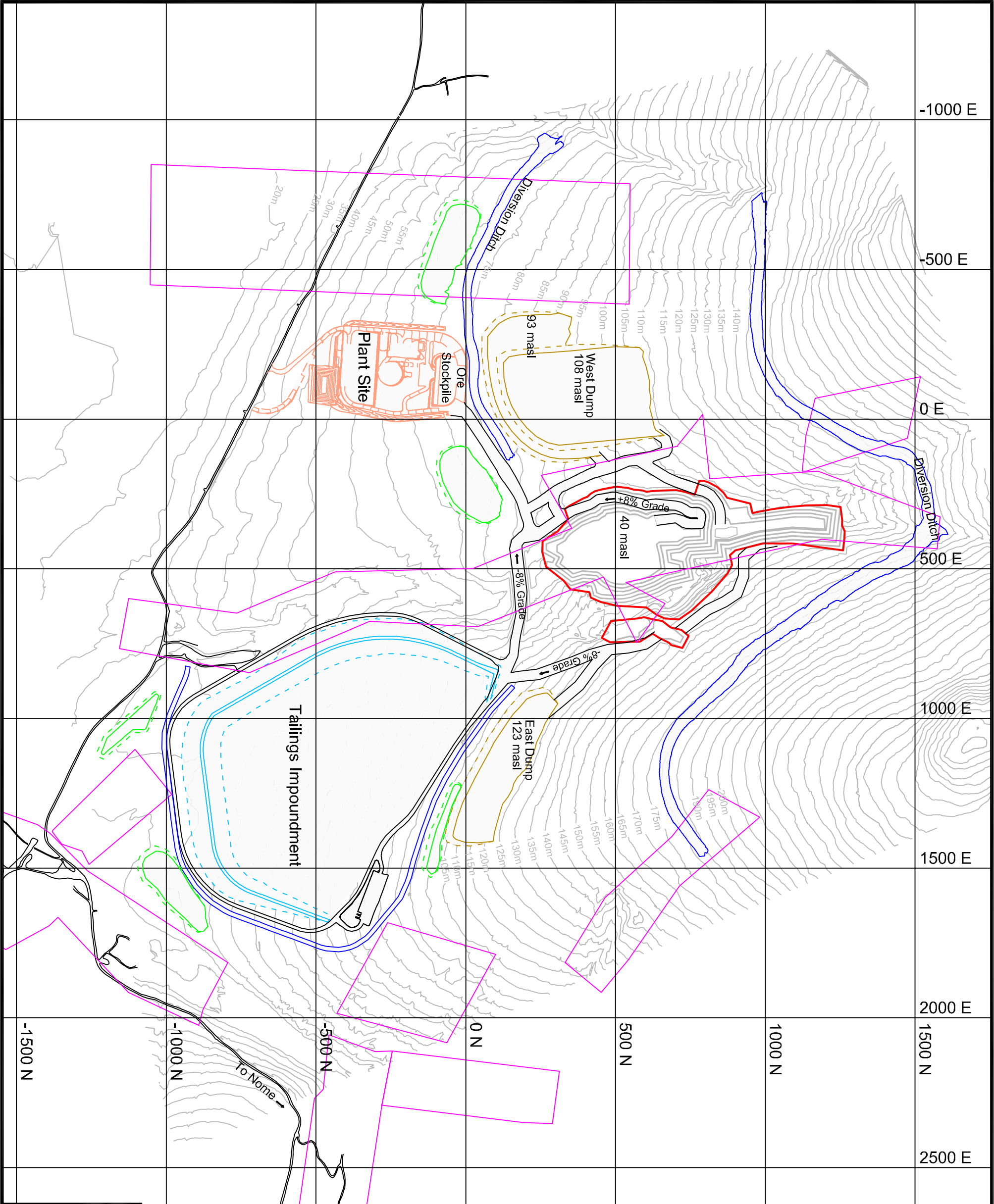


Rock Creek Feasibility Study		
ROCK CREEK PIT: END OF 2010		
FIGURE 25-8		
Drawn By: PP Checked: PP Rev: 00	NORWEST	Scale: As Shown Coordinates in Mine Grid
		Fig. 25-8









NOTE: Tailings Dam shown in its final configuration.

- Legend**
- Claim Boundary
  - Waste Dumps
  - Tailings Dam
  - Pit Boundary
  - 5m Contours (2004 Survey)
  - Transportation Roads
  - Diversion Ditches
  - Soil Stockpile

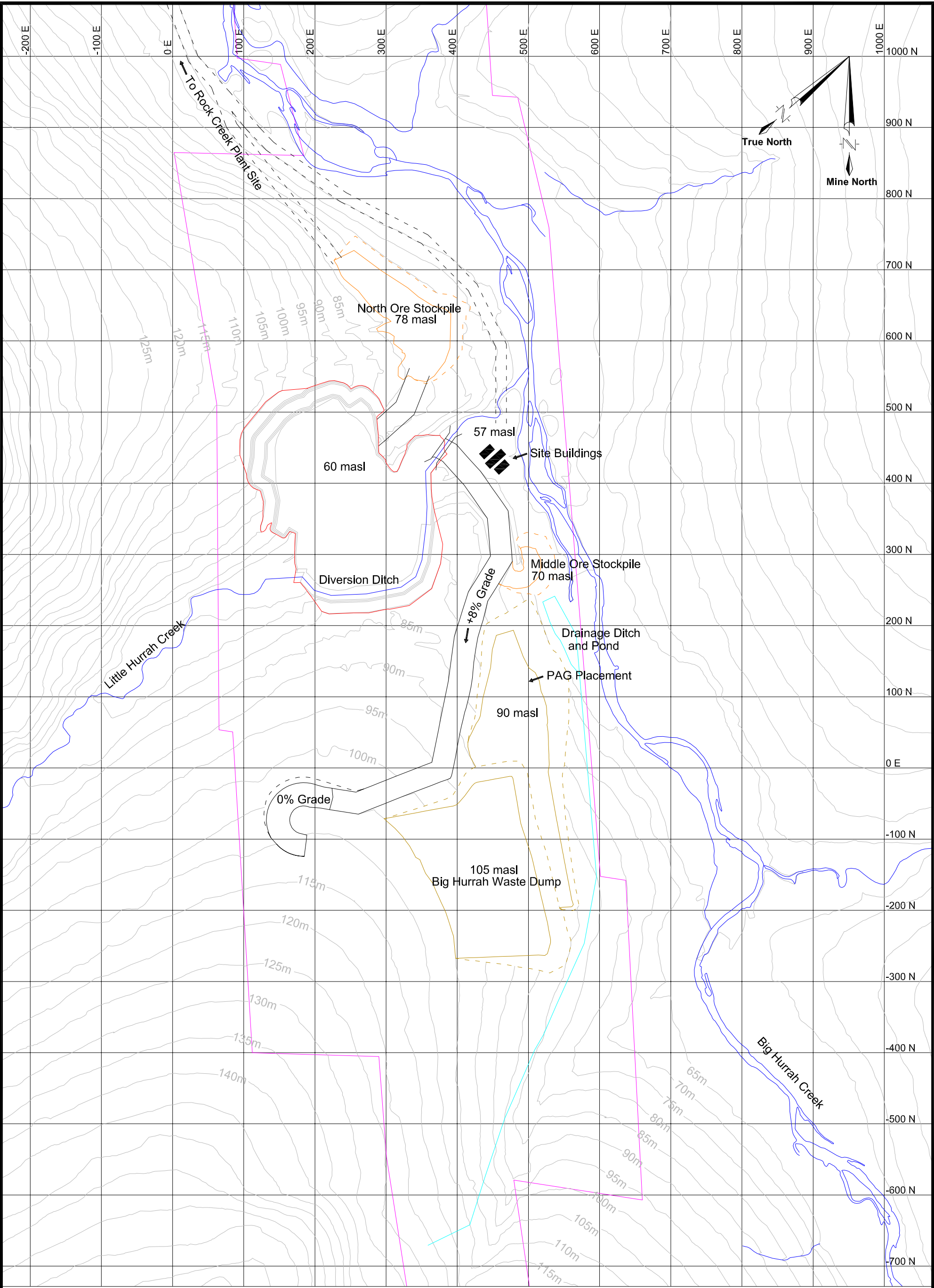


Rock Creek Feasibility Study			
ROCK CREEK PIT: END OF 2010			
FIGURE 25-8			
Drawn By: PP Checked: PP Rev: 00	<b>NORWEST</b>	Scale: As Shown Coordinates in Mine Grid	Fig. 25-8





FILE: I:\NovaGold\07-3129 Rock Creek-Big Hurrah Feasibility Upadte\Big Hurrah Engineering\Drafting\Phase 1\Pl.dwg



Legend

- |                                       |                           |
|---------------------------------------|---------------------------|
| Property Boundary                     | Streams and Rivers        |
| Waste Dumps                           | Ore Stockpile             |
| Pit Boundary                          | 5m Contours (2004 Survey) |
| Surface Water Drainage and Collection | Transportation Roads      |

100m 0 100 200m

SCALE 1:5000



Rock Creek Feasibility Study

BIG HURRAH PIT: END OF 2008

FIGURE 25-10

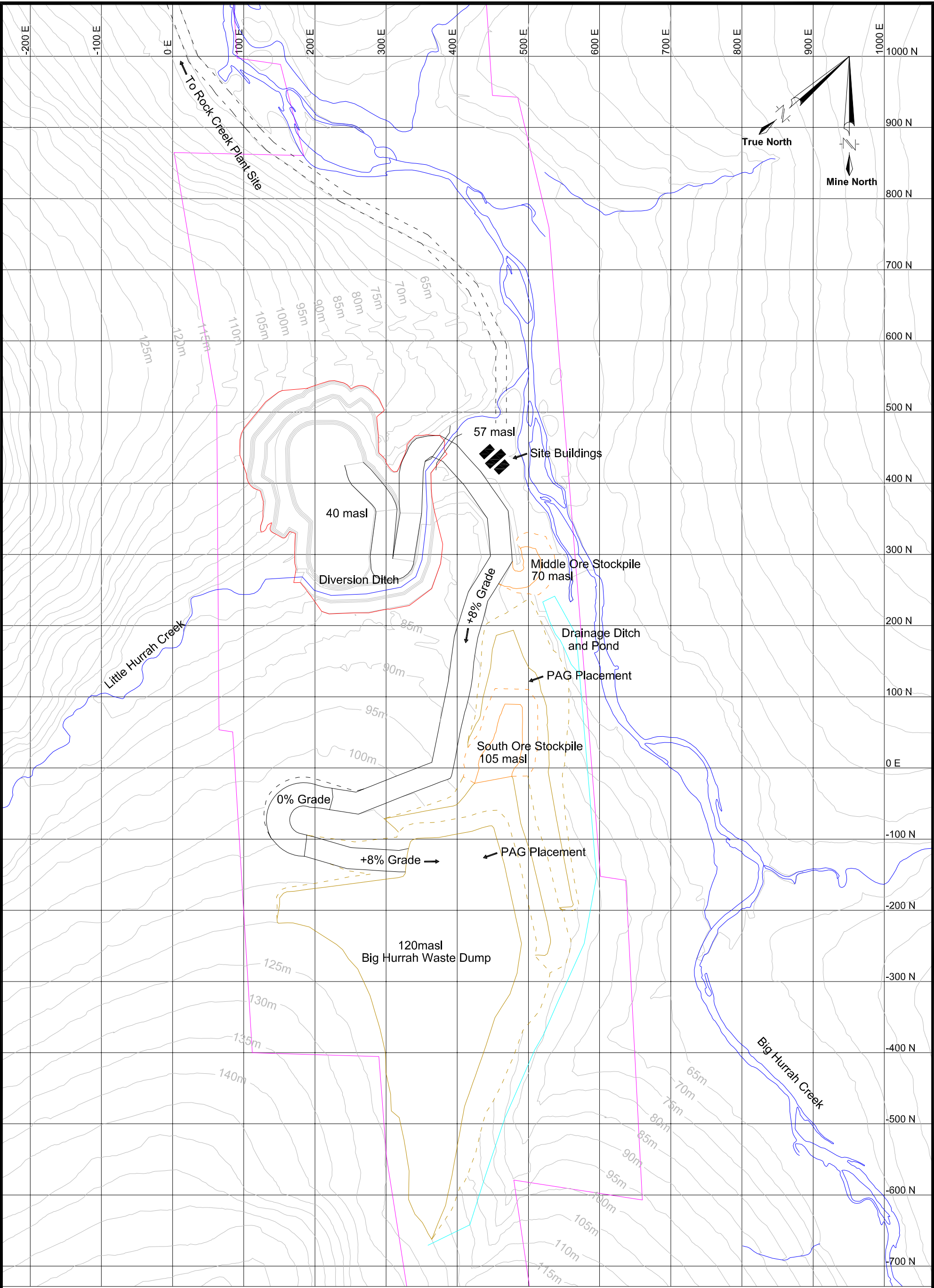
DRAWN BY: PP  
DATE: 24-Jan-08  
REV: 00

NORWEST

Scale: As Shown  
Coordinates in Mine Grid

Fig.  
25-10

FILE: I:\NovaGold\07-3129 Rock Creek-Big Hurrah Feasibility Upadte\Big Hurrah Engineering\Drafting\Phase 2\P2.dwg



Legend

- |                                       |                           |
|---------------------------------------|---------------------------|
| Property Boundary                     | Streams and Rivers        |
| Waste Dumps                           | Ore Stockpile             |
| Pit Boundary                          | 5m Contours (2004 Survey) |
| Surface Water Drainage and Collection | Transportation Roads      |



Rock Creek Feasibility Study

BIG HURRAH PIT: END OF 2009  
FIGURE 25-11

DRAWN BY: PP  
DATE: 24-Jan-08  
REV: 00

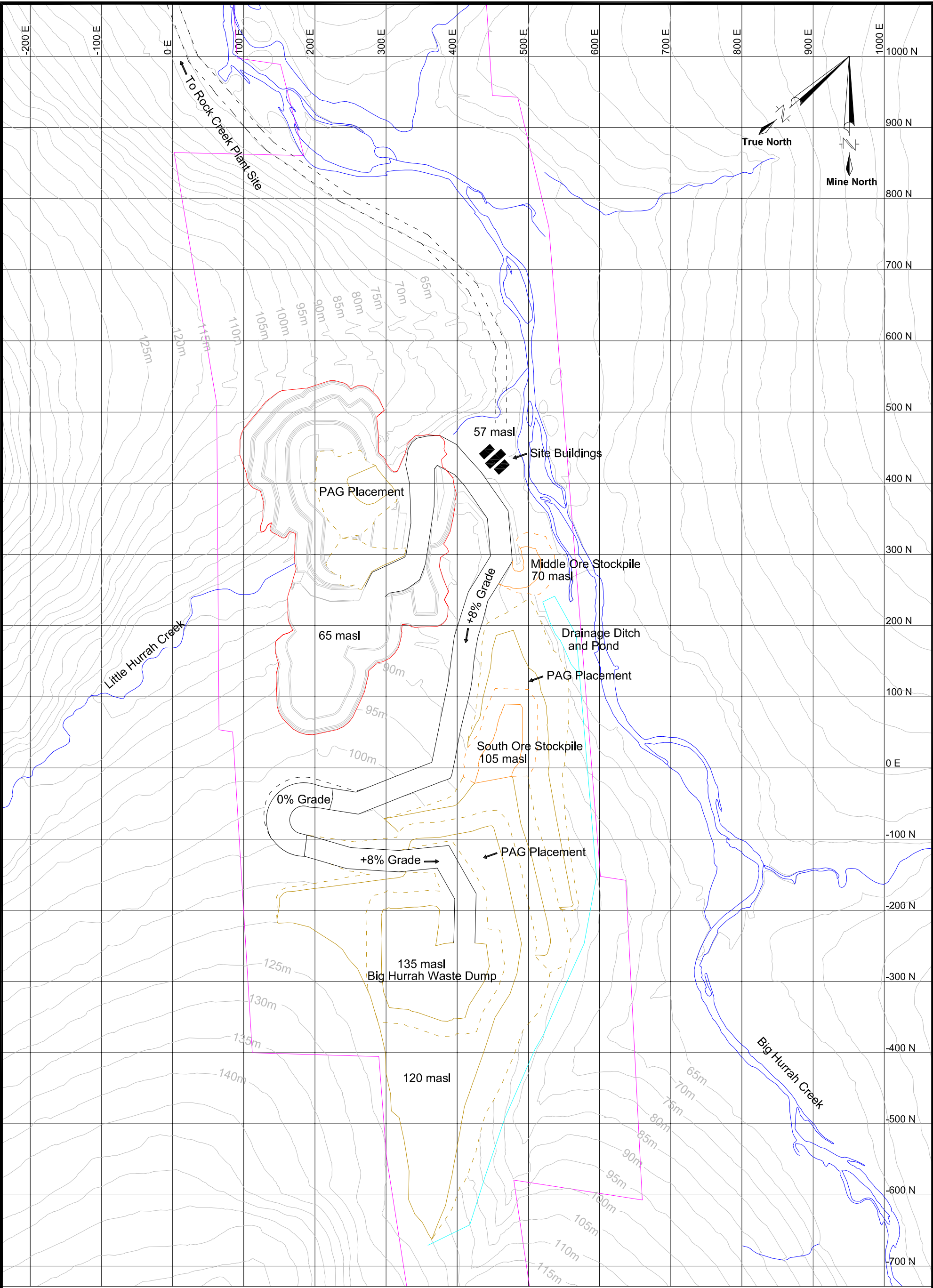
**NORWEST**

Scale: As Shown  
Coordinates in Mine Grid

Fig. 25-11



FILE: I:\NovaGold\07-3129 Rock Creek-Big Hurrah Feasibility Upadte\Big Hurrah Engineering\Drafting\Phase 3\P3.dwg



Legend

- |                                       |                           |
|---------------------------------------|---------------------------|
| Property Boundary                     | Streams and Rivers        |
| Waste Dumps                           | Ore Stockpile             |
| Pit Boundary                          | 5m Contours (2004 Survey) |
| Surface Water Drainage and Collection | Transportation Roads      |
| Final PAG Placement                   |                           |

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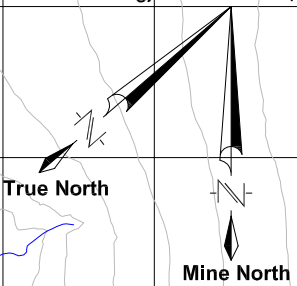
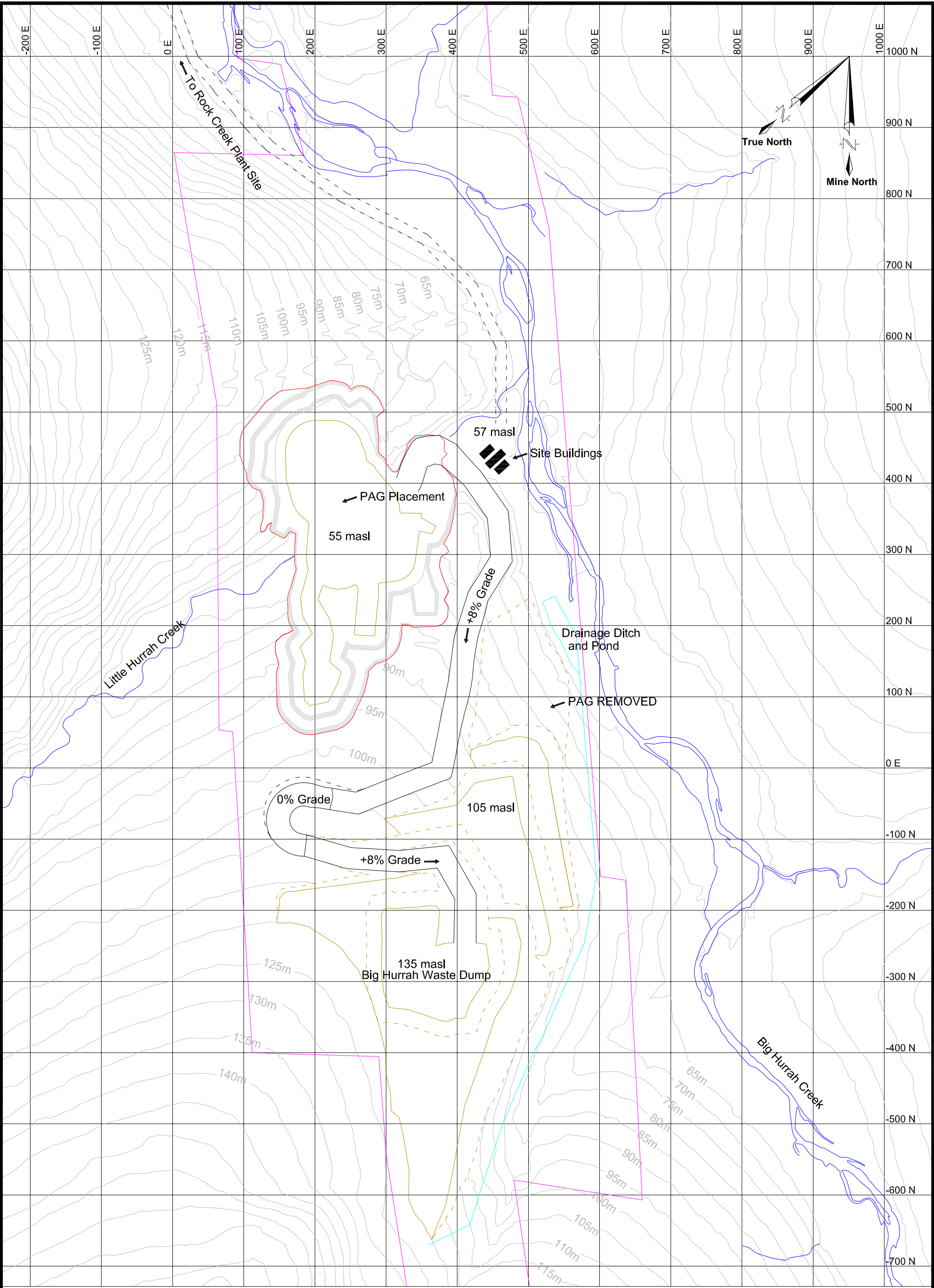
Rock Creek Feasibility Study

**BIG HURRAH PIT: END OF 2010**

FIGURE 25-12

DRAWN BY: PP DATE: 24-Jan-08 REV: 00	<b>NORWEST</b>	Scale: As Shown Coordinates in Mine Grid	Fig. 25-12
--	----------------	---	---------------

FILE: I:\NovaGold\07-3129 Rock Creek-Big Hurrah Feasibility Upadte\Big Hurrah Engineering\Drafting\Phasing\End of Mine Life\End of Mine Life.dwg



**Legend**

- |                                       |                           |
|---------------------------------------|---------------------------|
| Property Boundary                     | Streams and Rivers        |
| Waste Dumps                           | Final PAG Placement       |
| Pit Boundary                          | 5m Contours (2004 Survey) |
| Surface Water Drainage and Collection | Transportation Roads      |

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Rock Creek Feasibility Study

**BIG HURRAH PIT: END OF MINING (2011)**

FIGURE 25-13

DRAWN BY: PP  
DATE: 24-Jan-08  
REV: 00

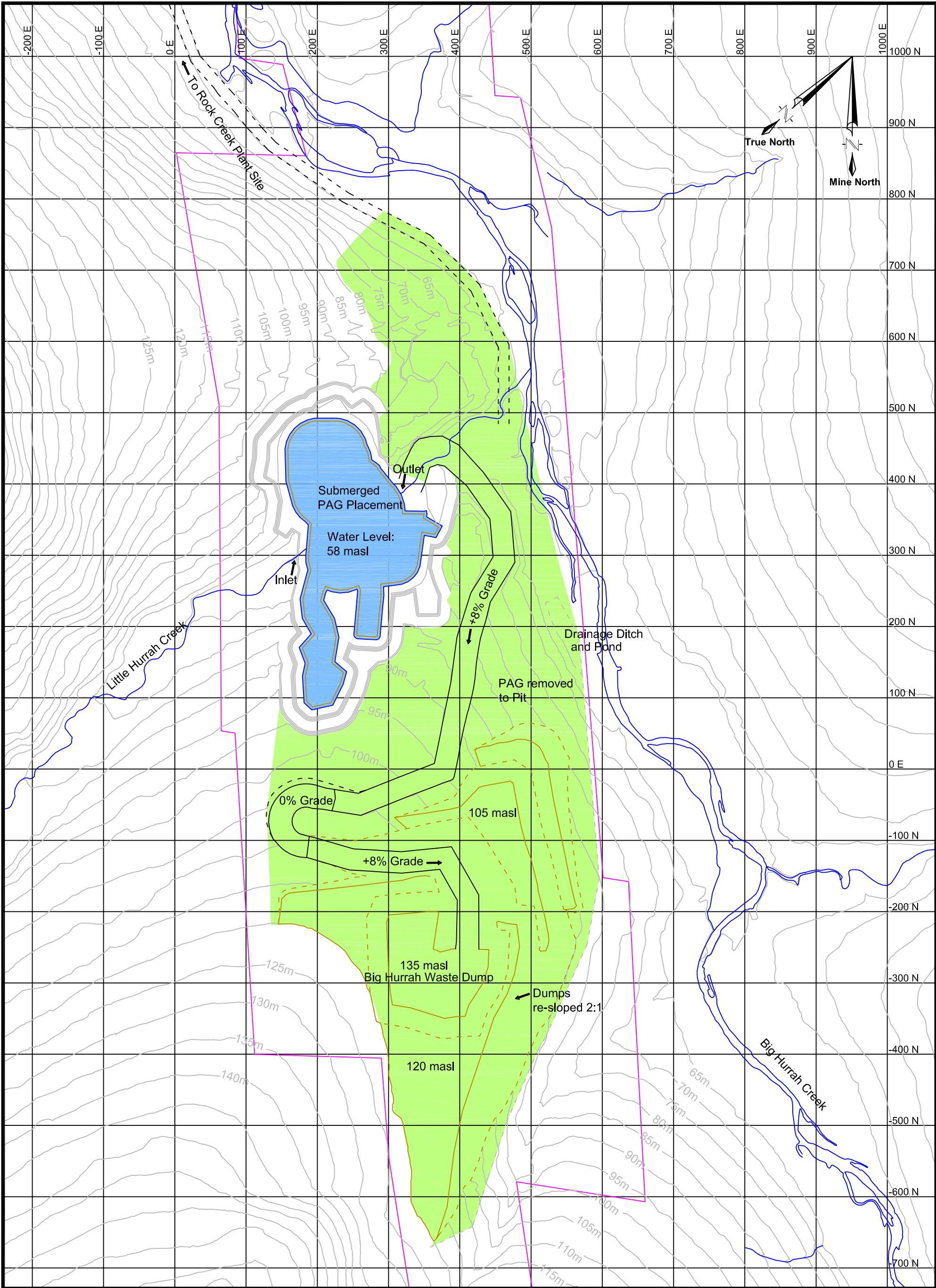
**NORWEST**

Scale: As Shown  
Coordinates in Mine Grid

Fig.  
25-13



FILE: I:\NovaGold\07-3129 Rock Creek-Big Hurrah Feasibility Update\Big Hurrah Engineering\Drafting\Reclamation\Reclamation.dwg



Legend

- |                                       |                           |
|---------------------------------------|---------------------------|
| Property Boundary                     | Streams and Rivers        |
| Reclaimed Waste Dumps                 | Final PAG Placement       |
| Surface Water Drainage and Collection | 5m Contours (2004 Survey) |
| Reclaimed Area                        | Transportation Roads      |



Rock Creek Feasibility Study

BIG HURRAH PIT: RECLAMATION PLAN

FIGURE 25-14

DRAWN BY: PP  
DATE: 24-Jan-08  
REV: 00

**NORWEST**

Scale: As Shown  
Coordinates in Mine Grid

Fig. 25-14