NI 43-101 Technical Report and Preliminary Assessment on the Young-Davidson Property, Matachewan, Canada

Prepared by:
Pierre Rocque, P. Eng.
Willie Hamilton, P. Eng.
Armando Simon, CPG
Rick Welyhorsky, P. Eng.
Sheila Daniel, P. Geo.

Effective Date: 1 April 2008
Project No.: 158985

IMPORTANT NOTICE

CERTIFICATE OF QUALIFIED PERSON

Sheila Ellen Daniel, P.Geo.
AMEC Americas Limited
160 Traders Blvd East, Suite 110
Mississauga Ontario Canada, L4Z 3K7
Tel: (905) 568-2929 Fax: (905) 568-1686
sheila.daniel@amec.com

I, Sheila E. Daniel. P.Geo., am employed as Head, Environmental Management / Associate Geoscientist with AMEC Americas Limited.

This certificate applies to the technical report entitled "NI 43-101 Technical Report and Preliminary Assessment on the Young-Davidson Property, Matachewan, Canada " with an effective date of 1 April 2008.

I am a member of Professional Geoscientist in the Province of Ontario (Reg. # 0151). I graduated from McMaster University in 1990 with a M.Sc. and University of Western Ontario with a B.Sc. (Honours).

I have practiced my profession for eighteen years. I have been directly involved in environmental consulting related to mining covering all phases of mineral development. A significant portion of this has related to environmental support for the engineering and construction of mining projects including baseline studies, environmental approvals and reclamation costing.

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 for this report.

I visited the Young Davidson Property March 31, 2007, October 2, 2007 and May 13, 2008. I am responsible for the preparation of Sections 18.6, 20.8 and 21.4 of the technical report entitled "NI 43-101 Technical Report and Preliminary Assessment on the Young-Davidson Property, Matachewan, Canada " dated 1 April, 2008.

I am independent of Northgate Minerals Corporation as independence is described by Section 1.4 of NI 43–101.

I have read NI 43–101 and this report has been prepared in compliance with that Instrument.

As of the date of this certificate, to the best of my knowledge, information and belief, the technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

"Signed and Sealed"

Sheila E. Daniel. P.Geo.
Head Environmental Management
Associate Geoscientist
Dated 8 August 2008

CERTIFICATE OF QUALIFIED PERSON

Rickardo Welyhorsky, P. Eng.
AMEC Americas Limited
2020 Winston Park Drive, Suite 700
Oakville, ON, Canada L6H 6X7
Tel: (905) 829.5399 ext. 2360 Fax: (905) 829-3633
rick.welyhorsky@amec.com

I, Rickardo Welyhorsky, P. Eng., am employed as a Senior Process Engineer with AMEC Americas Limited.

This certificate applies to the technical report entitled "NI 43-101 Technical Report and Preliminary Assessment on the Young-Davidson Property, Matachewan, Canada " with an effective date of 1 April 2008.

I am a member of Professional Engineers of Ontario and graduated in 1993 from Laurentian University in Ontario with a Bachelor's degree in Metallurgical Engineering (B. Eng.).

I have practiced my profession for 15 years. I have been directly involved in process plant operations for the first 11 years of my professional career in gold, silver, uranium, nickel and copper.

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 for this report.

I did not visit the Young Davidson Property. I am responsible for the preparation of Sections 16, 20.7 and 21.3 of the technical report entitled "NI 43-101 Technical Report and Preliminary Assessment on the Young-Davidson Property, Matachewan, Canada " dated 1 April, 2008.

I am independent of Northgate Minerals Corporation as independence is described by Section 1.4 of NI 43–101.

I have read NI 43–101 and this report has been prepared in compliance with that Instrument.

As of the date of this certificate, to the best of my knowledge, information and belief, the technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

"Signed and Sealed"

Rickardo Welyhorsky, P. Eng.
Senior Process Engineer
Dated 8 August 2008

CERTIFICATE OF QUALIFIED PERSON

Pierre Rocque, P. Eng.
AMEC Americas Limited
2020 Winston Park Drive, Suite 700
Oakville, ON, Canada L6H 6X7
Tel: (905) 829.5399 ext. 2393 Fax: (905) 829-3633
pierre.rocque@amec.com

I, Pierre Rocque, P. Eng., am employed as a Consulting Manager for Mining and Geology with AMEC Americas Limited.

This certificate applies to the technical report entitled "NI 43-101 Technical Report and Preliminary Assessment on the Young-Davidson Property, Matachewan, Canada " with an effective date of 1 April 2008.

I am a member of Professional Engineers of Ontario and Ordre des ingénieurs du Québec. I graduated in 1986 from École polytechnique de Montréal with a Bachelor's degree in Mining Engineering (B. Ing.) and in 1992 from Queen's University at Kingston with a Master's degree in Mining Engineering (MSc. Eng.).

I have practiced my profession for twenty years. I have been directly involved in mine design of underground gold mines and, since 1997 I have overseen the mining engineering department at three narrow veins underground gold mines, providing relief to the Mine Manager and General Manager on site.

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 for this report.

I visited the Young Davidson Property between 14 February and 15 February, 2007 and from February 13 to 15, 2008. I am responsible for the preparation of Sections 1 to 6, 15, 17.2, 18.1, 18.3 to 18.5, 18.7 to 18.11, 19, 20.1, 20.4, 20.6, 20.9, 21.2 and 21.5 of the technical report entitled "NI 43-101 Technical Report and Preliminary Assessment on the Young-Davidson Property, Matachewan, Canada " dated 1 April, 2008.

I am independent of Northgate Minerals Corporation as independence is described by Section 1.4 of NI 43–101.

I have read NI 43–101 and this report has been prepared in compliance with that Instrument.

As of the date of this certificate, to the best of my knowledge, information and belief, the technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

"Signed and Sealed"

Pierre Rocque, P. Eng.
Consulting Manager Mining and Geology
Dated 8 August 2008

CERTIFICATE OF QUALIFIED PERSON

Armando Simón, Ph.D., Principal Geologist, R.P.Geo, (AIG)
2020 Winston Park Drive, Suite 700
Oakville, Ontario, Canada, L6H 6X7.
Tel. (905)-829-5399, ext. 1-2667; Fax (905)-829-3633
armando.simon@amec.com

I, Armando Simón, Ph.D., R.P.Geo (AIG), am a Principal Geologist with AMEC Americas Limited.

This certificate applies to the Technical Report entitled "NI 43-101 Technical Report and Preliminary Assessment on the Young-Davidson Property, Matachewan, Canada", with an effective date of 1 April 2008.

I graduated from the University of Bucharest with a Bachelor of Engineering degree in Geology and Geophysics in 1974, and a Doctorate of Engineering in 1985. I am a Registered Professional Geologist of the Australian Institution of Geoscientists (AIG # 10053).

Since 1974, I have continually been involved in mineral exploration projects for precious and base metals and industrial minerals in Argentina, Brazil, Canada, Colombia, Cuba, Chile, Eritrea, Ethiopia, Guyana, Jamaica, Madagascar, Mexico, Nicaragua, Peru, Portugal, Romania, Russia and Vietnam.

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 for this report.

I visited the Young-Davidson Property from 5 to 8 May 2008. I am responsible for the preparation of the whole or parts of the sections 7 to 14.0, 17.1, 20.2 to 20.5 and 21.1 of the Technical Report entitled "NI 43-101 Technical Report and Preliminary Assessment on the Young-Davidson Property, Matachewan, Canada", with an effective date of 1 April 2008.

I am independent of Northgate Minerals Corporation as independence is described by Section 1.4 of NI 43-101.

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

As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

"Signed and Sealed"

Armando Simón, Ph.D., R.P.Geo
Principal Geologist
Dated 8 August 2008

CERTIFICATE OF QUALIFIED PERSON

Willie Hamilton, P. Eng.
AMEC Americas Limited
2020 Winston Park Drive, Suite 700
Oakville, ON, Canada L6H 6X7
Tel: (905) 829.5399 ext. 2071 Fax: (905) 829-3633
willie.hamiton@amec.com

I, Willie Hamilton, P. Eng., am employed as a Senior Mining Engineer with AMEC Americas Limited.

This certificate applies to the technical report entitled "NI 43-101 Technical Report and Preliminary Assessment on the Young-Davidson Property, Matachewan, Canada " with an effective date of 1 April 2008.

I am a member of Professional Engineers of Ontario. I graduated in 1988 from the University of Alberta with a Bachelor's degree in Mining Engineering (BSc.) and in 1990 from the University of Alberta with a Master's degree in Mining Engineering (MSc.).

I have practiced my profession for eighteen years. I have been directly involved in mine design and scheduling of open-pit mines, equipment selection, material handling, long-range and short-range forecast.

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 for this report.

I visited the Young Davidson Property between 5 May and 8 May, 2008. I am responsible for the preparation of Sections 18.1, 18.2, 18.11, 20.4, 20.6, 20.9 and 21.2 of the technical report entitled "NI 43-101 Technical Report and Preliminary Assessment on the Young-Davidson Property, Matachewan, Canada " dated 1 April, 2008.

I am independent of Northgate Minerals Corporation as independence is described by Section 1.4 of NI 43–101.

I have read NI 43–101 and this report has been prepared in compliance with that Instrument.

As of the date of this certificate, to the best of my knowledge, information and belief, the technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

"Signed and Sealed"

Willie Hamilton, P. Eng.
Senior Mining Engineer
Dated 8 August 2008

CONTENTS

TABLES

FIGURES

1.0 SUMMARY

Northgate Minerals Corporation (Northgate) commissioned AMEC Americas Limited (AMEC), to provide a Preliminary Assessment (PA) NI43-101 Technical Report (the Report) for the Young Davidson open-pit and underground gold project (the Project) located near the town of Matachewan, Ontario, Canada.

The following people served as the Qualified Persons responsible for the preparation of the Report as defined in National Instrument 43-101, Standards of Disclosure for Mineral Projects, and in compliance with Form 43-101F1 (the Technical Report):

- Pierre Rocque, P.Eng.; Principal Mining Engineer, AMEC Oakville office
- Willie Hamilton, P. Eng., Senior Mining Engineer, AMEC Oakville office
- Rick Welyhorsky, P. Eng. Senior Process Engineer, AMEC Oakville office
- Armando Simon, R.P.Geol., AIG; Principal Geologist, AMEC Oakville office
- Sheila Daniel, P. Geo., Head, Environmental Management, AMEC Mississauga office

AMEC updated the Mineral Resources statement and ensured compliance with the CIM code.

Several effective dates are appropriate for this report, as shown below:

- Effective Date of the report: 1 April 2008.
- Effective Date of the open pit mineral resources statement: 1 May 2007.
- Effective Date of the underground mineral resources statement: 28 November 2007
- Effective date of the financial model and cash flow analysis: 1 August 2008.

1.1 Property Setting

The Project site is located 3 kilometres (km) west of the community of Matachewan in northern Ontario. Kirkland Lake is 60 km east of the project site and Timmins, which is the regional centre, is located 170 km by road northwest of the site. There are a number of other communities also within reasonable daily commuting distance to the Young-Davidson Project. The Matachewan First Nation Indian Reserve, located approximately 12 km north of the site, is the closest First Nation community to the site.

The site is connected by means of Highway 566 to the northern Ontario highway network. A new bridge across the West Montreal River at Matachewan allows ready transport of large equipment. Relocation of a section of Highway 566 is proposed to support Project development as a portion of the existing highway intersects the proposed open pit.

1.2 Tenure and Agreements

The Project is situated on the Northgate claim block which occupies an area of approximately 5,685 hectares (ha). The claim block includes mineral claims and dispositions.

On July 31, 2006, Northgate completed an amalgamation of its three wholly-owned subsidiaries: Northgate Resources Corporation, Young-Davidson Mines Limited, and Kemess Mines Ltd. The company operates in Canada as Northgate Minerals Corporation and is publicly traded on the Toronto Stock Exchange and on the American Stock Exchange.

The claim block is located in the Powell, Yarrow and Cairo townships, within the Larder Lake Mining district. A majority of the claim block is found between Mistinikon Lake to the west and the West Montreal River to the east.

1.3 Previous Work

Historical records show that the local area was first staked by two prospectors in 1910: Jake Davidson identified the Young-Davidson prospect and Sam Otisse the Matachewan Consolidated prospect. This eventually led to gold production between 1934 and 1956 from two significant gold mines located in close proximity: the Young-Davidson Mine and the Matachewan Consolidated Mine. The mines together produced approximately 970,000 ounces (oz) of gold from 9.8 million tonnes (Mt) of ore (SWRPA 2007).

1.4 Geology and Mineralization

The YD Property is located within the southwestern part of the Abitibi Greenstone Belt, which is the largest preserved Archean greenstone belt in the world and one of the most continuous units of the Superior Geologic Province. The Abitibi Greenstone Belt extends for 750 km from the Grenville Province in the east to the Kapuskasing Gneiss Belt in the west, and for over 170 km from the Opatica Gneissic belt in the north to the Proterozoic Huronian sedimentary rocks in the south.

The regional Larder Lake-Cadillac Fault Zone (LLCFZ) cuts across the YD Property. The LLCFZ has a sub-vertical dip, and generally strikes east-west. The LLCFZ is characterized by chlorite-talc-carbonate schist, and the deformation zone can be followed for over 200 km from west of Kirkland Lake to Val d'Or.

The syenite-hosted gold deposits, commonly associated with quartz-monzonite to syenite stocks and dikes, has been individualized as a distinct group of gold deposits, well represented in the Abitibi Greenstone belt (Salvi and Williams-Jones, 2004), and particularly at the Porcupine and Kirkland Lake districts, Northern Ontario.

The Young-Davidson deposit, also located in the Abitibi greenstone belt, can be classified as an Archean, syenite-hosted gold deposit. The gold mineralization is primarily related to quartz veinlet stockworks and disseminated pyrite mineralization, mostly enclosed within the syenite intrusion boundaries, or very close to the contacts with the enclosing rocks, and is frequently associated with broader zones of potassic alteration

At least five styles of gold mineralization are recognized at the YD Project. They are described in detail by Micon (2004) and PGI (2003).

1. Syenite-hosted gold mineralization
2. Mafic volcanic-hosted gold mineralization (MCM Mine)
3. Timiskaming sediment-hosted gold mineralization
4. Ultramafic-hosted gold mineralization
5. Hanging wall contact gold mineralization

Essentially, all of the historical production at the YD Mine, and approximately 60% of the production from the MCM Mine is from syenite-hosted gold mineralization (Lovell, 1967). Most of the current open pit and underground resources are also related to syenite-hosted gold.

1.5 Drilling and Sampling

Since 2006, Northgate has conducted a nearly continuous drilling program at the Property. The YD Resource Database contains 854 surface and underground diamond drill holes totalling 214,727.5 metres (m).

AMEC visited various drill sites, and confirmed that drill holes were well marked in the field with solid cement monuments and 1 m long pieces of steel bar, and included a steel triangle showing the drill hole identification.

During the 2006-2008 drilling program, Northgate implemented a QC protocol consisting of the submission of reject duplicates, certified reference material (CRMs) and blanks in the sample batches. This program has been permanently supervised by Ron Konst, an independent Vancouver QA/QC consultant.

Although the QC protocol implemented by Northgate was not complete, as it did not assess the sampling variance, AMEC is of the opinion that Northgate followed best practice procedures by having an independent QC over the data. Ron Konst used industry-standard QC methods that ensured reliable results.

1.6 Data Verification

AMEC conducted a series of verification checks on the Young-Davidson project, including two separate database audits; the first for the open pit resource model and the second for the underground resource model. Additional checks were completed during the AMEC QP site visit that included a review of drill hole collars and down-hole surveys, drill core and core logging, assay data recording, validity of geological interpretations, and sample security and storage, as well as QA/QC data processing and validation.

1.7 Mineral Resources

1.7.1 Open Pit Resources

AMEC is of the opinion that the open pit mineralized solids are adequate to support a resource estimate, but the solids are conservative and have a minor upside potential. AMEC recommends that Northgate update the mineralized solid wireframes to reflect the 2007 economic assumptions.

AMEC has validated the open pit resource estimates, primarily by using swath plots comparing the inverse distance squared (ID2) grade estimates with a nearest neighbour (NN) grade estimate. The resultant comparison shows that there is no grade bias with the ID2 resource model.

Overall, AMEC is of the opinion that the open pit resource model is adequate and acceptable for public disclosure of mineral resources at the Young-Davidson property.

In the case of the Open Pit zone (OP), AMEC prefers the use of a cut-off grade lower than breakeven for the grade shell construction. Northgate used a 0.80 g/t Au for grade shell construction, which was based on the 2004 price of gold (USD$400/oz). A higher assumed long term gold price would likely capture additional resource blocks for the open-pit zone. AMEC used a long term price for Au mineral resources at USD$750/oz, as of June, 2008. The assumed metallurgical recovery of 91.7% for the open-pit resource maybe high since the metallurgical test samples have approximately twice the gold grade as the average open-pit resource grade. A lower assumed metallurgical recovery would likely reduce the resource blocks in the OP zone.

1.7.2 Underground Resources

AMEC has validated the underground resource estimates, primarily by using swath plots comparing the ID2 grade estimates with a NN grade estimate. The resultant comparison shows that there is little or no grade bias with the ID2 resource model.

AMEC is of the opinion that there is no significant grade bias in the ID2 underground grade model and that the resource estimates are adequate and acceptable for public disclosure.

AMEC is of the opinion that the underground mineralized solid models are adequate and reflect the current known mineralization of the Young-Davidson property, but are too conservative based on the cut-off grade used for grade shell construction. These wireframes are snapped to the drill holes and comply with the cut-off grade of 2.3 g/t Au, but also using a 1.7 g/t Au incremental cut-off grade and a 3 m minimum width criterion, which was based on the Micon report from 2004 which used USD$400/oz for the price of gold. AMEC is of the opinion that the Au grade used to outline the underground mineralization is too high and is very likely underestimating the mineralized tonnes.

AMEC recommends that Northgate model the underground mineralization using a cut-off grade lower than breakeven for grade shell construction. AMEC uses a long term price for Au mineral resources at USD$750/oz, as of June, 2008.

1.7.3 Young-Davidson Mineral Resources

Table 1-1 shows the base case mineral resources for the Young-Davidson Project, which includes both the open pit and underground mineralization. The effective date of the open pit resources is May 1, 2007 and the effective date of the underground resources is November 28, 2007, which explains the difference in price of metal and process recovery used to calculate the cut-off grade for mineral resources.

Figure 1-1: OP and UG Mineral Resources for the Young-Davidson Project

OP & UG Zones-2008 Mineral Resources-Young-Davidson Property Using Base Case Cut-off Grades of 0.80 g/t Au-OP &1.90 g/t Au-UG					
Zone	**Au Cut-off (g/t)**	**Resource Category**	**Tonnes (x000)**	**Au Id2 (g/t)**	**Au (oz) (x000)**
OP[1]	0.80	Indicated	4,280	2.00	275
UG[2]	1.90	Indicated	11,494	3.79	1,401
Total		**Indicated**	**15,774**	**3.31**	**1,676**
Zone	**Au Cut-off (g/t)**	**Resource Category**	**Tonnes (x000)**	**Au Id2 (g/t)**	**Au (oz) (x000)**
OP[1]	0.80	Inferred	42	2.11	3
UG[2]	1.90	Inferred	3,988	3.35	430
Total		**Inferred**	**4,030**	**3.34**	**433**

Base case

[1]Au cut-off has applied total costs of USD$15.70/t (mining, processing, G&A), metal price of USD$600/oz Au and USD$0.90=CND$1.00, and metal recovery of 89% Au

[2]Au cut-off has applied total costs of $43.58/t ($26.00-mining, $13.58-processing, $4.00-G&A), metal price of USD$700/oz Au and USD$0.90=CND$1.00, and metal recovery of 91.7% Au

Note: the difference in gold price reflects the different assumed long term gold price between the date of the open pit and underground studies.

1.8 Mineral Reserves

Northgate has not declared mineral reserves for the open-pit nor the underground deposits at Young-Davidson.

1.9 Mine Development and Mine Plan

The open pit block model consisted of one general mining area with no distant additional satellite deposits. Contact dilution was added to the resource model so that a diluted block model was used in the calculation of Whittle® shells.

The pit optimization parameters were based on a gold price of USD$635/oz, an average contractor mining cost of $3.50/t mined, an exchange rate of USD$0.90/CDN$1.00, processing costs of $11.50/t milled, general and administrative (G&A) costs of $4.00/t milled and a gold process recovery of 91.7%. Additional price and production royalties were also accounted for in the calculation of pit value. The pit sizes were found to be very sensitive to gold price, particularly when gold prices were reduced.

The Whittle® maximum undiscounted cashflow pit (no capital included) was used as a guide to design a detailed pit with the Mintec MineSight® software. The inter-ramp slope angle for the pit design was 55°. Pit ramps were designed with a gradient of

10% and 15 m width to accommodate 50 t haulage trucks. The pit ramp exits the pit at the east side at approximately 10345 m reference elevation. The pit bottom elevation was at 10230 m while the maximum topography contact elevation was approximately 10365 m. Haulage routes will extend from the pit exit to the northwest for crusher feed and to the southeast for waste.

At a cutoff grade of 0.845 g/t Au, the pit design contained 3.7 Mt of crusher feed @ 1.90 g/t Au and 10.7 Mt of waste material. The crusher feed and waste tonnages from the pit design are approximately two percent lower and five percent higher respectively than the associated ultimate pit shell tonnages.

Due to the short duration of the open-pit schedule (i.e. less than four years at average mill feed rate), no pit phasing has been designed and utilized. After considering that years one and four are only partial years, actual truck requirements are expected to be between three and four trucks for the majority of the open pit mining.

The underground deposit stretches from approximately 210 m to 1,500 m below ground surface.

The primary access to the Young-Davidson mineralized material is through a 6.0 m diameter shaft and a ramp. Sub-Level Open Stoping was selected as the preferred mining method based on a list of criteria developed by Northgate and AMEC.

The deposit has been divided in four mining fronts, each producing 1,250 tpd (on average). Stopes will be mined in a “primary-secondary” sequence starting at the bottom of the mining front and progressing upwards and “centre-out”. Pastefill was selected as the material of choice for backfilling stopes, prior to mining the next lift up. Sill pillars created between the mining fronts will be recovered near the end of mine life and have been assigned a lower mining recovery and higher dilution factors than other stopes.

The combined open-pit and underground production schedule is shown in Table 1-2.

Table 1-1: Life of Mine Mill Feed Schedule for the Open-pit and Underground Operations (based on depletion of Mineral Resources)

	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Total
MILL FEED (t)		**450,000**	**1,801,000**	**1,826,000**	**1,826,000**	**1,825,000**	**1,825,000**	**1,830,000**	**1,825,000**	**1,825,000**	**1,825,000**	**1,830,000**	**1,439,000**	**176,000**	**20,303,000**
HEAD GRADE (g/t)		**1.56**	**2.02**	**2.33**	**3.18**	**3.16**	**3.16**	**3.21**	**3.29**	**3.19**	**3.08**	**3.02**	**3.05**	**2.95**	**2.94**
HEAD METAL (g)		**702,000**	**3,635,000**	**4,254,000**	**5,809,000**	**5,767,000**	**5,765,000**	**5,883,000**	**5,999,000**	**5,819,000**	**5,624,000**	**5,532,000**	**4,395,000**	**520,000**	**59,704,000**
HEAD METAL (oz)		**23,000**	**117,000**	**137,000**	**186,000**	**185,000**	**185,000**	**189,000**	**193,000**	**187,000**	**181,000**	**178,000**	**141,000**	**17,000**	**1,919,000**
Underground Mine Production (t)			**401,000**	**457,000**	**1,299,000**	**1,825,000**	**1,825,000**	**1,830,000**	**1,825,000**	**1,825,000**	**1,825,000**	**1,830,000**	**1,439,000**	**176,000**	**16,557,000**
Head Grade (g/t)			2.78	3.37	3.56	3.16	3.16	3.21	3.29	3.19	3.08	3.02	3.06	2.95	3.18
Head Metal (g)			1,115,000	1,543,000	4,618,000	5,767,000	5,765,000	5,883,000	5,999,000	5,819,000	5,624,000	5,532,000	4,395,000	520,000	52,580,000
Head Metal (oz)			36,000	50,000	148,000	185,000	185,000	189,000	193,000	187,000	181,000	178,000	141,000	17,000	1,690,000
Production Hoisted to the Mill (t)					843,000	1,825,000	1,825,000	1,830,000	1,825,000	1,825,000	1,825,000	1,830,000	1,439,000	176,000	15,243,000
Production Trucked to Mill (t)			401,000	457,000	456,000										1,314,000
Open-Pit Mine Production (t)		**450,000**	**1,400,000**	**1,369,000**	**527,000**										**3,746,000**
Head Grade (g/t)		1.56	1.80	1.98	2.26										1.90
Head Metal (g)		702,000	2,520,000	2,711,000	1,191,000										7,124,000
Head Metal (oz)		23,000	81,000	87,000	38,000										229,000

Note: The mill feed is from a preliminary assessment that is preliminary in nature. Mill feed includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is no certainty that this preliminary assessment will be realized.

1.10 Metallurgy and Processing

The metallurgical testwork programs considered for this phase were mostly completed in 2007 and early 2008 at SGS. Results of these tests provided the data used by Northgate to define the metallurgical response of a mineralized composite.

Additional work was also performed by Outotec early in 2008 on the thickening characteristics on samples of concentrate and flotation tailings produced at SGS.

A series of six mineralized samples and two waste samples were submitted for various grinding parameter determinations at SGS. Subsequently, a composite sample incorporating two of the mineralization types thus tested was prepared and used throughout the remaining testwork programs.

The grinding characteristics of the design mineralized material, an equal mixture of Upper Boundary and Pit Zone material as combined gives an average BWI of 18.0. Most samples tested fell in the medium to hard range of hardness with respect to impact breakage and Bond rod mill / ball mill grindability work indices while there was one waste sample which fell in the very hard range of hardness. All sampes as well have been identified as abrasive or very abrasive.

The testwork realized by SGS achieved a gravity recovery of about 20% of the gold contained in the composite sample tested when cleaning of the primary centrifugal concentrator product on a Mozley table was completed to a target 0.05% weight recovery of the initial feed material.

The metallurgical test programs support the selection of single stage autogenous grinding (AG) with a gravity circuit followed by flotation. The flotation concentrate is to be further ground and leached in a conventional carbon-in-leach (CIL). The flotation tailings will also be leached in a CIL circuit. The gold will be recovered from the carbon followed by electro-winning and pouring doré bars.

A gold recovery of 91.5% is indicated for the head grade of the samples on which the test work was performed and is the basis for the PA.

1.11 Cost Estimates and Financial Analysis

AMEC estimated the operating costs as follows:

- Mining – Open-pit: $3.50/t mined
- Mining – Underground: average of $27.23/t mill feed
- Milling: $11.10/t mill feed

- G&A: $3.30/t mill feed

Capital costs were estimated at $409 M ($340 M for pre-production capital and $69 M for sustaining capital.

The financial analysis of the base case (USD$635/oz gold price, an exchange rate of USD$0.90=CDN$1.00 and a discount rate of 8%), showed the project NPV to be negative $116 M and the internal rate of return to be 0.8%. The cumulative undiscounted cash flow value for the project is $20.3 M and the payback period is 11 years. The project is most sensitive to metal prices and head grade, and least sensitive to currency exchange rate operating and capital costs.

The results of the economic analysis represent forward-looking information that are subject to a number of known and unknown risks, uncertainties and other factors that may cause actual results to differ materially from those presented here. Factors and assumptions that may change include the following:

- Ability to obtain permits and approvals.
- Sourcing equipment in a timely manner.
- Obtaining skilled labour force and contractors.
- Operating costs and capital costs estimates.
- Metallurgical test work may not be representative of the entire deposit.

1.12 Environmental Considerations

In AMEC's opinion, the current status on mining rights enables Northgate to proceed with the development of a mining operation on the Young-Davidson property.

The Project will be required to comply with the Province of Ontario environmental legislation as well as with specific pieces of Federal legislation, where such jurisdiction exists.

A number of environmental approvals remain valid from the late 1990's when the site was explored by Royal Oak Mines. Three Provincial class EAs are anticipated to require completion based on the current project design.

Additional environmental approvals will be required to construct, operate and close the new mine. On September 19, 2007 the Canadian Environmental Assessment Agency instructed Northgate that the project design as presented in an Environmental Prospectus did not trigger the *Canadian Environmental Assessment Act* process. As a result, the Young-Davidson project will not require completion of a Federal Environmental Assessment (EA).

There is also the potential that a Class EA for Provincial Parks and Conservation Reserves could be required, pending completion of detailed land tenure investigations and placement of Project-related facilities.

1.13 Conclusions and Recommendations

Geology

Based on the reviewed information, AMEC is of the opinion that the Young-Davidson data are suitable for mineral resource estimation purposes.

Sub-sampling and analytical precisions were assessed, and were found within acceptable ranges. Au analytical accuracy was within the acceptable limits.

Significant cross-contamination for Au was not detected by routine testing of coarse blanks.

Double entry verification of the Au assay data did not identify errors in the Au database entries.

The open pit and underground 3D grade shell models used to constrain the gold mineralization are adequate to support a resource estimate, but the solids are conservative (by using grade cut-offs based on USD$400/oz Au) and have a minor upside potential to increase the mineralized tonnes.

AMEC is of the opinion that Northgate has potential to increase the current underground resource tonnes through delineation and infill drilling.

The highest mean grade (>4.00 g/t Au) for the underground resources appears to be located between 9,350 m El and 9,550 m El. This corresponds to the mineralization gap in the Lucky Zone. The mean grade at the bottom of the known mineralization is low (<3.00 g/t Au). Northgate should consider these higher mean grade trends when outlining the underground drilling programs and maximize the expected grade from the next drilling program.

The NN validation model shows a grade of almost 5.00 g/t Au on the most westerly portion of the underground model. Not only does this indicate a possible higher grade area, a significant portion of the current mineralization in this area is in the Inferred category. AMEC believes this area to the west of the Lower YD Zone has potential to add new mineralized tonnage.

AMEC recommends completing the following tasks prior to finalizing a Feasibility Study:

- The drill hole database must contain all the samples used in the final averaged assay for each interval in the assay table.
- The solid models used for grade shell construction should be performed using a cut-off grade lower than break-even for both the open pit and underground mineralization. Use metallurgical recovery assumptions from test samples more representative of the grade of the material to be processed.
- Continue to expand the continuity of mineralization through drilling in untested areas around current mineralization and upgrade the Inferred Mineral Resources into the Indicated category. The majority of Inferred Resources is in the Lucky and Lower YD zones, with a significant proportion that is more than 500 m below surface. A surface drilling program to accomplish this goal would be very expensive, so AMEC recommends that Northgate attempt to establish UG drilling platforms to effectively perform the infill drilling. A surface drilling program would require approximately 20 core holes at 1,000 m per hole totalling 20,000 m. At an assumed all-in drilling cost of $125/m, the surface drilling program would be approximately $2.5 M.
- Obtain silver samples to populate a database in sufficient numbers to allow the inclusion of silver in the the mineral resource estimate. Currently, there is approximately one-third of the number of silver samples compared to gold samples within the mineralized wireframes. If pulp reject samples from recent drilling are available, it is recommended that Northgate re-submit the pulps and analyze for silver. Also, AMEC recommends that Northgate commence analyzing for silver on all new core samples submitted for gold assaying. Re-submitting pulp rejects for silver assaying only is approximately $7.00/pulp (no sample prep required) and the cost of assaying for gold and silver on new core samples is approximately $16.00/sample (including sample prep).

Mining

There are currently no mineral reserves declared on the Young-Davidson property.

There is insufficient geomechanical data available to design stable pit wall slopes, stope dimensions and model the mining-induced stress re-distribution.

The usage and nature of backfill will need to be further examined. It is unclear at this stage if the project would benefit more from leaving pillars behind, increasing the level of ground support or placing backfill in the stopes.

Detailed quotes from contractors will be required to better estimate operating and capital costs.

AMEC recommends completing the following tasks prior to finalizing a Feasibility Study:

- A geomechanical program that will provide information necessary for properly designing stable underground excavations, pit wall and waste dump slopes.
- Trade-off studies related to the mine ground support on a large scale (i.e. usage of backfill versus leaving pillars versus installing additional ground support).
- A comprehensive backfill design program, taking into account various recipes for backfill and the resulting strength variation.
- Obtain appropriately detailed quotes from contractors, especially for the open-pit mining.
- Determine a cut-off grade strategy to deal with marginal grade material. This should include consideration of all royalties.
- Model of the overburden surface so that accurate overburden tonnages can be calculated.
- Work in and around the old underground workings will require procedures for identification, safety and risk management.
- Incorporation of additional hydrogeologic information to better define dewatering requirements and associated costs.

The approximate cost for mining recommended work amounts to $1 M.

Process

Northgate selected the samples to be representative of the different mineralized lithologies encountered in the deposit. The representativity of the samples and metallurgical responses have been reviewed by AMEC. This review indicated that the sample selection is sufficient for this level of study but that further work will have to be performed in the future, in particular for the lower zone (LZ) and OP material, to firm up information on metallurgical responses.

Gold recovery appears to be sensitive to grind at this stage and the test work indicates that losses are expected if grind sizes increase beyond 15 microns size.

The final product will be doré bars. The grade of the doré is estimated to be a total of 90% precious metal.

AMEC recommends completing the following tasks prior to finalizing a Feasibility Study:

- Collect representative samples across the deposit for metallurgical testing.
- Perform further gravity recoverable gold test work.
- Perform further regrind tests on flotation concentrate to optimize the grind recovery curve for this material.
- Conduct flotation pilot plant test work in order to confirm concentrate mass pulls. The bench scale results of the flotation test work revealed a 20% mass pull at a 1.5% sulphur feed grade. Confirming this criterion is critical for proper sizing and expected recovery determination.
- Determine further information on the gold and silver grade recovery relationship
- Assess the variability of gold, silver and sulphur throughout the deposit.
- Further test work should be carried out in the next phase (Phase 3) in order to optimize selection of the primary grind.

The above recommendations will be addressed in Northgate's Phase-3 test work, currently budgeted at $225,000.

Environmental

Additional provincial and federal environmental approvals will be required to construct, operate and close the new mine.

AMEC understands that Northgate is developing a positive relationship with the local Matachewan First Nation. Continuation along this path will be critical to ensuring that Project timelines are not impacted.

AMEC recommends completing the following tasks prior to finalizing a Feasibility Study:

- Continuation of the environmental approval process for long lead approvals as information becomes available.
- Continuation of public and First Nations consultation activities, working toward an Impact Benefit Agreement with the Matachewan First Nation in a timely manner

Cost Estimation and Financial Analysis

AMEC concludes that operating and capital cost estimated for this PA are within the level of accuracy expected for this type of study.

The financial analysis using a discount rate of 8%, showed the project NPV to be negative $116 M and the internal rate of return to be 0.8%. The cumulative undiscounted cash flow value for the project is $20.3 M and the payback period is 11 years. AMEC concludes that development of the Young-Davidson project is not supported by positive economic factors, except for the cumulative undiscounted cash flow.

The project is most sensitive to metal prices, head grade and currency exchange rate, and least sensitive to operating and capital costs.

The results of the economic analysis represent forward-looking information that are subject to a number of known and unknown risks, uncertainties and other factors that may cause actual results to differ materially from those presented here.

AMEC recommends modelling the silver content of the YD resources if Northgate is planning to use the silver revenue stream in project economic calculations.

2.0 INTRODUCTION AND TERMS OF REFERENCE

2.1 Introduction

The Young-Davidson Project is at an Advanced Exploration Stage with an access ramp being advanced for exploration and delineation drilling of underground mineralized zones.

The following people served as the Qualified Persons responsible for the preparation of the Report as defined in National Instrument 43-101, Standards of Disclosure for Mineral Projects, and in compliance with Form 43-101F1.

- Pierre Rocque, P.Eng.; Principal Mining Engineer, AMEC Oakville office
- Willie Hamilton, P. Eng.; Senior Mining Engineer, AMEC Oakville office
- Rick Welyhorsky, P. Eng.; Senior Process Engineer, AMEC Oakville office
- Armando Simon, R.P.Geol.; Principal Geologist, AMEC Oakville office.
- Sheila Daniel, P.Geo.; Associate Geoscientist / Head Environmental Management, AMEC Mississauga office.

AMEC understands that this report will be used by Northgate in support of a news release disclosing an update to the mineral resource estimate and the results of Preliminary Assessment on the Young-Davidson gold project.

2.2 Terms of Reference

Northgate commissioned AMEC to provide a PA NI 43-101 Technical Report for the Young-Davidson gold project located near the town of Matachewan, Ontario, Canada (Figure 2-1). The purpose of the report is to evaluate the geological potential, provide a mineral resources estimate (using the CIM code) and prepare a PA of the Project.

The Qualified Persons visited the Young-Davidson property at various dates since 2007 as shown in Table 2-1. R. Welyhorsky (QP for Process) did not visit the project site.

Figure 2-1: Location Map

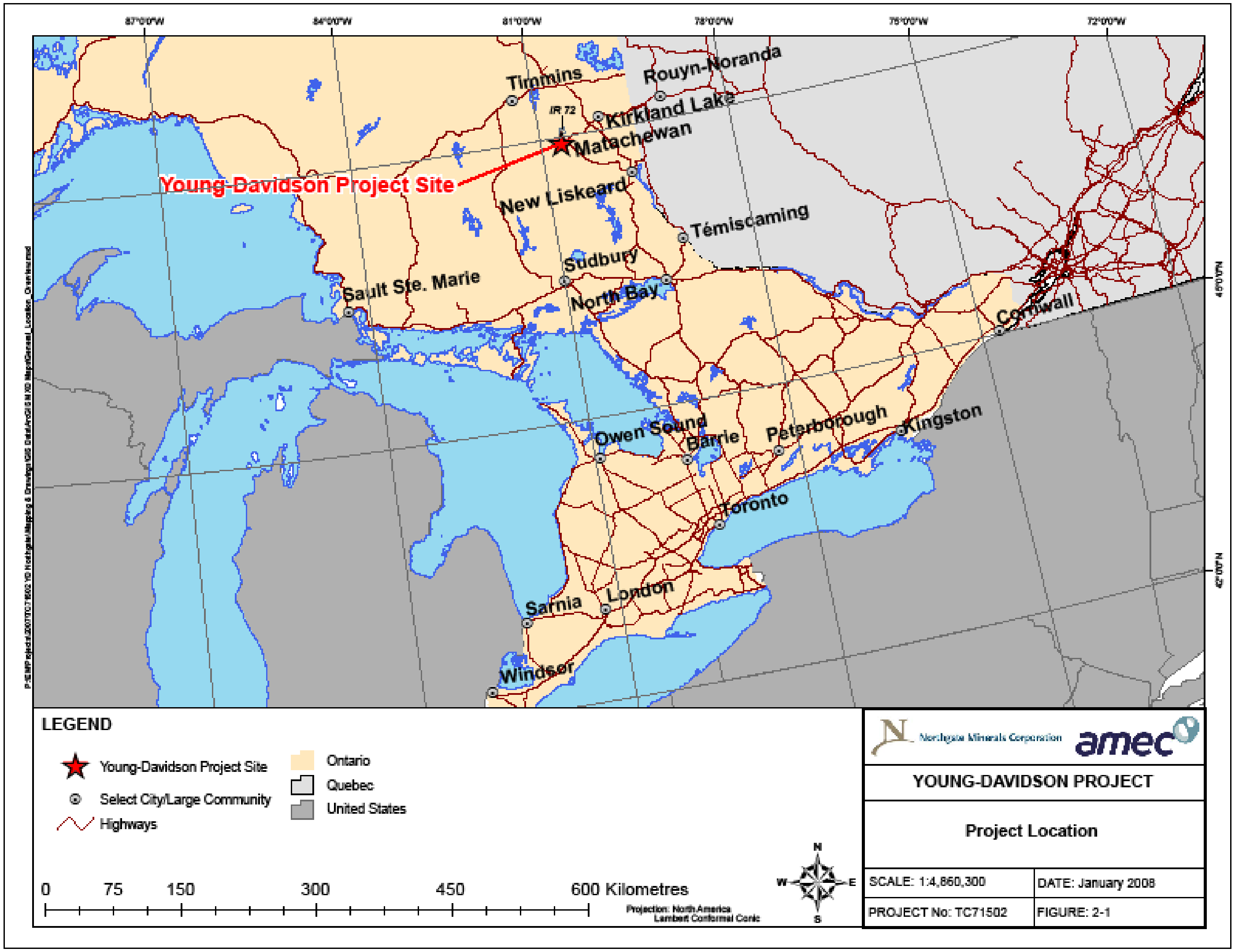


Table 2-1: Site Visits Completed by QPs in Support of the Technical Report

Qualified Person	Date(s) of Site Visit from	Date(s) of Site Visit to	Sections of Responsibility (or Shared Responsibility)
Pierre Rocque, P.Eng	February 14, 2007 February 13, 2008	February 15, 2007 February 15, 2008	1 to 6, 15.0,17.2, 18.1, 18.3 to 18.5, 18.7 to 18.11, 19, 20.1, 20.4, 20.6, 20.9, 21.2, 21.5
Willie Hamilton, P. Eng.	May 5, 2008	May 8, 2008	18.1, 18.2, 18.11, 20.4, 20.6, 21.2
Armando Simon, R.P.Geol.	May 5, 2008	May 8, 2008	7 to 14, 17.1, 20.2 to 20.5, 21.1
Rickardo Welyhorsky	None	None	16, 20.7, 21.3
Sheila Daniel, P.Geo.	March 31, 2007; October 2, 2007; May 13, 2008	(single days)	18.6, 20.8, 21.4

AMEC is independent of Northgate and the Young-Davidson property. AMEC's fees for this Technical Report are not dependent in whole or in part on any prior or future engagement or understanding resulting from the conclusions of this report. These fees are in accordance with standard industry fees for work of this nature, and AMEC's previously provided estimates are based solely on the approximate time needed to assess the various data and reach the appropriate conclusions.

Several effective dates are appropriate for this report, as shown below:

- Effective Date of the report: 1 April 2008.
- Effective Date of the open pit mineral resources statement: 1 May 2007.
- Effective Date of the underground mineral resources statement: 28 November 2007
- Effective date of the financial model and cash flow analysis: 1 August 2008.

All measurement units used in this report are metric and currency is expressed in Canadian dollars (CDN$), unless stated otherwise.

3.0 RELIANCE ON OTHER EXPERTS

The AMEC QPs, authors of this Technical Report, state that they are qualified persons for those areas as identified in the "Certificate of Qualified Person" attached to this report. The authors have relied, and believe there is a reasonable basis for this reliance, upon the expert reports regarding mineral rights, surface rights, permitting, and environmental issues in sections of this Technical Report as noted below. The AMEC QP's disclaim responsibility for this information.

3.1 Mineral Tenure

AMEC QPs have not reviewed the mineral tenure, nor independently verified the legal status or ownership of the Project area or underlying property agreements. AMEC has relied upon Northgate experts for this information through the following documents:

- Mineral Tenure Status Review – Young Davidson Project, Ontario. Letter sent to AMEC by Gene Gulajec (EG Resource Consultants Inc.) and dated 7 August, 2008.

The above information was used in section 4 of this report.

3.2 Surface Rights, Access and Permitting

AMEC QPs have relied upon Northgate experts to provide information regarding Surface Rights, Road Access and Permits and the following documents:

- Mineral Tenure Status Review – Young Davidson Project, Ontario. Letter sent to AMEC by Gene Gulajec (EG Resource Consultants Inc.) and dated 7 August, 2008.

The above information was used in section 4 of this report.

3.3 Environmental

AMEC's knowledge is based on field work and reliance on published and non-published material regarding the site, including environmental documentation developed in support of Royal Oak Mines and Northgate Minerals, exploration and development activities. The following documents were provided to AMEC by Northgate:

- Knight Piesold 2006. Northgate Minerals Corporation, Young-Davidson Project, 2006 Environmental Studies. Ref. No. NB102-00255/1-5. January 26, 2007.

- Northgate Minerals 2006. Advanced Exploration Amended Closure Plan, Prepared by Knight Piesold Ltd. for Northgate Minerals. Ref. No. NB102-00255/1-1. August 1, 2006.
- Royal Oak Mines 1997. Matachewan Project Comprehensive Study Report and Environmental Impact Statement, Volumes I to 3.
- Royal Oak Mines 1998. Matachewan Project Comprehensive Study Report.
- Knight Piesold, 2006; Northgate Minerals, 2006; Royal Oak Mines, 1997; Royal Oak Mines, 2008).

The above information was used in section 4 of this report.

3.4 Taxes

AMEC QPs have relied upon opinions of experts retained by Northgate for information regarding the taxes applicable to the project through the following document:

- A letter from Eugene Lee, VP Finance, Northgate Minerals Corporation, dated 5 August, 2008.

The above information was used in section 18 of this report, namely for cashflow forecast and financial analysis.

3.5 Royalties

AMEC QPs have relied upon opinions of experts retained by Northgate for information regarding the royalties applicable to the project through the following documents:

- Northgate Minerals Corporation, Project Alex Property, Property Interests and Royalty Agreement - Matachewan Consolidated Property, Royalty Agreement between Pamour Porcupine Mines Limited and Matachewan Consolidated Mines Limited. Dated June 1,1979 and amended on July 9, 1981, December 13, 1984 and April 27,1988 and extended on June 13, 2000.
- Northgate Minerals Corporation, Project Alex Property, Property Interests and Royalty Agreement - Welsh Property, Royalty Agreement between Pamour Porcupine Mines Limited and George S. Welsh. Dated April 26, 1979 and amended on March 11, 1986.

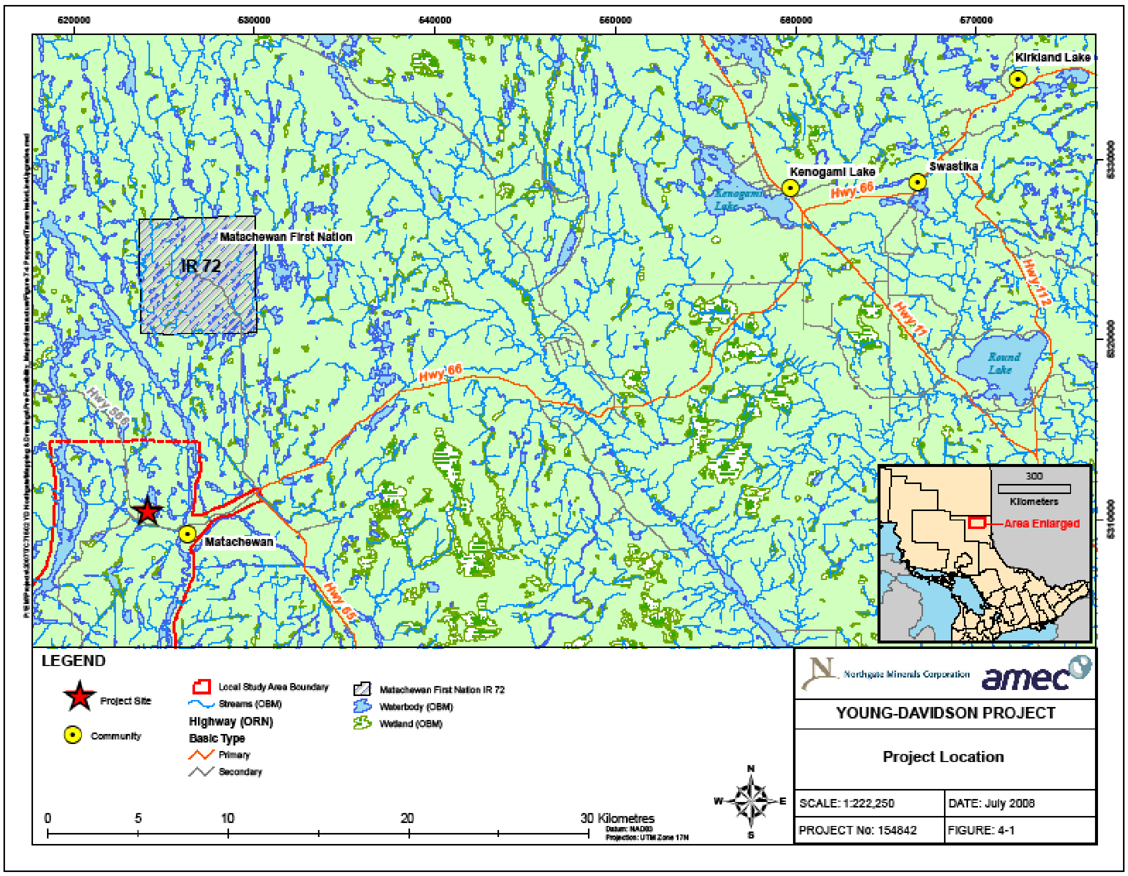
The above information was used in section 18 of this report, namely for mine design and cash flow forecast.

4.0 PROPERTY DESCRIPTION AND LOCATION

4.1 Location

The Young-Davidson Project is located 3 kilometres west of the community of Matachewan in northern Ontario at UTM 5310205 N 522230 E, or latitude 47°56’48” N and longitude 80°40’28” W (Figure 4-1). The Project is situated on the Northgate claim block which occupies an area of approximately 5,685 ha. The claim block includes patent leases and mineral claims.

Figure 4-1: Project Location



4.2 Property, Title and Mineral Claims

Northgate Minerals Corporation is a mid-tier mining company whose primary business is the acquisition, exploration, mining and extraction of precious and base metals. Northgate was incorporated in 1919 under the *Ontario Companies Act*.

On July 31, 2006, Northgate completed an amalgamation of its three wholly-owned subsidiaries: Northgate Resources Corporation, Young-Davidson Mines, Limited, and Kemess Mines Ltd. The company operates in Canada as Northgate Minerals Corporation and is publicly traded on the Toronto Stock Exchange and on the American Stock Exchange.

The claim block is located in the Powell, Yarrow and Cairo townships, within the Larder Lake Mining district. A majority of the claim block is found between Mistinikon Lake to the west and the West Montreal River to the east (Figure 4-2). A complete list of claims is shown in Table 4-1.

In AMEC's opinion, the current status on mining rights enables Northgate to proceed with the development of a mining operation on the Young-Davidson property.

Figure 4-2: Land Tenure Map

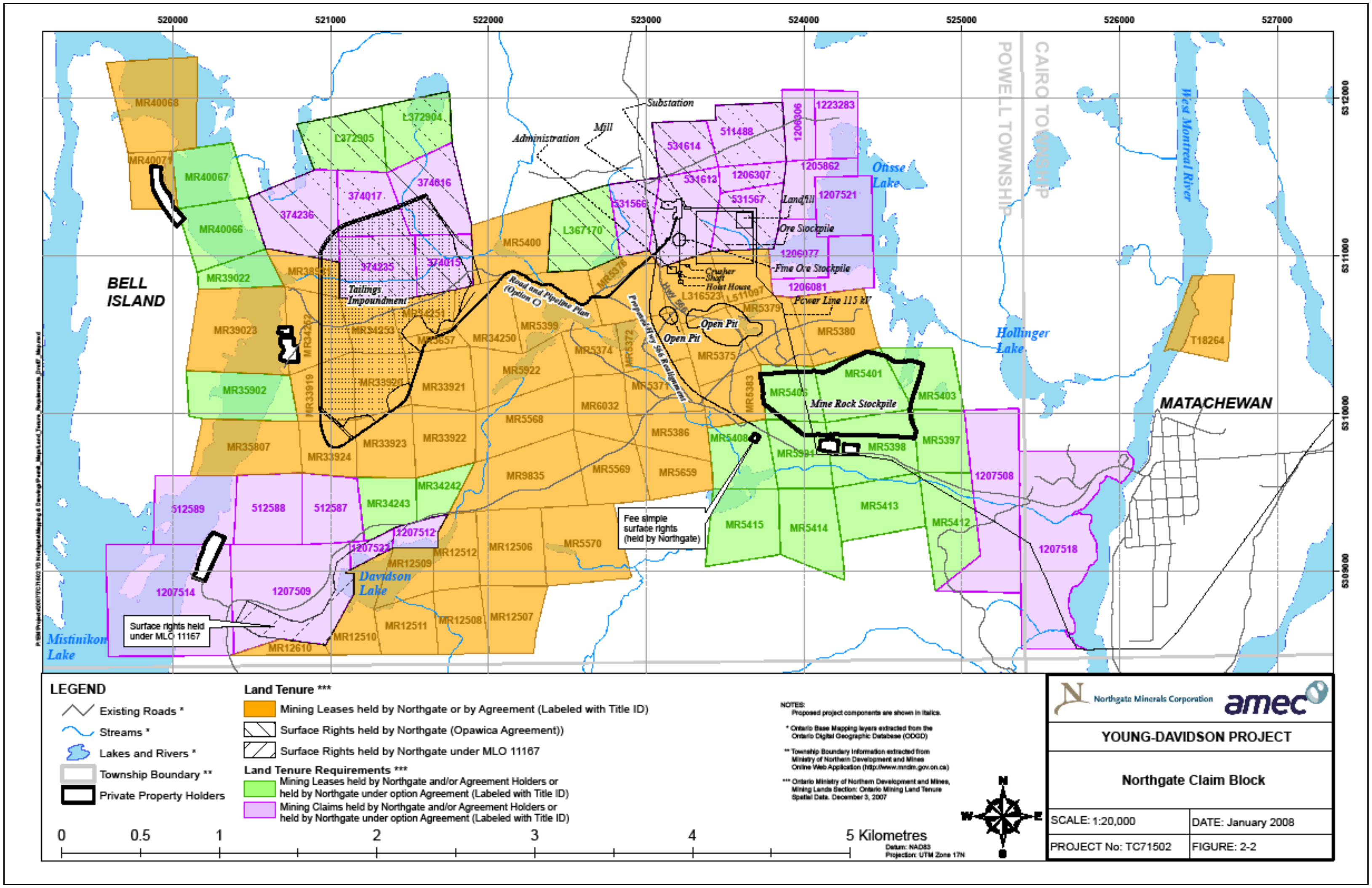


Table 4-1: Young Davidson Property Mineral Claims Details

Revised : February 15, 2008

Land Tenure Holdings by Agreement	Tenures	Area (ha)	Area (acres)
Schaus, Clarke & Shirriff - Yarrow Twp. Property	28	466.23	1,152.04
Kiernicki & Fekete Property	3	48.56	120
Welsh Property	2	24.54	60.64
Matachewan Consolidated Mines Property	24	371.58	918.17
Shirriff Property	36	597.11	1,475.45
Sedex Mining Corp. - OKA Property	18	328.82	812.5
Young-Davidson Property	45	2194.07	5,421.54
Opawica Option Properties (5)	54	877.82	2,169.09
	210	4908.71	12,129.43

Notes:

YDM Property: Licence of Occupation L.11167 & Fee Simple Title CL4871 surface right area included within claim or lease area.

Matachewan Property : Licence of Occupation L.1007 area included - tenure holds surface rights & undersurface rights.

Location:

Davidson Mine location - NTS: 041P/15; UTM NAD83 Z17N - 5310000N; 523000E, Long. 80 41', Lat. 47 56'

Claim Maps: Larder Lake Mining Division, Plans G3218, G3209, M0260, M207, M0237

Schaus, Clarke & Shirriff Yarrow Twp. Property

Northgate 100% subject to Letter Agreement between Royal Oak Mines Inc. and Schaus, Clarke, Shirriff dated September 9, 1992

Twp.	Title ID	Parcel No. or Claim Status	Lease No.	Term (Yrs)	Registered Tenure Holder	Area (ha.)	Claim Units	Surface Rights	Mining Rights	Exploration Rights Only	Expiry / Renewal Date	Royalty	Subject to Surface & Mining Rights Withdraw Order No.
YARROW	494591	Active Claim			Northgate - 20% & Schaus - 80%	16.188		N	N	Y	6-Mar-2012	2% NSR	
YARROW	494592	Active Claim			Northgate - 20% & Schaus - 80%	16.188		N	N	Y	6-Mar-2012	2% NSR	
YARROW	494593	Active Claim			Northgate - 20% & Schaus - 80%	16.188		N	N	Y	6-Mar-2012	2% NSR	
YARROW	494594	Active Claim			Northgate - 20% & Schaus - 80%	16.188		N	N	Y	6-Mar-2012	2% NSR	
YARROW	494595	Active Claim			Northgate - 20% & Schaus - 80%	16.188		N	N	Y	6-Mar-2012	2% NSR	
YARROW	495895	Active Claim			Northgate - 20% & Schaus - 80%	16.188		N	N	Y	6-Mar-2012	2% NSR	
YARROW	495896	Active Claim			Northgate - 20% & Schaus - 80%	16.188		N	N	Y	6-Mar-2012	2% NSR	W-LL-F1715
YARROW	495897	Active Claim			Northgate - 20% & Schaus - 80%	16.188		N	N	Y	6-Mar-2012	2% NSR	W-LL-F1715
YARROW	495898	Active Claim			Northgate - 20% & Schaus - 80%	16.188		N	N	Y	6-Mar-2012	2% NSR	
YARROW	495899	Active Claim			Northgate - 20% & Schaus - 80%	16.188		N	N	Y	6-Mar-2012	2% NSR	
YARROW	523116	Active Claim			Northgate - 20% & Schaus - 80%	16.188		N	N	Y	1-Mar-2011	2% NSR	(N/A)WL-21/95, F1715
YARROW	523117	Active Claim			Northgate - 20% & Schaus - 80%	16.188		N	N	Y	1-Mar-2011	2% NSR	(N/A)W-L-21/95
YARROW	523118	Active Claim			Northgate - 20% & Schaus - 80%	16.188		N	N	Y	1-Mar-2011	2% NSR	N/A-21/95, F1600,F171
YARROW	523119	Active Claim			Northgate - 20% & Schaus - 80%	16.188		N	N	Y	1-Mar-2011	2% NSR	(N/A)WL-21/95, F1715
YARROW	523141	Active Claim			Northgate - 20% & Schaus - 80%	16.188		N	N	Y	1-Mar-2011	2% NSR	(N/A)WL-21/95, F1715
YARROW	523142	Active Claim			Northgate - 20% & Schaus - 80%	16.188		N	N	Y	1-Mar-2011	2% NSR	(N/A)W-L-21/95
YARROW	523143	Active Claim			Northgate - 20% & Schaus - 80%	16.188		N	N	Y	1-Mar-2011	2% NSR	(N/A)W-L-21/95
YARROW	523144	Active Claim			Northgate - 20% & Schaus - 80%	16.188		N	N	Y	1-Mar-2011	2% NSR	(N/A)W-L-21/95
YARROW	523145	Active Claim			Northgate - 20% & Schaus - 80%	16.188		N	N	Y	1-Mar-2011	2% NSR	(N/A)W-L-21/95
YARROW	MR 29666	4938LT	106668	21	Northgate Minerals Corporation	start ↓		N	Y		30-Nov-2013	2% NSR	P* W-LL-F1715
YARROW	MR 29667	4938LT	106668	21	Northgate Minerals Corporation	↓		N	Y		30-Nov-2013	2% NSR	
YARROW	MR 29668	4938LT	106668	21	Northgate Minerals Corporation	↓		N	Y		30-Nov-2013	2% NSR	
YARROW	MR 29669	4938LT	106668	21	Northgate Minerals Corporation	↓		N	Y		30-Nov-2013	2% NSR	
YARROW	MR 29670	4938LT	106668	21	Northgate Minerals Corporation	↓		N	Y		30-Nov-2013	2% NSR	
YARROW	MR 29671	4938LT	106668	21	Northgate Minerals Corporation	↓		N	Y		30-Nov-2013	2% NSR	
YARROW	MR 29672	4938LT	106668	21	Northgate Minerals Corporation	↓		N	Y		30-Nov-2013	2% NSR	P* W-LL-F1715
YARROW	MR 29675	4938LT	106668	21	Northgate Minerals Corporation	↓		N	Y		30-Nov-2013	2% NSR	P* W-LL-F1715
YARROW	MR 29676	4938LT	106668	21	Northgate Minerals Corporation	158.653		N	Y		30-Nov-2013	2% NSR	
	28					466.23							

Ontario MNDM Withdraw Order No.

(N/A) W-L-21/95: Surface & Mining Rights withdrawn from prospecting, staking, sale or lease. These claims were acquired before 1995 and are exempted from Order.

W-LL-F1715 & W-LL-F1600: Living Legacy Withdraw area, P* indicates portion of claim withdrawn.

Kiernicki & Fekete Property

Northgate 100% subject to Purchase Agreement between Young-Davidson Mines, Limited and Kiernicki & Fekete dated May 8, 2003

Twp.	Title ID	Parcel No. or Claim Status			Registered Tenure Holder	Area (ha.)		Surface Rights	Mining Rights	Exploration Rights Only	Expiry / Renewal Date	Royalty	Subject to Surface & Mining Rights Withdraw Order No.
CAIRO	1199662	Active Claim			Northgate Minerals Corporation	16.188		N	Y		26-Aug-2010	2% NSR	P* W-LL-F1715
CAIRO	1199663	Active Claim			Northgate Minerals Corporation	16.188		N	Y		26-Aug-2010	2% NSR	
CAIRO	1199664	Active Claim			Northgate Minerals Corporation	16.188		N	Y		26-Aug-2010	2% NSR	
	3					**48.56**							

Welsh Property

Northgate 100% subject to terms of Mining Lease Agreement between Pamour Porcupine Mines Limited and George Welsh dated April 26, 1979 and Amendment dated March 12, 1986

Twp.	Title ID	Parcel No. or Claim Status	Lease No.	Terms (Yrs)	Registered Tenure Holder	Area (ha.)		Surface Rights	Mining Rights	Exploration Rights Only	Expiry / Renewal Date	Royalty	Subject to Surface & Mining Rights Withdraw Order No.
POWELL	L-316523	5397LT	107282	21	Northgate Minerals Corporation	14.524		Y	Y		30-Jun-2022	C$1.50/ ton	
POWELL	L-511097	5454LT	107440	21	Northgate Minerals Corporation	10.016		Y	Y		30-Apr-2024	C$1.50/ ton	
	2					**24.54**							

Matachewan Consolidated Mines Property

Northgate 100% subject to Mining Lease Agreement between Pamour Porcupine Mines Limited and Matachewan Consolidated Mines dated June 1, 1979 & Amendments dated (1981, 1984, 1988, 2000, 2006)

Twp.	Title ID	Parcel No. or Claim Status	Lease No.	Terms (Yrs)	Registered Tenure Holder	Area (ha.)	Claim Units	Surface Rights	Mining Rights	Exploration Rights Only	Expiry / Renewal Date	Royalty	Subject to Surface & Mining Rights Withdraw Order No.
CAIRO	T 18264	1172SEC	Patent		Matachewan Consolidated Mines Ltd.	14.41		Y	Y		N/A	US$1/ton+	
POWELL	MR 5379	3193LT	19020	10	Matachewan Consolidated Mines Ltd.	16.106		Y	Y		30-Sep-2008	US$1/ton+	
POWELL	MR 5380	3194LT	19019	10	Matachewan Consolidated Mines Ltd.	19.951		Y	Y		30-Sep-2008	US$1/ton+	
POWELL	MR 5402	4901LT	106561	21	Matachewan Consolidated Mines Ltd.	19.142		N	Y		30-Sep-2008	US$1/ton+	
POWELL	MR 5396	5125LT	106715	21	Matachewan Consolidated Mines Ltd.	start ↓		N	Y		30-Sep-2008	US$1/ton+	
POWELL	MR 5412	5125LT	106715	21	Matachewan Consolidated Mines Ltd.	↓		N	Y		30-Sep-2008	US$1/ton+	
POWELL	MR 5414	5125LT	106715	21	Matachewan Consolidated Mines Ltd.	↓		N	Y		30-Sep-2008	US$1/ton+	
POWELL	MR 5415	5125LT	106715	21	Matachewan Consolidated Mines Ltd.	↓		N	Y		30-Sep-2008	US$1/ton+	
CAIRO	MR 5417	5125LT	106715	21	Matachewan Consolidated Mines Ltd.	↓		N	Y		30-Sep-2008	US$1/ton+	
CAIRO	MR 5454	5125LT	106715	21	Matachewan Consolidated Mines Ltd.	↓		N	Y		30-Sep-2008	US$1/ton+	
CAIRO	MR 5455	5125LT	106715	21	Matachewan Consolidated Mines Ltd.	↓		N	Y		30-Sep-2008	US$1/ton+	
CAIRO	MR 5707	5125LT	106715	21	Matachewan Consolidated Mines Ltd.	↓		N	Y		30-Sep-2008	US$1/ton+	
POWELL	MR 5712	5125LT	106715	21	Matachewan Consolidated Mines Ltd.	139.321		N	Y		30-Sep-2008	US$1/ton+	
POWELL	MR 5397	5126LT	106716	21	Matachewan Consolidated Mines Ltd.	start ↓		N	Y		31-Dec-2014	US$1/ton+	
POWELL	MR 5398	5126LT	106716	21	Matachewan Consolidated Mines Ltd.	↓		N	Y		31-Dec-2014	US$1/ton+	
POWELL	MR 5401	5126LT	106716	21	Matachewan Consolidated Mines Ltd.	↓		N	Y		31-Dec-2014	US$1/ton+	
POWELL	MR 5403	5126LT	106716	21	Matachewan Consolidated Mines Ltd.	↓		N	Y		31-Dec-2014	US$1/ton+	
POWELL	MR 5406	5126LT	106716	21	Matachewan Consolidated Mines Ltd.	↓		N	Y		31-Dec-2014	US$1/ton+	
POWELL	MR 5408	5126LT	106716	21	Matachewan Consolidated Mines Ltd.	100.664		N	Y		31-Dec-2014	US$1/ton+	
POWELL	MR 5413	5127LT	106953	21	Matachewan Consolidated Mines Ltd.	19.142		N	Y		31-Mar-2015	US$1/ton+	
CAIRO	MR 9655	5128LT	106954	21	Matachewan Consolidated Mines Ltd.	10.927		N	Y		30-Apr-2015	US$1/ton+	P* W-LL-F1715
POWELL	MR 5991	5287LT	107051	21	Matachewan Consolidated Mines Ltd.	15.726		N	Y		31-Dec-2017	US$1/ton+	
CAIRO	537314	Active Claim			Northgate Minerals Corporation	16.188	1	N	N	Y	30-Sep-2009	US$1/ton+	
Licence of Occupation with Undersurface rights & Surface rights (Montreal River area)													
CAIRO	L0 1007		T18264		Matachewan Consolidated Mines Ltd.	2.995		Y	Y		N/A		W-LL-F1715
	24					**371.58**							

Note: Licence of Occupation L.1007 enables holder to remove all ores & minerals from land covered by water (see Title T18264)

Ontario MNDM Withdraw Order No.

W-LL-F1715: Living Legacy Withdraw area, P* indicates portion of claim withdrawn.

Shirriff Property

Northgate 100% subject to Agreement between Thomas J. Obradovich and John F. Shirriff dated September 25, 2001

Twp.	Title ID	Parcel No. or Claim Status	Lease No.	Term (Yrs)	Registered Tenure Holder	Area (ha.)	Units	Surface Rights	Mining Rights	Exploration Rights	Expiry / Renewal Date	Shirriff Royalty	Subject to Surface & Mining Rights Withdraw Order No.
POWELL	MR 5386	4982LT	106655	21	Northgate Minerals Corporation	start ↓		Y	Y		31-Mar-2014	2% NSR	
POWELL	MR 5400	4982LT	106655	21	Northgate Minerals Corporation	↓		Y	Y		31-Mar-2014	2% NSR	
POWELL	MR 5568	4982LT	106655	21	Northgate Minerals Corporation	↓		Y	Y		31-Mar-2014	2% NSR	
POWELL	MR 5569	4982LT	106655	21	Northgate Minerals Corporation	↓		Y	Y		31-Mar-2014	2% NSR	
POWELL	MR 5570	4982LT	106655	21	Northgate Minerals Corporation	↓		Y	Y		31-Mar-2014	2% NSR	
POWELL	MR 5657	4982LT	106655	21	Northgate Minerals Corporation	↓		Y	Y		31-Mar-2014	2% NSR	
POWELL	MR 5659	4982LT	106655	21	Northgate Minerals Corporation	↓		Y	Y		31-Mar-2014	2% NSR	
POWELL	MR 5922	4982LT	106655	21	Northgate Minerals Corporation	↓		Y	Y		31-Mar-2014	2% NSR	
POWELL	MR 6032	4982LT	106655	21	Northgate Minerals Corporation	↓		Y	Y		31-Mar-2014	2% NSR	
POWELL	MR 9835	4982LT	106655	21	Northgate Minerals Corporation	173.08		Y	Y		31-Mar-2014	2% NSR	
POWELL	MR 33919	5060LT	106881	21	Northgate Minerals Corporation	start ↓		Y	Y		31-Oct-2014	2% NSR	P* W-LL-F1715
POWELL	MR 33920	5060LT	106881	21	Northgate Minerals Corporation	↓		Y	Y		31-Oct-2014	2% NSR	
POWELL	MR 33921	5060LT	106881	21	Northgate Minerals Corporation	↓		Y	Y		31-Oct-2014	2% NSR	
POWELL	MR 33922	5060LT	106881	21	Northgate Minerals Corporation	↓		Y	Y		31-Oct-2014	2% NSR	
POWELL	MR 33923	5060LT	106881	21	Northgate Minerals Corporation	↓		Y	Y		31-Oct-2014	2% NSR	
POWELL	MR 33924	5060LT	106881	21	Northgate Minerals Corporation	↓		Y	Y		31-Oct-2014	2% NSR	
POWELL	MR 34250	5060LT	106881	21	Northgate Minerals Corporation	↓		Y	Y		31-Oct-2014	2% NSR	
POWELL	MR 34251	5060LT	106881	21	Northgate Minerals Corporation	↓		Y	Y		31-Oct-2014	2% NSR	
POWELL	MR 34252	5060LT	106881	21	Northgate Minerals Corporation	↓		Y	Y		31-Oct-2014	2% NSR	P* W-LL-F1715
POWELL	MR 34253	5060LT	106881	21	Northgate Minerals Corporation	139.843		Y	Y		31-Oct-2014	2% NSR	
POWELL	MR 34242	5365LT	107257	21	Northgate Minerals Corporation	start ↓		N	Y		30-Jun-2020	2% NSR	
POWELL	MR 34243	5365LT	107257	21	Northgate Minerals Corporation	20.598		N	Y		30-Jun-2020	2% NSR	
POWELL	MR 35807	5390LT	106880	21	Northgate Minerals Corporation	start ↓		Y	Y		31-Jul-2014	2% NSR	P* W-LL-F1715
POWELL	MR 38931	5390LT	106880	21	Northgate Minerals Corporation	↓		Y	Y		31-Jul-2014	2% NSR	P* W-LL-F1715
POWELL	MR 39023	5390LT	106880	21	Northgate Minerals Corporation	63.831		Y	Y		31-Jul-2014	2% NSR	W-LL-F1715
POWELL	MR 35902	5392LT	106882	21	Northgate Minerals Corporation	start ↓		N	Y		31-Jul-2014	2% NSR	W-LL-F1715
POWELL	MR 39022	5392LT	106882	21	Northgate Minerals Corporation	29.684		N	Y		31-Jul-2014	2% NSR	W-LL-F1715
POWELL	MR 40066	5391LT	106755	21	Northgate Minerals Corporation	start ↓		N	Y		31-Jul-2014	2% NSR	W-LL-F1715
POWELL	MR 40067	5391LT	106755	21	Northgate Minerals Corporation	32.65		N	Y		31-Jul-2014	2% NSR	W-LL-F1715
POWELL	MR 40068	5389LT	106757	21	Northgate Minerals Corporation	30.52		Y	Y		31-Jul-2014	2% NSR	W-LL-F1715
POWELL	MR 40071	5389LT	106757	21	Northgate Minerals Corporation	11.04		Y	Y		31-Jul-2014	2% NSR	W-LL-F1715
POWELL	MR 50439	5145LT	106876	21	Northgate Minerals Corporation	start ↓		N	Y		31-Dec-2015	2% NSR	W-LL-F1715
POWELL	MR 50440	5145LT	106876	21	Northgate Minerals Corporation	47.296		N	Y		31-Dec-2015	2% NSR	W-LL-F1715
POWELL	512587	Active			Northgate Minerals Corporation	16.188	1	N	N	Y	30-Sep-2009	2% NSR	
POWELL	512588	Active			Northgate Minerals Corporation	16.188	1	N	N	Y	30-Sep-2009	2% NSR	P* W-LL-F1715
POWELL	512589	Active			Northgate Minerals Corporation	16.188	1	N	N	Y	30-Sep-2009	2% NSR	P* W-LL-F1715
	36				**597.11**								

Ontario MNDM Withdraw Order No.

W-LL-F1715: Living Legacy Withdraw area, P* indicates portion of claim withdrawn.

Sedex Mining Corp. OKA Property

Northgate - 60%, with Option to earn additional 20%; Property subject to
Option and Joint Venture Agreement between 1519864 Ontario Limited & Sedex Mining Corp. dated October 1, 2002

Twp.	Title ID	Parcel No. or Claim Status	Lease No.		Registered Tenure Holder	Area (ha.)	Claim Units	Surface Rights	Mining Rights	Exploration Rights Only	Expiry / Renewal Date	Royalties	Subject to Surface & Mining Rights Withdraw Order No.
POWELL	1205862	Active Claim			Fred S. Kiernicki - 100%	16.188	1	N	N	Y	27-Apr-2010	Nil	
POWELL	1206077	Active Claim			Opawica - B/S Error; Steven Stanwick - 50% & Suzaane Guimond	5.059	1	N	N	Y	15-Sep-2010	3.0% NSR	
POWELL	1206081	Active Claim			Fred S. Kiernicki - 100%	16.188	1	N	N	Y	14-Dec-2010	3.0% NSR	
POWELL	1206147	Active Claim			Thomas J. Obradovich - 50% Canadian Royalties Inc. - 50%	16.188	1	N	N	Y	4-Apr-2010	2.5% NSR	
POWELL	1206148	Active Claim			Thomas J. Obradovich - 50% Canadian Royalties Inc. - 50%	16.188	1	N	N	Y	4-Apr-2010	2.5% NSR	
POWELL	1206150	Active Claim			Thomas J. Obradovich - 50% Canadian Royalties Inc. - 50%	16.188	1	N	N	Y	4-Apr-2010	2.5% NSR	
POWELL	1213838	Active Claim			Fred S. Kiernicki - 100%	48.56	3	N	N	Y	27-May-2011	3.0% NSR	
CAIRO	1223270	Active Claim			Thomas J. Obradovich - 100%	16.188	1	N	N	Y	17-May-2010	2.5% NSR	
POWELL	1223271	Active Claim			Thomas J. Obradovich - 100%	32.376	2	N	N	Y	10-Apr-2010	2.5% NSR	
POWELL	1223281	Active Claim			Thomas J. Obradovich - 100%	16.188	1	N	N	Y	17-May-2010	2.5% NSR	
POWELL	1223283	Active Claim			Thomas J. Obradovich - 100%	16.188	1	N	N	Y	10-Apr-2010	2.5% NSR	
POWELL	1223284	Active Claim			Thomas J. Obradovich - 100%	16.188	1	N	N	Y	10-Apr-2010	2.5% NSR	
POWELL	1223285	Active Claim			Thomas J. Obradovich - 100%	16.188	1	N	N	Y	10-Apr-2010	2.5% NSR	
POWELL	1223286	Active Claim			Thomas J. Obradovich - 100%	16.188	1	N	N	Y	10-Apr-2010	2.5% NSR	
POWELL	1223287	Active Claim			Thomas J. Obradovich - 100%	16.188	1	N	N	Y	10-Apr-2010	2.5% NSR	
POWELL	1223288	Active Claim			Thomas J. Obradovich - 100%	16.188	1	N	N	Y	10-Apr-2010	2.5% NSR	
POWELL	1224878	Active Claim			Alcanex Ltd. - 100%	16.188	1	N	N	Y	10-Apr-2010	3.0% NSR	
POWELL	3009961	Active Claim			Thomas J. Obradovich - 100%	16.188	1	N	N	Y	20-Sep-2010	2.5% NSR	
	18					**328.82**	21						

Young-Davidson Property

Northgate - 100%

Twp.	Title ID	Parcel No. or Claim Status	Lease No.	Term (Yrs)	Registered Tenure Holder	Area (ha.)	Claim Units	Surface Rights	Mining Rights	Exploration Rights Only	Expiry / Renewal Date	Royalty	Subject to Surface & Mining Rights Withdraw Order No.
CAIRO	537315	Active Claim			Northgate Minerals Corporation	8.094	1	N	N	Y	30-Sep-09	NIL	W-LL-F1715
CAIRO	537316	Active Claim			Northgate Minerals Corporation	2.023	1	N	N	Y	30-Sep-09	NIL	
CAIRO	537317	Active Claim			Northgate Minerals Corporation	8.094	1	N	N	Y	30-Sep-09	NIL	W-LL-F1715
POWELL	1207501	Active Claim			Northgate Minerals Corporation	16.188		N	N	Y	6-Apr-10	NIL	W-LL-F1715,F1600
POWELL	1207502	Active Claim			Northgate Minerals Corporation	259		N	N	Y	6-Apr-10	NIL	W-LL-F1715,F1600
POWELL	1207503	Active Claim			Northgate Minerals Corporation	32.376		N	N	Y	6-Apr-10	NIL	
YARROW	1207504	Active Claim			Northgate Minerals Corporation	259		N	N	Y	6-Apr-10	NIL	W-LL-F1715,F1600
POWELL	1207505	Active Claim			Northgate Minerals Corporation	194.256		N	N	Y	6-Apr-10	NIL	
YARROW	1207506	Active Claim			Northgate Minerals Corporation	242.82		N	N	Y	6-Apr-10	NIL	
YARROW	1207507	Active Claim			Northgate Minerals Corporation	259		N	N	Y	6-Apr-10	NIL	
POWELL	1207508	Active Claim			Northgate Minerals Corporation	48.564		N	N	Y	6-Apr-10	NIL	
POWELL	1207509	Active Claim			Northgate Minerals Corporation	64.752		N	N	Y	6-Apr-10	NIL	
POWELL	1207510	Active Claim			Northgate Minerals Corporation	16.188		N	N	Y	6-Apr-10	NIL	
POWELL	1207511	Active Claim			Northgate Minerals Corporation	48.564		N	N	Y	6-Apr-10	NIL	
POWELL	1207512	Active Claim			Northgate Minerals Corporation	16.188		N	N	Y	6-Apr-10	NIL	
POWELL	1207513	Active Claim			Northgate Minerals Corporation	16.188		N	N	Y	6-Apr-10	NIL	
POWELL	1207514	Active Claim			Northgate Minerals Corporation	64.752		N	N	Y	6-Apr-10	NIL	P* W-LL-F1715
YARROW	1207515	Active Claim			Northgate Minerals Corporation	32.376		N	N	Y	6-Apr-10	NIL	W-LL-F1715,F1600
YARROW	1207516	Active Claim			Northgate Minerals Corporation	129.504		N	N	Y	6-Apr-10	NIL	
CAIRO	1207518	Active Claim			Northgate Minerals Corporation	80.94		N	N	Y	6-Apr-10	NIL	P* W-LL-F1715
POWELL	1207521	Active Claim			Northgate Minerals Corporation	8.1347		N	N	Y	15-Sep-10	NIL	
POWELL	1207522	Active Claim			Northgate Minerals Corporation	16.188		N	N	Y	6-Apr-09	NIL	
POWELL	1207550	Active Claim			Northgate Minerals Corporation	16.188		N	N	Y	6-Apr-09	NIL	
CAIRO	1248827	Active Claim			Northgate Minerals Corporation	16.188		N	N	Y	7-Jun-09	0.5 % NSR	
CAIRO	1248828	Active Claim			Northgate Minerals Corporation	32.376		N	N	Y	7-Jun-09	0.5 % NSR	
CAIRO	1248829	Active Claim			Northgate Minerals Corporation	16.188		N	N	Y	5-Jun-09	0.5 % NSR	
CAIRO	3004550	Active Claim			Northgate Minerals Corporation	48.564		N	N	Y	16-Sep-10	NIL	P* W-LL-F1715
CAIRO	3004551	Active Claim			Northgate Minerals Corporation	32.376		N	N	Y	18-Sep-10	NIL	
POWELL	MR 12506	3858LT	19190	10	Northgate Minerals Corporation	22.237		Y	Y		30-Apr-13	NIL	
POWELL	MR 12507	3857LT	19191	10	Northgate Minerals Corporation	15.362		Y	Y		30-Apr-13	NIL	
POWELL	MR 12508	3856LT	19192	10	Northgate Minerals Corporation	12.93		Y	Y		30-Apr-13	NIL	
POWELL	MR 12509	3861LT	19197	10	Northgate Minerals Corporation	9.741		Y	Y		30-Apr-13	NIL	
POWELL	MR 12510	3860LT	19196	10	Northgate Minerals Corporation	14.225		Y	Y		30-Apr-13	NIL	
POWELL	MR 12511	3859LT	19195	10	Northgate Minerals Corporation	13.124		Y	Y		30-Apr-13	NIL	
POWELL	MR 12512	3855LT	19194	10	Northgate Minerals Corporation	12.351		Y	Y		30-Apr-13	NIL	
POWELL	MR 12610	3854LT	19193	10	Northgate Minerals Corporation	3.849		Y	Y		30-Apr-13	NIL	
POWELL	MR 5371	3104LT	19574	10	Northgate Minerals Corporation	14.933		Y	Y		30-Sep-17	NIL	
POWELL	MR 5372	3105LT	19575	10	Northgate Minerals Corporation	13.476		Y	Y		30-Sep-17	NIL	
POWELL	MR 5374	3106LT	19576	10	Northgate Minerals Corporation	10.522		Y	Y		30-Sep-17	NIL	
POWELL	MR 5375	3107LT	19577	10	Northgate Minerals Corporation	15.216		Y	Y		30-Sep-17	NIL	
POWELL	MR 5376	4215LT	19411	10	Northgate Minerals Corporation	17.766		Y	Y		30-Sep-16	NIL	
POWELL	MR 5383	3108LT	19578	10	Northgate Minerals Corporation	11.372		Y	Y		30-Sep-17	NIL	
POWELL	MR 5399	4314LT	18848	10	Northgate Minerals Corporation	21.893		Y	Y		31-Mar-17	NIL	
	43					2,194.07							

Surface Rights Only- Fee Simple Lot within MR5408 & Licence of Occupation - Davidson Lake area

Patent											
POWELL	CL4871/MR5408	23381			Northgate Minerals Corporation	0.228		Y	N		N/A
Licence of Occupation											
POWELL	MR 9839 et al	1207509	LO 11167		Northgate Minerals Corporation	24.127		Y	N		N/A
	2										

W-LL-F1715: Living Legacy Withdraw area, P* indicates portion of claim withdrawn.

W-LL-F1600: Living Legacy Withdraw area.

Opawica Explorations Inc.

Northgate Option to earn 55% interest in properties of Letter Agreement dated May 28, 2007 between Opawica Explorations Inc. & Northgate Minerals Corp., subject to the following Underlying Agreements.

In addition, Northgate has the right to acquire 100% interest of the surface rights (#) of certain claims held under the option.

Opawica Schedule A Lands: Welsh Property

Underlying Property Purchase & Sale Agreement dated Sept 27, 2006 b/w Estate of Ethel Welsh and Opawica Explorations Inc.

Twp.	Title ID	Parcel No. or Claim Status			Registered Tenure Holder	Area (ha.)	Claim Units	Surface Rights	Mining Rights	Exploration Rights Only	Expiry / Renewal Date	Royalty	Subject to Surface & Mining Rights Withdraw Order No.
Powell	1206013	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	26-Apr-08	2% NSR	
Powell	340615	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	4-Sep-08	2% NSR	
Powell	340616	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	4-Sep-08	2% NSR	
Powell	374013	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	4-Sep-08	2% NSR	
Powell	374014	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	4-Sep-08	2% NSR	
Powell	387779	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	4-Sep-08	2% NSR	
Powell	387780	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	4-Sep-08	2% NSR	
Powell	523195	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	30-Sep-09	2% NSR	
Powell	523196	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	30-Sep-09	2% NSR	
Powell	523197	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	30-Sep-09	2% NSR	
Powell	523198	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	30-Sep-09	2% NSR	
Powell	531566	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	# N	N	Y	30-Sep-09	2% NSR	
Powell	531567	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	# N	N	Y	30-Sep-09	2% NSR	
Powell	531568	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	30-Sep-09	2% NSR	
Powell	531613	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	# N	N	Y	30-Sep-09	2% NSR	
Powell	531614	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	# N	N	Y	30-Sep-09	2% NSR	
Powell	531615	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	30-Sep-09	2% NSR	
Powell	531815	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	30-Sep-09	2% NSR	
Powell	531816	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	30-Sep-09	2% NSR	
	19					307.57	19						

Opawica Schedule A Lands: Welsh-Furneaux Property

Underlying Property Purchase & Sale Agreement dated Sept 27, 2006 b/w Estate of Ethel Welsh, Mary Beth Furneaux and Opawica Explorations Inc.

Twp.	Title ID	Parcel No. or Claim Status	Lease No.	Term (Yrs)	Registered Tenure Holder	Area (ha.)	Claim Units	Surface Rights	Mining Rights	Exploration Rights Only	Expiry / Renewal Date	Vendors Royalty	Subject to Surface & Mining Rights Withdraw Order No.
Powell	374015	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	# N	N	Y	4-Sep-2008	2% NSR	
Powell	374016	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	# N	N	Y	4-Sep-2008	2% NSR	
Powell	374017	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	# N	N	Y	4-Sep-2008	2% NSR	
Powell	374235	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	# N	N	Y	4-Sep-2008	2% NSR	
Powell	374236	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	# N	N	Y	4-Sep-2008	2% NSR	P* W-LL-F1715
Powell	374237	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	4-Sep-2008	2% NSR	P* W-LL-F1715
Powell	374238	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	4-Sep-2008	2% NSR	P* W-LL-F1715
Powell	374239	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	4-Sep-2008	2% NSR	
Powell	374240	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	4-Sep-2008	2% NSR	
Powell	374241	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	4-Sep-2008	2% NSR	P* W-LL-F1715
Powell	374242	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	4-Sep-2008	2% NSR	P* W-LL-F1715
Powell	374243	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	4-Sep-2008	2% NSR	
	12					194.256	12						

Ontario MNDM Withdraw Order No.

W-LL-F1715: Living Legacy Withdraw area, P* indicates portion of claim withdrawn.

Opawica Schedule A Lands: Stanwick Property

Twp.	Title ID	Parcel No. or Claim Status	Lease No.	Term (Yrs)	Registered Tenure Holder	Area (ha.)	Claim Units	Surface Rights	Mining Rights	Exploration Rights Only	Expiry / Renewal Date	Royalty	Subject to Surface & Mining Rights Withdraw Order No.
Powell	1206306	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	28-Feb-2008	2% NSR	
Powell	1206307	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	# N	N	Y	28-Feb-2008	2% NSR	
Powell	511486	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	4-Sep-2009	2% NSR	
Powell	511487	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	4-Sep-2009	2% NSR	
Powell	511488	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	# N	N	Y	4-Sep-2009	2% NSR	
Powell	511489	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	4-Sep-2009	2% NSR	
Powell	511490	Active Claim			Opawica Explorations Inc. - 100%	16.188	1	N	N	Y	4-Sep-2009	2% NSR	
	7					**113.32**	7						

Opawica Schedule A Lands: Walker Property

Underlying Property Option Agreement dated January 24, 2007 between Reginald (Rick) Walker and Opawica Explorations Inc.

Twp.	Title ID	Parcel No. or Claim Status	Lease No.	Term (Yrs)	Registered Tenure Holder	Area (ha.)		Surface Rights	Mining Rights	Exploration Rights Only	Expiry / Renewal Date	Optionor Royalty	Subject to Surface & Mining Rights Withdraw Order No.
Powell	L372902	PCL5546	104927	21	Walker, Reginald F.	start ↓		N	Y		30-Sep-2008	2.5% NSR	
Powell	L372903	PCL5546	104927	21	Walker, Reginald F.	↓		N	Y		30-Sep-2008	2.5% NSR	
Powell	L373507	PCL5546	104927	21	Walker, Reginald F.	↓		N	Y		30-Sep-2008	2.5% NSR	
Powell	L367170	PCL5546	104927	21	Walker, Reginald F.	70.516		# N	Y		30-Sep-2008	2.5% NSR	
Powell	MR37455	4636LT	108116	21	Walker, Reginald F.	10.607		Y	Y		30-Sep-2008	2.5% NSR	
Powell	MR37456	4635LT	108117	21	Walker, Reginald F.	13.128		Y	Y		30-Sep-2008	2.5% NSR	
	6					**94.25**							

Opawica Schedule A Lands; Camking Property

Underlying Property Option Agreement dated June 30, 2006 between Camking Exploration & Resources Ltd. and Opawica Explorations Inc.

Twp.	Title ID	Parcel No. or Claim Status	Lease No.	Term (Yrs)	Registered Tenure Holder	Area (ha.)	Claim Units	Surface Rights	Mining Rights	Exploration Rights Only	Expiry / Renewal Date	Optionor Royalty	Subject to Surface & Mining Rights Withdraw Order No.
Powell	L372901	5501 1/2 LT	107875	21	Camking Exploration & Resources Ltd	↓		N	Y		31-Jul-2027	2% NSR	
Powell	L372904	5502 1/2 LT	107876	21	Camking Exploration & Resources Ltd	15.63		# N	Y		31-Jul-2027	2% NSR	
Powell	L372905	5502 1/2 LT	107876	21	Camking Exploration & Resources Ltd	15.63		# N	Y		31-Jul-2027	2% NSR	
Powell	L372908	5501 1/2 LT	107875	21	Camking Exploration & Resources Ltd	↓		N	Y		31-Jul-2027	2% NSR	
Powell	L372909	5501 1/2 LT	107875	21	Camking Exploration & Resources Ltd	↓		N	Y		31-Jul-2027	2% NSR	
Powell	L372910	5501 1/2 LT	107875	21	Camking Exploration & Resources Ltd	↓		N	Y		31-Jul-2027	2% NSR	
Powell	L372911	5501 1/2 LT	107875	21	Camking Exploration & Resources Ltd	89.715		N	Y		31-Jul-2027	2% NSR	
Powell	L367899	5502 1/2 LT	107876	21	Camking Exploration & Resources Ltd	15.63		N	Y		31-Jul-2027	2% NSR	
Powell	L367900	5502 1/2 LT	107876	21	Camking Exploration & Resources Ltd	15.63		N	Y		31-Jul-2027	2% NSR	
Powell	3006742	Active Claim			Fred S. Kiernicki - K19582	16.188	1	N	N	Y	1-May-2008	2% NSR	
	10					**168.42**							

4.3 Environmental Regulations

The Project will be required to comply with the Province of Ontario environmental legislation as well as with specific pieces of Federal legislation, where such jurisdiction exists. AMEC has assisted Northgate with implementing a program to meet the permitting and approval requirements for the Young-Davidson project site and necessary offsite infrastructure. A list of existing and required permits for construction and operation of the mine is displayed in Table 4-2.

4.3.1 Existing Environmental Approvals

A number of environmental approvals remain valid from the late 1990's when the site was explored by Royal Oak Mines. These include:

- A Closure Plan (approved in 1996)
- A Certificate of Approval for Industrial Sewage Works originally approved in 1996 (#4-0053-96-987) and amended and consolidated in 1998 (#4-0053-96-987).

In order to support advanced exploration activities, Northgate submitted a certified amendment to the original Closure Plan (August 2006), amended the existing Certificate of Approval (#4-0053-96-987; September 2006) and obtained a Permit to Take Water to allow shaft dewatering (#8331-6XDQF3; January 2007).

4.3.2 Required Environmental Approvals

Additional environmental approvals will be required to construct, operate and close the new mine. On September 19, 2007 the Canadian Environmental Assessment Agency instructed Northgate that the project design as presented in an Environmental Prospectus did not trigger the *Canadian Environmental Assessment Act* process. As a result, the Young-Davidson project will not require completion of a Federal Environmental Assessment (EA).

Three Provincial class EAs are anticipated to require completion based on the current project design:

- Ministry of Transportation Class EA for Provincial Transportation Facilities
- Ministry of the Environment Class EA for Electricity Projects
- Ministry of Natural Resources Class EA for MNR Resource Stewardship and Facility Development Projects.

There is also the potential that a Class EA for Provincial Parks and Conservation Reserves could be required, pending completion of detailed land tenure investigations and placement of Project-related facilities. The Young-Davidson Project site is located close to the West Montreal River Provincial Waterway Park.

Table 4-2: Permits Applied for and/or Granted

Permit/Licence/Assessment	Agency Responsible	Description
Closure Plan Amendment *Mining Act*	Ministry of Northern Development and Mines	For mine production
Comprehensive Certificate of Approval – Air and Noise *Environmental Protection Act*	Ministry of the Environment	Approval to discharge air emissions and noise
Amendment to Certificate of Approval – Industrial Sewage Works *Ontario Water Resources Act*	Ministry of the Environment	Approval to treat and discharge effluent (mine / pit water, TIA, septic field, oil water separator)
Certificate of Approval – Waste Disposal *Environmental Protection Act*	Ministry of the Environment	Operation of a landfill and/or waste transfer site
Permits to Take Water *Ontario Water Resources Act*	Ministry of the Environment	Water takings from surface or ground water (multiple permits expected to be required)
Forest Resource Licence (Cutting Permit) *Crown Forest Sustainability Act*	Ministry of Natural Resources	Clearing of Crown merchantable timber
Plans and Specifications Approval *Lakes and Rivers Improvement Act*	Ministry of Natural Resources	Dams and dikes in watercourses, including tailings impoundment area
Work Permit *Public Lands Act*	Ministry of Natural Resources	Work / construction on Crown land
Land Use Permit *Public Lands Act*	Ministry of Natural Resources	Temporary form of tenure for Crown land (transmission line)
Leave to Construct *Ontario Energy Board Act*	Ontario Energy Board	Approval to construct a transmission line
Approval of Works in Navigable Waters *Navigable Waters Protection Act*	Transport Canada	Construction of transmission line crossing over the West Montreal River.
Letter(s) of Advice *Fisheries Act*	Fisheries and Oceans Canada	Disruption to creeks and ponds supporting fish populations; approval for groundwater dewatering effects.
Licence for a Magazine for Explosives *Explosives Act*	Natural Resources Canada	Construction and operation of an explosives magazine.

4.4 Agreements

Northgate is working to establish and maintain cooperative relationships with the Matachewan First Nation (MFN), the closest First Nation to the Project site. The MFN community is located on Indian Reserve (IR) 72 approximately 10 km north of the

Town of Matachewan and has an area of approximately 4,160 ha (INAC 20071[1]). The MFN is one of seven First Nation members of the Wabun Tribal Council, is a signatory of Treaty 9 and is affiliated with the Nishnawbe-Aski Nation. Northgate has signed a Memorandum of Understanding with the MFN which addresses a joint consultation approach.

The Young-Davidson Project is bound by two royalty agreements: one on the Welsh claims and the other one on the MCM claims.

4.5 Environmental and Socio-Economic Issues

As the Project involves the redevelopment of an area where two mines previously operated (Matachewan Consolidated Mine and and Young-Davidson Mine) there is historic environmental liability associated with the property. This includes:

- Historic concrete building foundations and structures.
- Six open pits including the Young-Davidson Pit together having a surface expression of 3.1 ha.
- Extensive underground workings (approximately 19 km and more than 20 levels).
- 'The Boundary Pit' which represents a stope open to surface and has a surface expression of 0.9 ha.
- Three shafts.
- Five historic tailings storage areas covering approximately 78 ha; only one of these areas covering approximately 2.4 ha is potentially acid generating (tailings from the custom milling of ore from the Matarrow Mine).
- Mine rock stockpiles.

The historic mining operations appear to have been closed in a manner consistent with industry standards, regulatory reclamation requirements at the time and the former operator's policies. The historic tailings areas are actively eroding and are prone to becoming airborne or washing downslope. Some of the other facility remnants may pose a physical hazard.

Reclamation of these historic liabilities is addressed in the closure plan prepared on behalf of Royal Oak Mines in 1996. AMEC has not reviewed the assessment of costs associated with this closure plan.

Northgate submitted a certified amendment to the original Closure Plan in August 2006 to address the then proposed advanced exploration work that is now underway.

1[1] Indian and Northern Affairs Canada 2007. http://pse2-esd2.ainc-inac.gc.ca/FNProfiles/FNProfiles_home.htm

AMEC understands that financial assurance for the reclamation and monitoring associated with the original and amended closure plans has been provided to the Ministry of Northern Development and Mines for a total amount of $539,100 (Northgate Minerals, 2006).

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

5.1 Accessibility

The Project site is 3 km west of the community of Matachewan in northern Ontario. Kirkland Lake is 60 km east of the project site and Timmins, which is the regional centre, is located 170 km by road northwest of the site (Figure 4-1). There are a number of other communities also within reasonable daily commute distance to the Young-Davidson Project. The Matachewan First Nation Indian Reserve, located approximately 12 km north of the site, is the closest First Nation community to the site.

The site is connected by means of Highway 566 to the northern Ontario highway network. A new bridge across the West Montreal River at Matachewan allows ready transport of large equipment. Relocation of a section of Highway 566 is proposed to support Project development as a portion of the existing highway intersects the proposed open pit.

5.2 Climate

The Matachewan area experiences cold winters and warm summers, typical of most of northern Ontario. The nearest climatic station to the site is Kirkland Lake, located approximately 55 km to the northeast, and serves as the reference station for the project site. The climate in Kirkland Lake can be summarized as follows, based on climate normal data (1950 to 1995):

- Average annual daily temperature is 1.7°C. Monthly average daily temperatures range from -16.9°C in January to 17.6°C in July.
- Precipitation averages 790 mm/yr. The highest average monthly precipitation generally occurs in September with 95.8 mm. The lowest average precipitation falls in February with 47.1 mm.
- The maximum average monthly snowfall is 123.2 cm falling during the month of January (Environment Canada 2007).

Information on wind speed and direction is not available for the Kirkland Lake station. The next closest weather station to the project site is in Timmins approximately 70 km to the northwest. Winds in Timmins are gentle to moderate, averaging 11.9 km/h annually. Monthly averages range from 9.8 km/h to 13.5 km/h, with calmer conditions prevailing during the summer months.

5.3 Local Resources and Infrastructure

The site is currently connected to the provincial electrical grid by a 44 kV transmission line. The line is heavily loaded and there is no excess capacity. Redevelopment of the property will require existing transmission line upgrades and new transmission line construction.

In AMEC's opinion, the current status on mining rights enables Northgate to proceed with the development of a mining operation on the Young-Davidson property.

Matachewan is located near Kirkland Lake and Timmins, two mining towns with a significant pool of personnel that would allow Northgate to recruit and retain employees during the life of mine of the proposed open-pit and underground mines.

A comprehensive investigation was completed to ascertain the most appropriate tailings impoundment area location balancing all factors. AMEC believes a geotechnically acceptable location has been selected that has benefits from the environmental approvals perspective. This site does not require approval through a federal Environmental Assessment process, nor listing on Schedule 2 of the Metal Mining and Effluent Regulations, Fisheries Act.

Several locations are available to store mine waste rock on the property over the life of mine. The preferred location is on top of a previously disturbed area, which is expected to be capable of storing all mine rock produced, although other locations including in-pit disposal are possible.

AMEC has reviewed the proposed location of the process plant and is of the opinion that Northgate has sufficient room to build and operate the process plant during the expected life of mine.

5.4 Physiography and Vegetation

The project site is located on a raised plateau within an area of rugged hummocky terrain and significant topographic relief. Elevation changes in the range of 20 m to 50 m are common. Elevation at the project site is approximately 350 m above mean sea level (amsl) while the West Montreal River is only 300 m amsl.

The local area has been defined as bedrock knobs with subdominant areas of ground moraine or till (Roed and Hallett 1979). Shallow soils are present, within limited organic topsoil. Sandy loam soil characterizes the area surrounding the project area. The low areas between the bedrock knobs often contain waterbodies or marsh areas.

Undisturbed portions of the site are covered by a conifer-dominated boreal forest. Dominant species within the local forest stands include: balsam fir, black spruce, white birch with some white spruce and trembling aspen. This vegetation is typical of the region and representative of the local climate and subsurface conditions.

6.0 HISTORY

Historical records show that the local area was first staked by two prospectors in 1910: Jake Davidson identified the Young-Davidson prospect and Sam Otisse the Matachewan Consolidated prospect. This eventually led to gold production between 1934 and 1956 from two significant gold mines located in close proximity: the Young-Davidson Mine and the Matachewan Consolidated Mine. The mines together produced approximately 970,000 oz of gold from 9.8 Mt of ore (SWRPA 2007).

There was no mining on the property from 1956 until Pamour Porcupine Mines Limited operated a short-lived, small, open pit mine to extract near surface mineralization between 1981 and 1982. All ore was trucked offsite and there was no processing on site or tailings resulting from this operation. Since that time there were a series of exploration programs conducted by Pamour Porcupine Mines Limited, and its successors Pamour Inc. and Royal Oak Mines between 1982 and the mid-1990's but no further mining on the property.

Royal Oak Mines Inc. (RYO) continued its involvement in the property and completed a number of engineering studies and environmental baseline investigations between 1995 and 1997. It is Northgate's understanding that RYO withdrew from the environmental approvals process for corporate reasons prior to its completion. The property remained inactive for a number of years after this withdrawal.

Northgate became interested in the Matachewan area for its exploration potential and in November 2005 Young-Davidson Mines Limited became a wholly-owned subsidiary. Northgate owns 100% of mineral rights to all of the Young-Davidson Mine and Matachewan Consolidated Mine claims.

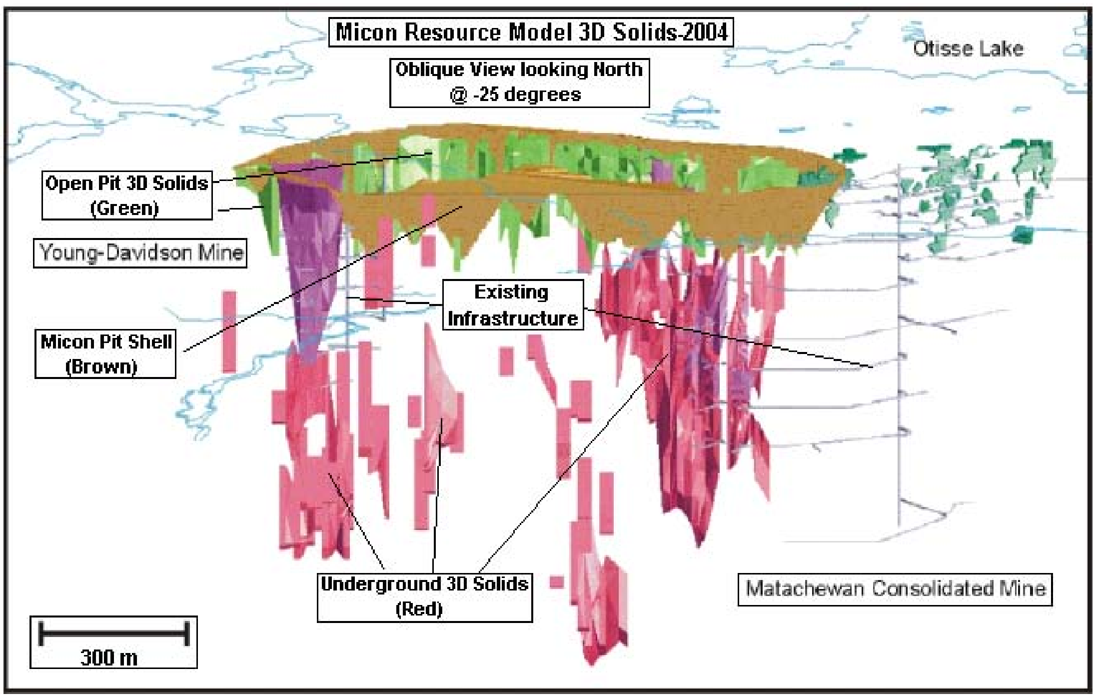
6.1 Historical Production and Exploration

The following summary of past exploration and production on the YD Property is excerpted mostly from Micon (2004). Almost one million ounces of gold has been produced from the YD Property (Table 6-1). The underground development, stopes, and the YD carrot-shaped glory hole are shown in Figure 6-1.

Table 6-1: Historical Production at the Young-Davidson Property (SWRPA, 2007)

Northgate Minerals Corporation: Young-Davidson Property				
Period	Mine	Tons	Grade (oz/ton Au)	Contained Ounces Au
1934 to 1957	YD	6,218,272	0.094	585,690
1934 to 1954	MCM	3,525,200	0.107	378,101
1981 to 1982	MCM	106,000	0.069	7,314
Total		**9,849,472**	**0.099**	**971,105**

Figure 6-1: Historical Development and Micon Mineralized Models (After SWRPA, 2007)



A chronological listing of the historical exploration and development work on the main claim groups is summarized below.

6.1.1 Young-Davidson Property

A great deal of work has been done on the YD Property over the years, beginning with the initial gold discovery on the Davidson Claims by Mr. Jake Davidson in 1916.

Since then, much exploration and development has been done on the property, including excavation of two shafts, six production levels, and one exploration level. Production of gold from this property took place mainly from 1934 to 1957. A brief chronological summary is detailed below:

- 1916-1933: Young-Davidson Mines Ltd.: surface prospecting, hand trenching and stripping. Pre-production activities.
- 1934-1957: Hollinger Corporation: production of gold under contract from Young-Davidson Mines. According to records maintained by the Ontario Geological Survey, a total of 6,218,272 tons were produced at an average grade of 0.094 oz/ton Au (585,690 oz Au).
- 1979: Pamour: concluded Option Agreement.
- 1980: Pamour: Diamond drilling, 44 holes totalling 12,841 feet (ft).
- 1986: Pamour: additional diamond drilling in Boundary Pit Area, 84 holes totaling 32,130 ft.
- 1988: Pamour: diamond drilling, 10 holes totalling 3,882 ft, testing shallow targets and upper portions of the Boundary Zone.
- 1989: Pamour: diamond drilling, 10 holes totalling 13,052 ft, testing Boundary Zone (underground target).
- 1990: Pamour: diamond drilling, 34 holes, testing several targets in syenite.
- 1995: Royal Oak Mines Inc: diamond drilling, 68 holes totalling 71,102 ft that tested selected underground targets, and testing for the western and depth extensions of the open pit mineralization 1996: Royal Oak Mines Inc: diamond drilling, 23 holes totalling 11,832 ft, confirming the western and depth extensions of the open pit mineralization, and to confirm the assay values indicated by the 1980 vintage drill holes.
- 1997: Royal Oak Mines Inc: diamond drilling, 9 holes totalling 3,383 ft.
- 2003: Young-Davidson Mines, Limited: diamond drilling, 10 holes totalling 5,407 ft.

6.1.2 Matachewan Consolidated Mines Property

The initial gold discovery on the adjoining Davidson Claims in 1916 sparked a staking rush which resulted in the discovery of gold on the MCM property later that year. Since then, much exploration and development has been done on the property, including excavation of three shafts and eleven production levels. Production of gold from this property took place mainly from 1934 to 1954. A brief chronological summary is detailed below:

- 1916: Discovery of gold on the mine property by Samuel Otisse.
- 1916-1933: Ventures Limited: surface prospecting, hand trenching and stripping. Pre-production activities.
- 1934-1954: Ventures Limited: production period. According to records maintained by the Ontario Geological Survey, a total of 3,525,200 tons were produced at an average grade of 0.107 oz/ton Au (378,101 oz Au).
- 1980: Pamour: concluded Option Agreement.
- 1981-1982: Pamour: gold production from five small open pits, whole ore trucked back to Pamour mill for processing. Internal company documents indicate that 106,000 tons at an average grade of 0.069 oz/ton Au were produced (Skeeles, 1989).
- 1995: Royal Oak Mines Inc.: diamond drilling, 34 holes totalling 22,984 ft testing for the eastern extensions of the open pit mineralization.
- 1996: Royal Oak Mines Inc.: diamond drilling, 6 holes totalling 2,717 ft testing for the eastern extensions of the open pit mineralization. Commencement of an underground exploration program in the fall of 1996 and proceeding through to the Fall of 1997. Work completed included dewatering to the 9th Level loading pocket, shaft rehabilitation to the 8th Level station, and geological mapping and sampling to the 5th Level. Preparation of necessary documentation to produce a Comprehensive Study Report and Environmental Impact Statement in fulfillment of the requirements outlined in the Canadian Environmental Assessment Act.
- 1997: Royal Oak Mines Inc: trenching program, including geological mapping and channel sampling. Reconnaissance level Induced Polarization (IP) survey.
- 2000: 1519864 Ontario, Limited: diamond drilling, 11 holes totalling 983 ft to test for the presence of gold mineralization in the crown pillars of selected stopes. Limited stripping and trenching.
- 2002: Young-Davidson Mines, Limited: Line cutting, IP and magnetometer surveys, soil sampling, trenching, and geological mapping of the area located from the MCM #3 shaft eastwards to the Montreal River. Diamond drilling, 21 holes totalling

12,793 ft to test selected IP anomalies or geological targets for their potential of hosting significant gold values.

- 2003: Young-Davidson Mines, Limited: Diamond drilling, 37 holes totalling 17,759 ft.

6.1.3 Welsh Claims

- 1916: Discovery of gold on adjoining claims.
- 1979: Pamour: concluded Option Agreement.
- 1986: Pamour: diamond drilling to test for the western extension of the Boundary Pit mineralization.
- 1995: Royal Oak Mines Inc.: diamond drilling, total 4,982 ft in 18 holes.
- 1996: Royal Oak Mines Inc.: diamond drilling, total 1,375 ft in 7 holes.
- 1997: Royal Oak Mines Inc.: diamond drilling, total 2,812 ft in 6 holes.

6.1.4 Shirriff Claims

- 1936: Matachewan Consolidated Mines: 3 drill holes completed on the Shirriff claims just south of the YD Mine.
- 1949: British Matachewan Gold Mines Ltd.: Diamond drilling, 1 hole (1,001 ft).
- 1960-1966: British Matachewan Gold Mines Ltd.: Diamond drilling, 7 holes totaling 3,858 ft.
- 1971: British Matachewan Gold Mines Ltd.: Magnetic and electro-magnetic (EM) surveys in the Mistinikon Lake area. Diamond drilling, 2 holes.
- 1973: British Matachewan Gold Mines Ltd.: IP survey.
- 1990: Pamour: Line cutting, magnetic and CSAMT surveys, geological mapping, diamond drilling (4,335 ft in one complete hole, 1 partial hole, crossing claim boundary (YD90-21)).
- 1994: Royal Oak Mines Inc.: Minor line cutting, diamond drilling (9,568.1 ft in 3 holes).
- 1995: Royal Oak Mines Inc.: Minor line cutting, diamond drilling (4,801 ft in 3 holes).
- 2003: Young-Davidson Mines, Limited: Diamond drilling, one hole totalling 2,579.7 ft to search for the western depth projection of the Young-Davidson deposit.

6.1.5 Schaus-Clarke-Shirriff Claims

The MNDM assessment files have no records of exploration activities conducted on the Schaus-Clarke-Shirriff claims.

6.2 Previous Mineral Resource Estimates

Details from a previous Micon resource estimate are disclosed in a NI 43-101 technical report dated August 2004.

In December 2006, Scott Wilson, Roscoe, Postle and Associates (SWRPA) estimated the underground Mineral Inventory for the Lower Boundary Zone, the Lucky Zone, and the Lower YD Zone.

7.0 GEOLOGICAL SETTING

7.1 Regional Geology

The YD Property is located within the southwestern part of the Abitibi Greenstone Belt, which is the largest preserved Archean greenstone belt in the world and one of the most continuous units of the Superior Geologic Province. The Abitibi Greenstone Belt extends for 750 km from the Grenville Province in the east to the Kapuskasing Gneiss Belt in the west, and for over 170 km from the Opatica Gneissic belt in the north to the Proterozoic Huronian sediments in the south (Figure 7-1).

The Abitibi Greenstone Belt consists of a complex and diverse array of volcanic, sedimentary, and plutonic rocks typically metamorphosed to greenschist facies grade, but locally attaining amphibolite facies grade adjacent to large plutons and along the Grenville Front.

Volcanic rocks range in composition from rhyolitic to komatiitic, and commonly occur as mafic to felsic volcanic cycles. Sedimentary rocks consist of both chemical and clastic varieties, and occur as both intravolcanic sequences and as uncomformably overlying sequences. A wide spectrum of mafic to felsic, pre-tectonic, syn-tectonic and post-tectonic intrusive rocks is present. All lithologies are cut by late, generally northeast-trending Proterozoic diabase dykes.

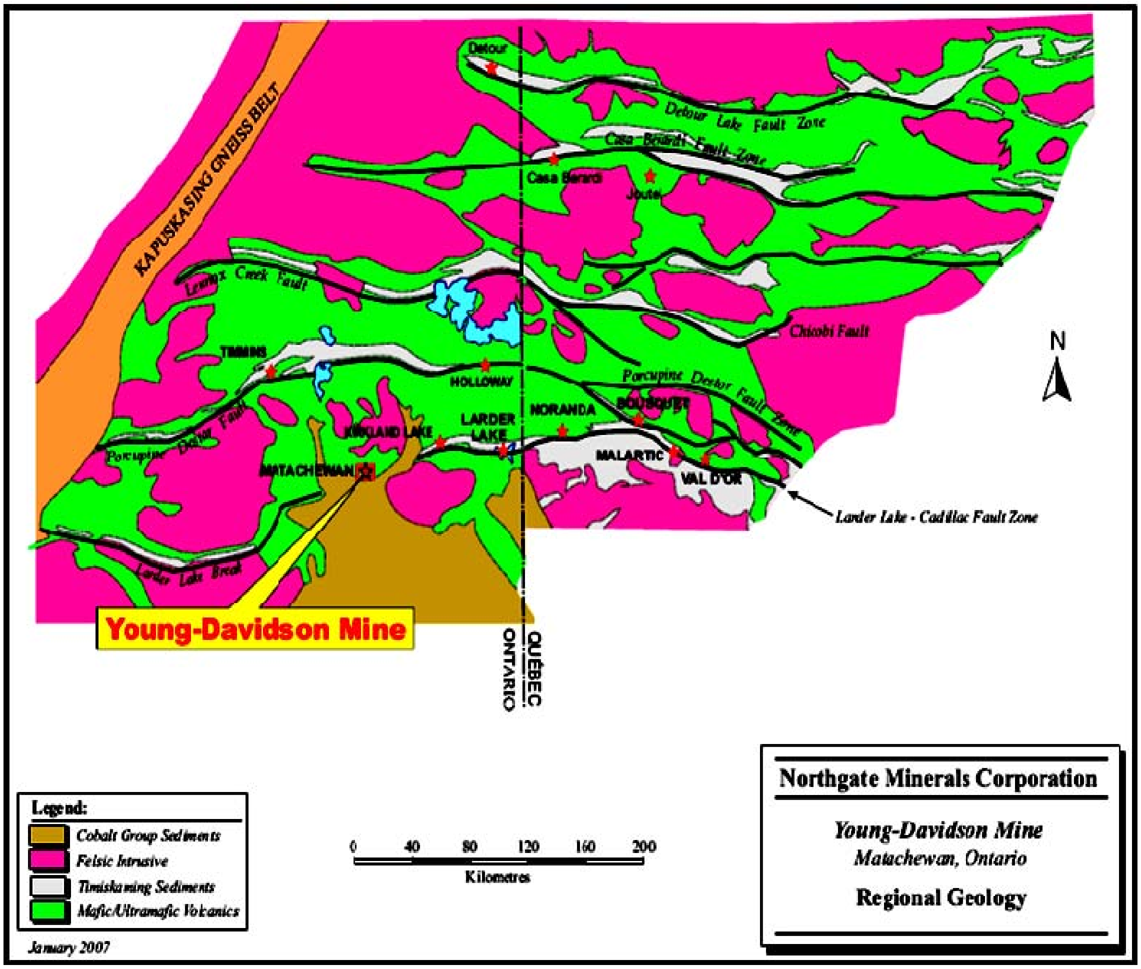
The Abitibi Greenstone Belt rocks have undergone a complex sequence of deformation events ranging from early folding and faulting through later upright folding, faulting and ductile shearing, resulting in the development of large, dominantly east-west trending, crustal-scale structures ("breaks") that form a lozenge-like pattern.

The regional Larder Lake-Cadillac Fault Zone (LLCFZ) cuts across the YD Property. The LLCFZ has a sub-vertical dip, and generally strikes east-west. The LLCFZ is characterized by chlorite-talc-carbonate schist, and the deformation zone can be followed for over 200 km from west of Kirkland Lake to Val d'Or.

7.2 Local and Property Geology

In general, the Archean volcanic rocks comprise two similar volcanic sequences characterized by basal komatiitic units, and overlain by magnesium and iron tholeiitic units, which finally grade into calc-alkaline volcanic rocks. The oldest rocks of these sequences are 2,747 million years (Ma), while the youngest are 2,700 Ma (Corfu et al., 1989); at Matachewan, they are likely correlative to the Larder Lake Group.

Figure 7-1: Regional Geology of the Young-Davidson Property (SWRPA, 2007)



There are three important groups of Archean sedimentary rocks in the district. The oldest are the Pontiac Group quartz greywackes and argillites, which occur as thick assemblages in Québec, while interbedded within the Larder Lake Group volcanic rocks are turbiditic siltstones and greywackes of the Porcupine Group. Uncomformably overlying the former is the Timiskiming Group conglomerates, turbidites and iron formations, with minor interbedded alkalic volcaniclastic units.

Archean intrusive rocks are numerous in the district, but are largely manifested as small stocks, dykes and plugs of augite syenite, syenite and feldspar porphyry occurring in close temporal and spatial association with the distribution of Timiskiming Group sediments.

Huronian Proterozoic sedimentary rocks onlap and define the southern limit of the Abitibi in Ontario. In the project area, these rocks are correlative to the Gowganda Formation, which is a tillite yielding an age date of 2,288 ±87 Ma (Fairbairn et al., 1969).

Post-Archean dyke rocks include Matachewan Diabase (2,454 ±2 Ma; Heaman, 1988) and Nipissing Diabase (2,219 ±4 Ma) (Corfu and Andrews, 1986), which respectively bracket the Huronian unconformity in the project area.

The local and property geology and stratigraphy are shown in Figures 7-2 and 7-3, respectively.

7.3 Lithology

The lithologic assemblage exposed on the YD Property is described below in order of super-position or from the oldest to youngest (Edmunds, 2007). The descriptions and interpretations are based on previous studies (Micon, 2004; PGI, 2003; Powell et al., 1991) complemented by direct core observations.

7.3.1 Larder Lake Group (Archean)

The Larder Lake Group is intermittently exposed in the central eastern portion of the property. It is composed of interbedded mafic to ultramafic flows of tholeiitic to komatiitic composition and interflow volcanic-derived sediments. The ultramafic rocks occur as dark grey-green, talc-chlorite+carbonate schists with all primary textures destroyed by metamorphism and deformation. In core, these units range from 15 m to 100 m in intersected thickness.

Tholeiitic basalts occur as finer grained massive featureless chlorite sericite schists, often grey-green in colour. Areas exposed at surface northeast of the #2 Shaft show well developed pillow textures indicating younging directions to the south. Some core holes have intersected narrow sections of mafic lapilli tuffs and related fragmental breccias. The proportion of ultramafics in the Larder Lake rocks varies across the property, and appears to increase towards the west.

Figure 7-2: Local and Property Geology of the Young-Davidson Property (SWRPA, 2007)

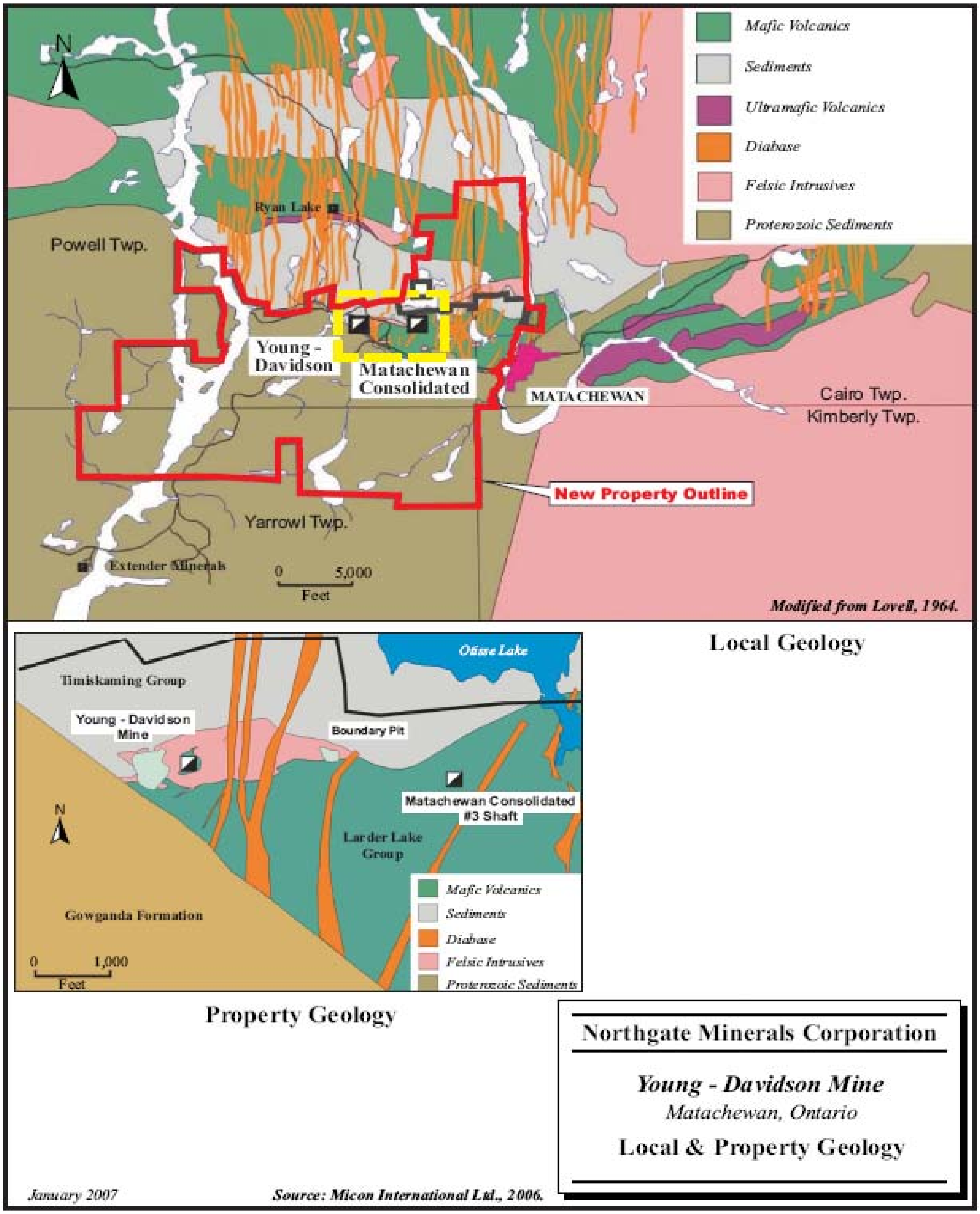
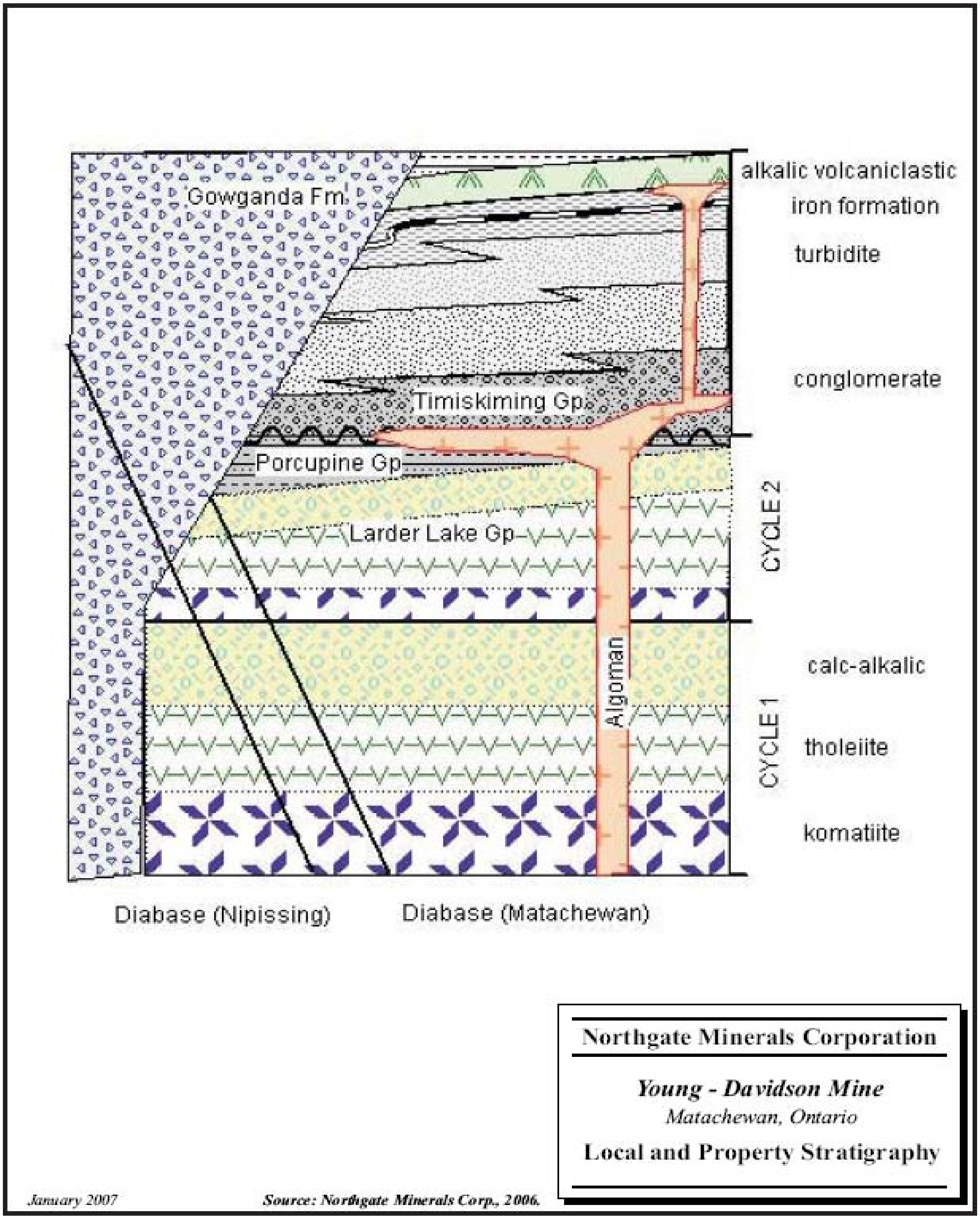


Figure 7-3: Local and Property Stratigraphy of the YD Property (SWRPA, 2007)



7.3.2 Timiskiming Group (Archean)

The Timiskiming Group dominates the northern reaches of the property and, at surface, is presented as a monotonous sequence of quartz-wackes, greywackes, and siltstones. There are rare surface exposures of the contact between Larder Lake Group and Timiskiming sediments, and these often show a basal polymictic conglomerate composed of clasts ranging from 1 centimetre (cm) to 3 cm diameter. This observation implies an opposing or northerly younging direction for the Timiskiming assemblage. Core logging of deeper drill holes has identified polymictic fragmental units within the Timiskiming, which have been described as jasperoidal sediments due to the presence of chert clasts. These fragmental units may correspond to the basal conglomerate.

7.3.3 Gowganda Formation (Proterozoic)

Gowganda Formation rocks are dominated by red to brown-grey interbedded conglomerates (tillites), mudstones, and sandstones, which can be massive to well-bedded in sections. The glaciogenic origin for these sediments is suggested by the presence of drop stones in otherwise massive graded units. The contact between the base of the Gowganda and the underlying rocks is always very sharp, but has only been observed in drill core. The Gowganda Formation covers the southern two thirds of the property.

7.3.4 Intrusive Rocks

The most abundant Algoman intrusive rocks are dominated by syenite feldspar porphyry and trachytic syenite porphyry. These units are often composed of 30% to 70% fine to coarse-grained alkali feldspar phenocrysts, set in a finer-grained compositionally similar matrix. Alteration affects the colour of the syenite units, and ranges from economically significant brick red to brown or grey. The “trachytic” term is used to describe flow-aligned feldspar laths in certain sections of syenite, which can range up to 3 cm in length.

The Matachewan area is well known for diabase dykes, and those that affect the area covered by the exploration work are Matachewan diabases, which occur as dark grey-green dykes with fine to medium grain size, often showing chill-bake margins and feldspar textures that vary from glomerophyric to massive.

7.4 Structural Geology

Recent structural studies completed by PGI (2003) have documented the main structural events on the property and are summarized below.

On a regional scale, some important large-scale features transect or are in close proximity to the property. The regionally extensive and economically significant LLCFZ has been interpreted to either pass through the property (MERQ, 1983), or breaks into three splays (Powell et al., 1991). The southernmost of these splays is interpreted by Powell el al. (1991) to cross the property on the contact between the Timiskiming and Larder Lake Groups. The presence of a polymictic basal conglomerate in the Timiskiming suggests that the extension of the break may be south of this unconformity.

The Larder Lake units trend east-west, dip steeply south at 70°, and are upright such that they young to the south. Timiskiming units trend in a similar manner; however, they are overturned and, although younger, form the structural footwall to the Larder Lake Group volcanic rocks. The unconformity trends east-west for much of the property; however, it swings to the north along steeply plunging fold axes east of the main mass of syenite.

The syenite occurs near the unconformity, and appears to transgress the Archean contact, such that it is much closer to the Larder Lake Group in the east as compared to the west, where it is fully enveloped by Timiskiming sediments near surface and at depth. The main mass measures almost 1,000 m east-west by 300 m north-south, and its western limits are poorly defined. Minor apophyses of syenite occur sporadically within 500 m of the unconformity, and some portions of the deformational history have affected it, as the dykes are folded and faulted.

The Gowganda Formation forms a progressively thickening southward dipping wedge that rapidly increases in thickness towards the southwest, suggesting significant pre-Gowganda topography.

PGI (2003) confirmed the previous interpreted structural history for the property. There are at least three Archean tectonic events, followed by Proterozoic and Palaeozoic deformation. The first Archean event involved isoclinal folding, uplift, and erosion of the Larder Lake Group volcanic rocks, such that a pre-Timiskiming downward-facing limb of an isocline underlies part of the property. No fabric has been associated with this event (D1).

The second Archean event is major in terms of establishing rock fabrics, and affects the previously deformed Larder Lake Group, Timiskiming Group, and Algoman intrusive rocks, as well as gold-bearing quartz vein structures and associated alteration (D2). Schistosity forms the main D2 fabric defined by the preferred orientation of phyllosilicates, and flattening of clasts in conglomerate units (Powell, 1991).

The third Archean structural event ranges from a weakly developed northeast to southwest crenulation cleavage to a complete transposition of earlier fabric elements (D3). Mineral and elongation lineation is a feature of the D3 event, and workers such as Derry (1948) and Powell et al. (1991) have noted that this direction parallels the trend of mineralization at the YD Property. Both Powell et al. (1991) and PGI (2003) consider a fourth Archean deformation event that produced steeply plunging open folds associated with north-northeast to north-northwest striking axial planar cleavage. This event may be a macroscopic feature related to the later stages of the D3 crenulation event.

7.5 Metamorphism

The rocks in the townships surrounding Matachewan have undergone regional metamorphism ranging from prehnite-epidote facies in Bannockburn to greenschist facies (actinolite-epidote-chlorite for metabasalts) in Powell Township, closest to the YD Project area (Powell, 1991). These assemblages correspond to a regional low-pressure-temperature event with temperatures up to 250 °C, at burial depths in the order of 6.5 km. This event appears to be synchronous with the D2 structural event (Powell, 1991).

7.6 Alteration

The most obvious form of alteration in the volcanic units of the Larder Lake Group is extensive carbonate alteration, manifested by distal calcite and proximal iron carbonate adjacent to mineralization. Timiskiming sediments show a comparatively minor amount of carbonate alteration; however, they can become hematitic adjacent to mineralized portions of the syenite masses.

The predominant alteration empirically associated with syenite-hosted gold mineralization is quartz veining, microcline development, and sulphidation in the form of increased pyrite content with accessory chalcopyrite, sphalerite and galena. Semi-quantitative ICP analyses show that, through mineralized sections of syenite, iron contents remain relatively constant, while sulphur, pyrite and gold contents vary antithetically with magnetic susceptibility and reported ICP barium. This suggests that iron oxide as magnetite is being reduced during the mineralizing process, and the silicates are metasomatized capturing barium in an insoluble silicate such as barian feldspar. Thin section petrology may help understand some of these observations from the ICP analyses.

8.0 DEPOSIT TYPE

The syenite-hosted gold deposits, commonly associated with quartz-monzonite to syenite stocks and dikes, has been individualized as a distinct group of gold deposits, well represented in the Abitibi Greenstone belt (Salvi and Williams-Jones, 2004), and particularly at the Porcupine and Kirkland Lake districts, Northern Ontario.

According to Robert (2004), the syenite-hosted gold deposits occur mainly along major fault zones, in association with preserved alluvial-fluvial, Timiskaming-type, sedimentary rocks. Robert (2004) describes the gold mineralization in these deposits as being represented by disseminated sulphide replacement zones, with variably developed stockworks of quartz-carbonate-K-feldspar veinlets within zones of carbonate, albite, K-feldspar, and sericite alteration. Syenitic intrusions are broadly contemporaneous with deposition of Timiskaming sedimentary rocks and, together with disseminated gold mineralization; they have been overprinted by subsequent regional folding and related penetrative cleavage.

The disseminated gold mineralization occurs within composite syenitic stocks or along their margins, along satellite dikes and sills, and along faults and lithologic contacts away from intrusions. Robert (2004) has interpreted the mineralized bodies as proximal to distal components of large magmatic-hydrothermal systems centered on, and possibly genetically related to, the composite syenitic stocks.

The Young-Davidson deposit, also located in the Abitibi greenstone belt, can be classified as an Archean, syenite-hosted gold deposit. The gold mineralization is primarily related to quartz veinlet stockworks and disseminated pyrite mineralization, mostly enclosed within the syenite intrusion boundaries, or very close to the contacts with the enclosing rocks, and is frequently associated with broader zones of potassic alteration.

Recent findings in similar environments of Northern Ontario and Québec have been reported at Upper Beaver[2], Abitibi West[3], Hislop[4], and Cadillac Break[5], etc., in the Kirkland Lake-Timmins area.

This type of mineralization is also present in the Yilgarn block (Kalgoorlie, Western Australia), where the Jupiter deposit shares some of its characteristics (Duuring et al., 2000). Similarly, the Wallabi gold deposit bears similarities with the Young Davidson deposit, in particular the Archean age, and the association of gold mineralization with

[2] findarticles.com/p/articles/mi_pwwi/is_200702/ai_n18631292
[3] http://www.vencan.com/pressreleases/jun26_2007.htm
[4] www.eos.ubc.ca/about/grad/D.Mitchinson.html
[5] www.cadillacmining.com/Cadillac%20May%2031%2006%20MD&A-Final.doc

hematite alteration in the proximities of a syenitic intrusion (Mueller et al., 2008). However, in the Yilgarn block the gold mineralization is related to a broader range of granitoid host rocks (Duuring et al., 2007).

9.0 MINERALIZATION

At least five styles of gold mineralization are recognized at the YD Project. They are described in detail by Micon (2004) and PGI (2003).

1. Syenite-hosted gold mineralization
2. Mafic volcanic-hosted gold mineralization (MCM Mine)
3. Timiskaming sediment-hosted gold mineralization
4. Ultramafic-hosted gold mineralization
5. Hanging wall contact gold mineralization

Essentially, all of the historical production at the YD Mine, and approximately 60% of the production from the MCM Mine is from syenite-hosted gold mineralization (Lovell, 1967). Most of the current open pit and underground resources are also related to syenite-hosted gold.

This mineralization consists of a stockwork of quartz veinlets and narrow quartz veins, rarely greater than a few centimetres in thickness, situated within a broader halo of disseminated pyrite and potassic alteration. Visible gold is common in the narrower, glassy-textured quartz veinlets. In general, gold grades increase with quartz veinlet abundance, pyrite abundance, and alteration intensity.

Mineralized areas are visually distinctive, and are characterized by brick red to pink K-feldspar-rich syenite containing 2% to 3% disseminated pyrite and several orientations of quartz extension veinlets and veins. The quartz veins and veinlets commonly contain accessory carbonate, pyrite, and feldspar.

At least two orientations for the quartz veins and veinlets are recognized. Most dip gently to the north and are ladder-type flat veins, and some dip steeply to the north. The flat veinlets are common in the large outcrop exposures and small pits on surface. SWRPA (2007) noted that the syenite-hosted gold mineralization is generally more extensive with lower grade near surface, but appears to be more channelled and concentrated into higher grade corridors at depth.

Ore shoots within the syenite may plunge moderately to the southwest, parallel to the L3 lineation (PGI, 2003); however, the historical open pits and underground stopes indicate a strong vertical down-dip attenuation and plunge direction. The current mineralization wireframes suggest that the mineralization may plunge steeply to the south-southwest or rake sub-vertically to the west.

Actual plunge direction(s) for the underground syenite-hosted gold mineralization will become more evident as new data become available.

A plan view and long section view of the mineralized solid models for the open pit are presented in Figure 9-1 and Figure 9-2, respectively.

Figure 9-1: Plan View of 2007 Open Pit Mineralized Solid Models

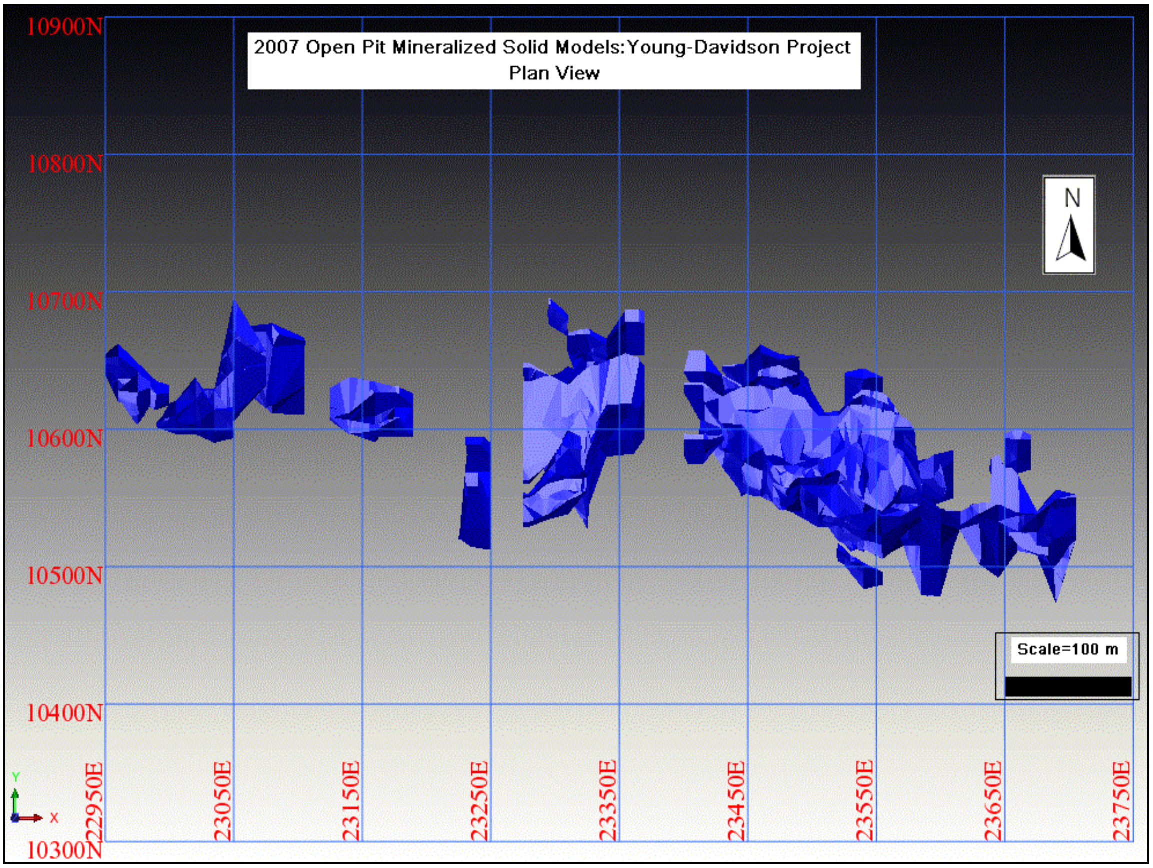
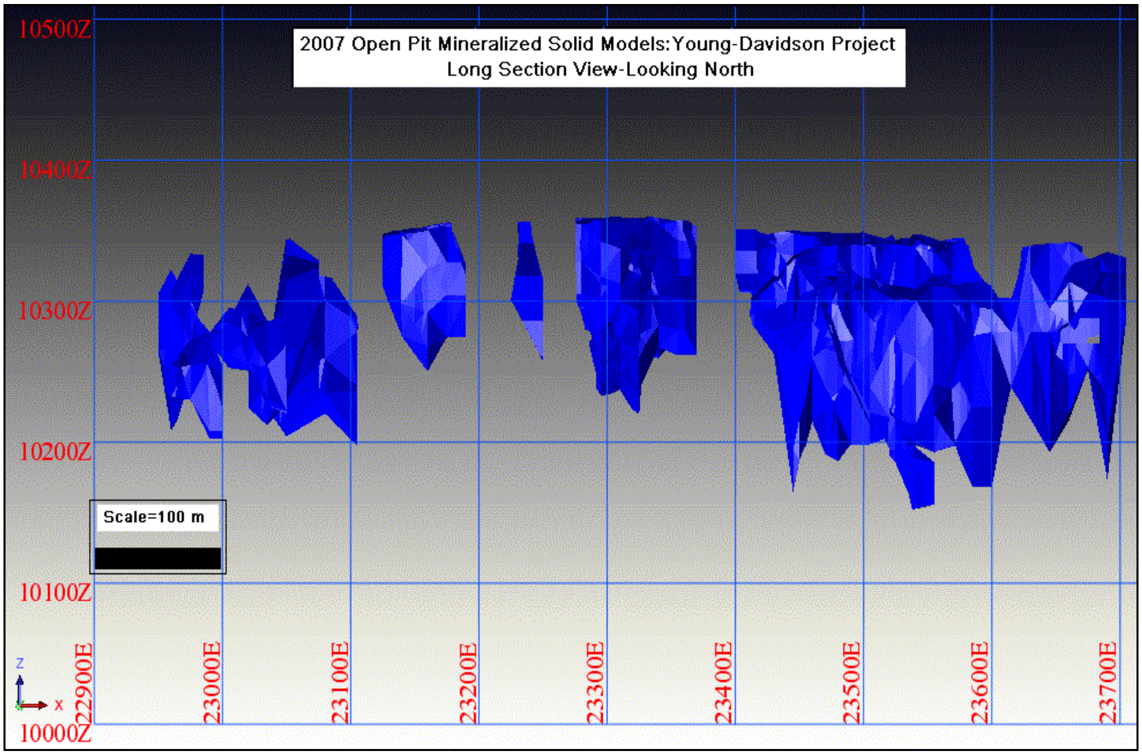


Figure 9-2: Long Section View of 2007 Open Pit Mineralized Solid Models



The underground mineralization has been subdivided into four main zones; Upper Boundary Zone (UBZ), Lower Boundary Zone (LBZ), the Lucky and Lower Lucky Zones and the Lower Young-Davidson (LYD). Some lenses are formed from a number of discrete solids that are the result of clipping mineralization solids with the barren diabase dikes or from relative stratigraphic correlations.

The approximate lateral and vertical extents of the mineralized zones are summarized in Table 9-1. The mineralization strikes generally east-west and dips steeply at approximately -75º to -80º to the south. The mean gold grade of the assays representing the open pit mineralization is 1.89 g/t with the maximum grade being 82.29 g/t. The mean gold grade of the assays contained in the underground mineralization is 4.38 g/t with the maximum grade being 330.96 g/t.

The current Northgate inferred (inferred solids include the indicated solids) mineralization wireframes for the underground are shown plan view and in long section in Figure 9-3 and Figure 9-4, respectively.

Table 9-1: Mineralization Extents by Zone: Young-Davidson Project

Northgate Minerals Corporation: Young-Davidson Project			
Approximate Mineralization Extents by Zone			
Zone	Northing Extents (m) (min to max, ***length***)	Easting Extents (m) (min to max, ***length***)	Elevation Extents (m) (min to max, ***length***)
OP	10,475 to 10,700, ***225***	22,950 to 23,700, ***750***	10,200 to 10,425, ***225***
UBZ	10,300 to 10,500, ***200***	23,450 to 23,825, ***375***	9,600 to 10,175, ***575***
LBZ	10,225 to 10,425, ***200***	23,250 to 23,625, ***375***	9,025 to 10,050, ***1,025***
Lucky	10,200 to 10,500, ***300***	22,875 to 23,575, ***700***	8,850 to 10,150, ***1,300***
LYD	10,275 to 10,525, ***250***	22,700 to 23,050, ***350***	8,950 to 9,950, ***1,000***

Figure 9-3: Plan View of 2007 Underground Mineralized Solid Models

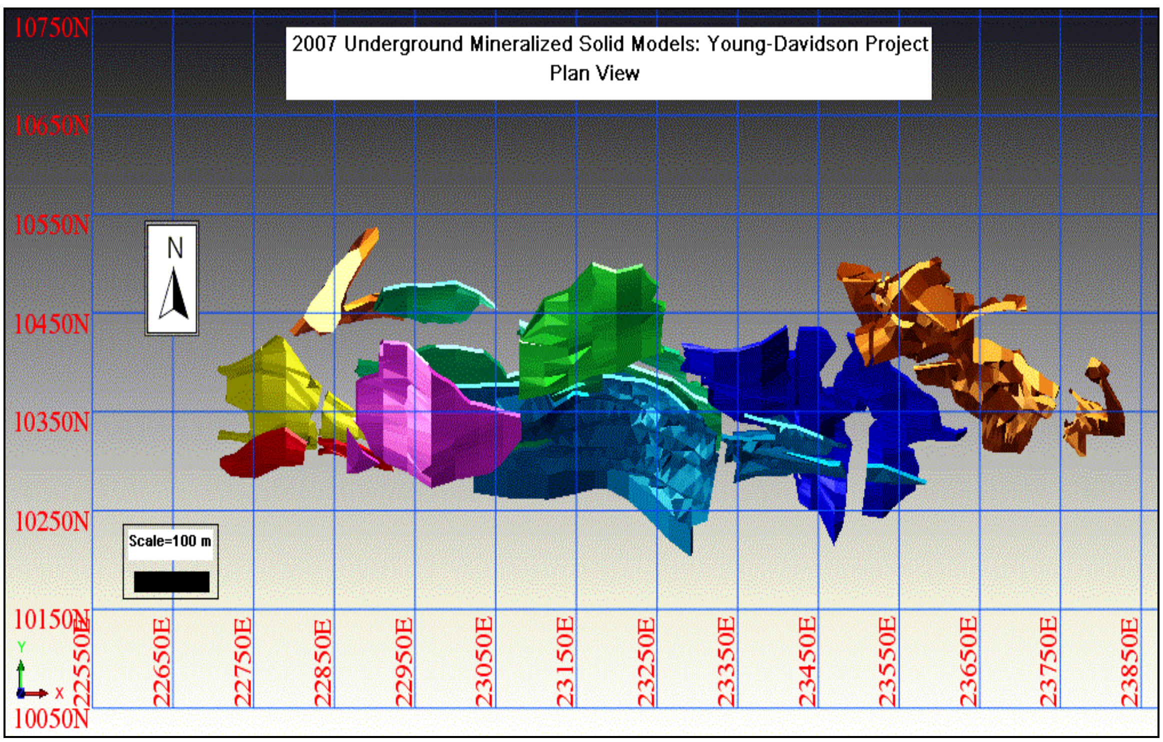
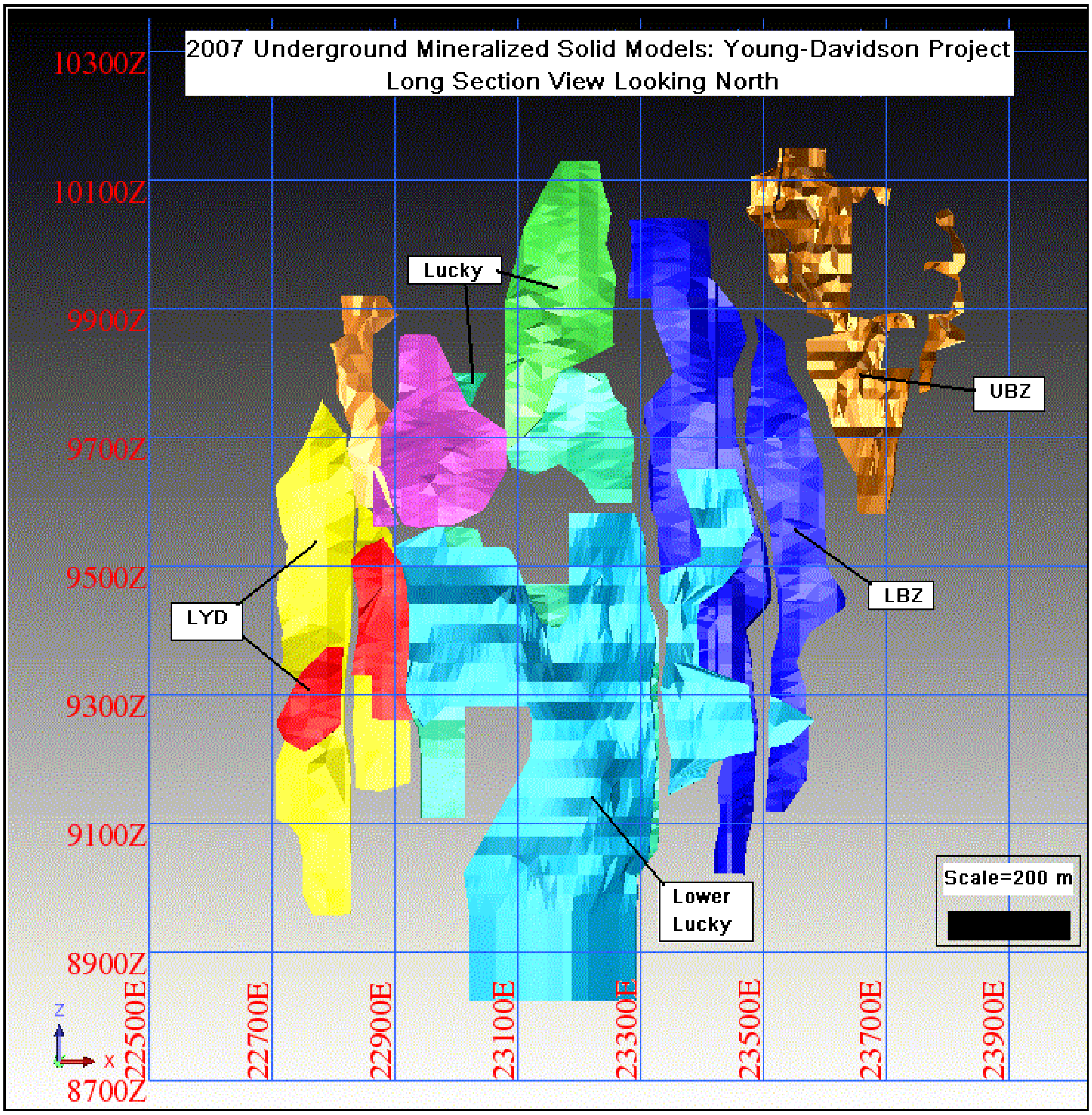


Figure 9-4: Long Section View of 2007 Underground Mineralized Solid Models



10.0 EXPLORATION

10.1 Pre-2002 Exploration

Detailed information on pre-2002 exploration has not been available to AMEC.

10.2 1519865 Ontario Limited/Young Davidson Exploration

The exploration conducted by 1519865 Ontario Limited (1519865-OL), a predecessor company to Young-Davidson, and by Young-Davidson itself, was reviewed by Micon (2004), which concluded that such data were generally reliable, and could be used as basis for further exploration. A description of the 1519865-OL and Young Davidson exploration is presented below.

10.2.1 Induced Polarization (IP) Surveys

In August and October-November 2002, 1519865-OL commissioned two Induced Polarization (IP) and Resistivity surveys, which covered the area of the property from immediately west of the Young-Davidson pit eastwards to the Montreal River. These surveys were conducted by TMC Geophysics from Val d'Or, Québec (Lambert, 2002a, 2002b), using a GDD IPT1400 Time Domain transmitter. The transmitter was powered by a portable 1.4 kW generator, and an Elrec-Ires IP-6 receiver that measured the chargeability in 10 windows along the IP decay curve, and also measured the apparent resistivity of the earth at each dipole (the “n”) spacing.

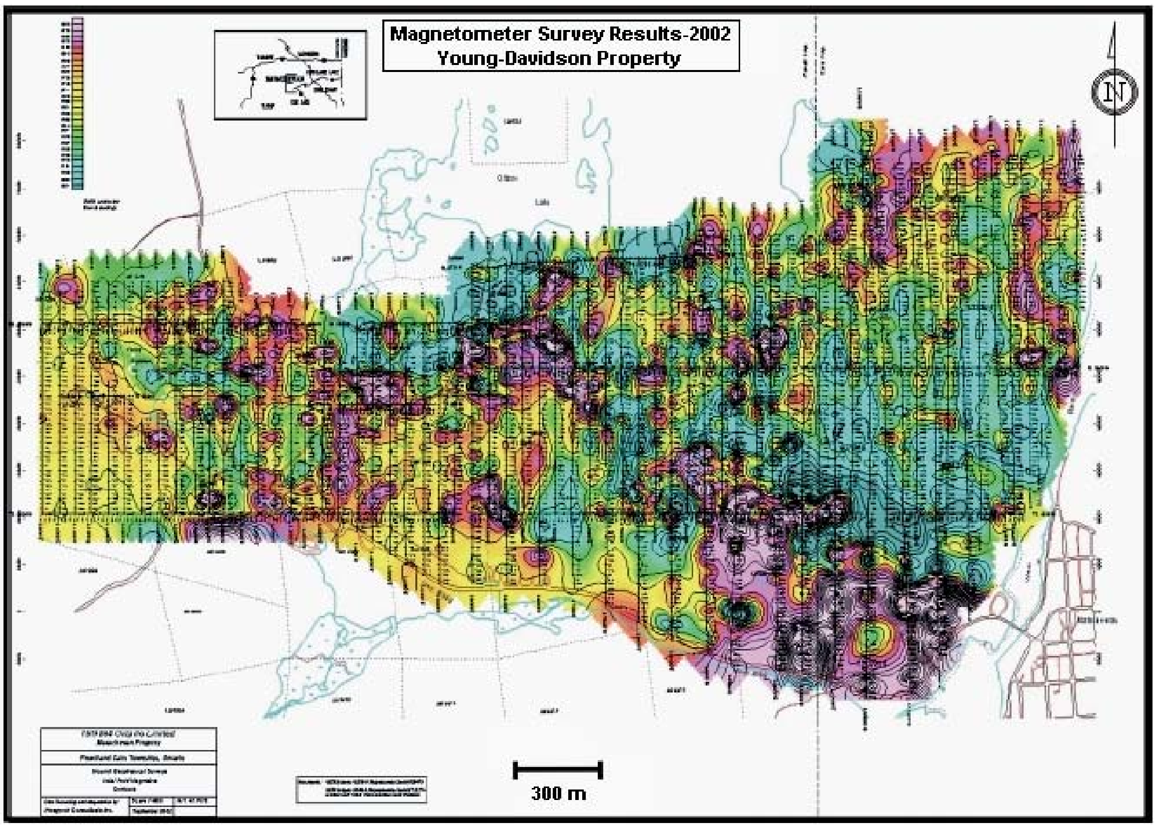
The surveys were carried out on grid lines that were spaced 200' apart, and utilized the dipole-dipole electrode configuration with an electrode spacing (the “a” spacing) of 100'. In all, six dipole spacings were read at each station (n = 1 to 6), and approximately 52.8 line-km of grid line were covered by the surveys.

A number of chargeability anomalies were detected by these surveys, some of which were tested for their gold-bearing potential by subsequent diamond drill holes. Micon (2004) reviewed the results of these IP surveys and found the data presented therein to be reliable.

10.2.2 Magnetometer Survey

1519865-OL commissioned a magnetometric survey that was conducted during 1 to 15 September and from 1 November to 5 December 2002. The field work was carried out by Meegwich Consultants Inc. (MC), an independent geophysical contracting company. The magnetometric survey covered approximately the same area as the IP surveys described above, and totaled approximately 71.0 line-km (Figure 10-1). The total field readings were recorded using two Gem Systems Overhauser GSM-19 V5.0 magnetometers, and a Scintrex EDA base station. This survey was particularly useful for identifying numerous post-mineralization diabase dykes.

Figure 10-1: Magnetometer Survey Map on Young-Davidson (Micon, 2004)



10.2.3 Soil Sampling Survey

1519865OL also commissioned a soil sampling program in the area extending from the Matachewan Consolidated #3 shaft eastwards to the Montreal River. The program was conducted from 11 to 27 September 2002 with three objectives:

1. to complete a limited orientation survey over a selected part of the property (the “Mine Horizon”) located west of Otisse Lake,
2. to obtain soil samples over the possible eastern extension of the Mine Horizon in order to identify diamond drill targets,

3. to examine in detail the anomalous gold soil responses outlined in previous surveys (Brisban and Van Hees, 1982).

Soil sampling focused on the darkest portion of podzol “Bhorizon”. Any apparent data gaps in the survey area are due to lack of suitable sample material. The samples were collected from a depth range of 5 cm to 20 cm, on a 61 m by 15 m (200 ft by 50 ft) grid, and picketed 61 m (200-foot) spaced grid lines, baselines or tie-lines. A total of 1,272 samples of soil were collected. In addition, 57 duplicate soil samples and 39 blank samples were inserted for Quality Assurance/Quality Control (QA/QC) purposes. Approximately 23.3 line-km of grid lines were surveyed.

Samples were dried and sieved, and the -80 mesh fraction was pulverized and assayed by fire assay (FA) fusion with Atomic Absorption spectroscopy (AAS) finish at Swastika Laboratories (Swastika), in Swastika, Ontario. Samples found to contain greater that 1,000 particle per billion (ppb) Au were re-assayed by FA with gravimetric finish. A 1 assay-ton aliquot was used in the assay procedure.

The soil survey located various areas anomalous in gold. One of them is located immediately west of the southern arm of Otisse Lake, and three additional areas are located along Hollinger Creek and to the northeast of Hollinger Lake (Micon, 2004).

10.2.4 Geological Mapping

1519865-OL conducted geological mapping from 7 August to 5 September 2002, along grid lines spaced 200'. This program covered approximately 47 line-km of grid. The composition of the rock types at each outcrop location was noted, structural features were measured, and the degree and type of any hydrothermal alteration were described.

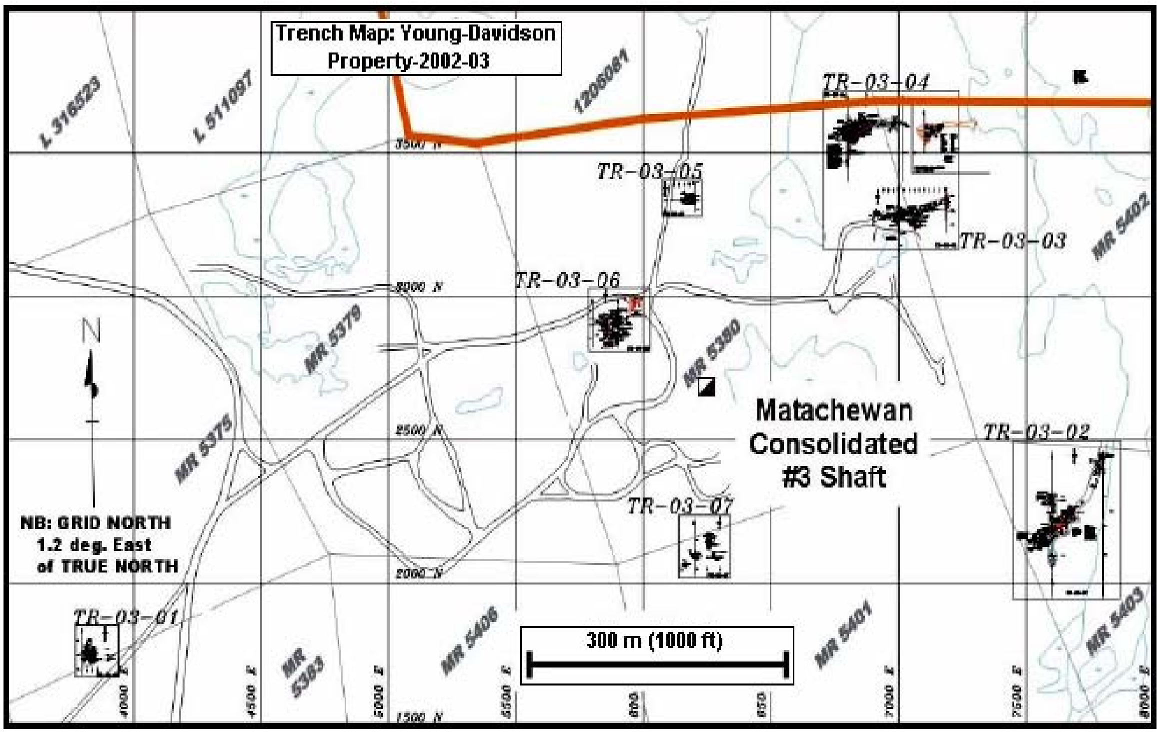
10.2.5 Lithogeochemical Sampling

A small program of litho-geochemical bedrock sampling was carried out from 25 September to 11 October 2002 by 1519865-OL. In total, 193 samples of rock were taken.

10.2.6 Stripping and Trenching

A program of stripping and trenching was conducted by Young-Davidson from 22 June to 23 July 2002, and from 7 to 17 October 2003. This program comprised the removal of moss, soil and dirt by means of a John Deere 790 hydraulic excavator to expose the bedrock surface at selected locations. A geological map of each trench exposure was subsequently prepared, and a total of 157 grab samples and 38 channel samples were taken on quartz veins, hydrothermal alteration, and accumulations of sulphide minerals. Six trenches were excavated, totalling 1,012 m in length (Figure 10-2) Samples were assayed by Swastika, as described in Section 10.2.3 (Micon, 2004).

Figure 10-2: Trenching Map on the Young-Davidson Property (After Micon, 2004)



10.3 Northgate Exploration

10.3.1 IP Surveys

In July 2006, Northgate contract JVX Limited (JVX) to conduct a spectral time-domain IP survey at the Young-Davidson area, using a Walcer 9 kW and a Scintrex IPC-7 transmitters, and a Scintrex IPR-12 receiver. The survey was conducted on 10.2 line-km, using a pole-dipole array with a=50 m, and n=1 to 8. The purpose of the survey was to identify hidden disseminated sulphide zones to a maximum of 150 m depth. JVX produced chargeability and conductivity pseudo-sections and plans.

At the same time, JVX conducted a borehole spectral time-domain IP survey on five NQ-BQ holes, with depths ranging from 600 m to 1,000 m. Three of the holes were used for actual survey (YD06-09, YD06-16 and YD06-17) and two for current injection

(YD06-01A and YD06-13). JVX used a Scintrex IPC-7 transmitter and a Scintrex IPR-12 receiver.

10.3.2 Titan 24 DCIP and MT Survey

Between 18 March and 7 April 2007, Quantec Geoscience Ltd. (Quantec) conducted a Tensor Magnetotelluric (MT) and DC Resistivity and Induced Polarization (DC/IP) survey in the Young-Davidson property, aimed at detecting chargeability and resistivity signatures associated with known syenite-hosted gold mineralization, and at extending this information to other areas. In addition, the survey should assist in understanding the structural geology in the project area (Quantec, 2007).

Quantec used a Titan 24 Distributed Acquisition System (DAS), which employs a combination of large array size and a large multiplicity of sensors, as well as precise 24-bit digital sampling, with state-of-the-art signal-processing and 2D-3D computer inversions, to reach deeper penetration levels than conventional mineral exploration surveys.

The Titan DAS combined the Tensor Magnetotelluric Resistivity (MT) method, with its high resolution and deep penetration (exceeding 1.0 km to 1.5 km depth) and galvanic DC Resistivity and Induced Polarization (DCIP) surveys, which benefited from superior shallow to mid-depth resolution and penetration (less than 500 m), and sensitivity to metallic mineralization, from disseminated to massive. The survey used a GDD Tx II (3.6kW) transmitter with frequency/waveform control. The survey was chosen based on its high resolution and deep drill targeting capabilities.

The DC/IP survey covered 14.5 km (21.3 km including overlaps), with a pole-dipole array, array length of 2,200 m to 2,600 m, and 100 m dipole spacing. The MT survey covered 13.5 km (15 km including overlaps), with two array-lines, array lengths of 2,400 m to 2,600 m, and 100 m dipole spacing.

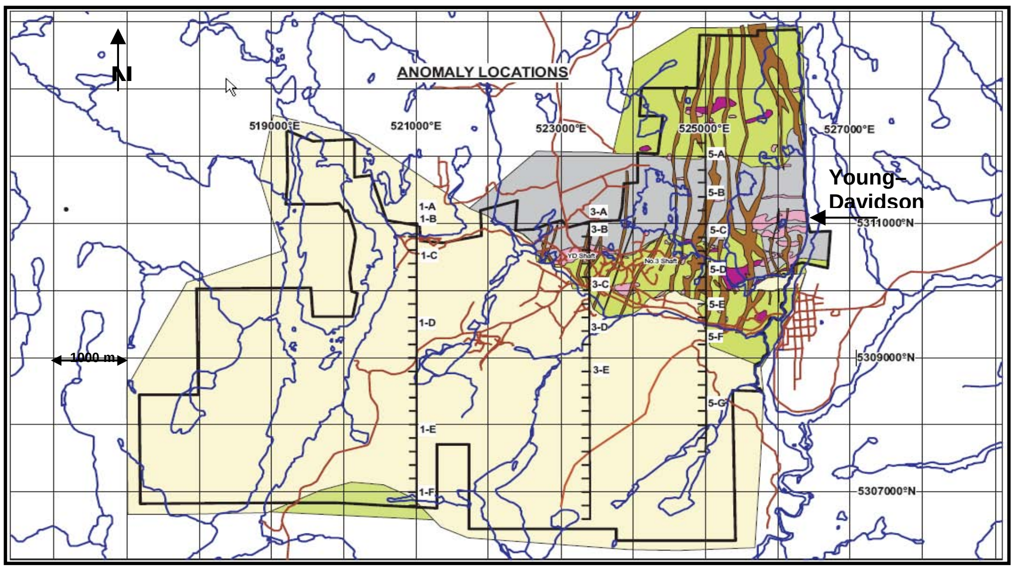
Lucas (2007) interpreted the Titan survey, and identified five high priority anomalies with high chargeability and medium to high resistivity, as well as six medium priority and seven low priority anomalies, located in three N-S-oriented survey lines (Figure 10-3). Northgate is currently evaluating these anomalies.

10.3.3 Geological Mapping

During 2007, Northgate completed a 1:10,000 geological mapping program supported by hand-held GPS orientation (Lucas, 2008). The program covered 35 km^2, but did not include the Young-Davidson mine site. The final product was plotted on a 91 cm by 102 cm (36 inches by 40 inches) sheet.

During this program, eight chip samples and thirty-three grab samples were collected from outcrops and analyzed at ALS Chemex for Au by FA, and for 34 elements by aqua regia digestion/ICP-AES. In addition, 35 rock samples were collected for whole-rock geochemical studies, and analyzed at ALS Chemex by X-Ray Fluorescence (XRF).

Figure 10-3: Location of Titan 24 Anomalies: 1-A to 5-G (Source: Northgate)



10.3.4 Drilling

Since 2006, Northgate has conducted a nearly continuous drilling program at the Property. Details of this program are presented in Section 11.

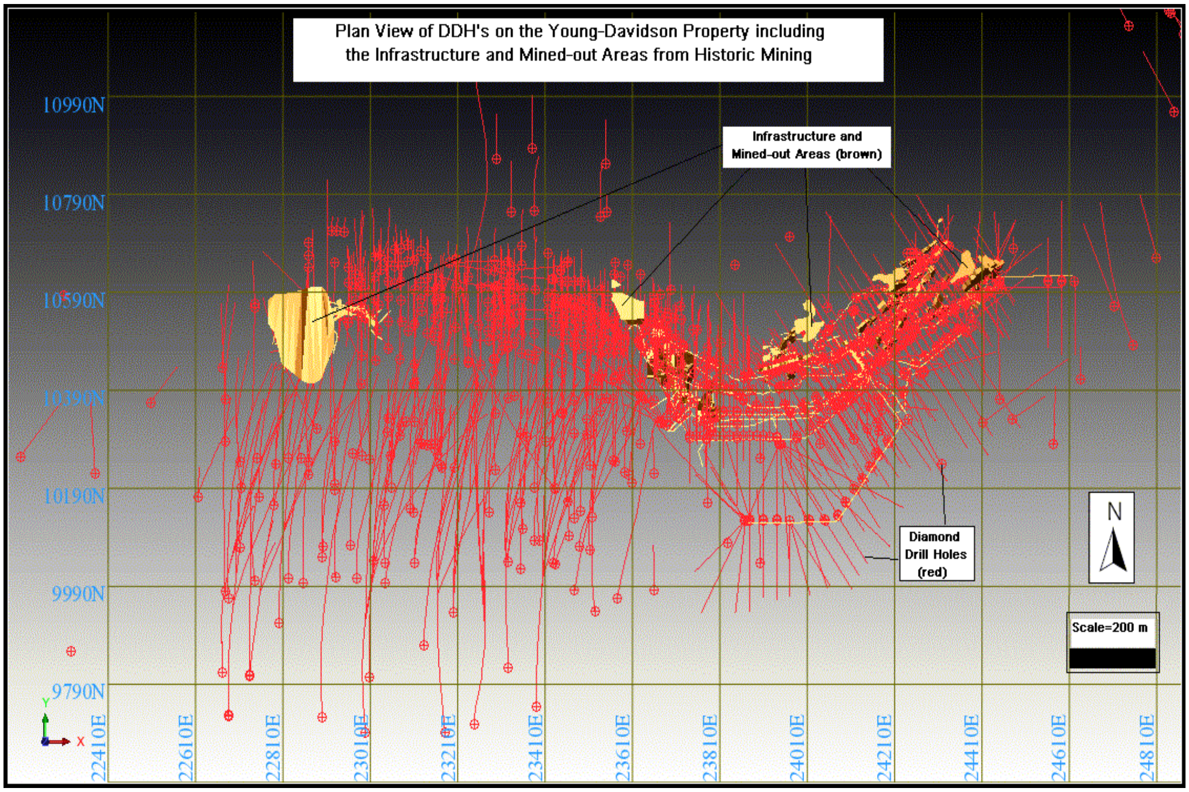
11.0 DRILLING

Current open pit and underground resources extend from approximately 22,700 E to 23,850 E. The YD Resource Database contains 854 surface and underground diamond drill holes totalling 214,727.5 m. (Table 11-1). The YD Resource Database surface and underground drill hole traces and the underground mine development are shown in Figure 11-1.

Table 11-1: Drilling Summary - YD Resource Database (Modified after SWRPA, 2007)

Period	From Hole Nr.	To Hole Nr.	Nr. of Holes	Meterage (m)
Unknown	BM1U	BM5U	5	826.0
Unknown	V-1	V-7	6	1,021.7
Unknown	MZ-101	MZ-607	30	2,209.8
1930s to 1950s	YD99	YD100	32	2,344.2
1930s to 1950s	MCM999	MCM1012	251	20,236.3
1980	MC80-30	YD80-62	62	5,384.8
1986	YD86-01	YD86-97	84	9,793.2
1987	WL9705	WL9705	1	124.1
1988	YD88-01	YD88-10	10	1,183.2
1989	YD89-01	YD89-10	10	3,978.3
1990	YD90-01	YD90-5B	29	18,687.0
1995	MCM9502	YD9599	102	31,827.4
1996	MCM9619	YD9616A	35	6,234.7
1997	WL9701	YD97137	14	1,763.9
2003	M03-42	M03-65	13	2,096.1
2006	YD06-01	YD06-32	48	44,907.5
2006 (water)	MW-06-03	MW-06-05	2	18.9
2007	NO-07-01	NO-07-11	11	3,531.5
2007	OP07-01	OP07-55	55	5,140.1
2007	YD07-09A	YD07-58	47	45,659.9
2008	YD08-53B	YD08-63	7	7,758.9
Total			**854**	**214,727.5**

Figure 11-1: Plan View of Drill Holes and UG Infrastructure on YD Property



11.1 Pre-2006 Drilling Campaigns

Prior to 2006, 684 drill holes totalling 32,830 m had been drilled at the Property according to SWRPA (2007) (Table 11-1). However, detailed information regarding the drilling procedures during the pre-2002 drilling campaigns have not been available to AMEC. However, SWRPA (2007) mentions that historical holes from 1980 were down-hole surveyed using Pajari instruments or by acid tests.

Between late October 2002 and mid-May 2003, 1519865-OL conducted a drilling campaign at the Property to test selected geophysical, geological or geochemical features identified during the exploration programs. Drilling procedures were described by Micon (2004).

The drill holes were completed by Heath and Sherwood (1986) Inc. (Heath & Sherwood), an independent diamond drilling contractor from Kirkland Lake, using either a Boyles B20 or B25 diamond drill, or a custom-made diamond drill. During this campaign, 72 diamond drill holes totalling 11,747 m in length were completed. Core size was of BQ (36.5 mm) diameter, except for one drill hole, which was completed using NQ (47.6 mm) wire-line equipment. Down hole deviations were determined at a nominal 61 m interval using the Reflex EZ-Shot survey equipment.

The drill core was delivered to a secured core-logging facility twice per day. The core was re-aligned by the geologist to a consistent orientation, and was measured to confirm the accuracy of the depth markers placed in the core boxes by the diamond drilling crews. Logging included descriptions of the lithologies, alteration styles and intensities, structural features, occurrences and orientations of quartz veins, occurrences of visible gold, and the style, amount and distribution of sulphide minerals. Magnetic susceptibility was measured using a hand-held instrument.

Micon (2004) did not identify any drilling or recovery factors that would materially impact the accuracy and reliability of the exploration data. The drill core provided samples of high quality, which were representative of alteration, veining, or sulphide accumulations intersected by drill holes. In AMEC's opinion, drilling and logging procedures followed during the 2002-2003 diamond drilling program were adequate for resource estimation purposes.

11.2 Northgate Drilling Campaign

Northgate began a deep surface drilling program in early 2006, designed to confirm and expand the underground resources on the YD Property. Northgate has drilled 170 drill holes (YD06-01 to YD08-63) totalling 107,016.8 m up until late February 2008. The cut-off date for data used in the resource estimates, discussed in this report, is October 17, 2007. The resource models were completed prior to the 2008 drilling and will be used by Northgate in updated resource models leading up to a Feasibility Study in late 2008. Drill hole location plan is shown in Figure 11-1.

Northgate has used Orbit-Garant Drilling (OGD), from Val d'Or, Québec, as the drilling contractor. During this period, core drilling has been conducted with up to six custom-made SH-1 rigs. Core diameter on surface drilling has been NQ (47.6 mm), but underground drilling has used BQ (36.5 mm) diameter. Drilling commenced with hole YD06-01, and has continued to date. Most holes have been drilled with 0º ±10º azimuth, and at a range of dips from -45º to -80º; however, some holes were also drilled with approximately 90º and 180º azimuths. Depth ranged from 15.5 m to 1592.2 m, averaging 543.7 m.

Northgate has down-hole surveyed all drill holes, mainly by the gyroscopic method (95% of the holes), and some of them with Flexit Multishot, at approximately 75 m intervals, and at the end of hole. International Directional systems (IDS), from Sudbury, Ontario, has supplied the gyroscopic equipment. Some holes were also surveyed in

2006 by Sperry-Sun, from Northbay, using the gyroscopic method. The underground holes, usually less than 150 m long, were surveyed only with the Flexit method.

Drilling has been often conducted in directional fans. IDS has been the contractor in charge of directing the holes, using deviation equipment rented by Northgate from Devico Systems, and sometimes from Navy-Drill.

AMEC visited various drill sites, and confirmed that drill holes were well marked in the field with solid cement monuments and 1 m long pieces of steel bar, included a steel triangle showing the drill hole identification.

After extraction from the core barrel, the core was placed in wood boxes. All core boxes were properly identified. Small wood pieces were used to mark the drill runs. All core boxes were transported every day by truck to a core logging facility at Matachewan, where core was photographed, logged and sampled. All core was later transported to secure storage facilities within the project premises.

After arrival to the logging site, core boxes were placed on wood logging stands. Northgate personnel on site calculated the core drilling length recovery, and measured RQD. Core length recovery was in general good, usually exceeding 95%. Additionally, magnetic susceptibility was measured with a portable instrument at 3 m intervals.

Logging was done directly into a computer laptop using MS-Access©-based log forms. Logs recorded lithology, alteration and mineralization types, details about the mineralization style (approximate percentage of pyrite and chalcopyrite), and information on texture, color, grain size, presence and type of structures, and angle with core axis. Table 11-2 lists the lithology codes used in the Young-Davidson project.

AMEC's inspection of drill core confirmed that the logging protocols were correctly used. AMEC considers that the logging protocols and information collected are appropriate for defining mineralization controls for mineral resource and reserve estimation.

Table 11-2: Lithology Codes used in the Young-Davidson Project

ID	Type	Code	Translation	ID	Type	Code	Translation
137	Alt Int	0	unaltered	166	Min	FL	fluorite
138	Alt Int	1	weakly	145	TYPE	FLT	faulting
139	Alt Int	2	moderately	41	Lith2	FLW	Flow
140	Alt Int	3	strongly	70	GRN	FM	Fine to
141	Alt Int	4	intensely	278	TXT	FOL	foliated
216	Group - OGS	A	5 Algoman Intrusives	146	TYPE	FOL	foliation
213	Lith2	AGL	Aglomerate	14	Lith1	FP	Feldspar
154	Min	AK	ankerite	252	Lith1	FPS	Feldspar
269	Lith1	ARG	Argillite	104	TXT	FRG	fragmental
155	Min	AS	arsenopyrite	62	COM	FRK	fractured
249	Lith1	ASYN	Augite Syenite	105	TXT	FRK	fractured
156	Min	AU	native gold	167	Min	FU	fuchsite
157	Min	B	biotite	277	Alt1	FUC	fuchsitic
191	Min	BA	barite	305	Lith1	FZ	Fault Zone
142	TYPE	BED	bedding	42	Lith2	FZ	Fault Zone
95	TXT	BEDD	bedded	168	Min	GA	galena
279	Lith1	BIF	Banded Iron Formation	208	Lith2	GG	Fault Gouge
75	COL	BK	black	79	COL	GN	green
60	COM	BKN	broken	170	Min	GR	graphite
76	COL	BL	blue	63	COM	GRND	ground
61	COM	BLK	blocky	268	Lith1	GW	Greywacke
97	TXT	BLK	blocky	80	COL	GY	grey
77	COL	BN	brown	171	Min	H	hematite
158	Min	BN	bornite	306	Min	HBL	Hornblende
311	Lith1	BSYN	Brick Red Syenite	193	Alt1	HEM	hematitic
39	Lith2	BX	Breccia	130	Alt1	HFL	hornfelsed
98	TXT	BXD	brecciated	299	Min	I	iron-
67	GRN	C	Coarse grained	43	Lith2	IN	Intrusive
217	Group - OGS	C	3 Cobalt Group	21	Lith1	INT	Intermediate
161	Min	C	chlorite	289	Lith1	JSED	Jasperoid
159	Min	CAL	calcite	131	Alt1	K	potassic
203	Alt1	CARB	carbonate altered	172	Min	K	K-feldspar
5	Lith1	CAS	Casing	207	COL	KK	khaki
296	Min	CB	carbonate	218	Group	L	7 Larder
287	Lith1	CGL	Conglomerate	91	TON	L	light
7	Lith2	CGL	Conglomerate	251	Lith1	LAM	Lamprophyre
258	Alt1	CLOR	chloritic	111	TXT	LAM	laminated
143	TYPE	CNT	contact	132	Alt1	LIM	limonitic
186	COM	COM	competent	302	COL	LM	Lime
162	Min	CPY	chalcopyrite	173	Min	LM	limonite
40	Lith2	D	Dyke	72	GRN	M	Medium
93	TON	D	dark	175	Min	M	magnetite
10	Lith1	DIA	Diabase	25	Lith1	MAF	Mafic
78	COL	DN	dun	112	TXT	MAS	massive
144	TYPE	DYK	dyke	73	GRN	MC	Medium to
165	Min	E	epidote	174	Min	MO	molybdenite
300	Alt1	EP	epidote altered	113	TXT	MOT	mottled
100	TXT	EQ	equigranular	81	COL	MR	maroon
69	GRN	F	Fine grained	45	Lith2	MUDS	Mudstone
101	TXT	FBND	flow banded	312	Lith1	MW	Mine
102	TXT	FBX	flow brecciated	121	TXT	SHRD	sheared

71	GRN	FC	Fine to coarse grained	66	COM	SHT	shattered
276	Alt1	FCB	iron-carbonate altered	136	Alt1	SIL	silicified
12	Lith1	FEL	Felsic	48	Lith2	SILT	Siltstone
285	Lith1	NR	No Recovery	86	COL	SK	smoky
197	COL	OL	olive	87	COL	SL	salmon
83	COL	OR	orange	231	Lith2	SLATE	Slate
308	Min	OR	Orange alteration	180	Min	SPEC	specularite
29	Lith1	OVB	Overburden	181	Min	SPH	sphalerite
133	Alt1	OXD	oxidized	150	TYPE	STK	stockwork
114	TXT	PBED	poorly bedded	123	TXT	STKD	stockworked
255	TXT	PEB	pebble	151	TYPE	STR	stringers
84	COL	PK	pink	37	Lith1	SYN	Syenite
117	TXT	PORF	porphyritic	222	Group	T	6
31	Lith1	PRDL	Previously Drilled	49	Lith2	T	Tuff
177	Min	PY	pyrite	307	Min	T	tourmaline
184	Min	PYX	pyroxene	262	Alt1	TALC	talc altered
221	Group - OGS	Q	1 Quaternary	267	Lith1	TALC	Talc
178	Min	Q	quartz	183	Min	TET	tetrahedrite
297	Min	QCB	quartz-carbonate	283	Lith1	TFC	Tuffaceous
32	Lith1	QFP	Quartz Feldspar	284	TXT	TFC	tuffaceous
301	Alt1	QI	quartz-iron-carbonate	88	COL	TN	tan
298	Min	QI	quartz-iron-carbonate	304	Lith1	TSYN	Trachyitic
259	Alt1	QZCA	quartz-carbonate	253	Lith1	UMF	Ultramafic
85	COL	RD	red	195	Lith1	UND	Undifferentia
215	Lith1	RHY	Rhyolite	50	Lith2	V	Vein
64	COM	RUB	rubbly	152	TYPE	V	veins/veinlet
120	TXT	RUB	rubbly	74	GRN	VF	Very fine
219	Group - OGS	S	4 Matachewan Swarm	190	GRN	VFC	Very fine to
179	Min	S	sericite	188	GRN	VFF	Very fine to
46	Lith2	SAND	Sandstone	189	GRN	VFM	Very fine to
254	MIN	SC	scheelite	52	Lith2	VO	Volcanic
214	Lith2	SCH	Schist	127	TXT	WBED	well bedded
286	TXT	SCH	schistose	89	COL	WT	white
238	TYPE	SCH	schistosity	187	TXT	XEN	xenolithic
270	Lith1	SEDS	Sediments	282	Lith2	Xno	Xenolith
47	Lith2	SEDS	Sediments	90	COL	YL	yellow
275	Alt1	SER	sericitic	53	Lith2	ZN	Altered Zone
149	TYPE	SHR	shear	309	Lith1	ZSYN	Zone-
65	COM	SHRD	sheared				

12.0 SAMPLING METHOD AND APPROACH

12.1 Pre-2006 Drilling Campaigns

No information was available to AMEC about the sampling method and approach during the pre-2002 exploration.

Micon (2004) described the sampling procedures during 2002-2003 drilling campaign conducted by 1519865-OL. The drill core provided samples of high quality, which were representative of any alteration, veining, or sulphide accumulations that were intersected by the drill hole. Samples were marked by the geologist on sampling intervals ranging from 0.3 m to 1.5 m. Major geological contacts were honoured.

Core was split into two halves by means of a hydraulic core splitter. One-half of the core was placed into a 6-mil plastic bag, whereas the remaining half was stored as backup. The core technician assigned an identification number to the sample using a uniquely numbered sample tag.

Whenever visible gold was noted in the drill core, special care was taken to ensure clean conditions at the hydraulic splitter both before and after processing of that sample. In all cases, the portion of the sample that contained the visible gold was placed into the sample bag. Micon (2004) did not identify any factors that may have resulted in a sample bias.

According to Micon (2004), sampling procedures followed during the 2002-2003 diamond drilling program are adequate to ensure sufficient representativeness of gold contents for resource estimation purposes. AMEC accepts the statement from Mincon.

12.2 Northgate Drilling Campaign

After logging, sample intervals were marked by the logging geologist and labelled with bar-coded sample tags. In principle, the whole mineralized section was predominantly sampled in 0.5 m to 1.5 m intervals. Major lithologic contacts were usually respected.

Drill core was mechanically split in half with hydraulic splitters instead of diamond saws, to prevent the possibility that some gold particles be washed out during the cutting operation. Occasionally, a diamond saw was used for core splitting, mainly in softer weakly mineralized hanging wall material. Sample weight ranged from 1 kilogram (kg) to 4 kg.

One half of the drill core was stored for reference, and the other half was bagged, numbered and submitted to the primary laboratory for preparation and analysis. Triple-redundancy data-capture checks by geologists, core samplers, and sample preparation staff was used to help identify and eliminate any data entry errors (Konst, 2008).

In total, 929 samples of split drill core have been taken during the course of the Northgate drilling program until the effective date.

Once sufficient samples had accumulated, Northgate transported them under the direct supervision of the field crew to the sample receiving facilities of Swastika Laboratories. A total of 5,070 samples of split drill core were taken during the course of the drilling program.

Significant intersections for the drilling campaigns at Young-Davidson are listed in Table 12-1. True widths usually range between 70% and 95% of the apparent widths, depending on the position of the drill hole relative to the mineralized bodies.

Table 12-1: Significant DDH Mineral Intersections – Drilling Campaigns

DHID	Zone	From (m)	To (m)	Length (m)	True Width (m)	Au (g/t)
YD06-01D	LBZ2	1000.66	1011.63	10.97	9.22	12.57
MCM1134	UBZ	0.00	2.13	2.13	2.08	11.16
YD06-01B	LBZ1	1062.99	1117.09	54.10	41.34	10.66
YD06-29	LL1	1232.31	1239.65	7.34	4.70	9.89
YD06-01C	LBZ1	1023.79	1030.22	6.43	5.40	8.12
YD06-09	LBZ1	1039.28	1055.13	15.85	8.18	8.10
MCM50	UBZ	114.30	118.11	3.81	2.23	8.03
YD9554	UBZ	264.57	302.67	38.10	30.42	8.01
YD88-09	UBZ	238.96	270.66	31.70	21.61	7.80
YD9616A	LBZ2	743.71	755.90	12.19	7.42	7.41
MCM1247	UBZ	0.00	13.41	13.41	10.05	7.30
YD06-10	LKY	500.18	509.63	9.45	6.79	7.20
YD07-36	LL1	879.00	885.10	6.10	3.93	7.19
YD06-17B	YD3	1007.36	1012.24	4.88	2.93	7.09
YD06-01A	LBZ1	1101.24	1127.42	26.18	20.59	6.98
MCM1213	UBZ	9.15	15.24	6.10	5.94	6.86
MCM1245	UBZ	0.00	9.30	9.30	8.55	6.86
YD9544	LBZ1	890.63	895.96	5.33	3.41	6.62
YD9551	UBZ	215.49	258.17	42.68	28.63	6.53
MCM1222	UBZ	35.05	49.68	14.63	12.28	6.51
YD90-22x	LBZ2	919.90	939.40	19.50	11.72	6.42
MCM1189	UBZ	74.68	100.28	25.60	20.51	6.42
YD07-56	LL1	1075.80	1086.60	10.80	7.74	6.38
YD06-01D	LBZ1	1043.94	1054.91	10.97	9.29	6.36
YD90-01	UBZ	243.23	289.47	46.24	26.87	6.34
YD90-03	LBZ1	520.90	534.62	13.72	6.16	6.14
YD07-51	LBZ1	669.60	677.20	7.60	4.88	6.10
MCM1221	UBZ	56.69	72.85	16.16	12.62	6.06

13.0 SAMPLE PREPARATION, ANALYSES AND SECURITY

13.1 Pre-2006 Drilling Campaigns

There is no information available to AMEC about the sample preparation or analytical techniques used during the pre/2002 exploration.

During the 2002-2003 drilling campaign, 1519865-OL used Swastika as primary laboratory. Micon (2004) described the sample preparation and assaying procedures. Sample preparation was as follows:

- Drying
- Crushing to better than -10 mesh (proportion not specified)
- Splitting to obtain a 300 g sub-sample
- Pulverizing to 0.074 mm (200 mesh) (proportion not specified).

Au was determined by FA on one assay-tonne aliquots (29.2 g), with an atomic absorption spectrometer (AAS) finish. Samples with Au grade exceeding 1 g/t Au were re-assayed using gravimetric finish.

At the time of the 1519865-OL exploration program, Swastika was not ISO-certified, but it conformed to the assay proficiency testing protocols as outlined by CANMET. Laboratoire Expert (the check laboratory) was not certified at the time; however, it participated in round-robin programs sponsored by CANMET.

According to Micon (2004), sample preparation, security, and analytical procedures followed during the 2002-2003 diamond drilling program were adequate to ensure a representative determination of the gold contents for resource estimation purposes.

13.2 Northgate Drilling Campaign

Northgate used ALS Chemex (ALS) from January 2006 to June 2007 as the primary analytical laboratory. ALS is an international analytical service, and is corporately accredited to ISO 9001:2000[6].

Samples were transported by Manatoulin Transports to ALS in Sudbury using secured sealed bags. A chain of custody procedure was strictly followed during transportation. The sample preparation and assaying procedures were described by SWRPA (2007) and Konst (2008a). Sample preparation was as follows:

[6] www.alschemex.com/learnmore/learnmore-qa-overview.htm

- Weighing the bags and labelling with bar code labels
- Drying to 105°C
- Crushing to better than 70% passing -2 mm
- Splitting to obtain a 1 kg sub-sample
- Pulverizing to 85% passing 0.074 mm (200 mesh); where indicated, a 250 g duplicate split of crushed material was taken and pulverized.

The prepared samples, including inserted control samples, were then shipped to ALS Chemex's Vancouver laboratory.

Au was determined by the ore grade, Au-AA26 method (FA on 50 g aliquots, with AAS finish) on original and duplicate samples prepared on the spot. Final gold grades in the assay database were the averages of the original and duplicate results. In addition, all original samples were assayed with the ME-ICP41 method (34 elements, aqua-regia digestion, ICP-AES determination). ALS assay protocols, including working ranges, are summarised in Table 13-1.

Since June 2007, Northgate has been using Swastika as the primary laboratory. Samples were prepared and assayed (only for Au) using similar methods as those described above.

Table 13-1: Brief description of ALS analytical protocols

Analytical Protocol	Element (Working Range) (ppm, unless % is stated)	Procedure
Au-AA26	Au (0.01 ppm – 100 ppm)	FA fusion of 50 g aliquots, AAS determination
ME-ICP41	Ag (0.2 – 100); Al (0.01% - 15%); As (2 – 10,000); Ba (10 - 10,000); Be (0.5 – 1,00); Bi (2 - 10,000); B (10 - 10,000); Ca (0.01% - 15%); Cd (0.5 - 500); Co (1-10,000); Cr (1 - 10,000); Cu (1 - 10,000); Co (1 - 10,000); Fe (0.01% - 50%); Ga* (10-10,000); K* (0.01% - 10%); Hg (1 – 10,000); La* (10-10,000); Mg* (0.01% - 15%); Mn (5 – 100,000); Mo (1 - 10,000); Na (0.01% - 10%); Ni (1 - 10,000); P (10 - 10,000); Pb (2 - 10,000); S (0.01% – 10%); Sb (2-10,000); Sc (1 - 10,000); Sr (1 - 10,000); Ti (0.01% -10%); Tl (10 - 10,000); U (10 - 10,000); V (1 - 10,000); W (10 - 10,000); Zn (2 - 10,000)	Aqua-regia digestion, ICP-AES, reading, 0.5 g aliquots

* Partial digestion.

13.3 Quality Control (QC)

13.3.1 Pre-2006 Drilling Campaigns

There is no information available to AMEC about the QC prodcedures used during the pre-2002 exploration. However, Micon (2004) mentions that a blind QC program was in place. In addition, selected sections of core from the 1990 program were re-assayed, and four twin holes were drilled to verify the accuracy of the gold grades reported from the 1980 drilling campaign.

According to Micon (2004), during the 2002-2003 drilling campaign, 1519865-OL implemented a limited QC protocol, consisting of the periodical insertion on the submission batches of coarse blanks obtained from a rock type that had a high probability of containing no significant gold values (15 samples), as well as post-mineralization diabases (41 samples). The latter were found to contain gold values below the method detection limit, which indicates that significant sample cross-contamination was not identified. Sampling, sub-sampling and analytical precision were not assessed.

At the end of the drilling program, a total of 283 coarse rejects and 294 sample pulps were selected and forwarded to Laboratoire Expert Inc. (Expert), from Rouyn-Noranda, Québec. Gold contents were determined using the same methods as were employed by Swastika.

AMEC is not aware of the insertion of CRMs in the Swastika original batches, or the Expert check sample batches. Therefore, accuracy can be only estimated in relative terms. AMEC reviewed the check sample versus original sample plots presented by Micon (2004), and concludes that any sample assay bias Swastika in comparison with Expert appears to have been within acceptable limits.

13.3.2 Northgate Drilling Campaigns

During the 2006-2008 drilling program, Northgate implemented a QC protocol consisting of the submission of reject duplicates, CRMs and blanks in the sample batches. This program was supervised by Ron Konst, an independent Vancouver QA/QC consultant. QC protocol samples were inserted as follows (Konst, 2008c):

Coars reject duplicates: a second 250 g split of reject material was inserted in the batch at the laboratory during the normal course of sample preparation following Northgate’s instructions. A second 250 g split of reject material was taken from continuous groups of samples in mineralized zones containing over 0.5 g/t Au, during the initial period, but this practice was later discontinued because of the very good precision found from the reject duplicates.

- CRMs: two Rocklabs CRMs were inserted in the batches prior to submission to ALS.
- Coarse blanks: crushed material from concrete blocks were inserted in the batch prior to submission to the laboratory.

The control sample insertion frequency was as follows: reject duplicates, 1 in 80; CRMs, 2 in 80; coarse blanks, 1 in 80. These samples occupied systematically the same position in the numbering sequence (sample numbers ending in 01, 21, 41, 61, and 81).

Ron Konst regularly processed the QC data, and ensured that all failed CRM samples were timely investigated (Konst, 2008b). Errors were corrected or certificates revised. Where investigation confirmed CRM performances, these have been accepted as correct. The independent consultant has also investigated all failed blanks, and errors were corrected or certificates revised. As of 31 December 2007, Konst (2008b) concluded the following:

- Results from the 280 coarse blanks indicated that there were no contamination issues. One contamination issue was encountered at Swastika, but the associated batch of samples was re-run and revised.
- Results from the 290 CRM (RockLabs CRMs SJ32 and SK33) yielded 26 outliers attributable to be fluxing issues related to the CRM only. All outlier CRM investigations and non-outlier CRM performance indicated that analytical results were accurate.
- Results of the 1,615 pulp replicates, over the reported detection limit and below 7.20 g/t Au (0.21 oz/ton Au), indicated that the analytical precision was very good (approximately 7% at the 1.71 g/t Au, or 0.05 oz/ton Au, cut-off grade). Above 7.20 g/t Au (0.21 oz/ton Au), average precision was 14%.
- Results of the 4,455 reject duplicates, over the reported detection limit and below 7.20 g/t Au (0.21 oz/ton Au), indicated that the combined preparation and analytical precision was very good (approximately 13% at the 1.71 g/t Au, or 0.05 oz/ton Au, cut-off grade). Above 7.20 g/t Au (0.21 oz/ton Au), average precision was 23%, which was still deemed as good precision.

In spite of the fact that the QC protocol implemented by Northgate was not complete, since it did not assess the sampling variance, AMEC is of the opinion that Northgate followed best practice procedures by having an independent QC over the data. Ron

Konst used industry-standard QC methods that ensured reliable results. AMEC's independent assessment of the QA/QC data is presented in Section 14.0.

14.0 DATA VERIFICATION

AMEC conducted a series of verification checks on the Young Davidson project, including two separate database audits; the first for the open pit resource model and the second for the underground resource model. Additional checks were completed during the AMEC QP site visit that included a review of drill hole collars and down-hole surveys, drill core and core logging, assay data recording, validity of geological interpretations, and sample security and storage, as well as QA/QC data processing and validation.

14.1 Drill Hole Database Validation

14.1.1 Open Pit Resource Model

As per AMEC's standard procedure for building resource models, an audit was completed on the database provided to AMEC. In early April, 2007, Northgate sent AMEC three files that contained all the relevant drill holes to complete resource estimates for both the UBZ and OP zones. AMEC received a zip file (AMEC_ddh_dbase.zip) containing three files:

- matu_ddh_colllar.csv - 281 drill hole collar records
- matu_ddh_survey.csv -1,214 down hole survey records
- matu_ddh_assay.csv – 13,902 assay records

The database audit was performed on a minimum of 5% of the total records. Based on the number of records supplied, a minimum of 15 drill holes, 60 down hole surveys and 695 assay records were audited by AMEC.

It is the opinion of AMEC that the database is suitable for conducting resource estimation on the YD Property.

In 2004, Micon performed a database audit that included most of the drill holes (except for the 2006 drill holes) in the current database supplied to AMEC. Micon concluded that the database was adequate for use in the resource estimation (Micon, 2004).

14.1.2 Underground Resource Model

Subsequent to the drill hole database validation discussed above, an updated database validation was performed by AMEC in April, 2008 in support of a new underground and a new open pit resource model from the Young-Davidson Project.

A total of 101 new diamond drill holes have been added to the database since the last underground resource model, with roughly one-half of these new holes targeting the open pit mineralization and one-half targeting the underground mineralization.

Although AMEC is of the opinion that the database is adequate for resource estimation, AMEC is concerned about the structure and content of the assay table in the database. During the course of the audit, it was determined that Northgate averages all the assays (original, pulp checks and duplicates) for a particular sample, but in the database provided to AMEC, only the final averaged assay is stored. AMEC highly recommends that Northgate include all available assay records in the database with the certificate numbers for each assay and have a final Au column that clearly states that this is the column used for resource estimation (Au_final or Au_avg). This database set-up makes it much easier to determine if the final grade is accurate and makes it much easier for auditing purposes.

14.2 Drill Hole Collars

The survey data are digitally entered from reports provided by the surveyor. AMEC reviewed the collars of 18 holes (6.0% of the holes included in the resource database; Table 14-1), and measured the NAD83 UTM coordinates with a Garmin GPSMAP 60CSx. The collars were usually well marked and identified. When compared to the collar coordinates recorded in the project database, the maximum individual variations were 2.58 m in easting and 7.88 m in northing, within the GPS precision range (average variations were 1.17 m and 2.16 m, respectively). AMEC is of the opinion that the collar locations are accurate.

14.3 Down Hole Survey Review

The down hole survey records were checked in the two separate database audits conducted by AMEC by comparing the paper copies in the individual drill hole folders sent to AMEC from the Matachewan Exploration office, with those entered in the digital database. AMEC found no errors in the review of down hole survey records.

Table 14-1: GPS Collar Review (NAD83 Datum)

Drill Hole Nr.	AMEC GPS (m)		Northgate DB Corrected (m)		Northgate-Amec (Absolute Value, m)	
	Easting	Northing	Easting	Northing	Easting	Northing
YD07-50	522,686	5,309,964	522,685.05	5,309,964.00	0.95	0.00
YD06-32	522,680	5,309,979	522,677.72	5,309,979.05	2.28	0.05
YD0742	523,525	5,309,938	523,523.87	5,309,937.97	1.13	0.03
YD06-09	523,430	5,310,036	523,429.40	5,310,037.63	0.60	1.63
YD06-13	523,323	5,310,043	523,324.98	5,310,039.62	1.98	3.38
YD07-58	523,016	5,310,041	523,015.96	5,310,041.12	0.04	0.12
YD06-27	522,979	5,310,005	522,978.66	5,310,006.53	0.34	1.53
YD08-61	523,043	5,310,039	523,043.82	5,310,036.14	0.82	2.86
YD07-48	523,108	5,310,036	523,110.29	5,310,037.50	2.29	1.50
YD07-35	522,903	5,310,067	522,902.36	5,310,070.95	0.64	3.95
YD07-57	522,901	5,310,050	522,900.02	5,310,049.61	0.98	0.39
YD06-24	522,857	5,309,995	522,856.71	5,309,996.57	0.29	1.57
YD06-22	522,823	5,310,006	522,822.32	5,310,005.82	0.68	0.18
YD07-55	522,796	5,310,237	522,794.08	5,310,238.13	1.92	1.13
YD08-60	523,156	5,310,271	523,156.30	5,310,269.67	0.30	1.33
YD07-51	523,359	5,310,103	523,359.74	5,310,106.38	0.74	3.38
YD06-08	523,431	5,310,180	523,433.58	5,310,187.88	2.58	7.88
YD06-10	523,431	5,310,180	523,433.58	5,310,187.88	2.58	7.88
Average					**1.17**	**2.16**
SD					**0.85**	**2.43**
Max					**2.58**	**7.88**
Min					**0.04**	**0.00**

14.4 Database Entry Checks

Collar coordinates are digitally entered into the database, and no original hard-copy records exist. The same procedure is followed for lithology data, which are directly digitized into the database. For that reason, AMEC limited the data entry check to Au assay values.

The assay data are digitally entered from laboratory reports that ALS e-mailed regularly to Northgate in .csv format files. Northgate keeps scanned .pdf-format certificates in the Matachewan office, which is the site for all primary data backup for the Young-Davidson project. Northgate supplied copies of the original certificates to AMEC in scanned .pdf-formatted files. Then, AMEC selected 22 assay certificates (Table 14-2) totalling 1,673 samples (18.8% of the samples included in the database) for double data-entry of the Au assay values. AMEC personnel re-digitized the Au data in an Excel file, and later compared the new entries with the corresponding database field.

During the assay review, AMEC identified some differences between database entries and certificates, but such differences were explained by the fact that whenever Northgate had two values for a sample due to assay repeats, the values were averaged. After considering this, no errors were identified. Therefore, AMEC is of the opinion that the assay database is accurate and can be used for resource and reserve estimations.

Table 14-2: List of Reviewed Certificates

Certificate Number	No. of Samples	Certificate Number	No. of Samples
SD06011301	197	Sd06040581	59
SD06014197	185	SD06040582	59
SD06014199	132	SD06040589	81
SD06018027	67	SD06043354	59
SD06024037	59	SD06046015	58
SD06028433	79	SD06046482	57
SD06034076	42	SD06046483	86
SD06034078	11	SD06046503	68
SD06036396	65	SD06052779	62
SD06039472	51	SD06053294	53
SD06039474	84	SD06053295	59

14.5 Geology, Mineralization and Deposit Model

AMEC reviewed the previous technical reports and the progress reports on geology and mineralization supplied by Northgate, and summarized this information in Sections 7 to 9 of this report. AMEC also reviewed the geometry of the interpreted geological and mineralization shapes in very schematic E-W-oriented cross-sections.

All cross sections were represented at 1:500 scale, and were spaced 15 m from each other (starting at 22945E and ending at 23720E). Drill holes were represented with the projected trace, main lithology, mineralized bodies, and calculated composite Au grade for every mineral intersection according to a color scale.

During the review, AMEC found only minor discrepancies. AMEC recognizes that the preliminary interpretation respects the data recorded in the logs and the sections, as well as the interpretation from adjoining sections, and is consistent with the known characteristics of this deposit type, and with the geology and mineralization styles observed during the site visit.

The geological models have been diligently constructed in conformance to industry standards practices. AMEC is of the opinion that the geological understanding is sufficiently robust for the Project to support resource estimations.

14.6 Sample Security and Sample Storage

AMEC reviewed the sample security protocols (Sections 12 and 13) and visited the storage area during the site visit. The protocols and storage were considered acceptable.

14.7 Drill Core versus Original Logs

During the site visit, AMEC reviewed selected core intervals from drill holes being logged at the time of the site visit, and compared the core with the original logs. AMEC checked the logging consistency, the main lithological contacts, mineralization types, alteration, textural and structural features, and determined that all were adequately recorded. In addition, AMEC reviewed sample intervals, and all were found to be adequately marked in the core boxes. Sample intervals (from–to) usually respected major lithological changes on drill logs.

14.8 Quality Control (QC)

14.8.1 Pre-2006 Drilling Campaigns

There is no information available to AMEC about the QC procedures used during the pre/2002 exploration. However, Micon (2004) mentions that a blind QC program was in place. In addition, selected sections of core from the 1990 program were re-assayed, and four twin holes were drilled to verify the accuracy of the gold grades reported from the 1980 drilling campaign.

According to Micon (2004), during the 2002-2003 drilling campaign, 1519865-OL implemented a limited QC protocol, consisting of the periodical insertion on the submission batches of coarse blanks obtained from a rock type that had a high probability of containing no significant gold values (15 samples), as well as post-mineralization diabases (41 samples). The latter were found to contain gold values below the method detection limit, which indicates that significant sample cross-contamination was not identified. Sampling, sub-sampling and analytical precision were not assessed.

At the end of the drilling program, a total of 283 coarse rejects and 294 sample pulps were selected and forwarded to Laboratoire Expert Inc. (Expert), from Rouyn-Noranda, Québec. Gold contents were determined using the same methods as were employed by Swastika.

AMEC is not aware of the insertion of certified reference materials (CRMs) in the Swastika original batches, or the Expert check sample batches. Therefore, accuracy can be only estimated in relative terms. AMEC reviewed the check sample versus original sample plots presented by Micon (2004), and concluded that any sample assay bias of Swastika in comparison to Expert appears to be within acceptable limits.

14.8.2 Northgate Drilling Campaigns

During the 2006-2008 drilling program, Northgate implemented a QC protocol consisting of the submission of reject duplicates, CRMs and blanks in the sample batches. Ron Konst, an independent QA/QC consultant based in Vancouver, supervised this program. QC control samples were inserted as follows (Konst, 2008c, Konst, 2008d).

As of 31 December 2007, Northgate had submitted 820 regular control samples at a combined frequency of 1 in 25 or 1 in 20, along with 19,076 mainstream samples submitted to the primary laboratories (the overall insertion rate was approximately 4.2%). This QC program included 280 blanks, 290 certified reference materials (CRMs), and 250 regular reject duplicates. Additionally, Northgate re-assayed 1,195 pulp samples and 4,337 reject-duplicates that were averaged with the originals to improve overall precision. Details of the QC program are presented below:

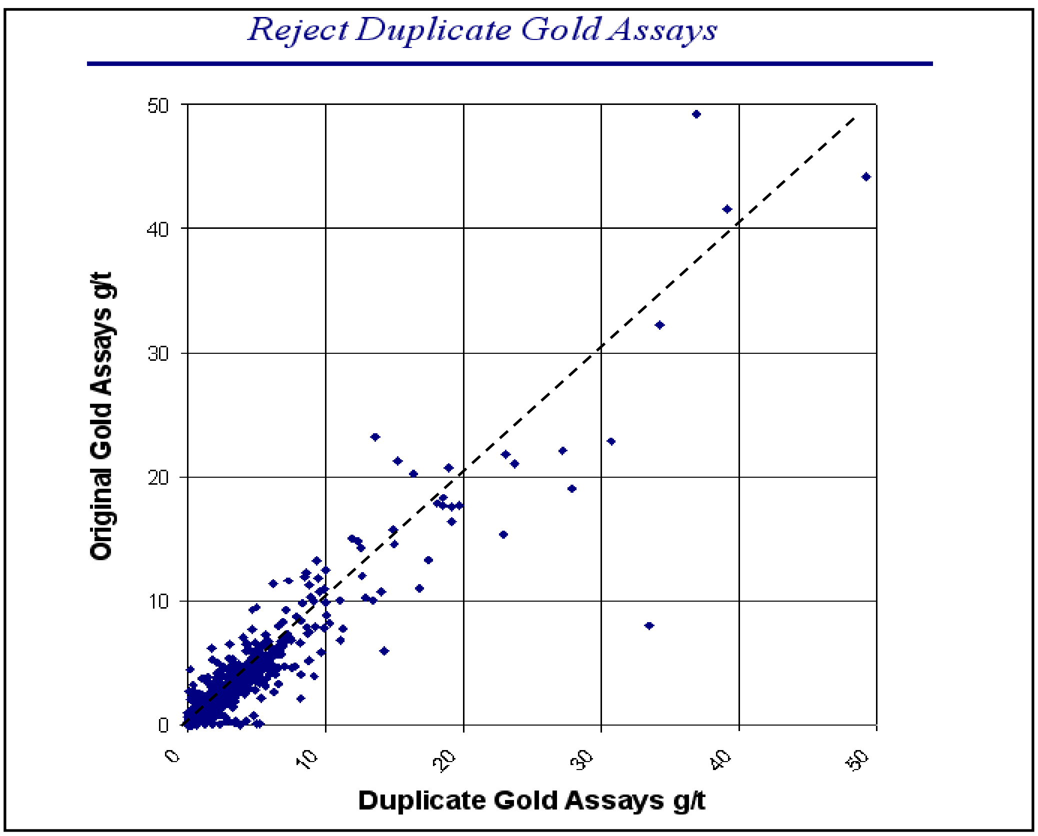
- Coarse reject duplicates: after the first few months of the program, Northgate started to select and analyze reject-duplicates for groups of samples from mineralized zones (over 0.5 g/t Au). This re-run program generated 4,337 reject duplicates from mineralized zones. In addition, Northgate regularly inserted reject duplicates in a proportion of one in 75 samples (250 samples).
- Pulp duplicates: During the first stages, Northgate systematically submitted dual 50-gram assays to achieve better overall precision. Pulp-duplicates were analyzed for all of the first 1,195 samples. This practice was later suspended.
- CRMs: Rocklabs CRMs were inserted in the batches prior to submission to the primary laboratory.
- Coarse blanks: crushed concrete block material was inserted in the batch prior to submission to the primary laboratory.

The regular control sample insertion frequency was as follows: coarse reject duplicates, 1 in 80; CRMs, 2 in 80; coarse blanks, 1 in 80. These samples occupied systematically the same position in the numbering sequence (sample numbers ending in 01, 21, 41, 61, and 81).

Ron Konst regularly processed the QC data, and ensured that all failed CRM samples were timely investigated (Konst, 2008b, 2008d). Errors were corrected or certificates revised. Where investigation confirmed CRM performances, these have been accepted as correct. The independent consultant has also investigated all failed blanks, and errors were corrected or certificates revised. As of 31 December 2007, Konst (2008d) concluded the following:

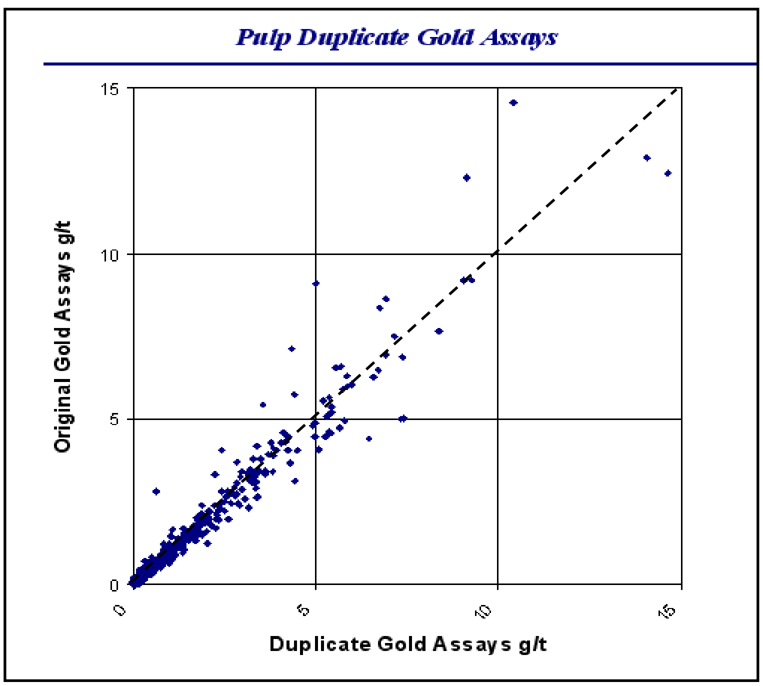
- Results of 4,519 reject duplicates over the reported detection limit indicated that the combined preparation and analytical precision (calculated using the Thompson-Howarth regression analysis) was very good, approximately 15% at the open-pit cut-off grade of 0.6 g/t (0.018 oz/ton), and 14% at the 1.71 g/t Au, or 0.05 oz/ton Au, underground cut-off grade. Above 7.20 g/t Au (0.21 oz/ton Au), the average precision was 23%, which was still deemed as acceptable (Figure 14-1).

Figure 14-1: Reject Duplicate X-Y Plot (After Konst, 2008d)



- Northgate submitted 1,195 pulp duplicates during the first phase of the project. Konst (2008d) processed these data together with 750 pulp replicate data reported by ALS. Results of 1,765 pulp replicates over the reported detection limit and below 7.20 g/t Au (0.21 oz/ton Au), indicated that the analytical precision was very good (approximately 7% at the 1.71 g/t Au, or 0.05 oz/ton Au, underground cut-off grade). For values above 7.20 g/t Au (0.21 oz/ton Au), Konst (2008d) estimated the average precision at 14%. However, the more erratic higher-grade matched pairs only represent 0.6% of the pulp-duplicates (Figure 14-2).
- Results from the 290 CRMs (RockLabs CRMs SJ22 in 2006 and SJ32 in 2007) yielded 53 outliers, of which four corresponded to data entry errors that were corrected, 26 outliers that were investigated and found to be acceptable, and 23 outliers that resulted in re/analysis and re-issue of corrected certificates. The 2006 Au bias was -1.9%, and the 2007 Au bias was -1.1%, both within the acceptable accuracy limits.
- Results from the 280 coarse blanks indicated that there were no significant contamination issues. One contamination issue was encountered at Swastika, but the associated batch of samples was re-run and revised.

Figure 14-2: Pulp Duplicate X-Y Plot (After Konst, 2008d)



In spite of the fact that the QC protocol implemented by Northgate was not complete, since it did not assess the sampling variance, AMEC is of the opinion that Northgate followed good QC procedures by having an independent QC program over the data. Ron Konst used industry-standard QC methods that ensured reliable results. AMEC is of the opinion that the Northgate assay data are sufficiently precise and accurate for mineral resource and reserve estimation purposes.

14.9 Bulk Density

No information was available to AMEC regarding bulk density determinations during the pre-2006 exploration.

During the 2006-2008 exploration, Northgate conducted on-site bulk density determinations with the water displacement method, by taking one sample in every second box. Therefore, on average Northgate has one bulk density sample every 8 m to 9 m of drill core length. The rock is usually very competent. For that reason, the bulk density determinations did not include coating the samples in paraffin.

The database supplied to AMEC includes 3,687 bulk density determinations, ranging from 2.48 g/cm^3 to 3.20 g/cm^3. Of them, 2,373 samples (65%) include Au values (Figure 14-3), and 80% of them have bulk densities ranging from 2.60 g/cm^3 to 2.80 g/cm^3, a fairly restricted density interval (0.2 g/cm^3), over the whole Au grade range. Similarly, no significant variation of bulk density with depth is observed (Figure 14-4).

Figure 14-3: Bulk Density versus Au grade

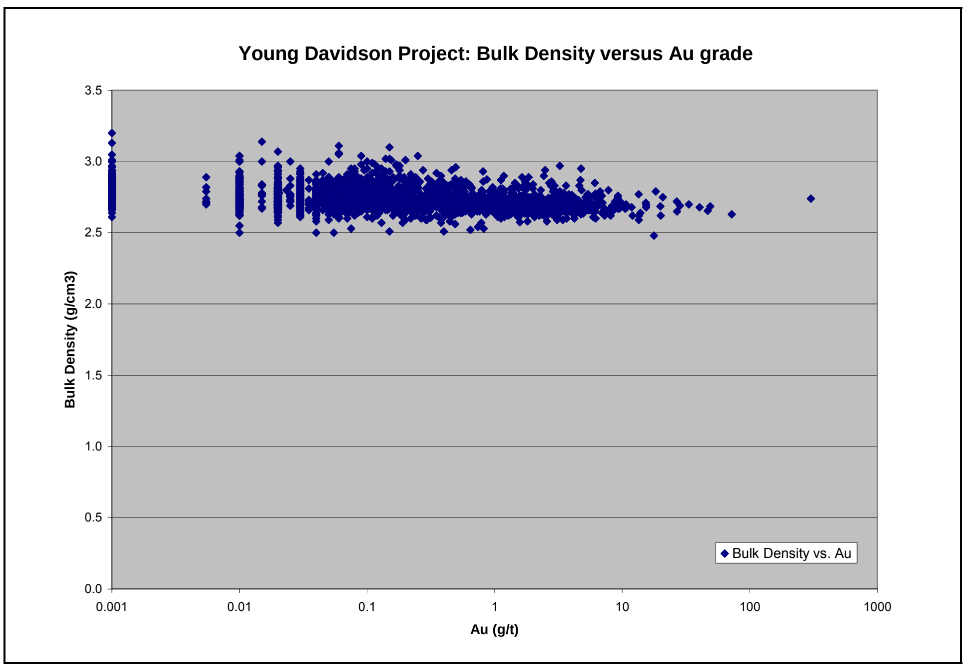


Figure 14-4: Bulk Density versus Depth

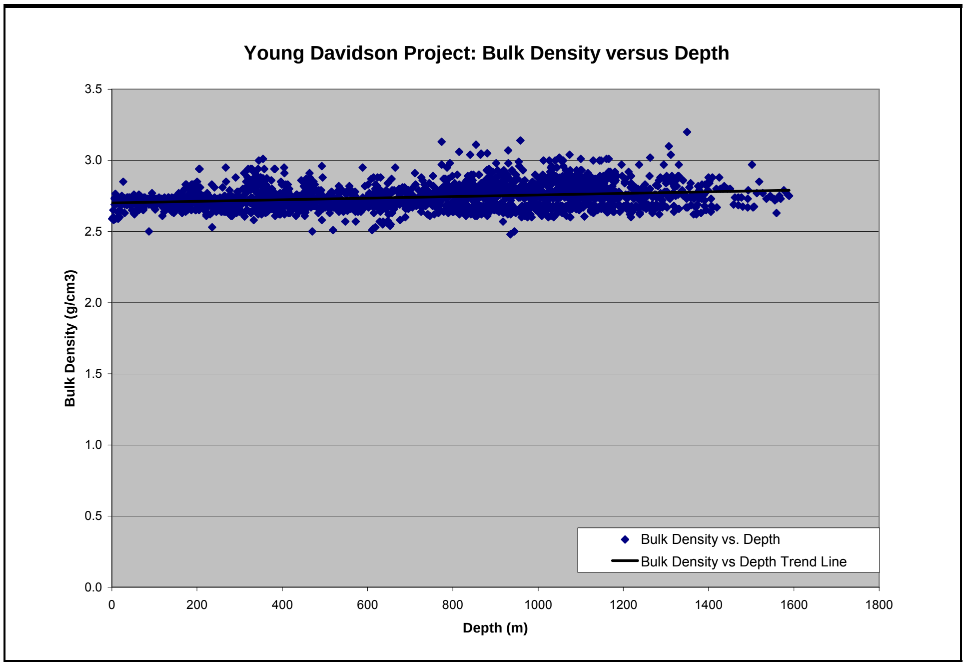
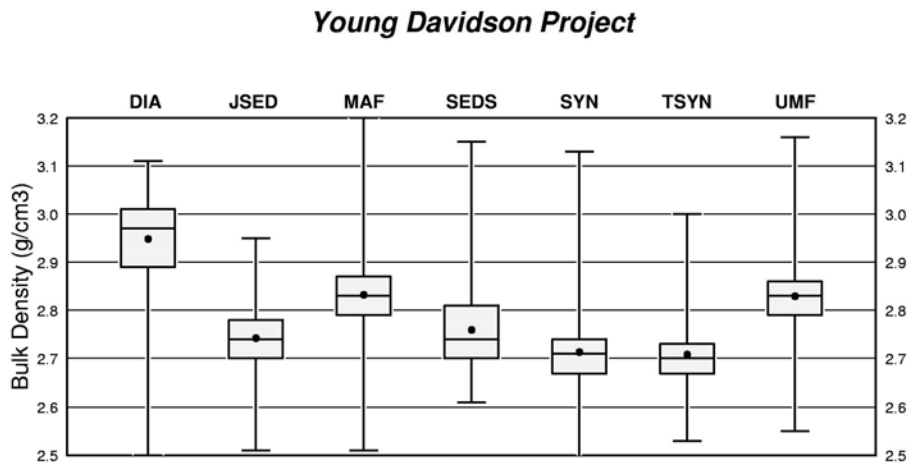


Table 14-3 lists the results of density determinations from the major rock types at the Young-Davidson Property, showing the number of samples, the minimum, maximum and average density values for each rock type. Figure 14-5 shows boxplots for some lithology types.

Table 14-3: Density Determinations for the YD Project (Edmunds, 2008)

Northgate Mineral Corporation - Young-Davidson Project, Ontario				
Rock Type	**Number of Test**	**Average (g/cm^3)**	**Minimum (g/cm^3)**	**Maximum (g/cm^3)**
Syenite	459	2.715	2.503	3.141
Diabase	96	2.966	2.715	3.110
Mafic Volcanic	453	2.835	2.523	3.204
Timiskaming	266	2.738	2.605	3.110
Total	1,274		2.503	3.204
Resource Syenite	**67**	**2.692**	**2.563**	**3.051**

Figure 14-5: Bulk Density Boxplots



	DIA	JSED	MAF	SEDS	SYN	TSYN	UMF	
Number of data	213	398	445	658	1140	346	389	Number of data
Mean	2.948	2.742	2.832	2.759	2.713	2.708	2.829	Mean
Maximum	3.11	2.95	3.2	3.15	3.13	3.0	3.16	Maximum
Upper quartile	3.01	2.78	2.87	2.81	2.74	2.73	2.86	Upper quartile
Median	2.97	2.74	2.83	2.74	2.71	2.7	2.83	Median
Lower quartile	2.89	2.7	2.79	2.7	2.67	2.67	2.79	Lower quartile
Minimum	2.5	2.51	2.51	2.61	2.48	2.53	2.55	Minimum
Variance	0.0072	0.0039	0.006	0.0067	0.0042	0.0032	0.005	Variance
CV	0.029	0.023	0.027	0.03	0.024	0.021	0.025	CV
Skewness	-1.262	0.124	-0.023	1.126	0.966	0.822	0.549	Skewness

Note: DIA: Diabase; JSED: Jasperoid; MAF: Mafic rocks; SEDS: Undetermined sedimentary rocks; SYN: Syenite; TSYN: Trachitic syenite; UMF: Ultramafic.

15.0 ADJACENT PROPERTIES

The Young-Davidson Project resources are centered on a large claim block owned by Northgate. There is currently no significant gold mineralization located in adjacent properties.

16.0 MINERAL PROCESSING AND METALLURGICAL TESTING

16.1 Mineralization and Mineralogy Description

The Young-Davidson deposit is a syenite-hosted gold deposit. The gold mineralization is mostly related to quartz veinlets and disseminated pyrite mineralization.

In 2007, eight distinct mineralized samples from various mineralized zones of the Young-Davidson property were sent to SGS Minerals Services (SGS) in Lakefield, Ontario for assaying, ore characterization and scoping level metallurgical work. Work was performed in gravity separation, flotation and cyanidation. Chemical head analysis was conducted on each mineralized sample as well as chemical head analysis of a master composite sample of the eight mineralized samples was conducted. Northgate selected the samples to be representative of the different mineralized lithologies encountered in the deposit. The representation of the samples and metallurgical responses have been reviewed by AMEC. This review indicated that the sample selection is sufficient for this level of study but that further work will have to be performed in the future, in particular for the lower zone (LZ) and OP material, to firm up information on metallurgical responses.

For the purpose of describing the mineralogy of the mineralized samples, the master composite chemical head analysis is presented. As well, some mineralogical observations using optical microscopy from the gravity concentrate (from testwork) have been included.

16.1.1 Chemical Head Analysis

Each sample was subjected to fire assaying, LECO and a thirty element ICP analysis as can be seen in Table 16-1 and 16-2.

Table 16-1: Results of Fire Assay and Pulp Metallics for Au and Ag in the Master Composite

	Au +150	Au -150 A	Au -150 B	Head	Ag +150	Ag -150 A	Ag -150 B	Head
Wt. (g)	28.8	984.8		1013.6	28.8	984.8		1013.6
g/t (PM)	11.35	3.50	3.94	**3.94**	4.20	4.30	3.10	**3.71**
% Dist.	8.2	91.8		100.0	3.2	96.8		100.0
g/t (FA)				**4.14**				**3.70**
Average			**Au g/t**	**4.04**			**Ag g/t**	**3.71**

Table 16-2: ICP, LECO and WRA results from the Master Composite

Element, unit	LECO, ICP
S= %	0.86
S %	1.55
CO2 %	4.52
Te g/t	5
Al g/t	68000
As g/t	~~30~~
Ba g/t	2000
Be g/t	1.5
Bi g/t	~~20~~
Ca g/t	37000
Cd g/t	~~2~~
Co g/t	14
Cr g/t	110
Cu g/t	240
Fe g/t	30000
K g/t	37000
Li g/t	~~5~~

Element, unit	ICP
Mg g/t	9900
Mn g/t	620
Mo g/t	~~15~~
Na g/t	25000
Ni g/t	44
P g/t	1100
Pb g/t	170
Sb g/t	~~10~~
Se g/t	~~30~~
Sn g/t	~~20~~
Sr g/t	910
Ti g/t	440
Tl g/t	~~30~~
V g/t	61
Y g/t	15
Zn g/t	59

Element, unit	WRA
SiO2 %	57.70
Al2O3 %	13.80
Fe2O3 %	4.30
MgO %	1.67
CaO %	5.05
Na2O %	3.13
K2O %	6.87
TiO2 %	0.37
P2O5 %	0.26
MnO %	0.08
Cr2O3 %	0.02
V2O5 %	0.02
LOI %	4.40
Sum %	97.70

Strike through represents below detection limit

16.1.2 Mineralogy

Optical microscopy was conducted on three concentrates products from three individual Master Composite samples which was ground to an average product P_{80} of 101µm size and subjected to Knelson concentration followed by cleaning of the concentrate with a Mozley separator. The concentrates differed by their percentage of starting weight which were approximately 0.05%, 0.10% and 0.15%. Figure 16-1 shows Concentrate 1 (0.05%) is mainly composed of pyrite with some chalcopyrite, galena and other unknown sulphide minerals. Gold can easily be found and occured as flakes, spheres, rods and other shapes. The grain size of gold varies, with a large flake being estimated about 400 x 1000µm. No tellurides are identified. If any, they may occur in sulphide minerals. Concentrates 2 and 3 are very similar to Concentrate 1, but have much less gold. There are some smaller gold particles observed in Concentrate 2, but no free gold was observed in Concentrate 3.

Figure 16-1: Optical Microscopy Plates of Gravity Concentrate

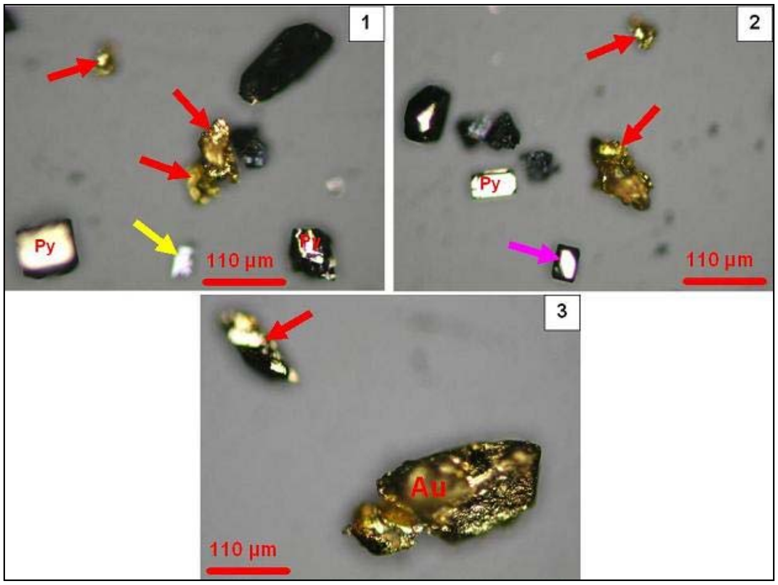


Plate 1 showing liberated native gold (indicated by red arrow), pyrite (indicated by Py) and galena (indicated by yellow arrow), X 100

Plate 2 showing liberated native gold (indicated by red arrow) and pyrite (indicated by Py and pink arrow), X 100

Plate 3 showing liberated native gold (indicated by Au and red arrow), X 100

16.2 Test work

The metallurgical testwork programs considered for this phase were mostly completed in 2007 and early 2008 at SGS. Results of these tests provided the data used to define the metallurgical response of the gold mineralized composite.

A series of six gold mineralized samples and two waste samples were submitted for various grinding parameter determinations at SGS. Subsequently, a composite sample incorporating two of the minerlization types was prepared and used throughout the remaining testwork programs.

In early in 2008, additional work was also performed by Outotec on the thickening characteristics on samples of concentrate and flotation tailings produced at SGS.

AMEC was not involved in the selection of the samples tested. The review of the sample selection information indicated that while these samples allowed for the development of a flowsheet applicable to the deposit, further variability work will be required to delineate metallurgical responses.

The following is an overview of the content of the testwork programs:

- Gravity concentration trials using a small Knelson unit with a Mozley table for upgrading to a target weight recovery. Mineralogical analysis of the gravity concentrate.
- Rougher flotation response under different grind fineness and reagent regimes.
- Timed rougher flotation under optimized flotation conditions.
- Leaching trials on the flotation concentrate under various regrinding intensities, cyanide, pH, carbon content and levels of oxygen.
- Leaching trials on the flotation tailings with various levels of cyanide, pH, carbon content and levels of oxygen.
- Leaching trials of pre-leached flotation concentrate in combination with flotation tailings.
- Cyanide destruction tests on combined leach tails.
- High-capacity thickening testwork and pulp rheology measurements on the thickened concentrate and tailings.

METSO was provided with a sample of the flotation concentrate, for establishment of the power demand related to the regrinding duty selected. However these results were not available for consideration at this stage of the YD Project.

Subsequent to above list of test work a second phase of test work was conducted to test the grindability of the mineralized material via a pilot plant grinding test at SGS. Fresh samples from different mineralized zones have been selected for this work. While the final results were not available and thus not included for this report, early indications showed that a single Ag milling arrangement may be the most appropriate grinding configuration for the Young-Davidson material.

16.3 Test work Results

AMEC has reviewed metallurgical testwork data provided by SGS to Northgate on the recovery of gold from samples from the Young-Davidson Property.

16.3.1 Grinding

Establishment of Target Grind

The early series of flotation tests (F1 to F9, and F12) were all performed at a nominal P_{80} of 90 µm while the chemical conditions were being optimized, yielding variable mass pulls. Afterwards, coarser grind trials were completed, with F10, F11 and F13 at a nominal P_{80} of 120 µm, F14 at 165 µm and F15 at 100 µm. Of interest are comparisons between F15 and F14, which were performed at the favoured mass recovery target and reagent regime. The results show a slight advantage for the finer grind, with a gold recovery of 95.1% vs. 94.0% for F14, while both tests achieved a sulphur recovery of about 97%. One test (F16) was performed at a grind even coarser at a nominal P_{80} of 180 µm, achieving a gold recovery, of 91.5% at lower mass pull levels than used for F14.

With the limited scoping testwork performed the design grind was targeted at P_{80} of 150 µm. Further testing should be performed in the course of the next phase of work in order to properly optimize the selection of the grind size.

Grindability and YD Material Characteristics

Table 16-3 outlines the grindability and material characteristics of a number of samples taken from the YD property. Most samples tested fell in the medium to hard range of hardness with respect to impact breakage and Bond rod mill / ball mill grindability work indices while there was one waste sample which fell in the very hard range of hardness. A sample composed of an equal mixture of Upper Boundary and Pit Zone material yielded a BWI of 18.0 and was selected as the design mineralized material. All samples have also been identified as abrasive or very abrasive.

Two mineralization types included in the design mineralized material definition are the hardest of the series tested. Under these conditions, only inclusion of dilution material similar to the waste sample YD07-31A would potentially limit the actual throughput capacity of the plant below the nameplate rating. Assessing the variability of the two harder mineralization types included in the design mineralized material, by testing individual samples of the same sources, would determine if this rate can be sustained on average with the design mineralized material as well.

Table 16-3: Summary from the Grindability Study

Sample Name	Ore Density	DWT Parameters			RWI	BWI (@ 100M)	Ai
	(g/cm^3)	A	b	A x b	(kWh/t)	(kWh/t)	
Lucky Zone	2.67	100	0.43	43.0	15.0	16.4	0.675
Lower Boundary	2.69	85.64	0.55	47.1	14.0	15.3	0.506
Upper Boundary	2.68	90.22	0.41	37.0	17.5	18.3	0.690
Pit #6	2.71	88.46	0.47	41.6	15.5	16.5	0.819
YD Zone	2.69	94.38	0.49	46.2	12.7	14.7	0.540
Pit Zone	2.67	96.12	0.38	36.5	16.3	17.7	0.687
Waste (YD06-26)	2.71	86.58	0.45	39.0	15.7	17.5	0.696
Waste (YD07-31A)	3.02	100	0.27	27.0	21.4	23.0	0.395
Average (Pit Zone & Upper Boundary)	**2.68**	**93.17**	**0.395**	**36.8**	**16.9**	**18.0**	**0.689**

The circuit has been designed based on the modified Barratt/Allan methodology for determining the power requirements for a single-stage AG or SAG mill circuit configuration. The modified Barratt-Allan method makes use of the crushing (CWi), rod mill (RWi) and ball mill (BWi) work indices. The CWi was estimated from a range of determinations on materials deemed of similar mineralogy.

As was mentioned above a pilot plant grinding study was conducted and final results would permit proper calibration of the breakage parameters required to implement valid JKSimMet simulations of the primary grinding mill, and thus provide an opportunity to fine-tune the operating conditions indicated. The approach would be to oversize the AG mill as a contingency against harder mineralized materials and allow enough power to convert the AG mill to a SAG mill at a low ball charge.

16.3.2 Gravity Concentration

The gravity concentration testwork was conducted on the composite sample, which included a primary centrifugal concentrator followed by cleaning on a Mozley table. SGS reported a gold recovery of approximately 20% and a target mass recovery of 0.05%. The approach was to use a design recovery of 15% for the gravity circuit to bring it in line with the average feed grade expected.

The gravity product would be leached in an intensive cyanidation unit (ICU), instead of relying on tabling for upgrading it into a smeltable product. Sizing of the ICU is based on the same 0.05% weight recovery as sought in the lab-scale testwork, indicating a reactor capable of processing 2.7 t/d of concentrate.

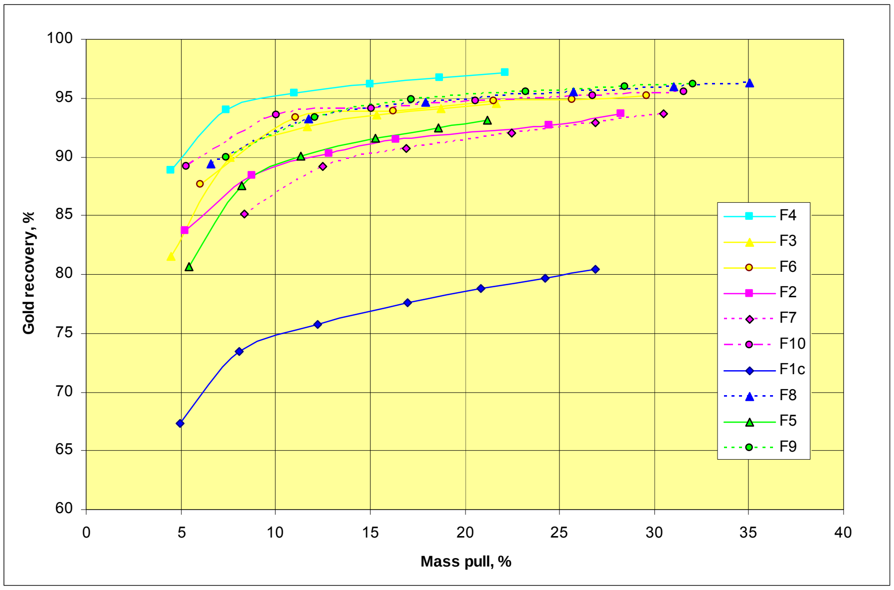
16.3.3 Flotation

Retention Time and Cell Volume Requirements

Flotation testwork was used to establish the desired mass pull of 20% required to maximize gold recovery. This value should be expected to vary with the sulphide content of the ore being based on the tested sample content of 1.5%. Since the sulphur value was not represented in the geological block model, its variability and a statistically appropriate design value could not be established.

Figure 16-2 illustrates the impact of the flotation weight recovery on gold recovery for trials performed on the various individual mineralized samples (after gravity concentration). The results indicate that, once a 20% mass pull has been achieved, only a marginal incremental gold recovery is obtained thereafter, with the Lucky Zone being an exception, displaying slower gold kinetics and much lower flotation recovery potential.

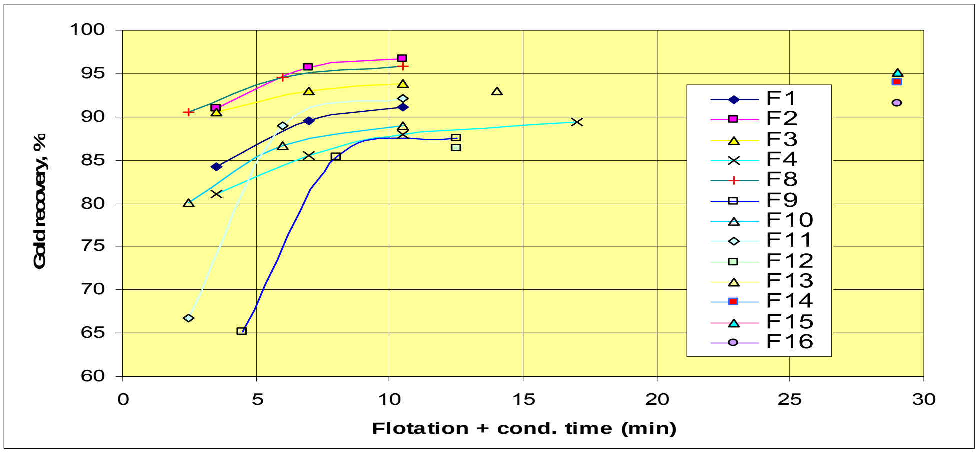
Figure 16-2: Effect of Flotation Weight Recovery on Gold Recovery



F4	Pit Zone
F3	Upper Boundary
F6	YD-06 (Upper Boundary)
F2	Lower Boundary
F7	YD-09 (Lower Boundary)
F10	YD-20c (Lower Boundary)
F1	Lucky Zone
F8	YD-11 (Lucky Zone)
F5	YD Zone
F9	YD-17c (YD Zone)

The flotation kinetics were typical of the profiles shown in Figure 16-3. The kinetics would suggest that an actual flotation time of less than the 20 minutes would be sufficient to achieve a gold recovery of about 93%, with an excess time contributing marginally to incremental recovery. This lab-scale retention time was then multiplied by a scale-up factor of 2.5, accounting for the slurry short-circuiting expected in large-scale cells installed in rows, to yield the commercial cell volume requirements, along with the mass balance feed flow and an allowance for 15% of the actual cell volume occupied by air and the froth layer on top.

Figure 16-3: Timed Rougher Flotation Kinetics



The resulting volume requirement of 500 m^3 is to be covered by providing four 130 m^3 cells.

The reagent addition rates for the xanthate (PAX), the promoter (Aero 407) and the frother (MIBC) were derived from the latest tests performed in the scoping series completed.

16.3.4 Regrinding Stage

The flotation concentrate production rate is set by the target weight pull of 20% retained for the flotation circuit. Sizing of the flotation concentrate obtained indicated a D_{80} of about 45 µm. This was translated into a F_{80} of 60 µm as the design value used for the regrinding stage.

The regrinding intensity required to achieve an optimized gold leaching recovery of the flotation concentrate was studied in the testwork campaign. The trials either used the flotation concentrate produced as-is, displaying a D_{80} of about 90 µm, or reground the flotation concentrate (as fine as 80% passing 10 µm in some tests). The best result obtained without regrinding indicated a gold recovery from gravity tails of approximately 85% by subsequent leaching. Leaching of the flotation concentrate which underwent further regrinding to a finer product yielded over 95% gold recovery at a P_{80} of 11 µm to 92% at a P_{80} of 20 µm. A target in the middle of this range, at 15 µm, was selected for design and ascribed a gold recovery potential of 94%.

16.3.5 Thickening

The role of thickening was to increase slurry density for both flotation concentrate and tails in order to achieve the appropriate densities for efficient leaching.

Both flotation concentrate and tails samples were provided to Outotec from test products resulting from the work at SGS. Outotec completed a series of dynamic thickening tests most appropriate for the sizing of high rate thickeners. Their resulting report contains testwork data generated for deriving the design criteria applicable to high rate thickeners. Unfortunately, the testwork produced by Outotec was geared at achieving the highest underflow density possible, instead of targeting the range of 50-55% relevant for the operation of a gold leach circuit. The resulting unit area requirements therefore had to be adjusted to values appropriate to achieve the lower underflow densities sought.

Flocculant scoping trials performed as part of Outotec's work indicated that a non-ionic polymer, would provide the most suitable overflow clarities for both the concentrate and tailings.

AMEC recommends that the next phase of testwork incorporates thickening work performed to the desired densities, to provide data to the design criteria.

Concentrate Thickener

A conventional thickener is specified for concentrate thickening to provide a cleaner overflow stream than what would be expected from a high-capacity thickener design. The unit area is divided by a factor of 0.7 to adjust the value derived from the Outotec testwork to a value appropriate to achieve the required underflow density targets.

The testwork results indicate that a flocculant addition rate of 20-25 g/t was required to achieve overflow clarity which was in a range of 200-250 ppm. A conventional thickener should achieve better results than this, due to its slower rise rate through the mud bed. For design purpose, a flocculant consumption of 15 g/t was used for a target overflow clarity with less than 150 ppm of solids.

The unit rate achieved for the underflow density over 64% solids is approximately 0.5 $t/h/m^2$. Applying the conversion factor to change from a high rate unit to a conventional unit would indicate an adjusted unit rate of 0.35 $t/h/m^2$. Finally, accounting for a target underflow density of 50% solids, instead of the 64% achieved in the testwork, and considering some benchmarked data for material of similar size and SG, the resulting conventional thickener unit area used in the design criteria is 0.5 $t/h/m^2$.

Using a thickener feed rate equivalent to 20% of the plant fresh feed, the unit rate translates into a thickener diameter of 10.4 m. A 12 m diameter thickener with a separate deaeration feed tank was selected. All the incoming stream flows will feed the deaeration tank before feeding into the thickener feedwell.

Tailings Thickening

A high rate thickener is specified for tailings thickening duty since there is limited occurrence of froth at the surface impacting the ability to produce a clean overflow.

The testwork results indicate that a flocculant addition rate of 25 g/t was required to achieve the target overflow clarity of 200 ppm or better. This value was adopted for design purpose.

The unit rate achieved for an underflow density surpassing 70% solids, is about 0.7 t/h/m^2. For the actual target underflow density of 55% solids selected, and considering some benchmarked data for material of similar size and SG, an adjusted unit area of 0.9 t/h/m^2 is used.

With a feed rate equivalent to 80% of the plant fresh feed, this unit rate translates into a thickener diameter of 17.6 m. A 20m diameter thickener was selected for the tailings duty, including a separate deaeration feed tank where all the incoming stream flows are to be discharged before proceeding into the pipe feeding the thickener feedwell.

16.3.6 Leaching

With most of the gold reporting to the flotation concentrate, the intended leaching circuit design is divided in two stages: one where the flotation concentrate after regrinding feeds a leach circuit followed by a second leach stage, the combined leach circuit. The combined leach circuit is where the flotation tailings are mixed with the flotation concentrate leach tailings to recover gold from the flotation tailings.

Concentrate Leach Circuit

As discussed in section 16.3.4, concentrate leach trials were completed with various F_{80}, as well as various chemical conditions. The use of air, oxygen, pre-aeration (4 or 8 hours), and different levels of free cyanide and alkalinity were tested. In one instance, lead nitrate was also added. Activated carbon was added in most trials, at a concentration of 10 or 15 g/l.

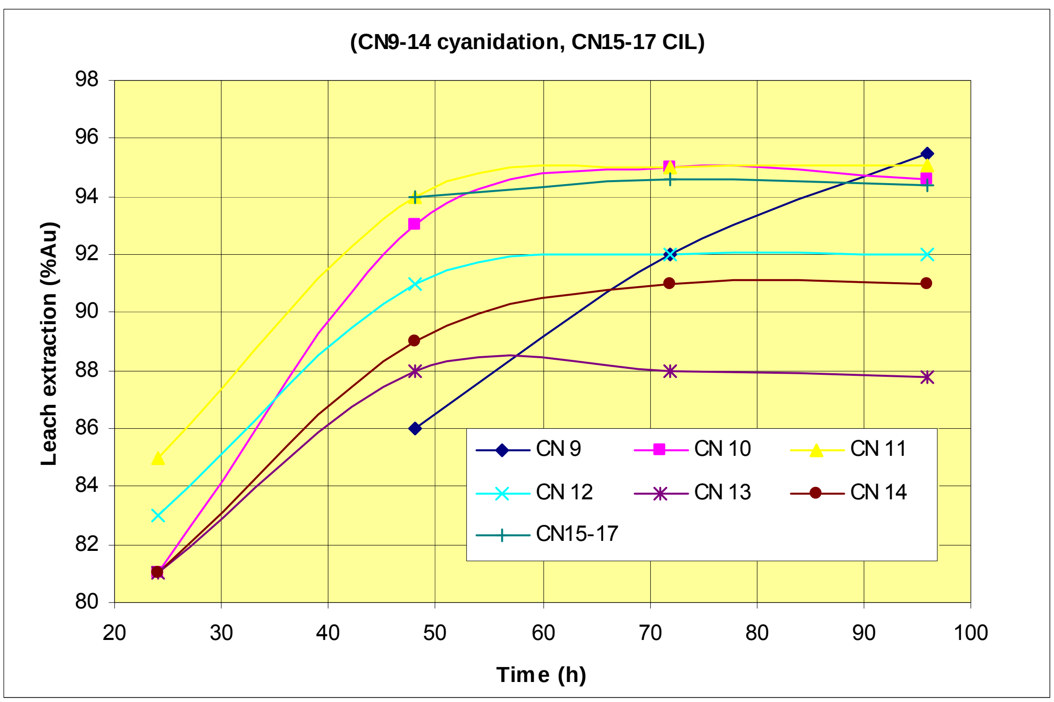
The trials with air as the oxidant showed a superior gold dissolution to those involving oxygen.

Figure 16-4 presents some of the typical leaching kinetics observed, with trials CN9 to CN14 performed as straight cyanidation leach tests (without the presence of activated carbon in the leach slurry) and CN15 to CN17 with 10 g/l of carbon in CIL tests. CN9 was the only test shown on Figure 16-4 involving oxygen instead of air. The K_{80} of most trials was measured as between 10 and 13 µm, except for some coarser regrind sizes exhibited in CN14 (17 µm), CN12 (20 µm) and CN13 (28 µm). The available cyanide and alkalinity levels were maintained at 2 g/l for tests CN9 to CN13 but dropped to 1 g/l for CN14 to CN17. Finally, CN11 differed from the other tests by the addition of 1 kg/t of lead nitrate. CN15, 16 and 17 were all tested under similar conditions but had durations of 96, 72 or 48 hours total leach time, respectively.

As per Figure 16-4, the addition of lead nitrate (CN11) did initially improve the leach kinetics but not the long term test outcome, relative to the other best tests represented by the series CN15-17 and CN10. Lower gold leach recovery was seen for the three trials with coarser feed size (CN12-14) while the poor outcome for CN9 is a reflection of the direct oxygen use instead of air.

The best tests results indicate that a leach time of 60 hours is sufficient to arrive at the optimum gold dissolution that can be achieved, which is approximately 95%. For the design regrind K_{80} of 15 µm, the target recovery used in the design criteria has been decreased to 94%.

Figure 16-4: Concentrate Leach Kinetics



The required retention time would be provided in four leach tanks for the concentrate leaching, to be preceded by a pre-aeration stage of 4 hours. The tanks are to be fitted with NKM-type submerged swept screens, with the carbon-laced slurry transferred upstream by recessed impeller pumps.

A carbon concentration of 15 g/l is retained, similar to what was used in the optimized CIL tests.

Combined Leach Circuit

Trials were performed initially with the flotation tailings only and, later, with the recombined mixture of pre-leached concentrate and flotation tailings, to emulate the combined leach circuit which would receive a mixture of both streams. The goal sought by integrating the pre-leached concentrate in a leach circuit where the "fresh" tailings are introduced was mostly for the opportunity to use the residual cyanide found in the concentrate leach circuit, measured at about 0.15 g/l, instead of this material proceeding to cyanide destruction. It is not expected that the additional leach time would increase recovery from the flotation concentrate.

Leaching the flotation tailings separately indicated a recovery potential for this material. A series of tests (CIL10-12) performed under similar conditions, specifically with 0.5 g/l NaCN (0.45-0.5 kg/t), but at variable leach durations indicated that the gold recovery after 12 hours was at 63.8% while extending it to 36 hours only increased the recovery to 67.6%. The cyanide consumption after 12 and 24 hour tests was low, at 0.04 kg/t while it increased to 0.13 kg/t for the 36-hour leach cycle.

The trials where the flotation tailings were leached in the leach solution extracted from the leached flotation concentrate showed that the residual cyanide level encountered was insufficient to achieve an appropriate gold extraction from the tailings (CIL22-23). Adding approximately 0.2 kg/t of cyanide (CIL18-19), in addition to the residual found in the leached concentrate solution, allowed to reach recoveries in the range of 55-60%. Flotation tailings recovery was found to be sensitive to cyanide addition, reducing the addition below this level reduced the recovery: an addition of 0.08 kg/t yielded only 36.6% recovery after 12 hours (CIL25); at 0.12 kg/t and 24 hours of leaching (CIL24), 56.6% of the gold was dissolved.

The approach for design is a combined leach duration of 24 hours and a fresh cyanide addition of 0.1 kg/t topping up the flotation concentrate residue achieving an estimated 50% recovery from the flotation tailings.

16.3.7 Cyanide Destruction

Two small-scale, batch-type trials were completed to assess the reagent additions required to perform the destruction of residual cyanide found in the combined leach tails. Because of the scale and the static nature of the tests, the indicated reagent consumptions are not considered reliable. As well, the tests were brought to an end point with less than 0.1 mg/l of free cyanide remaining, which is significantly below the target of 10 mg/l.

The indicated sulphur dioxide requirement derived from the testwork is likely to be less than the 4.1 and 5.5 g/g of CN_{wad} seen in the two tests which produced levels of 0.2 and 1.8 mg/l of CN_{wad} respectively in the solution. The test results in conjunction with industrial practice in similar operations, led to the adoption of a consumption rate of 3.0 mg/l of CN_{wad} as the design criteria. A lime addition equating to 0.75 g/g of sulphur dioxide added was also derived from the testwork, while a requirement for 25 ppm of copper ions in the solution was taken from benchmarked operations and assumed as coming entirely from copper sulphate addition, although it is expected that some naturally-occurring copper ions may in practice reduce this consumption.

A retention time of 1 hour was retained for sizing the cyanide destruction reactor, although the testwork achieved much lower levels of residual cyanide within half of this time.

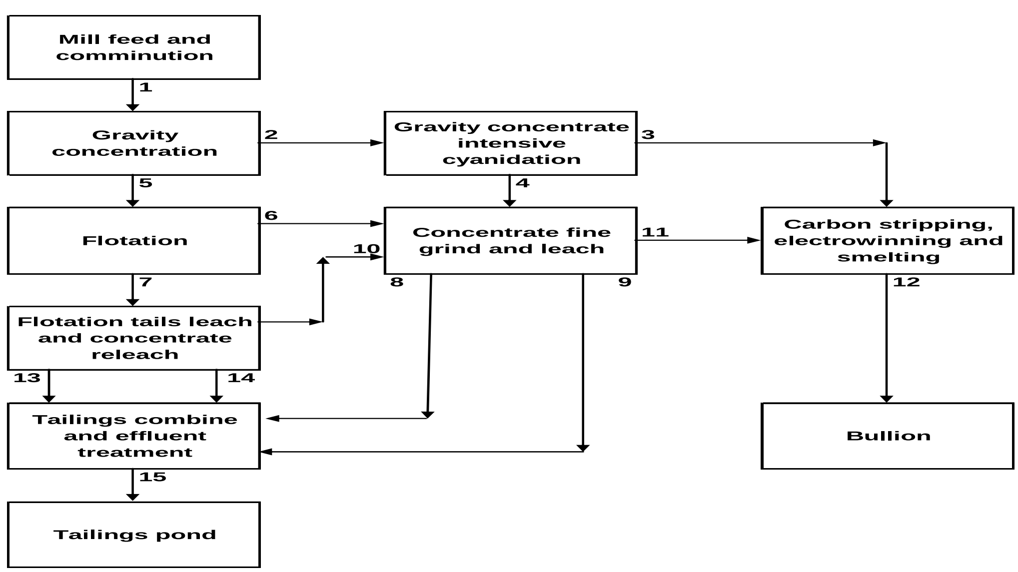
16.4 Metallurgical Recovery

Table 16-4 summarizes the recoveries of gold at each stage through the indicated process (Figure 16-5). An overall design recovery of 91.5% was projected, reflecting a lower head grade in the life of mine plan when compared to the head grades used in the metallurgical test programs.

Table 16-4: Summary of Staged Recovery at Design Head Grades of 3.5 g/t Au

Stream	***Feed***	***Gold***		
		Stage Recovery	***Unit***	***Distribution***
1	Ore (design head grade at 3.50 g/t Au)	100	350.0	100.0
2	Gravity concentrate	15	52.5	15.0
3	IC leach liquor	99.0	52.0	14.8
4	IC tails		0.5	0.2
5	Flotation feed		297.5	85.0
6	Flotation concentrate	93.0	276.7	79.0
7	Flotation tails		20.8	6.0
8	Concentrate leach tails	6	16.6	4.7
9	Releached IC tails	50	0.3	0.1
10	Partially loaded carbon		8.7	2.5
11	Fully loaded carbon		269.0	76.9
12	Recovery To Bullion (design gradeof 3.5 g/t Au)	91.7	321.0	91.7
	Projected Recovery To Bullion (average LOM at 2.94 g/t Au)	**91.5**		
13	Combined leach tails	50	10.4	3.0
14	Combined tails solution	0.5	1.8	0.5
15	Overall tails (design head grade 3.5 g/t)	8.3	29.0	8.3

Figure 16-5: Circuit Flow Showing Stream Numbers.



16.4.1 Gold Recovery

Although there was limited test work on gravity recovery it is estimated that gravity recovery would be in the order of 15%. The lack of GRG measurement on various samples however gives some uncertainty of the variability that might exist while treating different areas of the deposit. From the gravity concentrate, intensive cyanidation would extract approximately 99% of the gold into solution carried straight through to final Bullion.

Test work at SGS showed at 20% mass pull on flotation. While this may be feasible at the laboratory scale, reaching these levels in industrial-scale machines is unlikely with average sulphur grades in the order of 1.5%. A lower realized mass pull may reduce the flotation gold recovery but would decrease the size of required equipment in the regrinding and leaching circuits.

The flotation gold recovery, after gravity recovery, at the 20% mass pull indicated an average gold recovery of 93%. The estimated gold recovery in the flotation concentrate is 94% but is dependant on the overall regrind product size prior to leach. At a regrind P_{80} size of 11-13 microns the estimated gold recovery is 94%. Increasing the P_{80} to 20 micron the leach recovery for the concentrate reduces to approximately 92%. The reduction of recovery in this stage to 92% would drop the overall gold recovery from 91.5% to just over 90.0% if all other staged recoveries remained the same. More test work is required to determine the effective flotation concentrate regrind size on gold recovery.

Presumably regrinding of the intensive cyanidation tails would liberate any locked gold which may have still been encapsulated within the sulphide material. The gold contained in the intensive cyanidation tails stage is quite low and estimating a 50% recovery after regrinding would be considered acceptable for this level of evaluation. As well, flotation tails leach recovery is expected to be in the order of 50% while solution tails within the gold stripping circuit (as bleed) would typically run losses at 0.5% of overall gold content.

Head grades tested were in the order of 3.5 g/t Au and over while life of mine average grade was calculated to be 2.94 g/t Au, with mineralization from underground at 3.23 g/t Au and open pit mineralization at 1.5 g/t Au. The metallurgical recovery will likely be affected negatively as the average gold head grade moves lower. An overall recovery of 91.7% has been downgraded by a factor equivalent to 0.2 g/t Au to reflect a reduction of average gold head grade from 3.5 g/t to 2.94 g/t. AMEC justifies this reduction factor to better reflect the forecast gold grade from drill core.

16.5 Processing

The YD Project processing plant is designed for a daily capacity of 5,000 tonnes of mineralized material per day. The process plant circuit descriptions are provided below.

16.5.1 Primary Crushing Circuits

Open pit mineralization would be crushed to a specified product size under the responsibility of a contractor at a fixed price per tonne, while a primary crusher would be located underground. The crushing station equipment for the underground is sized for a 60% utilization rate, based on the selected work and maintenance schedules and mineralized material availability.

Crushed mineralized material will be transferred to two 2,500 t (live) capacity bins located on surface. The bins are insulated and ventilated to prevent freezing problems.

16.5.2 Grinding Circuit

Feed from each coarse ore bin discharges onto the AG mill feed conveyor via an apron feeder. The grinding circuit is in a single-stage AG configuration.

The AG mill discharge reports to the cyclone feed pump box. The discharge passes through a static safety screen, for removal of any large ore that might pass through worn or holed grates before entering the cyclone feed pump box.

A centrifugal pump (with one stand-by) delivers the slurry from the cyclone feed pump box to a battery of seven (of which five are typically in operation) 660 mm diameter hydrocyclones fed from a common manifold. The cyclone battery works in closed circuit with the AG mill, with the cyclone underflow returning as a circulating load to the mill feed. The cyclone overflow stream proceeds forward to the flotation circuit at a slurry density of 35% solids.

The grinding circuit is designed to operate with circulating loads fluctuating between 200 % and 400% relative to the fresh AG mill feed rate, using the variable speed capability of the cyclone feed pump to maintain the pump box level and the number of cyclones for feed pressure control to the cyclones.

16.5.3 Gold Gravity Concentration and Intensive Leaching Circuits

A fraction of the AG mill discharge slurry is pumped to a high-frequency vibrating screen, removing the +1.7 mm material. The screen undersize reports to a centrifugal gravity concentrator provided for coarse gold recovery.

The concentrator operates on a batch basis, with the feeding and concentrates discharge cycle durations optimized to obtain the appropriate balance between concentrate quality and unit recovery.

The small volume of concentrate produced per batch accumulates throughout the day in a conical settling tank, from where it is transferred once per day to a intensive cyanidation unit (ICU). This unit provides a high degree of gold dissolution within a short leach period. The reactor package includes a conical concentrate feed cone, the feed, solution and flush pumps, and a screw feeder for metering of the oxidizing agent. The unit is fully instrumented and automated.

The leach (pregnant) solution produced from the ICU reports to a dedicated electrowinning circuit, while the solid tailings are transferred to the flotation concentrate regrinding stage for size reduction and further leaching in the flotation concentrate leach circuit. This allows for additional recovery of gold from the residue.

16.5.4 Flotation

The cyclone overflow obtained from the grinding circuit passes through a trash screen prior to flowing into the flotation conditioner. The conditioner is agitated and provides time for contacting the slurry with the sulphide collectors, potassium amyl xanthate and flotation promoter A407.

The conditioner discharges into the first cell of the rougher flotation where a frother is added (MIBC). The flotation bank is comprised of four cells, each with a volume of 130 m^3.

Staged additions of xanthate, A407 and MIBC are made along the bank of rougher cells.

16.5.5 Thickening

The rougher concentrate reports to a pump box from which it is transferred to the concentrate thickener via a feed box. The type of thickener selected is a conventional thickener with a diameter of 12 m. The flotation tailings stream exiting the last cell is thickened in a high-capacity thickener, 20 m in diameter.

In case of a power shutdown, the thickener drive and underflow pumps are connected to the emergency power system, allowing for recirculation for steady operation.

Each thickener feed flow receives flocculant. Both thickener overflow streams report to a common standpipe, from where pumps (c/w stand-by units) send the overflow to the mill process water tank for internal reuse.

Each thickener underflow is fitted with a pair of pumps (one stand-by). The flotation concentrate thickener sends material to the regrinding circuit while the thickened tailings are pumped to the combined carbon-in-leach (CIL) circuit.

16.5.6 Regrinding Circuit

The thickened concentrate is pumped to the regrinding circuit, comprising a vertical tower mill, where the solids are reduced to a size distribution with a nominal P_{80} target of 15 µm. The tower mill discharge reports directly to the concentrate CIL circuit.

16.5.7 Gold Leaching Circuits

The gold and silver content of the flotation concentrate and tailings are subjected to cyanide leaching in two separate circuits comprised of agitated and aerated leach tanks. Both circuits employ the CIL method, with the pulp being transferred downstream and the carbon upstream for gradual gold and silver loading. The carbon is retained in a given leach tank by using submerged mechanically swept screens. Intermittently, inter-stage carbon transfer pumps are activated to transfer carbon upstream to achieve the desired precious metal loadings on the carbon.

Low-pressure compressed air is supplied to each tank, with cyanide and lime solution addition provided along the bank of tanks. The cyanide and lime addition is controlled in order to maintain appropriate oxygen and free cyanide concentrations, so as to provide adequate precious metals dissolution and protective alkalinity against cyanide gas evolution.

The circuit configuration allows for bypassing any one of the leach tanks while in operation if the need should arise.

16.5.8 Carbon Handling Circuits

Based on a design carbon loading of 12 kg/t, plus the design of as much as 20% impurities, and the design gold feed grades, the carbon handling circuits must be able to handle 3.3 t/d of carbon. The circuits were sized to process a batch size of up to 4.1 t/d of carbon, versus an expected average daily loaded carbon mass of 2.7 t. The extra capacity provides the operator the opportunity to either decrease the stripping frequency or process carbon at a lower loading level.

The Carbon Handling Circuit includes the following typical components;

- Carbon Acid Wash Circuit
- Carbon Stripping Circuit
- Carbon Regeneration Circuit
- Fresh Carbon Preparation Circuit

16.5.9 Gold Electrowinning Circuits

There are two parallel trains in this circuit, with one handling the eluate solution from the stripped carbon and the other receiving the pregnant solution produced by the ICU. Each of these pregnant solutions is stored in their respective pregnant solution tank for pumping, on a batch-basis, through the electrowinning circuit.

The EW circuit receiving the eluate from the stripped carbon comprises two EW cells which normally operate in series but are piped to allow for parallel operation as needed. The other EW circuit, dealing with the pregnant solution originating from the ICU, has one smaller EW cell. Both circuits have a pump box and pumps that receive the solution exiting the respective EW circuit and recirculate it back to the pregnant solution tank, again feeding the EW cells in a closed loop until the residual gold in solution is sufficiently low to indicate the end of a cycle, as shown by solution samplers at the discharge of the recirculating pumps.

Once an EW cycle in the two circuits is completed, the barren solution from the ICU is pumped back to the first tank of the concentrate CIL circuit, while the barren solution from the eluate is kept in the barren solution tank, to be used for the next strip cycle. A solution bleed is made as needed to maintain the solution inventory.

Gases escaping from above the EW cells are captured by a fan and sent into the atmosphere.

A dedicated rectifier powers each EW cell, providing high-amperage DC current for plating the precious metals onto the permanent steel wool cathodes of the EW cells. The cells operate to produce a sludge containing the precious metals. The plated solids remaining on the cathodes at the end of an EW cycle are pressure-washed and report with the surplus sludge deposited at the bottom of the EW cells. The sludge drains from the cells into a common pump box, to be transferred by a diaphragm pump into a plate-and-frame filter for dewatering. The dewatered solids are periodically removed from the filter and put onto a cart to be introduced into an oven, in preparation for the refining step.

Temperature control of the EW solution is through the use of heat exchangers.

16.5.10 Gold Refining Circuit

The dried EW sludge is put in a cement mixer, along with the fluxes required for melting it in an electric induction oven. Once the charge is thoroughly mixed, it is introduced into the induction oven.

The molten precious metals are poured into brick moulds to form the doré bars. The molten slag overflowing from the moulds passes into a slag pot. Low grade material is returned to the concentrate regrind circuit while higher grade slag is crushed and recycled in later pours. The cooled doré bars present in the moulds are emptied, cleaned with a needle gun, drill-sampled, punch marked and weighed before being locked up in a vault for storage while awaiting transport to the refinery.

16.5.11 Cyanide Destruction Circuit and Tailings Disposal

The combined leach circuit tailings report to a linear carbon safety screen. From there, they pass through a two-stage sampler arrangement, for collection of the metallurgical accounting sample, before entering the agitated cyanide destruction tank.

In this tank, the residual cyanide content is reduced below permissible levels through oxidation, using the INCO SO_2-air patented process. This involves introducing air, SO_2 and copper sulphate in the destruction tank, with the reagents added in stoichiometric proportions to the residual cyanide content of the slurry. Lime is also added to maintain a target pH.

The treated tailings slurry overflow to a standpipe, from which they are pumped by two centrifugal pumps that operate in series to the tailings impoundment. Surplus process and natural inflow water are seasonally discharged to the environment.

16.5.12 Tailings Disposal

The tailings will be pumped from the plant site to the tailings pond, where the suspended solids will settle out before reclaiming the supernatant for reuse in the process plant. Tailings will be spigotted into the pond at south side of the west dam as per previously selected option.

Tailings slurry is assumed to be 55% solids by weight with a 1.51 specific gravity. Two units of horizontal slurry pumps in series with approximately 150 hp electrical drives in operation, and two units in series as standby, will pump the design flow of 280 m^3/h of thickened leach tailings via HDPE pipe to the tailings pond.

16.5.13 Reagents Preparation Systems

Flotation Circuit and Thickeners

The following systems relate to the flotation and thickener circuits;

- Sulphide Collector: Potassium Amyl Xanthate (PAX) Preparation System
- Flotation Promoter: Aerofloat 407 Preparation System
- pH Modifier: Hydrated Lime System
- Frother: Methyl-Isobutyl-carbinol (MIBC) Preparation System
- Flocculant Magnafloc M-351 Preparation System

Leach and Carbon Stripping Circuits

The following systems relate to the leach and carbon stripping circuits;

- pH Modifier: Hydrated Lime System
- Sodium Cyanide (NaCN) System (bulk liquid and bulk bag as backup system)
- Oxidizing Agent LeachAid Preparation System
- pH Modifier Carbon Wash and Strip: Caustic Soda (NaOH) Preparation System
- Carbon Wash Acid Hydrochloric Acid (HCL) Preparation System

Cyanide Destruction Circuit

The following systems relate to the cyanide destruction circuits;

- pH Modifier: Hydrated Lime System
- Cyanide Oxidizer: Sulphur Dioxide (SO_2) Preparation System
- Catalyst: Copper Sulphate Copper Sulphate ($CuSO_4$*$5H_2O$) Preparation System

16.5.14 Water Management

The entire water management system includes the following main components;

- Fresh/Fire Protection Water
- Process Water System
- Reclaim Water System
- Gland Seal Water System

16.5.15 Air Systems

The entire air system includes the following main components;

- Dedicated Equipment Air Systems

- Plant Air
- Flotation Air
- Leaching and Cyanide Destruction Air
- Instrument Air

17.0 MINERAL RESOURCE AND MINERAL RESERVE ESTIMATES

17.1 Mineral Resources Estimate

17.1.1 Introduction

AMEC will discuss two separate topics in this section of the report

- The review of the open pit resource model from May 2007.
- The review of the current underground resource model from February 2008.

17.1.2 Density Determinations-Open Pit & Underground Zones

According to Edmunds (2008), the Micon 2004 resource estimate used a density of 2.69 g/cm^3 (based on a tonnage factor determined by Micon of 11.9 ft^3/ton) based on 54 specific gravity tests on syenite material completed by Royal Oak. The 2006 Northgate drilling program generated considerably more density data including 459 on-site immersion tests on syenite core that average 2.71 g/cm^3 (See section 14.9 for discussion of bulk density). The syenite data includes 67 tests on samples situated within the mineralization wireframes that average 2.69 g/cm^3. This new data corroborates well with the Micon 2004 tonnage factor. The mineralized syenite specific gravity is slightly lower than for barren syenite and this suggests that the increase in mineralization specific gravity expected from more pyrite may be offset by the potassic alteration and silicification.

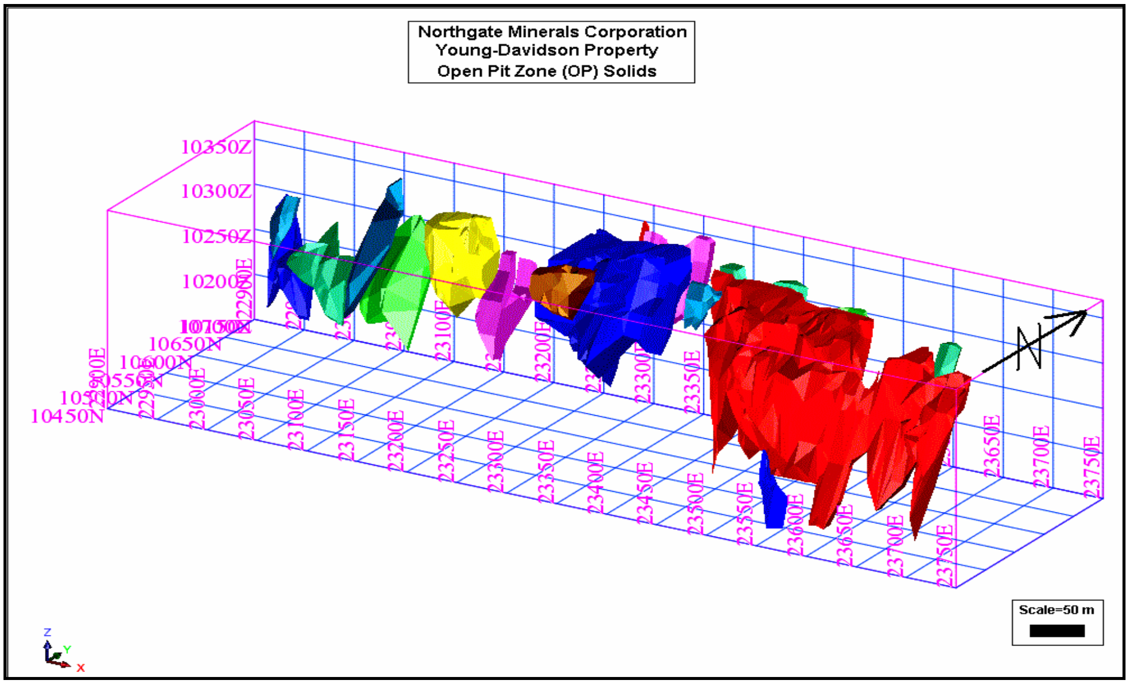
The work done by Micon and Northgate in assessing the density data shows that the syenite rock type varies between 2.37 g/cm^3 and 2.82 g/cm^3. Although syenite is a competent rock type, the range suggests that the mineralization in the syenite contributes to the varying density measurements. AMEC recommends that future resource models should attempt to model the density, assuming that the density measurements are scattered throughout the mineralized areas of the deposit. This will help in predicting tonnes locally based on the intensity of the mineralization.

17.1.3 Grade Shell Models-Open Pit

Northgate provided AMEC with 19 solids from for use in the OP resource estimate which represent primarily the syenite-hosted mineralization. See Figure 17-1 for all OP mineralized solids. The solid models (grade shells) were defined using a 0.80 g/t Au cut-off grade (0.024 oz/ton). This cut-off grade was first established in 1996 by Royal Oak and updated by Micon in 2004. A gold price of USD$400/oz (CND$533/oz) and a metallurgical recovery of 89% were used in the calculation.

All mineralized grade shells were digitized on 15 m (50 ft) spaced cross sections aligned in a north-south direction. Where possible, the polylines were snapped to the drill holes to ensure the exact location of the assays to be included within the solid.

Figure 17-1: Open Pit Zone (OP) Mineralized Solids



AMEC compared the mineralized solid shapes to the drill hole assay data provided and found them to be well constructed, although AMEC would prefer to use a lower gold value for grade shell construction.

AMEC believes that choosing a lower gold value (lower than the break even cut-off) for grade shell construction allows for the estimation process to decide the grade at a given location and not the subjectivity of the resource modeller based on a single assay or incremental assay on a drill hole. The grade of a block in a resource model is based on several assays distributed spatially. Using a lower cut-off provides the estimation algorithm with the opportunity to generate a grade using the available pre-determined search ranges and all samples within the search. The major axis for selecting additional assays is normally perpendicular (or at a high angle) to the orientation of the drill hole. Therefore, the adjacent assays on a drill hole may not be the closest assays for that block. The first assay pair will be along strike or along dip from the original assay. If the original assay is lower than the cut-off and is not included inside the wireframe, the assays selected in the search range may bring the estimated grade above the break-even cut-off grade (BECOG). If this assay was never inside the wireframe, then there is potential for lost resource tonnes, as it was pre-determined not to be included on just the assay value itself or on an increment based on adjacent assays on the same drill hole, which may or may not be the same samples used in the search range. Selecting a low grade shell cut-off allows the estimation process to produce grades without any bias.

In the case of the OP zone, AMEC would have preferred to use a cut-off grade lower than 0.80 g/t for the grade shell construction. By using a 0.80 g/t Au cut-off, which was based on the 2004 price of gold (USD$400/oz), Northgate may under-estimate the tonnage for the OP zone. Currently, AMEC uses a long term price for Au resources at USD$750/oz, as of June, 2008.

In AMEC's opinion, the mineralized solids capture the interpreted mineralization and are adequate to support a resource estimate, but the solids are conservative and have a minor upside potential. AMEC recommends that Northgate updates the mineralized solid wireframes to reflect the 2008 economic assumptions.

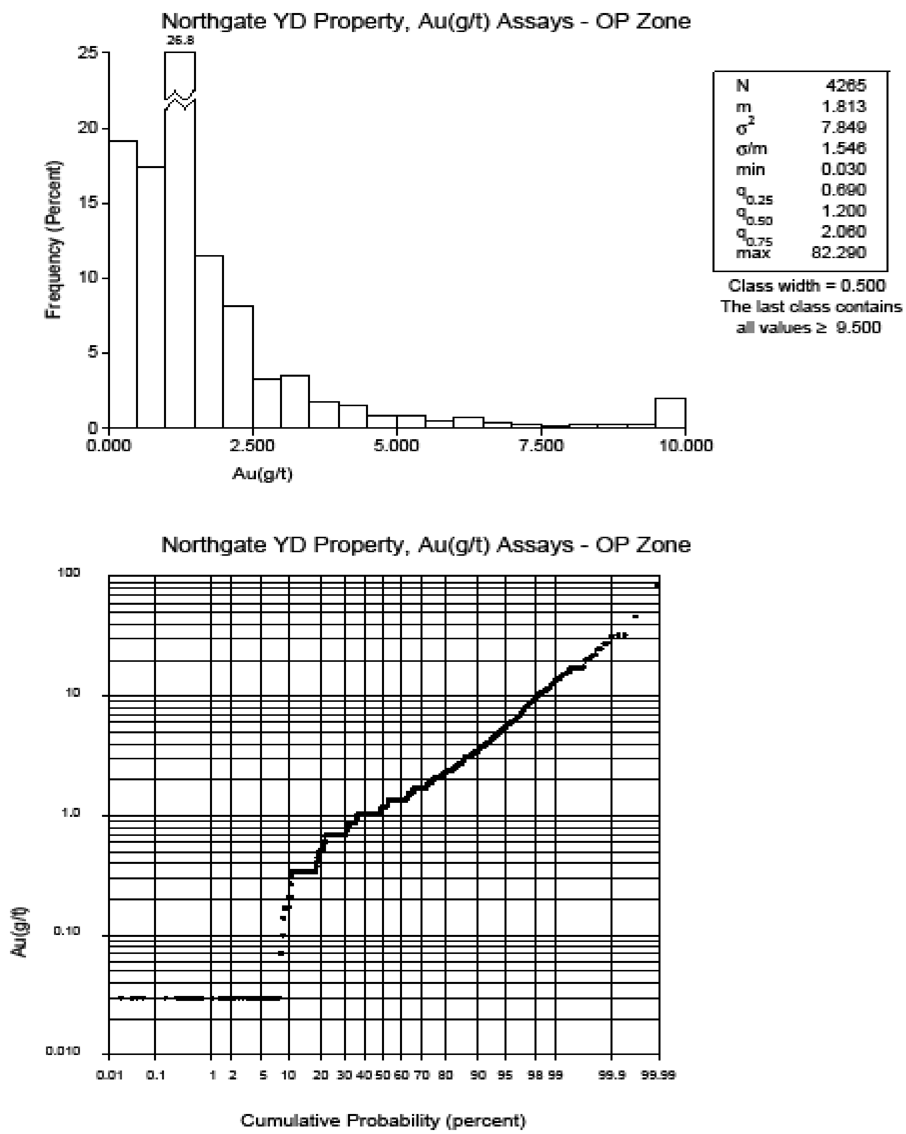
17.1.4 Exploratory Data Analysis (EDA)-Open Pit

Table 17-1 shows the EDA for the raw assay data from the OP used in the estimation of the resource model, while Figure 17-2 is a histogram of the raw assay data. There are a total of 4,265 assays from 191 core holes. Like the other two deposits on the YD Property, more than 80% of the Au mineralization is hosted in syenite. Therefore, the OP zone is evaluated as one zone and all assay data were combined and analysed together.

Table 17-1: EDA of the OP Zone Raw Assays

Number Assays	Minimum (Au g/t)	Maximum (Au g/t)	Mean (Au g/t)	Au Std Dev	Coefficient of Variation (CV)
4,265	0.03	82.29	1.89	2.86	1.51

Figure 17-2: Histogram and Log Scale Probability Plot of OP Raw Assays



Composites-Open Pit

During AMEC's review of the assay lengths, it was found that 3,550 out of 4,265 assays (83.2%) have a length of 1.49 m to 1.53 m. There are 13 assays with a length over 10 m with the longest sample being 58.49 m (192 ft). Based on most common assay length of 1.5 m, Northgate has chosen a composite length of 3.0 m. AMEC prefers that the composite length be equal to or a multiple of a common length. Down hole compositing from the collar was the method used for the OP composites.

Table 17-2 shows the primary statistics for the OP 3.0 m composites. Figure 17-3 is a histogram of the 3.0 m composite grades. The histogram shows that the OP zone is positively skewed, which is expected for gold deposits.

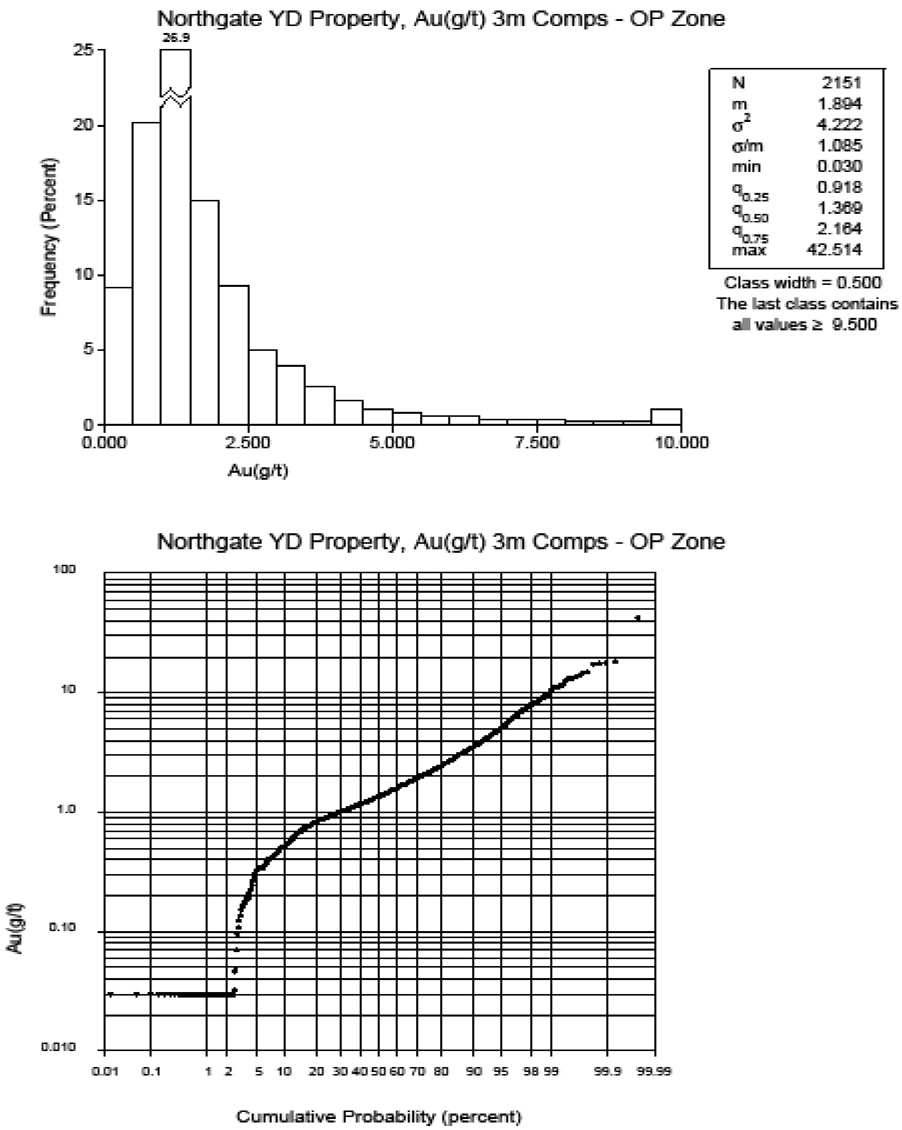
Comparing the raw assay statistics to the 3.0 m composite data shows that the mean grade of the composite data is 1.0% higher than the raw assay mean grade (1.89 g/t Au vs. 1.91 g/t Au). The CV of the composites, as expected, has gone down from 1.51 in the raw assay data to 1.09 on the composite data.

AMEC also checked the OP composites versus the OP original assays graphically using Surpac software. Drill hole assays and composites were compared on the screen and AMEC did not find any discrepancies and therefore believes that the composite file used in the resource estimation is reasonable and acceptable.

Table 17-2: OP Zone 3.0 m Composites Statistics

Number of Composites	Minimum (Au g/t)	Maximum (Au g/t)	Mean (Au g/t)	Au Std Dev	Coefficient of Variation (CV)
2,151	0.03	42.51	1.91	2.08	1.09

Figure 17-3: Histogram and Log Scale Probability Plot of OP 3.0 m Composites



Composite Capping-Open Pit

Northgate determined a maximum capped grade by looking at significant gaps between values of the top 5-10 percent of the composite values and choosing a maximum value that does not have a significant gap to the next lowest grade.

Table 17-3 shows the results of capping the 3.0 m composites at 18.38 g/t Au and the amount of metal that has been removed from the uncapped composites. AMEC capped 1 assay (42.51 g/t) from the OP zone, which has dropped the mean grade from 1.91 to 1.90 g/t Au, as shown in Table 17-4. This corresponds to a 0.59% reduction in grade after capping. The capping also had a minimal impact on the CV, which has dropped from 1.09 to 1.01 after capping.

Table 17-3: OP Zone Capped Composite Results

OP-Au 3.0 m Composite Grade Capping	
Number of Composites	2,151
Mean Grade of Uncapped Composites (g/t Au)	1.91
Number of Capped Composites	1
Capped Grade (g/t Au)	18.38
Mean Grade of Capped Composites (g/t Au)	1.9
% of Metal Capped	0.59%

Table 17-4: OP Zone 3.0 m Capped Composites Statistics

Number of Composites	Au Min (g/t)	Au Max (g/t)	Au Mean (g/t)	Au Std Dev	Coefficient of Variation (CV)
2,151	0.03	18.38	1.90	1.914	1.01

17.1.5 Variography – Open Pit Zone

AMEC reviewed the variography that was completed by Micon (2004) for the OP zone. Micon identified several issues that complicated the evaluation of the variography, such as varying mineralization styles, the irregular spacing of data and the discontinuity of geology imposed by the presence of barren post-mineral dikes.

In addition to these issues, the database provided to AMEC for estimating mineral resources for the OP only had 13,902 assay records compared to the 22,261 assay records that were used by Micon (2004). The Micon report must have also included the data for the LBZ, which was not included in the data provided to AMEC.

AMEC is of the opinion that the variography is adequate for resource modeling.

17.1.6 Resource Estimation – Open-Pit

AMEC prepared the mineral resource block model for the OP zone using Surpac software with a block size of 5 m x 10 m x 10 m, (N-S, E-W and elevation, respectively) based on the drill coverage and spacing. The OP model has been sub-blocked to a minimum of 2.5 m x 5 m x 5 m primarily for volumetric reporting purposes.

Interpolation Method-Open Pit Zone

AMEC estimated grades for the OP model using Inverse Distance Squared (ID2) method. Search orientations are based on Micon (2004) analysis and Table 17-5 shows the search direction and distances used for grade estimation of the OP zone.

Table 17-5: OP Zone Search Ellipse Parameters

Northgate Minerals-Young-Davidson Property - Anisotropic Parameters								
Zone	Nugget (C0)	Sill (C0+C1)	Range (m)	Maj:S-Maj Ratio	Maj:Min Ratio	Rot-Z*	Rot-X*	Rot-Y*
OP	0.002	0.0059	120	1.65	6.33	180	-75	0

Note: C1 = First Structure. * Using the ZXY LRL Rotation Convention.

Although there are 19 individual solids in the OP zone, AMEC used soft boundaries during the estimation process because most of the solids are too small to be estimated independently.

To estimate block grades, AMEC used a minimum of two and a maximum of eight composites. AMEC did not restrict the estimation by a maximum number of composites per drill hole because the drill hole spacing is approximately 25 m, which is much less than the total range of 120 m. Also, the dykes which cross-cut the mineralization may not pick-up some holes on the fringes of each lens.

AMEC believes that ID2 method is adequate for grade estimation at OP zone due to the low CV of 3.0 m capped composites.

Grade Estimation Validation-Open Pit Zone

For validation of the grade estimation quality, AMEC created a NN model based on the same 3.0 m composites used for the ID2 estimation. The NN model represents the declustered composite values and is a good tool to detect local estimation biases. AMEC used the same search parameters as defined in Table 17-6.

The global primary statistics for the 3.0 m composites compare reasonably well with the ID2 estimation. The mean grade of the 3.0 m capped composites is about 2.2% lower than the ID2 mean grade. The reduction in the coefficient of variation of both data sets was expected, as the ID2 model has less variance due to the averaging effect of the grades estimation.

When comparing the global results of the ID2 model with the NN model, the mean grade of the NN model is about 0.9% higher than the ID2 mean grade, which suggests that there is no bias between the two models.

AMEC created swath plots to compare the ID2 and NN models and search for grade estimation spatial biases. AMEC used all blocks that were estimated to generate this comparison.

Overall, AMEC observes no significant local bias in the ID2 estimate compared to the NN one. AMEC notes some grade spikes on the east side, around 22,950 E, of the deposit and around the east central area and a more moderate spike on the west side, near section 23,600 E.

A general decrease in the mean grade from south and northwards was observed. The southern area of the deposit has higher grade, approximately 1.0 g/t Au than the northern area. AMEC verified that, at the south end of the deposit, the NN grades are about 1.0 g/t to 1.5 g/t Au higher than the ID2 estimated grades due to a few high grade composites (11.21 g/t Au and 10.24 g/t Au) that were used to estimate several blocks of the NN model and raised the mean grade as compared to the ID2 mean grade.

A similar trend for the elevation swath plots was observed along the northing sections, where the overall mean grade decreases to the north. Also as above, the two models are not in agreement at the base of the deposit (10155 El to 10175 El), where the ID2 model is about 0.5 g/t Au higher than the NN model. AMEC observed a bias at the lower levels of the deposit, in between 10155 El and 10175 El, and reviewing this area found very few mineralized blocks and a couple of composites greater than 4.00 g/t Au that have contributed to the mean grade discrepancy.

Overall, AMEC is of the opinion that the open pit resource model is adequate and acceptable for public disclosure of mineral resources at the Young-Davidson property.

AMEC reviewed all data on the YD Property provided by Northgate. AMEC believes that all blocks within the mineralized wireframe and that have the nearest composite less than or equal to 35 m, that represents about one-third of the variogram ranges, to be classified as Indicated Resources All other blocks within the mineralized wireframe have been classified as Inferred Resources.

It is anticipated that Northgate will conduct infill drilling, in an attempt to upgrade the Inferred Resources to Indicated Resources.

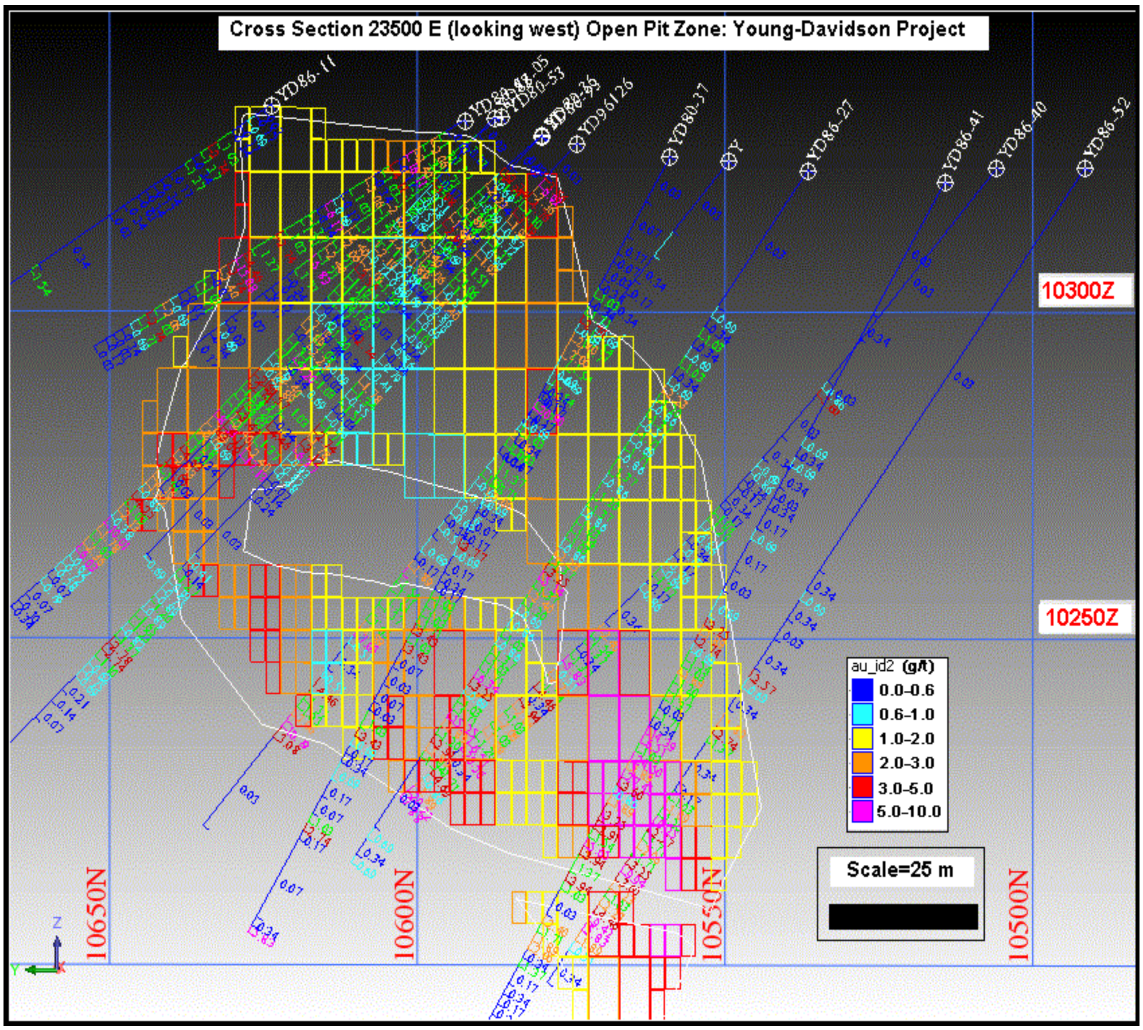
The mineral resources in this report were estimated in accordance with the definitions contained in the CIM Standards on Mineral Resources and Reserves Definitions; therefore, AMEC constrained the estimated blocks of the OP zone with an Whittle pit shell to show the reasonable expectation of mining based on the current economic conditions.

Resource Classification and Tabulation - Open Pit Zone

AMEC reviewed the cut-off grade calculated by Micon (2004) and even using the updated economic figures found the same value of 0.80 g/t Au.

Figure 17-4 shows a typical cross section through the OP zone at 23500 E, displaying the drill holes, the block model grades and an outline of the mineralized solid model used to constrain the OP mineralization.

Figure 17-4: Cross Section 23500 E of OP Zone showing Drill Holes & Block Model



17.1.7 Grade Shell Models-Underground

According to Edmunds (2008), the underground wireframes are based on a sectional interpretation by YD Project geologists that generated a set of preliminary, all-inclusive mineralization shapes that included some sub-economic intersections and a number of discontinuous hanging wall and footwall lenses. These preliminary shapes were reviewed in December 2007 and comprised approximately 60 individual bodies. These interim shapes were used effectively to guide the construction of nine final wireframes that were formed from 3D polylines on 30 m to 7.5 m spaced plans or sections, depending on the local complexity. These wireframes are snapped to the drill holes and comply with the cut-off grade of 2.3 g/t Au, but also using a 1.7 g/t Au incremental cut-off grade and a 3.0 m minimum width criterion. The cut-off grade calculation is discussed later in section 17.1.10.

AMEC is of the opinion that the Au grade used to outline the underground mineralization is too high and is very likely underestimating the mineralized tonnes. Refer to section 17.1.3 for details on grade shell construction

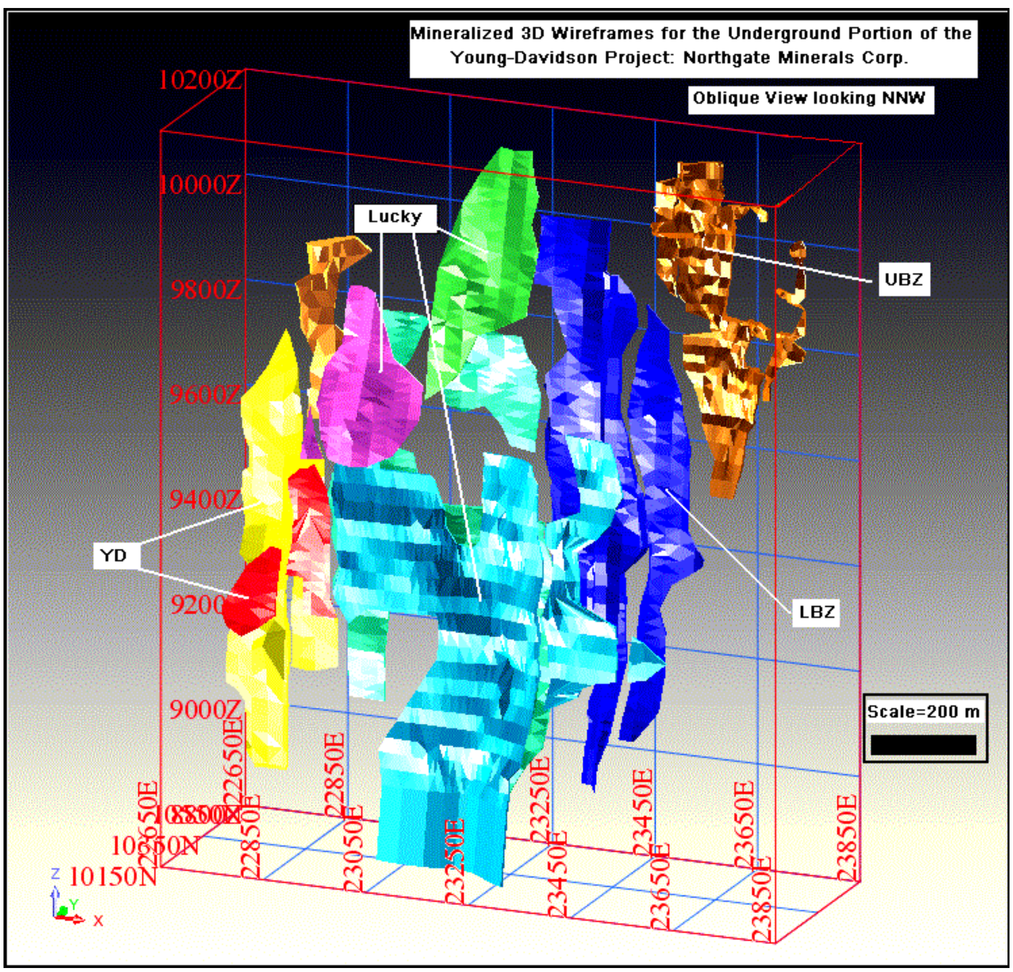
The final wireframes were clipped with a current set of diabase dyke wireframes prepared by YD staff. The final mineralization wireframes used for the resource estimate are shown in Figure 17-5. There are 4 major zones representing the underground mineralization; Upper Boundary Zone (UBZ), Lower Boundary Zone (LBZ1 and LBZ2), the Lucky (includes LKY and LL1) and the Young-Davidson (YD-which includes YD1, YD2, YD3 and YD4)

In 2004, Micon constructed wireframes for the historical underground development and the main syenite-hosted stopes and pits at both MCM and YD mines. The current UBZ wireframe was clipped in a north-south direction with a clipping polygon based on the Micon wireframes of the underground excavations. Two clipping polygons were developed to reflect a conservative (Indicated) and less conservative (Inferred) approach to the areas of past mining. The indicated polygons were constructed using an approximate 120 m distance from drill holes based on variography analysis, whereas the inferred polygons were constructed using an approximate 200 m distance from drill holes. The final UBZ Indicated wireframe does not include any of the remnant sill and rib pillars that were included in the 2004 Micon estimate. AMEC has assumed for now that all the remnant pillars are unrecoverable.

Preliminary cavity monitoring system (CMS) data for the uppermost UBZ stope indicates a larger cavity than currently modelled and that this may be due to rock slabs peeling off the original stope walls and back and to locally inaccurate underground excavation wireframes. Presently, the impact of the larger void space is expected to be insignificant (approximately 25,000 t) relative to the mineral resources estimate, but underscores the need to complete an accurate survey of all the underground mining areas as dewatering progresses.

AMEC reviewed the underground mineralized solid models by checking the control file (drill hole intervals that intersect the mineralized solids) sent by Northgate to AMEC with a control file generated by Gemcom Surpac. A comparison of the two files shows that the majority of the sample intervals were accurate to one decimal, but a few intervals were approximately 0.5 m different and do not affect the results of the estimates. In reviewing the UBZ mineralized solid, there were several discrepancies noted, but upon inspection it was determined that the additional drill hole intersections in the Northgate table that were not found in the AMEC table were due to the void space from mined out stopes from the previous owner-Royal Oak. One omission that AMEC found in the UBZ was drill hole YD90-25, which has an interval from 487.68 m to 523.04 m, averaging approximately 4.40 g/t Au. This DDH interval grade is above the mean grade of the deposit, so the local grades may be lower than estimated, if this DDH had been included in the resource estimate.

Figure 17-5: Mineralized 3D Wireframes for the YD Underground Resources



AMEC is of the opinion that the underground mineralized solid models are adequate and capture the current interpreted mineralization of the Young-Davidson property, but may be conservative based on the cut-off grade used for grade shell construction. AMEC recommends that Northgate model the underground mineralization using a cut-off grade lower than breakeven for grade shell construction. Mineral resources can be reported at higher cut-off grades within the mineralized grade shell.

17.1.8 EDA-Underground

Upon completion of the mineralized solid models, the DDH intervals from the control file are generated by intersecting the solid models with the drill holes. From these intersected drill hole intervals, the raw assay data was be extracted from the drill hole database for each zone. The primary statistics of the underground assays were reviewed and are shown in Table 17-6. A histogram and a log-scale probability plot of all the underground assay data is presented in Figure 17-6.

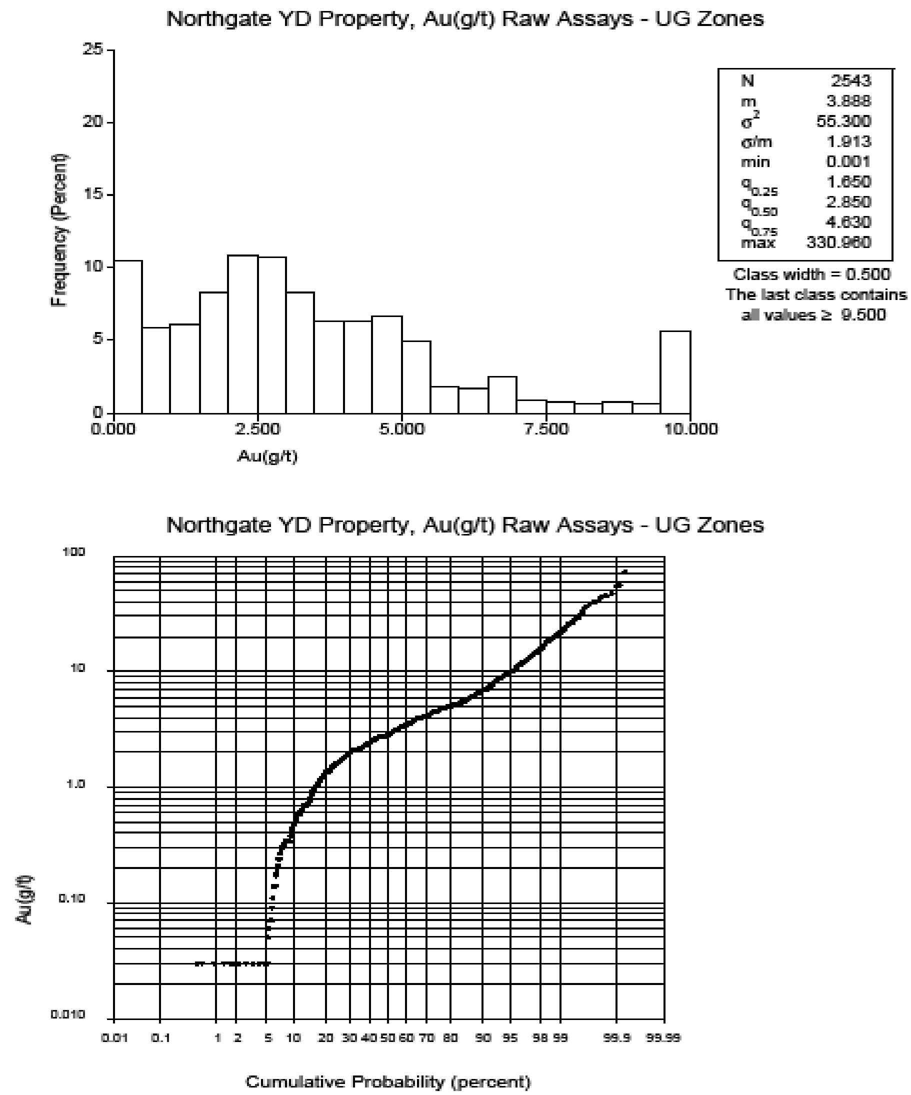
The 2,543 resource assays range from 0.00 g/t gold to 330.96 g/t Au, average 4.38 g/t Au, and are positively skewed with a coefficient of variation of 2.4. After the capping of high grade assays (>20 g/t Au) as discussed below, the average gold grade is reduced by approximately 11% to 3.91 g/t Au and the coefficient of variation is reduced to 0.98. The capped average gold grades range from 3.10 g/t Au for Lens YD2 to 4.44 g/t Au for Lens LBZ1. Lucky (LKY and LL1) and the main YD bodies (YD1, YD3 & YD4) and LBZ2 have lower mean grades compared to the main UBZ and LBZ1 zones.

Table 17-6: Raw Assay EDA within the Mineralized Solids (After Edmunds, 2008)

Northgate Minerals Corporation - Young-Davidson Project, Ontario							
Lens Code	**No. Samples**	**Minimum (Au g/t)**	**Maximum (Au g/t)**	**Mean (Au g/t)**	**Coefficient of Variation**	**Capped Mean (Au g/t)**	**Capped Coefficient of Variation**
LBZ1	548	0.03	301.00	5.35	2.7	4.44	1.9
LBZ2	343	0.05	111.25	3.77	1.8	3.47	1.0
LKY	157	0.07	18.38	3.47	1.0	3.47	1.0
LL1	164	0.06	44.85	3.73	1.2	3.55	0.9
UBZ	883	0.00	330.96	4.85	2.5	4.23	0.9
YD1	179	0.10	44.80	4.02	1.2	3.75	0.9
YD2	202	0.00	30.27	3.08	1.0	3.03	0.9
YD3	22	0.91	9.63	3.53	0.7	3.53	0.7
YD4	48	0.15	17.75	3.53	0.9	3.53	0.9
Totals	**2,543**	**0.00**	**330.96**	**4.42**	**2.3**	**3.95**	**1.0**

To validate the EDA presented in Table 17-6, AMEC performed the same function of intersecting the mineralized solid models with the drill holes using Gemcom Surpac. The validation exercise performed by AMEC resulted with virtually the same statistics as presented in Table 17-7.

Figure 17-6: Histogram and Log Scale Probability Plot of the UG Raw Gold Assays



AMEC is of the opinion that the raw assay data adequately represents the solid models for the underground mineralization at Young-Davidson, but as previously discussed, AMEC is of the opinion that the solid models are conservative based on the 2.3 g/t Au cut-off and the 1.7 g/t Au incremental cut-off for grade shell construction.

17.1.9 Raw Assay Capping-Underground

Erratic high grade assays can have a large and disproportionate influence in the estimation of the average grade of a gold deposit. The histogram of all of the assays located within the final mineralization wireframes shown above suggests that high grade assays should be capped at a level between approximately 16 g/t Au, which might be considered overly conservative, and 24 g/t Au, which might be considered overly aggressive. Consequently, 20 g/t Au is a reasonable and round number that falls midway within this range.

AMEC has reviewed the raw assay data and agrees with Northgate that there is a natural break at 24 g/t Au and could argue that this could be a justified capping level. Future underground resource models should look at the sensitivity of capped grades.

Cutting curves were built to investigate capping sensitivity. The UBZ is the most sensitive to capping with approximately a 12% reduction to the resource assay average grade at a 20 g/t Au capping level, while the LBZ (1 & 2) showed a 6.4% reduction in the resource average assay grade capping to the same level. The Lower YD Zone and Lucky Zone are relatively insensitive to capping levels above 20 g/t Au (Table 17-7).

Table 17-7: Metal Reduction due to Assay Capping (Edmunds, 2008)

Northgate Mineral Corporation - Young-Davidson Project, Ontario				
Zone	**UnCapped Mean (g/t Au)**	**Mean Capped @ 20 (g/t Au)**	**Mean % Reduction Assays**	**% Reduction Resource Estimate**
LBZ	4.74	4.07	-6.4%	-8.2%
Lucky	3.61	3.51	-2.7%	-4.4%
UBZ	4.80	4.20	-12.4%	-3.8%
YD	3.54	3.42	-3.6%	-2.1%

Overall, capping high grade assays reduces the average resource assay grade by approximately 11% (Table 17-7) while the actual global resource block model capped average grade is reduced by only 5.6%. Capping sensitivity work in the January 2006 estimate indicated that the LBZ resource was reduced by 16.1% compared to 8.2% in the current estimate. It is possible that increased numbers of drill intersections are having a moderating impact on the amount of contained gold accounted for by the higher grade intersections. An example of this is demonstrated by the UBZ, which is the most densely drilled of the underground zones; capping reduces mean assay value by 12% which translates on a resource basis to only 3.8%. The resource reduction is calculated from block model estimates using the 1.5 m composites based on capped assays (at 20 g/t Au) and uncapped assays.

17.1.10 Cut-off Grade Determination-Underground

Northgate assumed a USD$600/oz gold price, a 90% gold recovery, and a USD$38/ton underground operating cost to estimate a breakeven cut-off of approximately 2.1 g/t (Table 17-8). Also an incremental cut-off grade for lower grade underground mineralization located in the wallrock immediately adjacent to economic mineralization was estimated. The incremental cut-off grade for underground mining is based on the concept that the mining cost related to excavating additional wallrock material in developed stopes is significantly less than the overall mining cost.

The incremental cut-off grade cost component is estimated using the process and G&A costs and an incremental mining cost. An incremental cut-off grade of approximately 1.5 g/t Au was estimated based on the above assumptions and approximately a USD$12/ton incremental mining cost. The current application of an incremental cut-off grade has not increased the resource tonnage nor decreased the resource grade significantly.

Table 17-8: Economics used for Cut-off Grade Determination (Edmunds, 2008)

Northgate Minerals Corporation - Young-Davidson Project, Ontario	
Description	**Assumption**
Underground Mining	USD$22.00/ton
Processing	USD $12.00/ton
General & Administration	USD $4.00/ton
Gold price	USD $600/oz
US Exchange Rate	1.05
Gold price (CND$)	$571/oz
Gold recovery	90%

The US$600/oz gold price assumption is conservative for a 2007 year-end resource estimate and more appropriate for a reserve estimate. At US$650/oz, the breakeven and incremental cut-off grades decrease to 2.0 g/t Au and 1.5 g/t Au. In general, the resource estimate is not very sensitive to cut-off grades in the 2.0 g/t Au to 2.5 g/t Au range and incremental cut-off grades in the 1.5 g/t Au to 2.0 g/t Au range. Notwithstanding, a moderate increase in the resource estimate would be expected at higher assumed long term gold prices.

17.1.11 Composites-Underground

Approximately 81% of the resource assays have sample lengths that are less than or equal to 1.52 m (5 ft) and less than three percent of the resource assays have lengths greater than four metres. Northgate created two sets of 1.5 m equal length composites within the mineralization wireframes; one set representing composites generated from uncapped assays, while the other set was generated from capped assays. A small number of shorter remnant composites that are mostly situated at the mineralization northern or footwall contacts were retained.

For the YD underground zones, all the CV's are less than 1.0 and should produce grade estimates with reasonably high confidence.

AMEC is of the opinion that the 1.5 m composites, based on the capped assay data, are adequate for resource estimation for the YD underground mineralization.

17.1.12 Variography-Underground

Currently there is insufficient data to generate useful variograms for the YD Zones, Lucky Zone, and LBZ mineralization. This condition may persist until a significant amount of underground drilling and sampling data are available. At that point more variography work is recommended preceded by trend analysis.

17.1.13 True Thickness & Trend Analysis

According to Edmunds (2008), the true thickness of each lens was estimated directly in Vulcan software. The Vulcan results are dependent on an average dip and strike and they were found to be less reliable locally where there were strike or dip variations from average. True thicknesses were also measured directly on-screen from cross-sections where more accurate values were needed. The true thickness data were used to: confirm that the composite control intersections satisfied the minimum thickness requirements; to guide how far to extend the wireframe boundaries; and to assist in the resource classification.

The composite control data was used to create gold grade and thickness contours on east-west vertical longitudinal projections. No definitive grade or thickness trends were evident and the 2:1 sub-vertical attenuation suggested by the variography is not clearly defined. Overall, the mineralization appears to rake moderately to the west with thicker centres and thinner flanks. In some places the contours are not continuous across the dykes suggesting the possibility of post-mineralization vertical displacements between some of the diabase dykes.

17.1.14 Resource Estimation-Underground

In the original block model set-up by Northgate using Vulcan software, the blocks were 7 m N-S by 15 m E-W by 15 m Elevation, but AMEC requested that the block model be re-blocked at a smaller block size of 2.5 m N-S by 5 m E-W by 5 m Elevation for mine design purposes.

The information for each block in the model includes:

- The percentage of the mineralization wireframe model that is in each block.
- Lens codes for each block.
- Interpolated Au and capped Au grades related to blocks that contain at least 1% mineralization.
- The average distance of composites used to interpolate block mineralization grades.
- Number of samples used to estimate grade and number of holes used to estimate grade.

Grade Interpolation-Underground Zone

The current resource model for the underground at YD has been estimated using an inverse distance squared (ID2) interpolator. Each of the four main zones was modelled independently, meaning that hard boundaries were used during the estimation process. To AMEC's knowledge, a contact determination study was not performed by Northgate prior to estimation modeling. Although a contact study may be beneficial in understanding the grade relationship between zones, modeling Au grades from zones on different stratigraphic horizons, may not be appropriate. AMEC agrees with the use of hard boundaries for grade modeling.

The search methodology used a minimum of two samples and a maximum of twelve samples to estimate grades. The modeling was performed using a search ellipse and no restriction as to the number of samples per drill hole. The variogram has not been normalized, so the nugget (C0) has been calculated to be about 34% of the total sill (C0+C1).

AMEC believes that the interpolation method of inverse distance used for the underground mineralization is adequate for use in a resource estimate.

A single search ellipse measuring 200 m by 100 m by 50 m was employed to interpolate grade into blocks. Search ellipsoid was oriented east-west for the secondary axis, with the primary axis dipping 75º south parallel to the general dip and strike across the property. In addition, a lens code identifier was assigned to each composite, and composite target restrictions applied were such that the composites for one lens could not be used to interpolate grades for another lens.

The overall average distance between block centroids and informing composites is 63 m and 92 m for Indicated and Inferred blocks, respectively. The maximum distance used to interpolate Indicated and Inferred blocks is 200 m. Approximately 93% of the Indicated blocks are supported by distances less than 120 m, which is consistent with the general classification guidelines.

Grade Estimation Validation-Underground

AMEC used three methods to validate the grade estimate quality:

1. Statistical comparison of the uncapped and capped raw assay samples with the 1.5 m composite grades and determining the amount of capped metal.
2. Statistical comparisons of resource capped raw assays and 1.5 m composites with the global ID2 and NN block grades.
3. Block model validation on local grades by 3 orthogonal swath plot orientations comparing the ID2 and NN model estimates.

AMEC compared the block grades with the composite grades on sections and plans and found good overall visual correlation with some minor low and high grade smearing and banding problems due to local changes in strike and dip. As more data become available in the future from closer spaced underground definition drilling, it may be possible to refine the model by adding more customized search orientations related to smaller structural domains.

AMEC is of the opinion that the statistical mean grade discrepancies observed have reasonable explanations and the Northgate underground resource model, on a global review, is adequate for estimating gold mineral resources.

Local or geographical bias in the block model can be detected using swath plots. These are obtained by plotting the average ID2 and NN grades in East-West, North-South, and vertical slices. The ID2 and nearest-neighbour swath grades should normally follow each other, although the ID2 swath grades generally would appear smoother.

Based on the review of the swath plots, AMEC is of the opinion that there is no grade bias in the ID2 estimation model and that the resource estimates are adequate for public disclosure.

Resource Tabulations-Underground

In Table 17-9, AMEC shows the updated mineral resource by zone for the underground portion of the YD project with an effective date of November 28, 2007.

The mineral resources have been estimated using a 1.90 g/t Au cut-off grade. AMEC assumes that the UG deposit will be mined by open hole stoping. The cut-off grade was calculated using USD$700/oz Au (CND$778/oz Au), metallurgical recoveries of 91.7%, and all up costs of $43.58/t ($26.00-mining, $13.58-processing, $4.00-G&A). The rounding off of the Inferred and Indicated Resource numbers reflects that these numbers are estimates.

Table 17-9: YD Underground Mineral Resources by Zone-May, 2008

Mineral Resources - Underground Zone, May 2008 Young-Davidson Property-Northgate Minerals					
Zone	**Au Cut-off [1] (g/t)**	**Resource Category**	**Tonnes (x000)**	**Au (g/t)**	**Au Ounces (x000)**
UBZ	1.90	Indicated	1,910	3.89	239
LBZ	1.90	Indicated	5,031	3.98	644
YD	1.90	Indicated	2,273	3.48	255
LUCKY	1.90	Indicated	2,280	3.58	263
U/G Total	**1.90**	**Indicated**	**11,494**	**3.79**	**1,401**
Zone	**Au Cut-off [1] (g/t)**	**Resource Category**	**Tonnes (x000)**	**Au (g/t)**	**Au Ounces (x000)**
UBZ	1.90	Inferred	295	3.91	37
LBZ	1.90	Inferred	1,696	3.21	175
YD	1.90	Inferred	874	3.41	96
LUCKY	1.90	Inferred	1,123	3.38	122
U/G Total	**1.90**	**Inferred**	**3,988**	**3.35**	**430**
U/G Total	**1.90**	**Ind + Inf**	**15,482**	**3.68**	**1,831**

[1]Au cut-off has applied total costs of $43.58/t ($26.00-mining, $13.58-processing, $4.00-G&A), Long term gold price of USD$700/oz Au and USD$0.90=CDN$1.00, and gold recovery of 91.7% Au

Table 17-10 lists the tonnes and grade at various Au cut-off grades with 1.90 g/t Au as the base case for the underground portion of the YD project. The rounding off of the Inferred and Indicated Resource numbers reflects that these numbers are estimates.

Table 17-10: YD Underground Mineral Resources at Various Cut-off Grades

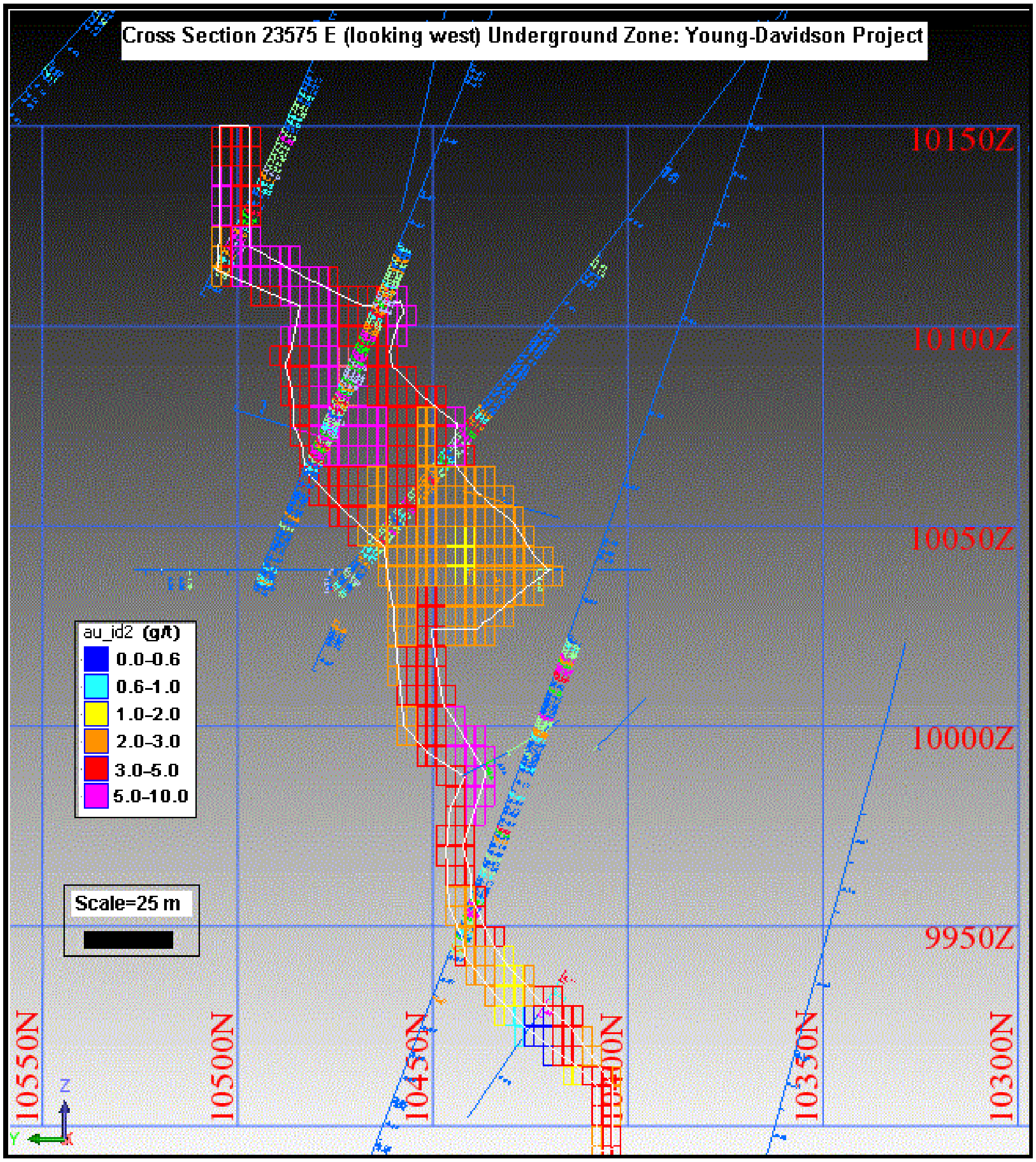
All Underground Zones-2008 Mineral Resource-Young-Davidson Property Using Base Case of 1.90 g/t Au and Various Cut-off Grades for Sensitivity					
	Au Cut-off [1] (g/t)	**Resource Classification**	**Tonnes (x000)**	**Au (g/t)**	**Au (oz) (x000)**
Young-Davidson Underground Zones	1.70	Indicated	11,702	3.75	1,411
	1.80	Indicated	11,611	3.77	1,407
	1.90	**Indicated**	**11,494**	**3.79**	**1,401**
	2.00	Indicated	11,355	3.81	1,391
	2.20	Indicated	10,964	3.87	1,364
	2.40	Indicated	10,362	3.96	1,319
	2.60	Indicated	9,613	4.07	1,258
	2.80	Indicated	8,668	4.22	1,176
	3.00	Indicated	7,755	4.38	1,092

	Au Cut-off [1] (g/t)	**Resource Classification**	**Tonnes (x000)**	**Au (g/t)**	**Au (oz) (x000)**
Young-Davidson Underground Zones	1.70	Inferred	4,001	3.35	431
	1.80	Inferred	3,997	3.35	430
	1.90	**Inferred**	**3,988**	**3.35**	**430**
	2.00	Inferred	3,972	3.36	429
	2.20	Inferred	3,805	3.42	418
	2.40	Inferred	3,588	3.48	401
	2.60	Inferred	3,213	3.60	372
	2.80	Inferred	2,834	3.72	339
	3.00	Inferred	2,529	3.82	311
Base case					

[1]Au cut-off grade has applied total costs of USD$43.58/t ($26.00-mining, $13.58-processing, $4.00-G&A), Long term gold price of USD$700/oz and USD$0.90=CND$1.00, and gold recovery of 91.7%

Figure 17-7 shows a typical cross section through the underground zone at 23575 E, displaying the drill holes, the block model grades and an outline of the mineralized solid model used to constrain the underground mineralization.

Figure 17-7: Cross Section 23575 E of UG Zone showing Drill Holes & Block Model



17.2 Mineral Reserves Estimate

There are currently no mineral reserves declared for the Young Davidson property.

18.0 OTHER RELEVANT DATA AND INFORMATION

18.1 Preliminary Assessment

The objective of this preliminary assessment is to determine the potential economic viability of the Project at a conceptual level.

The Young-Davidson project consists on an open-pit and an underground mine with a combined mine life of 12 years, with the open pit being mined first. The maximum annual mill feed production is set at 1.825 Mtpa, or 5,000 tpd.

18.2 Open-Pit Mine Design and Production Schedule

18.2.1 Introduction

The target peak mill production rate for the open pit material will be 1.4 Mtpa. The processing facilities are planned to be located approximately 300 to 500 m to the north of the open pit limit.

The waste storage facility is planned to be located approximately 500 m to the southeast of the open pit. This facility will require a capacity of approximately 10.7 Mt to accommodate all waste material from the open pit.

The pit optimization parameters were based on assumed gold metal prices of USD$635/oz. Contractor rates ($3.50/t) were used for mining costs. Two different royalties were accounted for in the calculation of net revenue. A diluted resource block model was used in the calculation of Whittle® shells. The open pit block model consisted of one general mining area with no distant additional satellite deposits.

18.2.2 Mining Method

The mining strategy is to strip the overburden in the open pit, followed by initial bench mining during the first year. The overburden has not been modeled, but is expected to typically vary in thickness from 0 to 3 m, with some areas of up to 10 m (Golder, 2006). During the second and third years, the main pit will be mined with approximate vertical advance rates of 35 m and 45 m respectively. The approximate open pit crusher feed is 1.4 Mtpa for years two and three. Open pit mining will be completed during the fourth year of operation.

Loading of material to be processed and waste in the open pits will be done using Front-End loaders (FEL) with an approximate bucket capacity of 8 m^3 and bucket width of 4.5 m. Off-highway rear dump haul trucks of 50 t capacity will be used to haul material to waste and process facilities. All ore and waste rock will require drilling and blasting once the overburden has been removed.

A specialist mining contractor will be retained to perform all the mining activities. The contract will be all inclusive with the contractor supplying all the required manpower, mining equipment, support equipment and infrastructure facilities to meet the scheduled mining rates. This will include dewatering requirements for surface water.

Mining benches will be 10 m in height, with material typically being mined in 5 m splits due to the small equipment and also to improve ore selectivity. The pit design implemented a 55° inter-ramp pit slope as recommended in a previous preliminary geotechnical report (Golder, 1996). This report also stated that parameters were determined based upon limited data, so future geotechnical information should be gathered in future studies. Haulage roads were designed with a width of 15 m to accommodate 50 t haul trucks, berms and ditches. The pit design was completed with single benching. As more detailed geotechnical information is gathered, it may be beneficial to incorporate double benching in the pit design to accommodate wider catch berms.

Good and diligent grade control will be essential to maintaining the projected mill head grades. Careful adherence to good grade control practice will help to minimize waste dilution and to ensure good ore recovery. After every blast the grade control geologist will mark the ore/waste boundaries on the muck pile which will be carefully adhered to by the FEL operator.

No backfilling of pits has been considered in the handling of waste materials in this study. Future studies should evaluate the benefits of reduced waste haul distances and waste storage capacity requirements.

18.2.3 Block Model Dilution

Mintec Inc.'s MineSight® software was used to load the geologic block model and then prepare it for use in the pit shell generation software. The resource block model was modified to account for waste contact dilution prior to importing into pit shell generation software. All blocks that contained less than 10% or were equal to 100% mineralized material received no waste contact dilution. All other blocks that contained between 10% and 95% mineralized material had a 5% waste dilution added at 0 g/t Au. The only exception was that the final diluted mineralization percentage was capped at 100%. This restriction occurred when undiluted blocks contained between 95% and 100% mineralized material. This dilution percentage represents a percentage of the total block rather than of the mineralized material only. For each block, an associated diluted grade and percent mineralized material was calculated. The amount of dilution should be re-evaluated in future studies in more detail to ensure a proper match with bench heights and selected equipment.

18.2.4 Pit Shell Evaluation

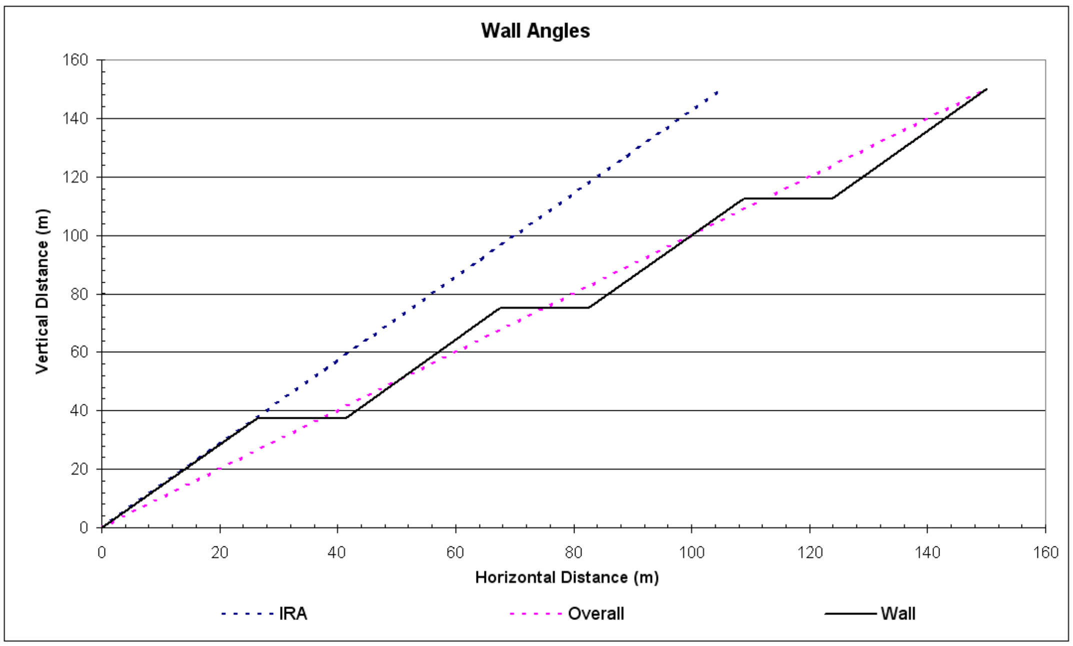
The software used for pit shell generation was GEMCOM® Software International's Whittle 4.1 Strategic Mine Planning program (Whittle®). The pit shell generation completed in this study incorporated a diluted block model. The block model dimensions were 10 m by 5 m in plan and 10 m in height. Only material classified in the Indicated category was used for pit shell generation.

Pit Slope Design

A 55° inter-ramp pit slope with 10 m double benches was recommended in a previous geotechnical report (Golder, 1996). This report also stated that parameters were determined based upon limited data, so future geotechnical information should be gathered in future studies. An initial Whittle® run with the 55° slopes indicated that the pit could extend to a depth of approximately 150 m below topography. Haulage roads with a width of 15 m were anticipated to accommodate 50 t haul trucks, berms and ditches. It was estimated that a haul road would wrap around the pit three times in order to reach this depth. An approximate overall pit slope of 45° was used in future runs to account for haul roads in the slopes as shown in Figure18-1.

Figure 18-1: Pit Slope Adjustment for Haul Roads

	Units	Value
Wall Height	*m*	150
Inter Ramp Wall Angle	*degrees*	55
Road Width	*m*	15
Passes through Wall	#	3
Overall Wall Angle	*degrees*	45
Wall Flattening Angle	*degrees*	10.0

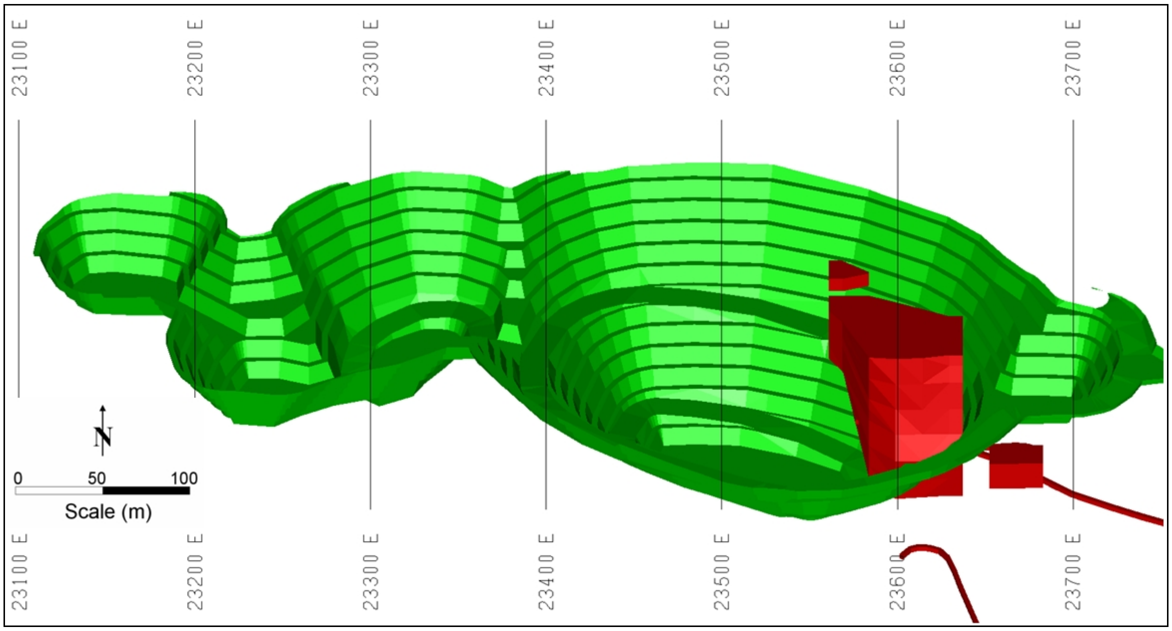


Mining Costs

A specialist mining contractor is expected to be used for all ore and waste mining. Several bids have been received by Northgate and they provided guidance in using an approximate average mining unit cost of $3.50/t of material mined, when the material is hauled to a destination within 800 m of the pit. This mining cost was used in the generation of Whittle® pit shells. No sustaining capital has been added due to the use of a contractor and also due to short mine life. No reclamation unit costs have been explicitly included in the mining cost, but have been assumed in the capital mine closure costs.

The eastern portion of the block model near 23600E contains a mined out stope from previous underground mining. AMEC has confirmed that the gold has been adequately removed from the block model with respect to stope solids provided. In order to attribute costs associated with mining near previous underground workings, AMEC has left the stope material as waste in the block model. This stope is displayed in Figure 18-2 with respect to the final pit design. Future studies must include more detail in handling mining near old workings, particularly if more information is made available.

Figure 18-2: Underground Workings near Final Pit (oblique view looking N)



Dilution and Mining Recovery

A diluted model was imported into Whittle® so no additional dilution was added within Whittle®. A 98% mining recovery was applied in this Whittle® analysis. These values assume good grade control practices are followed and ore mining occurs on 5 m split benches.

Process, G&A and Assocated Royalty Costs

Process and G&A costs used in Whittle® were $11.50 and $4.00 per tonne of mill feed respectively.

Two significant applicable royalties are described in the royalty document provided by Northgate Minerals (Northgate, 2000). The first royalty is included here and requires USD$1.00 to be paid per ton of ore mined and processed from the Matachewan Consolidated Mining (MCM) Property. Using a USD$/CND$ exchange rate of 0.90 and converting to tonnes, a royalty of $1.22 was applied for each tonne of mill feed mined and processed. A total cost of $16.72 was applied in Whittle® for all tonnes processed. This approach to royalties was considered representative for pit optimization. Royalties by individual claim have been applied in the financial analysis. It is recommended to consider incorporating royalties by individual claim at the pit optimization stage in future studies.

Process Recovery

A LOM gold process recovery of 91.7% was used in Whittle®.

Metal Price, Sell Cost and Associated Royalty

This Whittle® analysis was conducted with a gold price of USD$635/oz. The gold selling costs were assumed to be 2 percent of the gold price. The second royalty payment was applied in Whittle®. The royalty agreement (Northgate, 2000) contains a royalty payment due to MCM which compensates for any increase in price over USD$270/oz. 5% of the increase in price per ounce recovered above the base rate of USD$270 must be paid to MCM.

No other metal credits were assumed in the Whittle® pit revenue calculations.

Whittle® Parameter Summary

Whittle® was run using the same parameters for all mining areas in the block model. The Whittle® parameters are displayed in Table 18-1.

Table 18-1: Whittle® Input Parameters

Description	Units	Value
Resource categories used		Indicated
Conversions	g/troy oz	31.1035
	tonne/ton	0.90718
	US$/C$	0.90
Pit slope angle (includes 55° inter-ramp + haul roads)	degrees	45
Mining Cost per tonne mined	C$/tonne	$3.50
Process Cost per ore tonne		
Process	C$/tonne	$ 11.50
G&A	C$/tonne	$ 4.00
Ore Process Royalty	C$/tonne	$ 1.22
Total	C$/tonne	$ 16.72
Mining recovery	%	98%
Mining dilution (applied to block model prior to Whittle)	%	0%
Process Recovery Au	%	91.7%
Au Price	US$/troy oz	$ 635
Au Sell Cost (2% of Au Price)	US$/troy oz	$ 12.70
Au Price Royalty (5% of Au Price above US$270/oz)	US$/troy oz	$ 18.25
Density (Ore and Waste)	tonnes/m^3	2.69

Whittle® Pit Shell Summary

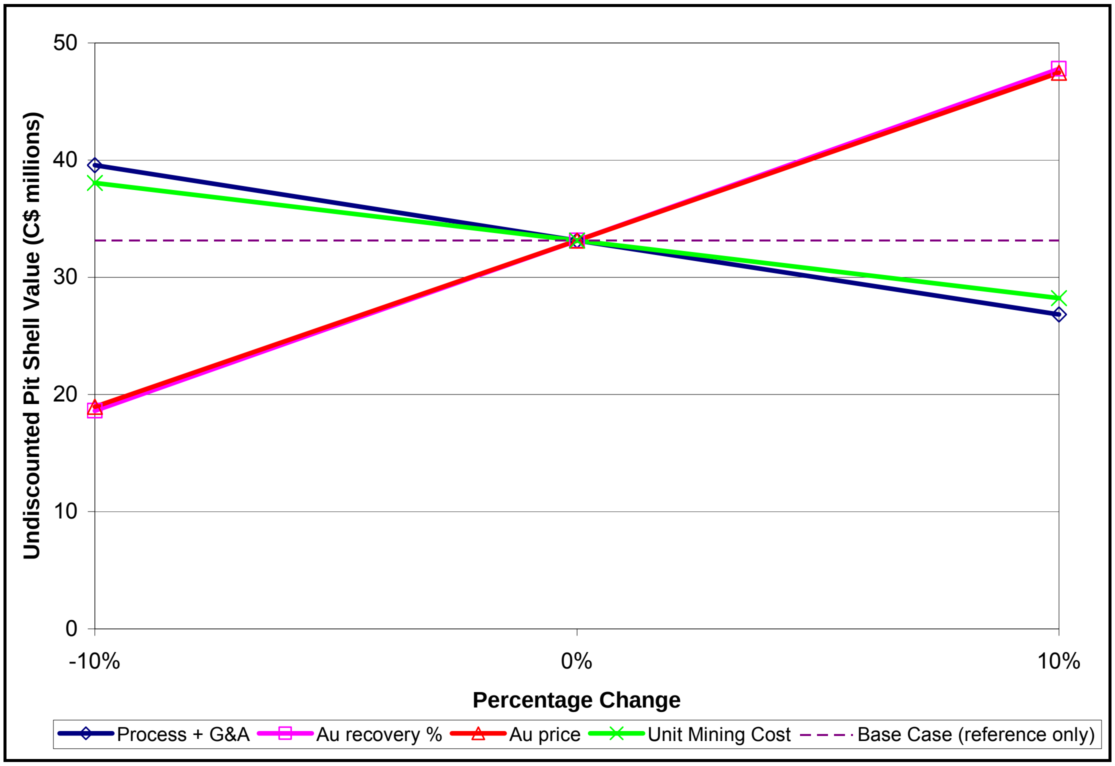
A series of pit shells was generated within Whittle® using different factored gold prices, with all other parameters remaining the same. Whittle® refers to these factors as revenue factors. The ultimate pit shell used an applied revenue factor of 1.

The relative impact of a change in gold price on the pit size can be understood by observing revenue factors. AMEC observed that the pit size is very sensitive to metal price decreases: a 20% reduction in Whittle® revenue factor results in a dramatic reduction in pit size associated with the maximum cashflow. The pit size is less sensitive to gold price increases.

An approximate reclamation cost of $0.75/ tonne milled was added to the process cost to determine another pit shell and see whether the selected ultimate pit should be reduced in size significantly. The resulting pit shell contained 1.5% fewer total tonnes than the base case.

A further method of demonstrating pit sensitivity is to use the use the base case ultimate pit shell and vary selected Whittle® input parameters by ±10% to determine various undiscounted pit values. Figure 18-3 displays the undiscounted ultimate pit values as inputs for process cost, G&A cost, gold recovery, gold price and unit mining cost are varied individually. Figure 18-3 shows that a 10% change in gold price or recovery will have a larger impact than that of mining cost or process/G&A.

Figure 18-3: Ultimate Pit Shell Value Sensitivity

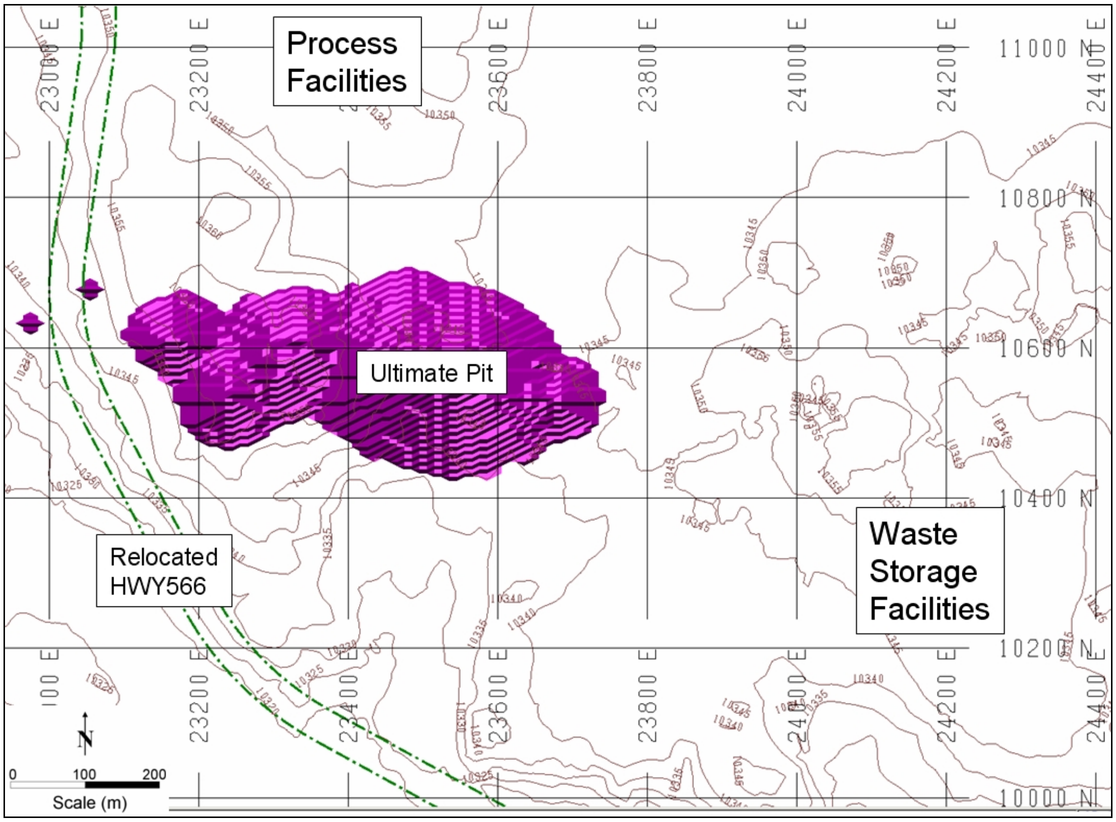


A check was performed on the ultimate pit shell cutoff grade calculation. The marginal cut-off grade was calculated to be 0.845 g/t Au. This marginal cut-off grade was confirmed in Whittle® Pit reports to ensure proper application of parameters. The marginal cut-off grade is calculated as follows:

Au cutoff grade (g/t)	= Total C$ marginal cost per tonne milled / Net C$ Price per recovered g of Au
	= Incremental Mining Cost + Process cost + G&A + Production Royalty / (Selling Price - Selling Cost - Price Royalty) * Au recovery
	= 0 + 11.5 + 4.00 +1.22 / (22.68 - 0.45 - 0.65) * 0.917
	= 16.72 / 19.79
	= **0.845**
where:	
Production Royalty (C$/t)	= 1 US$ /ton * (C$/US$ exchange) * (ton per tonne conversion)
	= 1 * (1/0.90) * 1.1023
	= 1.22
Selling Price (C$/g)	= (Au price in US$/oz) * (C$/US$ exchange) * (oz per g conversion)
	= 635 * (1/0.90) * 0.03215
	= 22.68
Selling Price (C$/g)	= 2% * Selling Price
	= 2% * 22.68
	= 0.45
Price Royalty (C$/g)	= (Au Price in US$/oz - 270) * 5% * (C$/US$ exchange) * (oz per g conversion)
	= (635-270) * 5% * (1/0.90) * 0.03215
	= 0.65

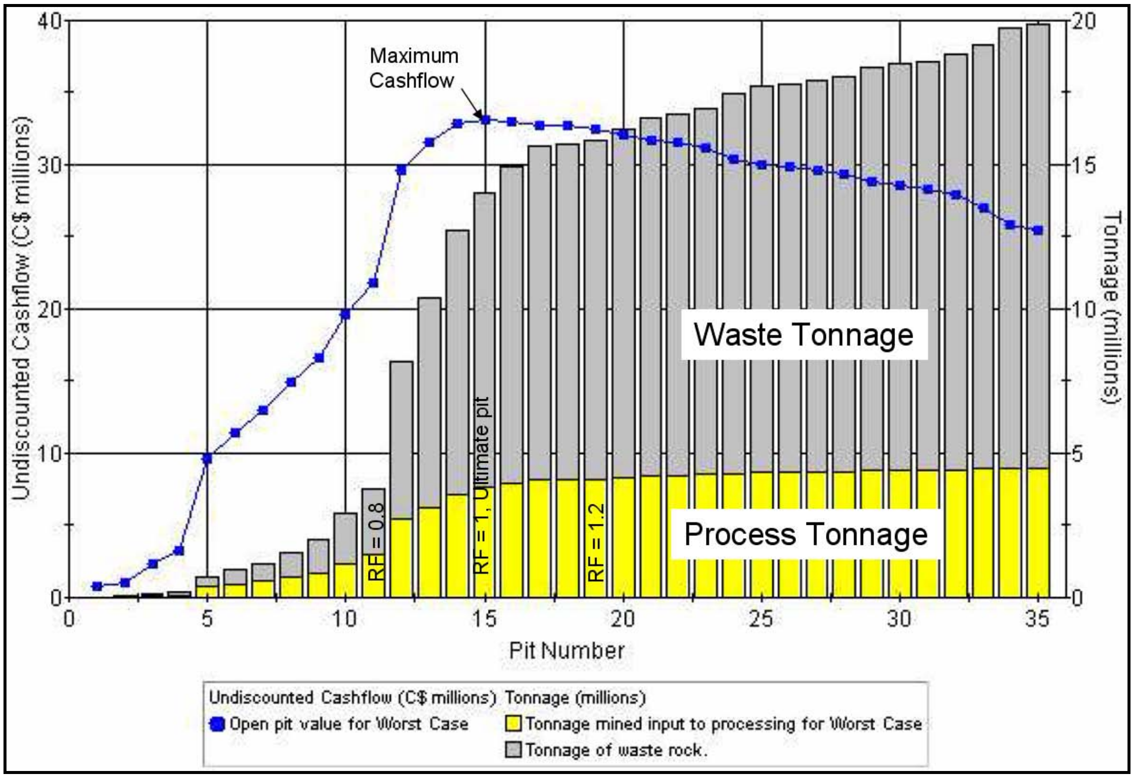
Visual observation of the ultimate pit shell in Figure 18-3 indicates that there would be a single main pit which extends to the west in the upper elevations. Figure 18-4 also shows the proposed relocation of highway 566. Two very small pits could occur near highway 566, but do not have enough value associated with them to justify an economic extraction (i.e. cover the cost associated with the road relocation further to the west). As a result, a north-south hard boundary was added at 23100 E so that Whittle would only include blocks to the east in its pit summaries. ThIs boundary enforced an approximate highway offset of approximately 50 m as jointly agreed to by AMEC and Northgate.

Figure 18-4: Ultimate Pit Shell Location Map



The Whittle® pit summary tonnages are displayed as a chart in Figure 18-5. The pit shells in this figure represent pit sizes generated at progressively higher gold prices. In this case, pit 15 represents the maximum undiscounted cashflow pit when the price is USD$635/oz Au. As previously stated, the pit sizes are very sensitive to gold price. An undiscounted cashflow profile is superimposed on this chart to demonstrate the sensitivity of the open pit cashflow when selecting different pit sizes for evaluation at the base cost and revenue parameters. The cashflows presented in this section do not include capital items and are not discounted due to the short expected open pit mine life. When a deposit has a relatively flat cashflow profile for different size pits, the pit size selection is usually reasonably insensitive to minor changes in parameters. In the case of the Young-Davidson deposit, careful determination of revenues and costs will be very important as more detailed analyses are carried out. Pit selections for detailed ultimate pit design should also take into account capital expenditures and site restrictions for different pit sizes.

Figure 18-5: Whittle® Pit Size vs. Undiscounted Cashflow Graph

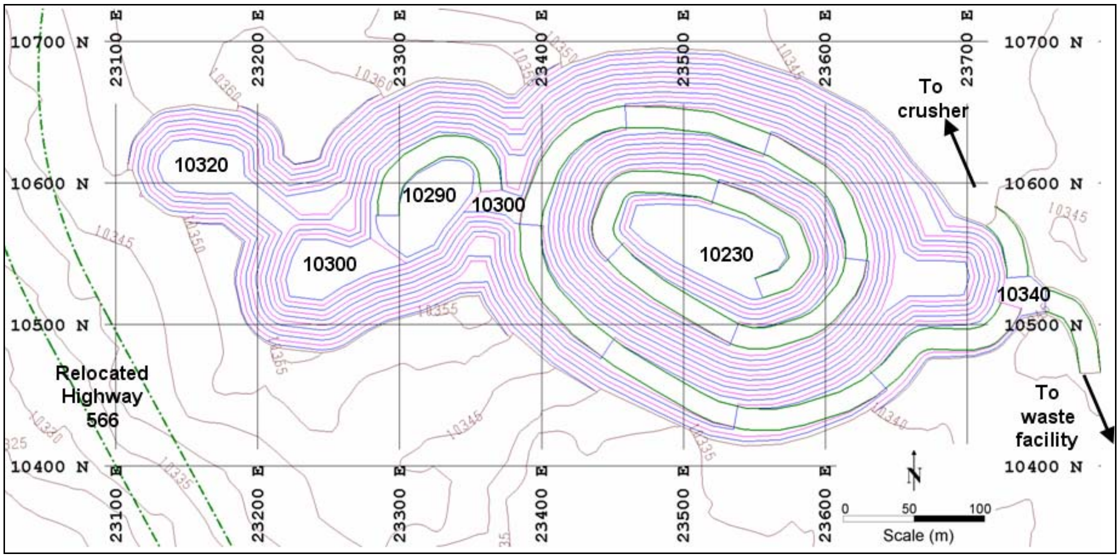


18.2.5 Detailed Pit Design

A detailed pit design was created with the Mintec MineSight® (version 4.00) software. The Whittle® maximum cashflow pit shell was used as a guide during design. The pit ramp exits the pit at the east side at approximately 10345 metre elevation as shown in Figure 18-6. The approximate surface elevations of the pit design varied between 10230 m and 10365 m. Haulage routes will extend from the pit exit to the northwest for crusher feed and to the southeast for waste.

The inter-ramp slope angle for the pit design was 55°. This was based upon a recommendation in a previous study (Golder, 1996). Bench face angles were designed at 70° for all pit walls. This study was based upon limited data so design criteria should be re-assessed with updated geotechnical information for future pit designs. Haul roads of 15 m width and 10% inclination were used to accommodate the 50 t haul trucks.

Figure 18-6: Ultimate Pit Design

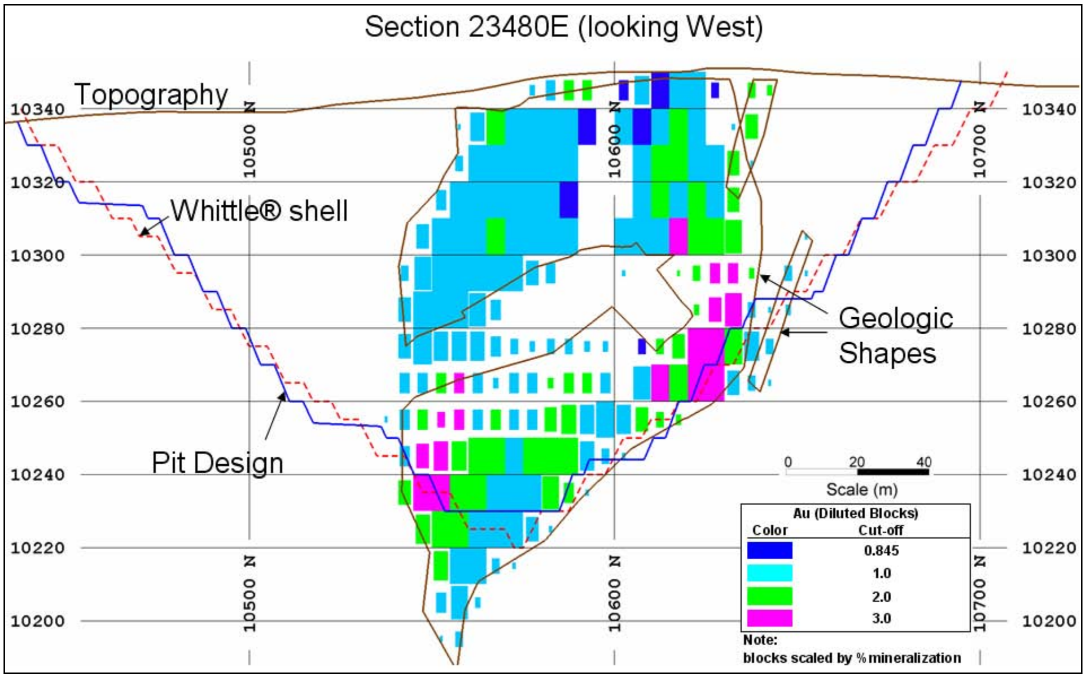


A typical North-South section is displayed in Figure 18-7, which shows the pit shell versus pit design. The north wall was matched better with the pit shell than the south wall. Diluted block gold grades and geologic shapes may also be viewed in Figure 18-7.

The pit design crusher feed and waste tonnages compare very well with the ultimate pit shell tonnages when summarized in MineSight®. The crusher feed and waste tonnages from the pit design are approximately two percent lower and five percent higher respectively than the associated pit shell tonnages.

The above cut-off grade was based upon the royalty from the Matachewan Consolidated Mines agreement (Northgate, 2000). This royalty actually only applies to claims MR5379 and MR5406 at the eastern end of the open pit design. For future studies, the MCM royalty should be replaced with terms from the Welsh agreement (Northgate Minerals, 1986) for claims L-316523 and L-511097. Each of these Welsh claims is located along the northern portion of the pit design, which was found to be fairly insensitive to price during the pit optimization. No production royalties exist for the Young Davidson claims, so costs are slightly overstated here for pit optimization. Claim royalties have been considered individually for the financial analysis.

Figure 18-7: Typical North-South Cross Section



18.2.6 Mine Schedule

An open pit schedule is displayed in Table 18-2. Due to the short duration of the schedule, no pit phasing has been designed and utilized. AMEC considers the vertical advance rates in this open pit schedule to be reasonable as they are not greater than 50 m in any year. A peak requirement of four 50 t haulage trucks is expected in year 2. This truck requirement is based on the calendar assumptions listed in Table 18-3. Actual truck requirements will be higher in the first and fourth year as these will not be complete years. Actual truck requirements are expected to be between three and four trucks for the majority of the open pit mining.

Table 18-2: Open Pit Schedule (based on depletion of mineral resources)

Description	Units	Year 1	Year 2	Year 3	Year 4	Total
Mill Feed	tonnes (millions)	0.45	1.40	1.37	0.53	**3.75**
Au grade	g/t	1.56	1.80	1.98	2.26	**1.90**
Waste (including O/B)	tonnes (millions)	2.30	5.27	2.85	0.33	**10.75**
Total tonnage	tonnes (millions)	2.75	6.67	4.22	0.86	**14.49**
Strip Ratio	waste tonnes/crusher feed tonne	5.1	3.8	2.1	0.6	**2.9**
Top Active Bench	metre	10360	10330	10300	10260	**10360**
Bottom active Bench	metre	10330	10300	10260	10230	**10230**
Active benches	number	4	4	5	4	**14**
Annual Trucks Required	number	2	4	3	1	

Note: The mill feed is from a preliminary assessment that is preliminary in nature. Mill feed includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is no certainty that this preliminary assessment will be realized.

Table 18-3: Unit Truck Calendar Assumptions

Time Description	Units	Value
Calendar days	days/yr	365
Non work days	days/yr	
Shifts per day	shift/yr	2
Hours per shift	hrs/shift	12
Total hours (TH)	hrs/yr	8760
Mechanical Availability (MA)	%	85%
Downtime (DT)	hrs/yr	1314
Standby	%	5%
Standby (SBY)	hrs/yr	372
Gross Operating Hours (GOH)	hrs	7074
NOH / GOH factor (Op. Efficiency)	%	83%
Net Operating Hours (NOH)	**hrs**	**5871**

The open pit covers a surface area of approximately 113,000 m^2. An assumed average thickness of 2 m and overburden density of 1.8 t/m^3 provides an estimate of overburden to be removed of 400,000 t. Overburden depths should be modeled in future studies to obtain an actual overburden surface and more accurate tonnages.

All waste material was scheduled to be hauled to a waste storage facility located approximately 500 m to the southeast of the main pit. No backfilling of pits was considered in this schedule.

18.3 Underground Mine Design and Production Schedule

Production rate analysis was derived from first principles, using rated capacity of equipment. Where information was missing or not available, AMEC made assumptions based on experience and leading practices. AMEC notes that rules of thumb are predicting a mining rate that varies from 2,200 tpd to 3,600 tpd.

The extraction rate was set at 5,000 tpd. The proposed extraction rate is based on the shape of the mineralized zones, productivities of the mining methods, appropriate mining fronts, rules of thumb and benchmarking underground mining operations with similar mining methods and production rates. Production from a stope was set at a maximum of 1,250 tpd. As a result, four mining fronts are required to meet the daily throughput. Production during the first three years will be trucked to surface while the shaft is being commissioned, after which time all production will be hoisted to surface. Achieving the target of 5,000 tpd mining rate will require superior and sustained performance from all facets of the mining process.

The production plan in Table 18-4 is based on depleting the mineral resources.

Table 18-4: Underground Mine Production Plan (based on depletion of Mineral Resources).

	Year -1 (2009)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Total
MILL FEED (t)			401,250	457,500	1,298,517	1,825,000	1,825,000	1,830,000	1,825,000	1,825,000	1,825,000	1,830,000	1,438,705	176,204	**16,557,176**
Head Grade (g/t Au)			2.78	3.37	3.56	3.16	3.16	3.21	3.29	3.19	3.08	3.02	3.06	2.95	**3.18**
Head Metal (g Au)			1,115,476	1,542,562	4,617,568	5,767,130	5,765,243	5,883,448	5,999,163	5,818,993	5,623,617	5,531,648	4,395,415	519,802	**52,580,063**
Head Metal (oz Au)			35,863	49,595	148,458	185,418	185,357	189,157	192,878	187,085	180,803	177,847	141,316	16,712	**1,690,488**
Production Hoisted to the Mill (t)					842,267	1,825,000	1,825,000	1,830,000	1,825,000	1,825,000	1,825,000	1,830,000	1,438,705	176,204	**15,242,176**
Production Trucked to Mill (t)			401,250	457,500	456,250										**1,315,000**
WASTE	293,047	393,003	348,153	324,355	276,842	276,843	286,300	280,293	190,840	138,421	124,295				2,932,390

Note: The mill feed is from a preliminary assessment that is preliminary in nature. Mill feed includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is no certainty that this preliminary assessment will be realized.

18.3.1 Geomechanical

There is no geomechanical data available for the underground deposit. Based on a review of known maximum span achieved during historical mining (SRK, 2006) and statements received from Northgate personnel (on perceived rock mass stability), AMEC considered the rock mass quality to range from “Good” to “Very Good”, based on the Q system.

AMEC selected the Modified Stability Graph method to assess the stability of the stopes. This empirical method takes into account the modified rockmass quality number (Q’), the effect of mining induced stress, the difference in direction between the stope surfaces and the local joint fabric, the impact of gravity on the failure mode and the size of the opening.

Based upon discussions and statements received from Northgate personnel (on perceived rock mass stability), AMEC assumed a modified stability number N’ greater than 10 for stope backs and 50 for stope walls, which translates in maximum stable Hydraulic Radii (unsupported) of 6 for the backs and 16 for the walls. The resulting maximum unsupported stope dimensions are 100 m by 50 m for the walls and 15 m by 50 m for the back.

18.3.2 Mining Method

Sub-Level Open Stoping (SLOS) was selected as the preferred mining method based on a list of criteria developed by Northgate and AMEC.

The deposit has been divided in four mining fronts, each producing 1,250 tpd (on average). Average sub-level spacing was set at 50 m, taking into account geomechanical and operational constraints. Stopes will be mined in a “primary-secondary” sequence starting at the bottom of the mining front and progressing upwards and “centre-out”. Pastefill was selected as the material of choice for backfilling stopes, prior to mining the next lift up. Sill pillars created between the mining fronts will be recovered near the end of mine life and have been assigned a lower mining recovery and higher dilution factors than other stopes (Table 18-5).

Table 18-5: Mining Recovery and Dilution Factors for Various Stopes

	Primary	Secondary	Sill Pillar
Dilution factor	15%	20%	20%
Recovery factor	95%	90%	75%

18.3.3 Mine Access and Development

The deposit to be mined by underground methods extends from approximately 210 m to 1,500 m below ground surface.

The primary access to the Young-Davidson mineral deposit is through a shaft and a ramp (Figure 18-8). An exploration ramp is currently being driven from surface and has reached a depth of about 400 m below surface elevation. Northgate is planning to extend the ramp down to the bottom level. The planned access design will take advantage of this infrastructure and complement it with a shaft, thus enabling an efficient material handling system that would be appropriate for the anticipated mechanized mining method.

The shaft has an inside diameter of 6.0 m (~20 ft) and is concrete lined with fixed guides. Conveyances within the shaft include a double drum hoist equipped with skip over cage on both sides. The skip payload is designed at 18 tonnes. One loading pocket will be located below the deepest level. As a result, the shaft depth is about 1,390 m and will be located close to the centre of gravity of the deposit. AMEC agrees with the chosen location of the shaft collar on the North side of the proposed open pit and in close vicinity of the proposed mill plant and surface complex location. This will allow a shorter distance of conveyor to transport the hoisted material directly to the processing plant (Figure 18-9).

The ramp is advanced at a negative 17% gradient. Its dimensions are 4.9 m wide by 4.6 m high, which in AMEC's opinion, are large enough to provide adequate clearance for the mobile equipment selected and a reasonable volume of air flow.

One surface ventilation raise for mine air intake will be bored to a diameter of 4.0 m and another one with a diameter of 2.5 m. Return air will exhaust through the new shaft, the ramp and the lateral connection with the existing Matachewan #3 shaft.

The ramp and shaft will be the major means of ingress and egress. A conveyance in the existing #3 shaft will be restored and act as a temporary second egress in the first two years previous to shaft commissioning.

Figure 18-8: Longitudinal View of the Underground Mine Access

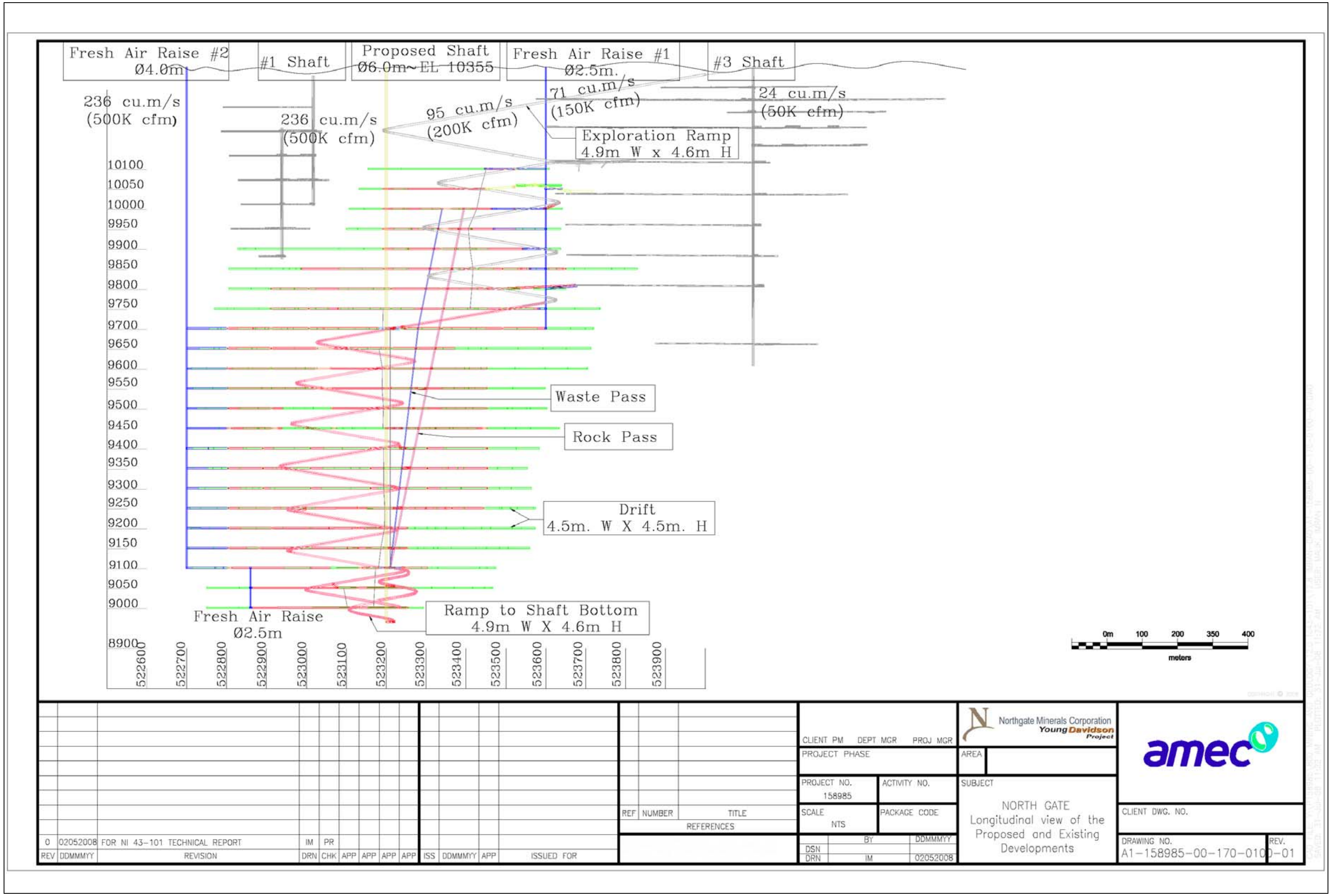
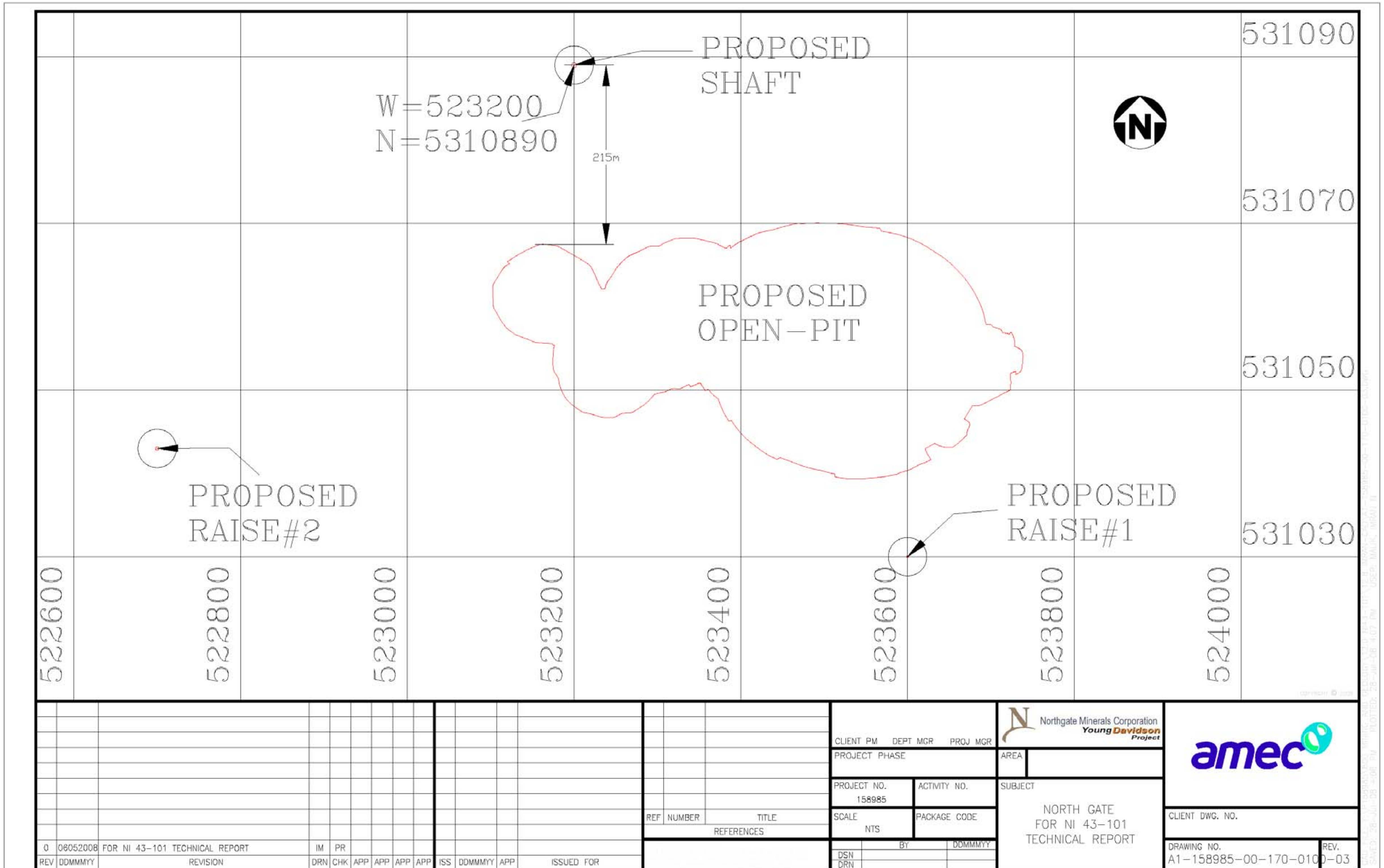


Figure 18-9: Surface View of the Shaft Location with Respect to the Open-Pit Mine



18.3.4 Mine Equipment

Based on the SLOS mining method, the equipment that will be used during production will include 2-boom jumbo drills, In-the-Hole (ITH) production drills, load-haul-dump units (LHD) and service trucks. Trucks will be rented out (via a contractor) to haul material until the shaft is commissioned and for hauling material below 9 100 El.

Diesel mobile equipment in use at the Young-Davidson property is listed in Table 18-6. In AMEC's opinion, the equipment listed in Table 18-6 is adequate to sustain a 5,000 tpd mining rate.

A portion of the fleet will likely be equipped with remote control capability to ensure safe and efficient material extraction from the stopes.

Table 18-6: List of Underground Mobile Equipment

		Units	Spare Unit (included)	Bhp per unit	Total Bhp
Production					
	Longhole drill - Simba M2C - ITH	2	1	156	156
	Raise Bore Machine	2	1		
	LHD - Toro 10	5	1	425	1,700
Development					
	Jumbo - Boomer 282	3	1	75	150
	Truck - MTI CDT2604 (23.6t)	3	1	250	500
	LHD - Toro 6	3	1	190	380
	Boltec 335H	1	0	154	154
	Shotcrete Transmixer - Normet	1	0		
	Shotcrete Sprayer - Normet	1	0		
Utility					
	Utility Truck (Fuel) - MTI-UVT-FT	2	1	115	115
	Explosives Truck - Getman A-64 2:	2	1	115	115
	Grader - J/D 6068 Grader	1	0	155	155
	Scissor Lift	3	1	115	230
	Utility Truck (Lube) - Getman A-64	1	0	115	115
	Personnel Carrier - Normet Utimec	5	1	130	520
	Toyota - Landcruiser	6	0	265	1,590
Total		**41**	**10**	**2,260**	**5,880**

18.3.5 Dewatering and Fresh Water

Two-stage pumping is proposed. Pumping stations are located on the bottom and top levels and they are positioned near the shaft. The conical main sumps are located on 9100 Level, with the secondary sumps installed on 9700 Level. Tertiary sumps are to be found on every sub-level. Drainage holes will connect levels down to the bottom of the mine (near the main conical sumps). Based on current information, the proposed pump capacity is anticipated to be 3,450 m^3/d (or 7,200 l/min).

18.3.6 Mine Ventilation

Ventilation requirements are based on an estimation of the underground diesel equipment types and quantities required to support the 5,000 tpd mill feed production rate. Manufacturer catalogues were referenced to determine the approximate installed power on each piece of equipment.

The Ontario Mining Regulations were used to set an adequate volume of air for ventilating the mine (i.e. requirements are 0.06 m^3/s of air per kW installed). An allowance of 10% for leakage was added to the total volume of air required. The allowance for underground crusher and loading pocket was based on rules of thumb.

Rules of thumb were also used to determine the size and number of mine ventilation openings, based on the following economical air velocities:

- Maximum air velocity in a bored raise is set at 15.2 m/s (3,000 fpm).
- Maximum air velocity in lateral excavations is set at 7.6 m/s (1,500 fpm).
- Maximum air velocity in circular concrete lining production shaft with fixed guides is set at 12.7 m/s (2,500 fpm).

The estimated design volumes of air required are shown in Table 18-7.

Table 18-7: Mine Ventilation Requirements.

Fleet/Item	Airflow (cfm)	Airflow (m^3/s)
Stope mucking/hauling fleet	151,542	72
Development and drill fleet	159,030	75
Utility fleet	269,800	127
Loading pocket/ Crusher etc.	50,000	24
Leakage @ 10%	63,037	30
Mine airflow required	693,410	327
Design Base Airflow Volume	700,000	330

The proposed ventilation system is of the “push” type with centrifugal fans located at surface intakes. The intake mine air will flow through two ventilation raises bored to 4.0 m and 2.5 m diameter. Exhaust air will return through the new shaft, ramp, and existing Matachewan #3 shaft. A centrifugal fan will be positioned over each of the intake raises and booster fans will be located at each of the mining fronts/faces to draw and distribute the air to one of the three exit routes.

Heating the intake air will utilize propane heaters capable of raising the surface air from -40°C to +4°C (-40°F to +40°F). The heaters will be located inside buildings to protect them from the winter environment.

Heating installed capacity will be 20 MW (1.1 MBTU/min) and was estimated as follows:

- 2 months per year at 100% of heating capacity.
- 2 months per year at 50% of heating capacity.
- 2 month per year at 25% of heating capacity.

18.3.7 Mine Compressed Air

One compressor capable of delivering 5,000 cfm (at a pressure of 115 psi) is budgeted to power small equipment (pumps, jacklegs, etc.) for the underground mine. Compressed air will be supplied from surface via a network of pipes down the shaft (250 mm pipe) and throughout the mine (150 mm and 100 mm pipes) on main levels, ramp and sub-levels.

18.3.8 Material Handling

During full production years, mill feed and waste rock will be hauled from the stopes to the appropriate pass on each level using Toro 10 LHD. A conveyor located on 9100 Level will transfer the material to the jaw crusher, where the mill feed will be reduced to 150 mm (80% passing) before being hoisted up to surface in 18 t skips at an average rate of 380 t/h.

Prior to the shaft being commissioned, mill feed and waste will be trucked up to surface using 40 t trucks.

All material from stopes and development located below 9100 Level will be trucked up to 9000 Level.

On surface, mill feed will be conveyed from a bin (500 t live capacity), located at the headframe, directly to the plant. Waste will be trucked from a surface waste bin (500 t live capacity) to the appropriate dump site located approximately 1 km away by 65 t haul trucks.

18.3.9 Mine Power

The power required for the underground mine is based on an estimation of the equipment supporting the production throughput. Power required for mobile equipment such as development jumbos, production drills was estimated from vendor catalogue data. The total connected load was determined and a utilization factor was applied to the connected load to estimate the power required. Motor efficiencies were also approximated.

Power from the main surface substation is distributed at 13.8 kV to the mine site in order to reduce line losses. A new substation located near the proposed plant site will distribute the power to the surface plant (compressors, fans, etc.) and underground operation. The line voltage will be further reduced to either 4160 V or 1,000 V or 600 V as required. Quantities of switches, transformers, cabling, etc. have been estimated.

The anticipated electrical load for the YD site is as follows:

- Connected load 26.7 MW
- Average load 16.8 MW
- Load Factor 64%
- Power factor 95%

The site power requirements will be sourced from the Kirkland Lake transformer station. There were three alternatives identified:

- utilizing the existing 44 kV line feed
- constructing a new 115 kV line from the Matachewan Junction
- constructing a new 115 kV line from the Extender Minerals line.

The preferred option is to construct a new line from the Matachewan Junction to site, approximately 7 km. The new line will run in parallel with the existing 44 kV line to the Matachewan substation and then follow along the previous 44 kV Right-of-Way (ROW) to the south of town. This alignment assumes that Hydro One has maintained the land tenure for the 44 kV ROW. The section of line in parallel with the 44 kV line will require land tenure considerations to meet the 10 m pole-to-pole clearance plus the 15 m ROW to the edge of clearing.

Site emergency power will be provided with a Standby Power Plant rated for the maximum power required in the event of a utility power failure.

The main requirements for standby power include:

- mine ventilation
- mine dewatering
- process plant critical loads

18.3.10 Infrastructure and Ancillary Buildings

Buildings

A common administration, warehouse and maintenance shop complex will be located adjacent the shaft. The complex considered the following requirements (Figure 18-10):

- mining equipment maintenance and repair bays.
- light vehicle repair and maintenance
- equipment wash bay
- warehouse space for mine and mill maintenance and critical spares
- dry facilities with showers and lockers for mine and mill personnel
- office space for mine management and support personnel
- office space for general administration.

The maintenance shop will have one wash bay and two repair bays with sufficient headroom for a 50 t rigid frame, rubber tired truck (example: Caterpillar 773E) and a common overhead 10 t crane. Offices within the shop area were included for supervision.

The common mine and mill warehouse will have 900 m^2 of floor space. Also located on the main floor will be the mine department offices and shift change area, as well as the dry and locker facilities for 150 people. The site administration and common operations would be located on the second floor and will have office space for 30 staff.

Communication system

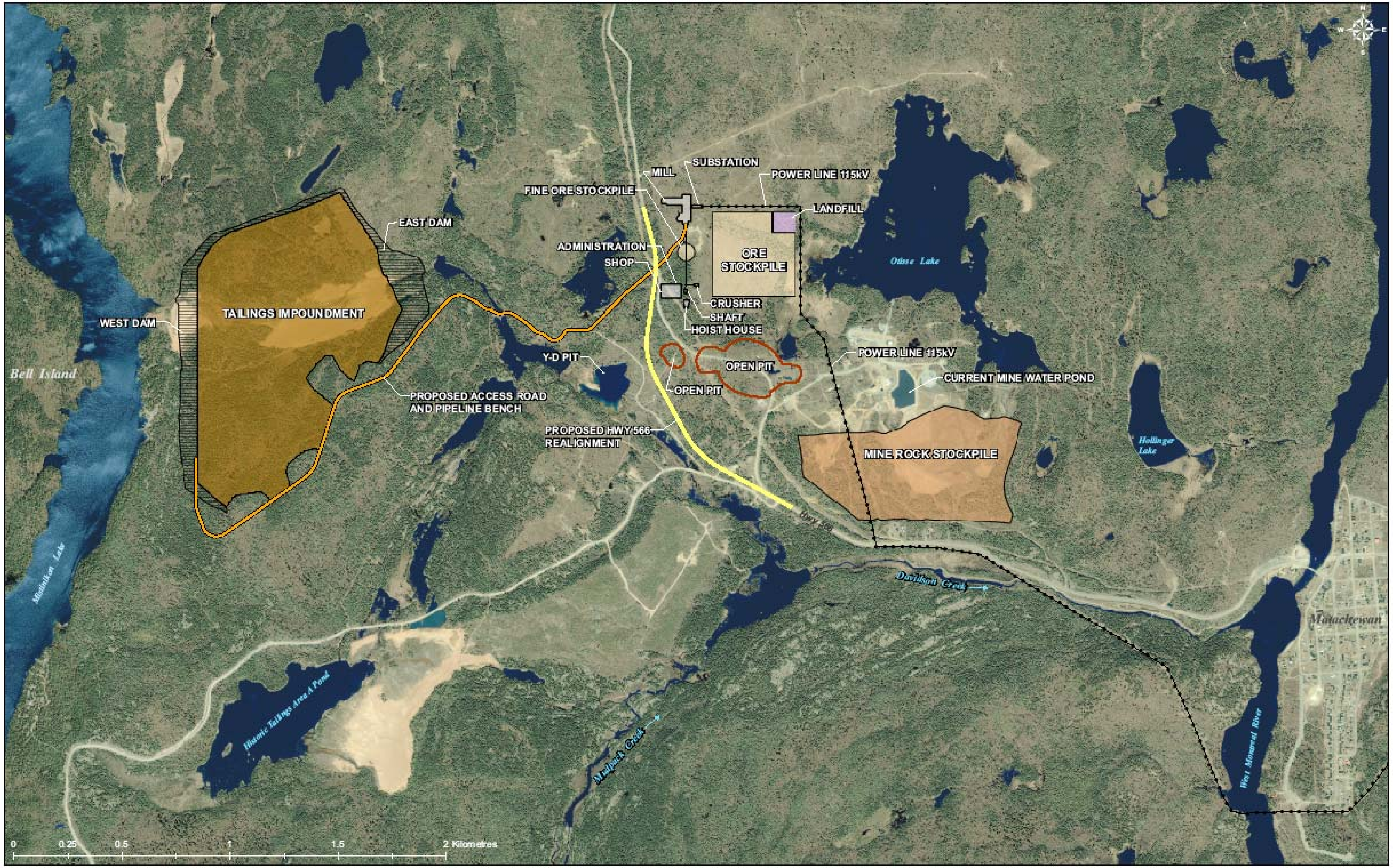
There are existing communications systems at the site to support the advanced exploration program. Phone, data and mine communication technologies are all in place. Northgate is currently in discussions with the supplier of the mine communication system to expand as the ramp and shaft dewatering progress. The next phase of design will assess the communication requirements in more detail.

Security and Fencing

The site currently has a controlled security entrance through which all personnel and material deliveries are directed. This facility will be relocated to the plant site access road north of where the new Highway 566 alignment meets back to the existing road. All other uncontrolled site access roads will be gated and secured.

There are several open pit and historical remnant facilities that are currently fenced with appropriate signage. The level of fencing for the new facilities will be in accordance with mining regulations and best practices. Temporary fencing requirements for the construction phase will be addressed through the project execution plan.

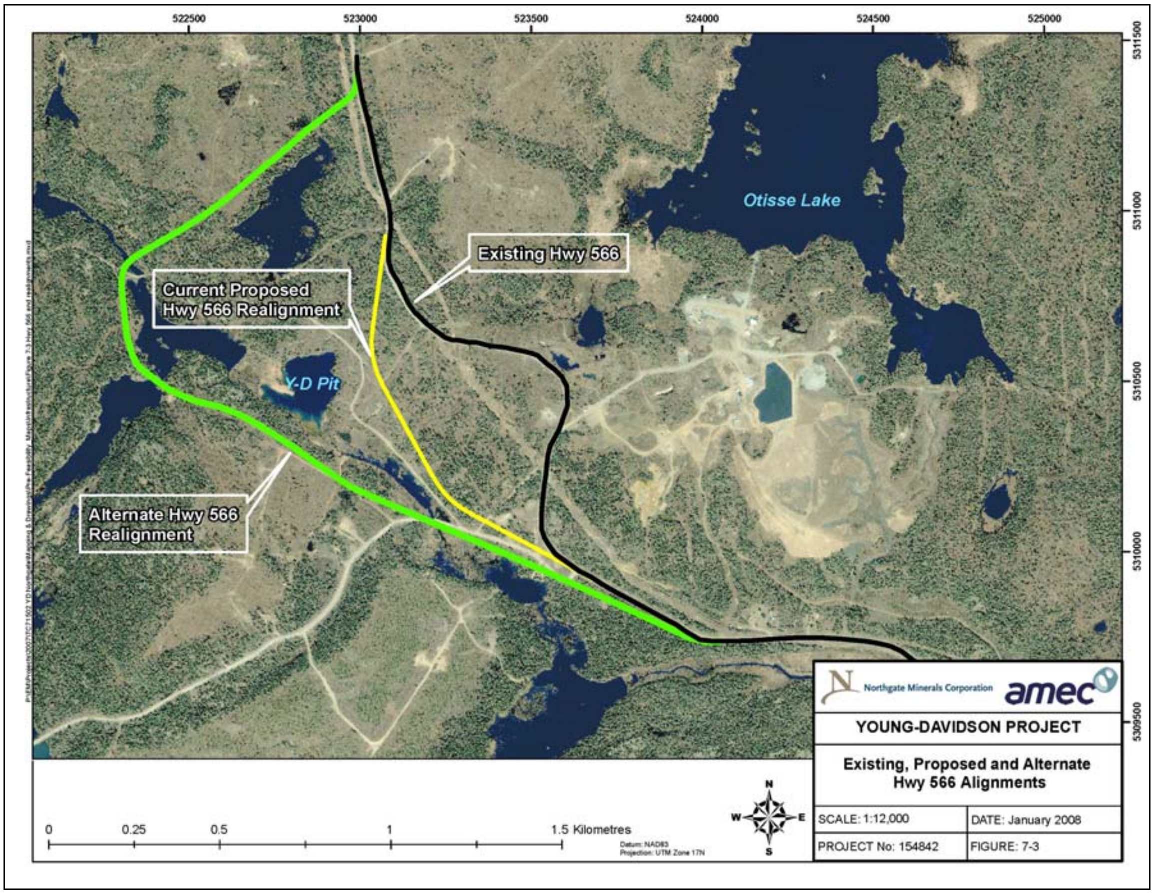
Figure 18-10: Mine Site Infrastructure Layout



18.3.11 Roads

The current alignment of Highway 566, routed west of the Town of Matachewan (Figure 18-11), directly interferes with the proposed open pit. As such, the road and 44 kV transmission line will need to be relocated to the west.

Figure 18-11: Plan View Showing the Current, Proposed and Alternate Realignment for Highway 566.



18.3.12 Waste Rock and Temporary Mill Feed Storage

Waste rock will be produced from the open pit operations and the development of a ramp, shaft and other underground workings. The total quantity of waste rock requiring storage is estimated at approximately 11 Mm^3. Geochemical investigations to date suggest that future waste rock will be chemically non-reactive; therefore, it will be stored in surface stockpile(s), with an undefined volume to be used for construction purposes and a potential for storage within the open pit.

The preliminary site plan includes two mine rock stockpiles storing approximately 8.5 Mm^3 and 2.5 Mm^3 each. The larger stockpile will be constructed on top of the historic Matachewan Consolidated tailings. Two alternative locations have been identified for the second smaller mine rock stockpile: south of Highway 566 and north of the plant site. A third alternative is to backfill the open pit.

No temporary mill feed storage is necessary as the hoisted material will be transferred to the mill via conveyors.

18.4 Markets

Northgate does not have a contract with a refinery to treat (and pay for) its anticipated gold production from the Young-Davidson project; however, Northgate provided a quotation from a refinery located in Ontario. AMEC is satisfied that Northgate will be able to sell its products from the Young-Davidson project.

18.5 Contracts

Two contractors are currently on site, providing services related to Northgate's development and exploration programs:

- Dumas Contracting Limited, based in Timmins (ON), is responsible for development of the exploration decline and and associated infrastructure or mining activities. The contract was enacted on December 1st, 2006.
- Forage Orbit Garant S.E.N.C., based in Val d'Or (QC), is responsible for exploration drilling activities (i.e. diamond drilling), as set out in Northgate's exploration program. The contract was enacted on January 14th, 2008.

In AMEC's opinion, the two contracts mentioned above are sufficient for Northgate to carry out their mine development and exploration activities, as per their current program.

AMEC was notified that Northgate will employ contractors for the development and operation of the open-pit mine.

18.6 Environmental Considerations

The Project has been designed to maximize utilization of lands previously altered by historic mining-related activities and, where practical, reclaim brownfield areas progressively during operations; and, minimize overall Project footprint and impacts.

There are no identified fatal flaws anticipated with obtaining permits and approvals for the proposed project as it currently exists. As the engineering study progresses and more public consultation occurs some Project aspects may change but are not anticipated to be financially onerous.

Closure Plan

AMEC has estimated reclamation costs of $10.7 M associated with the proposed Project. Financial assurance is in place for the advanced exploration phase.

18.7 Taxes

AMEC does not provide expert advice on taxation matters.

The taxes calculations are made based on the information provided by Northgate and documentation publicly available.

The Young Davidson project will be subject to income and/or revenue taxes as follows:

- Ontario mining tax: 10%
- Ontario income tax: 12%
- Ontario capital tax: 0%
- Federal capital tax: 0%
- Federal income tax: 15%

No municipal taxes or other levies were considered in the current scope

The amount of tax payable for the duration of the project is $ 13.9 M.

18.8 Capital Costs

Capital costs were estimated using a combination of vendor quotes and experience. The total capital costs amount to $409 M. Details are shown in Table 18-8, where the initial capital period stretches until the end of Year 2.

Table 18-8: Capital Cost Estimate

Area	Description	Category	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
				Initial					Sustaining								
Mining	Ramp Development	Mine Development		4,644,990	5,155,848												
	Lateral Development	Mine Development		3,222,552	5,766,672	4,431,016	2,726,288	3,858,212	3,904,060	3,904,225	1,869,138						
	Ventilation Raises	Mine Development		3,344,640	3,344,640												
	Ventilation and Heating	Mech/Elect			2,492,236	222,198											
	Shaft Development	Mine Developm	4,800,000	10,167,865	37,459,481												
	Ore Pass Development	Mine Development				2,272,000	678,400										
	Waste Pass Development	Mine Development				1,190,000	357,000										
	U/G Crusher Station					1,391,445	927,630										
	U/G Infrastructure	Mine Development			1,762,497	712,663											
	U/G Mobile Equipment	Equipment	3,748,787	3,748,787		8,263,610											
	U/G Dewatering	Mech/Elect			1,482,312												
	Surface Equipment	Equipment		1,000,000													
	U/G Electrical Equipment	Mech/Elect		1,163,479	2,714,785	1,675,075											
	O/P Overburden Removal	O/P Development			1,400,000												
	O/P Waste Removal	O/P Development			6,633,627												
	Subtotal Mining		**8,548,787**	**27,292,313**	**68,212,098**	**20,158,007**	**4,689,318**	**3,858,212**	**3,904,060**	**3,904,225**	**1,869,138**	**0**	**0**	**0**	**0**	**0**	**0**
Process	Labour	Mill		7,212,137	10,818,205												
	Material (Equipment)	Mill	4,500,000	31,690,750	21,127,167												
	Construction Equipment	Mill		108,454	162,680												
	Subcontract Labour	Mill		416,834	972,613												
	Subtotal Process		**4,500,000**	**39,428,175**	**33,080,665**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Pastefill	Paste Fill Plant			1,720,000	6,880,000												
	Boreholes				275,000	110,000	110,000	110,000	110,000	110,000	55,000						
	Connection excavations					20,000	20,000	20,000	20,000	20,000	15,000						
	Initial Piping				1,800,000	750,000	750,000	750,000	750,000	750,000	450,000						
	Subtotal Pastefill		**0**	**1,720,000**	**8,955,000**	**880,000**	**880,000**	**880,000**	**880,000**	**880,000**	**520,000**	**0**	**0**	**0**	**0**	**0**	**0**
Utilities	Main 115kV Power to site	Site	2,000,000	7,000,000	2,000,000												
	Site Power Distribution	Site		5,448,904	3,632,603												
	Fresh Water System	Site		341,014	511,521												
	Sewage Treatment System	Site			285,000												
	Fuel Storage and Distribution	Site			116,805												
	Connections and Misc.	Site		235,291	352,937												
	Subtotal Utilities		**2,000,000**	**13,025,209**	**6,898,866**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Site Developm	Hwy 566 Re-alignment	Site		2,065,848													
	General Site Development	Site		1,500,000	1,500,000												10,685,500
	Subtotal Site Development		**0**	**3,565,848**	**1,500,000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**10,685,500**
Ancillary Facili	Maintenance/Warehouse/Office	Site		2,980,479	1,277,348												
	Assay Lab	Site			1,142,826												
	Subtotal Ancillary Facilities		**0**	**2,980,479**	**2,420,174**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Tailings	Initial Tailings Facility			3,000,000	5,536,013												
	Ongoing Tailings Development						5,150,000			5,150,000			5,150,000				
	Subtotal Ancillary Facilities		**0**	**3,000,000**	**5,536,013**	**0**	**5,150,000**	**0**	**0**	**5,150,000**	**0**	**0**	**5,150,000**	**0**	**0**	**0**	**0**
	Subtotal Project Directs and Sustaining		**15,048,787**	**91,012,024**	**126,602,816**	**21,038,007**	**10,719,318**	**4,738,212**	**4,784,060**	**9,934,225**	**2,389,138**	**0**	**5,150,000**	**0**	**0**	**0**	**10,685,500**
Indirects	Construction Indirects		902,927	5,460,721	7,596,169												
	Start-up and Commissioning			697,991	1,628,645												
	Vendor Supervision			582,372	1,358,868												
	EPCM		1,805,854	10,921,443	15,192,338												
	Capital Spares				1,455,930												
	Duties and Custom Fees			776,496	1,164,744												
	Freight and Packaging			582,372	873,558												
	Owner's Costs (2% of Directs)		300,976	1,820,240	2,532,056												
	First Fills				970,620												
	Subtotal Project Indirects		**3,009,757**	**20,841,636**	**32,772,929**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	17.5% Contingency		**3,160,245**	**19,574,390**	**27,890,755**												
	Total Project Initial Capital - Preliminary Draft		**21,218,790**	**131,428,050**	**187,266,500**	**21,038,007**	**10,719,318**	**4,738,212**	**4,784,060**	**9,934,225**	**2,389,138**	**0**	**5,150,000**	**0**	**0**	**0**	**10,685,500**

18.9 Operating Costs

Operating costs for underground mining, milling and G&A were derived from first principles reflecting an “owner-operated” scenario. Quotes were sourced from local contractors in the case of open-pit mining. Northgate provided assistance in estimating site G&A costs.

The summary of operating costs is shown in Table 18-9.

Table 18-9: Operating Cost Estimate

Item	Average Cost
Mining – Open-pit	$3.50/t mined
Mining - Underground	$27.23/t mill feed
Milling	$11.10/t mill feed
G&A	$3.30/t mill feed

18.10 Economic Analysis

18.10.1 Summary Results

Using a discount rate of 8%, the project NPV is negative $116 M and the internal rate of return is 0.8%. The cumulative undiscounted cash flow value for the project is $20.3 M and the payback period is 11 years.

The project is most sensitive to metal prices, head grade and currency exchange rate, and least sensitive to operating and capital costs.

The results of the economic analysis represent forward-looking information that are subject to a number of known and unknown risks, uncertainties and other factors that may cause actual results to differ materially from those presented here.

18.10.2 Valuation Methodology

The YD Project has been valued using a discounted cash flow (DCF) approach. This method of valuation requires projecting yearly cash inflows, or revenues, and subtracting yearly cash outflows such as operating costs, capital costs, royalties, and taxes. Cash flows are taken to occur at the end of each period.

The resulting net annual cash flows are discounted back to the date of valuation (i.e. 4th quarter of 2007) and totalled, in order to determine the net present value (NPV) of the project at selected discount rates.

The internal rate of return (IRR) is expressed as the discount rate that yields a zero NPV.

The payback period is the time needed to recover the capital expenditures.

This economic analysis includes sensitivities to variation in metal prices and foreign exchange.

All monetary amounts are presented in Canadian dollars (CDN$).

18.10.3 Financial Model Parameters

Resource and Mine Life

This resource will be processed at an average rate of 1.825 Mtpa over a planned mine life of approximately 12 years.

Metallurgical Balance

Gold recovery is set at 91.5% and precious metal contained in doré is set at 90%.

Refinery Terms

The base case incorporates the refinery terms shown in Table 18-10.

Table 18-10: Gold Doré Refinery Terms

Item	Unit	Value
Au Pay Factor	(%)	99.9
Dore Refining Charge	(CDN$/kg net weight)	16.5
Transport Charge	(CDN$/per shipment[7])	1,750

Metal Prices and Foreign Exchange

The following gold prices and foreign exchange rate were used:

- Gold price: USD$635/oz
- Exchange Rate (USD$/CDN$): 0.90 (i.e. USD$1 = CDN$1.11)

Operating Costs

Operating costs used for the financial analysis are as follows:

[7] Assumed on average one shipment per week, therefore 52 per year for a full year of production

- Mining open-pit: $3.50/t mined
- Mining underground: average is $27.23/t milled
- Milling: $11.10/t milled
- G&A: $3.30/t milled

Capital Costs

The distribution of the estimated project capital costs are as follows (refer to Section 18.8 for capital costs details):

- Pre-production capital: $340 M
- Sustaining capital: $69.4 M
- Total project CAPEX: $409 M

Royalties

Royalty payments are calculated in function of the resources tonnage mined and the price of gold. The royalty calculations details can be found in the Matachewan Consolidated Property agreement. The current financial model estimates the total value of royalty payment at $1.94 M.

Working Capital

No working capital allocations have been made in the current cash flow model.

Taxes

AMEC does not provide expert advice on taxation matters.

The taxes calculations are made based on the information provided by Northgate and documentation publicly available.

The Young-Davidson project will be subject to income and/or revenue taxes as follows:

- Ontario mining tax: 10%
- Ontario income tax: 12%
- Ontario capital tax: 0%
- Federal capital tax: 0%
- Federal income tax: 15%

No municipal taxes or other levies were considered in the current scope

The amount of income tax payable for the duration of the project is $ 13.9 M.

Reclamation Bond

Reclamation costs of $10.7 M are used in the current model.

Financing

The base case economic analysis is based on 100% equity financing.

Inflation

The base case economic analysis included no inflation. Capital and operating costs are expressed in 4th quarter 2007 Canadian dollars.

18.10.4 Results of the Financial and Sensitivity Analyses

The after-tax cumulative undiscounted cash flow is $20.3 M with an IRR of 0.8% (Table 18-11). The pay back period for the base case is 11 years. The Base Case is defined with a gold price of USD$635/oz and a discount rate of 8%.

Table 18-11: Young-Davidson Cash Flows

		Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Expected mineral price																
Gold price (CDN$/ounce)		706	706	706	706	706	706	706	706	706	706	706	706	706	706	706
Production model																
Ore milled (million tonnes)	20.303	0.000	0.000	0.450	1.801	1.826	1.825	1.825	1.825	1.830	1.825	1.825	1.825	1.830	1.439	0.176
Contained mineral																
Gold (million ounces)	1.919	0.000	0.000	0.023	0.117	0.137	0.187	0.185	0.185	0.189	0.193	0.187	0.181	0.178	0.141	0.017
Recovered mineral																
Gold (million ounces)	1.756	0.000	0.000	0.021	0.107	0.125	0.171	0.170	0.170	0.173	0.176	0.171	0.165	0.163	0.129	0.015
Smelter mineral deductions																
Gold (million ounces)	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Payable mineral																
Gold (million ounces)	1.755	-	-	0.021	0.107	0.125	0.171	0.169	0.169	0.173	0.176	0.171	0.165	0.163	0.129	0.015
Cash flow calculation ($ million)																
Total mineral revenue	**$ 1,239**		**$ -**	**$ 15**	**$ 75**	**$ 88**	**$ 121**	**$ 120**	**$ 120**	**$ 122**	**$ 125**	**$ 121**	**$ 117**	**$ 115**	**$ 91**	**$ 11**
Gold revenue	$ 1,239		$ -	$ 15	$ 75	$ 88	$ 121	$ 120	$ 120	$ 122	$ 125	$ 121	$ 117	$ 115	$ 91	$ 11
Total production costs	**$ 786**		**$ -**	**$ 8**	**$ 74**	**$ 68**	**$ 111**	**$ 68**	**$ 67**	**$ 68**	**$ 67**	**$ 67**	**$ 66**	**$ 64**	**$ 52**	**$ 6**
Mining	$ 493		$ -	$ 2	$ 48	$ 42	$ 85	$ 42	$ 41	$ 41	$ 41	$ 40	$ 40	$ 38	$ 31	$ 3
Milling	$ 225		$ -	$ 5	$ 20	$ 20	$ 20	$ 20	$ 20	$ 20	$ 20	$ 20	$ 20	$ 20	$ 16	$ 2
G&A	$ 67		$ -	$ 1	$ 6	$ 6	$ 6	$ 6	$ 6	$ 6	$ 6	$ 6	$ 6	$ 6	$ 5	$ 1
Total royalty payments	**$ 7**		**$ -**	**$ 1**	**$ 1**	**$ 1**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 2**	**$ 3**	**$ -**
Ontario mining tax	$ 5		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2	$ 3	$ -
3rd party Royalty	$ 2		$ -	$ 1	$ 1	$ 1	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total concentrate payments	**$ 3**		**$ -**	**$ 0**	**$ 0**	**$ 0**	**$ 0**	**$ 0**	**$ 0**	**$ 0**	**$ 0**	**$ 0**	**$ 0**	**$ 0**	**$ 0**	**$ 0**
Transport payments	$ 1		$ -	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
Smelter mineral deduction	$ 1		$ -	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
Mineral refining cost	$ 1		$ -	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
Net income before tax	**$ 444**		**$ -**	**$ 6**	**$ 1**	**$ 19**	**$ 9**	**$ 51**	**$ 52**	**$ 54**	**$ 57**	**$ 54**	**$ 50**	**$ 48**	**$ 36**	**$ 5**
Federal income tax	$ 7		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2	$ 5	$ 0
Federal capital tax	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Provincial income tax	$ 7		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2	$ 4	$ 0
Provincial capital tax	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Net income after tax	**$ 430**	**$ -**	**$ -**	**$ 6**	**$ 1**	**$ 19**	**$ 9**	**$ 51**	**$ 52**	**$ 54**	**$ 57**	**$ 54**	**$ 50**	**$ 44**	**$ 27**	**$ 5**
Capital expenditure	$ 409	$ 21	$ 131	$ 187	$ 21	$ 11	$ 5	$ 5	$ 10	$ 2	$ -	$ 5	$ -	$ -	$ -	$ 11
Net project cash flow	$ 20	$ (21)	$ (131)	$ (181)	$ (20)	$ 8	$ 5	$ 47	$ 42	$ 52	$ 57	$ 49	$ 50	$ 44	$ 27	$ (6)
Net cash flow discounting factor																
DCF factor	8.0%	0.93	0.86	0.79	0.74	0.68	0.63	0.58	0.54	0.50	0.46	0.43	0.40	0.37	0.34	0.32
DCF NPV calculation ($ million)																
cumulative CF		$ (21)	$ (153)	$ (334)	$ (354)	$ (346)	$ (341)	$ (295)	$ (253)	$ (201)	$ (144)	$ (95)	$ (45)	$ (0)	$ 26	$ 20
Payback period (Years)		0														
Equity PV	$ (116)	$ (20)	$ (113)	$ (144)	$ (15)	$ 6	$ 3	$ 27	$ 23	$ 26	$ 26	$ 21	$ 20	$ 16	$ 9	$ (2)
Full equity stake DCF NPV		$ (116)		Internal rate of return (%):		0.75%										

Sensitivity analyses were performed on the base case, taking into account variations in metal prices, operating cost, capital cost, foreign exchange and head grade. Results from the analyses showed that metal price and head grade have the most impact on the project economics (Figure 18-12 and Table 18-12). Capex, opex and currency exchange rate have a lesser impact.

Figure 18-12: Sensitivity Analyses on Metal Price, Head Grade, Capex, Opex and Foreign Exchange Rate (Base Case is NPV at 8%).

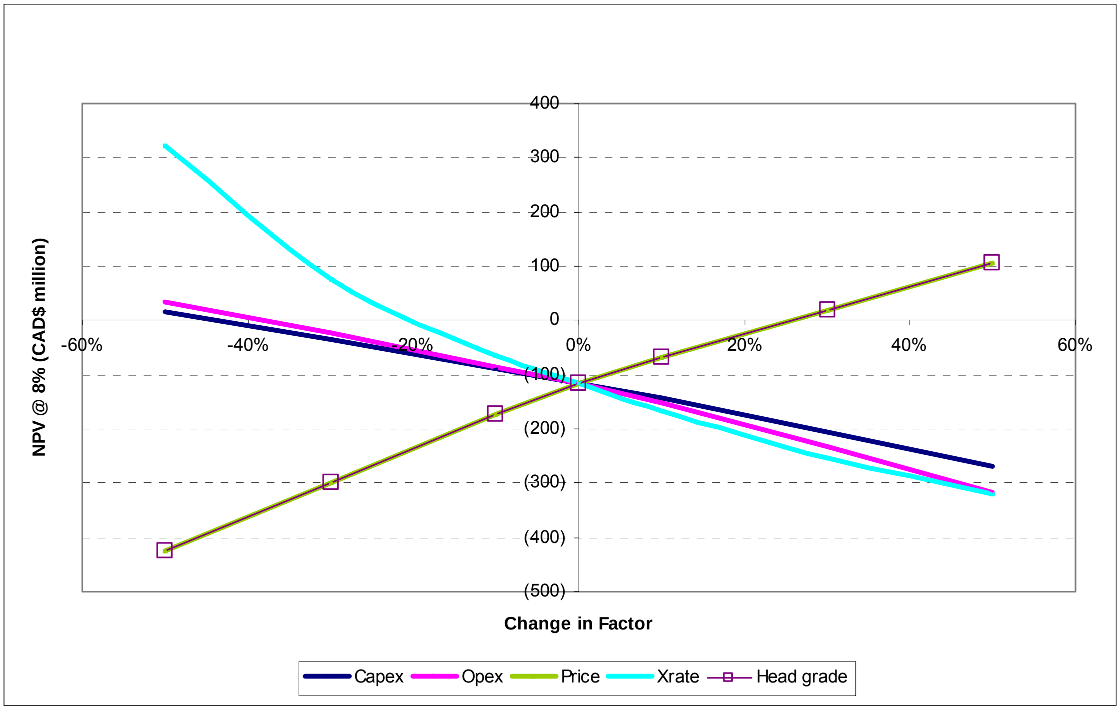


Table 18-12: Sensitivity Analysis Tabulated Results

Parameter	Base Case (NPV@8%) = 0%						
	(50%)	(30%)	(10%)	0%	10%	30%	50%
Capex	16.3	(35.6)	(88.7)	(116)	(143)	(206)	(270)
Opex	35.2	(23.8)	(84.5)	(116)	(151)	(234)	(318)
Metal Price	(425)	(299)	(173)	(116)	(69.1)	20.4	107
Exchange Rate	321	76.7	(64.1)	(116)	(167)	(255)	(320)
Head Grade	(424)	(298)	(172)	(116)	(69.2)	20.3	107

18.10.5 Payback

The payback period to recover the capital is estimated at 11 years.

18.11 Mine Life

Approximately 20 Mt of mill feed grading 2.94 g/t on average will be processed over a 12 year mine life for an annual mill feed production of 1.825 Mtpa (Table 18-13). This rate is based on the number of mining fronts available (four), production tonnes per day per extraction front (1,250 tpd/front) and the number of operating days per year (365). The combined LOM plan for the open-pit and underground mines includes a ramp-up period of 3 years and a ramp-down period of 2 years for the underground mine.

Table 18-13: Combined LOM Plan for the Open-Pit and Underground Mines

	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Total
MILL FEED (t)		450,000	1,801,000	1,826,000	1,826,000	1,825,000	1,825,000	1,830,000	1,825,000	1,825,000	1,825,000	1,830,000	1,439,000	176,000	20,303,000
HEAD GRADE (g/t)		1.56	2.02	2.33	3.18	3.16	3.16	3.21	3.29	3.19	3.08	3.02	3.05	2.95	2.94
HEAD METAL (g)		702,000	3,635,000	4,254,000	5,809,000	5,767,000	5,765,000	5,883,000	5,999,000	5,819,000	5,624,000	5,532,000	4,395,000	520,000	59,704,000
HEAD METAL (oz)		23,000	117,000	137,000	186,000	185,000	185,000	189,000	193,000	187,000	181,000	178,000	141,000	17,000	1,919,000
Underground Mine Production (t)			401,000	457,000	1,299,000	1,825,000	1,825,000	1,830,000	1,825,000	1,825,000	1,825,000	1,830,000	1,439,000	176,000	16,557,000
Head Grade (g/t)			2.78	3.37	3.56	3.16	3.16	3.21	3.29	3.19	3.08	3.02	3.06	2.95	**3.18**
Head Metal (g)			1,115,000	1,543,000	4,618,000	5,767,000	5,765,000	5,883,000	5,999,000	5,819,000	5,624,000	5,532,000	4,395,000	520,000	**52,580,000**
Head Metal (oz)			36,000	50,000	148,000	185,000	185,000	189,000	193,000	187,000	181,000	178,000	141,000	17,000	**1,690,000**
Production Hoisted to the Mill (t)					843,000	1,825,000	1,825,000	1,830,000	1,825,000	1,825,000	1,825,000	1,830,000	1,439,000	176,000	**15,243,000**
Production Trucked to Mill (t)			401,000	457,000	456,000										**1,314,000**
Open-Pit Mine Production (t)		450,000	1,400,000	1,369,000	527,000										3,746,000
Head Grade (g/t)		1.56	1.80	1.98	2.26										1.90
Head Metal (g)		702,000	2,520,000	2,711,000	1,191,000										**7,124,000**
Head Metal (oz)		23,000	81,000	87,000	38,000										**229,000**
WASTE AND OVERBURDEN															
Underground Mine Waste (t)	293,000	393,000	348,000	324,000	277,000	277,000	286,000	280,000	191,000	138,000	124,000				2,931,000
Open-Pit Waste(t)		1,895,000	5,268,000	2,852,000	332,000										10,347,000
Open-Pit Overburden (t)		400,000													400,000
Strip ratio		5.1	3.8	2.1	0.6										2.9
UNDERGROUND DEVELOPMENT															
Total Development (m)	5,520	6,500	6,510	6,760	5,110	5,110	5,460	5,190	3,520	2,550	2,290				54,520
Shaft	200	1,100	100												1,400
Ramp	2,550	2,080	750												5,380
Vent Raise	660	550	590	210											2,010
Rock Pass				720			150	60							930
Waste Pass				710			200								910
Lateral-Capital Devlopment	2,110	2,320	4,360	1,780	2,530	2,560	2,560	1,220							19,440
Lateral-Operating Development		450	710	3,340	2,580	2,550	2,560	3,900	3,520	2,550	2,290				24,450
Backfill volume (m^3)			88,000	178,000	302,000	576,000	712,000	712,000	714,000	712,000	712,000	712,000	712,000	330,000	6,460,000

Note: The mill feed is from a preliminary assessment that is preliminary in nature. Mill feed includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is no certainty that this preliminary assessment will be realized.

19.0 ADDITIONAL REQUIREMENTS FOR TECHNICAL REPORTS ON DEVELOPMENT PROPERTIES AND PRODUCTION PROPERTIES

The Young-Davidson property is not in production nor in development.

20.0 INTERPRETATION AND CONCLUSIONS

20.1 Summary

AMEC reviewed pertinent geological, mining and metallurgical data from the Young-Davidson Project to obtain a sufficient level of understanding to assess the status of the project as of the effective date of this report.

Based on the information gathered during the completion of the PA, AMEC concludes that development of the Young-Davidson project is not supported by positive economic factors, except for the cumulative undiscounted cash flow.

AMEC provides detailed conclusions in the following sections and recommendations for future work in Section 21.

20.2 Geology and Mineralization

As a result of the review, AMEC concludes that:

- Collar coordinates appear to be sufficiently accurate.
- Survey, drilling and sampling procedures, sample preparation and assay protocols are generally in agreement with best practices.
- The geology of the Young-Davidson deposit is reasonably well understood. Main mineralization controls have been identified, and are used in domaining for grade estimation.
- The geological interpretation respects the data recorded, as well as the interpretation from adjoining sections, and is consistent with the known characteristics of this deposit type.
- Northgate has assembled a thorough and reliable bulk density database.
- Based on the reviewed information, AMEC is of the opinion that the Young-Davidson data are sufficiently precise and accurate for resource estimation purposes.

20.3 Assaying, QA/QC and Data Verification

As a result of the review, AMEC concludes that:

- Northgate implemented a QC program, which included the regular submission of reject and pulp duplicates, CRMs and coarse blanks. An independent consultant, who used industry-standards procedures to assess the QC data, supervised this program.

- The QC protocol did not include the regular insertion of twin samples. Therefore, sampling variance could not be properly assessed. However, sub-sampling and analytical precisions were assessed, and were found within acceptable ranges. Au analytical accuracy was within the acceptable limits.
- Significant cross-contamination for Au was not detected by routine testing of coarse blanks.
- Double entry verification of the Au assay data did not identify errors in the Au database entries.

20.4 Mineral Resources and Reserves

As a result of the review, AMEC concludes that:

- The open pit and underground 3D grade shell models used to constrain the gold mineralization are adequate to support a resource estimate, but the solids are conservative (by using grade cut-offs based on USD$400/oz Au) and have a minor upside potential to increase the mineralized tonnes.
- The open pit and underground resource models have been validated with a nearest neighbour model showing no significant grade bias. AMEC is of the opinion that the Young-Davidson resource models are sufficiently estimated and acceptable for public disclosure.

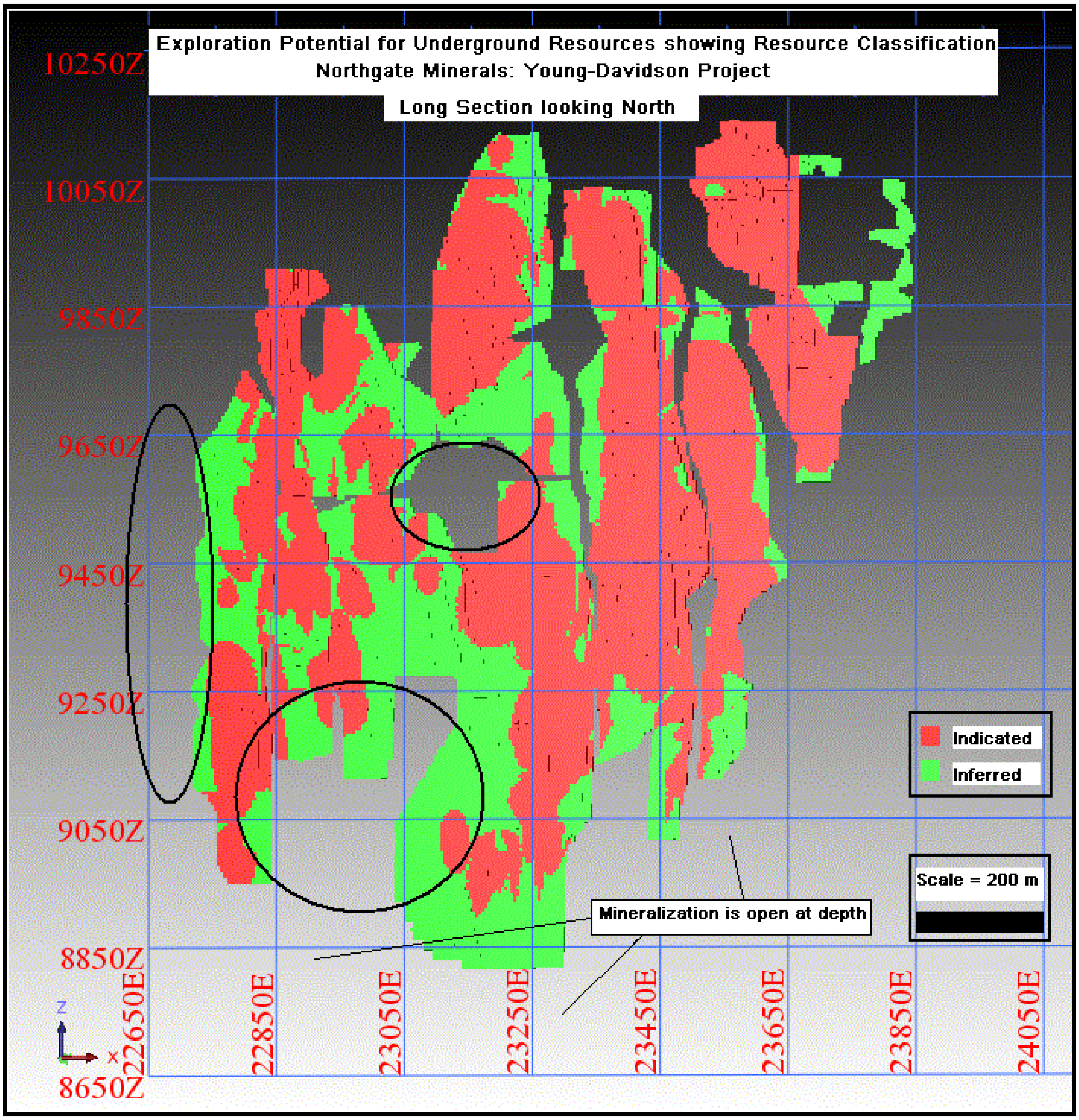
There are currently no Mineral Reserves declared on the Young-Davidson property. Northgate will need to implement a cut-off grade procedure in order to convert some of the Mineral Resources into Mineral Reserves.

20.5 Exploration Potential

AMEC is of the opinion that Northgate has potential to increase the current underground resource tonnes through delineation and infill drilling. Currently, there are gaps in the mineralized wireframe 3D models that should be infill drilled to confirm mineralization continuity. Figure 20-1 shows an approximate 200 m E-W x 100 m El gap occurs around a point centered at 23225 E and 9580 El within the Lucky Zone. There is also an approximate 150 m E-W x 350 m El gap at the base of the known mineralization between the Lower Lucky Zone and the Lower YD Zone centered at 23050 E and 9030 El. This gap and all the underground zones are open at depth.

Infill drilling in these gaps will potentially outline additional mineralization, but with a significant number of Inferred blocks surrounding these areas, the infill drilling will potentially upgrade these Inferred Resources into Indicated.

Figure 20-1: Underground Exploration Potential at Young-Davidson



Although the potential for additional mineralization exists, Northgate can also gain additional resource tonnes leading up to a Feasibility Study by converting the current Inferred tonnes into Indicated tonnes by infill drilling. The current Inferred Resource underground tonnes stand at approximately 4.0 Mt at an average grade of 3.35 g/t Au.

By referring to Figure 17-14, the elevation swath plot for the underground resources, the highest mean grade (>4.00 g/t Au) is between 9350 m El and 9550 m El, which corresponds to the mineralization gap in the Lucky Zone mentioned above. This swath plot also shows that the mean grade at the bottom of the known mineralization is low

(<3.00 g/t Au). Northgate should consider these higher mean grade trends when outlining the underground drilling programs, in order to maximize the expected grade from the next drilling program. AMEC is of the opinion that the mean Au grade of the YD mineral resources has a greater impact on the project economics than the resource tonnes.

By referring to Figure 17-12, the easting swath plot for the underground resources, the NN validation model shows a grade of almost 5.00 g/t Au on the most westerly portion of the underground model. Not only does this indicate a possible higher grade area, a significant portion of the current mineralization in this area is in the Inferred category. Therefore, this area to the west of the Lower YD Zone has potential to add new mineralized tonnes, but can also convert Inferred Resources to Indicated Resources with additional drilling.

20.6 Mine Development and Mine Plan

With regards to the proposed open pit operation, AMEC concludes that:

- Pit slope design criteria have been based upon limited data. Additional geomechanical test results will be needed to refine pit slope design criteria.
- Historical underground workings occur at the east end of the proposed pit design. Future studies will require more cost and scheduling detail be applied to account for working near historical underground excavations (which may be flooded).
- At a cutoff grade of 0.845 g/t Au, the pit design contained 3.7 Mt of crusher feed @ 1.90 g/t Au and 10.7 Mt of waste material. The crusher feed and waste tonnages from the pit design are approximately two percent lower and five percent higher respectively than the associated ultimate pit shell tonnages.
- Pit ramps were designed with a gradient of 10% and 15 m width to accommodate 50 t haulage trucks. The pit ramp exits the pit at the east side at approximately 10345 metre reference elevation. The pit bottom elevation was at 10230 metres while the maximum topography contact elevation was approximately 10365 metres. No pit phasing has been applied to the design due to the short duration of the schedule.
- Updated detailed quotes from contractors will be required to better estimate operating and capital costs in future studies.

With regards to the proposed underground operation, AMEC concludes that:

- There is insufficient geomechanical data available to design stable stope dimensions and model the mining-induced stress re-distribution. AMEC selected geomechanical data that are reasonable to propose initial stope design.

- The usage (and nature) of backfill will need to be further examined. It is unclear at this stage if Northgate would benefit more from leaving pillars behind, increasing the level of ground support or placing backfill in the stopes.
- Mine ventilation will require numerical modelling to simulate the airflow distribution underground and associated heating loads.
- Northgate should simulate the ore and waste flows within the context of material handling, in order to identify potential bottlenecks of the operation. As mentioned in section 18.3, AMEC notes that a 5,000 tpd extraction rate is at the high limit of what the Young-Davidson deposit could potentially sustain.
- A cut-off grade should be applied to convert Mineral Resources into Mineral Reserves an address the issue of marginal or incremental ore.
- Detailed quotes from contractors will be required to better estimate operating and capital costs.

20.7 Metallurgy and Processing

Several bench-scale metallurgical tests have been conducted on the Young Davidson ore since the start of 2007. Two metallurgical test phases have been finalized and a proposed gold processing facility was put forward by AMEC with Northgate that includes primary single stage underground crushing, single stage AG milling followed by gravity concentration/intensive cyanidation, flotation, regrinding, carbon in leach, carbon stripping, electrowinning, and gold refining. The primary P_{80} grind size (selected by Northgate) to be a targeted of 150 um and an overall LOM recovery of Au 91.5% and Ag 78% was projected.

AMEC concludes that the test program was appropriate for the current level of study; however, it is evident that further work will be required on samples reflecting the projected LOM grades to enhance confidence in the recovery numbers. Recovery values for gold at design grades of 3.5 g/t was projected at 91.7%. The lower gold head grade of 2.94 g/t LOM results in an increased risk that the recoveries projected by batch scale test work will not be realized in the Young-Davidson process. As a result a factor was applied to the recovery of gold to reduce it to 91.5% which reflects a very real trend that recovery would have a downward pressure as head grades lower.

The final product will be doré bars. The grade of the doré is estimated to be a total of 90% precious metal.

20.8 Environmental Considerations

Northgate has demonstrated a positive approach to environmental management at the Young-Davidson Project. They have been proactive in initiating environmental baseline investigations and environmental approvals processes in a timely manner to ensure proper Project planning. A number of environmental approvals remain valid from the late 1990's when the site was previously explored. These have been amended by Northgate as needed to support advanced exploration activities.

Additional provincial and federal environmental approvals will be required to construct, operate and close the new mine. The regulatory agencies and public have, in general, been supportive of redevelopment of this brownfield site and environmental approvals are expected to be able to be obtained in a timely manner. Careful attention to the engineering and construction schedule will be required to ensure that minor approval delays do not impact overall Project timing.

It is AMEC’s understanding that Northgate is developing a positive relationship with the local Matachewan First Nation. Continuation along this path will be critical to ensuring that Project timelines are not impacted.

20.9 Cost Estimates and Financial Analysis

AMEC concludes that operating and capital costs estimated for this PA are within the level of accuracy expected for this type of study.

The financial analysis, using a discount rate of 8%, showed the project NPV to be negative $116 M and the internal rate of return to be 0.8%. The cumulative undiscounted cash flow value for the project is $20.6 M and the payback period is 11 years. AMEC concludes that development of the Young-Davidson project is not supported by positive economic factors, except for the cumulative undiscounted cash flow.

The project is most sensitive to metal prices, head grade and currency exchange, and least sensitive to operating and capital costs.

The results of the economic analysis represent forward-looking information that are subject to a number of known and unknown risks, uncertainties and other factors that may cause actual results to differ materially from those presented here.

21.0 RECOMMENDATIONS

21.1 Geology Database and Resource Models

AMEC recommends completing the following tasks prior to finalizing a Feasibility Study:

- The drill hole database must contain all the samples used in the final averaged assay for each interval in the assay table. The final assay to be used in the resource estimate must be clearly labelled, such as Au_final or Au_avg.
- The solid models used for grade shell construction should be performed using a cut-off grade lower than break-even for both the open pit and underground mineralization. This will allow the estimation process to estimate a block grade and not the subjectivity of the resource modeller. The mineralization contained within the grade shell can be determined by a higher cut-off grade based on the project economics.
- Northgate should continue to expand the continuity of mineralization through drilling in untested areas around current mineralization and upgrade the Inferred Resources into Indicated Resources. Although it would be beneficial in adding resources at any grade, Northgate should focus the drilling on adding mineralization at grades above 3.50 g/t Au. A surface drilling program would require approximately 20 core holes at 1,000 m per hole totalling 20,000 m. At an assumed all-in drilling cost of $125/m, the surface drilling program would be approximately $2.5 M.
- Northgate should model the Ag content of the YD resources if they are planning to use the silver revenue stream in calculating the project economics. Although the Ag has not been reviewed by AMEC in this report, a quantile-quantile (QQ) plot of Au vs. Ag showed a reasonable correlation of 0.86 between the two elements. On average, from the 778 samples containing both Au and Ag assays within the underground mineralized grade shells, 1.00 g/t Au equates to about 0.80 g/t Ag. AMEC notes that Northgate database contains approximately 1 Ag assay for 3 Au assay within the underground grade shells. AMEC recommends obtaining silver samples to populate a database in sufficient numbers to allow the inclusion of silver in the the mineral resource estimate. Currently, there is approximately one-third of the number of silver samples compared to gold samples within the mineralized wireframes. If pulp reject samples from recent drilling are available, it is recommended that Northgate re-submit the pulps and analyze for silver. Also, AMEC recommends that Northgate commence analyzing for silver on all new core samples submitted for gold assaying. Re-submitting pulp rejects for silver assaying only is approximately $7.00/pulp (no sample prep required) and the cost of

assaying for gold and silver on new core samples is approximately $16.00/sample (including sample prep).

21.2 Mining

AMEC recommends completing the following tasks prior to finalizing a Feasibility Study:

- A geomechanical program that will provide information necessary for properly designing stable underground excavations. AMEC estimates such a program to cost approximately $100,000.
- Trade-off studies related to the mine ground support on a large scale (i.e. usage of backfill versus leaving pillars versus installing additional ground support). AMEC estimates the cost of trade-off studies to amount to $30,000.
- A comprehensive backfill design program, taking into account various recipes for backfill and the resulting strength variation. AMEC estimates the cost for a comprehensive backfill test program to exceed $200,000.
- Simulation of the mine ventilation airflows and heating requirements. AMEC estimates the cost for ventilation simulation work to amount to $50,000.
- Numerical modelling of the stresses re-distribution from mining activities. AMEC estimates numerical modelling work to cost $30,000.
- Material handling bottleneck(s) identification and appropriate measure(s) to de-bottleneck. AMEC estimates the cost of material handling work to amount to $100,000.
- Request appropriately detailed quotes from contractors, especially for the open-pit mining.
- Determine a Cut-off grade strategy to deal with marginal grade material. This should include consideration of all royalties.
- Complete modelling of the overburden surface so that accurate overburden tonnages can be scheduled.
- Additional geotechnical information should be gathered so that updated pit and dump slope design criteria may be calculated. AMEC estimates the cost of additional surface geotechnical work to $100,000
- Bench height and dilution should be considered in more detail so that changes are quantified relative to different production rates and mining equipment sizes.
- More detailed costs, procedures and survey information should used for quantifying mining near old underground workings.

The approximate cost for mining recommended work amounts to $1 M.

21.3 Metallurgy and Processing

AMEC recommends completing the following tasks prior to finalizing a Feasibility Study:

- Collect representative samples across the deposit for metallurgical testing.
- Perform further gravity recoverable gold test work.
- Perform further regrind tests on flotation concentrate to optimize the grind recovery curve for this material.
- Conduct flotation pilot plant test work in order to confirm concentrate mass pulls. The bench scale results of the flotation test work revealed a 20% mass pull at a 1.5% sulphur feed grade. Confirming this criterion is critical for proper sizing and expected recovery determination.
- Determine further information on the gold and silver grade recovery relationship
- Assess the variability of gold, silver and sulphur throughout the deposit.
- Further test work should be carried out in the next phase (Phase 3) in order to optimize selection of the primary grind.

The above recommendations will be addressed in Northgate's Phase-3 test work, currently budgeted at $225,000.

21.4 Environmental Considerations

AMEC recommends the following:

- Continuation of the environmental approval process for long lead approvals as information becomes available, including provincial Environmental Assessments; and diligent tracking of other environmental approvals in relation to engineering and construction schedule.

- Continuation of public and First Nations consultation activities, working toward an Impact Benefit Agreement with the Matachewan First Nation in a timely manner.

21.5 Financial Analysis

AMEC recommends that Northgate models the Ag content of the YD resources in order to consider silver revenue stream in the project economic calculations.

22.0 DATE AND SIGNATURE PAGE

The undersigned prepared this technical report titled "Preliminary Economic Assessment NI 43-101 Technical Report on the Young Davidson Property, Matachewan, Canada". The effective date of this Technical report is 1 April 2008.

Signed,

"signed and sealed"

Pierre Rocque, P. Eng.	AMEC Americas Limited 2020 Winston Park Drive, Suite 700 Oakville Ontario, L6H 6X7 Canada

"signed and sealed"

Willie Hamilton, P. Eng.	AMEC Americas Limited 2020 Winston Park Drive, Suite 700 Oakville Ontario, L6H 6X7 Canada

"signed and sealed"

Rick Welyhorsky, P. Eng.	AMEC Americas Limited 2020 Winston Park Drive, Suite 700 Oakville Ontario, L6H 6X7 Canada

"signed and sealed"

Armando Simon, R.P.Geo (AIG)	AMEC Americas Limited 2020 Winston Park Drive, Suite 700 Oakville Ontario, L6H 6X7 Canada

"signed and sealed"

Sheila Daniel, P.Geo	AMEC Earth and Environmental 160 Traders Blvd East, Suite 110, Mississauga Ontario, L4Z 3K7 Canada

23.0 REFERENCES

AMEC Americas Limited. Technical Report TR-154842-110-001 – Process Study Comminution Options. January 10, 2008.

AMEC Americas Limited. Resource model Review – Lower Boundary Zone / Resource Model – Upper Boundary Zone & Open Pit Zone. July 25,2007.

Brisban, D., and Van Hees, E., 1982, Geochemical Survey, Matachewan Project, Pamour Porcupine Mines Limited Exploration Department Report: Ontario Geological Survey Assessment File Number KL2174.

Corfu and Andrews, 1986. A U-Pb Age for Mineralized Nipissing Diabase, Gowganda, Canadian Journal of Earth Sciences, v. 23, p. 107-109

Corfu, F., Krogh, T.E., Kwok, Y.Y., Marmont, S., and Jensen, L., 1989, U-Pb Zircon Geochronology in the Southwestern Abitibi Greenstone Belt, Superior Province, Canadian Journal of Earth Sciences 26, p. 1747-1763.

CIM, 2004. CIM Definition Standards on Mineral Resources and Reserves, Prepared by the CIM Standing Committee on Reserve Definitions.

Duuring, P.; Cassidy, K.F.; b and Hagemann, S.G., 2007. Granitoid-associated orogenic, intrusion-related, and porphyry style metal deposits in the Archean Yilgarn Craton, Western Australia. Ore Geology Reviews, Volume 32, Issues 1-2, September 2007, pp. 157-186 .

Duuring, P.; Hagemann, S.G.; and Groves, D.I., 2000. Structural setting, hydrothermal alteration, and gold mineralisation at the Archaean syenite-hosted Jupiter deposit, Yilgarn Craton, Western Australia. Mineralium Deposita 3 5: 402-421.

Derry, D.R., Hopper, C.H., and McGowan, H.S., 1948, Matachewan Consolidated Mine in Structural Geology of Canadian Ore Deposits: CIMM Jubilee Volume I, p 638-643.

Edmunds, Carl, 2008. Technical Report on the Underground Mineral Resource Estimates, Young-Davidson Property, Matachewan, Ontario. NI 43-101 Report filed on SEDAR.

Fairbairn, H. W., Hurley, P. M., Card, K. D., and Knight, C. J., 1969, Correlation of Radiometric Ages of Nipissing Diabase and Metasediments with Proterozoic Orogenic Events in Ontario, Canadian Journal of Earth Sciences, v. 6, p. 489-497.

Golder Associates, 1996. Preliminary Slope Design for proposed Matachewan Open Pit, Report 961-1707, March 1996.

Heaman, L.M., 1988, A Precise U-Pb Zircon Age for a Hearst Dyke, Geological Association of Canada V13:A53.

J.R. Goode and Associates. Young-Davidson Project – Interim Assessment of Metallurgical Data. May 16, 2007

Knight Piesold 2006. Northgate Minerals Corporation, Young-Davidson Project, 2006 Environmental Studies. Ref. No. NB102-00255/1-5. January 26, 2007.

Knight Piesold, 2006; Northgate Minerals, 2006; Royal Oak Mines, 1997; Royal Oak Mines, 2008).

Konst, Ron, 2008a. Matachewan Gold Project 2006-2007 Drilling Program Sample Preparation and Analytical Quality Assurance Protocols. Internal document prepared for Northgate Minerals Corporation.

Konst, Ron, 2008b. QA/QC 2007 Summary. Internal document prepared for Northgate Minerals Corporation.

Konst, Ron, 2008c. Subject: QA/QC data. E-mail addressed to Armando Simon on 22 May 2008.

Lucas, Katie, 2007. Memorandum on 2007 Titan Survey Results. Internal report prepared by Northgate Minerals Corporation, 5 June 2007.

Lucas, Katie, 2008. Report on the 2007 Geological Mapping on the Young-Davidson Property. Internal report prepared by Northgate Minerals Corporation, February 2008.

Lambert, Gérard, 2002a, 1519864 Ontario Limited, Kirnova Management, Matachewan Property, Powell and Cairo Townships, N.E. Ontario, Matachewan area, N.T.S. 41P/15, Long 80 40'W, Lat 47 57'N, Report on Induced polarization Surveys, September 30, 2002, p.13, appended pseudo-sections and 2 plans scale 1"=400ft: Unpublished Internal Company Document.

Lambert, Gérard, 2002b, 1519864 Ontario Limited, Kirnova Management, Matachewan Property, Powell and Cairo Townships, N.E. Ontario, Matachewan area, N.t.S. 41P/15, Long 80 40'W, Lat 47 57'N, Report on Induced polarization surveys (Phase II), December 9, 2002, p.13, , appended pseudo-sections and 2 plans scale 1"=400ft:Unpublished Internal Company Document.

Lovell, H.L., 1967, Geology of the Matachewan Area: ODM Geological Report 51, 55 p.

MERQ–OGS, 1983, Lithostratigraphic map of the Abitibi Subprovince: Ontario Geological Survey / Ministère de l'Énergie et des Ressources, Québec, Map 2484/ DV83-16 Scale 1:500 000.

Micon, 2004, Technical Report on the Mineral Resource Estimate for the Matachewan Property Powell, Cairo & Yarrow Townships Larder Lake Mining Division, Ontario, Canada. Project NTS 41 P/15. NI 43-101 Technical Report prepared by Micon International Limited for Northgate Mineral Corporation, August 2004.

Mueller, A.G.; Hall, G.C.; Nemchin, A.A.; Stein, H.J.; Creaser, R.A.; and Mason, D.R., 2008. Archean high-Mg monzodiorite–syenite, epidote skarn, and biotite–sericite gold lodes in the Granny Smith–Wallaby district, Australia: U–Pb and Re–Os chronometry of two intrusion-related hydrothermal systems. Mineralium Deposita, Volume 43, Number 3, pp. 337-362.PGI, 2003.

Northgate Minerals. Advanced Exploration Amended Closure Plan, Prepared by Knight Piesold Ltd. for Northgate Minerals. Ref. No. NB102-00255/1-1. August 1, 2006.

Northgate Minerals. Matachewan Consolidated Property – Royalty Agreement, June 2000.

Northgate Minerals. Welsh Property – Royalty Agreement, 1986.

Northgate Minerals 2006. Advanced Exploration Amended Closure Plan, Prepared by Knight Piesold Ltd. for Northgate Minerals. Ref. No. NB102-00255/1-1. August 1, 2006.

Northgate Minerals Corporation, Project Alex Property, Property Interests and Royalty Agreement - Matachewan Consolidated Property, Royalty Agreement between Pamour Porcupine Mines Limited and Matachewan Consolidated Mines Limited. Dated June 1,1979 and amended on July 9, 1981, December 13, 1984 and April 27,1988 and extended on June 13, 2000.

Northgate Minerals Corporation, Project Alex Property, Property Interests and Royalty Agreement - Welsh Property, Royalty Agreement between Pamour Porcupine Mines Limited and George S. Welsh. Dated April 26, 1979 and amended on March 11, 1986.

Outotec. TH-0418-08 High Rate Thickening of a Flotation Concentrate and Tailings. January 2008.

Powell, W.G., Kilbourne, M.W., and Hodgson, C.J., 1991, Gold-Related Geology of the Matachewan Camp in Archean Gold Deposits of the Matachewan-Kirkland Lake-Larder Lake Area: Soc. Econ. Geol. Guidebook series, Volume 2, Lovell, H.L., Robinson, D.R., and Guindon, D.L., eds., p 72-88.

Quantec, 2007. Geophysical Survey Logistics Report Regarding Regarding the Quantec TITAN-24 Distributed Acquisition System TENSOR MT and DCIP Surveys over the Young Davidson Project, Matachewan, ON. Internal report pepared by Quantec Geoscience Ltd. For Northgate Minerals Corporation, March - April 2007, Project CA486T.

Robert, Francois, 2004. Syenite-associated disseminated gold deposits in the Abitibi greenstone belt, Canada. Mineralium Deposita, Volume 36, Number 6 / September, 2001.

Royal Oak Mines 1997. Matachewan Project Comprehensive Study Report and Environmental Impact Statement, Volumes I to 3.

Royal Oak Mines 1998. Matachewan Project Comprehensive Study Report.

SRK, 2006. Scoping Study Report on the Young-Davidson Gold Project, Ontario.

Salvi and Williams-Jones (2004). The origin of alkaline granite-syenite hosted deposits. In: Bob Linen (ed.), Rare-Element Geochemistry and Mineral Deposits. Short Course Report, The University of Waterloo, October 2004.

SWRPA, 2007. Technical Report of the Lower Boundary Zone, LuckyZone, and Lower YD Zone Mineral Resource Estimates, Young-Davidson Property, Mathewan, Ontario. NI 43-101 report prepared by Scott Wilson Roscoe Postle Associates Inc. for Northgate Minerals Corporation, January 12, 2007.

SGS Lakefield (2007). The Recovery of Gold from Samples from the Young Davidson Property - Project 11497-001, Final Report. November 30, 2007.