

# NI 43-101 Technical Report Preliminary Economic Assessment Zgounder Silver Deposit Kingdom of Morocco <u>Final Report</u>



# Prepared for Maya Gold & Silver Inc.

Prepared by:
Claude Duplessis, Eng., Goldminds Geoservices Inc.
Gaston Gagnon, Eng., SGS Canada Inc.
Gilbert Rousseau, Eng., SGS Canada Inc.
Jonathan Gagné, Eng., MBA., SGS Canada Inc.
Effective date: January 10, 2014
Issue date: March 19, 2014









**Claude Duplessis, Eng**. - GoldMinds Geoservices Inc. 2999 Chemin Sainte-Foy, suite 200, Québec, Qc Canada G1X 1P7

To accompany the Report entitled: "NI 43-101 Technical Report Preliminary Economic Assessment Zgounder Silver Deposit Kingdom of Morocco" dated March 18, 2014 with effective date of January 10, 2014 (the "Technical Report").

# I, Claude Duplessis, Eng., do hereby certify that:

- a) I am a graduate from the University of Quebec in Chicoutimi, Quebec in 1988 with a B.Sc. in geological engineering and I have practised my profession continuously since that time;
- b) I am a registered member of the Ordre des ingénieurs du Québec (Registration Number 45523). I am also a registered engineer in the province of Alberta and Newfoundland & Labrador. I am a Member of the Canadian Institute of Mining, Metallurgy and Petroleum. I am a Senior Engineer and Consultant of SGS Canada Inc.;
- c) I have worked as an engineer for a total of 25 years since my graduation. My relevant experience for the purpose of the Technical Report is over 20 years of consulting in the field of Mineral Resource estimation, orebody modelling, mineral resource auditing and geotechnical engineering;
- d) I have prepared and written the technical report, I am responsible of sections: 4, 5, 6, 7, 8, 9, 10, 11, 12, 14 and 23 in full while co-author on section 1, 2, 3, 25, 26 and 27. I have personally visited the site of the Zgounder Silver Deposit property from June 3 to June 10, 2013.
- e) I am independent of the issuer as defined in section 1.5 of NI 43-101("The Instrument");
- f) I have read the definition of "qualified person" set out in the National Instrument 43-101 and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfil the requirements to be an independent qualified person for the purposes of NI 43-101.
- g) I have read NI 43-101 and Form 43-101F1 and have prepared the technical report in compliance with NI 43-101 and Form 43-101F1; and have prepared the report in conformity with generally accepted Canadian mining industry practice, and 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.
- h) I have no personal knowledge as of the date of this certificate of any material fact or material change, which is not reflected in this report.

This 19th day of March 2014.

Original signed and sealed (Signed) "Claude Duplessis" Claude Duplessis Eng.
Senior Geological Engineer GoldMinds Geoservices Inc





# Gaston Gagnon, Eng.

gaston.gagnon@sgs.com

I, Gaston Gagnon, Eng. of Saint-Eustache, Quebec, do hereby certify:

- a) I am a Senior Mining Engineer with SGS Canada Inc. Geostat with an office at 10 Boul. de la Seigneurie Est, Suite 203, Blainville, Quebec, Canada, J7C 3V5.
- b) This certificate applies to the technical report entitled Preliminary Economical Assessment (PEA) Zgounder Silver Deposit, Kingdom of Morocco, Maya Gold & Silver Inc., Quebec, dated January 10, 2014 (the "Technical Report")
- c) I am a graduate of the University of Laval in Quebec City (B.Sc. Mining Engineering, 1964). I am a member of good standing (#15918) of the l'Ordre des Ingénieurs du Québec (Order of Engineers of Quebec). My relevant experience includes over 40 years of experience in mining minerals in underground and surface producers, processing mainly gold, silver, copper, zinc, aggregates and niobium. Experience also includes 5 years of consulting for several mining projects under development. EPCM experience covers scoping (now PEA) studies and prefeasibility studies, detailed economic estimation and construction management in Canada, Africa, Mexico, South America and Saudi Arabia. I am a "Qualified Person" for purposes of National Instrument 43-101 (the "Instrument").
- d) I first visited the property on January 18-19 in 2011, and made a second visit from April 05 to April 12, 2013.
- e) I am responsible of Sections 15, 16, 19, 20, 21, 22 and 24, and I am co-author of Sections 1, 2, 3, 18, 25, 26 and 27 of the Technical Report.
- f) I am independent of Maya Gold & Silver Inc. as defined by Section 1.5 of the Instrument.
- g) I have no prior involvement with the property that is the subject of the Technical Report.
- h) I have read the Instrument, and the sections of the Technical Report that I am responsible for have been prepared in compliance with the Instrument.
- i) As of the effective date of the Technical Report, to the best of my knowledge, information, and belief, the Technical Report, or part that I am responsible for, contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Signed and dated this 19th day of March 2014 at Blainville, Quebec.

"Original document signed and sealed <u>by Gaston Gagnon, Eng"</u> Gaston Gagnon. Eng Senior Mining Engineer SGS Canada Inc. - Geostat





# Gilbert Rousseau, Eng.

gilbert.rousseau@sgs.com

I, Gilbert Rousseau B Sc.A, Eng., of Ville de Saguenay, Province of Quebec, do hereby certify:

- a) I am a Senior Mining-Metallurgical Engineer with SGS Canada Inc., with a business address at 10 Boul. de la Seigneurie, Blainville, Quebec, J7C 3V5.
- b) This certificate applies to the Technical Report entitled, Preliminary Economical Assessment (PEA) Zgounder Silver Deposit, Kingdom of Morocco, Maya Gold & Silver Inc., Quebec, dated January 10, 2014 (the "Technical Report).
- c) I graduated from The Ecole Polytechnique of the University of Montreal (B.Sc.A, Mining Engineer in 1969). I am a member in good standing of the "l'Ordre des Ingénieurs du Québec" #20288). My relevant experience includes more than 40 years of experience in the mining and milling of minerals including iron, copper, lead, zinc, silver, gold, asbestos, graphite, nickel, silica, etc. I am a "Qualified Person" for the purposes of National Instrument 43-101 (the "Instrument").
- d) I visited the property on January 18 and 19, 2011.
- e) I am responsible for Sections 13 and 17 of the Technical Report, and I am co-author of Sections 1, 2, 3, 18, 25, 26 and 27 of the Technical Report.
- f) I am independent of Mine Arnaud Inc., as defined by Section 1.5 of the Instrument.
- g) I have no prior involvement with the property that is the subject of the Technical Report.
- h) I have read the Instrument and the sections of the report that I am responsible. These sections have been prepared in compliance with the Instrument.
- i) As of the effective date of the Technical Report, to the best of my knowledge, information and belief, the sections of the report for which I am responsible for, contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Signed and dated this 19th day of March 2014 at Blainville, Quebec.

"Original document signed and sealed by Gilbert Rousseau, Eng"
Gilbert Rousseau, Eng.
SGS Canada Inc. – Geostat





# Jonathan Gagné, Eng., MBA

## jonathan.gagne@sgs.com

I, Jonathan Gagné, Eng., do hereby certify:

- a) I am a Mining Engineer with SGS Canada Inc. Geostat with an office at 10 Boul. de la Seigneurie Est, Suite 203, Blainville, Quebec, Canada, J7C 3V5.
- b) This certificate applies to the Technical Report entitled Preliminary Economical Assessment (PEA) Zgounder Silver Deposit, Kingdom of Morocco, Maya Gold & Silver Inc., Quebec, dated January 10, 2014 (the "Technical Report")
- c) I am a graduate of the École Polytechnique de Montréal (B.Sc. Mining Engineer, in 2007). I am a member of good standing, No. 146075, of the l'Ordre des Ingénieurs du Québec (Order of Engineers of Quebec). My relevant experience includes working as a mine planning engineer for a gold mining company and working as a consulting engineer to evaluate the potential of various mining projects. I am a "Qualified Person" for purposes of National Instrument 43-101 (the "Instrument").
- d) I did not visit the property.
- e) I am co-author of Sections 16, 21 and 22 of the Technical Report.
- f) I am independent of Maya Gold & Silver Inc., as defined by Section 1.5 of the Instrument.
- g) I have no prior involvement with the property that is the subject of the Technical Report.
- h) I have read the Instrument and the sections of the Technical Report that I am responsible for have been prepared in compliance with the Instrument.
- i) As of the effective date of the Technical Report, to the best of my knowledge, information, and belief, the parts of the Technical Report that I am responsible for, contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Signed and dated this 19th day of March 2014, at Blainville, Quebec.

"Original document signed and sealed by Jonathan Gagné, Eng., MBA"

Jonathan Gagné, Eng., MBA

Mining Engineer SGS Canada Inc. - Geostat





# Table of Contents

Foreword	25
1 Summary	26
1.1 General	26
1.2 Property Description and Ownership	26
1.3 Geology and Mineralization	26
1.4 Exploration	27
1.5 Mineral Processing and Metallurgical Testing	27
1.6 Mineral Resource Estimates	28
1.7 Mining Method and Planning	28
1.8 Mineral Reserve Estimates	29
1.9 Environment	29
1.9.1 General	29
1.9.2 Permits	30
1.10 Project Infrastructures	30
1.11 Capital and Operating Costs	30
1.11.1 Capital Cost Estimate	30
1.11.2 Operating Cost Estimate	31
1.12 Economic Analysis	31
1.13 Other Relevant Data and Information	33
1.14 Conclusions and Recommendations	33
2 Introduction	34
2.1 Terms of Reference – Scope of Work	34
2.2 Personal inspection on the property by each Qualified Person	35
2.3 Units and Currency	36
3 Reliance on Other Experts	40





4 Pr	roperty Description and Location	42
4.1	Location	42
4.2	Property description	44
4.3	Mineral rights and other permits	44
4.4	Royalties	45
5 A	ccessibility, Climate, Local Resources, Infrastructure and Physiography	40
5.1	Accessibility	40
5.2	Climate	40
5.3	Local resources	48
5.4	Infrastructure	48
5.5	Physiography	55
6 H	listory	50
6.1	The ancient works (medieval period)	50
6.2	The SNAM-BRGM period (1955 – 1979)	58
6.3	The Somil period (1982 – 1990)	58
6.4	The BRPM period (1989 – 1999)	60
6.5	The CMT period (2002 – 2004)	63
6.6	The Maya Gold and Silver period	60
6.7	Previous resource estimates	60
6.	7.1 BRPM/ICELANDIC	60
6.	.7.2 CMT 2004	69
7 G	Geological setting	72
7.1	Regional geology	72
7.2	Property Geology	73
7.3	Mineralization	70
8 D	Penosit Types	78





9 Ex	ploration	79
9.1	Underground exploration and sampling	79
9.2	3D laser scanning survey	86
10 I	Drilling	94
10.1	Percussion drilling campaign 2013	94
11 S	Sample Preparation, Analysis and Security	101
11.1	Sample preparation at the laboratory	106
11.2	Quality Assurance/Quality Control (QA/QC) program	106
11.3	Security	107
12 I	Data Verification	108
12.1	The independent analytical program	108
12.2	The database	108
12.	2.1 The historical database	108
12.	2.2 Goldminds Geoservices Database (2013 percussion drill campaign)	110
12.3	Independent sampling – 2013 personal inspection	110
13 N	Mineral Processing and Metallurgical Testing	114
13.1	Introduction	114
13.2	Mineral Processing and Metallurgical Testing	115
13.	2.1 Ancient Tailings (Lot 3) Testwork	115
13.	2.2 Underground Mineralized Material (Lot 4) Testwork	116
13.	2.3 Bureau de Recherches Géologiques et Minières (BRGM) Testwork	116
13.	2.4 BRGM Testwork	117
13.	2.5 Disclaimer	121
13.3	Mill Historical Performance	121
13.4	Environment	121
13.5	Conclusion	121





14	Mineral Resource Estimates	123
14.	1 Summary	123
14.	2 Introduction	124
14.	3 Data	124
14.	4 Capping & Compositing	128
14.	5 Specific Gravity	132
14.	.6 Geological Interpretation	132
14.	7 The block models	134
1	14.7.1 The Envelopes	134
1	14.7.2 Block Model definition	142
1	14.7.3 Search ellipsoid & interpolation parameters	143
1	14.7.4 Mineral Resource Classification	144
1	14.7.5 Removal of mined out areas	145
1	14.7.6 Block models	147
1	14.7.7 Mineral Resource Estimation	149
1	14.7.8 The Panels	151
1	14.7.9 Discussion & Risk	160
15	Reserves	161
16	Mining Methods	162
16.	1 Introduction	162
16.	2 Geotechnical and Hydrological Parameters	162
16.	3 Existing Stopes	163
16.	4 Proposed Mining Methods	163
1	16.4.1 Avoca Mining Method	163
1	16.4.2 Shrinkage Method	165
16.	.5 Production Rates, Life of Mine and Mining Dilution	160





16.6	Mining Developments	166
16.6.	1 Underground Mining Equipment	167
16.6.	2 Mine Ventilation	167
16.6.	3 Manpower	167
17 Re	covery Methods	169
17.1	Process Description	169
17.2	Crushing	169
17.3	Milling	169
17.4	Leaching and Counter-Current Decantation	170
17.5	Silver Recovery and Smelting	171
17.6	Cyanide Destruction	171
17.7	Tailings	171
17.8	Services	172
17.8.	1 Water	172
17.8.	2 Electrical Power	172
17.9	Laboratories	172
17.10	Mill Operating Costs (OPEX)	172
17.10	0.1 Consumables (grinding media, fuel oil, lubricants and chemical reagents)	173
17.10	0.2 Spare Parts	173
17.10	0.3 Electrical Power	174
17.10	0.4 Manpower and salaries	174
17.10	0.5 Instrumentation and Process Monitoring	175
17.11	Mill Construction Cost (CAPEX)	176
17.12	Mill Preproduction Costs	176
17.13	Mill Sustaining Capital Expenditures	176
18 Pro	piect Infrastructures	177



Page 12





18.	.1	Zgounder Mine Site and Access Road	177
18.	.2	Major On-Site Infrastructures	177
1	18.2.1	Electrical Energy	177
1	18.2.2	Compressed Air	177
1	18.2.3	Repair Shop and Warehouse	178
1	18.2.4	Explosive Magazines	178
1	18.2.5	On-Site Roads	178
1	18.2.6	Concentrator	178
19	Maı	kets Studies and Contracts	179
20	Env	vironmental Studies, Permitting, and Social or Community Impact	180
20.	.1	Summary	180
20.	.2	Introduction	182
2	20.2.1	General	182
20.	.3	Chapter 1 - Overview of the Project	183
20.	.4	Chapter 2 - Analysis of the Legislative and Regulatory Framework	183
20.	.5	Chapter 3 - Natural Environment	186
20.	.6	Chapter 4 - Characterization of Current Status of the Project Environment	187
20.	.7	Chapter 5 - Project Description	190
20.	.8	Chapter 6 - Environmental Impact Assessment	191
20.	.9	Chapter 7 - Mitigations Impact	191
20.	.10	Chapter 8 - Monitoring Plan	191
20.	.11	Chapter 9 - Guidelines for Mine Site Restoration	193
21	Cap	ital and Operating Costs	196
21.	.1	Capital Costs	196
21.	.2	Surface Capex	196
21	3	Concentrator Capex Summary	197





Technical Report - Preliminary Economic Assessment - Zgounder silver deposit, Kingdom of Morocco	Page 13
21.4 Underground Mine Capex	198
21.5 Sustaining & Working Capital	199
21.6 Rehabilitation and Mine Closure	199
21.7 Operating Costs	200
21.7.1 Salaries	200
21.8 Development Costs	200
21.8.1 Mine Development and Stope Preparation in Waste	201
21.9 Direct Mining Costs	203
21.9.1 Stope Preparation Costs	204
21.9.2 Drill and Blast Cost	204
21.9.3 LHD's (Scoops) Mucking Cost	204
21.9.4 Trucking Cost	205
21.9.5 Rock Support Cost	205
21.9.6 General Mining Services	205
21.9.7 Energy Cost	206
21.9.8 Direct Underground Mine Supervision	207
21.10 General and Administration Expenses (G&A)	207
21.10.1 Cost of Administration Staff	207
21.10.2 Cost of General Expenses	208
22 Economic Analysis	210
22.1 Introduction	210
22.2 ONHYM Royalty	210
22.3 Glowat Royalty	210
22.4 ONHYM Participation	210
22.5 Assumptions	210
22.6 Taxation	211



Technical Report - Preliminary Economic Assessment - Zgounder silver deposit, Kingdom of Morocco	
22.7 Technical Assumptions	211
22.8 Financial Results	212
22.8.1 Cash Flow Statement	212
22.8.2 Sensitivity Analysis	214
23 Adjacent Properties	215
24 Other Relevant Data and Information	216
25 Interpretation and Conclusions	218
25.1 Mining	218
25.2 Process	218
25.3 General	218
26 Recommendations	220
26.1 Drilling	220
26.2 Survey	220
26.3 Development and Mining	221
26.4 Processing	221
26.5 Exploration	222
27 References	223





# List of Tables

Table 1: List of abbreviations	36
Table 2: CMT exploration programs from 2002 to 2004 (CMT final report, 2004)	63
Table 3: Summary of CMT underground workings from 2002 to 2004 (CMT final report	, 2004)64
Table 4: The distribution of various SOMIL reserve blocks (taken from the A International report, 1999)	
Table 5: Technical data	86
Table 6: Types of historical data	109
Table 7: ALS fire assay values of independent samples and respective duplicates	111
Table 8: Independent rock samples taken from the eastern area of the 2000 level	112
Table 9: Zgounder silver Base Case (>125 g/t) Resource Estimates (23 blocks + 67 pane	els)*123
Table 10: Zgounder silver deposit Base Case Resource Estimates (blocks only) *	123
Table 11: Zgounder silver deposit Base Case Resource Estimates (panels only) *	123
Table 12: Statistics of all silver assay results	130
Table 13: Block grid parameters	142
Table 14: Search ellipsoid list	143
Table 15: List of actions link to retagged	144
Table 16: Resources detailed with original numbers not rounded	149
Table 17: Zgounder silver deposit Base Case (>125 g/t) Resource Estimates (blocks + p	vanels) *.150
Table 18: Zgounder silver deposit Base Case Resource Estimates (23 BM blocks only) *	150
Table 19: Zgounder silver deposit Base Case Resource Estimates (67 panels only) *	150
Table 20: Details of indicated panels (19) used for the resource estimation, Zgounder sil	lver mine152
Table 21: Details of inferred panels (52 panels in total and 48 panels ≥125g/t Ag) u resource estimation, Zgounder silver mine	
Table 22: Waste Developments	166
Table 23: Estimated Manpower	168
Table 24: Mill operation cost at 200 and 300 tod	173



Technical Report – Preliminary Economic Assessment - Zgounder silver deposit, Kingdom of Morocco	Page 1
Table 25: Manpower-hours and wages	175
Table 26: Outline of costs prior to recommencing operations	170
Table 27: Mill pre-production costs based on 200 tpd	170
Table 28: Estimated Power Requirement	177
Table 29: Mine Compressed Air Requirement	178
Table 30: Water sampling coordinates and their identification	187
Table 31: Capex Summary	190
Table 32: Surface Capex Summary	197
Table 33: Concentrator Capex Summary	198
Table 34: Underground Mine Capex Summary	199
Table 35: Salaries at Zgounder Project	200
Table 36: Unit Development Costs	201
Table 37 Summary of Total Waste Developments	201
Table 38: Summary of waste development from 2,200 m to 2,000 m levels	202
Table 39: Summary of waste development from the 2,000 m to 1,925 m level	203
Table 40: Unit Mining Costs (200tpd)	203
Table 41: Unit Mining Costs (300tpd)	202
Table 42: General Mine Services (200tpd)	205
Table 43: General Mine Services (300tpd)	200
Table 44: Electrical Underground Requirements	200
Table 45: Power Cost	200
Table 46: Mine Supervision at 200tpd	207
Table 47: Mine Supervision at 300tpd	207
Table 48: Summary of G&A Costs	207
Table 49: Summary of Administration Personnel Cost	208
Table 50: General Evpenses	200





Technical Report – Preliminary Economic Assessment - Zgounder silver deposit, Kingdom of Morocco	Page 17
Table 51: Small Vehicles	209
Table 52: Service Vehicles	209
Table 53: Economic Parameters and Assumptions	211
Table 54: Technical Assumptions	211
Table 55: Economic Evaluation Summary – Base Case	212
Table 56: Cash Flow Model	213
Table 57: Sensitivity Analysis Results	214



SGS



# List of Figures

Figure 1: Location of Zgounder between Agadir and Ouarzazate (sourced Google Earth)42
Figure 2: Location and access to the Zgounder silver mine (sourced from Google Earth)43
Figure 3: The Zgounder silver mine site (sourced from Google Earth)
Figure 4: Property mining permit limits of Zgounder silver mine (image provided by Goulex)44
Figure 5: Location of the Zgounder mine with respect to Agadir (sourced from Google Maps)40
Figure 6: Average monthly precipitation and temperatures at Askaoun (climatdata.org)47
Figure 7: Average monthly temperatures at Askaoun village (climatedata.org)
Figure 8: Variations of monthly precipitation & temperatures for Askaoun (climatedata.org)48
Figure 9: A) Paved road from Taliouine to Askaoun. B) The gravel road on site from Askaoun49
Figure 10: Broadening the gravel trail from level 2000 to 2175 at Zgounder silver mine
Figure 11: A) Several bridges (yellow arrows) being constructed close to the entrance of the 2000 m level (white arrow). B) A close up of bridge construction. C) & D) Bridges being built on the road connecting the Zgounder mine to the village of Askaoun
Figure 12: A-B) The mining crew houses with the snowy Siroua massif visible in the background (April 2013). C) The office at the Zgounder site. D) A core shack used for the preparation and archiving of the drilling samples (cuttings and core samples). E) The mine entrance at level 2000. F) The trail linking the entrance of level 2000 to 2100, 2125 and 2150 m
Figure 13: A general view looking west of the Zgounder mill installations showing the conveyor belts (yellow arrows), storage bins with crushers (white arrows), two cyanidation lines with counter-current decantation (blue arrows) and diesel generators (black arrow)
Figure 14: The Zgounder River (arrow) flowing through the property
Figure 15: View of the cyanide leaching tanks & counter-current decantation thickeners54
Figure 16: A) Conveyors (yellow arrows) and the storage bins with crushers at the base (white arrows). B) A close-up view of the secondary crusher (white arrow)
Figure 17: A) Hills of moderate elevation and sparse vegetation. B) A cultivated valley between Taliouine and Askaoun, flanked by moderately steep hills
Figure 18: A) Ancient mining excavations (arrows) oriented generally N-S. B) A close-up view of arrancient excavation from the surface. C) An underground adit cross-cutting an old excavation (arrows)





Figure 19: A) A granite wheel used in the medieval period to reduce the size of extracted mineralized rocks. B) Scories (the remainders of molten metal) found at the surface, close to the entrance of level 2100 m at the Zgounder mine
Figure 20: A longitudinal view of the western sector by CMT displaying the ancient excavation areas at the Zgounder silver mine
Figure 21: A) A view looking to the east showing the entrance of the 2000 and 2025 adits, a network of water pipes and several bridges were in construction at the time of this photo. B) The entrance of the 2000 level before recent modifications. C) An ancient wagon on the mine railway at the 2000 level
Figure 22: A longitudinal section of the Zgounder mine levels from 1925 to 2175 m using a constant elevation (z) for each level (adits digitalized by Goulex from Somil and CMT mine plans)60
Figure 23: Southward view of oxidized mine waste dump resulting from the ancient mine working at the Zgounder silver mine
Figure 24: A) The location of the mine waste dump at the Zgounder silver mine (sourced from Google Earth). B) The location of samples collected by BRPM from the mine waste dump62
Figure 25: Surface exploration diamond drillholes (DDHS) on Zgounder property (XY plan, the topo surface is green)
Figure 26: Surface exploration diamond drillholes (DDHS) on Zgounder property (XZ plan, the topo surface is green)
Figure 27: Tailing behind the old dam
Figure 28: View of the old tailings dam, looking north
Figure 29: Northeast view of the recent tailings dam69
Figure 30: Comparison of CMT reserve* between 2002 and 2003
Figure 31: Regional geology of the Anti-Atlas displaying proterozoic windows hosting numerous polymetallic deposits including the Zgounder silver mine (AG, 2004)72
Figure 32: A) Geology, structure, and silver mineralization of the Zgounder mine. The trace of five principal adits and the ancient excavations can also be seen; B) Stratigraphy of the Zgounder volcanosedimentary assemblage with the silver-mineralized zones
Figure 33: A) Typical NNE-SSW cross section through the Zgounder mine showing the relation between the silver mineralized zones and the lithology; B) Distribution of silver mineralization in the central and northern parts of the mine stereogram and rose diagram representing the faults in this part (after a map established by Popov, Millar & Fettouhi, 1985, scale 1/500)75
Figure 34: Paragenetic sequence of Zgounder deposit (From Marcoux & Wadiinny 2005)





Figure 35: A) A large E-W shear zone with fractures filled by galena (arrows); an independent sample was taken from this structure (rock sample 3, table 8). B) Fractures filled by quartz/carbonates (yellow arrow) with arsenopyrite, erythryte (white arrow) and sulphide (black
arrow)
Figure 36: A) Quartz/carbonate stockwork (black arrow) with small pockets of galena and sphalerite (yellow arrows), often within pyrite and arsenopyrite. B) A sub-vertical fault filled with argillaceous material containing disseminated sulphides (arrows).
Figure 37: A) A shear zone with quartz, finely disseminated sulphides, and chlorite. B) A fault plane with quartz/carbonate cement hosting galena (white arrow) and sphalerite (yellow arrow) 80
Figure 38: A) Fine veinlets with native silver associated with galena, sphalerite and sulphide. B)  Native silver collected by GMG from various levels (2000, 2035E, 2075E and 2125) of the  Zgounder silver mine
Figure 39: Distribution of fractures/faults and samples collected by GMG at the 2000 level, Zgounder silver mine
Figure 40: Distribution of fractures/faults and samples collected by GMG at the 2035E level, Zgounder silver mine
Figure 41: Distribution of fractures/faults and samples collected by GMG at the 2050E level, Zgounder silver mine
Figure 42: Distribution of fractures/faults and samples collected by GMG at the 2075E level, Zgounder silver mine
Figure 43: Distribution of fractures/faults and samples collected by GMG at the 2100 level, Zgounder silver mine
Figure 44: Distribution of fractures/faults and samples collected by GMG at the 2125 level, Zgounder silver mine
Figure 45: Distribution of fractures/faults and samples collected by GMG at the 2150 level, Zgounder silver mine
Figure 46: The laser scanner used for the underground 3D monitoring survey
Figure 47: A) Cap Resource team and laser scanner (Faro Photon 120, arrow) with metal support before starting the scan of level 2100 at the Zgounder silver mine. B) Specific spheres (targets) used for scanning the adits
Figure 48: 3D laser scanner (Faro Focus <sup>3D</sup> S120) with a metal support scanning the 2075E stope88
Figure 49: Anchor points at the entrance of the 2000 level
Figure 50: A 3D underground laser scan of various levels and sublevels at Zgounder silver mine90





CMT plans9
Figure 52: Plan views of the 3D scans for the 2000 and 2100 levels9
Figure 53: Plan views of the 3D scans for the 2125 and 2150 levels9
Figure 54: Cross-sectional view of the east and west zones of the mine
Figure 55: Technominex Africa percussion drill team
Figure 56: T28 drill in eastern zone of 2000 level. The green bucket is collecting the cuttings9
Figure 57: YAK percussion drill on a steel frame at the entrance of the 2000 level9
Figure 58: Plan view of the percussion drillholes at the 2000 level
Figure 59: Twelve percussion holes drilled in the northern zone of the 2000 level with the highlight of the ALS fire assays.
Figure 60: Twenty four percussion holes drilled in the central zone of the 2000 level with the highlights of the ALS fire assays
Figure 61: Thirty seven percussion holes drilled in the eastern zone of the 2000 level with the highlights of the ALS fire assays
Figure 62: Twelve percussion holes drilled at the 2035E level with the highlights of the ALS fir assays
Figure 63: Percussion drill sampling protocol established by GMG at the Zgounder silver mine10
Figure 64: A) Composite samples taken after the drying process. B) Binocular microscopy used for petrographic analyses of select samples. C) Niton XL3t XRF used to analyze small samples (5g)
Figure 65: A) YAK sample (cuttings); the plastic bag on the left corresponds to a quarter of the cuttings prepared to be sent to ALS laboratory, the other plastic bag is kept in the core shack for archives. B) Percussion drill samples taken by the T28 drill hammer
Figure 66: A graph displaying the distribution of Ag concentrations of ½ versus ¼ of samples from YAK percussion drillhole ZP13-2000C-003
Figure 67: Comparison of XRF analyses on site and fire assay analyses by ALS. A,C) ALS and XR sample values from holes drilled by a T23 and T28 percussion drill. B,D) ALS and XRF sample values from holes drilled by a YAK percussion drill
Figure 68: Drift sampling method imposed by SOMIL
Figure 69: Percussion drill samples and respective duplicate fire assay values





Figure 70: Custom standards STDI and STDII and their duplicate analyses	113
Figure 71: Plan view of the all data of the Zgounder silver mine	126
Figure 72: Section of the Zgounder silver mine with the all drilling data	127
Figure 73: Cumulative frequency normal of all Ag silver assay results	128
Figure 74 Cumulative frequency Log of all Ag silver assay results	129
Figure 75 Histogram Log of all Ag silver assay results	129
Figure 76: Plan view and longitudinal with continuous high grade Ag values	131
Figure 77: Isometric view looking NNW with continuous high grade Ag values	132
Figure 78: Plan view of the mineralized envelopes at the Zgounder silver mine (northern, centra the eastern zone)	
Figure 79: Example of sub-level 2025 east sector with detail mapping by Somil.	135
Figure 80: Historical longitudinal view (graduations are 50m apart, source CMT)	136
Figure 81: Historical longitudinal view, mineralized zones in red, mined out in yellow (gradua are 50m apart, source CMT)	
Figure 82: Long view looking North of the mineralized envelopes at the Zgounder silver (northern, central and the eastern zone)	
Figure 83: Composite plan view of the mineralized envelopes at the northern part of the Zgou silver mine	
Figure 84: Composite plan view of the mineralized envelopes at the central part of the Zgou silver mine	
Figure 85: Isometric view of the mineralized envelopes at the Eastern part of the Zgounder mine	
Figure 86: A) Section showing stopes 2035E-2050E and 2050E-2075E; B) Vertical section tr the stopes between level 2035E and 2075E at the Zgounder silver mine	_
Figure 87: Block model view of Z2035A colour coded by silver grade	147
Figure 88: Example of block model Z2035A & Z2035C on level 2032 with openings	148
Figure 89: Localisation of indicated panels between level 2000 and 2150m at the Zgounder mine	
Figure 90: Localisation of inferred panels between level 1925 and 2150m at the Zgounder	silve1





Figure 91: Localisation of ressources panels at level 1925, Zgounder silver mine	156
Figure 92: Localisation of ressources panels at level 1950, Zgounder silver mine	156
Figure 93: Localisation of ressources panels at level 1975, Zgounder silver mine	157
Figure 94: Localisation of ressources panels at level 2000, Zgounder silver mine	157
Figure 95: Localisation of ressources panels at level 2035E, 2050E & 2075E, Zgounder mine	158
Figure 96: Localisation of ressources panels at level 2100, Zgounder silver mine	159
Figure 97: Localisation of ressources panels at level 2150, Zgounder silver mine	159
Figure 98: Avoca mining method - option 1	164
Figure 99: Avoca mining method - option 2	165
Figure 100: Silver charts of January and February 2014	179
Figure 101: Silver chart from 2000 to present	179
Figure 102: Water Sampling Locations done by Hydraumet in June 2013	188
Figure 103: Sensitivity Analysis (NPV)	214





# List of Appendices

Appendix 1: Flowsheets of the Concentrator	220
Appendix 2: Levels Plans showing the Primary Access Developments	227
Appendix 3: CD-ROM of Project Database	228





# **Foreword**

A special thanks to the underground workers at Zgounder who assisted GMG with independent drilling, occasionally in rehabilitated raises, adits and stopes under difficult conditions. A special thanks also to the Maya Moroccan team for their help and collaboration.





# 1 Summary

#### 1.1 General

The Zgounder Mine is a past producing silver mine located in the central Anti-Atlas Mountains in the Taroudant province, Morocco, approximately 265 km east of Agadir City. The mine is 85% owned by Maya Gold and Silver Inc. (Maya) and 15% by ONHYM.

In March 2013, Maya commissioned GoldMinds Geoservices Inc. (GMG) to do the first NI 43-101 compliant mineral resource estimation of the Zgounder project in order to recommence mining and exploitation. Resource calculation was performed using historical data and GMG independent drilling results. The 2013 underground percussion drilling campaign at Zgounder was prepared and supervised by GMG. Laser scanning of the underground openings was also performed.

In February 2014, Maya changed the scope of work to involve a Preliminary Economic Assessment (PEA) and hired the SGS Canada Inc. Geostat Office (SGS Geostat) to work in tandem with GMG and provide an evaluation of the preliminary metallurgical testing, mine design, and economical study.

Maya publically disclosed the results of the mineral resource estimate in its February 19, 2014 press release.

# 1.2 Property Description and Ownership

The Zgounder property covers an area of 16 km<sup>2</sup> (4 km x 4 km). In 2012, Maya and the "Office National des Hydrocarbures et des Mines" (ONHYM) agreed to negotiate a convention in order for Maya to acquire 85% of the Zgounder Silver Deposit. ONHYM authorized Maya to prospect and exploit base and precious metals commencing on January 6<sup>th</sup>, 2012. The mining title number 09/2096 and exploitation license number 2306 provide surface rights and access to the property and allow any type of mining.

Maya has fulfill its commitment of the convention up to now, the 3<sup>rd</sup> payment is now due by May 1<sup>st</sup> 2014 as per extension given by ONHYM on a letter dated December 9<sup>th</sup> 2013.

# 1.3 Geology and Mineralization

The Zgounder silver deposit is located in the central Anti-Atlas on the NW flank of the Siroua massif. The Zgounder deposit is Late Neoproterozoic in age and is mainly composed of a volcano-sedimentary formation attributed to the Precambrian II (PII). The formation is intruded to the West by the Askaoun granodioritic massif (later Precambrian II-III). The geology of Zgounder was divided into three formations (Demange, 1997), two with a major clastic component intercalated with volcanics (identified as the 'blue' and 'brown' formations) overlain by an acid ignimbritic volcanic complex (the 'black formation').





The Zgounder deposit is described as a Neoproterozoic epithermal hypogene system and shares common characteristics (e.g. Age, Ag-Hg mineralization and epithermal-type model) with the giant Imiter silver deposit. The silver mineralization occurs at the top of the Brown Formation (sandstones), mainly at the contact and within a dolerite sill. The economic silver concentrations at Zgounder are found mainly as vertical columns, complex clusters, shear zones, veinlets and at the intersection of the E-W and N-S fractures located preferentially at the contact zone between schist and dolerite.

The origin of the Zgounder silver mineralization is Na-Ca brines and the main driving mechanisms for silver deposition are dilution and the cooling processes.

# 1.4 Exploration

Maya commenced a percussion drilling campaign in June 2013 at the request of GMG. Eighty-five (85) underground percussion holes were drilled at Zgounder mine totalling 1547 samples (1870.5 m). Samples from 69 holes were analyzed by fire assay at the ALS laboratory in Val-d'Or, Quebec, Canada, corresponding to a total of 1037 samples (excluding blanks and standards). Out of the 85 holes, 73 holes were drilled at the 2000 m level (24 holes in the central part, 37 holes in the eastern part, and 12 holes in the northern part) and 12 holes were drilled at the 2035E m level.

Out of the 69 holes sent for fire assay, 52 percussion drillholes intersected significant silver mineralization.

# 1.5 Mineral Processing and Metallurgical Testing

At the start-up of the mill operation, the feed rate is expected to be 200 tonnes per day, the feed grade approximately 360 g/t Ag, and the silver recovery will be at least in the same range as it was when the mill was in operation in the 80's, +/- 85%. Shortly after the mill start up and commissioning, the mill feed rate is planned to increase to 300 tpd. In this scenario, ball mills should be changed sequentially for larger autonomous units to avoid ceasing the milling operation.

In parallel with the increase of the feed rate, the mill upgrade scenario includes the addition of four larger leach tanks to the existing eight tanks. The new leaching time should be in the order of 48 hours compared to the actual 33 hours. The silver dissolution shall be in the +90% range. This new approach should permit an increase in the annual silver production from 647,030 ounces to 1,027,640 ounces.

Waste material will undergo cyanide destruction before deposition into the tailings pond. SGS is of the opinion that the most recent tailings pond has the capacity to store approximately 1,000,000 tonnes of new tailings or the equivalent of all tailings that will be produced during the next ten years of operation.





#### 1.6 Mineral Resource Estimates

The present NI 43-101 mineral resource estimates for the Zgounder Silver Mine is based on historical information and new analytical data sampled from the underground percussion drilling completed for validation and certification in 2013.

A total of 24 mineralized envelopes and 71 panels (small mineralized bodies) are modeled and used for in the resources estimation. Out of these panels and envelopes; 23 envelopes and 69 panels are above the base case cut-off grade of 125 g/t Ag used in the PEA. Most of these envelopes represent junctions of structures and stockworks which have a vertical elongated shape, whereas the remainder (panels) represent isolated high grade structures.

A total of 6,000,000 ounces of silver (540,000 tonnes averaging 343 g/t) corresponding to measured and indicated mineral resources at the Zgounder silver mine.

Base case measured resources total 1,400,000 ounces of silver (142,000 tonnes averaging 304 g/t), indicated resources are 4,600,000 ounces silver (400,000 tonnes averaging 357 g/t), inferred resources total 5,300,000 ounces of silver (353,000 tonnes averaging 463 g/t) using a cut-off grade of 125g/t Ag.

Capping of outliers at 6Kg/t Ag is applied to the whole Zgounder database. The silver mineralization at Zgounder occurs in complex sets of microfractures within sandstones (specific gravity between 2.00 and 2.6 gm/cc) and dolerite (specific gravity between 3 and 3.05 gm/cc). The density used to convert volumes into tonnage is 2.7 t/m³ which correspond to an average density between Sandstones/schists and Dolerites.

# 1.7 Mining Method and Planning

The resumption of underground mining at Zgounder will involve mineral production coming from stopes that were not completely mined out when Somil ceased production in 1990. Following that date, the "Compagnie Minière Touissit" (CMT) did underground geological exploration and extracted about 5,500 tonnes at a grade of 429 g/t Ag from the Zgounder mine, but there is no report of the processing of that material. CMT workings were terminated in 2004. It is then adequate to resume mining for the first years by using the same method as used by Somil, which was the open long hole with sub levels.

SGS recommends for the future the implementation of the Avoca mining method: a variation of long hole, to reduce waste developments, achieve better selectivity and reduced mining dilution.

The existing underground conditions are generally safe, considering the fact that all previous mining was performed without any permanent rock support. The large natural air circulation due to many adits connecting to surface will greatly help the air requirements for the new all diesel mining fleet consisting of 2 trucks with 8 tonne payload and 3 x LHD's with 1.5 m<sup>3</sup> bucket capacity. To make the best usage of these equipments, SGS recommends driving a service ramp from the 2,100 m level down the last existing level at elevation 1,925 m.





#### 1.8 Mineral Reserve Estimates

In this PEA study there is no reserves.

#### 1.9 Environment

#### 1.9.1 General

The Hydraumet study (2013) was realized to assess the environmental and social impacts of the resumption of the Zgounder silver mine project. For the nearby population of Askaoun this project will provide many social and economic benefits to the community, mainly:

- Increasing the income of the rural village.
- Creating dynamic development of the Askaoun region.
- Reinforcing employment by creating new direct jobs (estimated to be around 150).
- Participation in the important mining sector of Morocco.
- Creation of small to medium sized enterprises providing services.

However, the project is likely to have some impacts on the mining area that will call for mitigation measures to ensure a Sustainable Development.

The identified items that could cause negative impacts are mainly those related to the water and air quality. The Zgounder mine has been operating from 1982 to 1990 and was relying on cyanide leaching process to recover the silver metal. Two tailings sites are present, and the Hydraumet analytical results indicate the presence of remaining cyanide that could be harmful. We recall that, to the contrary of the majority of recent cyanidation processing plants, the Zgounder first concentrator circuit was not designed to destroy the free cyanide left in the tailings\*.

Hydraumet recommendations are proposed to offset the negative impacts of cyanide and all other identified polluting elements. SGS Geostat agrees with the majority of these recommendations.

In addition to those proposed by Hydraumet, SGS Geostat proposes the following recommendations:

- \* Install a cyanide destruction circuit at the concentrator.
- Collect samples at depth within the tailings ponds to verify the cyanide content.
- Reprocess the old tailings to eliminate the cyanide.
- Add lime to the mill tailings to raise the pH and precipitate the heavy metals directly in the tailings pond.
- Install a basic heat transfer system (condenser) to recover all the mercury fumes from the mercury exhaustion static oven.

SGS Geostat agrees with the proposed Maya procedure to neutralize the possible cyanide outflows from the recent tailings, by covering them with an impervious membrane and bypassing the incoming surface running waters.





## 1.9.2 **Permits**

According to Hydraumet, four (4) permits are required for the Zgounder project, they are:

#### 1- Land Title

The land title No.09/2096 has been provided by the Mining Department Rabat. An operation of this land title agreement (leased) must be filed on behalf of the petitioner.

# 2- Operating License by Administrative Authorities

ONHYM delivered to Maya an operating license No. 2306 including prospecting license. This license also provides surface rights and access to the property and allows any type of mining.

# 3- Building Permits

All the necessary premises for the operation of the mine already exist on the site. They will undergo upgrades to improve working and living conditions. New buildings will require permits provided by the Municipality in accordance with regulations governing the planning.

# 4- Authorizations for use of public water

All necessary authorizations for the use of public water must be obtained from the Water Basin Agency of Souss Massa Draa, including the spring water or groundwater necessary for the mining process samples, the discharges of treated wastewater into wadis, and the temporary occupation of wadi banks.

## 1.10 Project Infrastructures

The Zgounder mine is located 5 km away from Askaoun, the closest existing village when going to the mine. The available electrical energy from the national power line terminating at Askaoun is not powerful enough to supply the mine installations that require a minimum of 1,600 kW. The old miners' lodging camp will not be rehabilitated, the owners having selected to transport on a daily basis the employees to and from Askaoun.

The old generating sets have been replaced by three new units having a capacity of 1,000 kVA each, and three new air compressors have been acquired. The main road going from Askaoun to the mine has been totally rebuilt. The concentrator and tailings pond have also been refurbished as described in other parts of this summary.

# 1.11 Capital and Operating Costs

## 1.11.1 Capital Cost Estimate

The Zgounder plant has been rehabilitated since the beginning of 2013. Some equipment has been commissioned, mainly the generating sets, the air compressors, the primary and secondary crushers,





and the conveyor belts. The required remaining capital (Capex) before resuming production is estimated at less than 4 M\$ as summarized in the following table.

Description	Cost USD
Surface and General	453,000
Concentrator	1,887,000
Underground Mine	1,448,000
Total	3,788,000

# 1.11.2 Operating Cost Estimate

The operating costs (Opex) are estimated in accordance to the information available from the previous plant operation and updated for the existing salaries. The production costs illustrated in the next table include all estimated expenses at the mine site. These operating costs are an average of the duration of the expected mine life of 10 years.

Items	Cost	Cost
	USD	USD/t milled
Waste development cost	11,369,439	12.00
Ore production cost	31,195,306	32.80
Ore processing	44,213,479	46.50
General and Administration	8,121,880	8.50
ONHYM royalty & Glowat NPI	13,025,438	13.70
Total	107,925,542	113.50

# 1.12 Economic Analysis

The economic parameters and assumptions of the base case are shown in the next table.

Items	Units	Values
Net silver price	USD/oz	22.00
Processed tonnage over LoM	metric tonne	951,250
Silver metal production	ounces	9,866,100
ONHYM royalty on sales	%	3.0
Glowat royaly: 5% of gross profits less milling & mining costs	%	3.0*
Taxes for the first 5 years on gross revenues	0/0	0.5
Taxes after the first 5 years on profits	0/0	17.5

<sup>\*</sup> The resulting 3.0% is not a fix rate, it only applies to this base case





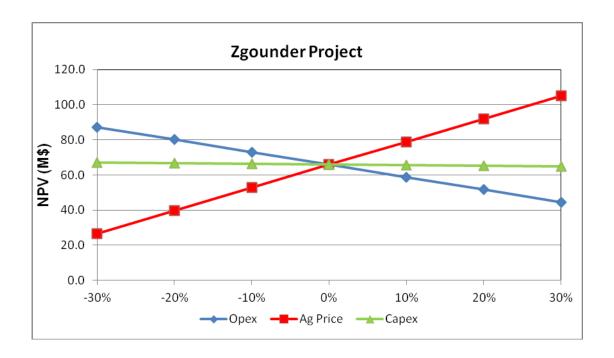
The estimated cash flow of the project is summarized below.

Items	Value
	USD
Total revenue of silver sales	217,054,400
Total operating costs	107,925,500
After-tax undiscounted cash flow	93,341,000
After-tax discounted (6.5%) NPV	65,919,000

The next figure is showing the project NPV sensitivity to the variants of the remaining Capex, of the silver price and to the operating cost (Opex) estimated with  $\pm 30\%$  relative variation, at a discounted rate of 6.5%.

Parameters	Units	-30%	-20%	-10%	0%	+10%	+20%	+30%
Capex	M\$	2.6	3.0	3.4	3.8	4.2	4.6	4.9
NPV @ 6.5%	M\$	67.1	66.7	66.3	65.9	65.5	65.1	64.8
Silver Price	\$/oz	15.4	17.6	19.8	22.0	24.2	26.4	28.6
NPV @ 6.5%	M\$	26.7	39.8	52.8	65.9	78.9	92.0	105.1
Opex	M\$	75.5	86.3	97.1	107.9	118.7	129.5	140.3
NPV @ 6.5%	M\$	87.2	80.1	73.0	65.9	58.8	51.7	44.6

A graph representing the variations of the NPV from the above table is shown below.







#### 1.13 Other Relevant Data and Information

GoldMinds Geoservices Inc. recognizes that in addition to the Measured, Indicated and Inferred Resources that there are areas within recognized structures and depth extensions which will require additional drilling. These recognized structure and depth extensions can offer additional Mineral Potential between 1.5 to 2.0 million tonnes grading 300 to 400 g/t Ag. The Mineral Potential is the tonnage which could be contained within elevation 1975 and 1750 (225m vertical panel) along the existing mine openings. This represents the historical amount processed by previous owner of the mine plus the current NI 43-101 mineral resource disclosure between the surface and level 1925. It does not consider the eastern extension (276400E) where surface medieval workings extent for another 200 meters eastward with no recent drilling.

# **Cautionary Statements:**

Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. The potential quantity and grade reported as Mineral Potential, is conceptual in nature, that there has been insufficient exploration to define a mineral resource and that it is uncertain if further exploration will result in the target being delineated as a mineral resource.

The Mineral Potential is the tonnage which could be contained within elevation 1975 and 1750 (225m vertical panel) along the existing mine openings. This represents the historical amount processed by previous owner of the mine plus the current NI 43-101 mineral resource disclosure between the surface and level 1925. It does not consider the eastern extension (276400E) where surface medieval workings extend for another 200 meters eastward with no recent drilling.

## 1.14 Conclusions and Recommendations

The parameters used in this Preliminary Economic Assessment include the production costs of the Zgounder past-producing mine. The existing concentrator should resume production at a tonnage of 200 tonnes per day for the first year and then is expected to increase to 300 tonnes per day, with a recovery of 90%, for the remaining of the mine life estimated at 10 years.

SGS and GMG have examined the technical and economical aspects of the Zgounder project within the level of accuracy of a Preliminary Economic Assessment in conformance to the standards required by NI 43-101 and Form 43-101F1.

A cash flow analysis was developed based on the technical aspects and on silver metal price projections. As it stands the Zgounder project contains an economic Mineral Resource. The authors of this Technical Report consider the Zgounder project to be sufficiently robust to warrant moving it to the next study stage.





# 2 Introduction

The Zgounder Mine is a past producing silver mine presently being resurrected by Maya Gold and Silver Inc. (Maya). It is located in the central Anti-Atlas Mountains in the Taroudant province, Morocco, approximately 265 km east of Agadir City. Zgounder was an operating underground mine from 1982-1990 extracting approximately 500,000 tonnes at 330 g/t Ag. From 2002 to 2004 the Compagnie Minière de Touissit (CMT) did exploration developments and extracted approximately 5,500 tonnes at 429 g/t Ag and 10,000 tonnes from the old mine development material at a grade of 358 g/t Ag. In 2012, Maya Gold and Silver and the Office National des Hydrocarbures et des Mines (ONHYM) signed a convention in order for Maya Gold and Silver to acquire 85% of the Zgounder Silver Deposit.

In March 2013, Maya commissioned GoldMinds Geoservices Inc. (GMG) to calculate the first NI 43-101 compliant mineral resource estimation of the Zgounder project in order to recommence mining development and exploitation. Maya publicly disclosed the resource estimation in the press release dated February 19, 2014.

The resource estimation of the Zgounder silver deposit is based on historical data and on the recent analytical results from the 2013 drilling campaign, which was managed and supervised by GMG.

It is of the opinion of GMG that the resource estimation presented in this report reasonably represents the silver mineralization as delineated by the historic and independent analytical results.

# 2.1 Terms of Reference – Scope of Work

The scope of work as defined in the initial mandate of March 2013 included the design of a mineral resource model for silver mineralization present at Zgounder as outlined by historic and recent independent drilling, as well as the compilation of a NI 43-101 compliant technical report. The purpose of the mandate was to evaluate the resumption of development and production at the Zgounder silver mine. The workflow was outlined in the mandate by GMG Senior Engineer, Claude Duplessis:

- 1. Site visit;
- 2. Compilation by Goulex (Maya consulting geologists) and verification/validation/integration of the historical data by GMG;
- 3. Modelling of zones by GMG;
- 4. Underground 3D monitoring survey of levels, sublevels and stopes using Laser scanner at the Zgounder silver mine by Cap-Resource;
- 5. Surface drilling;





- 6. Underground percussion drilling program supervised by GMG; drilling was performed by Technominex Africa;
- 7. Preparation of resource estimation and NI 43-101 compliant technical report by GMG.

In February 2014, Maya changed the scope of work to involve a Preliminary Economic Assessment (PEA) and hired the SGS Canada Inc. Geostat Office (SGS Geostat) to work in tandem with GMG and provide an evaluation of the preliminary metallurgical testing, mine design, and economical study.

SGS Geostat issued two QP'S to prepare the relevant PEA sections: Mr. Gilbert Rousseau, Eng., responsible for the sections related to the processing and metal recovery, and Mr. Gaston Gagnon, Eng., responsible for the mining and economical aspect of the project. The above two QP's will also participate in the preparation of all common sections of the technical report.

## Sources of Information

The information presented in this Technical Report was compiled from various internal reports and involves the contribution of several different contractors or consultants:

- Historical data (reports, plans, logs, geological data and geochemical data) compiled by Goulex;
- 3D monitoring laser scanning of the main levels, sublevels and some stopes at the Zgounder silver mine performed by Cap-Resources;
- Technical work during the drilling campaign performed by drilling contractor, Technominex Africa;
- Mining and geotechnical studies available at the mine site in relation to the stope design and recommended type of rock support;
- Environmental and impact recent study prepared in Morocco for the resumption of the production and covering the following items: water quality, old and new tailings chemical aspects, retaining dams, monitoring, recommendations, etc.

## 2.2 Personal inspection on the property by each Qualified Person

The following persons visited the site for various reasons as outlined below.

Claude Duplessis P. Eng., Senior Engineer, Goldminds Geoservices Inc., visited the Zgounder property from June 3<sup>rd</sup> to June 10<sup>th</sup>, 2013 and is an independent Qualified Person as defined in the NI 43-101. The purpose of his visit was to examine the principal underground mine levels and initialize the underground percussion drilling and sampling program. During his visit, he designed the sampling and shipment sequence to the ALS laboratory in Val-d'Or, Canada, and also supervised drilling in collaboration with Merouane Rachidi.





- Merouane Rachidi, Ph. D., GIT, Goldminds Geoservices Inc., visited the site on two occasions. The initial visit from April 5<sup>th</sup> to April 21<sup>st</sup>, 2013 met several objectives. He mapped and sampled mineralized structures cross-cutting the principal levels (levels 2000, 2100, 2125, 2150 and 2175). He also supervised the 3D underground monitoring survey (laser scanning) of the principal levels and sublevels conducted by Cap-Resources. The second visit of Merouane Rachidi was from June 4<sup>th</sup> to the October 11<sup>th</sup>, 2013. During this time, he supervised and managed the underground percussion drilling and sampling program while drafting the drill targets and schedule. He observed the sampling process of collection of the cuttings, drying, and splitting, and also examined the geology of various underground levels.
- Claude Bisaillon, Eng., Gilbert Rousseau, Eng., and Gaston Gagnon, Eng., made a reconnaissance visit to the plant site on January 18<sup>th</sup> and 19<sup>th</sup>, 2011. The installations were still on a care and maintenance basis and most buildings were not accessible, nevertheless this visit offered a good general overview of the surface infrastructures, for security purpose the mine visit was not possible.
- Gaston Gagnon, Eng., accompanied by Merouane Rachidi, Ph. D., from Goldminds made a second visit from April 5<sup>th</sup> to April 12<sup>th</sup>, 2013 mainly for visiting mainly the underground installations and reviewing the available documentation at the engineering offices. The underground (UG) visit included the levels 2000, 2100 and 2125. The overall UG safety conditions were generally satisfied particularly after so many years without any rehabilitation workings done. During this visit, refurbishing was going on at the concentrator installations, at the surface buildings and on the access road from Askaoun to the mine.

# 2.3 Units and Currency

In this report, all prices and costs, when no currency is specified, are expressed in United States Dollars (US\$), if other currencies are utilized their symbols are specified, as Canadian Dollars (CAD\$) and Moroccan Dirhams (MAD). Quantities are generally stated in *Système International d'Unités* (SI) metric units, the standard Canadian and international practice, including metric tonnes (tonnes, t) for weight, and kilometers (km) or meters (m) for distance. The projection system used is Lambert conic (South Morocco; Merchich). Abbreviations used in this report are listed below.

Table 1: List of abbreviations

Description	Abbreviation
Agricultural Area	SAU
Buildings and Public Works	ВТР





Description	Abbreviation
Bureau de Recherches et de Participations Minières (Morocco)	BRPM
Carbon monoxide	CO
Canadian dollar	CAD\$
Certificate of Authorization	CofA (CA)
Cubic meters per second	m³/s
Cubic meters per hour	m³/h
Decibel, a unit of sound intensity	dB
Decibel weighed by the frequency	dBA
Day-night intensity noise average	Ldn
Fecal Coliforms	CF
Fecal streptococci	SF
Calorific Value	PCI
Cubic meter	$m^3$
Cubic meter per hour	m³/h
General and Administration	G & A
Goldminds Geoservices Inc.	GMG
Gram per liter	g/L
Grams	g
Grams/tonne or parts per million	g/t
Gross Combined Weight	GCW
Hectare	ha
Inches	in
International Organization System	ISO
Kilograms	kg
Kilometers	km
Kilovolt	kV
Kilowatt	kW
Kilowatt per hour per tonne	kWh/t
Megawatt	MW
Laboratory for analysis (Casablanca)	Laagrima
Moroccan Dirham	MAD
Medium Voltage	MT (MV)
Mega Volt Ampere	MVA
Megawatt per hour per day	MWh/d
Meters	m
Micro Siemens per centimeter	μS/cm
Microns	μm





Description	Abbreviation
Milligram per liter	mg/L
Millions of cubic meter	Mm <sup>3</sup>
Millions of metric tonnes	Mt
Millions of metric tonnes per year	Mtpy
Moroccan dirham	MAD
National Action Plan for the Environment	PANE
National Instrument 43-101(Canadian)	NI 43-101
National Office of Drinking Water and Electricity	ONEE
Nitrogen oxides	$NO_x$
Normal milligram per cubic meter	mg/Nm³
Office of Agricultural Development in Agadir	ORMVAA
Office National des Hydrocarbures et des Mines	ONHYM
Omnium Nord Africain	ONA
Organic Matter	MO
Parts per million, parts per billion	ppm, ppb
Preliminary Economic Assessment	PEA
Provincial Directorate of Agriculture	DPA
Provincial Road	RP
Quintals per hectare	qx/ha
Regional Road	RR
Run of Mine	ROM
Secretary of State for the Environment	SEE
SGS Geostat Blainville	SGS
Short tons (0.907185 tonnes)	t, st, ST, ton
Société Anonyme Chérifienne d'Études Minières du Maroc	SACEM
Société Minière de Sidi Lahcen	SOMIL
Société Nationale des Autoroutes du Maroc	SNAM
Specific gravity	s. g.
Square meter	m <sup>2</sup>
Standard Moroccan Potability	NMP
Study of Environmental Impact	EIA
Sulfur dioxide	SO <sub>2</sub>
Suspended Matters	MY
Tonnes per day	Tpd (t/d)
Tonnes per hour	Tph (t/h)
Tonnes per month	tpm
Tonnes per year	tpy





Description	Abbreviation
United Nations Development Program	PNUD
United State dollar	US\$
Volt	V
Water supply	AEP





# 3 Reliance on Other Experts

This Report was jointly prepared by GoldMinds Geoservices Inc. and SGS Geostat for Maya Gold and Silver Inc. The information, conclusions, opinions, and estimates contained herein are based on:

Information available to GoldMinds Geoservices Inc at the time of the preparation of this Report with an effective date of January 10<sup>th</sup>, 2014;

- Assumptions, conditions and qualifications as set forth in this Report; and
- Reports, and opinions supplied by Maya Gold and Silver Inc.
- Historical drilling database supplied by Goulex. Historical data has been verified by GMG using the existing plans. No certificates of analyses exist for assay results of the historical database. GMG performed sufficient verification prior to including the historical database in the mineral resource model.
- The accuracy of the 3D underground laser scans have not been verified by GMG. Collar coordinates of the GMG drillholes were partially surveyed by Total Station and from the 3D scan.

This Report is intended to be used by Maya Gold and Silver Inc. as a Technical Report with Canadian Securities Regulatory Authorities pursuant to provincial securities legislation. In addition, this report is for use by Moroccan authorities. Except for the purposes contemplated under provincial securities laws, any other use of this Report by any third party is at the party's sole risk.

## NI 43-101 Technical Report

# Preliminary Economic Assessment Zgounder Silver Mine

## Table of Responsibilities

Section	Title of Section	Qualified Person
1.0	Executive Summary	Combined by GMG and SGS
2.0	Introduction and Terms of Reference	Combined by GMG and SGS
3.0	Reliance on Other Experts	Combined by GMG and SGS
4.0	Property Description and Location	Claude Duplessis, GMG
5.0	Accessibility, Climate, Local Resources, Infrastructure and Physiography	Claude Duplessis, GMG
6.0	History	Claude Duplessis, GMG
7.0	Geological Setting and Mineralization	Claude Duplessis, GMG
8.0	Deposit Types	Claude Duplessis, GMG





9.0	Exploration	Claude Duplessis, GMG
10.0	Drilling	Claude Duplessis, GMG
11.0	Sample Preparation, Analyses and Security	Claude Duplessis, GMG
12.0	Data Verification	Claude Duplessis, GMG
13.0	Mineral Processing & Metallurgical Testing	Gilbert Rousseau, SGS
14.0	Mineral Resource Estimates	Claude Duplessis, GMG
15.0	Mineral Reserve Estimates	Gaston Gagnon, SGS
16.0	Mining Methods	Gaston Gagnon, SGS
17.0	Recovery Methods	Gilbert Rousseau, SGS
18.0	Project Infrastructure	SGS
19.0	Market Studies and Contracts	SGS
20.0	Environment Studies Permitting and Social or Community Impact	SGS
21.0	Capital and Operating Costs	Gaston Gagnon, SGS
22.0	Economic Analysis	Gaston Gagnon, SGS
23.0	Adjacent Properties	Claude Duplessis, GMG
24.0	Other Relevant Data and Information	Combined by GMG and SGS
25.0	Interpretation and Conclusions	Combined by GMG and SGS
26.0	Recommendations	Combined by GMG and SGS
27.0	References	Combined by GMG and SGS

In relation to permits and convention interpretation, the authors rely on the opinion letter of the lawyer Me Said AMEHMOUL dated February 4<sup>th</sup> 2013, Casablanca, Morocco.





# 4 Property Description and Location

# 4.1 Location

The Zgounder silver mine is located approximately 265 km east of Agadir and 220 km west of Ouarzazate (Figure 1 to Figure 3, central part of the Anti-Atlas Mountains, Morocco).

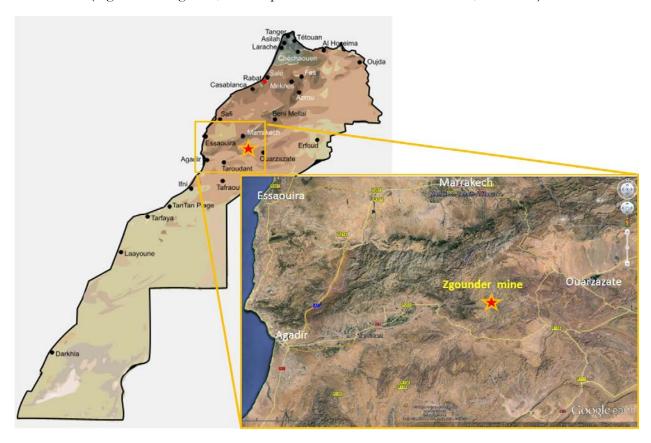


Figure 1: Location of Zgounder between Agadir and Ouarzazate (sourced Google Earth).





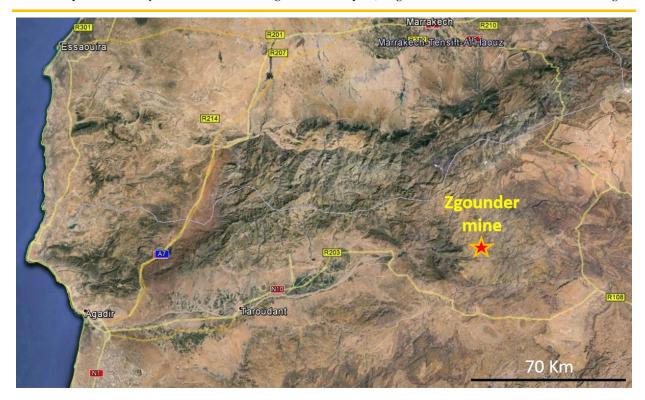


Figure 2: Location and access to the Zgounder silver mine (sourced from Google Earth).

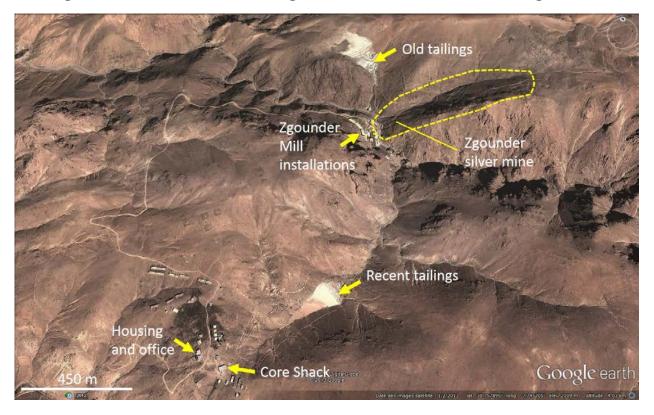


Figure 3: The Zgounder silver mine site (sourced from Google Earth).





# 4.2 Property description

The Zgounder property covers an area of 16 km<sup>2</sup> (4 km x 4 km, Figure 4) and is situated within the Proterozoic Siroua massif (Anti Atlas domain). The approximate Lambert coordinates of the project area: longitude: 276,000, latitude: 420,355 (South Morocco; Merchich) and an elevation between 2,000 and 2,180 m.a.s.l.

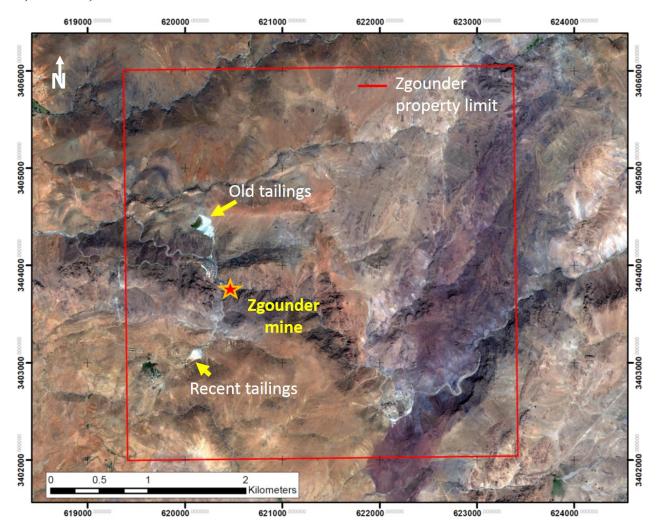


Figure 4: Property mining permit limits of Zgounder silver mine (image provided by Goulex).

# 4.3 Mineral rights and other permits

ONHYM authorizes Maya Gold and Silver Inc. to prospect and exploit base and precious metals at the Zgounder mine. Maya has fulfilled its commitment of the convention up to now; the 3<sup>rd</sup> payment is now due by May 1<sup>st</sup> 2014 as per extension given by ONHYM on a letter dated December 9<sup>th</sup> 2013. The mining title number 09/2096 and exploitation license number 2306 provide surface rights and access to the property and allow any type of mining. Necessary authorization for the use





of public water was obtained from the Water Basin Agency of Souss Massa Draa, including the use of spring water or groundwater necessary for the milling process. Treated wastewater will be discharged into the tailings pond.

# 4.4 Royalties

ONHYM launched a call of tender in 2012 for the total or partial transfer of the Zgounder silver mine (Taroudant province, Morocco) and its facilities for industrial exploitation.

Maya Gold and Silver presented an offer proposing a partnership approach with a participation rate of 15% granted to ONHYM. Maya Gold and Silver and ONHYM have signed an agreement for the development and the exploitation of the Zgounder mine. Maya Gold and Silver offered a 15% stake in its share capital to ONHYM, free of charge. Maya Gold and Silver is committed to give 5% of the gross revenues generated from the Zgounder silver mine, less mining and milling costs (the "Royalty") to Global works, Assistance and Trading Société à "responsibilité limitée" (Glowat S.A.R.L).

- The transfer of the Zgounder silver mine exploitation permit is for:
  - Premium of the first entrance = 48 Million MAD (14 million MAD to be paid by May 1<sup>st</sup> 2014);
  - Premium of the second entrance to be paid at the end of the feasibility study and no later than the end of the 24<sup>th</sup> month from the Zgounder mine transfer approval date (the 6<sup>th</sup> January 2012):
    - 1.5 million Canadian dollars, excluding taxes if proven reserves reach 10 million oz Ag;
    - 3 million Canadian dollars, excluding taxes if proven reserves reach 20 million oz Ag;
    - 4 million Canadian dollars, excluding taxes if proven reserves reach 30 million oz Ag.
- Maya Gold and Silver committed to pay a fixed annual fee to ONHYM of 100,000 MAD until commencement of the Zgounder mine production.

A new Moroccan company was established in January 2014 called Zgounder Millennium Silver Mining (ZMSM) with Maya Gold and Silver (85%) and ONHYM (15%) as shareholders. The mining title of the Zgounder property will be transferred to the ZMSM Company by ONHYM. ONHYM will receive a 3% royalty from the sales income of ZMSM for their management fees.

Any dispute related to the validity of the interpretation or execution of the Agreement between ONHYM and Maya Gold and Silver shall be resolved amicably by conciliation between the parties. It is appropriate to note that in case of the failure of this approach, the dispute shall be submitted to the arbitration process of the International Chamber of Commerce in Paris, under the rules of this chamber that apply to Moroccan laws.





# 5 Accessibility, Climate, Local Resources, Infrastructure and Physiography

# 5.1 Accessibility

The Zgounder silver mine is situated in the province of Taroudant. The Zgounder property is located approximately 265 km east of the port city of Agadir in the Precambian formations of Siroua (central part of Anti-Atlas Mountains, Morocco). The site is accessible from Agadir by a well maintained paved road (N10) running 216 km east to Taliouine. From Taliouine a hillside paved road heads north 50 km to the village of Askaoun (Figure 5). The mine site is accessible from Askaoun by a well maintained 5 km gravel road (Figure 9).

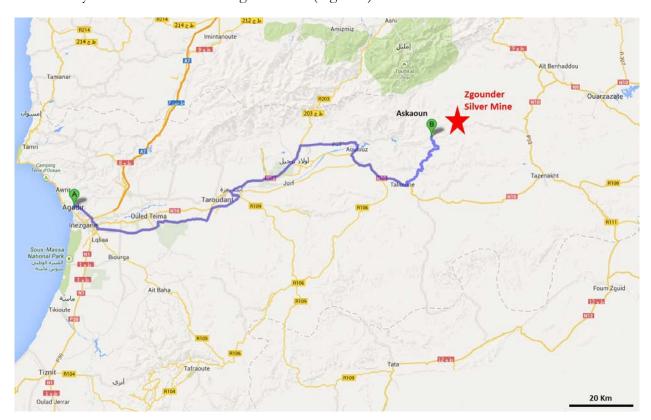


Figure 5: Location of the Zgounder mine with respect to Agadir (sourced from Google Maps).

A 260 km paved road from Marrakech to Askaoun via Agouim is presently under construction.

## 5.2 Climate

The Zgounder silver mine is located between 1,925 and 2,200 meters above sea level (m.a.s.l) on the western flank of the Siroua massif of the Anti-Atlas Mountains. This region is separated from the influence of the Mediterranean climate by the High Atlas Mountains to the north and therefore shares the Sahara climate. The area is semi-arid as the Sahara desert is less than 50 km away. Winters are cool to cold; snowfalls of up to 0.5 meters occasionally occur during the first quarter of the year





above 1,600 m elevation. The average annual rainfall is 500 mm; the driest month is July with 3 mm of rain and the December has the highest rate of precipitation with an average of 71 mm (Figure 6). The average annual temperature is approximately 12.2 °C; summers are warm to hot and essentially dry. Seasonal and daily temperature variations are significant (Figure 7).

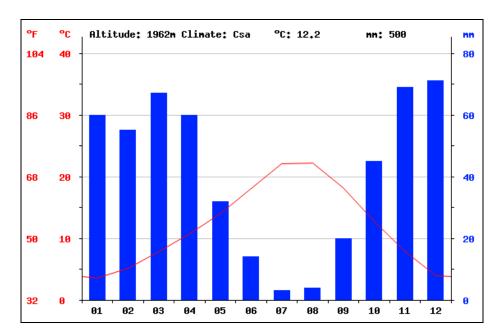


Figure 6: Average monthly precipitation and temperatures at Askaoun (climatdata.org).

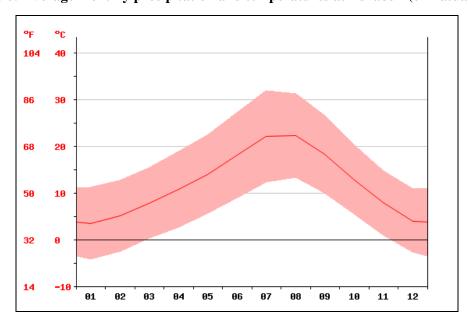


Figure 7: Average monthly temperatures at Askaoun village (climatedata.org).

The hottest month of the year is August with an average temperature of 22.2°C. January is the coldest with an average temperature of 3.5°C (Figure 8).





nonth	1	2	3	4	5	6	7	8	9	10	11	12
nn	60	55	67	60	32	14	3	4	20	45	69	71
°C	3.5	5.1	7.8	10.7	14	18.1	22.1	22.2	18.2	12.8	7.9	4
°C (min)	-4.3	-2.5	0.2	2.6	5.6	8.9	12.3	13.2	9.9	5.5	1	-2.8
°C (max)	11.3	12.8	15.5	18.9	22.5	27.3	31.9	31.2	26.6	20.2	14.8	10.9
°F	38.3	41.2	46	51.3	57.2	64.6	71.8	72	64.8	55	46.2	39.2
°F (min)	24.3	27.5	32.4	36.7	42.1	48	54.1	55.8	49.8	41.9	33.8	27
°F (nax)	52.3	55	59.9	66	72.5	81.1	89.4	88.2	79.9	68.4	58.6	51.6

Figure 8: Variations of monthly precipitation & temperatures for Askaoun (climatedata.org).

### 5.3 Local resources

The main villages are located close to rivers (oueds) for water sources, offering habitat for select vegetation (certain cereals, vegetables and some trees). The local population is exclusively Amazigh (aboriginal population) with a semi-sedentary lifestyle. The local economy is principally supported by livestock, agriculture and food trade (saffron, potatoes, dates), as well as the manufacturing of traditional carpets. The Siroua region is a popular destination of tourists from the spring to late fall.

Basic supplies such as food and limited accommodation are available at Askaoun; the larger city of Talioune offers more for supplies. Special items must be purchased from Agadir city.

Mining in Morocco has existed for centuries and skilled labour is readily available. The mining manpower for Zgounder resides in nearby villages between 5 and 10 kilometers away. Some of the villagers are previous employees of Somil and CMT employed by the present contractor operating at the Zgounder mine (Technominex Africa, Moroccan company). The implication of the local manpower in the Zgounder project will benefit the local economy, which is almost entirely based on agriculture.

#### 5.4 Infrastructure

The Zgounder silver mine is easily accessible by a well maintained gravel road from the village of Askaoun (Figure 9).







Figure 9: A) Paved road from Taliouine to Askaoun. B) The gravel road on site from Askaoun.

Recent work was completed on the Zgounder mine to broaden the trail ascending from the 2000 level to the 2175 level (Figure 10). Several bridges were constructed leading up to the mine entrance at the 2000 level, as well as along the access road from Askaoun (Figure 11).



Figure 10: Broadening the gravel trail from level 2000 to 2175 at Zgounder silver mine.







Figure 11: A) Several bridges (yellow arrows) being constructed close to the entrance of the 2000 m level (white arrow). B) A close up of bridge construction. C) & D) Bridges being built on the road connecting the Zgounder mine to the village of Askaoun.

Skilled labour is available in nearby villages and some inhabitants have previously worked for SOMIL and CMT. However, the mine quarters are in poor condition and renovations are required (Figure 12). Electrical power on site is provided by 3 x 1000 kVA (850kW) diesel generators (Figure 13).





Figure 12: A-B) The mining crew houses with the snowy Siroua massif visible in the background (April 2013). C) The office at the Zgounder site. D) A core shack used for the preparation and archiving of the drilling samples (cuttings and core samples). E) The mine entrance at level 2000. F) The trail linking the entrance of level 2000 to 2100, 2125 and 2150 m.





Figure 13: A general view looking west of the Zgounder mill installations showing the conveyor belts (yellow arrows), storage bins with crushers (white arrows), two cyanidation lines with counter-current decantation (blue arrows) and diesel generators (black arrow).

The Zgounder River flows through the property and is more than sufficient to supply water for the project (Figure 14). Potable water is piped by gravity from an artesian well five kilometres from the mine office. A small dam helps to maintain an adequate water supply during the dry summer months.





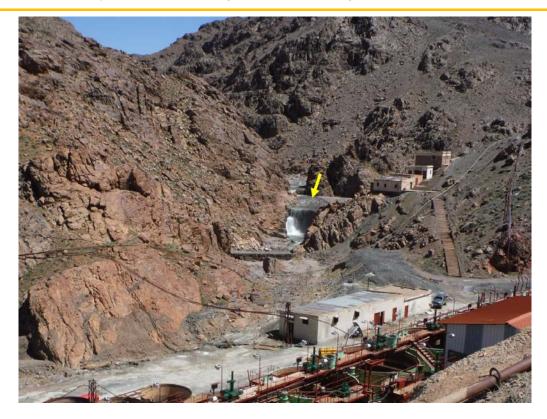


Figure 14: The Zgounder River (arrow) flowing through the property.

Milling installations at Zgounder include a crushing plant followed by cyanide leaching with countercurrent decantation circuit. The analytical geochemical laboratory at the Zgounder site is under renovation and the laboratory equipments are not installed yet by the owners.





Figure 15: View of the cyanide leaching tanks & counter-current decantation thickeners.



Figure 16: A) Conveyors (yellow arrows) and the storage bins with crushers at the base (white arrows). B) A close-up view of the secondary crusher (white arrow).



# 5.5 Physiography

The summits of the Anti-Atlas reach heights of 2500-2700 m.a.s.l. and the Jbel Siroua region (elevation 3304 m.a.s.l., Adrar n'Siroua) is the highest point of the Anti-Atlas, located 14 km southeast of the Zgounder mine. The Siroua massif is cut by numerous rivers, the principal ones being Assif n'Tifnout, Assif n'Oumarigh, and Assif n'Iriri. The Zgounder deposit is situated on the northern flank of a steep ridge between the Talat N'ouna River to the north and the Zgounder River to the south and west. The ridge rises steeply from an elevation of 2000 m.a.s.l. at the Zgounder River to 2230 m.a.s.l. in the far east of the deposit.

The topography at Zgounder is characterized by moderately steep hills with high altitudes in the range of 2100 m.a.s.l. and low valleys with seasonally flowing oueds. Vegetation is limited to minor alpine flowers, mosses, lichens and a small evergreen trees. Wheat is cultivated proximal to the villages on man-made terraces which are irrigated by springs and dams in waddies (Figure 17).

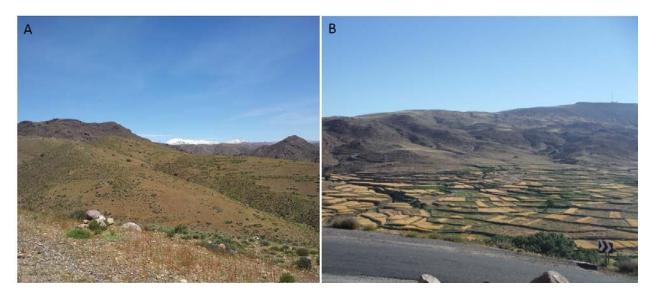


Figure 17: A) Hills of moderate elevation and sparse vegetation. B) A cultivated valley between Taliouine and Askaoun, flanked by moderately steep hills.



# 6 History

# 6.1 The ancient works (medieval period)

The Zgounder silver deposit was first exploited between the 10<sup>th</sup> and 12<sup>th</sup> centuries, principally in exposed shallow oxidized zones with stringers of native silver hosted within EW, NS, NW and NE-trending veins. Excavation scars are the result of these old exploitation operations, which can exceed 60 meters in depth (Figure 18). Evidence of these ancient operations are found locally (Figure 19) and sectors containing many of these excavation sites have been mapped (Figure 20).

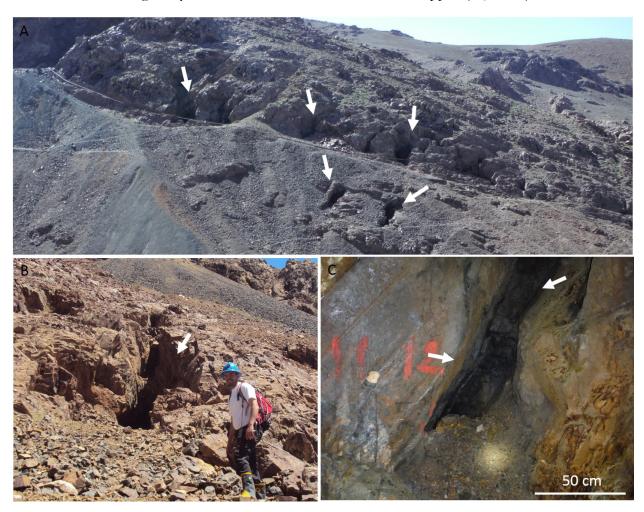


Figure 18: A) Ancient mining excavations (arrows) oriented generally N-S. B) A close-up view of an ancient excavation from the surface. C) An underground adit cross-cutting an old excavation (arrows).







Figure 19: A) A granite wheel used in the medieval period to reduce the size of extracted mineralized rocks. B) Scories (the remainders of molten metal) found at the surface, close to the entrance of level 2100 m at the Zgounder mine.

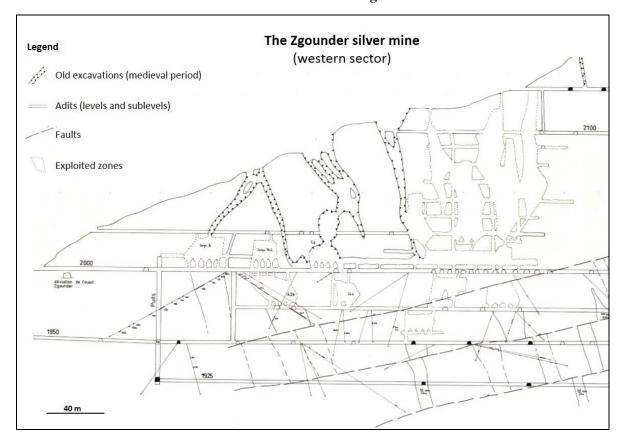


Figure 20: A longitudinal view of the western sector by CMT displaying the ancient excavation areas at the Zgounder silver mine.





# 6.2 The SNAM-BRGM period (1955 – 1979)

Earlier exploration campaigns and mining activity were completed by SNAM (1950-1955), BRPM (1956-1965 and 1969-1972) and SACEM-BRPM jointly (1971-1972). Mineral resources of around 435,000 tonnes at 385g/t Ag\* were defined (Reminex report, 2009).

\* The author has not performed sufficient work to classify the historical estimate as current mineral resources or mineral reserves; the issuer is not treating the historical estimate as current mineral resources or mineral reserves.

## 6.3 The Somil period (1982 – 1990)

The Société Minière de Sidi Lahcen (SOMIL) operated the Zgounder silver mine from 1982 to 1990. Several underground drifts and adits (9,220 m total) connected by raises (1,200 m total) were developed. The highest adit level was excavated at 2,175 m at the eastern end of the mine and the lowest level was excavated at 1,925 m in the western sector (Figure 22).







Figure 21: A) A view looking to the east showing the entrance of the 2000 and 2025 adits, a network of water pipes and several bridges were in construction at the time of this photo. B) The entrance of the 2000 level before recent modifications. C) An ancient wagon on the mine railway at the 2000 level.



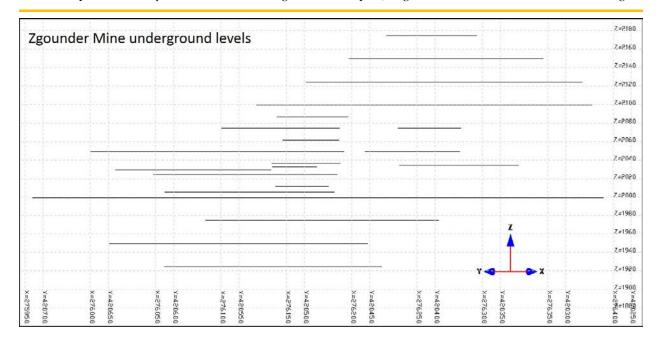


Figure 22: A longitudinal section of the Zgounder mine levels from 1925 to 2175 m using a constant elevation (z) for each level (adits digitalized by Goulex from Somil and CMT mine plans).

Drilling was conducted on several levels and sublevels totaling 15,383 meters (percussion and diamond drilling). These drillholes were named according to their collar elevation. The 2000 level (the main mine entrance) corresponds to the principal level for draw points and two Alimak raises were developed. The run of mine was transported by wagon to the entrance/exit of level 2000 and onwards to the primary crusher (Figure 21C). The northern sector of 2000 was the subject of underground exploration drilling between 1984 and 1987 with a total mineral resource calculated of 110,280t at 277g/t Ag\* including 10,700t at 180g/t Ag\*.

Between 1982 and 1990, SOMIL extracted a total of 500,000 t at 330g/t Ag\* using various mining methods (backfill, shrinkage, and open long-hole mining methods) and applying a cut-off grade of 125g/t Ag\* (Reminex report, 2009). The Zgounder mine has been closed since 1990 due to low silver prices.

\* The author has not performed sufficient work to classify the historical estimate as current mineral resources or mineral reserves; and the issuer is not treating the historical estimate as current mineral resources or mineral reserves.

## 6.4 The BRPM period (1989 – 1999)

In 1989, the BRPM pursued underground exploration with 10 drillholes totalling 2,282 metres to delimit the extension of silver mineralization in the western sector.

The BRPM started an exploration campaign in 1997 consisting of mapping and sampling the mineralized structures followed by a drill program. Seven surface holes were drilled along strike of mineralized zones totaling 1,761 m of core. The BRPM interpreted these zones as new mineralized





zones parallel to, and stratigraphically beneath, the dolerite contact zone. However, ACA Howe (ACA How International, 1999) believes these intersections can be explained by mineralized cross fractures.

ACA Howe International verified the available core left after the 1997 campaign and collected rock samples from key surface areas of the mine. ACA Howe estimated that there was at least 500,000 t\* present in the recent tailings. The old tailings averaged 250g/t Ag\* (9 m in thickness) and the recent tailings averaged 109g/t Ag\* (12 m).

\* The author has not performed sufficient work to classify the historical estimate as current mineral resources or mineral reserves; and the issuer is not treating the historical estimate as current mineral resources or mineral reserves.

The mine waste dump consists of surface reject material covering the southern side of the Oued Tlat N'ouna (Figure 23 and Figure 24). This mine waste dump was referred to as the 'ancient tailings' by Icelandic Gold Corporation, forming a superficial thin layer of coarse (5 – 10 cm) and fine (1 – 3 cm) debris that range from 0.5 to 2 m in thickness (Figure 24). In 1978, the BRPM and PNUD excavated pits on a 20 meter grid and outlined a reserve of 66,000 tonnes with a grade of 325g/t Ag\*, assuming a density of 1.5 g/cm³ (source: from the ACA Howe International report, 1999; the original BRPM/PNUD documents are not included).



Figure 23: Southward view of oxidized mine waste dump resulting from the ancient mine workings at the Zgounder silver mine.





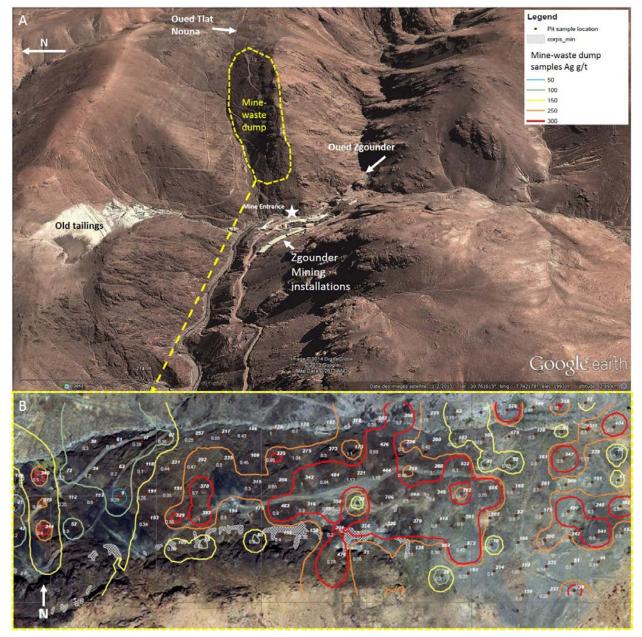


Figure 24: A) The location of the mine waste dump at the Zgounder silver mine (sourced from Google Earth). B) The location of samples collected by BRPM from the mine waste dump.

Icelandic Gold Corporation collected 20 surface samples from the mine-waste dump averaging 377g/t Ag\* (or 438g/t Ag\* from 17 samples). Another eight surface samples from an EW traverse along the mine waste dump were collected having an average of 573.6g/t Ag\* (ACA Howe International report, 1999).

The old tailings located at the north of the Zgounder mine installation correspond to the residues processed between 1980 and 1990 which were deposited in a V-shaped valley (Figure 24A). A channel sample 9 m deep taken by ACA Howe gave an average of 224g/t Ag\* (Icelandic Gold Corporation report, 1999).





# 6.5 The CMT period (2002 – 2004)

From 2002 to 2004, the Compagnie Minière de Touissit (CMT) conducted surface and underground exploration programs to delimit the mineralized zones in the northern sector of the Zgounder mine and to verify the historical resource estimation as previously defined by BRPM. CMT also continued to search for new mineralized zones in the central and eastern sectors of the mine. Table 2 summarizes the CMT exploration programs for 2002 to 2004.

Table 2: CMT exploration programs from 2002 to 2004 (CMT final report, 2004).

	2002	2003	2004	Total
Drilling (meter)				
Surface diamond drill	2,728	0	0	2,728
Underground diamond drill	619	2,647	835	4,100
Total drilling	3,346	2,647	835	6,828
Mining development (meter)				
Adits	65	470	443	978
Raises	35	19	98	151
Percussion drill T28	56	7,733	3,998	11,787
Percussion drill Yak	0	2,529	320	2,849

The exploration program consisted of 10 surface drillholes and 26 underground drillholes totaling 6,827.9 meters (Figure 25 and Figure 26), as well as mining developments (977.9 meters of new cross-cuts at levels 2150, 2125, 2100 and 2000) to define new silver-rich zones at the Zgounder mine.





Table 3: Summary of CMT underground workings from 2002 to 2004 (CMT final report, 2004).

Level/Zone	Adit Length (m)	Purpose/Results
2150	2.0	Silver-rich sedimentary schist layers in altered dolerite
2125	153.4	Reaching the southern end of the level
2100	20.0	Fractured sandstone/shale associated with rhyolitic rocks
2000	802.6	East, northwest and west of the Central Zone
Including		
Northwest	313.0	Strongly fractured shale/sandstone. Clay-filled faults containing quartz, lead, and zinc sulphides, disseminated pyrite and chlorite. Silver mineralization was encountered in and out of the fault zone

The new tailings are located south of the mine installations and correspond to the residues treated by CMT between 2002 and 2004. The Icelandic Gold Corporation referred to the old and recent tailings as 'modern tailings' (Figure 28 and 29).





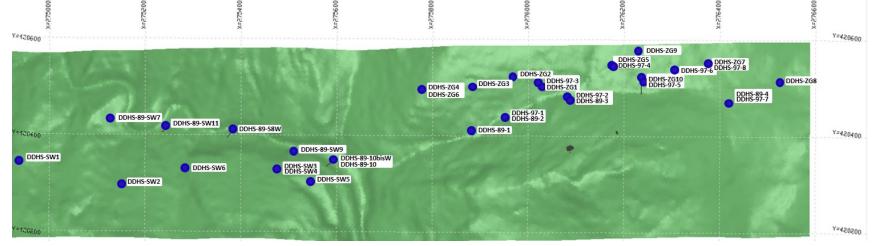


Figure 25: Surface exploration diamond drillholes (DDHS) on Zgounder property (XY plan, the topo surface is green).

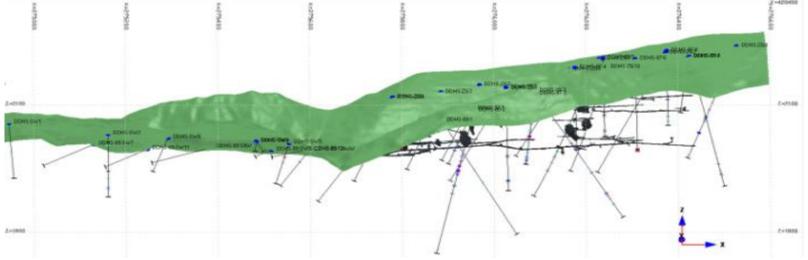


Figure 26: Surface exploration diamond drillholes (DDHS) on Zgounder property (XZ plan, the topo surface is green).







# 6.6 The Maya Gold and Silver period

In 2012, Maya Gold & Silver and the Office National des Hydrocarbures et des Mines (ONHYM) agreed to negotiate an agreement for Maya to acquire 85% of the Zgounder silver deposit. Maya Gold & Silver was granted the license (No. 2306) and the surface rights and access to the property for any type of exploration and exploitation. The agreement on the Zgounder silver deposit was signed on January 06, 2012.

Maya Gold and silver conducted a chip sampling on the 2,000 m level adit wall faces; specifically at six Ag mineralized sites where historical sampling and assay results from the BRPM (Boily, 2012). Forty-one (41) face wall samples were collected from nine stations (St1 to St9) eight of them located at the western part of level 2000m at the already exploited zones by SOMIL. Each sample represents an interval of one meter and their location is determined with  $\pm$  2 m precision. No previous evidence of face sampling was observed within the 2000 m level. The weights of the new samples vary from 0.97 to 3.33 kg and are deemed representative of the in situ silver mineralization. The face samples represent well stratified arenaceous schists with mineralized fractures containing <0.5 % pyrite and traces of sphalerite and galena (Boily, 2012).

These samples were fire assayed and the results are generally higher by a factor of 2 to 15 x than the historical data. These differences could partially be explained by different sampling techniques or by the method of assaying (Boily, 2012).

#### 6.7 Previous resource estimates

### 6.7.1 **BRPM/ICELANDIC**

'Reserves' were calculated for the Zgounder silver mine on June 30th, 1990, shortly before closure due to low silver prices. The 'reserves' stated were:

- Proven 15,377t at 388g/t Ag\*;
- Probable 143,003t at 348g/t Ag\*;
- Possible 177,878t at 367g/t Ag\*.

These values were taken from the ACA Howe international report (1999) and no verification was done by the author.





Table 4: The distribution of various SOMIL reserve blocks (taken from the ACA Howe International report, 1999).

SECTOR	UN	ITS	PROVEN	PROBABLE	POSS	IBLE	TOTAL		
Central	Ton	nes*	15,377	27,260	17,0	<b>17,077 59,7</b>			
	Agg	g/t*	388	336	31	.4	343.1		
Central at depth	Ton	nes*		34,760	27,0	27,614			
East	Ton	nes*		55,570	69,585		69,585 125,		125,155
	Ag ş	g/t*		374	39	394 <b>385.12</b>			
North	Ton	nes*		25,413	63,0	502	89,015		
	Ag g	g/t*		197	31	.8	283		
Total	Ton	nes*	15,377	143,003	177,878 <b>336</b> ,		336,258		
	Agg	g/t*	388	348	367		360		
Ancient tailings			Tonnes Ag g/t*	66,117 325		(not incl	uded in the in-situ total)		

In 1999, BRPM calculated the Zgounder reserves at 4.58 million ounces\* of silver (cut off grade of 150 g/t). Icelandic calculated an additional potential resource of 1.4 to 2.5 million ounces\* Ag hosted in the 500,000t tailings behind the old dam (Figure 27), (Icelandic Gold Corporation report, 1999).







Figure 27: Tailing behind the old dam



Figure 28: View of the old tailings dam, looking north.





Figure 29: Northeast view of the recent tailings dam.

### 6.7.2 **CMT 2004**

Research conducted by BRPM and CMT resulted in a total reserves calculation of 869,650t\* at 405.4g/t Ag\* (CMT report, 2004) divided between the southern (357,400t at 468.3g/t Ag\*) and northern (449,625t at 375.9g/t Ag\*) sector of the Zgounder mine. The total historical resource estimation is 869,650t grading 405.4g/t Ag\*, which includes remaining resources within existing stopes and the "reserves" calculated from the ancient tailings (CMT report 2004, this resource estimation is treated as historic information and has not been verified by Maya Gold and Silver or by GMG).

No details of the assumptions, parameters, and methods used to prepare the historical estimate are discussed in this report. Details regarding this estimate are available in the CMT final report, 2004 (Figure 30).





The southern bodies (principal) 357400t at 468.3g/t Ag\* (CMT final report, 2004)

Proven reserves: 114,800 tonnes 533.1g/t Ag\*
Probable reserves: 104,550 tonnes 455.7g/t Ag\*
Possible reserves: 138,050 tonnes 423.9g/t Ag\*

The northern bodies 449,625t at 375.9g/t Ag\* (CMT final report, 2004)

Proven reserves: 10,700 tonnes 180.0g/t Ag\*
Probable reserves: 97,175 tonnes 371.2g/t Ag\*
Probable reserves: 341,750 tonnes 383.3g/t Ag\*

The central part of the southern body is heavily exploited above the 2000 level and this mineralized zone extends to the east. The eastern zone of the 2000 level was therefore the subject of the drilling campaign supervised by GMG, followed by the central and northern zones.





COMPAGNIE MINIERE DE TOUISSIT CENTRE DE ZGOUNDER GEOLOGIE

# **COMPARAISON DES RESERVES**

Г	Réserve	s au 31 déce	embre 2002	Réserve	embre 2003	Observations	
Ţ.	ttv	Ag (g/t)	métal Ag (kg)	ttv	Ag (g/t)	métal Ag (kg)	métal Ag (kg)
réserves certaines	100		Service 5		1 1 1		<b>建</b> 型。 表
Corps sud, secteur Central	38 858	334,2	12 987	28 844	344,2	9 929	-3 059
Corps sud, secteur Central Aval	32 055	494,1	15 838	32 055	494,1	15 838	0
Corps sud, secteur Nord	10 700	180,0	1 926	10 700	180,0	1 926	0
Corps sud, secteur Est	17 740	321,0	5 694	50 897	650,2	33 096	27 401
Total réserves certaines, mine	99 353	366,8	36 445	122 496	496,2	60 788	24 343
Haldes	52 637	242,8	12 781	52 637	239,9	12 628	-153
Stock extrait mine, carreau	0		0	4 598	453,9	2 087	2 087
Stock haldes, carreau	4 481	270,7	1 213	4 481	270,7	1 213	0
Total réserves certaines	156 471	322,4	50 439	184 212	416,5	76 715	26 276
réserves probables							
Corps sud, secteur Central	15 136	402,2	6 087	15 136	402,2	6 087	0
Corps sud, secteur Central Aval	18 385	497,5	9 146	18 385	497,5	9 146	0
Corps sud, secteur Nord	14 181	399,0	5 658	31 866	349,0	11 120	5 462
Corps sud, secteur Est	117 082	411,5	48 185	71 797	472,1	33 897	-14 288
Total réserves probables, mine	164 784	419,2	69 076	137 184	439,2	60 250	-8 827
réserves possibles							
Corps sud, secteur Central	14 764	353,6	5 220	14 764	353,6	5 220	0
Corps sud, secteur Central Aval	37 093	400,4	14 851	37 093	400,4	14 851	0
Corps sud, secteur Nord	39 894	438,6	17 499	39 894	438,6	17 499	0
Corps sud, secteur Est	67 374	407,9	27 484	61 960	410,5	25 437	-2 047
Total réserves possibles, mine	159 125	408,8	65 054	153 711	409,9	63 007	-2 047
TOTAL RESERVES	480 380	384,2	184 569	475 107	420,9	199 972	15 403

LO, 03 janvier 2004

Figure 30: Comparison of CMT reserve\* between 2002 and 2003.





<sup>\*</sup> The author has not done sufficient work to classify the historical estimate as current mineral resources or mineral reserves; and the issuer is not treating the historical estimate as current mineral resources or mineral reserves.



# 7 Geological setting

# 7.1 Regional geology

The Zgounder silver deposit is located in the central Anti-Atlas on the northwest flank of the Siroua massif hosted in the Pan-African orogenic belt (680-580 Ma). The Pan-African orogeny started during the Middle Precambrian (Clauer, 1974) with the formation of a back-arc basin filled by a series of synorogenic volcano-sediments. The back-arc basin was covered at the end of the Precambrian by the Adoudounian marine sediments as a result of a marine transgression affecting the whole Anti-atlas (Figure 31 and 32).

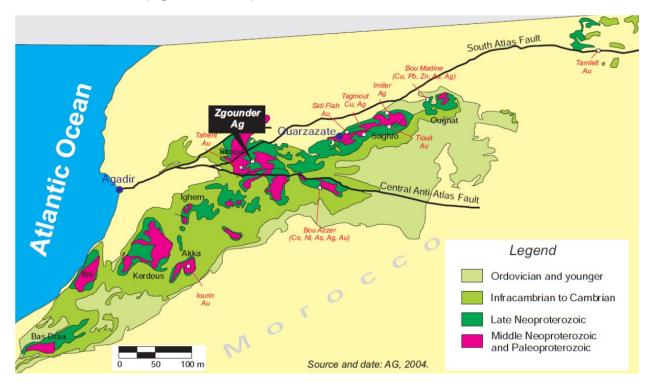


Figure 31: Regional geology of the Anti-Atlas displaying proterozoic windows hosting numerous polymetallic deposits including the Zgounder silver mine (AG, 2004).

The Siroua massif is located between two major structural zones, namely a northern unit attached to the Pan-African domain, and a southern unit generated by the Eburnian orogeny and accreted onto the West African Craton. The Siroua massif consists of Pan-African basement rocks (gneiss and amphibolites) which are unconformably overlain by ophiolitic complexes and volcano-sedimentary units of alternating schist-sandstones and limestones, quartzites and turbidites. The Zgounder dates to the Late Neoproterozoic during felsic calc-alkaline/alkaline volcanic activity marking the commencement of rifting and the Infracambrian–Cambrian transgression (Buggisch and Flügel, 1988).





## 7.2 Property Geology

The geological series of Zgounder consists mainly of volcano-sedimentary formations attributed to the Precambrian II (PII), which are intruded to the west by the Askaoun granodioritic massif (later Precambrian II-III), (Demange, 1977). The series are overlain in the east by the volcano-sedimentary rocks of the Ouarzazate series (PII) and Neogene phonolites.

The Zgounder volcano-sedimentary series comprise a mixed sequence of metavolcanics, metasediments and doleritic and granodioritic intrusives. It outcrops in the form of a window of PII rocks on the south limb of a large east-west trending monocline, strongly dipping to the south. It is surrounded by PIII volcanics and volcanoclastics to the east, basal PII formations to the north, and by the Askaoun granite to the west and southwest.

The geological series of Zgounder was divided into three formations (Demange, 1997), two with a major clastic component intercatated with volcanics (the 'Blue' and 'Brown' Formations) overlain by an acid ignimbritic volcanic complex (the 'Black Formation'), (Figure 32B).

### **Blue Formation**

The Blue formation is 300 to 400 m in thickness, composed of sandstones, greywackes and pelites with interbedded tuffs and quartz-keratophyre. The formation terminates in an orange rhyolitic unit, which forms the ridge to the north of the mineralized zone.

## **Brown Formation**

The Brown formation is 350 to 400 m in thickness and consists of mica schists, arenaceous schists, breccia intercalations, and pelites containing green volcanic clasts overlain by a 45 m thick dolerite sill/dyke. The brown formation is affected by epizonal metamorphism as evidenced by weak schistosity, which is difficult to distinguish from the stratification. This formation is composed of two units: Unit 1 is 120 m in thickness composed of heavily oxidized, coarse mica schists located north of Talat N'ouna; Unit 2 is 280 m in thickness, largely covered by the ancient tailings on the southern flank of the Oued Talat N'ouna. It is composed of a coarse-grained pelite with millimetric clasts in sericitic/chloritic tuffaceous bands. The bands have a volcano-sedimentary origin displaying polymetallic mineralization (pyrite, sphalerite, galena, arsenopyrite, silver sulphide and native silver), (Figure 33).

#### **Black Formation**

The Black Formation is 900 m in thickness, composed of a basal felsic volcanic complex (ignimbrites, rhyolitic breccias, devitrified rhyolites, pyroclastic rocks) forming the hanging wall of the Ag-mineralization in the upper part of the Brown Formation. Farther south, the upper part of the Black Formation is composed by sandstones, greywackes and some thin intercalations of polymictic conglomerate (Figure 32B and 33).





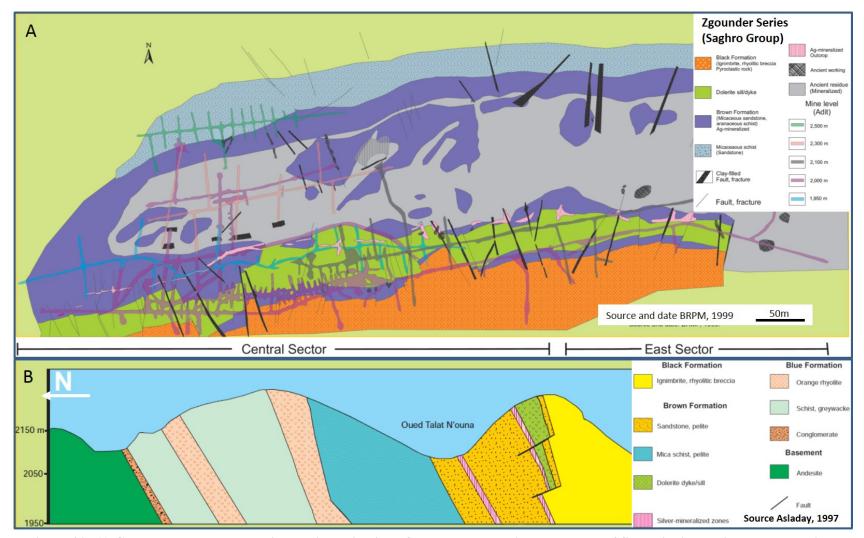


Figure 32: A) Geology, structure, and silver mineralization of the Zgounder mine. The trace of five principal adits and the ancient excavations can also be seen; B) Stratigraphy of the Zgounder volcanosedimentary assemblage with the silver-mineralized zones





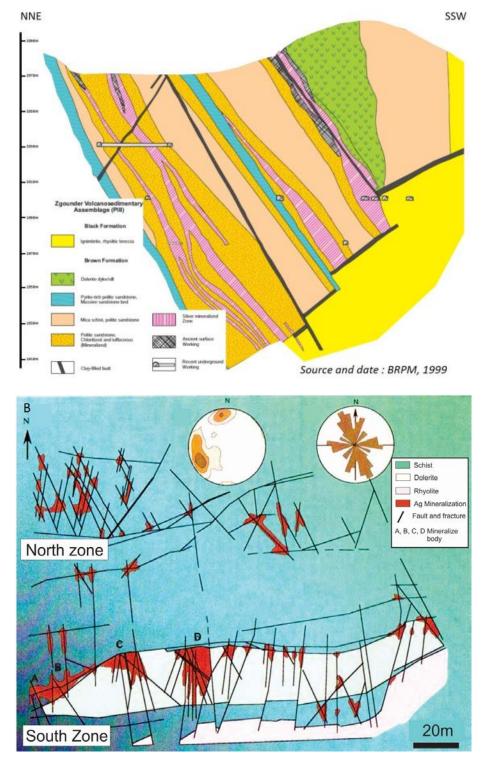


Figure 33: A) Typical NNE-SSW cross section through the Zgounder mine showing the relation between the silver mineralized zones and the lithology; B) Distribution of silver mineralization in the central and northern parts of the mine stereogram and rose diagram representing the faults in this part (after a map established by Popov, Millar & Fettouhi, 1985, scale 1/500).





The Zgounder silver deposit is cross-cut by fractures of variable orientations. There are at least four fractures systems: 1) Late sub-vertical E-W fractures and shear zones; 2) N-S fractures/faults dipping steeply to the east; 3) NNE-NNW-oriented system dipping 60° at a strike of 75°E and 4) A sub-horizontal system of fractures oriented NNE and NNW, which displace the Brown Formation to the north with depth (Bounajma, 2002).

#### 7.3 Mineralization

The silver mineralization occurs at the top of the Brown Formation (sandstones) mainly along the contact and within the dolerite sill. The economic silver concentrations at Zgounder are present mainly as vertical columns, complex clusters, shear zones, veinlets and at the intersection of the E-W and N-S fractures, preferentially at the contact zone between schist and dolerite (Figure 34), (Petruk, 1975; Popov et al., 1989).

Within the bodies, mineralization occurs in millimetric beds, pyritized, as well as veinlets filled by quartz cement and sulphides (Figure 36 and 37). Native silver is observed in complex sets of microfractures, mainly at intersections with sulphide veinlets and locally accompanied by a chlorite rich alteration (Figure 37). Small Ag grains (average size of 50 µm) are also found in corrosion zones of early sulphides or disseminated within the schist and dolerite. Tension gashes originally trapped the silver mineralization within a NNE-oriented shear zone (Figure 35 and 37) affecting the shale-sandstone beds (Brown Formation) that contain anomalous Ag values (Figure 38). The silver was then likely remobilized by EW-oriented structures forming isolated Ag-mineralized lenses and fissures. The silver mineralization extends laterally over 1,000 m with a subvertival dip to the south. The vertical extension of the body is offset by sub-horizontal faults with a northward movement of 10 to 30 m, pushing the mineralized zones in steps or blocks (Bounajma, 2002).

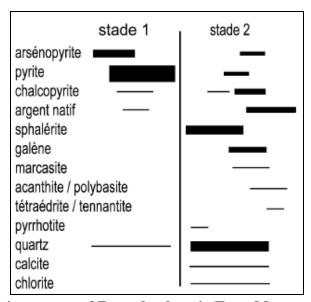


Figure 34: Paragenetic sequence of Zgounder deposit (From Marcoux & Wadjinny, 2005).





According to Marcoux and Wadjinny (2005), the paragenetic sequence of the Zgounder silver deposit (Figure 34) shows two successive stages: an early Fe-As stage (silver-bearing pyrite and arsenopyrite), followed by an Ag-bearing polymetallic (Zn, Pb, Cu, Hg; sphalerite and chalcopyrite) event. The late polymetallic event involved the formation of two generations of sphalerite with Fe-poor and Fe-rich components devoid of silver. Native silver is by far the most common form, representing 1.1 wt% of the concentrate, and 65 to 90% of the total amount of silver at Zgounder. The silver mineralization consists of an Ag-Hg amalgam in the shape of 25 to 480 μm blebs (average 150 to 250 μm). Marcoux and Wadjinny (2005), revealed the presence of two generations of silver amalgam: large Ag-rich patches (85–95 wt% Ag, Ag<sub>17</sub>Hg) presumably corresponding to remobilized mineralization, and "normal" blebs containing 72 to 80 wt% Ag (Ag<sub>3</sub>Hg; close to eugenite), which represent the majority of the native silver deposit at Zgounder. Acanthite (Ag<sub>2</sub>S) is the major silver sulphide but far less abundant than native silver and often includes several micropatches of native silver.

Based on lead isotope ratios (206Pb/204Pb: 17.89 and 207Pb/204Pb: 15.57) measured on the galena crystals of the polymetallic silver stage, the calculated age for the Zgounder silver mineralization is approximately 510 Ma (Marcoux and Wadjinny, 2005) using Stacey and Kramers (1975) model. The Zgounder lead isotopic ratios are similar to those measured at Imiter (206Pb/204Pb: around 18.10; 207Pb/204Pb: around 15.5) with a mineralization age calculated at around 550 Ma (Late-Proterozoic; Pasava, 1994; Cheilletz et al., 2002). The similar ages of Zgounder and Imiter (eastern Anti-Atlas, Morocco) imply that Zgounder is another example of a Neoproterozoic epithermal deposit in the Anti-Atlas of Morocco (Baroudi et al., 1999; Essarraj et al., 1998).



# 8 Deposit Types

The Zgounder deposit is described as a Neoproterozoic, epithermal, hypogene system and shares common characteristics (e.g. Age, Ag-Hg mineralization and epithermal-type model) with the giant Imiter deposit (Marcoux and Wadjinny, 2005).

The Zgounder silver deposition resulted from distinct stages of fluid circulation associated with two major events of mineral deposition (Essaraj et al., 1998):

The first stage was characterized by the deposition of quartz with minor biotite and As-Co minerals with a variety of H2O-CO2-CH4-rich fluids equilibrated with metasediments. These fluids were maintained at high temperatures (around 400-450°C) over a wide range of pressures during the early brittle deformation of the Brown Formation after the emplacement of the Askaoun granite.

The second stage corresponds to the major (Cu-Zn)-Ag(Hg) mineralization deposition and clearly postdates the As-Fe mineralization. Silver deposition occurs after the crystallization of quartz-sphalerite-chalcopyrite veins, but both Cu-Zn and Ag(Hg) mineralized-bearing fluids are NaCl-CaCl2 brines trapped under minimum temperatures of around 160°-200°C.

The origin of the Zgounder silver mineralization are thus Na-Ca brines and the main driving mechanisms for silver deposition are associated with the dilution and cooling process (Essaraj et al., 1998).





# 9 Exploration

In May 2013, Maya contracted GMG to prepare mineral resources (NI 43-101). GMG and SGS (Division Geostat, Blainville) performed two site visits at Zgounder. The first visit involved a detailed survey of the underground levels and sublevels considered fundamental for the preparation of the mineral resources. Gaston Gagnon Ing. from the Geostat division of SGS Canada Inc. (Blainville, Quebec) accompanied GMG on this visit to inspect the dimensions and competence of the rock in existing underground workings. During the second visit, GMG supervised and managed the underground percussion drilling program in order to validate and delineate the mineralized bodies (see section 10 Drilling).

# 9.1 Underground exploration and sampling

Exploration work was conducted in five levels (2000, 2100, 2125, 2150 and 2175) and three sublevels (2035E, 2050E, 2075E) at the Zgounder silver mine by GMG (M. Rachidi, Ph.D.).

The principal mineralized structures were mapped and sampled (Figure 35 to Figure 45). More than 150 rock samples were collected from adits (levels 2000, 2035E, 2050E, 2075E, 2100 and 2125) and mineralization remaining in the stopes (2035E and 2075E). The samples were analysed by XRF using a handheld Niton XL3 XRF with a lower detection limit of 10 ppm. The purpose of using this tool was to obtain prompt measurements of silver (in ppm) and to efficiently identify drill targets. A comparison between XRF analyses and the ALS fire assay values performed on the same drill percussion cuttings indicated that the XRF values were generally similar or lower than the ALS laboratory values (see Figure 66 in Section 11).



Figure 35: A) A large E-W shear zone with fractures filled by galena (arrows); an independent sample was taken from this structure (rock sample 3, table 8). B) Fractures filled by quartz/carbonates (yellow arrow) with arsenopyrite, erythryte (white arrow) and sulphide (black arrow).







Figure 36: A) Quartz/carbonate stockwork (black arrow) with small pockets of galena and sphalerite (yellow arrows), often within pyrite and arsenopyrite. B) A sub-vertical fault filled with argillaceous material containing disseminated sulphides (arrows).

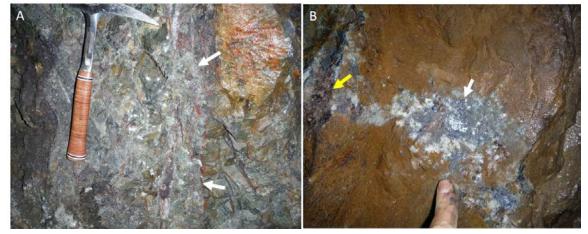


Figure 37: A) A shear zone with quartz, finely disseminated sulphides, and chlorite. B) A fault plane with quartz/carbonate cement hosting galena (white arrow) and sphalerite (yellow arrow).



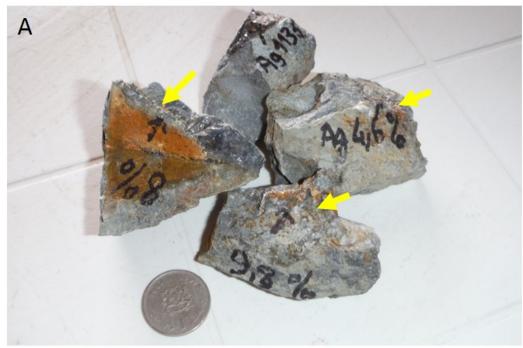




Figure 38: A) Fine veinlets with native silver associated with galena, sphalerite and sulphide. B) Native silver collected by GMG from various levels (2000, 2035E, 2075E and 2125) of the Zgounder silver mine.





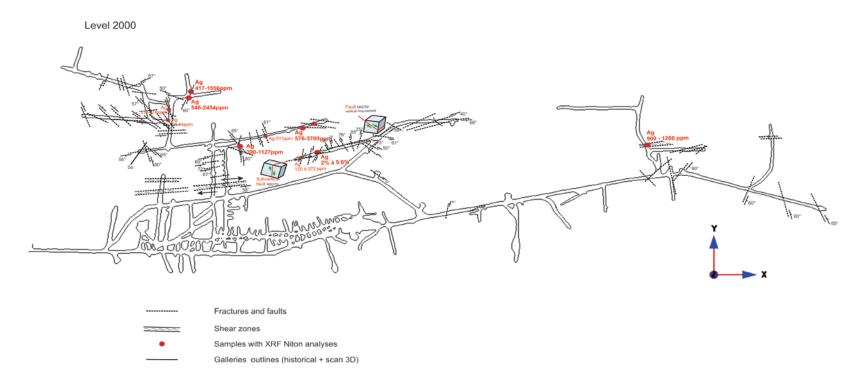


Figure 39: Distribution of fractures/faults and samples collected by GMG at the 2000 level, Zgounder silver mine.





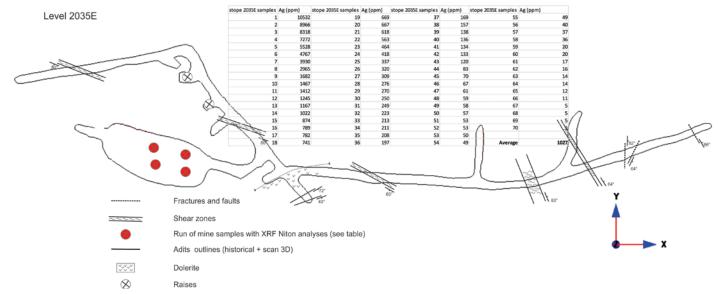


Figure 40: Distribution of fractures/faults and samples collected by GMG at the 2035E level, Zgounder silver mine.

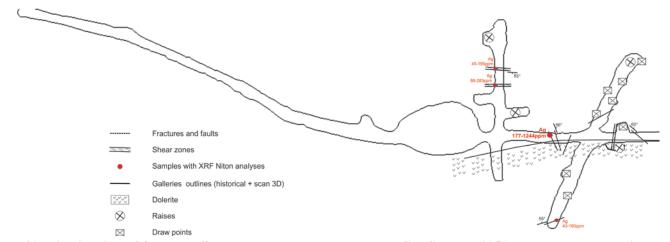


Figure 41: Distribution of fractures/faults and samples collected by GMG at the 2050E level, Zgounder silver mine.







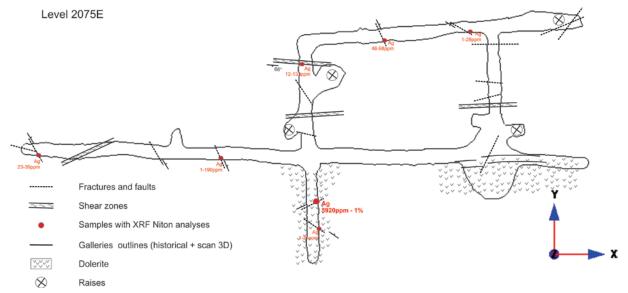


Figure 42: Distribution of fractures/faults and samples collected by GMG at the 2075E level, Zgounder silver mine.

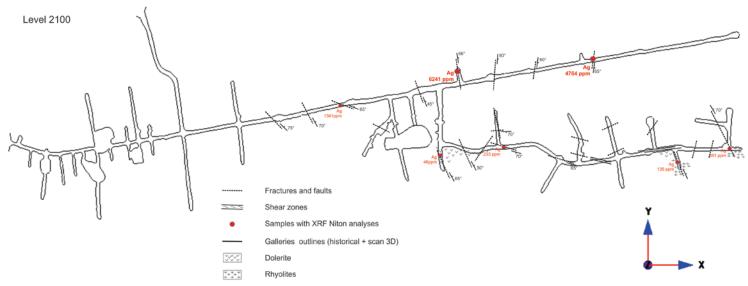


Figure 43: Distribution of fractures/faults and samples collected by GMG at the 2100 level, Zgounder silver mine.







Level 2125

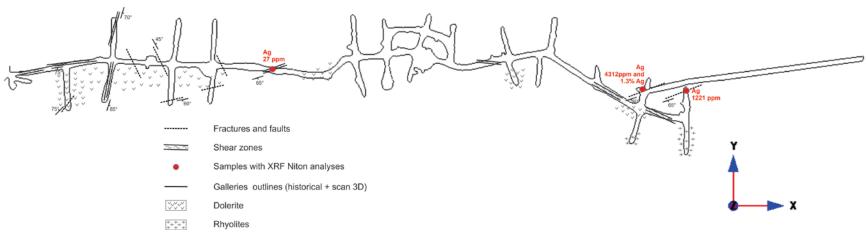


Figure 44: Distribution of fractures/faults and samples collected by GMG at the 2125 level, Zgounder silver mine.

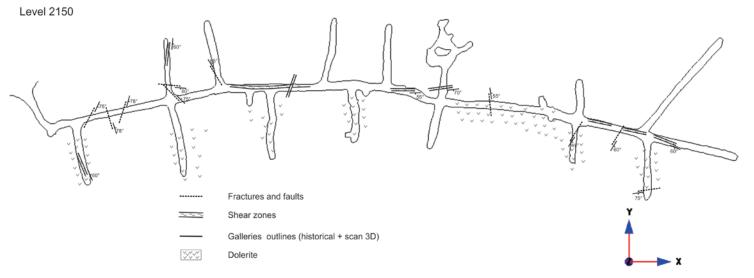


Figure 45: Distribution of fractures/faults and samples collected by GMG at the 2150 level, Zgounder silver mine.







# 9.2 3D laser scanning survey

In April 2013, Maya Gold & Silver contracted Cap-Resources to perform underground 3D monitoring survey of levels, sublevels and stopes using a Laser scanner at the Zgounder silver mine (Figure 46, table 5).



Laser Scanner Faro Photon 120
Focus 0,60 – 120m
Distance accuracy up to ±2mm
Deflector resolution 0,009° (40000 points 3D on 360)
Miror Max speed rotation: 2880 rpm



Laser Scanner Faro Focus<sup>3D</sup> S120
Focus 0,60 — 120m
Distance accuracy up to ±2mm
Deflector resolution 0,009° (40960 points 3D on 360)
Miror Max speed rotation: 5820 rpm

Figure 46: The laser scanner used for the underground 3D monitoring survey.

Table 5: Technical data

Contractor	Cap-Resources (Moroccan company)  56 Résidence Sanaa 2ème étage n° 18, Casablanca 20330, Morocco
Period	April – December 2013
Mission numbers	03 surveys (April, September and December)
Total surveying days	09 days
Levels and sublevels surveyed	5 levels (2000, 2100, 2125, 2150 & 2175) and 7 sublevels (2025, 2030N, 2050S, 2035E, 2050E, 2075 & 2087)







Geometric calibration and total metric surveyed	Lambert conic projection, (Maroc Zone II), around 7000m
Total collars	From 85 GMG drillholes, 17 were surveyed by Total Station and 60 collar coordinates were exported from the 3D scan (compiled in Excel file)
Final products	3D drifts and open stopes in DXF format

Underground adits (levels and sublevels) and the stopes (open space left after extracting mineralized bodies from the underground mine) have been the objects of the 3D laser scanning (Figure 50 to 54).

The laser scanner was placed in select positions and five specific spheres ("targets", Figure 47B) were placed on each side of the scanner with a well-defined geometrical position between the scanner and the object to be scanned. Following the initial scan, the scanner is moved a maximum distance of 30 m to the next scan section (without moving the targets). The second scan is performed and this procedure continues moving forward to complete the survey of the adits.

A specific device was used for the stopes (Figure 48). The laser scanner was fixed on a support and situated to cover the greatest surface area of the stope. For a complete stope survey, two scans were performed per stope, a scan in "normal" position (to reach the maximum upper extents of the stope) and a scan in the "reverse" position (to reach the maximum lower extents of the stope). GMG has detected a small shift between the scan in the normal and reverse position of around 4m for the stope 2075E.



Figure 47: A) Cap Resource team and laser scanner (Faro Photon 120, arrow) with metal support before starting the scan of level 2100 at the Zgounder silver mine. B) Specific spheres (targets) used for scanning the adits.







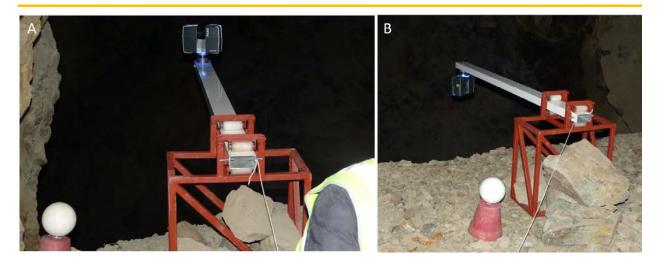


Figure 48: 3D laser scanner (Faro Focus<sup>3D</sup> S120) with a metal support scanning the 2075E stope.

The 3D scan of the adits and stopes was integrated with the mine coordinate system (Lambert conic projection, Maroc Zone II) using three methods depending on various issues encountered (Cap-Resources report, January 2014).

- 1. The first assignment involved positioning several stations at the entrance to each adit to adopt the mine coordinate system. These points were surveyed by Total Station and serve as an anchor points for the adit level scans (Figure 48). This method was affective for the 3D monitoring survey of the main levels with the exception of level 2000, where a substantial shift was detected (approximately 15 meters) due to the magnitude of this level;
- 2. The second assignment focused on correcting the shift at the northern and eastern extent of level 2000 using a combination of the laser scanner and Total Station;
- 3. The third assignment involved using several topographic reference points "broches" in each level to georeference the scans. In each sublevel, several "broches" visible to the laser scanner (at least five by sublevel) were identified and their registered coordinates taken from the surveyors' office at the Zgounder site (the "broches" coordinates are registered by SOMIL).









Figure 49: Anchor points at the entrance of the 2000 level.

During the first assignment in April 2013, the 3D scan covered approximately 75% of the main five levels that were accessible at the Zgounder silver mine (2000, 2100, 2125, 2150 and 2175). The 3D scan confirms the drift locations and remaining rock in place on the surveyed levels. Technominex Africa reopened areas where drift access was blocked by debris and muck to ensure these sections could be surveyed during the second assignment (September 15-16<sup>th</sup>, 2013).

In September 2013, a combination of laser scanner and Total Station was used to correct an offset of approximately 15 meters detected at the northern and eastern extents of level 2000. Seventeen of the GMG percussion drillhole collars were surveyed using Total Station at this time. In addition, a 3D scan of the accessible parts of sublevels 2035E and 2050E, and the 2035E stope were completed.

During the last assignment in November 2013, five sublevels were scanned (level 2025, 2030N, 2050S, 275 and 2087), as well as the stopes at levels 2075E, 2087, 2100 and 2125. Some of these sublevels are only partially surveyed due to a lack of access. Unfortunately the 3D scan of the stope at level 2125 is not georeferenced and cannot be used for mineral resource estimates. Sublevel 2035E was resurveyed at this time to account for missing details due to the previous presence of muck and steel debris. The 3D scan survey confirmed the location and presence of various openings and drifts at the Zgounder silver mine. The scan also confirmed that most of the mineralized panels identified by CMT (historical data) are still in place (confirmed on scanned levels).

The results of the 3D monitoring survey were integrated with the 3D resource model using Genesis, a modeling and estimation software developed by SGS Geostat. This allowed GMG to visualize the mined material within the mineralized envelopes and to account for this missing volume during estimation (see section 14).









Figure 50: A 3D underground laser scan of various levels and sublevels at Zgounder silver mine.

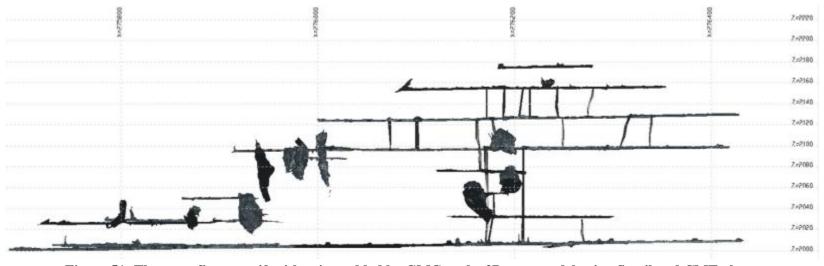


Figure 51: The same figure as 49 with raises added by GMG to the 3D scan model using Somil and CMT plans.







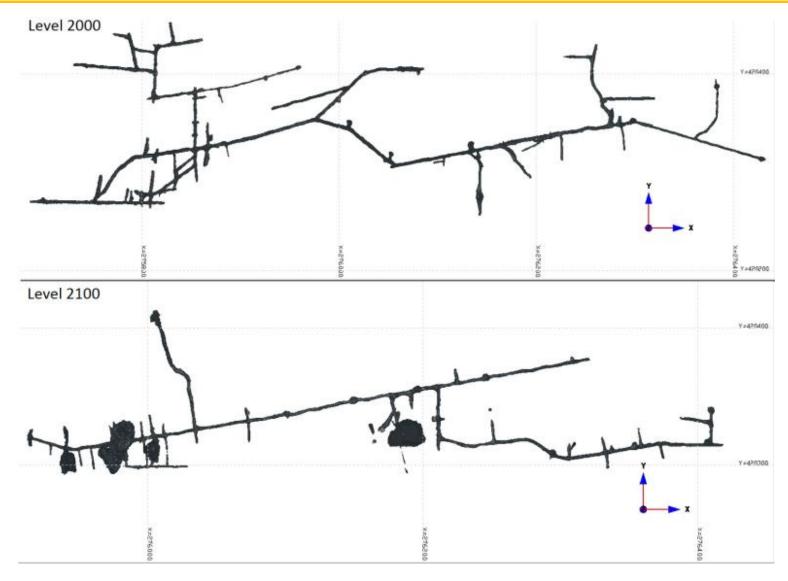


Figure 52: Plan views of the 3D scans for the 2000 and 2100 levels.







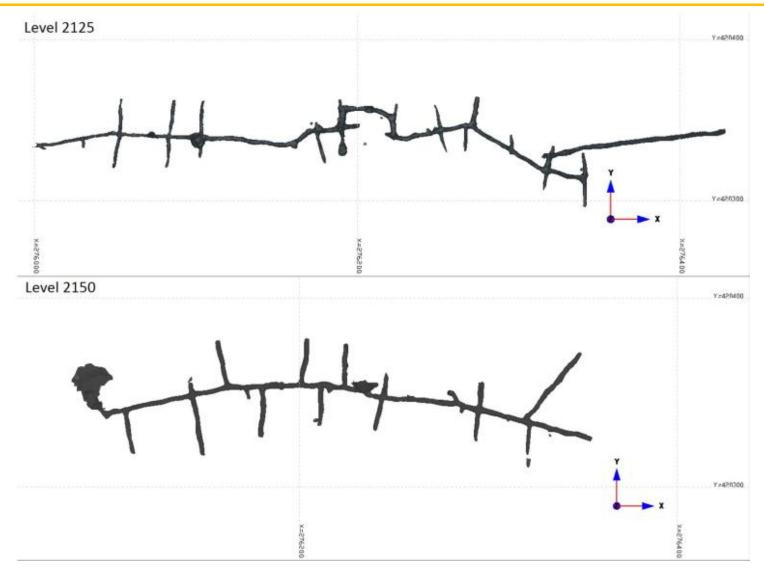


Figure 53: Plan views of the 3D scans for the 2125 and 2150 levels.







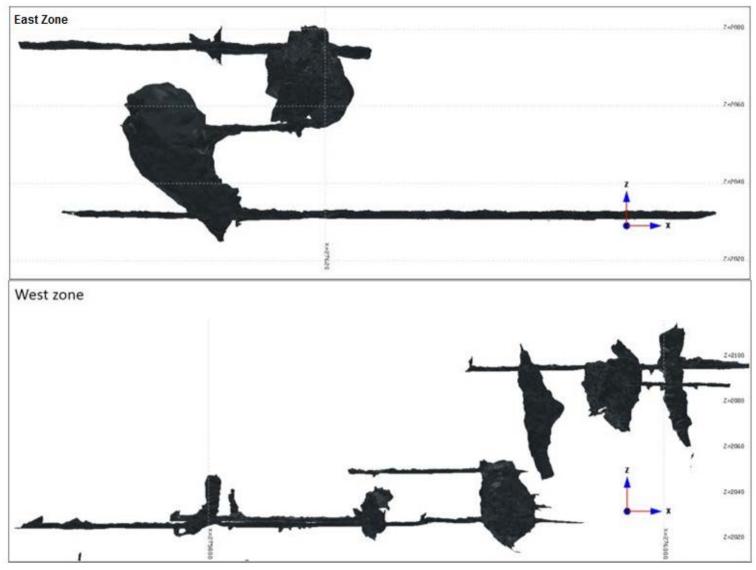


Figure 54: Cross-sectional view of the east and west zones of the mine.







# 10 Drilling

# 10.1 Percussion drilling campaign 2013

The Moroccan office of Maya Gold & Silver hired local mining contractor, Technominex Africa, for underground percussion drilling and underground mining development (Figure 55).



Figure 55: Technominex Africa percussion drill team.

GMG managed and supervised the percussion drilling campaign at the Zgounder silver mine. Claude Duplessis, Senior Engineer for GMG, visited the site and took independent samples from two holes at the beginning of the percussion drilling program. Level 2000 and 2035E were the subjects of the drilling operation. Three types of hammer drills (T23, T28 and hammer YAK) were used during this campaign (Figure 56 and Figure 57). Only T23 and T28 drill hammers were used in level 2035E due to the narrow adits width.

Eighty-five (85) underground percussion holes were drilled for a total of 1,870.50 meters (Figure 58 – 62). Out of the 85 holes, 73 underground percussion holes were drilled at the 2000 level (24 holes in the central zone, 37 holes at the eastern extent and 12 holes at the northern extent) and 12 underground percussion holes were drilled at the 2035E level. Seven hundred and ninety-nine (799) samples were collected from the T23/T28 percussion drills and seven hundred and forty-eight (748) samples were collected from the YAK percussion drilling.





Nine (9) out of eighty-five (85) holes had to be abandoned before reaching the target and thirteen (13) holes were stopped in mineralized zones due to intersections with shear zones, hardness of rock and/or mechanical problems.



Figure 56: T28 drill in eastern zone of 2000 level. The green bucket is collecting the cuttings.



Figure 57: YAK percussion drill on a steel frame at the entrance of the 2000 level.





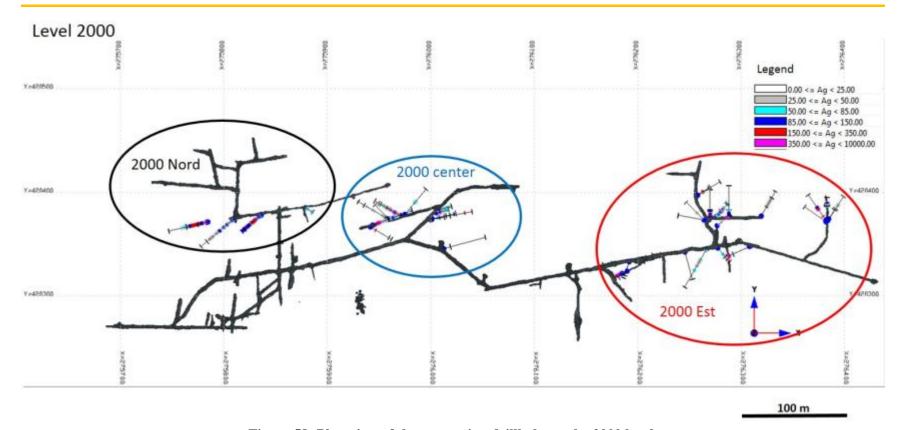


Figure 58: Plan view of the percussion drillholes at the 2000 level.







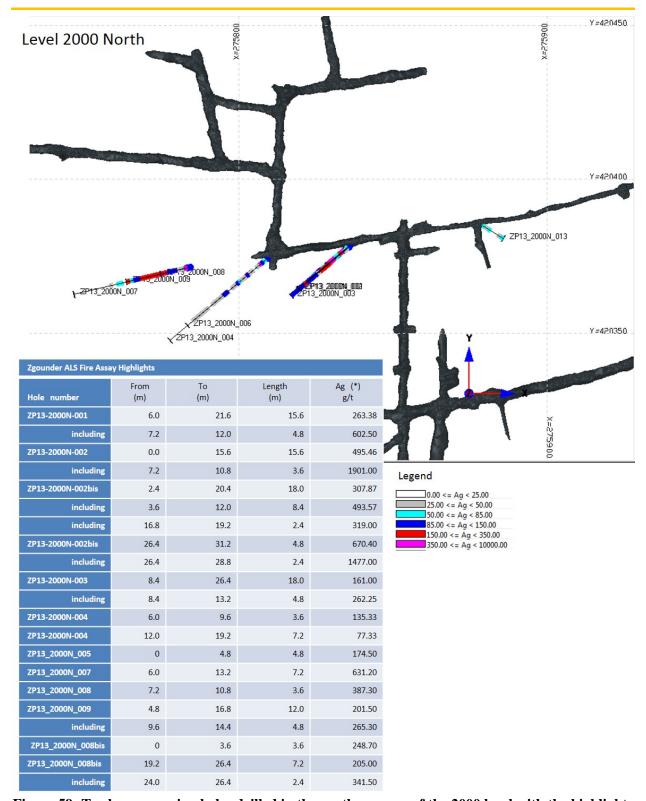


Figure 59: Twelve percussion holes drilled in the northern zone of the 2000 level with the highlights of the ALS fire assays.







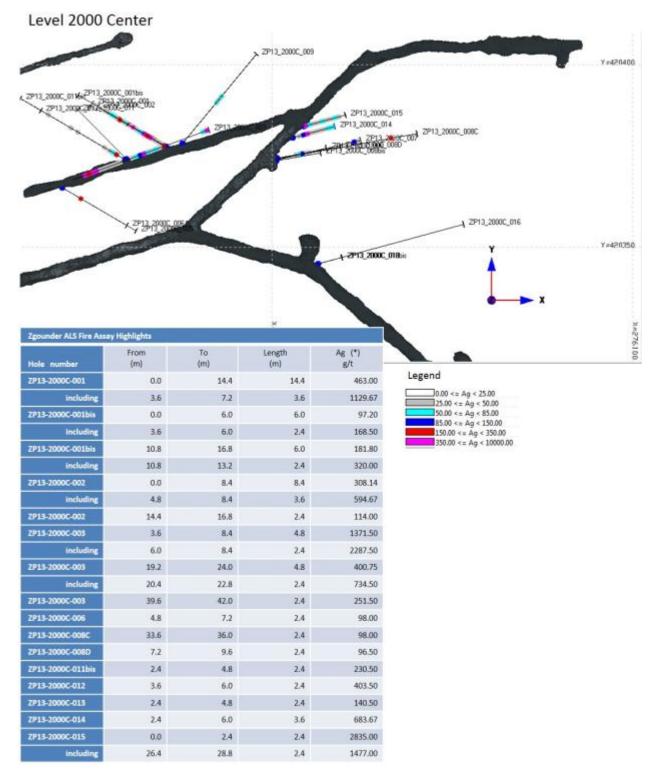


Figure 60: Twenty four percussion holes drilled in the central zone of the 2000 level with the highlights of the ALS fire assays.







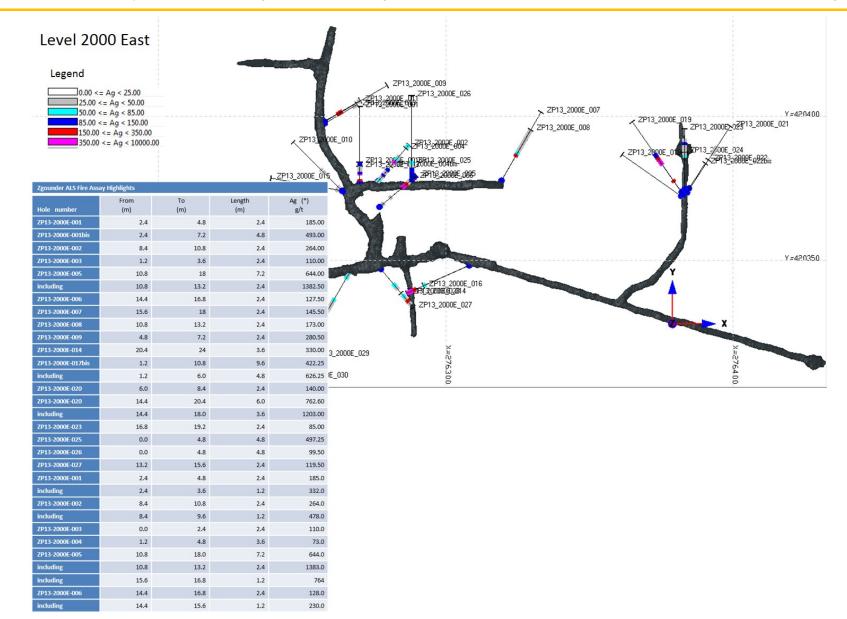


Figure 61: Thirty seven percussion holes drilled in the eastern zone of the 2000 level with the highlights of the ALS fire assays.







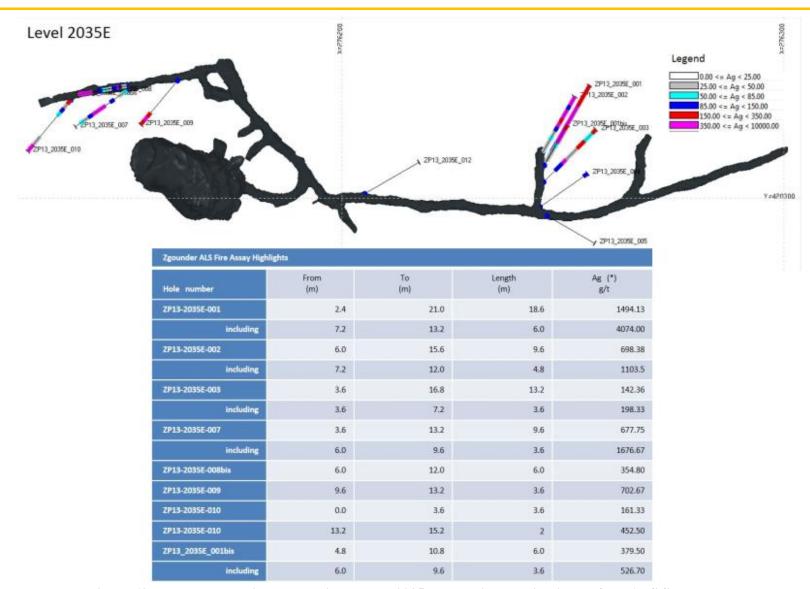


Figure 62: Twelve percussion holes drilled at the 2035E level with the highlights of the ALS fire assays.







# 11 Sample Preparation, Analysis and Security

Only a restrictive amount of information regarding sampling and analysis was found for the historical operations. Recent drillholes were oriented under the supervision of GMG. Water was circulated in the drillhole to collect the cuttings in buckets (Figure 56). The length of each sample (cuttings) is 1.2 m. The T28 and T23 percussion drill bit diameter is approximately 32 mm and the YAK percussion drill bit diameter is approximately 45 mm. Samples drilled by the YAK are larger and their weights may exceed 2 kg each after the drying process.

Cuttings samples are removed from the bucket and into a plastic bag and grouped by drillhole (Figure 63A). Sample bags are then transported to the core shack and emptied separately into small trays. A number is assigned to each sample for easy identification after the drying process (Figure 63B). Samples are placed in the oven at a low temperature until they are fully dried, typically between 12 to 16 hours (Figure 63C). After drying, each sample is divided in two using the Jones riffle separator (Figure 63D). One part is placed in a tightly sealed plastic bag with a laboratory identification number (tag Goldminds Geoservices Inc.) and grouped in sealed plastic buckets (Figure 63F), which are sent to the ALS laboratory in Val-d'Or, Canada (from the Zgounder core shack to the Agadir FEDEX office, onwards to Montreal and finally the Val-d'Or ALS laboratory). Two samples are then taken from the witness cuttings: a small split sample (5-10 grams) for XRF analysis and another small sample (~ 15 grams) that is placed in a plastic (composite sample), sealed box and clearly identified for analyses under binocular microscopy (Figure 64). The remaining sample material is kept for archive in a well organized area in the core shack (Figure 63E).







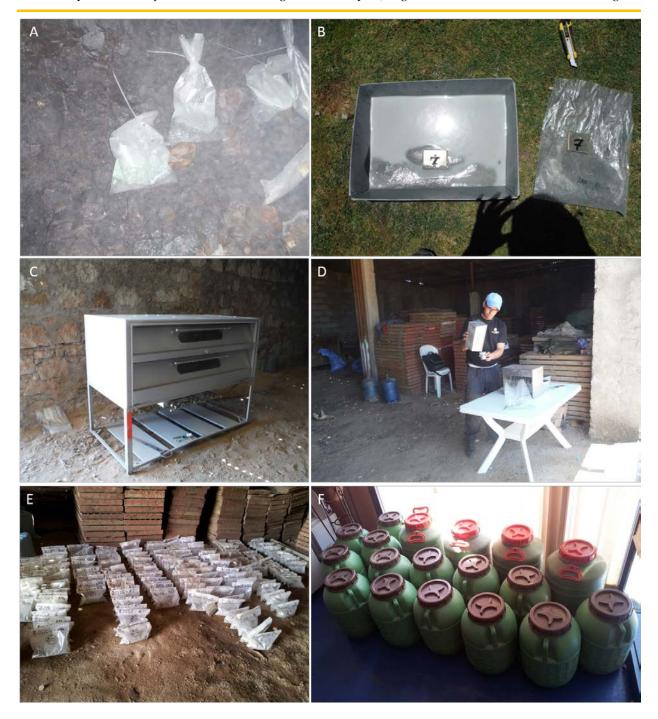


Figure 63: Percussion drill sampling protocol established by GMG at the Zgounder silver mine.







Figure 64: A) Composite samples taken after the drying process. B) Binocular microscopy used for petrographic analyses of select samples. C) Niton XL3t XRF used to analyze small samples (~ 5g).



Figure 65: A) YAK sample (cuttings); the plastic bag on the left corresponds to a quarter of the cuttings prepared to be sent to ALS laboratory, the other plastic bag is kept in the core shack for archives. B) Percussion drill samples taken by the T28 drill hammer.







As previously mentioned, cuttings samples from the YAK percussion drillholes (Figure 65A) are larger than those drilled by the T23 and T28 percussion drills (Figure 65B). The weight of the YAK percussion drill samples can exceed 2 kg. Transporting half of each YAK percussion drill sample to Canada for fire assay analysis is costly. To reduce the cost, only a quarter of each YAK percussion drill sample was sent to the ALS laboratory in Val-d'Or. Prior to commencing full-scale analyses of the reduced sample size, samples sizes of ½ and ¼ of each YAK percussion drill sample were sent for fire assay to observe the effect of weight splitting on the fire assay analyses (Figure 66). The correlation between the ½ split and ¼ split for YAK samples was good; following this, only ¼ split YAK samples were submitted to ALS for fire assay analyses.

A field XRF provided by ONHYM was used at site under the supervision of GMG. This interactive exploration method was implicated by GMG to increase the efficiency of the drill program. Samples from holes that reached target depth, and that were mineralized as identified by XRF, were sent to the ALS laboratory in Canada (Val-d'Or, Quebec) for analysis by fire assay with gravimetric finish. A total of sixty-nine (69) drillholes were the object of fire assay. The remaining sixteen drillholes were not submitted for analysis as they did not reach target depth or the XRF results were less than 30 ppm Ag.

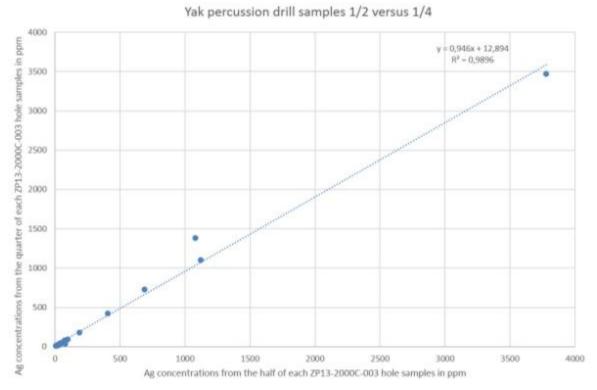


Figure 66: A graph displaying the distribution of Ag concentrations of ½ versus ¼ of samples from YAK percussion drillhole ZP13-2000C-003.

Figure 67, displays the positive linear relationship of the XRF versus ALS analytical values, particularly for values less than 700 ppm Ag. The distribution of results is encouraging to apply this approach in future.







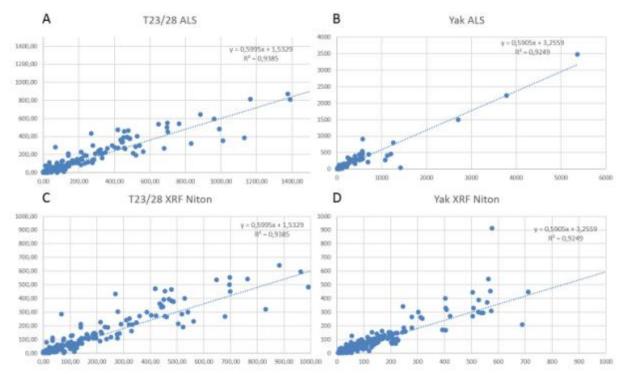


Figure 67: Comparison of XRF analyses on site and fire assay analyses by ALS. A,C) ALS and XRF sample values from holes drilled by a T23 and T28 percussion drill. B,D) ALS and XRF sample values from holes drilled by a YAK percussion drill.







## 11.1 Sample preparation at the laboratory

Chemical analyses for the percussion drilling samples from the 2013 campaign at the Zgounder silver mine were performed at the ALS laboratory in Val-d'Or, Quebec, Canada.

Eighty-five (85) underground percussion holes were drilled, totaling 1,547 samples excluding blanks and standards (799 samples drilled by the T23/T28 percussion drills and 748 samples drilled by the YAK percussion drill). Samples from 69 holes were analyzed by fire assay, resulting in 1,037 samples (excluding blanks and standards).

Upon reception, the laboratory weighed the samples (WEI-21) and then pulverized at  $85\% < 75\mu m$  (PUL-31). Following this, samples are crushed (PUL-QC) and prepared for fire assay. Samples were analyzed for high grade silver, which includes fire assay on a 50g sample followed by gravimetric finish (Ag-GRA21).

GMG inserted a blank and two custom standards at random in every batch of approximately 10 samples. The custom standards were prepared by GMG using one well mixed sample from the old tailings (STD I) and another mixed sample from the recent tailings (STD II). The fire assay analytical results for STD I displayed an average of 114g/t Ag (n: 19 samples) and a maximum of 131g/t Ag. STD II displayed an average of 83g/t Ag (n: 35 samples) and a maximum of 88g/t Ag. The last analytical certificate was received on December 20th, 2013. For the first batch of independent samples we sent a duplicate form each samples to the ALS laboratory.

# 11.2 Quality Assurance/Quality Control (QA/QC) program

The integration of blank and standard samples by GMG verified the accuracy and precision of the ALS results. In addition, achieving XRF analyses at the Zgounder property before sending samples to the ALS laboratory assisted (GMG) for the identification of the mineralized intervals and the planning of the drilling targets. Figure 67, show the linear relationship between the XRF and ALS laboratory values of the same samples and all mineralized intervals identified first by XRF analyses were confirmed by the ALS laboratory values.

GMG did not visit the ALS laboratory in Val d'Or but it has a reliable industry reputation and work was completed in a professional manner. The results from the combination of blanks, standards, field duplicates and the ALS's internal QA/QC met the quality criteria, indicating Maya can rely on these values for the sample program.







## 11.3 Security

Underground sampling, sample preparation, sample handling and transport followed a protocol established by GMG that included a strict chain of custody from the initial sampling in the mine to the point of shipping in Agadir, Morocco, via FEDEX.

Sampling was performed by sample crews working under the supervision of GMG. Percussion drill samples were transported from the mine to the core shack and registered in a log book, all under the supervision of GMG.

At the end of the sampling sequence during the drying and separation process, the GMG supervisor added laboratory numbers (tags) to each sample. Tag numbers were entered in an Excel file and confirmed prior to each shipment to the ALS laboratory. All samples were sent to ALS in sealed containers (Figure 63F) that were inspected for integrity upon arrival. No damaged containers or sample were reported.

The authors believe that the sample preparation, security, and analytical procedures were adequate and well suited for the purpose of this drilling program. Not one lost sample was reported during the percussion drilling campaign.







## 12 Data Verification

# 12.1 The independent analytical program

GMG verified the 2013 percussion drilling analytical results and integrated the batches into a database.

The percussion drillhole collar locations were partially surveyed by Cap-Resources. Only 17 of 85 percussion drillhole collars were surveyed using Total Station and 60 of 85 were surveyed using the 3D scan by manually extracting the drillhole collar coordinates. Cap-Resources did not survey the collar azimuth and dip of each drillhole as requested and specified by GMG. The azimuth and dip were measured by GMG geologist, using a compass and refers to the orientation of the drift wall. Drillhole lengths were measured by recording the number of drill steels used (each drill steel corresponds to 1.2 meters length).

### 12.2 The database

#### 12.2.1 The historical database

The historical database is composed of surface and underground drill core data, including percussion drillhole and drift samples. The database was compiled by Goulex. GMG verified this database by examining the paper records (Somil and CMT Geochemical plans) and comparing them to the electronic equivalent. GMG verified the majority of the historic drillhole positions by locating the collars underground (levels 2000, 2035E, 2050E, 2075E, 2100, 2125, and 2150). Several errors were identified (with regard to both collars position and duplicated collars) and corrected in the new compilation of the historical database. Certain collar positions were slightly adjusted to fit with the 3D scan wall. These changes are an improvement as the 3D scan was not available for the initial database compilation where collar locations had been confirmed using drill logs and mine plans.

The majority of the drillhole and drift sample elevations were corrected using the information from the 3D scan (levels 2000, 2035E, 2050E, 2075E, 2087, 2100, 2125, and 2150).

The historical database included 1,356 collars in September 2013 (including diamond drillholes, percussion drill holes and drift samples). Additional historical data (mining plans of some levels) were recently digitized by Goulex and verified or corrected by GMG. The historical database of the Zgounder silver mine is composed of 1,823 collars and 35,163 assays at December 2013 (Table 6).



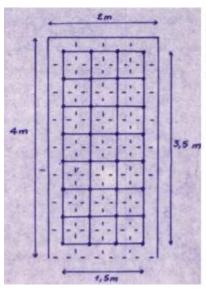




<b>Table</b>	6:	<b>Types</b>	of historica	l data.
--------------	----	--------------	--------------	---------

Hole type and drift	Collar	Total meters (m)	Total samples	Survey deviation
Surface diamond drill holes	34	7,349.3	7,011	For 10 holes
Underground diamond drillholes	131	9,458.22	7,516	For 27 holes
Underground percussion drillholes	996	17,655.25	13,238	
Channel drift sampling (converted to points)	662	9,132.39	7,398	
TOTAL	1,823	43,595.16	35,163	

The sampling method for diamond drillholes (DDHS and DDHU) in the historical database involved analyzing half of the core. Grids were used for drift samples; they were 3.5 m long and 1.5 m wide with a mesh of 0.5 m x 0.5 m). Thirty-two (32) grid samples of approximately 600 g each were taken (Figure 68).



# Sampling grid

- Dimensions 1,5m X 3,5m
- Mesh: 0,5m X 0,5m
- Sample number: 32

Figure 68: Drift sampling method imposed by SOMIL.







There are no certificates of analyses for assay results within the historical database. The author thus considers all quoted mineral resource estimates prior to 2004 as 'Historical Mineral Resources'. It should be noted that GMG encountered some irreproducible Ag results for the same mineralized interval in two planes of the same level. However, GMG has performed ample verification and validation to rely on the historical database of the Zgounder mine (see section 12.2.2).

### 12.2.2 Goldminds Geoservices Database (2013 percussion drill campaign)

GMG supervised the percussion drilling campaign at the Zgounder silver mine. Eighty-five (85) percussion drillholes were drilled at the 2000 (73 holes) and 2035E levels (12 holes). The drilling targets, implementation, sampling and transport were supervised by GMG.

The results of the independent percussion drilling campaign allowed GMG to validate select mineralized zones identified in the historical database, as well as explore new mineralized zones in the eastern sector of level 2000. Samples from 69 holes were fire assayed, corresponding to a total of 1,037 samples (excluding blanks and standards). Fifty-two of sixty-nine percussion drillholes intersected significant silver mineralization.

### 12.3 Independent sampling – 2013 personal inspection

Claude Duplessis, Senior Engineer, GMG, is a Qualified Person as defined by the NI 43-101. Mr. Duplessis visited the Zgounder silver mine from June 3<sup>rd</sup> to 10<sup>th</sup>, 2013 and organized the preparation and sampling protocol.

A total of 28 independent samples were taken. Twenty-five (25) cuttings samples were taken from two percussion drillholes (ZP13-2000E-001 and ZP13-2000E-010, table below) and three rock samples were taken from EW-trending structures in the eastern area of level 2000 (Figure 35). The standard material for the site QA/QC program was also designed. The author included the sealed independent samples in his luggage to Montreal were he sent them to the ALS laboratory in Val d'Or; results are presented in Table 7. Sample and duplicate fire assay values are quite similar and no abnormal values were detected (Figure 69).







Table 7: ALS fire assay values of independent samples and respective duplicates.

Hole Name	From	То	Length	Ag ppm (GRA-21)	Ag ppm (GRA-21) dup	Sample Number   Observations
Blank				-5		20
STDI				96		21
ZP13_2000E_010	0	1,2	1,2	23	20	24 Cutting
ZP13_2000E_010	1,2	2,4	1,2	15	15	25 Cutting
ZP13_2000E_010	2,4	3,6	1,2	11	10	26 Cutting
ZP13_2000E_010	3,6	4,8	1,2	12	12	27 Cutting
ZP13_2000E_010	4,8	6	1,2	12	11	46 Cutting
ZP13_2000E_010	6	7,2	1,2	8	6	47 Cutting
ZP13_2000E_010	7,2	8,4	1,2	18	20	48 Cutting
ZP13_2000E_010	8,4	9,6	1,2	36	38	49 Cutting
ZP13_2000E_010	9,6	10,8	1,2	11	13	50 Cutting
ZP13_2000E_001	0	1,2	1,2	10	9	28 Cutting
ZP13_2000E_001	1,2	2,4	1,2	6	5	29 Cutting
ZP13_2000E_001	2,4	3,6	1,2	307	366	30 Cutting
ZP13_2000E_001	3,6	4,8	1,2	32	37	31 Cutting
ZP13_2000E_001	4,8	6	1,2	18	18	32 Cutting
ZP13_2000E_001	6	7,2	1,2	19	21	33 Cutting
ZP13_2000E_001	7,2	8,4	1,2	13	14	34 Cutting
ZP13_2000E_001	8,4	9,6	1,2	16	14	35 Cutting
ZP13_2000E_001	9,6	10,8	1,2	11	11	36 Cutting
ZP13_2000E_001	10,8	12	1,2	10	9	37 Cutting
ZP13_2000E_001	12	13,2	1,2	7	8	38 Cutting
ZP13_2000E_001	13,2	14,4	1,2	9	10	39 Cutting
ZP13_2000E_001	14,4	15,6	1,2	6	5	42 Cutting
Blank				-5		40
STDI				69		41
ZP13_2000E_001	15,6	16,8	1,2	10	9	43 Cutting
ZP13_2000E_001	16,8	18	1,2	12	9	44 Cutting
ZP13_2000E_001	18	19,2	1,2	9	10	45 Cutting







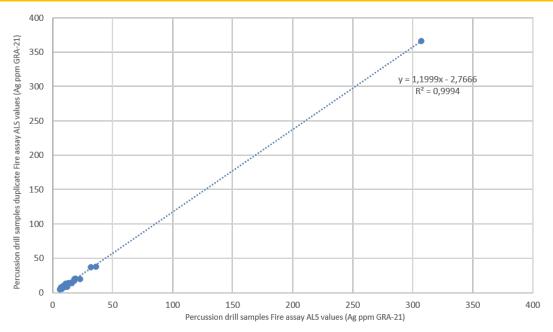


Figure 69: Percussion drill samples and respective duplicate fire assay values.

The independent samples taken from the underground mineralized zones (veins and shear zones) at the Zgounder silver mine confirmed the presence of high grade silver which can exceed 10,000 g/t Ag (Table 8).

Table 8: Independent rock samples taken from the eastern area of the 2000 level.

Hole Name	Ag ppm (GRA-21)	Ag ppm (AA-62)	Sample Number	Observations
Rock sample 1	126	132	1809	Vein E-W with galena
Rock sample 1 dup	120	138	1809-D	
Rock sample 2	20	20	1810	Shear zone with malachite and quartz
Rock sample 2 dup	15	19	1810-D	
Rock sample 3	>10000	>1500	1811	Vein E-W with galena
Rock sample 3 dup	>10000	>1500	1811-D	
STDI	131,75 (average n20)	126	1812	
STDII	84,55 (average n20)	79	1813	

Two custom made standards were used in the site QA/QC program; one sample from the old tailings (STDI) and another from the recent tailings (STDII). Approximately 50 kg from each tailings site were transported using a donkey to the core shack. Samples were separately mixed/homogenized using the Jones riffle splitter and inserted in small plastic bags identified as STDI or STDII. A total of twenty (20) samples from both custom standards were submitted to ALS for ICP analysis to examine the homogeneity, and returned excellent results. STDI displayed a minimum value of 125 ppm and a maximum value of 138 ppm Ag with an average of 131.7 ppm.







STDII displayed a minimum value of 81 ppm and a maximum value of 88 ppm Ag with an average of 84.5 ppm (Figure 70).

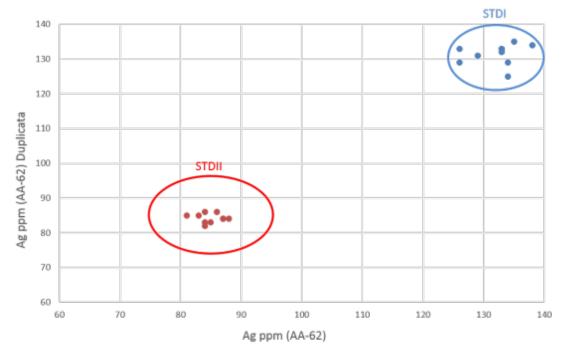


Figure 70: Custom standards STDI and STDII and their duplicate analyses.

Maya Gold and Silver is satisfied with the drilling operations; no incidents or errors occurred during this drilling campaign under the GMG supervision.





# 13 Mineral Processing and Metallurgical Testing

### 13.1 Introduction

In 1998, at the request of Icelandic Gold Corporation, ACA Howe International Limited visited the Zgounder property. The objective of the visit was to gather geological and processing information. During the visit, a series of check samples of outcropping mineralization, as well as ancient and modern tailings were collected.

After the field trip, ACA Howe visited the "Bureau de Recherche et de Participation Minière" (BRPM) in Rabat where a single, pertinent report detailing the Zgounder metallurgy was found entitled D.V.E.M./D.M./No 406 "Essais de Valorisation du Minerai Argentifère de Zgounder en Laboratoire et en Usine Pilote". The report was prepared by A. Ammor of the BRPM in 1978.

The report contains information regarding metallurgical test work performed on samples prior to building the plant and involves both laboratory and pilot plant test work. The following represents a summary of the relevant portions of the report:

Four samples were submitted for test work; however the first two were not considered representative and were rejected. Samples from Lot 3 and Lot 4 representing the ancient tailings (1) and underground material respectively were used for the test work (2).

The lots assay results are as follows (3):

Lot 3 (ancient tailings): 250 g/t Ag

Lot 4 (underground mineralization): 350 g/t Ag

Silver is present with sulphides or gangue minerals but principally as native silver.

Notes (1) Tailings from very ancient exploitation(s), long before Zgounder modern mining operation

(2) The ACA Howe report is in appendix

(3) Only silver values are provided in this report since it is the only metal of commercial value







## 13.2 Mineral Processing and Metallurgical Testing

## 13.2.1 Ancient Tailings (Lot 3) Testwork

### **Flotation**

A 100 kg/h pilot plant flotation test on Lot 3 (ancient tailings) resulted in the following optimum parameters:

•	Fineness:	90% <74 μn
•	рН:	7.6 (natural)
•	PAX (collector):	30  g/t
•	MIBC (frother):	20  g/t
•	Sodium Silicate:	$600  \mathrm{g/t}$
•	Aeropromotor:	26 g/t

The following results were obtained:

•	Ag feed:	240 g/t
•	Ag tails:	$100 \mathrm{g/t}$
•	Ag concentrate:	31.25  kg/t
•	Ag recovery:	58.6%

Natural pH (6.5-7.6) was found to be the best for silver flotation. No improvement occurred from the addition of copper sulphate.

# Cyanidation of Flotation Tails

Pilot plant leaching of the flotation tails from Lot 3 resulted in the following optimum parameters:

•	Fineness:	90% <74μm
•	% solid:	40%
•	Cyanide consumption:	1.31 kg/t
•	Lime consumption:	1.0  kg/t
•	pH:	11.0
•	Leaching time:	15 hours
•	Ag recovery:	82.8%







Flotation and cyanidation of the flotation tails for Lot 3 (ancient tailings) produced a total recovery of 92.4%, 56.2% from flotation and 36.2% from leaching of the flotation tails (1).

Note (1) We assume that the flotation part of the flotation-cyanidation pilot test reported in this paragraph is not the same as the one reported for the pilot flotation alone.

### **Cyanidation Only**

Pilot plant direct cyanidation of the lot 3 (without flotation) yielded the following optimum parameters:

Fineness: 95% <74μm</li>
 % solid: 40%
 Cyanide consumption: 3.0 kg/t
 Lime consumption: 1.20 kg/t
 pH: 10.0
 Leaching time: 24 hours
 Ag recovery: 93.8%

### 13.2.2 Underground Mineralized Material (Lot 4) Testwork

# Cyanidation only (2)

Pilot plant cyanidation of the total material for Lot 4 without flotation yielded the following optimum parameters:

Fineness: 96% <74μm</li>
 % solid: 40%
 Cyanide consumption: 3.0 kg/t
 Lime consumption: 1.20 kg/t
 pH: 10.0
 Leaching time: 24 hours
 Ag recovery: 93.0%

Note (2) There is no mention of flotation for the underground material in the ACA Howe report.

## 13.2.3 Bureau de Recherches Géologiques et Minières (BRGM) Testwork

When in operation, the Zgounder silver mineralized material was processed in a direct cyanidation mill. The mill feed rate was approximately 200 tonnes per day and the silver recovery was in the 85% range. In 2003, the owner of the property, the Compagnie Minière Touissit (CMT), was evaluating methods to resume the operation while increasing the mill feed rate by adding to the mill a flotation and/or a gravity circuit before the cyanidation.







In order to attain this goal CMT asked the BRGM to run a series of physical concentration tests (flotation and gravity). The aim was to diminish the feed to the cyanidation circuit. If physical concentration would prove feasible, flotation and/or gravity tailings would then be leached in the present cyanidation circuit. The BRGM completed the test work and in August 2003 issued a report authored by Mr J-F Thomassin titled: Valorisation du minerai d'argent de Zgounder (Maroc) -BRGM/RC-52507FR.

## 13.2.4 **BRGM Testwork**

#### **Flotation**

The study of the concentration of the silver by flotation was made at two different mineralized material finenesses:  $P_{80}$  = 90  $\mu m$  and  $P_{80}$  = 50  $\mu m$ .

Due to the fact that the Zgounder mill cannot presently grind finer than  $P_{80} = 90 \mu m$  to obtain a decent silver recovery, only the flotation test work performed at this fineness is detailed in this report.

### Flotation Parameters:

PAX:  $250 \, g/t$ Lime:  $2.0 \text{ kg/t}^{(1)}$ Flotation time: 5.0 min. pH:

Natural (7.67)

Notes (1) BRGM water must be particularly acidic if 2.0 kg/t of lime is required to bring it to a pH of 7.67

### Flotation results:

	Weight recovery	Ag	Distribution
	0/0	g/t	%
Concentrate	17.65	300.0	77.2
Tails	82.35	19.0	22.8
Calculated grade	100.00	68.6	100.0
Analyzed grade		72.0	

N.B. Conditioning with copper sulphate (CuSO<sub>4</sub>) or sodium sulfite (Na<sub>2</sub>S) did not improve the recovery.

## Gravity







Gravity testwork was done on a Wilfley table. There is no indication in the BRGM report of the fineness of the material. Even though gravity testwork is generally done at a coarser grind than flotation testwork, we can only presume that the material was ground at a  $P_{80} = 90 \mu m$  since the aim of the gravity testwork was to eliminate a good portion of the material while leaching only the gravity concentrate.

## Gravity results

	Weight recovery	Ag	Distribution
	0/0	g/t	0/0
Concentrate	1.16	2110.0	31.2
Middlings	0.94	190.0	2.3
Tails	97.90	53.0	66.5
Calculated grade	100.00	78.1	100.0
Analyzed grade		72.0	

# Cyanidation – Mineralized Material "as is" $P_{80} = 90 \mu m$

# Cyanidation parameters

Time	Fineness	Solid	Ca(OH) <sub>2</sub>	NaCN	pН	NaCN	Ag
Hours	$P_{80}$	%	kg/t	kg/t		mg/l	mg/l
0.0	90 μm	35.0			9.55		
0.1			1.5				
4.40				5.0		2683	
23.0					10.95	2600	34.5
47.0					10.60	2400	42.4
71.0					10.34	2150	42.5

# Cyanidation results

	mL	g	Ag	Ag	Distribution	Leaching time
			mg/L	g/t	0/0	hours
Solution	745.53		42.5		87.8	66.5
Tails Solid		401.44		11.0	12.2	
Calculated grade		401.44		90.0		
Analysed grade				72.0		







# Cyanidation of flotation concentrate

# Cyanidation parameters

Time	Fineness	Solid	Ca(OH) <sub>2</sub>	NaCN	pН	NaCN	Ag
Hours	$P_{80}$	%	kg/t	kg/t		mg/l	mg/l
0.0	90 μm	30.0					
0.1			2.0				
4.40				5.0		2158	
23.0					10.27	1400	133
47.0					9.76	900	145
71.0					10.34	580	120

# Cyanidation results

	mL	g	Ag	Ag	Distribution	Leaching time
			mg/L	g/t	%	hours
Solution	338.29		120		71.4	66.5
Tails Solid		144.98		112.0	28.6	
Calculated grade		144.98		392.0	100.0	
Analysed grade				300.0		

# Cyanidation of tabling concentrate

# Cyanidation parameters

Time	Solid	pН	NaCN	AG
Hours	%		mg/l	mg/l
0	30.4	11.10	2150	0
24		10.35	-	426
48		9.89	780	424

# Cyanidation results

	mL	g	Ag	Ag	Distribution	Leaching time
			mg/L	g/t	%	hours
Solution	296.00		426		82.9	24
Tails Solid		129.62		200	17.1	
Calculated grade		129.62		1173	100.0	
Analysed grade				1190		







The material received by the BRGM was very low grade (72 g/t) for reasons unknown. As a result, it was decided to perform another series of tests with a more realistic mill feed grade; a head grade of 360 g/t was selected.

## Flotation - Mineralized Material "as is"

Flotation Parameters:

• PAX: 250 g/t rougher

150 g/t scavenger

• Lime: 2.0 kg/t

• Flotation time: 5.0 min rougher

5.0 min scavenger

• pH: Natural (7.67)

### Flotation results

	WRec	WRec	Ag	Distribution
	g	%	g/t	%
Concentrate	87.38	3.64	7757	82.6
Tails	2191.38	96.16	65	17.4
Calculated grade	2278.46	100.00	360	100.0
Analyzed grade			360	

# Cyanidation of flotation concentrate

## Cyanidation parameters

Time	Solid	Ca(OH) <sub>2</sub>	pН	NaCN	Ag
Hours	%	kg/t		mg/l	mg/l
0	30.0	3.75	11.2	1891	0
24			9.2	690	1140
48			9.0	150	1250

## Cyanidation results

	mL	g	Ag	Ag	Distribution	Leaching time
			mg/L	g/t	0/0	hours
Solution	230.27		1250		54.1	48
Tails Solid		87.28		2800	45.9	
Calculated grade		87.28		6098	100.0	







#### 13.2.5 **Disclaimer**

No metallurgical test work was carried out by SGS Geostat, nor was it supervised by the Qualified Person responsible for the Mineral Processing and Metallurgical Testwork section of this report. The results were therefore not independently verified, but are considered of sound quality based on the industry reputation of the BRPM and BRGM laboratories.

#### 13.3 Mill Historical Performance

Notwithstanding the above, SGS is of the opinion that the best test work resulted from the historical mill operation.

Item	1986	1987
Processing (t)	61 388	66 440
Ag grade (g/t)	290	350
Ag recovery (%)	84.4	86.6

### 13.4 Environment

Even after many years of the cessation of operations at the Zgounder mine site, Hydraumet reported in 2013 that at least two locations downstream from the old tailings have CN<sup>(--)</sup> values that exceed the accepted limit. On the environmental side, the author is aware of the tailings legacy from the previous operators, the author have been told by Maya owners' that they will take the necessary steps to offset the possible environmental contamination that may be caused by this legacy.

It is therefore evident that the mill flowsheet must incorporate a cyanide destruction circuit to ensure that upon leaving the mill, the tailings will be devoid of any free cyanide.

### 13.5 Conclusion

In consideration of the above results and assuming there are no other tests to the contrary, there is very little purpose in adding a flotation circuit to the mill between the grinding and the cyanidation circuits unless the grinding capacity is increased while keeping the same ground fineness to a  $P_{80} \approx 75 \,\mu\text{m}$  (or finer).

The best flotation recovery obtained at both the BRPM and the BRGM laboratories was 82.6%. The cyanidation of this concentrate returned a recovery of 54.1% for a total combined recovery of only 44.68%.

Increasing the mill feed rate based on the fact that because of the small flotation weight recovery, the leaching time will be increased by 8 to 10 times, thus obtaining a much better recovery at the cyanidation is definitely not a solution either. If it is true that the recovery at the cyanidation will be somewhat better it will be more than offset by the loss of recovery at the flotation and/or by a probable lower flotation recovery due to coarser grind.







Note (1) Flotation recovery at a fineness of P80 = 50 µm is 80.4% Flotation recovery at a fineness of P80 = 90 µm is 77.7% BRGM/RC-52507FR Report pages 20 and 22

Unfortunately, one of the mill hindrances is the grinding circuit.

Considering mill production is impeded by a combination of the undersized grinding circuit and the limited cyanidation time, SGS recommends to increase the size of both ball mills to the maximum motor amperage possible, as well as adding one or two leaching tanks to increase the leaching time from 33 to 48 hours.

The BRGM gravity test did not yield anticipated results, likely due to excessive fineness of the material. As such, SGS Geostat is of the opinion that the installation of a gravity circuit concentrator (Falcon or Knelson) followed by a shaking table at the cyclone underflow could permit the collection of coarse silver particles that could otherwise be lost due to the short cyanidation time.







## 14 Mineral Resource Estimates

## 14.1 Summary

The mineral resources at Zgounder Silver mine with the base case are Measured Resources total 1,400,000 ounces of silver (142,000 tonnes averaging 304 g/t), Indicated Resources are 4,600,000 ounces silver (400,000 tonnes averaging 357 g/t), Inferred Resources total 5,300,000 ounces of silver (353,000 tonnes averaging 463 g/t) using a cut-off grade of 125g/t Ag (rounded numbers).

Table 9: Zgounder silver Base Case (>125 g/t) Resource Estimates (23 blocks + 67 panels)\*

	Measured			Indicated			Inferred			M+I			
Ī		Tonnes	Ag g/t	Ounces									
*	Total	142,100	304	1,391,000	397,000	357	4,560,000	352,800	463	5,254,000	538,700	343	5,948,000

Table 10: Zgounder silver deposit Base Case Resource Estimates (blocks only) \*

		Measure	d	Indicated			Inferred			M+I		
	Tonnes	Ag g/t	Ounces	Tonnes	Ag g/t	Ounces	Tonnes	Ag g/t	Ounces	Tonnes	Ag g/t	Ounces
Total	142,100	304	1,391,000	357,500	359	4,132,000	208,500	545	3,654,000	499,700	344	5,523,000

Table 11: Zgounder silver deposit Base Case Resource Estimates (panels only) \*

		Measured		Indicated					M+I			
	Tonnes	Ag g/t	Ounces	Tonnes	Ag g/t	Ounces	Tonnes	Ag g/t	Ounces	Tonnes	Ag g/t	Ounces
Tota	1			39,000	338	425,000	144,000	339	1,599,500	39,000	388	425,000

<sup>\*</sup>Note: rounded numbers, base case mineralized body (corps) is >125 g/t. Individual calculations in tables and totals may not add up correctly due to rounding of original numbers.

Mineral Reserves and Mineral Resources are as defined by CIM Definition Standards on Mineral Resources and Mineral Reserves. Mineral Resources which are not Mineral Reserves do not have demonstrated economic viability. Mineral Resources are estimated as February 19, 2014.

The cut-off grade of 85 g/t was used to define the mineralized intervals within mineralized bodies (envelopes), intersections (assays and/or mineralized intervals) with grade lower than 85 g/t have been locally included in the mineralized bodies and are considered as internal dilution. No cut-off was applied on individual blocks of the block models. The definition of the cut-off grade in the resource modelling (COG) is based on a composite of the various mining methods which may apply to the interpreted bodies such as shrinkage, long hole, narrow vein mining and mechanized bulk mining, along with processing cost. With the PEA study the base case cut-off for mineral resources was revised to 125 g/t. Panels and bodies having an average grade under 125 g/t were removed and not taken into account in the resource disclosure. Above 85 g/t there were 24 block models and 71 panels.







The 125g/t Ag base case cut-off was applied to the whole bodies and/or prisms, individual blocks and panel have not been modified to exclude intersection lower than the COG, i.e. rejected as a whole. It is not the tabulation of individual blocks above a COG.

Capping of outliers at 6Kg/t Ag is applied to the whole Zgounder database. The silver mineralization at Zgounder occurs in complex sets of microfractures within sandstones & schist (specific gravity between 2.00 and 2.6) and dolerite (specific gravity between 3 and 3.05). The density used to convert volumes into tonnage is 2.7 t/m³ which corresponds to an average density between sandstones and dolerites.

### 14.2 Introduction

This section reports the results of the first NI 43-101 mineral resource estimates for the Zgounder Silver Mine, which is based on historical information and new analytical data sampled from the underground percussion drilling completed for validation and certification in 2013.

Mineral intervals and geological interpretation on section and plan of the mineralized bodies of the Zgounder Silver deposits was done by Claude Duplessis Eng and Merouane Rachidi Ph. D. of GMG.

Mr. Duplessis is an independent Qualified Person under NI 43-101 guidelines using the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Standards on Mineral Resources and Reserves, Definitions and Guidelines prepared by the CIM Standing Committee on Reserve Definitions and adopted by the CIM Council on December 11, 2005.

Furthermore, Mineral resources are not mineral reserves and it should not imply that the resources stated herein have demonstrated economic viability by GMG.

### 14.3 Data

For the resource estimation of the Zgounder silver mine, GMG is based on a total of 45468.06 metres of drilling (diamond drill and percussion) and drift samples obtained from the historical data base (43597.56 m) and from Maya/GMG percussion drillholes (percussion drilling campaign 2013, 1870.5m). The Zgounder drillhole database is made of diamond drillholes, percussion holes and drift samples.

Drillhole database: Compile Historic et GMG 28 Jan 2014 V1.mdb

Collars 1908
Deviations 108
Assays intervals 36710
Lithological intervals 3182
(see data verification section 12.2 for additional details)







Following figures presents, a longitudinal and a plan views of the data.

The author could not find information of QA/QC on historical data, it is why GMG has requested independent drilling of principal mineralized bodies at Zgounder. Since the mine is not a greenfield, GMG has compared historical level plans, cross-sections, drift outlines and the 3D scans of the adits with the drillhole database, new drilling data and considers the data reliable enough to support mineral resource estimate.

It is important to mention that drillhole data and drift data exact locations in the western part of the Zgounder mine (which is mined out) were not validated since it was not possible to have the mine scanned in this exercise. No mineral resources are identified in this sector from this data.







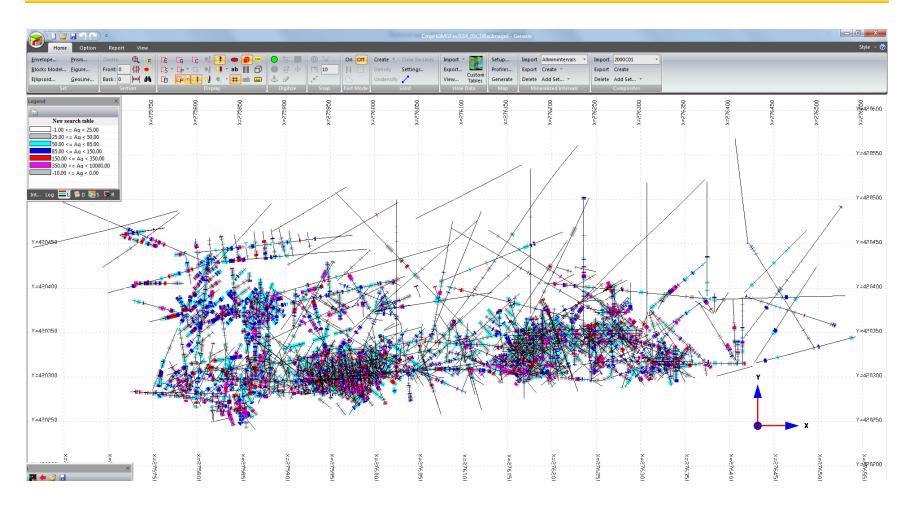


Figure 71: Plan view of the all data of the Zgounder silver mine





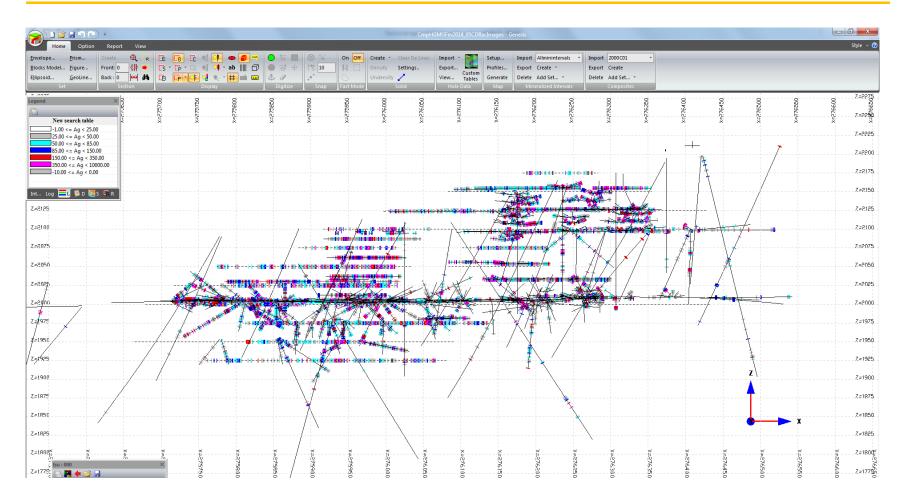


Figure 72: Section of the Zgounder silver mine with the all drilling data





### 14.4 Capping & Compositing

Block model grade interpolation is conducted on composited assay data. A composite length of 1.2 m has been selected to reflect the average sample length and the drilling sample length of the 2013 program. Compositing is conducted from the start of each mineralized intercept of drillholes or channels, drift data. The last composite kept at the end of the mineralized intercept has a minimum length of 0.8 m. Composite grades were not capped. Assays were capped (during intercept and composite calculation) at 6000 g/t Ag. The following statistical figures (Figure 73) have been used to select the capping level. The high grade values are not isolated and distribution is lognormal and continuous.

As the silver mineralization system is considered the same all over the mine, the analysis of the original sample data of the whole mine has been used for the determination of the capping value (lowering of outliers).

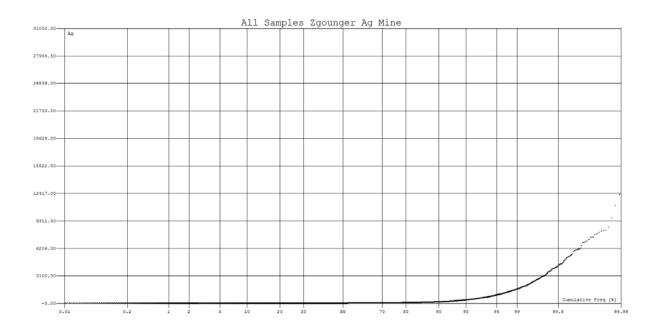


Figure 73: Cumulative frequency normal of all Ag silver assay results







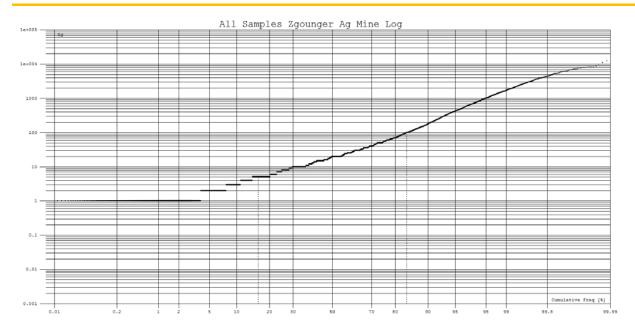


Figure 74 Cumulative frequency Log of all Ag silver assay results

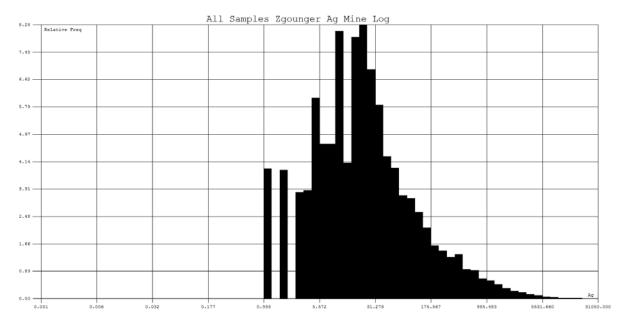


Figure 75 Histogram Log of all Ag silver assay results







### Table 12: Statistics of all silver assay results

STATISTICS FOR Ag

\_\_\_\_\_

Regular Log
Minimum Value -1.0000 0.0000
Percentile 5% 0.0000 0.6931
16% 3.0000 1.6094
50% 15.0000 2.9957
84% 85.0000 4.5951
95% 383.0000 6.0403

Maximum Value 31050.0000 10.3434

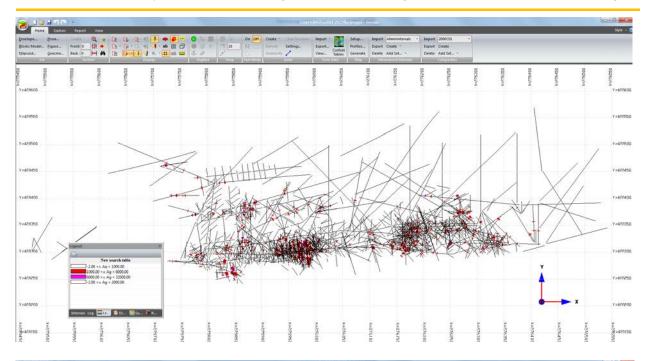
#Samples 36742 Average 97.4529 Variance 199243.5578 Std. Dev. 446.3671 Coef of Var. 4.5803 Skewness 20.6834 Kurtosis 879.2242

#Log Samples 33595 Log Average 3.0503 Log Variance 2.5456 Log Std. Dev. 1.5955 Log Mean 75.4219 Log Skewness 0.5311 Log Kurtosis 3.4129









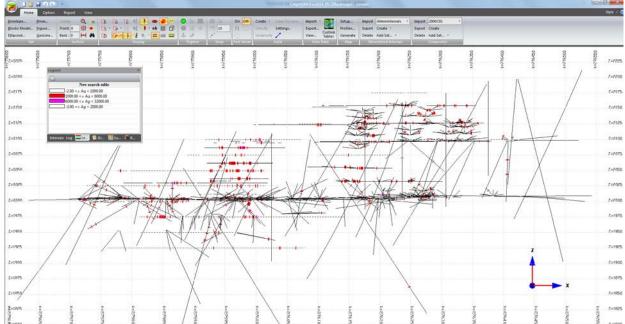


Figure 76: Plan view and longitudinal with continuous high grade Ag values

The figure above presents silver assay grade between 1kg to 6 kg/t in red while assays above 6kg/t are in magenta. Assay results below 1 kg/t are not shown.







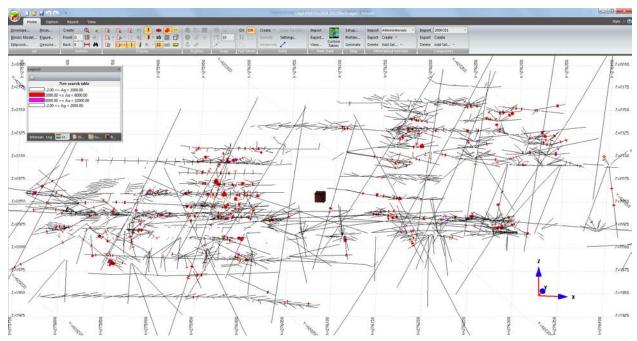


Figure 77: Isometric view looking NNW with continuous high grade Ag values

# 14.5 Specific Gravity

An average bulk density of 2.70 t/m³ was used to convert the volume of in-situ rock to tonnage at Zgounder; in order to calculate tonnage from the volumetric estimates of the block models and panels. This is an average value of the different rock types found in historical documents. GMG has not carried independent specific gravity measurement at Zgounder.

The silver mineralization at Zgounder occurs in complex sets of microfractures within sandstone/schist (specific gravity between 2.00 and 2.6) and dolerite (specific gravity between 3 and 3.05). The density used to convert volumes into tonnage is 2.7 t/m³ which corresponds to an average density between sandstones and dolerites.

It is recommended to carry specific gravity measurement on fresh core during the next drill program. Complete intervals of core pieces with corresponding assay tags (intervals) should be measured for a few select holes in order to allow additional reliable analysis and validation of the specific gravity.

### 14.6 Geological Interpretation

GoldMinds, conducted the geological, mineralization interpretation and modelling of the 3D wireframe envelopes of the Ag mineralization (Figure 78). The interpretation was first completed on sections to define mineralized vertical projection contours called prisms in Genesis© using Ag







assays and based on observed mineralised zones. Initially a minimum Ag grade of 85 g/t over a minimum drillhole interval length of 2.4m was generally used as guideline to define the width of the mineraliszed prisms. The geological interpretation was done by sector and by geological zones. Envelopes were constructed by connecting directly the defined mineralized prisms defined on the sections. Interpretations of zones near surface were limited by bedrock 3D surface. Most of the envelopes for block modelling have significant width and size. The narrow mineralized zones are generally coming from the panels.

A three-dimensional model of level plans and cross-sections was created to enable a better understanding of the inter-relationships between the various mineralized structures found at the Zgounder Silver Mine. Most of the bodies represent junctions of structures and stockworks which have a vertical elongated shape, whereas the remainder represents isolated high grade structures.

Each mineralized body (meshed envelopes for block modeling and panels) were validated visually to ensure that grade and classification was geologically reasonable, and also cross validated with 3D laser scans of openings and historical mine plans.

For the purpose of the mineral resource estimation, the Zgounder mine is divided into three sectors: West, Center and East.







#### 14.7 The block models

## 14.7.1 The Envelopes

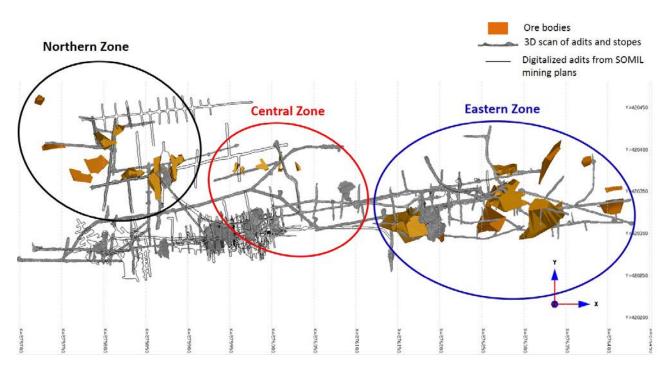


Figure 78: Plan view of the mineralized envelopes at the Zgounder silver mine (northern, central and the eastern zone)

The envelopes were created from the meshing of prisms (polygon interpretation on level plans, special cross sections). The following figures present the location and shapes of the envelopes used for block modelling.

The modelling of envelopes relied on data available in the compiled database and historical geological compilation plan as shown on next page. The reader should note continuity of proven (mined-out longitudinal plan demonstrated in the next figure) mineralized zones over 150 meters long vertically. The GMG modelling has taken this into account during modelling procedures.

Envelopes were not created when there was a doubt or it was not possible to verify that it was not mined out.







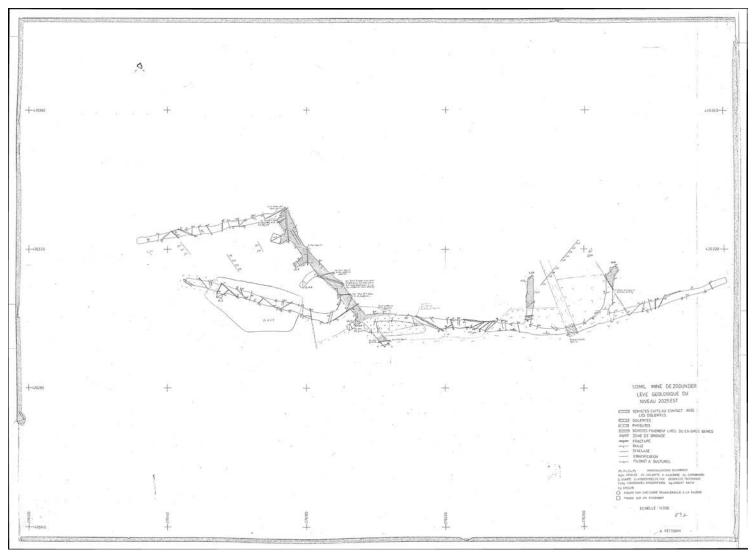


Figure 79: Example of sub-level 2025 east sector with detail mapping by Somil.







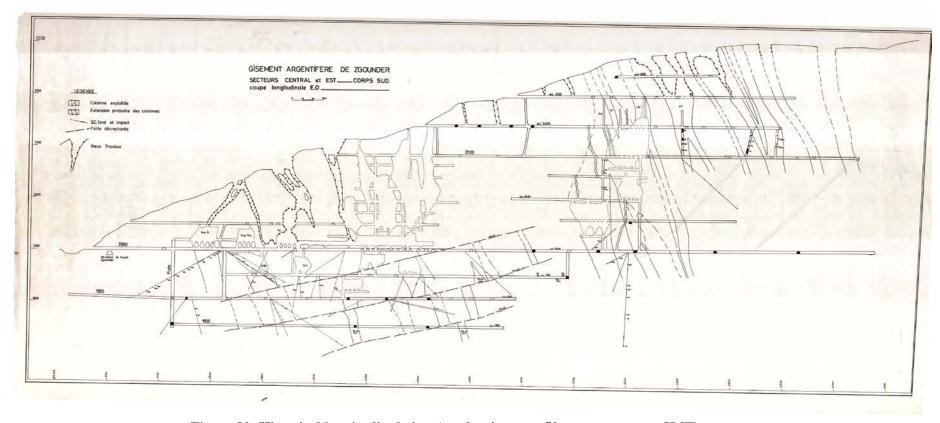


Figure 80: Historical longitudinal view (graduations are 50m apart, source CMT)









Figure 81: Historical longitudinal view, mineralized zones in red, mined out in yellow (graduations are 50m apart, source CMT)







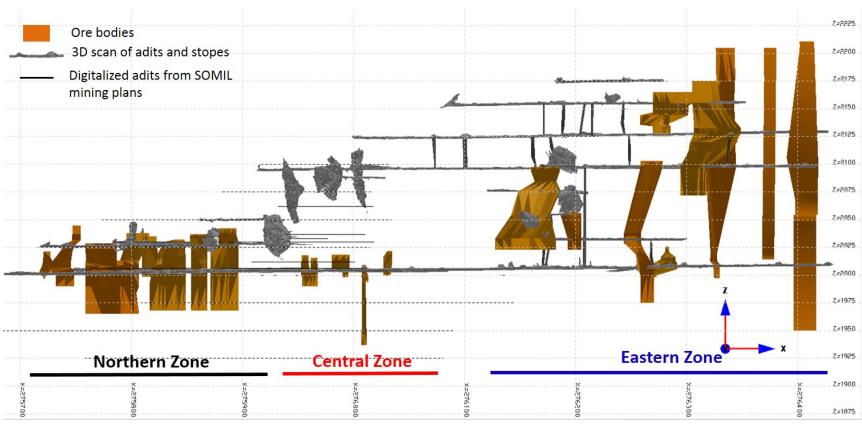


Figure 82: Long view looking North of the mineralized envelopes at the Zgounder silver mine (northern, central and the eastern zone)







# **Northern Zone**

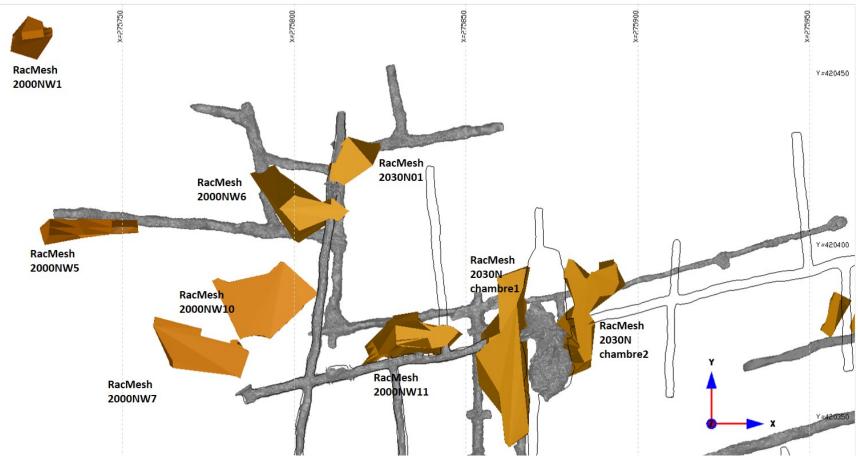


Figure 83: Composite plan view of the mineralized envelopes at the northern part of the Zgounder silver mine







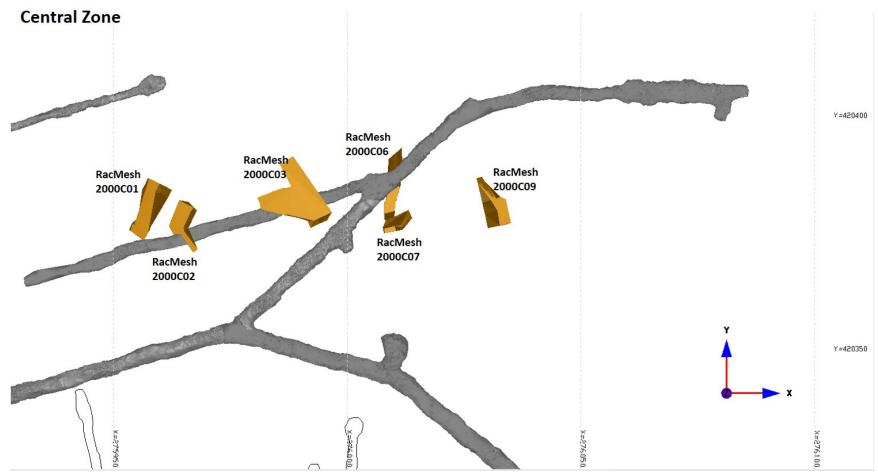


Figure 84: Composite plan view of the mineralized envelopes at the central part of the Zgounder silver mine







Figure 85: Isometric view of the mineralized envelopes at the Eastern part of the Zgounder silver mine







## 14.7.2 Block Model definition

The origin of the block model is the lower left corner of the mine. The block size has been defined to respect complex geometry of envelopes.

Table 13: Block grid parameters

	Blocks Grid Origin	
	_	275 675
	Origin X	420 240
	Origin Y	1 850
	Origin Z Blocks Size	1 600
	Size in X	1
	Size in X	1
	0.20	
_	Size in Z	2
Ы	Blocks Discretization	
	Discretization in X	1
	Discretization in Y	1
	Discretization in Z	1
	Blocks Grid Index	
	Start iX	1
	Start iY	1
	Start iZ	1
	End iX	876
	End iY	261
	End iZ	189
	Blocks Grid Coordinate	
	Start X	275 675
	Start Y	420 240
	Start Z	1 850
	End X	276 550
	End Y	420 500
	End Z	2 226

Block size are 1 m east(X) by 1 m north(Y) by 2 m vertical (Z).







### 14.7.3 Search ellipsoid & interpolation parameters

Search ellipsoids were used to select the composites (point data) used in the estimation of the grade of a block. The following table presents the search ellipsoids with their axis length and orientation.

Show Color Shading Date Azimuth Dip Spin Azimuth2 Major Median Minor Name Transparency Visible Z2000C02 Flat 03-02-2014 09:34 None 30 80 0 0 15 8 30 Z2000C02 mes Visible Flat 03-02-2014 09:37 None 80 0 0 30 Z2000C06 Invisible Flat 28-01-2014 10:34 0 90 0 50 30 None 0 Z2000C06\_mes Invisible Flat 28-01-2014 10:35 None 0 90 0 0 8 4 4 Z2000C1 Invisible Flat 22-01-2014 16:59 None 0 90 0 0 15 Invisible Z2000C B Flat 22-01-2014 13:33 None 0 90 0 0 100 20 20 Z2000E\_6 Invisible Flat 22-01-2014 13:52 None 0 90 0 0 80 35 35 Z2000ExtE Invisible Flat 22-01-2014 09:35 0 88 0 0 250 50 25 None 72000NW1 Invisible Flat 23-01-2014 14:36 None 0 90 0 0 20 10 10 Z2000NW 10 Invisible Flat 27-01-2014 14:21 0 90 0 40 20 20 Z2000NW10\_mes Invisible Flat 27-01-2014 14:21 0 90 0 0 15 None Z2000NW11 Invisible Flat 23-01-2014 15:44 None 170 87 0 0 40 20 20 7 Z2000NW11\_mes Invisible Flat 23-01-2014 15:55 None 170 87 0 Z2000NW5 Invisible Flat 27-01-2014 13:39 75 0 0 30 15 15 None 90 Z2000NW5\_mes Invisible Flat 27-01-2014 13:49 None 90 75 0 0 15 7 Z2000NW7 Invisible Flat 27-01-2014 14:02 0 90 0 0 40 20 20 None 72000NW7 mes Flat 0 90 15 Invisible 27-01-2014 14:04 None 0 0 Z2030Nchambre 1 Invisible Flat 27-01-2014 16:03 0 90 0 0 40 20 20 None Z2030Nchambre1\_mes Invisible Flat 27-01-2014 16:03 0 90 0 0 15 7 None Z2035A Invisible Flat 29-01-2014 16:01 None 0 90 0 0 50 25 25 Z2035A\_mes 0 90 0 15 Visible Flat 29-01-2014 16:02 0 Z2035B Invisible Flat 22-01-2014 16:16 0 90 0 80 35 35 None 0 None Z2100\_6\_Y Invisible Flat 22-01-2014 15:48 0 90 0 0 80 35 35 0 90 0 15 7 Z2100\_6\_Y\_mes Invisible Flat 22-01-2014 14:00 None 0 72100C H Invisible Flat 22-01-2014 12:00 None 0 90 0 0 125 25 10 Z2100C\_H\_mes Invisible Flat 22-01-2014 12:46 0 90 0 0 15 7 None Z2125\_01 Invisible Flat 28-01-2014 13:37 None 0 90 0 0 80 35 35 Z2125 01 mes Invisible Flat 28-01-2014 13:37 None 0 90 0 0 8 4 Z22035B\_mes Invisible Flat 22-01-2014 16:40 90 0 0 15 7 7 Visible Flat 31-01-2014 10:59 90 30 0 0 20 10 10 ZChem14 None ZChem14\_mes Visible Flat 31-01-2014 11:10 None 90 30 0 0 8

Table 14: Search ellipsoid list

The major is the long axis, the median is the intermediate axis and the minor is the short axis. Most of the ellipsoids have the long axis oriented in the subvertical direction similar to observations in the mined out areas i.e. the best long continuity axis.

In some cases, ellipsoids of classification of similar envelope shape have been used without creating a new labelled ellipsoid.

Block grades were interpolated from the composites in a single pass using the inverse distance to the square methodology. Blocks were estimated with a minimum of 4 composites and maximum of 6 composites with a limit of 3 composites from the same drillhole.







#### 14.7.4 Mineral Resource Classification

The block grades were first classified automatically requiring a minimum of two drillholes within a radius (variable for each zone) for Measured Resources and double the search radius for Indicated Resources and double yet again the search radius for Inferred Resources. Afterward, the classification was revisited manually to change confidence level from measured into indicated in certain bodies since it was not possible to drill the mineralized zone during control drilling.

Smaller mineralized bodies (panels) were modelled and the length weighted average grade of the mineralized intercepts within the panel was used to estimate the grade of the panel.

Each mineralized body was validated visually to ensure that grade and classification was geologically reasonable. Additionally they were also cross validated with 3D laser scans of openings and historical opening drawing plans. The search ellipsoids parameters for the measured category are identified in previous section in the table presenting the search ellipsoid.

The classification was revisited manually to change confidence level from measured into indicated in certain bodies since it was not possible to drill the mineralized zone during control drilling.

The following table presents the classification retagged and indicates where it was required or not. It also shows the bodies which requires removal of mined out areas like stopes, drift and raise.

Fixed SG 2.7 t/m3 Genesis Blocks exported(includes mined out) Calculation minedout removed Status Action details Corps Drft or Stope Retagged NeedRetag Change code 2100 Y6 Yes prsmManuel Yes Yes 3 to 2 2035A No Yes prsmManuel Yes prsmManuel Yes Yes 3 to 2 2030Nchambre 2 Yes prsmManuel Yes Yes 3 to 2 2030Nchambre 1 3 to 2 2125 01 Yes prsmManuel Yes Yes N/A No 2000NW10 prsmManuel No 2035B Yes Nο 2000NW7 N/A Yes prsmManuel No 2000NW11 prsmManuel No 2100C\_Haut Yes /es Yes 3 to 2 2000NW5 N/A prsmManuel 2035C Yes No Yes prsmManuel No Chem 14 No 2000C3 Yes prsmManuel N/A No 2000C01 prsmManuel Yes 3 to 2 2000E\_6 Yes Yes 0 to 2 2000NW1 Yes prsmManuel Yes Yes prsmManuel 2000C02 Yes No Yes Yes 3 to 2 2000C09 N/A 2000C6 N/A No 2000C7 N/A No prsmManuel Yes Yes 0 to 1 2000ExtE Yes prsmManuel 2030N01 Yes Yes Yes 0 to 1 N/A Yes 0 to 1 2100C\_Bas

Table 15: List of actions link to retagged







Codes in table above and in each block within the database are: 3 for Measured, 2 for Indicated, 1 for Inferred and 0 was not classified with ellipsoid.

#### 14.7.5 Removal of mined out areas

As the mined out volumes were included in the envelope of resource block model, it was necessary to remove the tonnage of the mined out areas.

For the mineralized zones which intersect the stopes already exploited by Somil and CMT (stopes 2035E-2050E and 2075E). In order to accurately estimate the resources of the sub-vertical bodies partially exploited by the SOMIL and CMT (2035A and 2035C) we have to substract the mined out volume from the mineralized material bodies modeled by GMG. This operation encountered difficulty in the case of the Zgounder mine because the 3D scan of the stopes done by Cape Resources shows several 3D face solid merged in one file (see vertical section of the stopes) with inconsistencies or the surface. The 3D scan of the stopes provided in this form are unusable for this operation (subtracting exploited volumes directly). Cap Ressources was unable to deliver one 3D consistent surface of each stopes that can be used for the volumes calculation of the extracted material. It is why GMG took the decision to stay on the safe side by modelling a panel covering the openings and representing the mined out tonnage due to inconsistencies in the survey. This had the effect to probably remove more than what was actually mined out.

So for the calculation of the resources estimates GMG has created 3D solid (panels) with dimensions close to the exploited stopes then substracted the (volumes) Tonnage of these 3D solid from the block model tonnage intersected by these stopes as blocks were interpolated in the mined out envelopes. The mined out tonnages have been removed from the mineral resource reports of the block models.







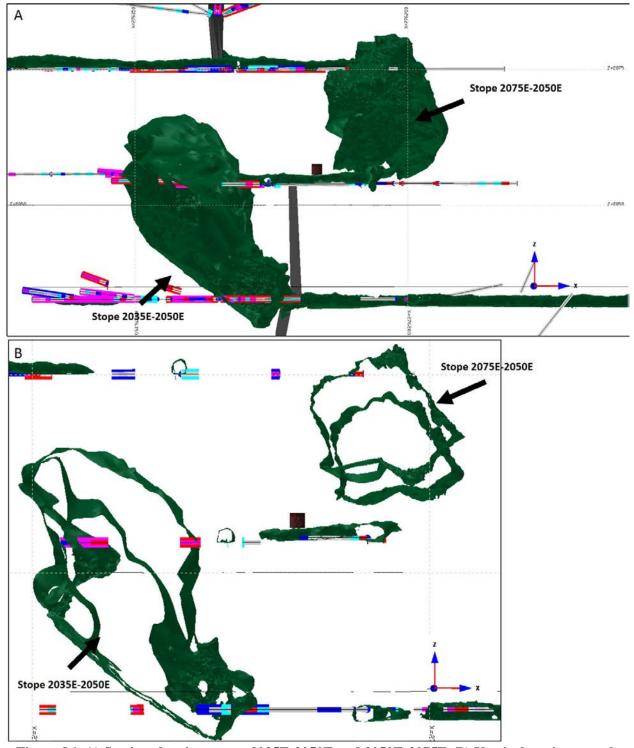


Figure 86: A) Section showing stopes 2035E-2050E and 2050E-2075E; B) Vertical section trough the stopes between level 2035E and 2075E at the Zgounder silver mine.







## 14.7.6 Block models

The envelopes have been filled by regular blocks and only composites within the envelopes have been used to estimate the grades of the blocks. Following figure present the block model of Z2035A.

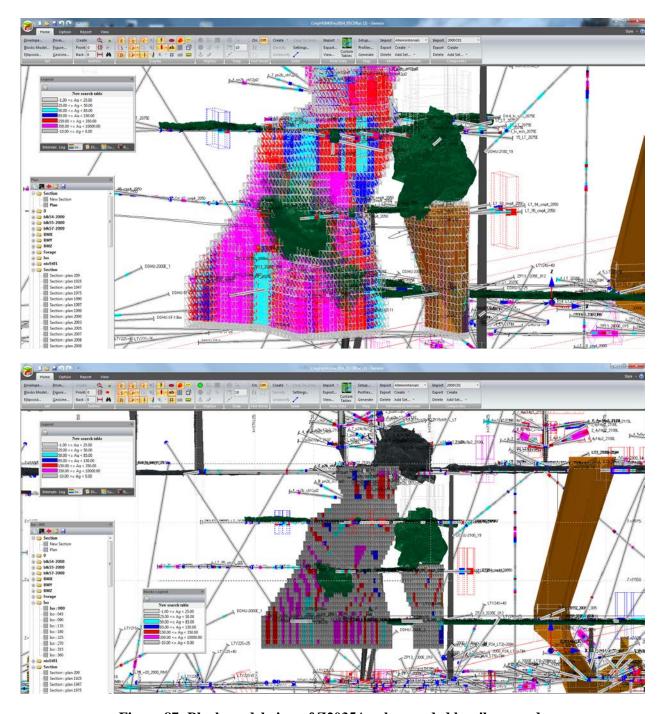


Figure 87: Block model view of Z2035A colour coded by silver grade







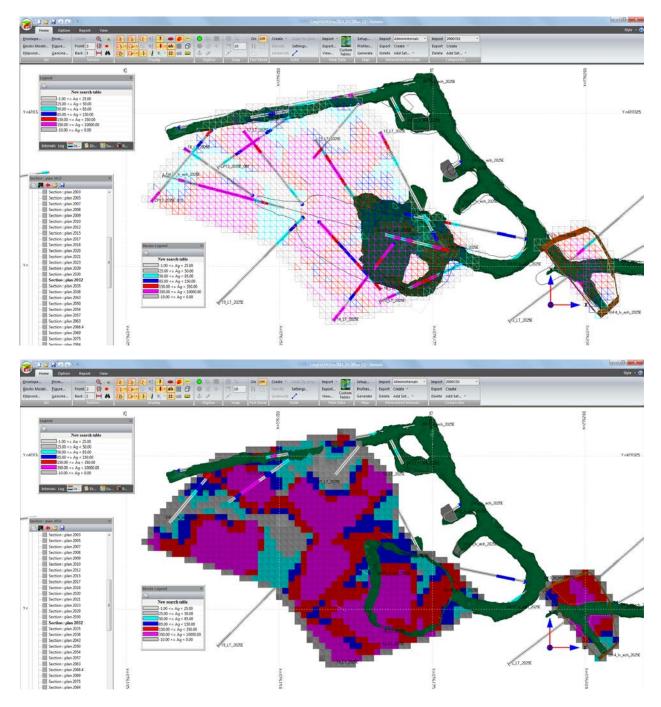


Figure 88: Example of block model Z2035A & Z2035C on level 2032 with openings







## 14.7.7 Mineral Resource Estimation

The base case Measured Resources total 1,400,000 ounces of silver (142,000 tonnes averaging 304 g/t); Indicated Resources are 4,600,000 ounces silver (400,000 tonnes averaging 357 g/t); Inferred Resources total 5,300,000 ounces of silver (353,000 tonnes averaging 463 g/t) using a cut-off grade of 125g/t Ag (rounded numbers).

The table below present the resources original numbers (mined out removed) and numbers not rounded. The details of panels are presentment in following section.

Table 16: Resources detailed with original numbers not rounded

Fixed SG 2.7 t/m3		Feb 17	, 2014	Base Case							
	Measured			Indicated			Inferred			M+I	
	Tonnes	Ag g/t	31,103	Tonnes	Ag g/t	Oz	Tonnes	Ag g/t	Oz	Tonnes	Ag g/t
2000C09			0	1 593	419	21 460	281	439	3 966	1 593	419
2000C3	1 015	267	8 713	2 549	463	37 944			0	3 564	407,2
2000C6	356	1604	18 359	367	1761	20 779	6 939	650	145 013	723	1684
2000C7	178	439	2 512	130	378	1 580			0	308	413,3
2000E_6			0	2 137	160	10 993	55 766	279	500 232	2 137	160
2000ExtE			0			0	25929	618	515 195	0	0
2000NW1			0	2 122	647	44 142			0	2 122	647
2000NW5			0	7 263	343	80 095			0	7 263	343
2000NW11	17 937	231	133 217	13 916	191	85 457	4 827	150	23 279	31 853	213,5
2000NW7	15 735	194	98 145	22 410	194	139 779	7 846	250	63 065	38 145	194
2030N01			0			0	6 204	450	89 760	0	0
2030Nchambre1			0	48 310	247	383 647	11 200	243	87 503	48 310	247
2030Nchambre2			0	54 853	545	961 158	7 776	915	228 757	54 853	545
2035B	15 446	435	216 024	24 764	364	289 814	22 302	340	243 793	40 210	391,3
2100_Y6	0		0	97 525	338	1 059 816	1 566	210	10 573	97 525	338
2100C_Bas			0			0	25996	905	756 402	0	0
2100C_Haut			0	21 122	685	465 182	23 646	1160	881 888	21 122	685
2125_01			0	45 303	278	404 920	8 159	393	103 093	45 303	278
Chem 14	4 454	329	47 113	2 522	330	26 758	65	841	1 758	6 976	329,4
2035C	6 676	282	60 529	367	141	1 664			0	7 043	274,7
2035A	78 175	310	779 161	7 819	279	70 138			0	85 994	307,2
2000C01	1 420	215	9 816	1 512	148	7 195			0	2 932	180,4
2000C02	744	717	17 151	934	653	19 609			0	1 678	681,4
Panels Indicated				39 089	338	425 149			0	39 089	338,3
Panels Inferred			-				144 267	339	1 599 513		
Total	142 136	304	1 390 741	396 607	357	4 557 279	352 769	463	5 253 790	538 743	343
Oz	1 390 741			4 557 279			5 253 790			5 948 020	

The following table summarizes the GoldMinds Geoservices Inc. (GMG) mineral resources estimates combining twenty-three (23) block models and sixty seven (67) panels with no cut-off grades<sup>(4)</sup> applied to individual blocks, but applied on corps (mineralized zones) and panel above 125 g/t Ag.







Mineral Reserves and Mineral Resources are as defined by CIM Definition Standards on Mineral Resources and Mineral Reserves. Mineral Resources which are not Mineral Reserves do not have demonstrated economic viability. Mineral Resources are estimated as February 19, 2014.

Silver commodity prices of US\$20.00/oz Ag is used in the calculation of the 85g/t COG for modelling. Individual calculations in the following tables and totals may not add up correctly due to rounding of original numbers. Capping of outliers at 6Kg/t Ag is applied to the whole Zgounder database. Specific gravity used to convert volumes in tonnage is 2.7 t/m<sup>3</sup>.

Table 17: Zgounder silver deposit Base Case (>125 g/t) Resource Estimates (blocks + panels) \*

	Measured		Indicated		Inferred			M+I					
	Г	Tonnes	Ag g/t	Ounces	Tonnes	Ag g/t	Ounces	Tonnes	Ag g/t	Ounces	Tonnes	Ag g/t	Ounces
To	tal 1	142,100	304	1,391,000	397,000	357	4,560,000	352,800	463	5,254,000	538,700	343	5,948,000

Table 18: Zgounder silver deposit Base Case Resource Estimates (23 BM blocks only) \*

	Measured			Indicated			Inferred			M+I		
	Tonnes	Ag g/t	Ounces	Tonnes	Ag g/t	Ounces	Tonnes	Ag g/t	Ounces	Tonnes	Ag g/t	Ounces
Total	142,100	304	1,391,000	357,500	359	4,132,000	208,500	545	3,654,000	499,700	344	5,523,000

Table 19: Zgounder silver deposit Base Case Resource Estimates (67 panels only) \*

	Measured		Indicated			Inferred			M+I				
ĺ		Tonnes	Ag g/t	Ounces	Tonnes	Ag g/t	Ounces	Tonnes	Ag g/t	Ounces	Tonnes	Ag g/t	Ounces
ĺ	Total				39,000	338	425,000	144,000	339	1,599,500	39,000	388	425,000

<sup>\*</sup>Note: rounded numbers, base case mineralized body (corps) is >125 g/t







#### 14.7.8 The Panels

Smaller mineralized bodies (panels) were modeled and the length weighted average grade of the mineralized intercepts within the panel was used to estimate the grade of the panel. En total 71 panels were modeled (19 indicated and 52 inferred) from level 1925 to 2150m. Each panel is created from at least two drillholes with a minimum width of 2.4m. The maximum real tonnage of inferred and indicated panels is around 19000 tonnes at 570 g/t Ag and 7000 tonnes at 206 g/t Ag respectively. Finally 67 of the panels are above 125 g/t and are used as the base case for the mineral resource disclosure.

The volume of the mined out areas are subtracted from the panels present in partially mined zones or cross cutting adits based on the 3D scans and the mine plans. We have to subtract the exploited volume from the mineralized bodies modeled by GMG.

The construction of prisms (panels) required a minimum of two holes (two mineralized intervals).

The criteria for classification are basically: indicated when minimum of two holes, 3D scan of drift and/or face drift sample (GMG 2013) by handheld XRF (samples only used as confirmation of mineralization, not included in average grade calculation) and/or a new 2013 percussion drillhole was used. Inferred panels, where classified because of no drift 3D scan is available and historic hole only.







Table 20: Details of indicated panels (19) used for the resource estimation, Zgounder silver mine

Prism Name	Volume	Tonnage	Ag	Mined tonnage	Real tonnage
2016_ch14	1040,77	2810,08	427,867	0	2810,08
2108_4y14p2_2	878,087	2370,84	272,063	0	2370,84
2108_4y14p2_8	658,116	1776,91	771,545	0	1776,91
2108_4y14p2_8bis	198,998	537,296	245,75	0	537,30
2109L_6y6yP2	651,624	1759,38	1353,22	11,86	1747,52
2109L_6y6yP2_3	170,835	461,254	558	0	461,25
2109L_6y6yP2bis	260,205	702,553	211,125	25,76	676,79
2120_5y5yp1_4	147,559	398,41	192,619	35,17	363,24
2125_LT55	2110,45	5698,21	305,077	369,99	5328,22
2125_LT55bis	1517,43	4097,07	201,28	0	4097,07
2150_23cmpl	2597,53	7013,33	205,714	69,25	6944,08
2150_6cmpl	141,241	381,349	136,725	0	381,35
DDHU_2100_14	757,585	2045,48	319,677	0	2045,48
DDHU_2100_14bis	694,559	1875,31	287,857	0	1875,31
DDHU_2100_15	792,213	2138,97	224,167	0	2138,97
DDHU_2100_15_3	596,258	1609,9	150,334	140,13	1469,77
DDHU_2100_15bis	102,717	277,337	133,75	0	277,34
DDHU_2100_18	525,129	1417,85	533,75	0	1417,85
Zp13_2000E_014	951,402	2568,79	176,87	198,68	2370,11
	1		<u> </u>		T

TOTAL	14792,708	39940,32	336,377	850,84	39089,48
	14800	40000	336	851	39000

Teneur Ag	338,28586
	338







Table 21: Details of inferred panels (52 panels in total and 48 panels ≥125g/t Ag) used for the resource estimation, Zgounder silver mine

Prism Name	Volume	Tonnage	Ag	Mined tonnage	Real tonnage
1925_17cmpl	493,836	1333,36	280,89	24,22	1309,14
1925_30cmpl	529,731	1430,27	178,67	0	1430,27
1925_E_11	357,431	965,064	146,03	51,45	913,614
1925_E_15Drf	771,575	2083,25	674,78	94,56	1988,69
1925_E_24Drf	1521,27	4107,43	530,45	32,76	4074,67
1925_E_24Drf_1	363,604	981,731	194,01	38,76	942,971
1950_5cmplt	145,007	391,519	423,05	38,97	352,549
1950_6cmplt	946,761	2556,25	411,04	155,18	2401,07
1975_19cmplt	962,076	2597,61	289,51	0	2597,61
1975_20	1764,41	4763,9	660,2	35,02	4728,88
1975_2cmplt	600,942	1622,54	368,74	0	1622,54
1975_30cmplt	2257,95	6096,48	206,34	38,73	6057,75
1975_9cmplt	2611,7	7051,6	271,85	25,94	7025,66
1975_O_2	400,96	1082,59	106,63	101,72	980,87
1975_O_6	1346,34	3635,11	255,2	93,88	3541,23
1975_O_6bis	3524,18	9515,29	241,52	85,93	9429,36
2000_27cmpl	373,104	1007,38	201,51	0	1007,38
2000_33cmpl_Drf	926,175	2500,67	219,46	325,3	2175,37
2000_37cmpl	360,198	972,533	622,48	0	972,533
2000_56cmpl	571,084	1541,93	674,45	0	1541,93
2000_anx8_51Drf	3997,9	10794,3	232,35	299,41	10494,89
2000_LT8	69,0518	186,44	194,44	0	186,44
2000_LTY24N	603,238	1628,74	399,5	0	1628,74
2000E_LT4	617,549	1667,38	202,03	0	1667,38
2000E01c_1	2264,2	6113,34	205,05	95,09	6018,25
2025E_LT8	2087	5634,9	87,849	73,73	5561,17
2050E_94cmplt	470,525	1270,42	164,82	0	1270,42
2075E_LT11	89,92	242,784	194,54	9,11	233,674
2075E_LT20	208,989	564,27	149,24	22,59	541,68
2075E_LT6	346,145	934,591	256,72	0	934,591
2091_ch12	192,771	520,483	438,25	0	520,483
2108_4y14p2_2bis	171,088	461,937	329,67	21,78	440,157
2149_4y14p1_2	3922,98	10592,1	223,72	278,18	10313,92
2150_30cmpl	1919,05	5181,44	303,34	90,76	5090,68
2150_ch10pl1	488,318	1318,46	146,91	0	1318,46
2150_ch8pl_Drf3	1048,33	2830,48	465,82	76,54	2753,94
DDHU_1950_10	151,565	409,226	195,46	0	409,226
DDHU_1950_10_1	2033,44	5490,3	193,57	0	5490,3
DDHU_1950_10_2	1157,26	3124,6	162,5	0	3124,6







DDHU_1950_3	7108,72	19193,6	569,64	0	19193,6
DDHU_1950_4	1406,89	3798,61	238,26	29,6	3769,01
DDHU_1950_4_1	425,196	1148,03	95	12,22	1135,81
DDHU_1950_6	1118,4	3019,69	246,65	3,09	3016,6
DDHU_1975_4	783,343	2115,02	588,83	0	2115,02
DDHU_2100_14_2	349,279	943,053	307,86	0	943,053
DDHU_SF9	453,791	1225,24	460,22	0	1225,24
DDHU1975_22	454,086	1226,03	269	0	1226,03
DDHU1975_22bis	458,322	1237,47	102	0	1237,47
DDHU1975_4bis	672,443	1815,59	240,77	0	1815,59
DDHU1975_8	766,718	2070,14	165,04	0	2070,14
ZP13_2000C03	217,553	587,393	1371,5	80,25	507,143
Zp13_2000E_017bis	699,477	1888,59	539,39	19,04	1869,55

TOTAL	57581,87	155471,15	323,97	2253,81	153217,344
52 panels	57600	160000	324	2250	153000

Average Grade	324,0937591
	324







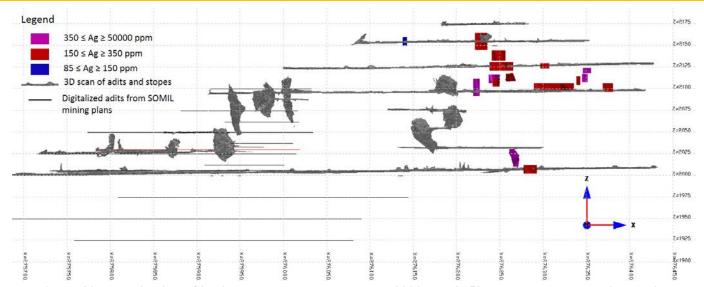


Figure 89: Localisation of indicated panels between level 2000 and 2150m at the Zgounder silver mine

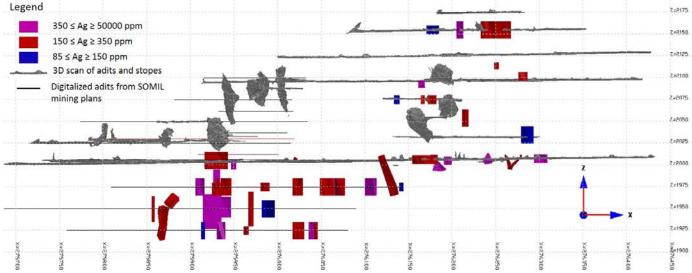


Figure 90: Localisation of inferred panels between level 1925 and 2150m at the Zgounder silver mine.





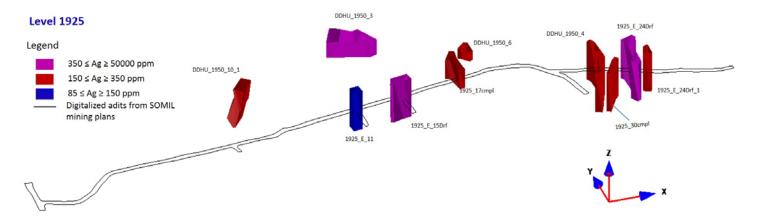


Figure 91: Localisation of ressources panels at level 1925, Zgounder silver mine

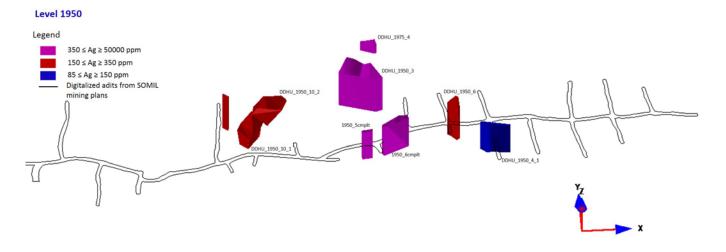


Figure 92: Localisation of ressources panels at level 1950, Zgounder silver mine







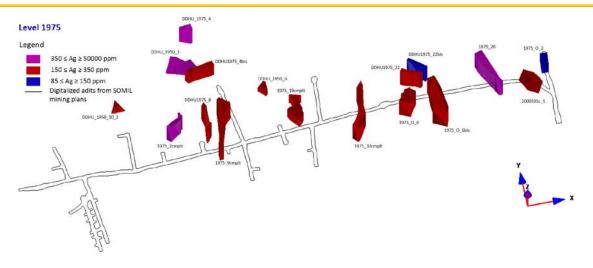


Figure 93: Localisation of ressources panels at level 1975, Zgounder silver mine

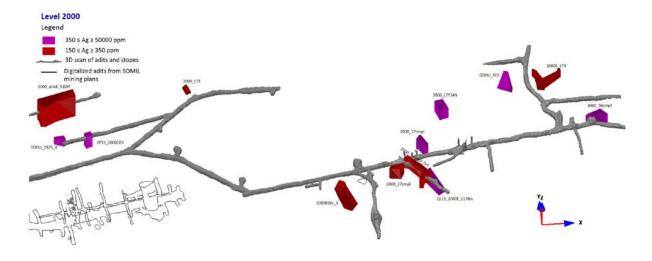


Figure 94: Localisation of ressources panels at level 2000, Zgounder silver mine









Figure 95: Localisation of ressources panels at level 2035E, 2050E & 2075E, Zgounder mine





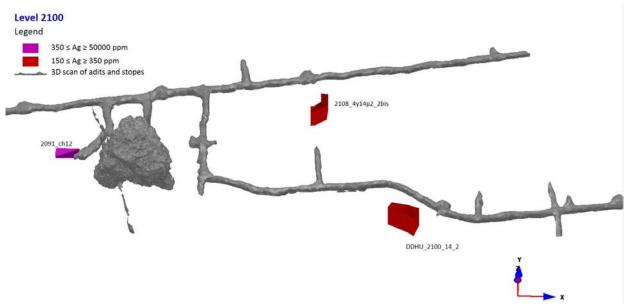


Figure 96: Localisation of ressources panels at level 2100, Zgounder silver mine

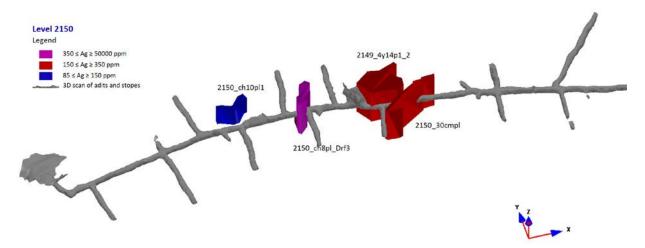


Figure 97: Localisation of ressources panels at level 2150, Zgounder silver mine





#### 14.7.9 **Discussion & Risk**

The author has taken all possible actions to insure that the mineral resource statements are accurate. The author relies on historical data verification, independent drilling results from the available equipments and on the scanning of the critical mine openings.

GMG has identified for this work that 5% of the mineralized intervals length were taken from the historical drift samples data to estimate the resource.

On the environmental side, the author is aware of the tailings legacy from the previous operators, the author have been told by Maya owners' that they will take the necessary steps to offset the possible environmental contamination that may be caused by this legacy.

The author is also aware that Zgounder mine and mineralization contain deleterious elements such as arsenic, lead, zinc and mercury, which Maya will have to take into account in their mineral processing, tailings disposal, water management and reclamation plan.

The actual situation of Zgounder can be compared with Orphan tailings in the Province of Quebec. It is of common sense that the reopening of the Zgounder mine will need corrective actions sustained by the revenues of the operation for the benefits of stakeholders and the populations downstream the Zgounder Oued.

To the author knowledge, Maya has met its commitment with OHNYM as of the conditions of the joint-venture company. The author does not have direct contact with the Moroccan authorities and relies on information provided by the management of Maya on this topic.

The commodity price of Silver is favorable for the economical development of the Zgounder Mine, considering the high grade of the deposit.

At the moment of writing this report, the Kingdom of Morocco is a politically stable country with a strong history of mining and qualified workforce, either for underground workings or concentrator operations. Certain risk will always exist in mining development projects, but for this project the author believe that they are of low impact.

No adverse protest or objection to the mine development has been observed at Zgounder and Askaoun areas. The population has expressed their confidence in the project, as it is expected that new jobs will be created in this region.





# 15 Reserves

In this PEA there are no reserves.





# 16 Mining Methods

## 16.1 Introduction

The Zgounder mine was in operation from 1982 to 1990 during which time SOMIL extracted 500,000 tonnes of material using underground mining methods. The mine closed in 1990 mainly as a result of low silver prices. Since then, "Compagnie Minière Touissit" (CMT) did exploration and mining production, (please refer to Section 6.5 for details). The Canadian company Maya Gold and Silver acquired this property in early 2012, and has since been working to put the mine back in production.

All previous underground production was muck out from adits. The mineral deposit is subvertical and most of the material was transported by rail on the 2,000 m level, which connects to the primary crusher of the processing plant. The material below the 2,000 m level was hoisted through a small vertical shaft next to the 2,000 m level portal.

I, Gaston Gagnon, co-author of this report, personally had the opportunity to visit several stopes and developments in April 2013, which generally demonstrated the rock competency of the deposit. Development accesses, as well as drifts and cross-cuts, were in sections of approximately 7 to 8 m<sup>2</sup> ( $\sim 2.5$  m in width and  $\sim 2.8$  m in height) and were in relatively good condition despite the limited rock support. Mine production was terminated very suddenly in 1990, but certain mining stopes are still accessible and contain in-situ mineral resources.

Goldminds Geoservices Inc., from Quebec City, was mandated to estimate the mineral resources that will be part of the preliminary economical study (PEA), prepared for the mine rehabilitation and the resumption of the production. (Refer to Section 14).

This PEA study is realized to demonstrate the economic value of the Zgounder project production on selected mineralized sites, whose mineral resources have recently been estimated in compliance to NI 43-101 regulations.

#### 16.2 Geotechnical and Hydrological Parameters

Neither SGS Geostat nor Goldminds has performed geotechnical or hydrogeological studies at Zgounder. Underground visits have demonstrated that rather large open mining stopes can be planned for most of the known mineral resources. Some open stopes that I (G. Gagnon) visited have dimensions as large as 10 m and more than 30 m of vertical height. The walls and backs are still in place as very few rocks have fallen. The overall design of future mining stopes will be similar to the mining method used in the past since the appropriateness of the selected methods has been demonstrated.

Internal studies conducted on the Zgounder project were reviewed during the site visit in April 2013; the recommended dimensions for open mining stopes with sublevels are 4 m wide, 18 m high





and 25 m in length according to Mathews, Potvin et al. The internal studies also discussed that geomechanical characterizations applied to the Zgounder project were adopted from a similar deposit as a result of a lack of core records

No known hydrogeological difficulties presently exist at the Zgounder mine. Production will first focus on workings above the 2,000 m level when mining will resume. The 2,000 m level is above the small river (oued) that flows at the entrance of the mine. In general, the Zgounder mine does not have dewatering issues for mining stopes above the 2,000 m level, as the flow rates are small and almost completely gravity controlled.

## 16.3 Existing Stopes

The first years of production will focus on existing stopes that were not completely mined out in 1990, thus granting operators time to develop new mining sites. The stopes were visited and appear stable; detailed inspections will have to be done to confirm their competency. Most of the material will be trucked out from the 2,000 m level.

## 16.4 Proposed Mining Methods

It is initially recommended to use the open long-hole mining method with sub-levels for the proposed new mining sites. Backfilling should be planned for larger stopes and those displaying unstable ground conditions

## 16.4.1 Avoca Mining Method

The highly regarded Avoca mining method should be implemented if unstable rock conditions are encountered. This method is similar to the open long-hole method, however backfill is used during or after each horizontal lift to minimize dilution and reinforce stope stability. The most economical fill is the waste material resulting from mine developments. Two types of the Avoca mining method are presented in the following sketches.





## Option 1 - accesses at one stope end only

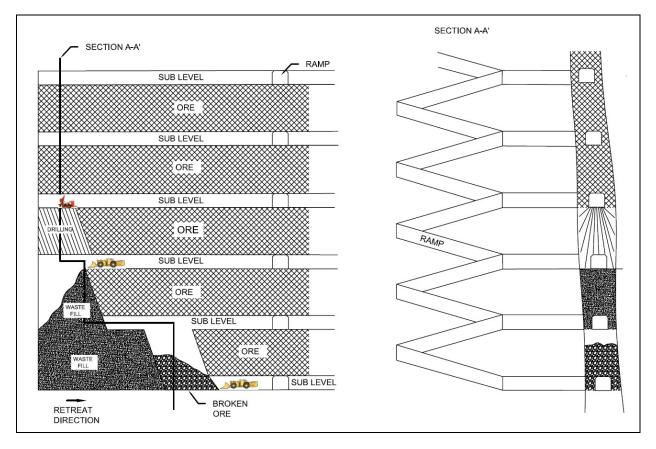


Figure 98: Avoca mining method - option 1

The above Figure illustrates the option in which only one end of the stope has sublevel access. This approach reduces the development cost but includes dilution as the blasting sequence involves backfill resting against the mineralized material. One of the most popular procedures is to leave a very thin pillar between each new sequence; the pillar would have appropriate dimensions to maintain safety as outlined by geotechnical studies. Certain mining operations are selecting to 'choke blast' the material against the backfill and not to leave pillars.





## Option 2 - accesses at both stope ends

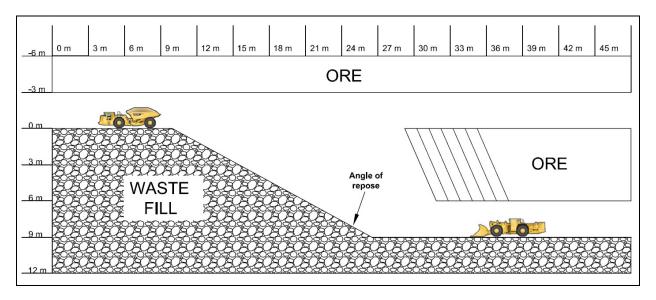


Figure 99: Avoca mining method - option 2

The second Figure illustrates the option where access developments are available at both ends of the stope. It is more expensive than the first method, but the dilution is minimal since the backfill is placed at the repose angle and there is no need to leave permanent pillars.

These two Figures are shown only as references; they are not adapted to the dimensions of the Zgounder deposit. The purpose is to illustrate the main advantages of the method in that the waste development is minimized as there is no hauling drift or draw points. This method is also very safe and field proven.

It is recommended to apply the first aforementioned Avoca mining method considering the majority of estimated resources are contained within relatively small lenses. As discussed, this method involves a single sublevel access per stope and costs less to development.

## 16.4.2 Shrinkage Method

The shrinkage method was used during the Zgounder mine's initial operation with little success. This method was also deemed unsafe, especially for stopes of large vertical dimension. As a result, the present mine owners have decided not to implement this method. This owners' decision to not implement shrinkage method is in line with today's global tendency to avoid having miners working in open stopes, in other words, select mechanized method that are safer and generally more productive.





## 16.5 Production Rates, Life of Mine and Mining Dilution

The current plant was built to process 200 metric tons per day, assuming 350 working days per year, which amounts to 70,000 tonnes per year. With the present total mineral resources being on the order of 900,000 tonnes, the mine life would be 14 years. However, the existing mill circuit can be easily modified to process approximately 300 tonnes per day while retaining most of the existing infrastructure. The grinding and leaching operations would require modifications, specifically, the ball mills as the motors are already powerful enough for the proposed larger mills. Please refer to Section 17 for more details. Therefore the first year is planned at 200 tpd and the following years at 300 tpd, which represents a total life of mine (LoM) of 10 years.

According to historical mine production, the mining dilution is 10% on average and the mining recovery is estimated at 97%. Considering a dilution grade of 50 g/t Ag, the mill feed grade will be approximately 92% of the mineralized grade in place.

Additional silver production could be obtained from the reprocessing of more or less 500,000 tonnes of old tailings. The tailings are probably economical at the current silver price; additional metallurgical tests are required before a reprocessing decision can be made.

## 16.6 Mining Developments

The estimation on the primary mining developments in waste was completed for the known resources and is presented in detail in Section 21; the total waste development totalizing 7,730 metres in total as shown in the next tables. It is important to realize these development workings spread over the projected life of mine, represents a daily average of only 3.0 metres; this is the big advantage of resuming production in a partly developed mine.

 Description
 Development

 m
 1,225

 Drift & draw points
 4,730

 Raises
 1,775

**Table 22: Waste Developments** 

A minimum quantity of waste development will be done around old stopes and will require only small amounts of access drifts and cross cuts, which means that stope production can resume in a relatively short period of time. Prior to commencing development, all existing mine workings will have to be inspected and rehabilitated as described and estimated in Section 21. In accordance to the owner's decision to rely on trackless equipment, the mine planning will involved ramps to connect all main levels providing the best flexibility to mining developments and production. Existing raises in areas of reduced tonnage will be used, to bring in the required equipment, mainly slushers, air driven mucking machines and long-hole drills.





Goldminds has estimated mineral resources of  $\pm 150,000$  tonnes below the 2,000 m level. A permanent decline from the 2,000 m level is the recommended approach to developing the resources below the 2,000 m level down to the 1,925 m level.

## 16.6.1 Underground Mining Equipment

The main underground mining equipment for loading and hauling will be trackless. Three LHD's (scoops) of 1.5 m<sup>3</sup> (±2.5 tonnes) bucket capacity and two mine trucks of 8 tonnes payload have already been ordered. This equipment is sufficient to supply the concentrator and develop new mining stopes. In future, it may be useful to install remote controls on the LHD's to safely muck out the largest open stopes. Modern day remote controls are fully reliable and economically feasible.

Conventional small mining equipment will be used for development workings and mining production: jacklegs, stopers, long-hole hammer drills, etc. There is presently no advantage to having drifting jumbos, except if a major ramping program is put in place. For the development sites where there are only access raises, we recommend the usage of Atlas Copco Cavo 310 which are fully air driven loaders and can be rapidly dismantled and easily transported through small raises.

#### 16.6.2 Mine Ventilation

The regulations for underground mine ventilation are now more globally standardized; a fixed rate of fresh air per worker and per diesel engine are mandatory. The required amounts of fresh air in the Province of Quebec, which are similar to international standards, are: 15 m³/minute per working people, and 2.7 m³/minute per kilowatt of every diesel engine. The Zgounder mine was developed using adits at different elevations that have access to surface, creating important natural ventilation that needs only to be controlled and directed towards blind development workings. The selected diesel equipment are only 115 kW each (small engine output); there should not be any fresh air ventilation issues.

#### 16.6.3 **Manpower**

The total manpower for the Zgounder project has been estimated at 137 employees when the production will be increased to 300 tpd. The labour force is presented in details for the concentrator operation and for the administration. In regards to the mine workings, the manpower costs are included in the unit production and development costs, as well as in the heavy equipments operating costs. Therefore the total mine and maintenance manpower is obtained from the labour percentage of the local salaries inside the respective unit total costs. We are confident that the underground manpower estimation is within an accuracy of 10%. The following table displays the estimation of the total project manpower. It must be noted that the manpower required for the exploration diamond drilling, the long-hole drilling used for the stoping selectivity, and the grade control, is not included in this estimate. The cost of the selectivity drilling itself is included in the general mining cost.





**Table 23: Estimated Manpower** 

MANPOWER	<b>Engineers Geologists</b>	Technicians	Specialized Workers	Helpers	Total
Administration					
Accounting	2	3	1		6
Mine engineering	1	3	1		5
Geological engineering	1	2	2		5
General workings					
Maintenance				1	1
Drivers			3		3
Guards				4	4
Processing	1	8	22	4	35
Underground mine					
Ore production		3	22	8	33
Development		3	10	6	19
Mechnical and electrical maintenance		2	6	4	12
Rehabilitation of the mine		2	6	6	14
Total	5	26	73	33	137





# 17 Recovery Methods

## 17.1 Process Description

The processing plant is designed to recover the silver by direct cyanidation. The mill will incorporate the following sections: run-of-mine storage, a two-stage crushing plant, crushed storage, single-stage ball milling with cyclone classification, leaching (cyanidation), zinc cementation (Merrill Crowe), refining, tailings, water and reagents distribution. At the start of the operation the mill will not be connected to a central Program Logic Controller (PLC). The mill process will be conventional with operation relying on operators' experience and skill supported by individual mill control devices: conveyor scales, pH meters, automatic samplers, flow meters, AA analyzer, colorimetric determination of silver with rhodanine, etc.

For simplicity, only major pieces of milling equipment are enumerated and described in this report.

## 17.2 Crushing

Material grading approximately 360 g/t is hauled from underground by haul trucks and when possible, it is dumped directly on a 300 x 300 mm static grizzly above the crusher feed hopper. Due to the inconsistent schedules for mining and crushing operations, it is assumed that the haul trucks will transport 25% of the loads to a RoM stock pile; the rest will be dumped directly onto the grizzly. The RoM stockpile area is sized to hold approximately 2,000 tonnes. Secondary handling will be performed by a 958 Caterpillar front end loader (or equivalent) that will, among other things, be used to feed the crusher hopper with stockpiled RoM as necessary.

A large portion of the material will be coarser than the grizzly aperture, a result of the long-hole mining method. The oversized rock will be broken in place with a stationary hydraulic rock breaker. Material falls from the grizzly into an out-of-mine hopper having a volume of 10 m³. The hopper feeds an 800 mm x 600 mm jaw crusher using a vibrating feeder. From the jaw crusher, the material falls on a 650 mm conveyor belt feeding a 100 tonne coarse bin. From the coarse bin, it is conveyed to a 6.0 m² double deck screened-in closed circuit with a 3 foot Symons short head cone crusher. Undersize screen material (10 mm) is conveyed to two 5200 mm x 6000 mm (~170 tonnes live load) bins in parallel. Each bin has a dedicated feeder at the bottom. Before entering the mill, the material is weighed with weightometers installed on each of the conveyors feeding the ball mills.

The crushing capacity is approximately 40 tonnes per hour (Drawing 2014 - 01), in Appendix-1.

## 17.3 Milling

Presently, each of the fine bins feeds an approximately 3 m long x 1.70 m diameter ball mill located in a small, covered building. Each ball mill has two discharge pumps, one in operation and one





standby. Each pump pumps mill discharge slurry at approximately 70% solid to a 10" Krebs type cyclone. Each cyclone underflow returns to its dedicated ball mill while the cyclone overflow of 40% solid and  $P_{80} = \sim 75 \mu m$  fineness proceeds to the leaching section (bypassing the unnecessary thickeners) with an identical circuit for each mill. Circulating load is deemed to be in the range of 300%.

To obtain a decent silver recovery at the cyanidation stage ( $\sim$ 85%), the mill feed rate is set to be 200 tonnes per day or 70,000 tonnes per year (Drawing 2014 - 02), in Appendix-1.

Shortly after the start of the operation, Maya intends to increase the mill feed rate to at least 12.5 tonnes per hour or 300 tpd.

To do so, both ball mills will be changed autonomously for larger ones (7'  $\times$  7.5') or any mill size that can maximize the actual power of the motors (132 kW or 175 HP), based on a ball mill Work Index of 17.0 kWh/t.

It is a possibility that it will not be possible to keep the same motors and maintain the mill's critical speed in the 75-80% range due to the gear reducer, the sizes of the pinion and/or the mill bull gear. In such a case, Maya could purchase the larger ball mills second-hand as the motor-gear reducer-mill comes as a package.

The present pump boxes, piping and cyclones will remain except that the cyclones will have to be jacked up to overflow directly into the first new leach tank of each circuit (Drawing 2014 - 02A), in Appendix-1.

## 17.4 Leaching and Counter-Current Decantation

Each cyclone at approximately 40% solids overflows by gravity to the first cyanidation tank of its dedicated leaching circuit. Each circuit consists of four identical 5 metres in diameter by 3.3 metres in height leach tanks operating in series for a total of eight tanks.

Leaching time is on the order of 33 hours.

Each circuit consists of five, 12 meters in diameter counter-current decantation (CCD) thickener type tanks, totalling ten. The overflow solution from each tank is enriched by being pumped up to the preceding one while the underflow (slurry) is depleted from its silver content by being pumped down to the next tank. The tailings pump boxes and pumps are installed to pump the tailings slurry from both the final CCD tanks to the cyanide destruction circuit. The overflow solution from each of the first CCD tanks passes to the silver recovery section (Drawing 2014 – 03), in Appendix-1.

During the first year of operation and in parallel to the increase of the mill feed rate, Maya intends to augment the leaching time from 33 to 48 hours in an attempt to obtain a silver recovery in the 90% range. To do so, two more leaching tanks (5 mD  $\times$  8.0 mH) will be added to each circuit. The two unnecessary 12 meter thickeners of each circuit will be removed and the two new leach tanks will be erected at their location.

Because there is no room to accommodate, at a reasonable cost, the installation of more counter-current decantation thickeners on each circuit, it is felt that the silver recovery, which normally should be in the 92% range will top at more or less 90%. (Drawing 2014 - 03A), in Appendix-1.





Even if it is not presently evident, Maya will evaluate if the two thickeners could be transformed into CCD tanks

## 17.5 Silver Recovery and Smelting

The silver recovery section is housed in a secure, covered building and is common to both mill circuits. It incorporates the Merrill Crowe process for the recovery of silver using zinc dust cementation.

Main equipment consists of a 20-leaf clarifier, a standard Crowe tank connected to a vacuum pump, a zinc cone dust feeder, two 1 m x 1 m filter presses, a loaded and a barren solution tank.

The filter press sludge is dried, depleted from the remnant mercury in a static oven, and then smelted in a Wabi type furnace (Drawing 2014 - 04), in Appendix-1.

## 17.6 Cyanide Destruction

The tailings from the last CCD tanks are pumped to the SO<sup>2</sup> cyanide destruction circuit. Since there was no cyanide destruction circuit when the mill was in operation and no cyanide destruction tests have been previously performed, the following description and drawing 2014-05 are conceptual by nature. The cyanide destruction circuit consists of a first aerated reactor tank where sodium bisulphite and copper sulfate are added. Slurry from this first reactor tank overflows into a second, non-aerated one. Flotation cells could be used as cyanide destruction reactors.

Chemicals added to the second reactor tank are lime and copper sulfate. Slurry from the second reactor tank overflows into a pump box prior to being pumped to the tailings pond (Drawing 2014 – 05), in Appendix-1.

## 17.7 Tailings

Considering a mine life of 10 years, the milling of 65,800 tonnes the first year, and 98,700 (300 t/d x 350 d/y x 94% availability = 98,700 t/y. (300 t/d x 350 d/y x 94% availability = 98,700 t/y). tonnes per year thereafter, SGS Geostat is of the opinion that there is enough room in the most recent tailings pond emplacement for the whole 10 years of operation ( $\approx$ 900,000 tonnes). The actual pond will be covered with an impervious membrane and the dam will be raised as necessary by spigotting the mill tailings.

Unfortunately, SGS does not have enough information to properly quantify the real cost, Capex and Opex of impounding the mill tailings. In Canada, the general guideline is that the cost of a new tailings pond is approximately \$1.00 per every tonne milled. In the case of Zgounder, the Capex is solely for the spigotting cyclones and the piping; impervious membrane has already been purchased. All other costs are estimated and are included in the mill operating costs.





Overflow from the tailings pond will flow by gravity to a small polishing pond, treated if necessary and then be pumped back to the mill (Drawing 2014 - 06), in Appendix-1.

#### 17.8 Services

#### 17.8.1 Water

Water is supplied mainly from the barren solution tank and from the supernatant water from the tailings-polishing ponds. If the tailings-polishing ponds provide insufficient water, additional water supply is available from the small "Zgounder" river flowing through a valley downhill from the mill. All water will be pumped to an overhead tank located directly above the plant and flows by gravity to the required sections of the plant. Potable water is obtained from the source Mascot and gravitates some distance to the plant site. Although the "Zgounder" river ebbs and flows over the years, it was reported that there has always been sufficient water for the plant operations.

#### 17.8.2 Electrical Power

Electrical power is supplied by 3 x 1000 KVA (800 kW generators). Two of these generators supply all surface and underground installations while the third one is standby.

#### 17.9 Laboratories

A combined assay/metallurgical laboratory is situated on site. At the time of writing this report, none of the laboratory facilities were completely refurbished. It was discussed that the assay laboratory will be equipped with new pieces of equipment such as laboratory crushers and pulverisers, fire assay oven, precision balances, atomic absorption spectrometer (AAS), chemicals, glassware, etc.

## 17.10 Mill Operating Costs (OPEX)

The mill operating costs for the Zgounder Project presented in this section are strictly for the mineral processing for the recovery of the silver. The cost estimation is based on the procedures from the start at the RoM storage to the end at the tailings ponds. General and administrative costs (G&A) are included but are limited to the mill operation and do not consider any costs related to the mine or Maya Gold & Silver head office. Milling costs are mainly based on salaries, consumption of reagents and other consumables, supplies and power.

The costs presented exclude the fringe benefits. The mill operation costs are considered to have an accuracy range of  $\pm -30\%$ .

The breakdown of the mill operation costs per tonne milled for a 200 and 300 tonnes per day operation is as follows:





ITEMS	200 TPD	300 TPD
Consumables	\$17.98	\$17.98
Spare parts	\$4.49	\$4.49
Electric power	\$16.08	\$10.97
Salaries	\$6.41	\$4.49
G&A ≈10%:	\$4.50	\$3.79
Contingency 10%	\$4.95	\$4.17
TOTAL	\$54.41	<i>\$45.89</i>

Table 24: Mill operation cost at 200 and 300 tpd

## 17.10.1 Consumables (grinding media, fuel oil, lubricants and chemical reagents)

Consumables are limited to the grinding mill steel balls, a flocculent for the thickeners (and CCD tanks), sodium cyanide and lime for the leaching circuit, diatomaceous earth, lead nitrate and zinc dust for the Merrill Crowe circuit, fuel oil, silica sand and other fluxes for the refinery fuel oil for the loader, gasoline for the pick-up truck, some chemicals for the assay office and mill laboratory and different lubricants for the mill machinery.

At the time of writing this report, costs for every reagent and other consumables was unavailable, therefore it was assumed that the grinding media, the sodium cyanide and the lime consumption account for 85% of the cost of all consumables.

- Grinding mills steel balls \* 1.41 kg/t @ \$1.45/kg = \$1.86/t
   \* Grinding steel balls consumption and unit costs were obtained from Maya
- NaCN 3.30 kg/t @ \$4.17/kg = \$12.52/t
- Lime\*\* 4.31 kg/t @ \$0.23/kg = \$0.90/t\*

  \*\* Lime consumption was obtained from Maya but unit cost is from Canadian supplier
- Total: \$15.28/t

The cost for the reagents and consumables is thus expected to be around \$17.98/tonne. (\$15.28/85% = \$17.98)

## 17.10.2 Spare Parts

Spare parts are all pieces of mechanical or electrical equipment that are subject to the wearing of time and are normally kept in a warehouse (jaw crusher wear plates, cone crusher bowls and mantles, screens, ball mill liners, V-belt, electric motors, bearings, pumps parts, light bulbs, tires, etc.)

The cost of the spare parts is evaluated at 25% of the consumables  $\sim$  \$4.49/tonne.





## 17.10.3 Electrical Power

An extensive computation of the power of each motor of the mill when it was in operation was provided by Maya. SGS Geostat maintained the same power demand with the exception of the crushing, where the short head cone crusher is much smaller than the one previously used.

•	Crushing:	174.1 kW
•	Grinding:	$315.0 \; kW^{(1)}$
•	Cyanidation (including the compressors <sup>(2)</sup> for the leaching tanks):	118.9 kW
•	Cementation:	54.5 kW
•	Fresh and reclaim water pump:	$37.0 \text{ kW}^{(3)}$
•	Miscellaneous (cyanide destruction, refinery, laboratories, etc):	80.0  kW
•	Total:	779.5 kW

Notes

- (1) The installed power for the grinding section of the mill is abnormally high, it comes mainly from the overdesigned ball mills motors
- (2) Mill is self sufficient in compressed air
- (3) Not included in the motors computation provided by Maya

In the case of a 200tpd operation, SGS considers that the motors will have an average power consumption (charge factor) equal to 75% of their nominal power.

- $779.5 \text{ kW} \times .75 = 584.6 \text{ kW}$
- For 8 t/h  $\rightarrow$  584.6 kW/8 t/h = 73.1 kW-h/t
- At  $\approx \$0.22/\text{kW-h} \rightarrow 73.1 \text{ kW-h/t x } \$0.22/\text{kW-h} = \$16.08/\text{tonne}$

In the case of a 300 tpd operation, SGS considers that the motors will have an average power consumption (charge factor) equal to 80% of their nominal power.

- 779.5 kW x .80 = 623.6 kW
- For 12.5 t/h  $\rightarrow$  623.6 kW/12.5 t/h = 49.9 kW-h/t
- At  $\approx \$0.22/\text{kW-h} \rightarrow 40.9 \text{ kW-h/t} \times \$0.22/\text{kW-h} = \$10.97/\text{tonne}$

## 17.10.4 Manpower and salaries

For an efficient mill operation a work force of 35 employees will be required. The mill will operate on three 8-hour shifts per day, seven days per week, as outlined in the following table below.

The salaries come from a report supplied by Maya. It should be noted that these values are based on 2009 salaries for similar positions in the Moroccan mining industry. SGS increased the 2009





salaries by a factor of 16% to account for inflation and somewhat adjust the wage scale to imitate various milling positions within Canada. The exchange rate has been set at 7.63 MAD = \$1.00, as of December 29, 2013.

Table 25: Manpower-hours and wages

Function	Number	Wages	Wages (1)	Wages	Wages
runction	of Employees	\$/hr	\$/year	\$/t 200 tpd	\$/t 300 tpd
Mill superintendent	1	19.42	40,392	0.58	0.4
Mill shift tech. (Leaders)	3 + 1 <sup>(2)</sup>	6.93	57,693	0.82	0.58
Crushing	1 + 1	4.86	20,215	0.29	0.2
Grinding	3 + 1	4.86	40,430	0.58	0.4
Cyanidation	3 + 1	4.86	40,430	0.58	0.4
Cementation - Refinery	3 + 1	4.86	40,430	0.58	0.4
Tailings	3 + 1	4.86	40,430	0.58	0.4
Loader operator	0.5 (3)	4.86	5,054	0.07	0.05
Millwrights	2	6.93	28,846	0.41	0.29
Electrician	0.5	6.93	7,212	0.1	0.07
Chief analyst	1	6.93	14,423	0.21	0.14
Analyst	1	4.86	10,108	0.14	0.1
Samplers	2	4.86	20,215	0.29	0.2
Mill clerk	1	4.86	10,108	0.14	0.1
Mill general laborers/helpers	3 + 1	3.89	32,329	0.46	0.32
Total	35		408,315	5.83	4.08
Overtime 10%			40,831	0.58	0.41
Grand Total			449,146	6.41	4.49

Notes: (1) Salaries are based on 40 hours/week

- (2) Swing shift
- (3) Sharing with other operations

## 17.10.5 Instrumentation and Process Monitoring

At the start of the operation, the Zgounder mill will likely not be connected to a central PLC. Monitoring will rely on the skill and knowledge of the mill operators supported by individual mill control devices such as conveyor scales, pH meters, automatic samplers, flow meters, AA analyzer, etc.

Determination of the silver in the barren solution will be done every hour by the rhodanine colorimetric method.





## 17.11 Mill Construction Cost (CAPEX)

As the mill is already built and almost ready to operate there is no construction cost per se, at least in the case of a 200 tpd operation. Certain purchases will be necessary, such as a pick-up truck, a hydraulic rock breaker, a versatile PLC, agitators and tanks for the cyanide destruction circuit, cyclones, and piping for the tailings and laboratory pieces of equipment amounting to approximately \$600,000.

Construction costs exclude the raising of the tailings dam (most recent) which will be done by spigotting the mill tailings, and is included in the milling costs.

TTEMS
Cost - \$
Hydraulic rock breaker
100,000
PLC
150,000
Cyanide destruction circuit
25,000
Spigotting cyclones and piping for the tailings
25,000
Laboratory equipment
275,000

Table 26: Outline of costs prior to recommencing operations

Costs prior to resumption. However, since it is the intention of Maya to increase the mill feed rate to 300 tpd and augment the leaching time from 33 to 48 hours in the first year of operation, another capital expenditure amounting to approximately \$400,000 must be budgeted and added to the above to change the ball mills for larger ones and fabricate and install two new leaching tanks.

## 17.12 Mill Preproduction Costs

The mill feed rate will be 200 tpd upon recommencing operation and as such, the mill preproduction costs are mainly for the purchase of a 3 month supply of steel balls and reagents plus other consumables, some inventory for the warehouse and a one month commissioning period.

Table 27: Mill pre-production costs based on 200 tpd

ITEMS	Cost - \$
Steel balls, reagents + consumables	267,540
Warehouse inventory	79,625
One month commissioning	318,500
TOTAL	665,665

## 17.13 Mill Sustaining Capital Expenditures

Mill sustaining capital expenditures are minimal and are included in the mill operation costs.





# 18 Project Infrastructures

## 18.1 Zgounder Mine Site and Access Road

Following closure of the mine in 1990, installations have been well maintained by permanent security guards. The equipment and facilities remain in relatively good condition with the exception of the employee camp installation which was badly damaged. Some of the staff housing and offices have already been renovated to prepare for the resuming of mining operations. Considering the proximity of the Askaoun village, it was decided that employees will be transported daily instead of rebuilding the entire camp facilities. The 5.5 km gravel road between Askouan and the mine site has been rebuilt: new permanent concrete bridges were put in place with appropriate drainage.

## 18.2 Major On-Site Infrastructures

## 18.2.1 Electrical Energy

Three new generating units of 1,000 kVA (850 kW) were purchased and are on site. Two of them were installed to run in parallel while the third generator is a spare. These units were commissioned and are in running condition. According to the mine owners, the generators have been performing perfectly during concentrator equipment tests of the primary and secondary crushers and conveyor belts.

The estimated power demand for the project is 1,690 kW and is summarized below.

**Table 28: Estimated Power Requirement** 

Description	kW
Concentrator	780
Mine - general services	400
Mine - compressed air	460
Surface and repair shops	50
Total	1,690

## 18.2.2 Compressed Air

Three new electric compressors were delivered to site and have been tested; two of them are delivering 25m³/min (415 l/sec) each for a total of 830 l/sec, which is sufficient for mine production. The third one is rated at 18m³/min (300 l/sec) and was purchased as a back-up unit. This third compressor could be used for the definition diamond drilling if air driven motors are selected. The estimated requirement of air consumption of 602 l/sec for mining is outlined in the following Table 29.





**Table 29: Mine Compressed Air Requirement** 

Mine Compressed Air Requirements	Number	Demand	Usage	TOTAL
		I/s	%	I/s
Long-hole drill - A Copco BBC 120	1	167	70%	116.9
Jack Legs - A Copco BBC 17	6	60	50%	180
Stopers - A Copco 46	4	75	50%	150
Blower pipes, small tools & miscellaneous	2	100	25%	50
Shops and repairs		Estimation		50
Sub-total			547	
Losses: 10%			55	
Total: I/s			602	
		То	tal: m³/min	36

The maintenance shops will also require compressed air but in small quantities and on irregular sequences, estimated to be  $\sim 50$  l/sec. The total air requirement is then 602 l/sec, which is 75% of the output of the two largest compressors. There is therefore more than sufficient available compressed air at the site. The concentrator operates on its own system of compressed air.

## 18.2.3 Repair Shop and Warehouse

These installations are in place and only require minor repairs.

## 18.2.4 Explosive Magazines

The former site is still available; however, it should be protected by elevated earth berms for safety purposes.

## 18.2.5 On-Site Roads

The existing roads from the main offices to the concentrator were also completely rebuilt and are in very good condition. All bridges and culverts were rebuilt and proper drainage has been put in place.

#### 18.2.6 **Concentrator**

This item is fully described in section 17.





## 19 Markets Studies and Contracts

The silver metal bullions can be sold on spot market or by contract. The author is not aware of any specific contract. Historically the precious metals price retained in economical studies was the average spot prices of the last three years, which is US\$30.02/oz Ag, as shown below.

Years	London Fix - US\$/oz
2011	35.12
2012	31.15
2013	23.79
Average	30.02

Following the general all metals low prices for the past twelve months, this above average price did not appeared fair to this study. The author has prepared the economical analysis with a silver price of US\$22/oz, as of the market price on the last week of February 2014, when the economical analysis study was completed; these prices are shown below.

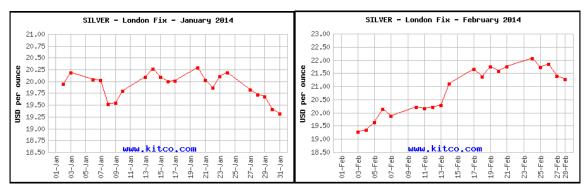


Figure 100: Silver charts of January and February 2014

The last chart is illustrating changes from January 2000 up to the present.



Figure 101: Silver chart from 2000 to present





# 20 Environmental Studies, Permitting, and Social or Community Impact

## 20.1 Summary

The Hydraumet study (2013) was realized to assess the environmental and social impacts of the resumption of the Zgounder silver mine project. For the nearby population of Askaoun this project is indicating many social and economic benefits on the community, mainly:

- Increasing the income of the rural village.
- Creating dynamic development of the Askaoun region.
- Reinforcing employment by creating new direct jobs (estimated to be around 150).
- Participation in the important mining sector of Morocco.
- Creation of small or medium enterprises providing services.

However, the project is likely to have some impacts on the mining area that are calling for mitigation measures to ensure a "Sustainable Development".

The identified items that could cause negative impacts are mainly those related to the water and air quality. The Zgounder mine has been operating from 1982 to 1990 and was relying on cyanide leaching process to recover the silver metal. Two tailings sites are present, and the Hydraumet analyses results are indicating the presence of remaining cyanide that could be harmful. We recall that, to the contrary of the majority of recent cyanidation processing plants, the first Zgounder concentrator circuit was not designed to destroy the free cyanide left in the tailings\*.

Hydraumet recommendations are proposed to offset the negative impacts of cyanide and all other identified polluting elements. SGS Geostat agrees with the majority of these recommendations.

In addition to Hydraumet, SGS Geostat proposes the following additional recommendations:

- \* Install a cyanide destruction circuit in the concentrator.
- Collect samples at depth on tailings ponds to verify the cyanide content.
- Reprocess the old tailings to eliminate the cyanide.
- Add lime to the mill tailings to raise the pH and precipitate the heavy metals directly in the tailings pond.
- Install a basic heat transfer system (condenser) to recover all the mercury fumes from the mercury exhaustion static oven.

SGS Geostat agrees with the proposed Maya procedure to neutralize the possible cyanide outflows from the recent tailings, by covering them with impervious membrane and bypassing the incoming surface running waters.





According to Hydraumet, four (4) permits are required for the Zgounder project, they are:

#### 1- Land Title

The land title No.09/2096 has been provided by the Mining Department Rabat. An operation of this land title agreement (leased) must be filed on behalf of the petitioner.

# 2- Operating License by Administrative Authorities

ONHYM delivered to Maya an operating license No. 2306 including prospecting. This license also provides surface rights and access to the property and allows any type of mining.

# 3- Building Permits

All the necessary premises for the operation of the mine already exist on the site. They will undergo an upgrade to improve the conditions of work and life. The new buildings will be subject to obtaining a building permit provided by the Municipality in accordance with regulations governing the planning.

# 4- Authorizations for use of public water

All necessary authorizations for the use of public water must be obtained from the Water Basin Agency of Souss Massa Draa, including the spring water or groundwater necessary for the mining process samples, the discharges of treated wastewater into wadis, and the temporary occupation of wadi banks.





#### 20.2 Introduction

A Study of Environmental Impact (EIA) prepared in 2013 by Hydraumet of Morocco, is the reference document for this Section of the PEA study. The Purpose of Hydraumet study was to give an analysis of the impact of the resumption of the Zgounder silver mine project, and to propose recommendations for minimizing adverse effects related to the mining and concentrating operations.

SGS Geostat environmental report is prepared by relying to the Hydraumet study and retains the same format. SGS has extracted the most important topics and added comments, observations and recommendations.

#### 20.2.1 General

The land area related to this impact study is covered by the title No 09/2096 provided by the Mining Department in Rabat. The ONHYM delivered to Maya and Silver Inc., an operating license No. 2306 including prospecting license, surface rights and access to the property and allows any type of mining.

All necessary authorizations for the use of public water must be obtained from the Water Basin Agency of Souss Massa Draa, including the spring water or groundwater necessary for the mining process, the discharges of treated wastewater into wadis, and the temporary occupation of wadi banks.

The abbreviations and acronyms utilized in this report are included inside the PEA Technical Report under Section 2.1, Terms of reference.

The study includes the following topics (items):

- 1. Overview of the project;
- 2. Analysis of the legislative and regulatory framework;
- 3. Description of the natural environment;
- 4. Characterization of the initial state of the environment of the project area;
- 5. Project description;
- 6. Evaluation of the project impacts;
- 7. Definition of mitigation measures;
- 8. Development of the monitoring plan;
- 9. Rehabilitation plan for the mine closure.



SGS



# 20.3 Chapter 1 - Overview of the Project

This chapter of Hydraumet report describes in detail the mining industry in Morocco, the mineral deposits, the metallogenic provinces and the history of the mining sector in this country with statistics and other information's. A summary of the main characteristics of the Zgounder project is included.

In conclusion, SGS recalls the importance given to this mining project by the EIA authors.

# 20.4 Chapter 2 - Analysis of the Legislative and Regulatory Framework

This chapter is defining the legal and regulatory framework governing the mining activity and the extraction of metal, the most important highlights are summarized below:

# Legal Texts

- 1. Dahir of 16 April 1951, Regulations concerning the mining sector.
- Decree No. 2-80-273 (February 18, 1981), Specifications prescribing the procedure applicable to the award of mining concessions under Article 89 of the Royal Decree of 16 April 1951 concerning mining regulations.
- 3. Decree No. 2-57-1647 (December 20, 1957), Mining regulations in Morocco on brokerage institution or renewal of mining rights at the annual tax concessions, and work obligations at the expense of dealers research or mining.
- 4. Order Vizierial (March 11, 1938), General regulations on the use of mines other than mines fuels.

# Related Legal Texts

- Dahir No. 1-69-170 of July 1969 on the protection and restoration of soil.
- Order of the Director of industrial production and mining of December 29, 1954 as amended and supplemented by Decree of the Minister of Energy and Mines No. 167-01 of 21 Shawwal 1421 (16 January 2001) regulating the technical conditions for storage of explosives, detonators and fireworks firing explosives.
- Vizierial order dated 2 January 1932 (23 Sha'ban 1350) regulating the use of explosives in quarries and construction sites, as amended by the Vizierial decree of February 24, 1940.
- Royal Decree of 30 January 1954 (24 Jumada I 1373) on the control of explosives.
- Law No. 11-03 on the protection and enhancement of the environment.
- Law No. 12-03 on studies of environmental impact.







- Decree No. 2-04-563 of November 4, 2008 on the functions and operation of the national committee and regional committees studying environmental impact.
- Decree No. 2-04-564 04 November 2008 laying down rules for the organization and conduct of the public inquiry into the project subject to the studies of environmental impact.
- Law No. 13-03 on the fight against air pollution.
- August 25, 1914 Dahir regulating unhealthy institutions, inconvenient or dangerous, as amended and its implementing regulations.
- Law No. 10-95 on the water.
- Law No. 28-00 on waste management and disposal.
- Decree No. 2-07-253 of 18 July 2008 concerning the classification of waste and establishing a list of hazardous waste.
- Decree No. 2-97-787 of 4 February 1998 on water quality standards and inventory of the degree of water pollution.
- Law No. 78-00 on municipal charter.
- Law No. 12-90 on the town and its implementing Decree No. 2-92-832.
- 65-99 Act on the Labour Code.

# The following conventions have been ratified by Morocco and are applicable to the project:

- International Convention on Wetlands of International Importance especially as Waterfowl Habitat (RAMSAR).
- International Convention on Migratory Species of Wild Animals (Bonn).
- Convention on Biological Diversity.
- Convention establishing the International Conservation Union (IUCN).
- Convention 176 on Safety and Health in Mines.
- African Convention on the Conservation of Nature and Natural Resources.
- North African Charter on the protection of the environment and sustainable development.
- Concentrations emission limits for the project under the conditions of normal operation shall agree with texts or draft Moroccan legislation grids as implemented in decrees and related documents for discharge limits; in absence of regulation at national level, international guidelines shall be applied.
- Water for human consumption: Moroccan Standard No. 03.07.00 setting limits for water quality values of food.
- Domestic wastewater discharges: Decree No.2-05-1533 of 14 Muharram 1427 (13 February 2006) on-site sanitation.
- Leachate discharges: Moroccan standards for direct discharges into receiving waters.
- Ambient air: Moroccan standards of quality of the ambient air.
- Noise: Noise emission guidelines recommended by the World Bank.





Vibrations: Recommendation GFEE (Explosive Energy Group French).

# > Permits required

According to Hydraumet, the four (4) permits required for the Zgounder project resumption are:

#### 1- Land Title

The land title No.09/2096 *has been provided by the Mining Department Rabat*. An operation of this land title agreement (leased) must be filed on behalf of the petitioner.

# 2- Operating License by Administrative Authorities

ONHYM delivered to Maya an operating license No. 2306 including prospecting license. This license also provides surface rights and access to the property and allows any type of mining.

# 3- Building Permits

All the necessary premises for the operation of the mine already exist on the site. They will undergo an upgrade to improve the conditions of work and life. The new buildings will be subject to obtaining a building permit provided by the Municipality in accordance with regulations governing the planning.

# 4- Authorizations for use of public water

All necessary authorizations for the use of public water must be obtained from the Water Basin Agency of Souss Massa Draa, including the spring water or groundwater necessary for the mining process samples, the discharges of treated wastewater into wadis, and the temporary occupation of wadi banks.

# > Other legal conventions and guidelines applicable to the project.

# ✓ Ratified conventions applicable to the project

This section described the five (5) international and the two (2) regional conventions ratified by Morocco and applicable to this project.

# ✓ Grid boundaries used for the project

In the absence of regulation at national level, international guidelines are applied. This section is illustrating them all, in full details.

#### ✓ Institutional framework





Many Moroccan institutions and technical departments are directly involved in the management of the environment. There are eight (8) Ministries involved by the environment, and three (3) councils, or bodies, also involved.

At the regional level, there is the existence of the:

- Agencies watersheds;
- Provincial Directorates of Agriculture, and the
- Urban Agencies: Regional Committees impact studies on the environment.

# 20.5 Chapter 3 - Natural Environment

A complete description is done relating to the physical, biological and socio-economic environment of the project area. Sensitive characteristics of this environment are thus highlighted. To locate the project in its regional and local context, particular attention is given to the characterization of the existing natural environmental and human components of the province of Taroudant and the rural town of Askaoun to which the project site depends administratively.

In relation to the socio-economic activities, a Socio-Economic survey was conducted by Hydraumet throughout the intervention of the study, in Askaoun and villages that belong to the territory of the province of Taroudant. This survey was conducted in close collaboration with local authorities (Caïdat of Askaoun and president of the town). Social or community impacts related to the project were discussed during the Hydraumet study, mainly:

- Air quality: mainly dust control from the roads and the tailings pounds.
- Sound characterization and protection: for underground miners and operators of noisy machineries.
- > Storm water runoff: it was mentioned that difficulties occurred in the past due to heavy rainfalls that have caused flooding and damages.
- ➤ Groundwater controls: secured and protect all tanks and reservoirs containing chemical products, oil, grease or combustibles, from leakages or spills by installing basins or appropriate devices.
- ➤ Wastewater discharges: identification and control, by septic tanks or other methods of all sewers from the plant.
- Soil Protection: re-vegetation of unused spaces to limit erosion.
- Fauna and Flora: mitigation of the impacts of the mine on wildlife measures are those required to bring a diversity of flora and fauna as the operation of the mine and especially during his rehabilitation. In this context, it is recommended to define in advance a comprehensive vision for planting forest species to protect the surrounding environment and introduce a rich diversity of flora and fauna.
- Usage of cyanide: this item is fully discussed elsewhere in the report.





# 20.6 Chapter 4 - Characterization of Current Status of the Project Environment

The baseline characterization of the project site of the silver mine has been made by Hydraumet on the basis that an action plan and analysis has been implemented by a series of measurements of the quality of groundwater and surface water. The analysis plan and the results of measurements were carried out in June 2013 by Hydraumet. The air quality of the site, the quality of ground and surface waters in the region, and the noise levels on site were characterized. Analyzes of the water samples were done at the Laboratory "Laagrima", located in Casablanca.

Nine water collecting points have been identified in the vicinity of the project site for a reference of the groundwater and surface water in the study area. Analyses were performed on chemical parameters (sulfide (H2S)), parameters of organic pollution (BOD5, COD, TSS, dissolved O2), and parameters of heavy metal pollution (cyanide, lead, mercury, arsenic).

Sample No. **Points** Lambert coordinates Identification X (m) Y (m)  $M_1$ Source Tinghrif 275,756 416,642 Water Source Ech 2 Amsirar 275,645 416,699 Water well Ech 3 Ain Izegharne 273,737 417,787 Water source Ech 4 Flow Tassiouite 274,361 419,047 Surface water Ech 5 Ain macoste 274,336 419,039 Water sourcde 275,492 Ech 6 Leachate Dam 420,758 Leachate discharge Ech 7 Downstream dam Leachate discharge Ech 8 Dam 275,421 419,387 Leachate discharge

Table 30: Water sampling coordinates and their identification

The above table is giving the coordinates and identification of the water sampling locations that are shown on the next figure.

275,606

420,338

Surface water

On the Zgounder River



Ech 9



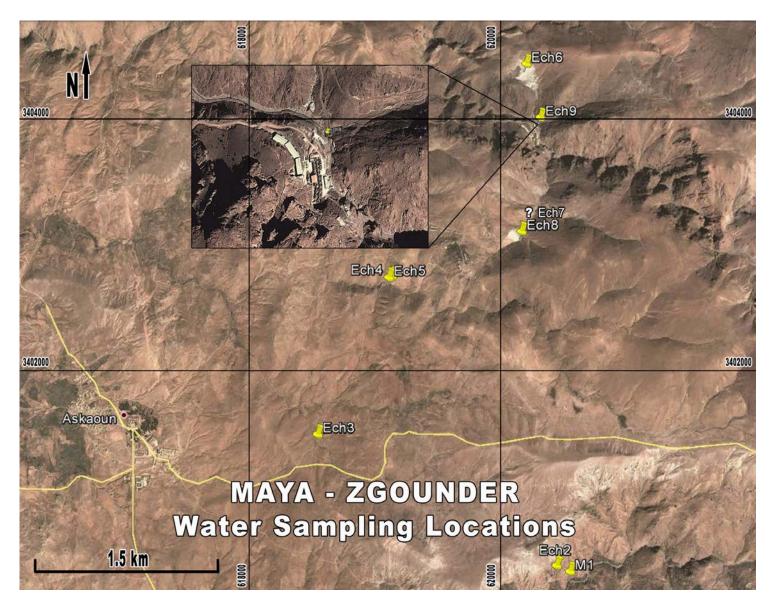


Figure 102: Water Sampling Locations done by Hydraumet in June 2013





# > Water quality

The interpretation of the analyses results of these nine samples are described below: extracts from the Hydraumet report:

M1 (Source Tineghri tiliwo Tamaloute): In comparison with water quality standards for surface water source Tineghri tiliwo Tamaloute results are excellent.

<u>Ech2 (Well Amsirar)</u>: Amsirar Well waters are in the drinking water standards and require a simple physical treatment and disinfection to fit human consumption needs. They are not polluted by liquid discharges from the mine.

Ech 3: Ain Izagharne: The Ain Izegharne water is of excellent quality.

Ech 4 Ain Tasstiwite: The waters of Ain Tasstiwite are of excellent quality.

Ech 5 Ain Mascote at 9 km: The zagharne ain water is of excellent quality.

Ech 6: Leachate dyke 1 (old): The leachate from the old dam has characteristics are compliant with direct release into the environment standards.

Ech 7: Downstream of the dam: Waters downstream of the dam are compliant with direct discharges standards. These waters are not contaminated by solid and liquid wastes from silver mine.

<u>Ech 8</u>: Water collected on the surface of the exploitable for tailings dam: The analyze results revealed that the accumulated water at the dam recently exploited is *high in cyanide* with upper limits for direct release into the environment values levels. This content comes from previous processing activities of silver materials in the Zgounder mine. There is a risk of leaching into surface water and soil pollution.

Ech 9 Oued Zgounder: Analyses show that the waters of the river Zgounder located about 1 of km south of the dam have high cyanide content, making it a poor water quality body in this setting.

#### **SGS Comments and Recommendations**

There are no laboratory certificates of analyses results in the Hydraumet report; efforts will be made to incorporate them in subsequent reports.

Ech 6 (Old tailings): Only the water above the tailings was analyzed, SGS recommends collecting samples at depth to verify the cyanide content.

Concerning this tailings site, SGS recommends reprocessing them completely in order to eliminate the cyanide that could be trap inside the tailings.

More sampling should be done upstream, to clearly locate from where the cyanide is coming from.





# Maya proposal for the recent tailings, and supported by SGS Geostat

Ech 8: The actual owners processing planning is to isolate this tailings pond, by covering it with an impervious membrane and directing away the surface waters, in other words, to neutralize its polluting risk.

# > Other Measurements

There were no other measurements done as the mine was not in operation at the date of the preparation of the Hydraumet report.

# 20.7 Chapter 5 - Project Description

This chapter gives a complete mechanical, electrical and processing description of the whole plant. In relation to this description, here are SGS conclusions and recommendations.

# ✓ Mine

Regarding the underground mine, one additional recommendation is done concerning the usage of the Amex type of explosive; this explosive which can be delivered in bags is sometimes discarded anywhere near blasting sites, only to empty the bags. When this explosive is washed by water, it is partly dissolve and increase the pH of the water, making it harmful. The solution is to neutralize it with acidic liquid. It is therefore important to avoid to leave unconfined ammonium explosives in the mine.

# ✓ Concentrator

To offset the negative impacts of the cyanide, arsenic, lead and mercury, here are SGS recommendations.

### ✓ Cyanide

Recommendation to install at the concentrator a cyanide destruction circuit;

Retreat the old tailings and process them at the concentrator where the cyanide will be totally destroyed.

# ✓ Arsenic (and other heavy metals)

If one or several of these heavy metals (including the arsenic) exceed acceptable limit values, lime should be added to the mill tailings pump box in order to raise the pH and precipitate the heavy metals directly in the tailings pond.

# ✓ Mercury

SGS Geostat recommends that a basic heat transfer system (condenser) be installed to recover all the mercury fumes from the mercury exhaustion static oven.





# 20.8 Chapter 6 - Environmental Impact Assessment

Here is the extract of the introduction, as presented by Hydraumet.

An impact on the environment in the broadest sense occurs when human activity located in space generates a change in the balance of potential, sensitivities and natural resources and human components of a fixed initial state at a given time. The intensity of the impact is in the magnitude of the changes generated on the site between the initial and final state of the activity and its consequences. It is not the absolute intensity of the result of an effect that is important, but the result of the difference between the situation with the project and non-project situation. The importance of an impact on a given environmental component will be assessed using an expert judgment method in connection with this component, the importance of early changes taking into account the spatial and temporal context of the project insertion. This judgment may be based on different criteria mentioned in the table below, and is often worn in conjunction with the level and nature of pollution, and more generally, with nuisances related to project activities.

# 20.9 Chapter 7 - Mitigations Impact

A complete review is done of all the procedures and steps that should be taken to reduce or offset any environmental negative impact during the mine operation. It is mainly a summary of the proposed detailed procedures of the previous chapters. Here is the extract of the introduction of this chapter:

This chapter describes the steps to be taken to eliminate, reduce or offset any environmental impact deemed severe or critical project during the previous evaluation. Reduction measures to be proposed in the framework are based on the best professional judgment of the ELA team and the state of knowledge and advancement of technologies available in the field of environmental protection.

The proposed measures are based on the one hand, the analysis of the current state of the natural environment of the site and its vulnerability and secondly, the analysis of the expected impacts of the project on these items. The environment of the site has been characterized and sensitive items that may be affected by the project activities have been identified. Similarly, identification and characterization of matrix effects was developed using the sources of pollution activities and the affected receiving environments.

# 20.10 Chapter 8 - Monitoring Plan

A full recommendation by the Hydraumet authors regarding the monitoring procedures. We reproduce the chapter, except the tables.

#### Introduction

This chapter describes the actions, methods and expected frequencies to track, monitor and record the potential impacts of the proposed rehabilitation and recovery of the mine Zgounder on the environment, particularly on the quality of the air, groundwater quality and noise levels. The project proponent will conduct an annual environmental report which will include detailed data below. The







reports will be archived and kept on site for a period of at least five years. Furthermore, and according to environmental practices, the developer will be required to carry out an environmental audit of its various facilities every two years. The results of these audits will also be archived and kept on site.

# Plan of control and monitoring of impacts

The Promoter will conduct a continuous monitoring in operation after the implementation of the project. This chapter describes the types of monitoring, data logging and account reports that the developer must produce to supply the annual environmental report of Zgounder mine. To ensure compliance of the operating silver mine Zgounder the recommendations of the study, periodic measurements of air quality and water will confirm the broad mitigation in immediate vicinity of the producing property. The measurement results will be available in the vicinity.

The project developer will undertake during operation monitoring campaigns on the environment:

- The air quality: dust, heavy metals, carbon monoxide, sulfur dioxide and nitrogen oxides (each year)
- The quality of water each year
- Monitoring visits to the physical stability of containment structures and adjacent structures
  once per season while maintaining a register identifying these visits and make it accessible at
  all times.

The objective set through these campaigns is to verify the effectiveness of corrective actions implemented by the operator.

#### 1. Air Quality

Site characterization will cover both the air quality on measures of dust fall and in the vicinity of this site. These characterization data will be compared with the values of the Decree on the limitation of air pollution in the mining sector in order to ensure compliance with the provisions of this decree.

#### 2. Water Quality

The project developer will monthly perform pH analysis, temperature, oil, grease and suspended solids for all outfalls of wastewater and storm water within the site.

The developer will monitor the water quality of water benchmarks that are in the vicinity of the site during measurement campaigns carried out by an approved laboratory after the start of operation. The analysis will focus on heavy metals, nitrates, pH and conductivity as well as total and faecal coliforms. Based on the results of this monitoring, the number of water points (including those of the baseline) and the sampling frequency will be specified. The result of all analyzes of wastewater and groundwater will be summarized and included in the annual environmental report of the mine.





#### 3. Noise

After the commissioning of the mine Zgounder a new campaign to characterize the noise levels of the site will be done by the developer. These measurements will be performed to determine if the activities of the mining operations emit unacceptable levels of noise. The equipment noise sources will be monitored to check whether the noise levels obtained coincide with the advanced levels by suppliers.

# 20.11 Chapter 9 - Guidelines for Mine Site Restoration

The complete Chapter extract is reproduced below.

#### Introduction

Like any industrial activity, mining will have negative impacts on the environment. Mitigation, compensation and monitoring recommended in the previous two chapters, are likely to reduce or eliminate pollution associated with the project. These measures include those relating to the rehabilitation of the mine after operation. Briefly present the guidelines for redevelopment of the mine at the end of its operations.

# Criteria for redevelopment of mine

In prescribing solutions, several criteria must be considered:

- Simplicity;
- Feasibility;
- Pragmatism;
- Compliance with regulations;
- The economy;
- Compatibility with the general spirit of redevelopment.

### Options for restoration

Before discussing the possible options for mine restoration, it is useful to recall the need at the beginning of mining for a study to redevelop the site and to emphasize the importance of prior consultation between key stakeholders, namely the promoter, the government, local authorities, etc., the choice of final restoration of the mine in question. This dialogue should reflect the necessary motivation and consensus to enable the developer to achieve the options considered.

Solutions and redevelopment proposals aim to eliminate the nuisance to the existence of an abandoned excavation with a visual impact that is also a source of change in the local ecosystem and a source of risk to the surrounding population. While maintaining a balance between the simplicity of implementation, efficiency and cost, the proposed solutions will help eliminate risk, stabilize soils and reintegrate the site.





The early stages of redevelopment are designed to clean the areas at risk and strengthen the fronts of sizes as well as demolish abandoned buildings that do not fit into the redevelopment plan.

On the other hand, the redevelopment options to retain depend both site characteristics (socio-economic, environmental, hydrogeological, hydrological, geological and geotechnical) and concerns that the promoter of the state of exploitation, conditions (water depth, pit walls and furniture cliffs) and the mine environment (rural, suburban, urban, distant views, close-ups, etc.).

Thus, redevelopment options can be considered for the rehabilitation of the silver mine Zgounder:

# Return to an agricultural state

This option is a recovery of the vegetation around the site for agriculture, forestry, landscape, ecological, etc. The techniques are generally fairly well understood, they allow recovering after restoration, soil with agronomic potential identical to the existing soil before extraction. This needs the following surveyed data:

- Groundwater level (high water, ten rating);
- Field background (nature, general topography, permeability);
- Soil characteristics of the soil in place (horizons encountered thickness analysis);
- Risk of runoff and erosion on the site: discharge device and drainage;
- Sterile (characteristics and volumes);
- Backfill (nature, volume, rate of intake).

#### Reforestation

This option consists of a forest revegetation to comply with strict constraints, in particular the preparation of the soil, the choice of species and plants as well as maintenance.

However, the currently accepted rules for pioneer species, hardwood (birch, alder, etc.), resinous (mostly pine) and the majority of shrubs favor a mandatory minimum depth of 50 cm before the first barrier to root exploration. On average, the rating level will be restored at least above 1.50 m level rating of the groundwater.

#### Rehabilitation

The mitigation plan, presented in Chapter VII, recommends the restoration of the mine after operation. Since the silver mine Zgounder is located far from major cities and did not have fertile soil rehabilitation options for agricultural-ii) is impractical.

Thus, the preferred option for the rehabilitation of the mine is the redevelopment of land for reforestation purposes, the steps to be followed are:

• The securing of fronts.





- The sloping edges.
- Planting a plant screen on the fronts by local species of trees and shrubs adapted to the soil conditions of the site and that will be an attractive screen for the mine and a habitat for local wildlife.
- The creation of water bodies, the banks will have a sinuous contour and depth adapted to provide habitat for idle.





# 21 Capital and Operating Costs

# 21.1 Capital Costs

Capital expenditures (capex) required for the resumption of production is estimated at a total of \$ 3.77 million. Estimates of capex purchases were mainly prepared using prices of new equipment from recent supplier's quotations received from the project owners, and also from in house prices of similar studies. Under the terms of the general conditions of a PEA (preliminary economic assessment), the estimation of all costs is made with a margin of certainty of about 25-30%. Contingencies are set at a rate of 10-15% when price quotes are available; otherwise they are at 20%. Prices for machinery and equipment include delivery, taxes and a minimum of spare parts. The summary and details of capital costs is provided in the following Tables.

**Table 31: Capex Summary** 

Description	Cost USD
Surface and General	453,100
Concentrator	1,886,765
Underground Mine	1,447,590
Total	3,787,455

# 21.2 Surface Capex

This section describes the equipment and vehicles that are estimated for surface operations. A wheel loader, a dump truck, a water truck and one compressor for the mine and workshops are required. The remaining items are supplies and materials required for regular office work and to assist the mine production.





Description	Q	Unit cost	Cost USD
Surface & General			
Maintenance shop - tools & supplies, lot	1	22,000	22,000
Fuel and gazoline storage tanks & pumping stations	2	12,000	24,000
Main office building - furnitures & supplies, lot	1	15,000	15,000
Computers / Softwares / Printers / Network, lot	1	25,000	25,000
First aid equipments, lot	1	5,000	5,000
Telecommunications system, kit	1	15,000	15,000
Surface electrical power line & distribution	1	10,000	10,000
Explosive & detonators magazines	1	6,000	6,000
Dump truck - 15 t load capacity	1	82,000	82,000
Water truck	1	30,000	30,000
Wheel loader, 150 kW engine - 4.0 m <sup>3</sup> bucket	1	160,000	160,000
		Sub-total	394,000
	Continger	ncies - 15%	59,100
		Total	453,100

**Table 32: Surface Capex Summary** 

# 21.3 Concentrator Capex Summary

The current mill is almost in an operable state and as such, there is no building construction cost to maintain a 200 tpd operation. Certain additional purchases are needed, such as a pick-up truck, a hydraulic rock breaker, a versatile PLC, agitators and tanks for the cyanide destruction circuit, cyclones, and piping for the tailings and laboratory pieces of equipment amounting to approximately \$600,000.

However, since it is the intention of Maya to increase the mill feed rate to 300 tpd and augment the leaching time from 33 to 48 hours in the first year of operation, another capital expenditure must be added. Approximately \$400,000 must be added to the budget for larger ball mills and to fabricate and install two new leaching tanks.

The mill preproduction costs for the initial start up at 200 tpd are mainly for the purchase of a 3 month supply of steel balls and reagents, as well as consumables, inventory for the warehouse, and a one month commissioning period.

All the above described capital expenses are summarized in the following Table.







Description Unit cost **Cost USD** Concentrator 100,000 100,000 Hydraulic rock breaker 150,000 150,000 25,000 25,000 Cyanide destruction circuit Spigotting cyclones and piping for the tailings 25,000 25,000 lot Laboratory equipments lot 275,000 275,000 New ball mills and leaching tanks 400,000 400,000 lot 267,540 267,540 Steel balls, reagents ans consumables lot Warehouse inventory 79,625 79,625 One month commissioning 318,500 318,500 Sub-total ,640,665 Contingencies: 15% 246,100 Total 1,886,765

**Table 33: Concentrator Capex Summary** 

# 21.4 Underground Mine Capex

Following the mine closure in 1990, most of the equipment, tools and machinery were removed from the underground mine, except water pipes, compressed air pipes, and some sections of track rails; most of the rails were of very light gauge and were in very bad conditions. The water and air pipes that were constructed of steel and were welded to each other have to be removed and replaced, preferably with new ones made of a more flexible medium. The owners have selected to replace the rail transportation method by a trackless one.

The cost of three load-haul-dump (LHD or Scoop) of 1.5 m<sup>3</sup> bucket capacity and two mining trucks of 8 tonnes payload represents more than 50% of the estimated underground mine investments. The remaining units are conventional non mechanical mining equipment.

For small sublevel excavation where it would be more economical to avoid ramp access, it is recommended to use air driven mucking machines. The Cavo Type 310 manufactured by Atlas Copco is still available in large quantities, either second hand or refurbished. These machines are easy to disassemble for raise transportation and perform well. The operation of air driven equipment eliminates diesel pollution which is crucial in confined areas, especially in the sublevels. An alternative for sublevel excavation over short distances is slusher hoists (either air or electric driven). The Table below is a summary of UG estimated Capex.





Description Unit cost **Cost USD** Underground mine LHD - 1.5 m<sup>3</sup> bucket 3 129,500 388,500 Mine Truck - 8 t 2 127,500 255,000 2 Long hole dril - complete 25,000 50,000 Jack Legs - complete 6 8,200 49,200 Raise Stopers 4 5,500 22,000 3 Loaders for sub levels - Cavo 310 type 12,000 36,000 Drill steels, bits and reamers, lot 1 9,100 9,100 Air & water hoses, 25 & 40 mm, m 300 22.75 6,825 Miners cap lamps with chargers 35,000 100 350 Air & water pipes with fittings - m 1000 13.65 13,650 Main electric fan - 30 kW 22,000 66,000 3 Secondary electric fans - 15 kW (6) 6 9,500 57,000 Air ducts - lot 18,500 18,500 1 UG rehabilitation & dewatering below 2000 level 1 95,000 95,000 Water pumps - 15 kW 6 57,000 9,500 Electrical gear: starters, wires, switches, lot 1 50,000 50,000 Tuggers and slushers 2 15,000 30,000

**Table 34: Underground Mine Capex Summary** 

# 21.5 Sustaining & Working Capital

Construction material: timber, steel

The expected life of mine (LoM) of 10 years as calculated in this study is short, and capital replacements costs are very limited. The major equipment and vehicles have a replacement life which is fortunately longer than the LoM.

1

20,000

Contingencies: 15%

Sub-total 1,258,775

Total 1,447,590

20,000

188,815

The working capital covers costs for the duration between expenses until the metal sale revenue; this period typically endures one month.

An annual amount of \$100,000 is budgeted for the above two items.

#### 21.6 Rehabilitation and Mine Closure

A preliminary amount of US\$500,000 has been estimated for rehabilitation and mine closure, as no detailed study has been done. The expenses for this item shall cover the cost of rehabilitation for the areas of mineralized material and waste stockpiles, as well as the costs of removing or relocating temporary installation such as roads, bridges, dykes, etc. As the Zgounder mine is located in a remote, arid area the rehabilitation required will be minimal. In accordance to the NI 43-101, a deposit representing the estimated amount has to be done in three installments: 50% in the first year and 25% in each of the two following years. Recall that the estimated amount for the rehabilitation







is a deposit that can be recovered by the operators following the approval and completion of the recommendations presented in the submitted document.

# 21.7 Operating Costs

The estimated operating costs of development and mining were prepared mainly from Zgounder historical costs as provided by Maya. This data was reviewed and updated to current salaries. The most recent available data was from 2009 and has been accrued by 4% annually. Others costs are built-in costs as taken from the SGS Geostat in-house data, and adjusted with the actual salaries as shown below. The mine production from Zgounder will mainly result from long-hole mining method with sub-levels. Certain mining stopes will require backfilling and the most economical backfill material would be the waste resulting from mine developments.

#### 21.7.1 Salaries

Reference costs for mine salaries, development and production operations were obtained from historical costs provided by the mine owners. These costs were updated to present-day conditions and were compared with similar mining operations for validation. The following Tables illustrate these unit reference costs.

Table 35: Salaries at Zgounder Project

Task Description	USD/h
Superintendant - engineer or specialized technician	19.42
"Agent de maîtrise" - shift boss	6.93
Experienced employee - developmernt and production leader miners	4.86
Operators - mine helpers and laborers	3.89

These salaries account for the operations at the concentrator, for the underground development and mining, and also for general and maintenance workings. They are calculated based on 52 weeks of work per annum and do not include additional fringe benefits.

# 21.8 Development Costs

The development costs in both waste and mineralization were estimated from historical figures and have been compared with other similar operations.





**Table 36: Unit Development Costs** 

Development Workings	Unit Cost
	USD/m
Sublevel & draw points - 10 m <sup>2</sup>	900
Drifts and draw points - 12 m <sup>2</sup>	1,075
Ramps - 15 m <sup>2</sup>	1,500
Raises manually driven - 4 m <sup>2</sup>	685
Alimak raise - 10 m <sup>2</sup>	1,100
Alimak raise with manway - 10 m <sup>2</sup>	1,500

# 21.8.1 Mine Development and Stope Preparation in Waste

The required development and preparation workings in waste rock for the production of the estimated resources have been identified. The unit costs were applied and the total cost has been summarized for all resources. The highest grade stopes will be targeted first in order to improve the payback period and the cash flow. The mine plan in waste is prepared from the following assumptions:

- all levels below elevation 2,100 m will be connected by a main ramp which offers the greatest flexibility for mining and development;
- access drifting will be done mainly parallel to the geological structures on main levels
  to connect neighbouring resources as outlined in the estimation provided by
  Goldminds Geoservices;
- mucking drifts will be proximal to resource locations in order to provide diamond drilling accesses and stope draw points;
- raises for access to sublevels and ventilation are proposed for stopes;
- draw points are estimated for most of the stopes.

This proposed mine plan is flexible enough to apply to either open long-hole or the Avoca mining method, the latest requiring backfilling. A summary of all estimated waste development is shown in the following Tables.

**Table 37 Summary of Total Waste Developments** 

Description	Development	Cost	Cost
	m	\$/m	\$
Ramp	1,225	1,500	1,837,500
Drift & draw pts	4,730	1,075	5,084,750
Raises	1,775	685	1,215,875
	8,138,125		
	2,034,531		
		Total	10,172,656







The next Table is showing developments from level 2,200 m to level 2,000 m.

Table 38: Summary of waste development from 2,200 m to 2,000 m levels

Resources Reference		Main I	Ramp	- 1	Access	Drift	N	lucking	g Drift	[	Praw F	oints	Ser	vice	Raises	Total
	m	\$/m	\$	m	\$/m	\$	m	\$/m	\$	m	\$/m	\$	m	\$/m	\$	\$
		Sumr	mary of was	ste dev	elopme	nt for stope	pro	duction	from 217	'5 to	2200 m	ì				
2200 m: access drifts				255	1,075	274,125										274,125
2175 m: mucking drift & draw pts							0	1,075	0	0	1,075	0				
2175 to 2200 m: raises													100	685	68,500	68,500
Total (1)				255	1,075	274,125			0			0	100	685	68,500	342,625
		Sumr	mary of was	ste dev	elopme	nt for stope	pro	duction	from 215	0 to	2175 m	ì				
2175 m: access drifts				275	1,075	295,625										295,625
2150 m: mucking drift & draw pts							50	1,075	53,750	50	1,075	53,750				107,500
2150 to 2175 m: raises													100	685	68,500	68,500
Total (2)				275	1.075	295.625	50	1.075	53,750	50	1.075	53,750	100	685	68,500	471,625
		Sumr	mary of was	ste dev	elopme	nt for stope	e prod	duction		_	2150 m				,	, , , , , , , , , , , , , , , , , , , ,
2150 m: access drifts					1,075											107,500
2125 m: mucking drift & draw pts					.,3.3	,	25	1,075	26,875	25	1.075	26.875		l		53.750
2125 to 2150 m: raises							ا آ	.,5,5		ا آ	.,5,5	_==,5.0	125	685	85.625	85.625
Total (3)				100	1,075	107,500	25	1,075	26,875	25	1,075	26,875	125	685	85,625	246,875
10tai (5)		Sumr	mary of was										120	000	00,020	240,070
2125 m: access drifts		Juilli	nary or was		1,075	198,875	) piot	Juction	110111 210	10.0	_ 120 11	İ				198,875
2100 m: mucking frift & draw pts				100	1,075	190,073	E0.	1,075	53,750	F0	1,075	53,750				190,673
							50	1,075	55,750	50	1,075	55,750		685	0E 60E	,
2100 to 2125 m: raises										-			125			85,625
Total (4)					1,075	198,875		1,075			1,075	,	125	685	85,625	392,000
			mary of was		elopme	nt for stope	pro	duction	from 207	'5 to	2100 m	ו				
Ramp: 2100 to 2075 m level	175	1,500	262,500													262,500
2100 m: access drifts				0	1,075	0										0
2075 m: mucking drift & draw pts							100	1,075	107,500	100	1,075	107,500				215,000
2075 to 2100 m: raises													200		137,000	137,000
Total (5)	175	1,500	262,500	0	1,075	0	100	1,075	107,500	100	1,075	107,500	200	685	137,000	614,500
		Sumr	mary of was	ste dev	elopme	nt for stope	e pro	duction	from 205	0 to	2075 m	ì				
Ramp: 2075 to 2050 m level	175	1,500	262,500													262,500
2075 m: access drifts				380	1,075	408,500										408,500
2050 m: mucking drift & draw pts							150	1,075	161,250	150	1,075	161,250				322,500
2050 to 2075 m: raises													200	685	137,000	137,000
Total (6)	175	1,500	262,500	380	1,075	408,500	150	1,075	161,250	150	1,075	161,250	200	685	137,000	1,130,500
(-7)			mary of was		elopme										,	,
Ramp: 2050 to 2025 m level	175	1,500	262,500				Ė									262,500
2050 m: access drifts		, i	,	325	1,075	349,375										349,375
2025 m: mucking drift & draw pts					,	,-	ı	1.075	53,750	50	1,075	53.750				107,500
2025 to 2050 m: raises							"	',	33,.00		',5.0	55,.50		685	102,750	102,750
Total (7)	175	1 500	262.500	325	1.075	349,375	50	1,075	53,750	50	1,075	53,750	150		102,750	822,125
Total (1)	.,,		mary of was		,				,			,	100	500	.02,100	ULL, 12U
Ramp: 2025 to 2000 m level	175	1,500	262,500		5.5piil0	ioi otope	) p.o.			1						262,500
2025 m: access drifts	173	1,000	202,000		1,075	462,250	ĺ							İ		462,250
2000 m: mucking drift & draw pts				+30	1,073	+02,200	150	1 075	161 250	150	1 075	161,250		İ		322,500
2000 to 2025 m: raises							130	1,015	101,230	'30	1,013	101,230		60F	119,875	119,875
2000 to 2025 m: raises Total (8)	175	1 500	262.500	420	1,075	462.250	150	1.075	161,250	150	1.075	161 250	175			1,167,125
		1,500				2,096,250				_			_			5,187,375
Total: (1) to (8)	700	1,500	1,050,000	1,950	1,075	2,090,250	3/5	1,075	618,125	5/5	1,075	618,125				
													Contin	igenc	ies: 25%	1,296,844
														Gra	nd Total	6,484,219

The last Table is the summary for the development from the 2,000 m level to the last existing level at Zgounder at elevation 1,925 m.







Table 39: Summary of waste development from the 2,000 m to 1,925 m level

Description	I	Main F	Ramp	-	Access	Drift	M	ucking	g Drift		raw P	oints	Se	rvice	Raises	Total
	m	\$/m	\$	m	\$/m	\$	m	\$/m	\$	m	\$/m	\$	m	\$/m	\$	\$
Summary of waste development for stope production from 2000 - 1975 m																
Ramp: 2000 to 1975 m level	175	1,500	262,500													262,500
1975 m: access drifts				750	1,075	806,250										806,250
1975 m: mucking drift & draw points							100	1,075	107,500	0	1,075	0				107,500
1975 to 2000 m: raises													300	685	205,500	205,500
Total (1)	175	1,500	262,500	750	1,075	806,250	100	1,075	107,500	0	1,075	0	300	685	205,500	1,381,750
	S	ummar	y of wast	e devel	opmen	t for stope	orodu	iction fi	rom 1975	to 19	950 m					
Ramp: 1975 to 1950 m level	175	1,500	262,500													262,500
1950 m: access drifts				80	1,075	86,000										86,000
1950 m: mucking drift & draw points							100	1,075	107,500	100	1,075	107,500				215,000
1950 to 1975 m: raises													150	685	102,750	102,750
Total (2)	175	1,500	262,500	80	1075	86,000	100	1,075	107,500	100	1,075	107,500	150	685	102,750	666,250
	S	ummar	y of wast	e devel	opmen	t for stope	orodu	iction fi	rom 1950	to 19	925 m					
Ramp: 1950 to 1925 m level	175	1,500	262,500													262,500
1925 m: access drifts				200	1,075	215,000										215,000
1925 m: mucking drift & draw points							150	1,075	161,250	150	1,075	161,250				322,500
1925 to 1950 m: raises													150	685	102,750	102,750
Total (3)	175	1,500	262,500	200	1,075	215,000	150	1,075	161,250	150	1,075	161,250	150	685	102,750	902,750
Total (1)+(2)+(3)	525	1,500	787,500	1,030	1,075	1,107,250	350	1,075	376,250	250	1,075	268,750	600	685	411,000	2,950,750
Contingencies: 25%									737,688							
					-									Gra	nd Total	3,688,438

The level plans illustrating these waste developments are included in the Appendix-2, of this report.

A constant contingency of 25% was applied and is present in all tables. This should take into account any additional excavations required to complete the developments; examples include small water sumps, cut-outs for turn-around openings or small cross-cuts needed to verify geology or for exploration drilling, etc.

# 21.9 Direct Mining Costs

The next Table displays the summary of direct unit mining estimated costs, which are detailed in the following paragraphs.

Description (200 tpd)	USD/t
Average stope prep in ore: subleveling, slot raises and ore definition	7.00
Long hole drill & blast	4.00
LHD with 1.5 m <sup>3</sup> bucket mucking	3.20
Truck mucking to primary crusher and stockpile	2.30
Rock support	1.50
Mining services (mechanical and electrical)	7.80
Underground mining supervision	1.00
Backfilling 50% of tonnage	1.75
Sub-total Sub-total	28.55
Contingencies - 20%	5.24
Total	33.79

**Table 40: Unit Mining Costs (200tpd)** 







**Table 41: Unit Mining Costs (300tpd)** 

Description (300 tpd)	USD/t
Average stope prep in ore: subleveling, slot raises and ore definition	7.00
Long hole drill & blast	4.00
LHD with 1.5 m <sup>3</sup> bucket mucking	3.20
Truck mucking to primary crusher and stockpile	2.30
Rock support	1.50
Mining services (mechanical and electrical)	6.62
Underground mining supervision	0.90
Backfilling 50% of tonnage	1.75
Sub-total	27.27
Contingencies - 20%	5.45
Total	32.72

#### 21.9.1 Stope Preparation Costs

All stope preparation workings are estimated at \$7.00/tonne of resources and are included in the unit mining costs as shown in the above Table. The main expenses included in this item are:

- ✓ excavation of the sublevels themselves with all required cut-outs;
- ✓ opening of the first slot raise, and
- ✓ resources definition (selectivity) that could be effected by long-hole machines or by diamond drilling including the cost of Ag assaying (estimated to be around \$2.50 per tonne milled).

#### 21.9.2 Drill and Blast Cost

The drill and blast cost estimate is supported by similar studies for projects of medium size. It is also assumed that explosives are mostly ammonium nitrate having very low unit costs, as long as there is no water in the stopes. In the presence of water, water resistant ammonium nitrate explosives would be used; these are still less expensive than gels or emulsions. During the site visit, it was observed that there is very little water above the 2,000 m level, where most of the production will occur upon resuming operations. The cost estimate of \$4.00/tonne is considered safe and should allow for proper fragmentation with easy loading and transportation.

#### 21.9.3 LHD's (Scoops) Mucking Cost

From 1982 to 1990, certain portions of the mine were developed and mined using ST-2 LHD. Additional transportation to the truck loading bays will be necessary as the majority of existing access developments were not designed for LHD's. The mucking cost was estimated at \$ 3.20 per tonne to account for this, which is slightly above the minimum cost, but it also includes a safety margin for secondary blasting required in draw points.





#### 21.9.4 Trucking Cost

The material will be transported to the primary crusher using mining trucks of 8 tonnes payload. These trucks are slightly wider than the loaders (1.8 m versus 1.65 m) but will easily access most of the development workings (drifts and cross-cuts). The estimated cost is \$2.30 per tonne.

#### 21.9.5 **Rock Support Cost**

The site visit performed in April 2013 demonstrated that the overall rock conditions are stable. The majority of the drifts, cross-cuts and raises that were visited have no support and very few loose rocks were observed. Even if the largest open stopes were only partially visited, there was no evidence of rock support in place. Historically, it is reported that some production areas encountered stability issues due to the presence of faults and alteration. An estimated \$1.50 per mined tonne was added to maintain safety and account for any incompetent rock requiring support. The onsite engineering studies have proper rock support recommendations, consisting of standard rock bolts with shells, Swellex expandable bolts and grouted cable bolts for very large openings.

# 21.9.6 General Mining Services

General mining services include all maintenance work and underground installations involving electrical services, ventilation, drainage, etc. This cost is estimated at \$ 7.80/tonne and is presented in the following Table assuming 6 days of work per week at a capacity of 200 tpd.

**Table 42: General Mine Services (200tpd)** 

Underground General Mining Services (200 tpd)	Cost - USD
	tonne milled
Electrical consumption: 470 kW * (12h/day*6day/week) * US\$0.22/kWH	5.32
Ventilation: ducts, controls, etc.	0.66
Dewatering: manpower and materials	0.68
Maintenance of workings: drifts, X-cuts, rooms, sumps, etc	1.14
Total	7.80

We have assumed that mining will proceed to 7 days per week when operation increases to 300 tpd. The resulting general mining costs are reduced to \$6.62/tonne, as shown in the following Table.





**Table 43: General Mine Services (300tpd)** 

Underground General Mine Services (300 tpd)	Cost - USD
	tonne milled
Electrical consumption: 470 kWH * (12h/day*7day/week) * US\$0.22/kWH	4.14
Ventilation: ducts, controls, etc.	0.66
Dewatering: manpower and materials	0.68
Maintenance of workings: drifts, X-cuts, rooms, sumps, etc	1.14
Total	6.62

As seen in the above Table, the main cost results from the electrical consumption of the air compressors. The remaining costs were estimated from other comparable mining projects.

The electricity consumption rates are detailed in table below. It is evident that the compressors are responsible for the majority of the electrical consumption.

**Table 44: Electrical Underground Requirements** 

Underground electrical requirements	Number	Power	TOTAL
		kW	kW
Air compressor rated at 25 m3/min each	2	240	480
Main fan	1	45	45
Secondary fans	4	15	60
Dewatering pumps	4	10	40
Lighting			5
UG diamond drills	2	20	40
		Sub-total	670
	Average demand	70%	469

#### 21.9.7 Energy Cost

All electricity consumption at Zgounder will be provided by on site fuel generators. There are three 1,000 kVA units on site, two will run in parallel and the third one is a spare. The estimated power cost is US\$0.22 per kWH. The following Table illustrates the details of the power cost.

**Table 45: Power Cost** 

Generator	Ove	erhaul	Maint	enance	Fuel	Lube	Total	Power Cost
Power	Parts	Labor	Parts	Labor	for motor		C\$/hr	US\$/kWH
850 kW	1.16	0.32	1.43	0.40	178.36	3.00	184.67	0.22

The delivered fuel cost is reported at \$1.02 per liter, and the consumption of 163 l/hr is assuming a load factor of 75%.







# 21.9.8 Direct Underground Mine Supervision

The mine supervision cost assumes that 2 supervisors will work underground when operating at 200 tpd, and 3 supervisors when mining at 300 tpd, plus a permanent mine responsible, or mine captain equivalent, as outlined below.

Table 46: Mine Supervision at 200tpd

Mining Supervision (200 tpd)	USD/h	USD/day	USD/t
One mine captain on dayshift	6.93	55.44	0.28
2 'Agent de maîtrise'	6.93	110.88	0.55
		Sub total	0.83
	Ove	rtime: 20%	0.17
		Total	1.00

Table 47: Mine Supervision at 300tpd

Mining Supervision (300 tpd)	USD/h	USD/day	USD/t
One mine captain on dayshift	6.93	55.44	0.18
3 'Agent de maîtrise'	6.93	166.32	0.55
		Sub total	0.73
	Ove	rtime: 20%	0.17
		Total	0.90

# 21.10 General and Administration Expenses (G&A)

This category includes all costs that are not directly related to the operations of mining production and mineralized material processing. These costs include administrative and other such overhead costs. The following table provides a summary of these costs expressed on an annual basis as they are not affected by the tonnage variation.

Table 48: Summary of G&A Costs

Items	Annual Cost (USD)
Administration manpower	\$308,098
General expenses	\$504,090
Total	\$812,188

These G&A annual expenses represent a unit cost of \$11.60 per tonne at 200tpd and \$8.37 per tonne at 300tpd.

#### 21.10.1 Cost of Administration Staff

The cost of administrative staff is summarized into three sections, the administration and the services for mining and geology. Staff personnel required for the concentrator is charged directly to the processing cost. The total estimated personnel are shown in the following summary is







considered sufficient for production work and also for geological exploration, which should be initiated following the resumption of production.

**Table 49: Summary of Administration Personnel Cost** 

Staff Personnel	Director	Assistants	Technicians	Total Cost
				USD/year
Administration				
Mine director	1			45,000
Chief accountant	1			40,500
Accountant assistant		1		14,415
Purchasing agent		1		14,415
Clerk			1	10,108
Safety & security agent		1		14,415
Sub-Total	2	3	1	124,438
Mine engineering				
Mining engineer	1			40,500
Mining technicians		2		28,830
Surveyors		1	1	24,500
Sub-Total	1	3	1	93,830
Geology				
Chief geologist	1			40,500
Geological technicians		2		28,830
General assistants			2	20,500
Sub-Total	1	2	2	89,830
TOTAL (16)	4	8	4	308,098

# 21.10.2 Cost of General Expenses

Expenses that are not directly attributable to a specific service and are distributed throughout the project are regrouped under this section. These expenses are estimates derived from historical descriptions of the Zgounder mine operations and from in house studies of similar mining projects.





**Table 50: General Expenses** 

Description	USD/year
Infrastructures & site maintenance	4,550
Electrical consumption for offices and maintenace	45,500
Consultants and studies	13,650
Communications	9,100
Assistance to local communities	13,650
Office equipments, computers and supplies	18,200
Insurance	9,100
Security guards (4)	36,400
Operating cost of wheel loader (150 kW engine)	68,250
Operating cost of dump truck - 15 t load capacity	63,700
Operating costs of the water truck	31,850
Pick-ups rental and operating expenses (6)	99,000
Buses operating expenses (3)	49,140
Drivers for buses, loader, grader, water and dumper truck (3)	42,000
TOTAL	504,090

# Vehicles

The most important item of the general expenses section is the cost of small vehicles for personnel transportation and services. We have estimated that 6 vehicles are needed for the project operation. The following Table represents small vehicles fleet and the annual operating cost on a rental option.

**Table 51: Small Vehicles** 

Vehicles	Q	Service	Rental & operating
			USD/year
SUV (sport utility vehicle) 4 x 4	1	Mine director	16,500
Pick-up with crew cab	1	Geology - mine - surveyors	16,500
Pick-up with crew cab	1	Concentrator - maintenance	16,500
Ambulance	1	First aid	16,500
Pick-up with crew cab	1	Administration - purchasing	16,500
Pick-up with crew cab	1	Explosive & general transport	16,500
Total	6		99,000

Larger service vehicles are included in the capex, therefore only their operating costs are shown.

**Table 52: Service Vehicles** 

Vehicles	Q	Usage	Operating cost USD/year		
Wheel loader - 150 kW engine	1	Ore rehandling & general services	68,250		
Road grader		Maintenance of roads	35,000		
Dump truck - 15 t load capacity	1	General transportation: rock & parts	63,700		
Buses for employees	3	To and from Askouan	49,140		
Total	5		216,090		







# 22 Economic Analysis

#### 22.1 Introduction

A preliminary economic analysis of the project base case is prepared from an annual cash flow model constructed in constant money terms (first quarter of 2014). No provision is made for inflation effects and results are presented after taxation. The after tax cash flow results are shown in two separate items, one for the whole project and a second one for the Maya portion alone, which takes in account the 15% ONHYM participation in the project.

# 22.2 ONHYM Royalty

An NSR type royalty of 3.00% applicable on the metal sales is payable to the ONYHM (Office National des Hydrocarbures et des Mines) du Maroc.

# 22.3 Glowat Royalty

Glowat (Global Works, Assistance and Trading, S.A.R.L. Maroc) has a royalty equal to 5% of the gross revenues from the Zgounder mine, less mining and milling costs.

# 22.4 ONHYM Participation

ONYHM also has a 15% non contributing participation of the net earnings of the Zgounder project, as described in the above Section 4.4.

## 22.5 Assumptions

The silver metal price, is based on actual marketing conditions, and has been agreed by the project operators.

The sensitivity analysis examines a price range of  $\pm 30\%$ .

The following Table is a summary of the main economic parameters and assumptions retained in the base case.



17.5



Items	Units	Values
Net silver price	USD/oz	22.00
Processed tonnage over LoM	metric tonne	951,250
Silver metal production	ounces	9,866,100
ONHYM royalty on sales	%	3.0
Glowat royaly: 5% of gross profits less milling & mining costs	%	3.0*
Taxes for the first 5 years on gross revenues	%	0.5

 $\frac{0}{0}$ 

**Table 53: Economic Parameters and Assumptions** 

# 22.6 Taxation

The tax system applicable in the cash flow is the 2013 Moroccan one as supplied by Maya Canada, this consists of a minimal tax of 0.5% for the first 5 years applicable on the gross revenues, and by a 17.5% tax applicable on the net profits for the following years.

# 22.7 Technical Assumptions

Taxes after the first 5 years on profits

The main technical assumptions retained in the base case cash flow preparation are given in the following table.

**Table 54: Technical Assumptions** 

Description	Units	Data
Undiluted Mineral Resources (all categories)	Tonnes	891,500
Average Undiluted Grade	Ag g/t	391
Processed Diluted Tonnage	Tonnes	951,250
Average Diluted Mill Head Grade	Ag g/t	360
Mine Life	Years	10
Process Recovery - first year	%	85
Process Recovery - next 9 years	%	90
Total Metal Production	Oz of Ag	9,866,100
Average Mining Costs including waste development	\$/t processed	44.76
Average Mill Processing Costs	\$/t processed	46.48
Average G&A Costs	\$/t processed	8.54

The production is scheduled to process 200 tonnes per day for the first year (65,800 tpy) and increased to 300 tonnes per day (98,700 tpy) for the remaining years.





<sup>\*</sup> The resulting 3.0% is not a fix rate, it only apply to this base case



#### 22.8 Financial Results

The summary of the base case financial results is presented in the following Table. The financial results are those of the whole project and are given from an assumed regular production at a constant grade as no production optimization was made. It is almost certain that a detailed production optimization would return a better cash flow by processing the higher grade stopes during the first years; the present cash flow was prepared by including all resources, regardless of categories, grade or operating costs.

**Table 55: Economic Evaluation Summary – Base Case** 

Items	Value
	US\$
Total Project Sales (Gross) Revenue	217,054,000
Total Operating Costs (Opex)	107,925,500
Total Project After-Tax Undiscounted Cash Flow	93,341,000
Total Project After-Tax NPV @6.5% (Base Case)	65,919,000

#### 22.8.1 Cash Flow Statement

The base case cash flow is presented in the following table.





# **Table 56: Cash Flow Model**

Zgounder Project USD Cash flow - March 2014

															Zgounder Project USD Cash flow - March 2014											
References		Data							Yea	ars																
References	Items	Y 1	Y 2 - Y 10	Preproduction	1	2	3	4	5	6	7	8	9	10	Total											
Contained silver ounces in resources	Ag	OZ	OZ		774,840	1,162,235	1,162,235	1,162,235	1,162,235	1,162,235	1,162,235	1,162,235	1,162,235	1,128,713	11,201,434											
Undiluted ore grade	g/t	390.8	390.8		390.8	390.8	390.8	390.8	390.8	390.8	390.8	390.8	390.8	390.8												
Forecasted undiluted mined tonnage	t/year	t	t		61,668	92,500	92,500	92,500	92,500	92,500	92,500	92,500	92,500	89,832	891,500											
Mining dilution	dilution	10%	10%		10%	10%	10%	10%	10%	10%	10%	10%	10%	10%												
Dilution grade	g/t	50	50		50	50	50	50	50	50	50	50	50	50												
Mining recovery	%	97%	97%		97%	97%	97%	97%	97%	97%	97%	97%	97%	97%												
Diluted mill feed grade	Ag	g/t	g/t		360	360	360	360	360	360	360	360	360	360												
Working days	days/year	days	days		350	350	350	350	350	350	350	350	350	350												
Concentrator availibility	%	94%	94%		94%	94%	94%	94%	94%	94%	94%	94%	94%	94%												
Processing tonnage design	t/day	200	300		200	300	300	300	300	300	300	300	300	300												
Processed tonnage	t/day	t	t		188	282	282	282	282	282	282	282	282	282												
Processed Tonnage	t/year	t	t		65,800	98,700	98,700	98,700	98,700	98,700	98,700	98,700	98,700	95,850	951,250											
Mill recovery	%	85%	90%		85%	90%	90%	90%	90%	90%	90%	90%	90%	90%												
Metal production	Ag	oz/year	oz/year		647,032	1,027,639	1,027,639	1,027,639	1,027,639	1,027,639	1,027,639	1,027,639	1,027,639	997,965	9,866,107											
Metal price	US\$/oz	22.00	22.00		22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00												
Total Gross Revenues	US\$				14,234,700	22,608,053	22,608,053	22,608,053	22,608,053	22,608,053	22,608,053	22,608,053	22,608,053	21,955,237	217,054,363											
Ore production cost	US\$/t	33.79	32.72		2,223,382	3,229,464	3,229,464	3,229,464	3,229,464	3,229,464	3,229,464	3,229,464	3,229,464	3,136,212	31,195,306											
Development in waste: years 1 to 9	US\$/year	598,392	1,196,783		598,392	1,196,783	1,196,783	1,196,783	1,196,783	1,196,783	1,196,783	1,196,783	1,196,783	1,196,783	11,369,439											
Ore processing	US\$/t	54.41	45.89		3,580,178	4,529,343	4,529,343	4,529,343	4,529,343	4,529,343	4,529,343	4,529,343	4,529,343	4,398,557	44,213,479											
G & A: General & Administration	US\$/year	812,188	812,188		812,188	812,188	812,188	812,188	812,188	812,188	812,188	812,188	812,188	812,188	8,121,880											
ONHYM royalties on sales	3.00%	\$	\$		427,041	678,242	678,242	678,242	678,242	678,242	678,242	678,242	678,242	658,657	6,511,631											
Glowat NPI: 5% on gross revenues less mining & milling costs		\$	\$		391,637	682,623	682,623	682,623	682,623	682,623	682,623	682,623	682,623	661,184	6,513,807											
Total of Expenses		\$	\$		8,032,818	11,128,643	11,128,643	11,128,643	11,128,643	11,128,643	11,128,643	11,128,643	11,128,643	10,863,581	107,925,541											
Zgounder Project Profit before Amortization and Taxes		\$	\$		6,201,882	11,479,410	11,479,410	11,479,410	11,479,410	11,479,410	11,479,410	11,479,410	11,479,410	11,091,656	109,128,822											
Amortization		\$	\$		478,745	478,745	478,745	478,745	478,745	478,745	478,745	478,745	478,745	478,745	4,787,450											
Taxes on gross revenues: first 5 years	0.50%	\$	\$		71,174	113,040	113,040	113,040	113,040						523,335											
Taxes on profits: after 5 years	17.50%	\$	\$							2,008,897	2,008,897	2,008,897	2,008,897	1,941,040	9,976,627											
Net Earnings		\$	\$		5,651,963	10,887,625	10,887,625	10,887,625	10,887,625	8,991,769	8,991,769	8,991,769	8,991,769	8,671,871	93,841,410											
ONHYM Participation on Net Earnings	15%	\$	\$		847,794	1,633,144	1,633,144	1,633,144	1,633,144	1,348,765	1,348,765	1,348,765	1,348,765	1,300,781	14,076,212											
Capital for resuming production and increase to 300 tpd		\$	\$	3,787,455											3,787,455											
Sustaining & working capital		\$	\$		100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	1,000,000											
Total Capital Expenditure (Capex)		\$	\$	3,787,455	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	4,787,455											
Rehabilitation and mine closure (Deposit)					250,000	125,000	125,000		·		-				500,000											
MAYA N	et Annual (	Cash Flow		-3,787,455	4,932,914	9,508,226	9,508,226	9,633,226	9,633,226	8,021,748	8,021,748	8,021,748	8,021,748	7,749,836	79,265,194											
MAYA Net Cumulative Cash Flow			-3,787,455	1,145,459									79,265,194													
Discounted MAYA Cash Flow at 6.5% - NPV			55,804,336										, , , , , , , , , , , , , , , , , , ,													
IRR			174%																							
ZGOUNDER Total Annual Project Cash Flow			-3,787,455	5,780,708	11,141,370	11,141,370	11,266,370	11,266,370	9,370,514	9,370,514	9,370,514	9,370,514	9,050,616	93,341,405												
ZGOUNDER Cumulative Annu	,			-3,787,455	1,993,253					56,179,248					, , ,											
Discounted Zgounder Cash				65,919,186	. ,	, ,	. ,				. ,	. ,		, ,												
8		IRR		200%																						





# 22.8.2 Sensitivity Analysis

The sensitivity analysis has been prepared from the base case described above for the results of the NPV and evaluated for three variants: the Capex, the Opex and the silver (Ag) price. As seen in the sensitivity results, the net present value (NPV) is more sensitive to variations in the metal price, this value is still positive (26.7 M\$) at a silver price of 15.4 \$0/oz which illustrates the robustness of the project. The economical project break-even is happening when silver price is at 11.00 \$/oz. All NPV results are discounted at 6.5% rate. The following table is presenting the variations for the after-tax results of the whole project.

**Parameters** -10% +20% Units -30% -20% 0% +10% +30% M\$ 2.6 3.0 3.4 3.8 4.2 4.9 Capex 4.6 NPV @ 6.5% M\$ 65.5 64.8 67.1 66.7 66.3 65.9 65.1 Silver Price \$/oz 15.4 17.6 19.8 22.0 24.2 26.4 28.6 NPV @ 6.5% 26.7 39.8 52.8 65.9 78.9 92.0 105.1 M\$ 97.1 Opex M\$ 75.5 86.3 107.9 118.7 129.5 140.3 NPV @ 6.5% M\$ 87.2 80.1 73.0 65.9 58.8 51.7 44.6

**Table 57: Sensitivity Analysis Results** 

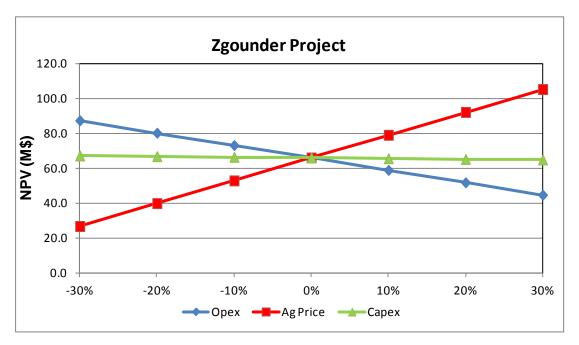


Figure 103: Sensitivity Analysis (NPV)

This PEA is preliminary in nature and it includes Inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves. There is no certainty that the conclusions reached in the PEA will be realized. Mineral resources that are not mineral reserves do not have demonstrated economic viability





# 23 Adjacent Properties

There are no adjacent properties, and the author is not aware of any significant exploration works by others. The next mines are Hajjar (Zn, Pb, Cu and Ag) to the north and Imini (Mn) to the east, which are both at large distances (around 50 km) from Zgounder.





# 24 Other Relevant Data and Information

The author has taken all possible actions to insure that the mineral resource statements are accurate. The author relies on historical data verification, independent drilling results from the available equipments and on the scanning of the critical mine openings.

On the environmental side, the author is aware of the tailings legacy from the previous operators, the author have been told by Maya owners' that they will take the necessary steps to offset the possible environmental contamination that may be caused by this legacy.

The author is also aware that Zgounder mine and mineralization contain deleterious elements such as arsenic, lead, zinc and mercury, which Maya will have to take into account in their mineral processing, tailings disposal, water management and reclamation plan.

It is of common sense that the reopening of the Zgounder mine will need corrective actions sustained by Maya Gold and Silver for the benefits of stakeholders and the populations downstream the Zgounder Oued.

To the author knowledge, Maya has met its commitment with OHNYM as of the conditions of the joint-venture company. The author does not have direct contact with the Moroccan authorities and relies on information provided by the management of Maya on this topic.

The commodity price of Silver is favorable for the economical development of the Zgounder Mine, considering the high grade of the deposit.

At the moment of writing this report, the Kingdom of Morocco is a politically stable country with a strong history of mining and qualified workforce, either for underground workings or concentrator operations. Certain risk will always exist in mining development projects, but for this project the author believe that they are of low impact.

No adverse protest or objection to the mine development has been observed at Zgounder and Askaoun areas. The population has expressed their confidence in the project, as it expected that new jobs will be created in this region.

GoldMinds Geoservices Inc. recognizes in addition to the Measured, Indicated and Inferred Resources that there are areas within recognized structures and depth extensions which will require additional drilling. These recognized structure and depth extensions can offer additional Mineral Potential between 1.5 to 2.0 million tonnes grading 300 to 400 g/t Ag. The Mineral Potential is the tonnage which could be contained within elevation 1975 and 1750 (225m vertical panel) along the existing mine openings. This represents the historical amount processed by previous owner of the mine plus the current NI 43-101 mineral resource disclosure between the surface and level 1925. It does not consider the eastern extension (276400E) where surface medieval workings extent for another 200 meters eastward with no drilling beneath.





#### **Cautionary Statements:**

Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. The potential quantity and grade reported as Mineral Potential, is conceptual in nature, that there has been insufficient exploration to define a mineral resource and that it is uncertain if further exploration will result in the target being delineated as a mineral resource.

The Mineral Potential is the tonnage which could be contained within elevation 1975 and 1750 (225m vertical panel) along the existing mine openings. This represents the historical amount processed by previous owner of the mine plus the current NI 43-101 mineral resource disclosure between the surface and level 1925. It does not consider the eastern extension (276400E) where surface medieval workings extent for another 200 meters eastward with no drilling beneath.





# 25 Interpretation and Conclusions

# 25.1 Mining

The resumption of the Zgounder silver project will be achieved by working at proximity or next to existing stopes, where access developments are already done, allowing a rapid start of the mining operations. Most of the production will first come from longhole mining method that was the most popular one when the mine ceased production in 1990. According to on site studies, the open stopes dimensions could be in the range of 4 m wide, 18 m high and 25 m in length. Some old stopes visited in 2013, which were not backfilled, have openings that are much larger than the above dimensions, demonstrating the general stable mechanical rock conditions.

The older mining production was realized on rails of small gauges that have to be replaced: the mine operators have decided to go trackless for the production resumption that is offering greater flexibility and the possibility of increasing rapidly the daily mined tonnage.

#### 25.2 Process

When the mill was in operation at 200 tonnes per day in the 90's the silver recovery was in the 85% range. There is no reason today for the same feed rate; the recovery will not be in the same order of magnitude.

Maximum feed rate of 200 tonnes per day is imposed in part by the lack of grinding capacity and second by a too short cyanide leach time. Any increase in the mill feed rate has two perverse effects affecting the silver recovery: the granulometry at the cyclone overflow becomes coarser and the leaching time, already marginal further decrease. At the suggestion of SGS, during the first year of operation, Maya will take steps to increase the mill feed rate and augment the leaching time. Both ball mills will be changed for bigger ones and more and higher capacity leaching tanks will be added.

These changes will not only permit to obtain a better recovery (± 90%) but will also permit to increase the yearly silver production from some 647,000 ounces to 1,028,000 ounces.

#### 25.3 General

The parameters used in this Preliminary Economic Assessment include the production resumption of the Zgounder past-producer mine. The existing concentrator should resume production at a tonnage of 200 tonnes per day for the first year and then is expected to increase to 300 tonnes per day, with a recovery of 90%, for the remaining of the mine life estimated at 10 years.





SGS and GMG have examined the technical and economical aspects of the Zgounder project within the level of accuracy of a Preliminary Economic Assessment in conformance to the standards required by NI 43-101 and Form 43-101F1.

A cash flow analysis was developed based on the technical aspects and on silver metal price projections. As it stands the Zgounder project contains an economic Mineral Resource. The authors of this Technical Report consider the Zgounder project to be sufficiently robust to warrant moving it to the next study stage.





# 26 Recommendations

# 26.1 Drilling

In order to convert inferred mineralized envelopes to indicated or measured it is necessary to start a surface and underground drilling campaign.

- Diamond drilling from surface and underground to validate mineralized envelopes.
- Underground percussion drilling to validate panels from adits and existing opening of 20 to 30 meters length.
- A total of 2,000 metres of percussion drilling (140,000 CAD), 3000 metres of underground diamond drilling (585,000 CAD), and another 5,000 meters of surface diamond drilling are recommended (875,000 CAD).
- For the tailings we recommend a campaign of 1000 meters of auger drilling (75,000 CAD).
- All holes should be surveyed at collar and along the hole (deviation) for diamond drillholes longer than 150 meters.
- The logging should include RQD measurements, core recovery, and if possible oriented core for key exploration holes.
- Core specific density measurement should be done on the whole core sample length, ideally the whole core and match the from-to of the analysis for at least 5 holes of the diamond drilling program. Note that if porosity in encountered, the plastic wrap method should be used in the weight in air weight in water method.
- Maya should acquire the appropriate equipment for logging, appropriate balance for SG measurement and splitting tools.
- At least 5 holes per tailing should be sampled in a manner which enables the measurement of the in-situ density profile from surface to bottom which should allow conversion an adequate estimation of tonnage. By experience, in-situ density increase with depth.
- A picture of each core box should be taken in wet and dry condition.
- Put in place a QA/QC program, with in house standard, commercial standards, blanks and second laboratory cross checks.
- Part of the rejects from core samples should be used to carry addition metallurgical testing to validate liberation and recovery for each mineralized zones encountered

# 26.2 Survey

• It is recommended to survey the remaining drillhole collars supervised by GMG by Total Station. It is also recommended to resurvey the historical drillhole collars with Total Station





(position, azimuth and dip) especially those intersecting mineralized envelopes with high grade, prior to carry definition drilling before blasting.

• For a better use of the mine and for a production life of mine of many years in safe conditions it is recommended to make a full 3D scans of all remaining levels, raises, draw points, stopes and developments workings.

# 26.3 Development and Mining

- Prepare and rehabilitate stopes access and raises, especially on 2,030 m and 2,100 m levels in the northern portion and on 2,125 m level where mining will most likely first resume;
- Pump water from the eastern and the northern zone of the level 2,000 m;
- Complete the mining installations on levels from 2,050 to 2,125 by installing all services: compressed air, water and blasting lines, and air ventilation ducts.
- Assess the advantages of having a service ramps to deserve all levels rapidly.
- Consider the Avoca mining method, which greatly reduce the waste development and is totally safe as backfill is used.

# Development below level 2000m

Mine levels below elevation 2000m need to be dewatered if Maya Gold and Silver decide to start developing exploration in these parts of the mine. It is highly recommended to analyse the water coming from these levels to make sure it can be safely discharged into the Zgounder river without being treated. It is also recommended to do a 3D scan of the adits and the openings below level 2000 m at the Zgounder mine.

#### 26.4 Processing

Because electrical energy produces by diesel generators is very costly and the mill is the most energy consuming department of the Zgounder mine, SGS recommends that Maya moves right away to obtain the services of the national electrical services; as of now we have been told that the existing line from Askaoun is not powerful enough to operate the Zgounder installations. A more detailed study is recommended for the next study level.

Maya should evaluate the possibility of installing a gravity concentrator (Falcon or Knelson) followed by a shaking table at the cyclone underflow. This gravity concentration circuit may permit the immediate recovery of coarse silver particles that because of their coarseness could be lost at the cyanidation tailings.





It is probable that no effort was ever made in the past to condense the mercury vapor from the mercury depletion system. SGS Geostat recommends that a very basic heat transfer system (condenser) be installed to recover all the mercury fumes from the mercury exhaustion static oven.

Since there is no data on the quality of the future effluent from the tailings-polishing ponds, SGS recommends that soon after the start up of the mill, effluent be thoroughly analyzed for heavy metals (Pb, Cu, Zn, Cd, As, etc.). If one or several of these heavy metals exceed acceptable limit values, lime should be added to the mill tailings pump box in order to raise the pH and precipitate the heavy metals directly in the tailings pond.

If in the future Maya has the intention of further raising the mill feed rate beyond 300 tonnes per day, to generate sufficient yard space, the counter current thickeners could be removed and replaced by drum filters. By doing so, enough yard space will be freed to allow the installation of more leaching tanks.

# 26.5 Exploration

#### Estimation of the first phase of exploration budget at the Zgounder property.

	, , , , , , , , , , , , , , , , , , ,
Recommanded works for Phase I	All included cost (CAD)
Tailings auger drilling (1000 meters)	75,000
Surface diamond drill (5000 meters)	875,000
Underground diamond drill (3000 meters)	585,000
Percussion drilling (2000 meters)	140,000
3D scan and collars survey with Total Station	100,000
Total	1,860,000 CAD





# 27 References

Baroudi, Z., El Beraaouz, H., Rahimi, A., Saquaque, A., Chouhaidi, M.Y. (1999): Minéralisations poly métalliques argentifères d'Imiter (Jbel Saghro, Anti-Atlas, Maroc): Minéralogie, évolution des fluides et mécanismes de dépôt. Chronique de la Recherche Minière 536-537, 91–112.

Boily, M. (2012): The Zgounder Silver Deposit Taroudant Province, Kingdom of Morocco. NI 43-101 report, 120 pp.

Bounajma, H. (2002): Le Gisement de Zgounder: Données et Réflexions Géologiques. Rapport Interne de la compagnie CMT; 7 pp.

Buggisch, W. and Flügel, E. (1988): The Precambrian/Cambrian boundary in the Anti-Atlas (Morocco) discussion and new results. The Atlas System of Morocco, Lecture Notes in Earth Sciences, 15, 81-90.

Cheilletz, A., Levresse, G., Gasquet, D., Azizi Samir, M.R., Zyadi, R., Archibald, D. (2002): The giant Imiter silver deposit: Neoproterozoic epithermal mineralization in the Anti-Atlas, Morocco. Miner. Depos. 37, 772–781.

Clauer, N. (1974): Utilisation de la méthode Rb-Sr pour la datation d'une schistosité de sédiments peu métamorphisés : application au Précambrien II de la boutonnière de Bou Azzer – El Graara (Anti-Atlas, Maroc). Earth and planetary Science Letters, 4, 404-412.

CMT. (2004): Synthèse des travaux de recherche à fin 2004, Rapport Interne; 13 pp.

Demange, M. (1977): Le cadre géologique du gisement argentifère de Zgounder (Massif du Sirwa, Anti-Atlas, Maroc). Notes Serv. Géol. Maroc, 267, 105-122.

Essarraj, A., Boiron, M-C., Cathelineau, M., Banks, D., El Boukhari, A. and Chouhaidi, M. (1998): Brines related to Ag deposition in the Zgounder silver deposit (Anti-Atlas, Morocco) Eur J Mineral, 10, 1201-1214.

Pasava, J. (1994): Geochemistry and the role of anoxic sediments in the origin of the Imiter silver deposit in Morocco, Vestnik Ceského geologického ustavu, 69, 1–11.

Leblanc, M. (1975): Ophiolites précambriennes et gisements arséniés de cobalt (Bou Azzer, Maroc). Unpubl. Doct Thesis, Paris VI Univ., 329 p.

Marcoux, E. and Wadjinny, A. (2005): Le gisement Ag-Hg de Zgounder (Jebel Siroua, Anti-Atlas, Maroc): un épithermal néoprotérozoïque de type Imiter. C. R. Geoscience, 337, 1439–1446

Petruk, W. (1975): Mineralogy and geology of the Zgounder Silver deposit in Morocco. Can. Mineral, 13, 43-54.





Popov, A.G., Millar, G., Belhaj, O.K., Serment, R., Fettouhi, A. (1989): Gisement argentifère de Zgounder: Etude des mineralisations et des roches encaissantes porteuses de sulfures. Unpubl. BRPM report.

Popov, A.G., Millar, G. and Fettouhi, A. (1985): Carte géologique inédite au 1/500 Unpubl. BRPM report.

Stacey, J.S. and Kramers, J.D. (1975): Approximation of terrestrial lead isotope evolution by a two-stage model, Earth Planet. Sci. Lett. 26, 207-221.





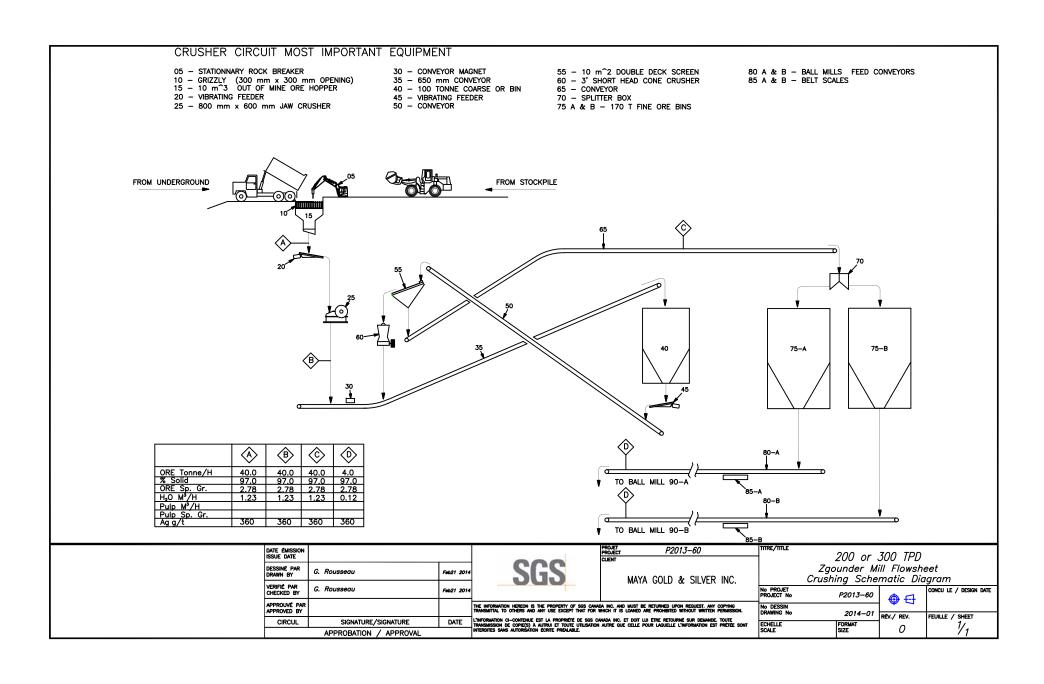
# Appendices

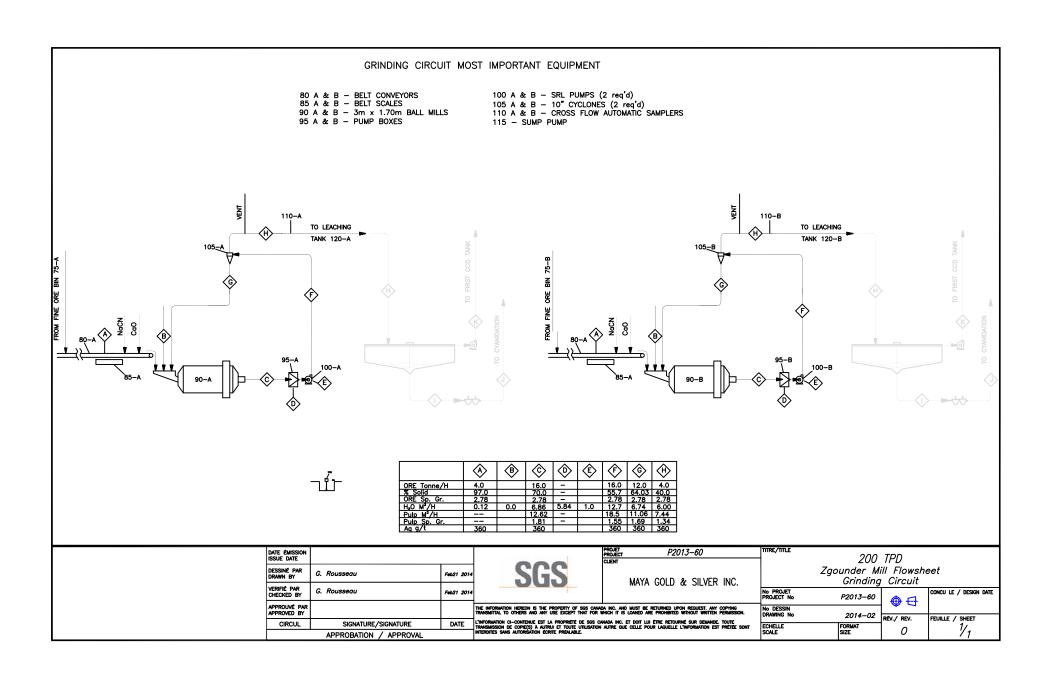


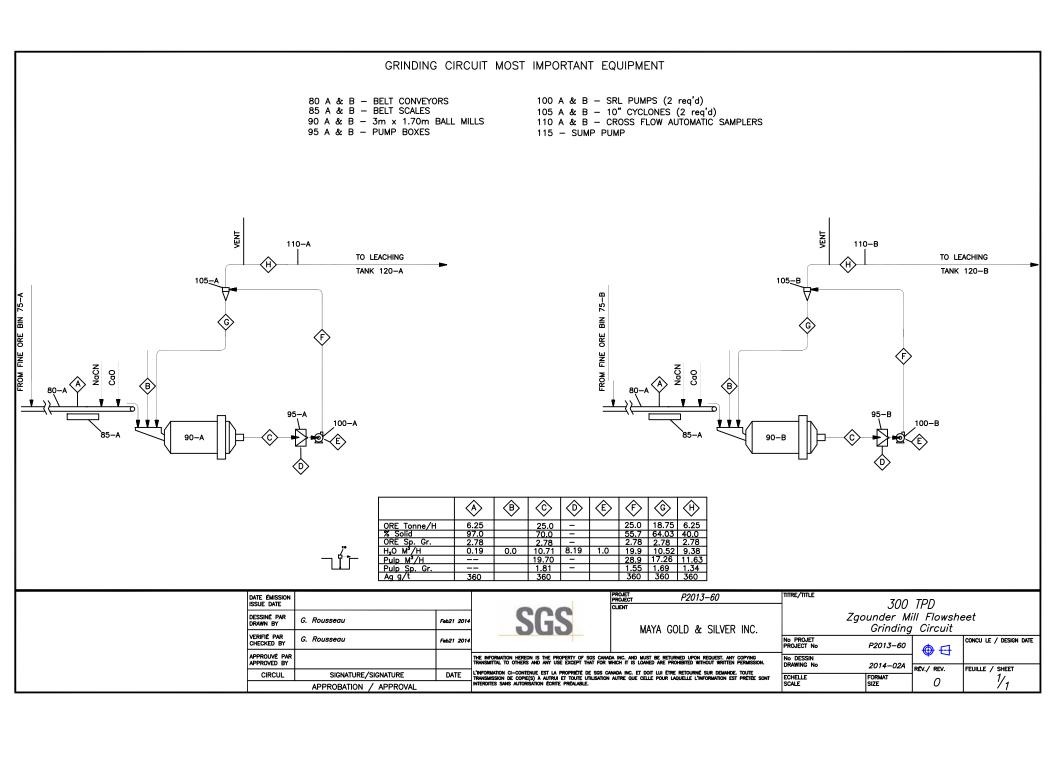


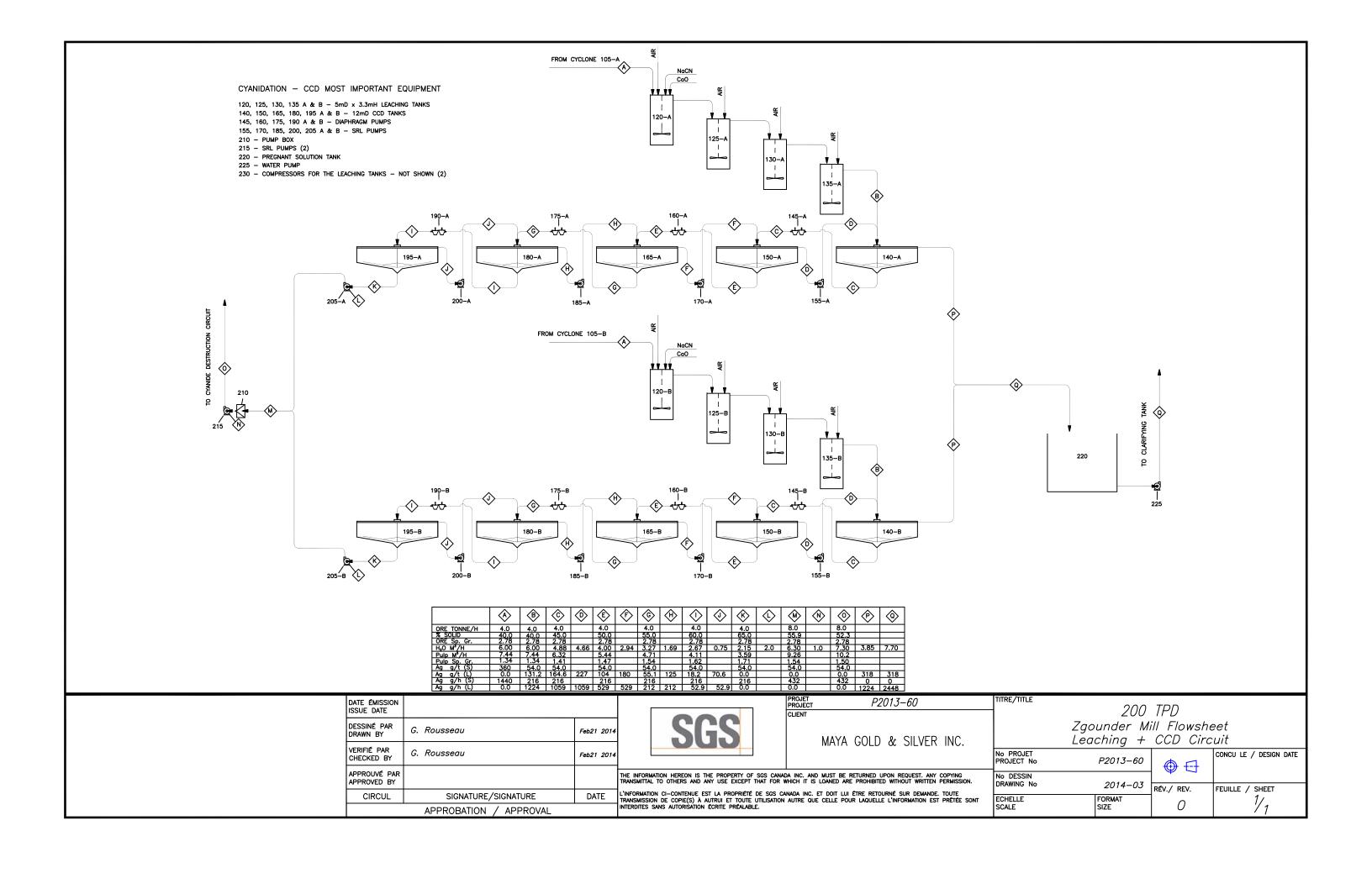
**Appendix 1:** Flowsheets of the Concentrator

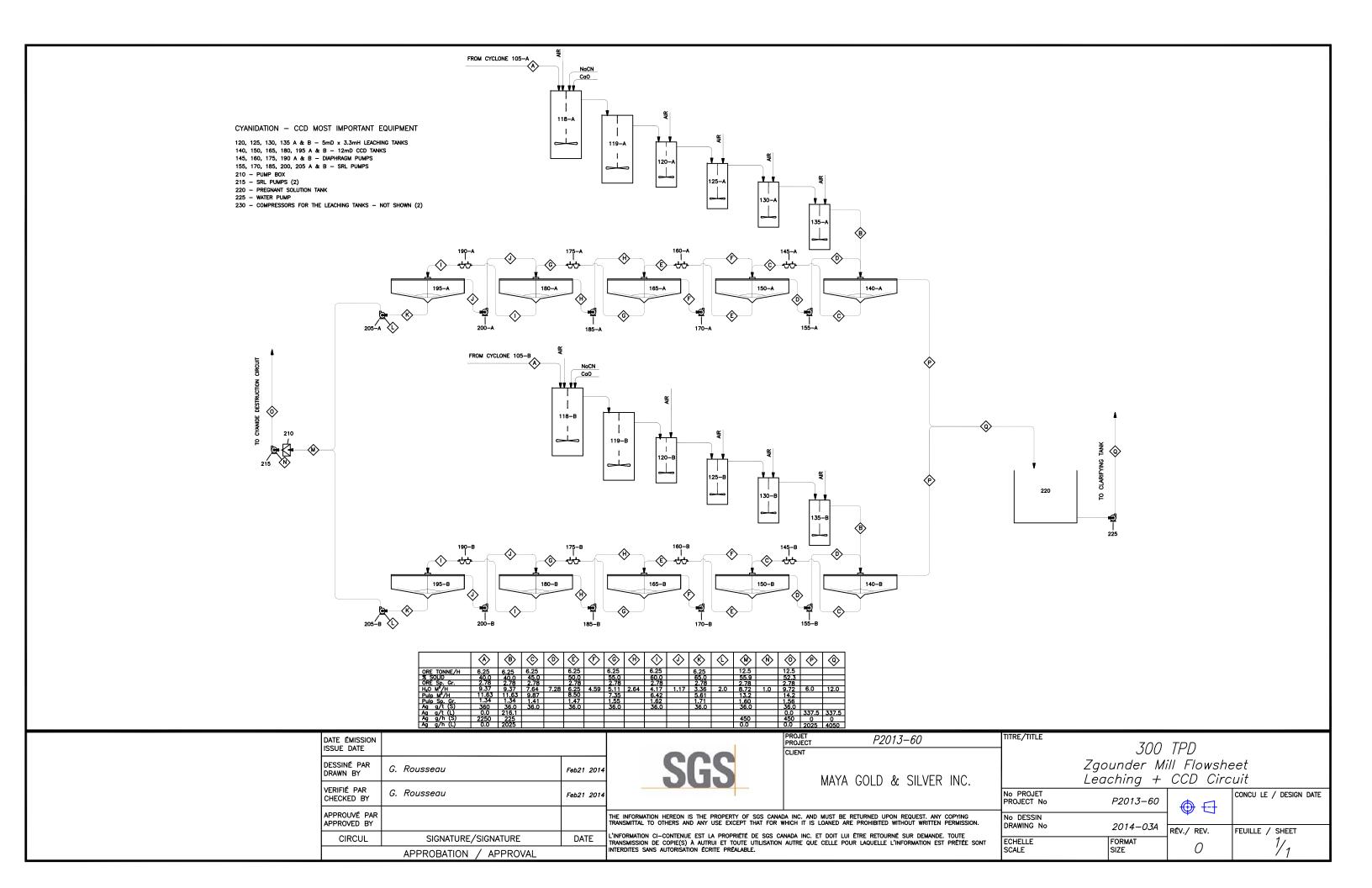


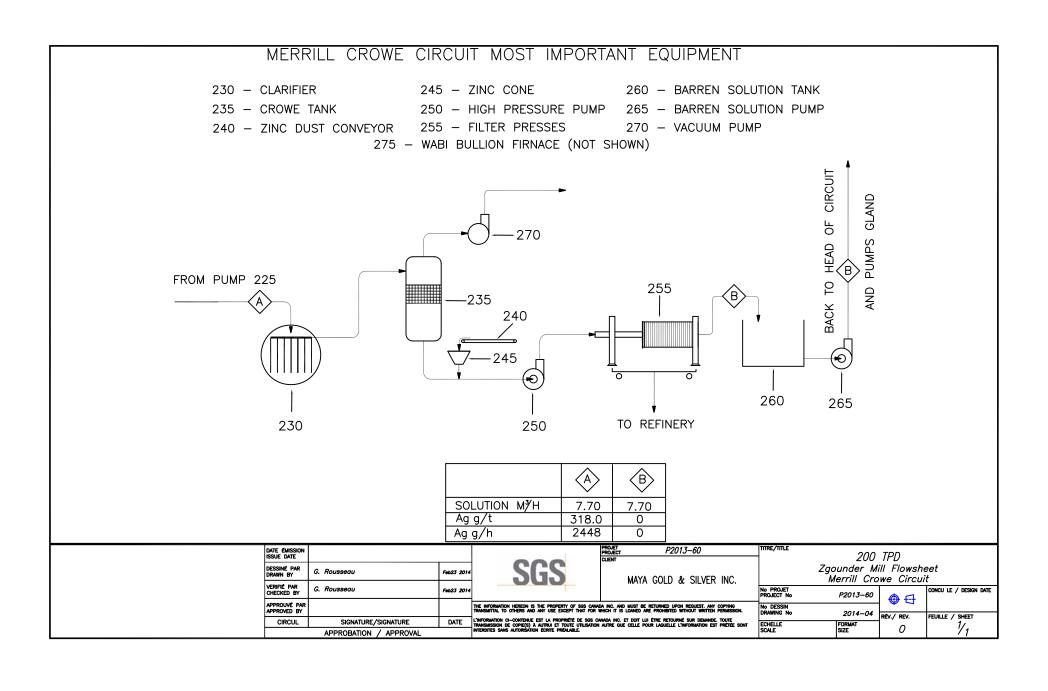


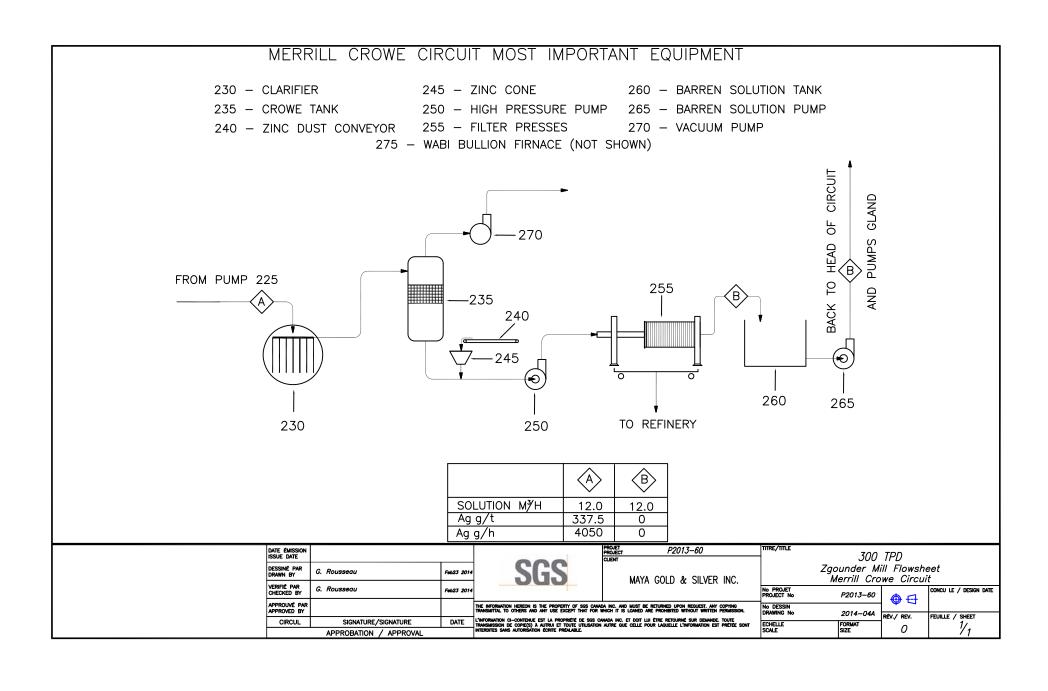


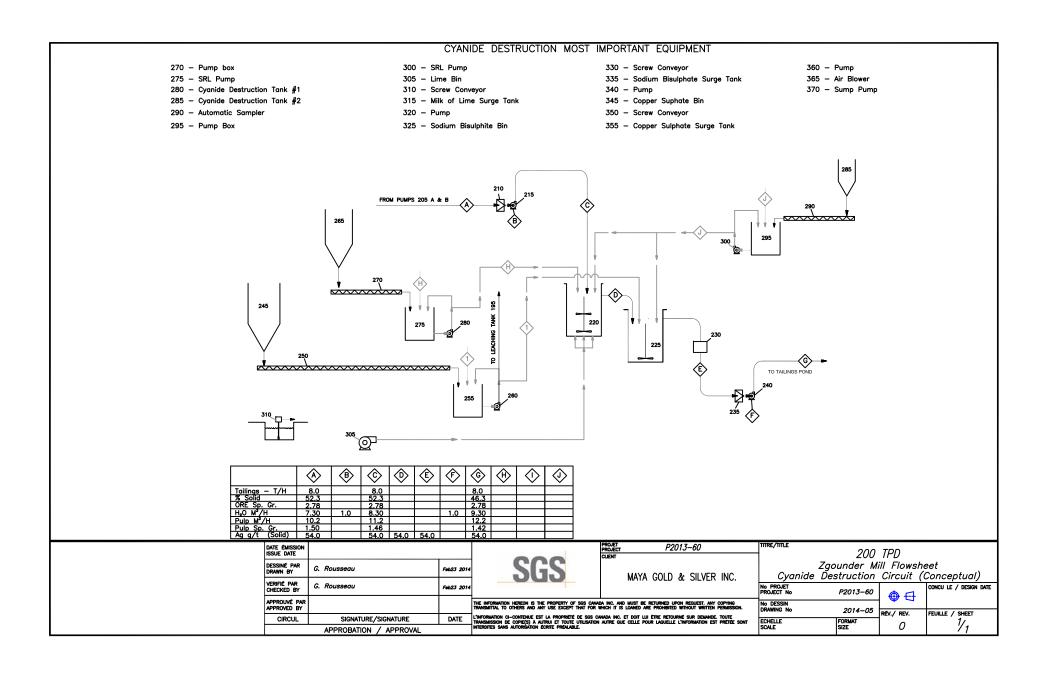


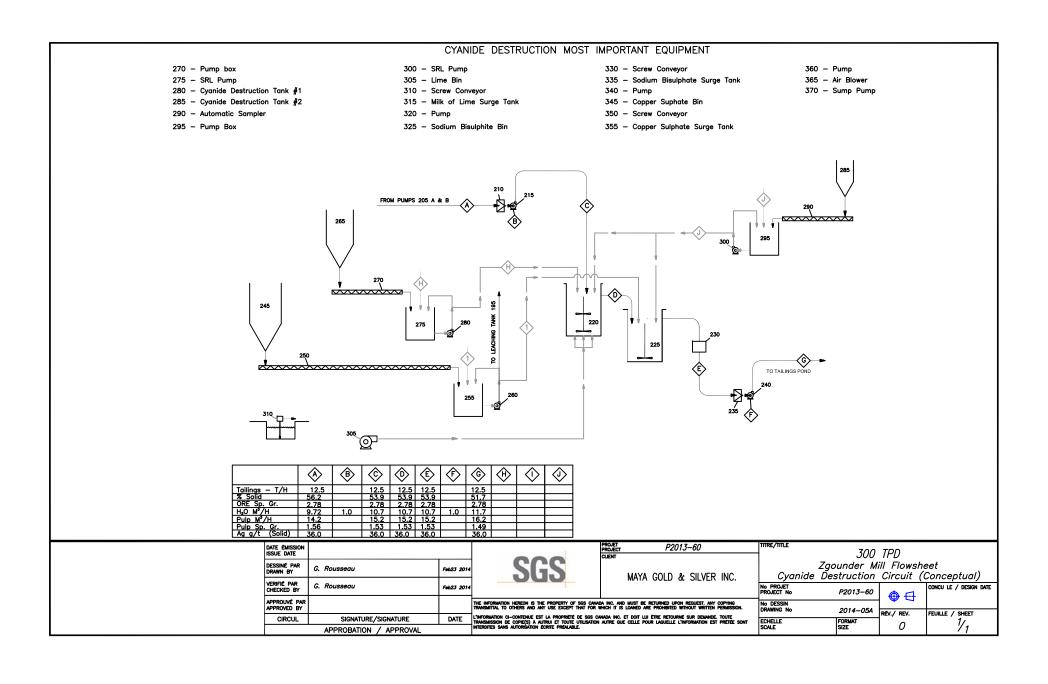


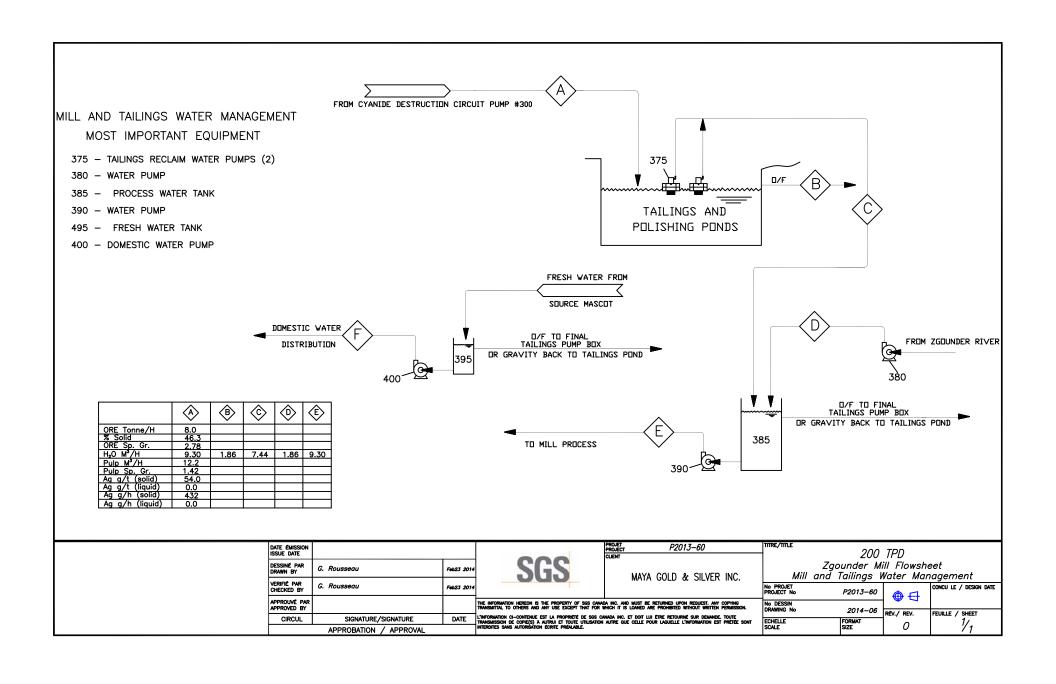


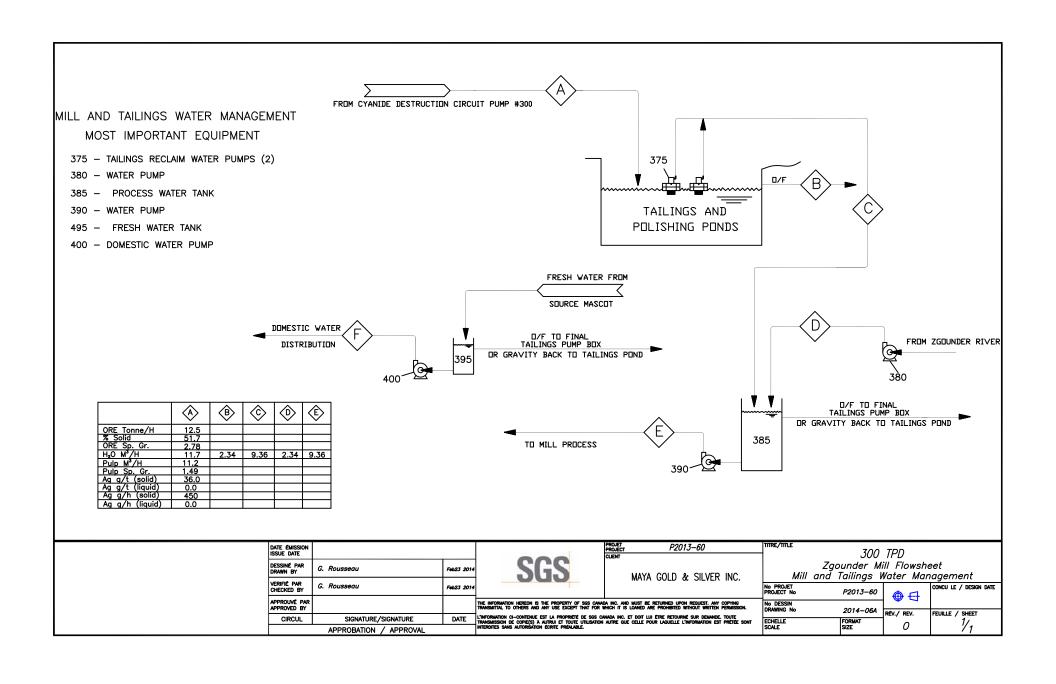








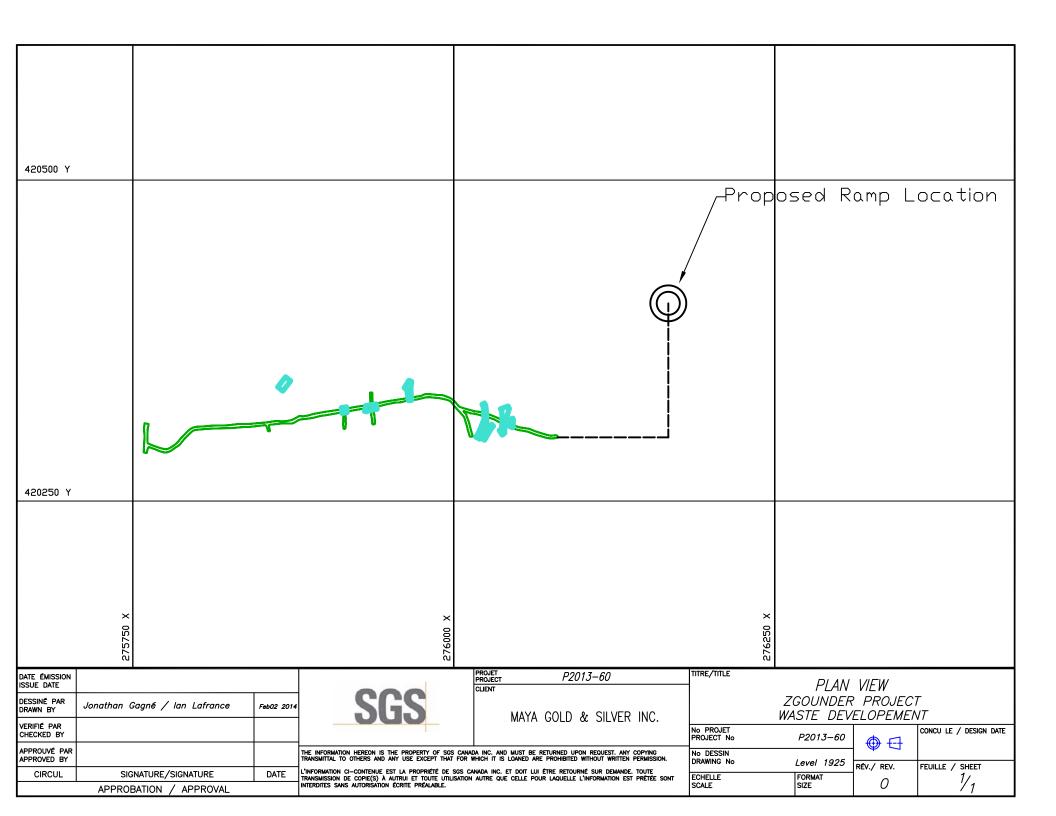


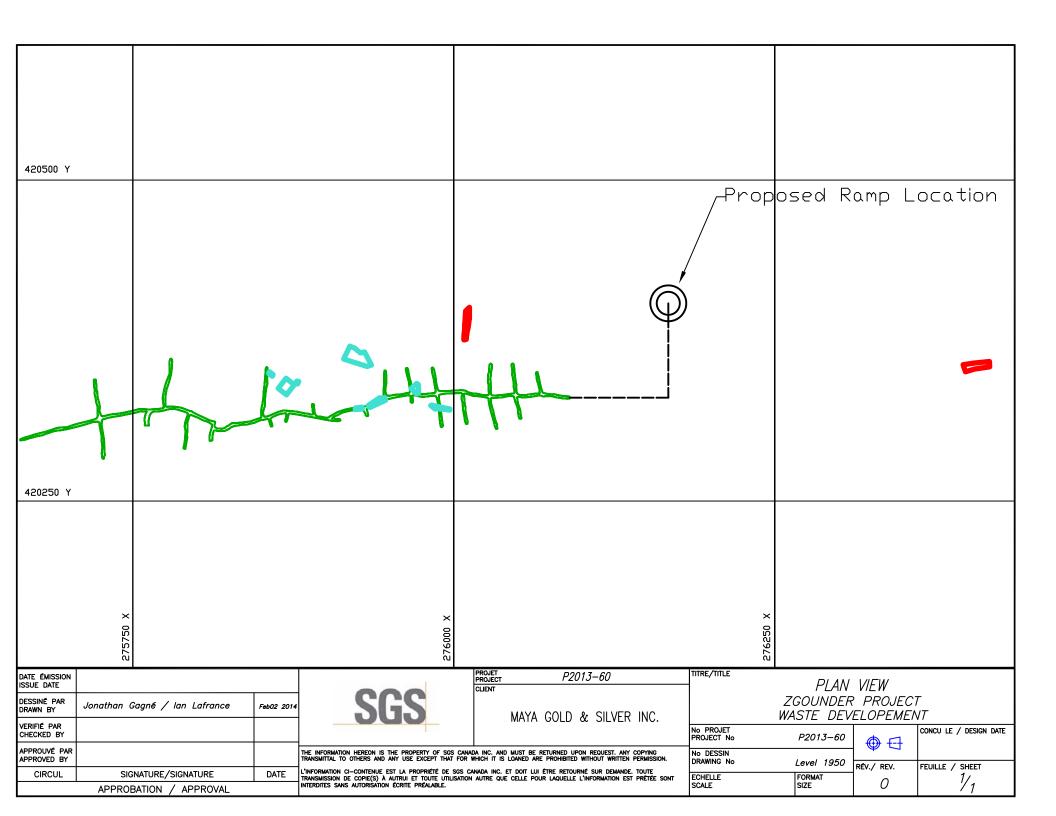


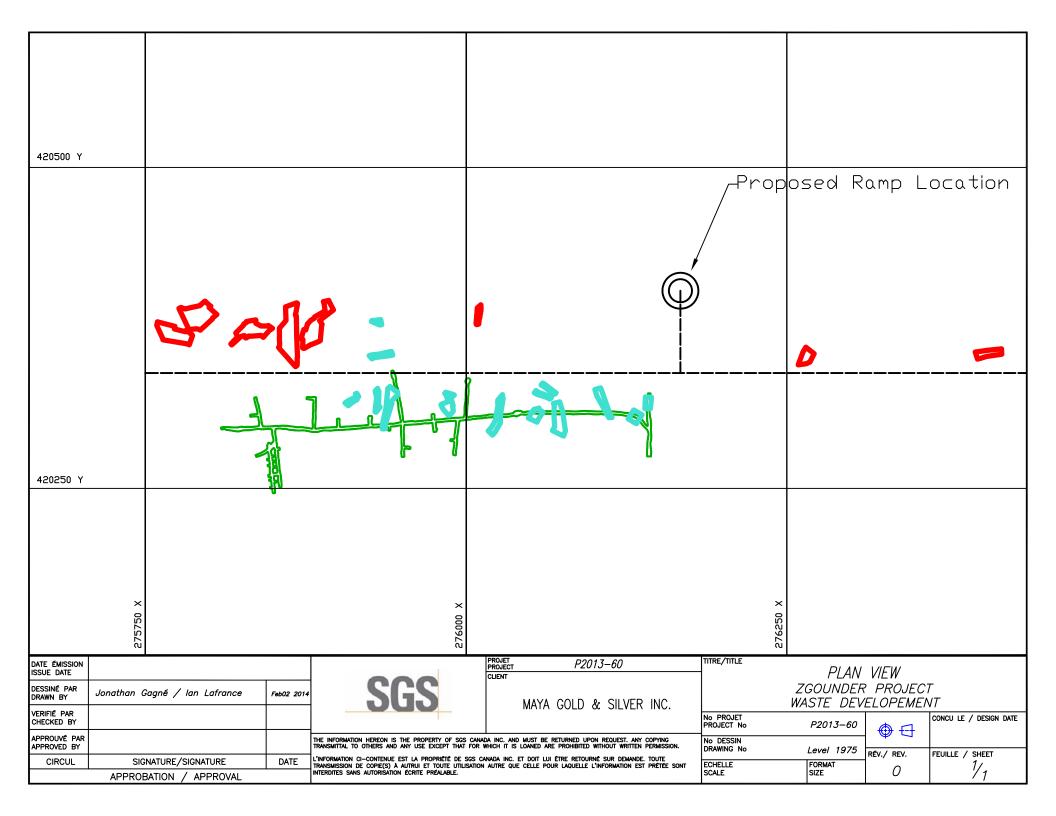


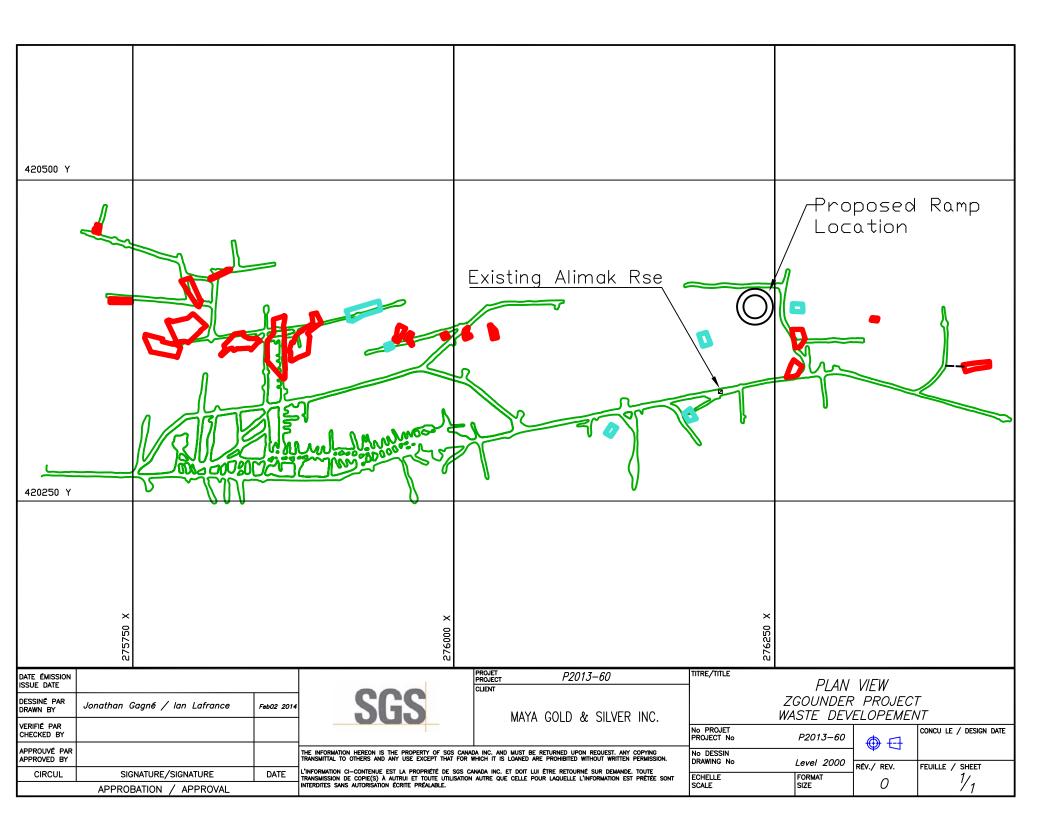
Appendix 2: Levels Plans showing the Primary Access Developments

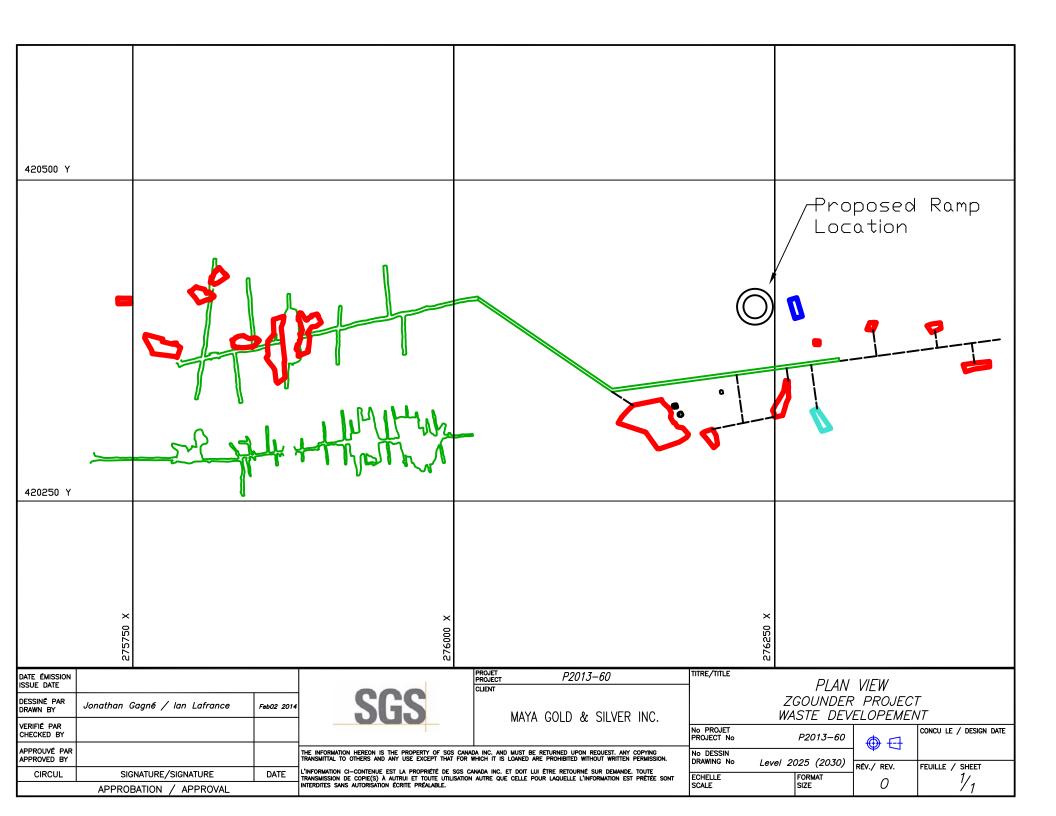


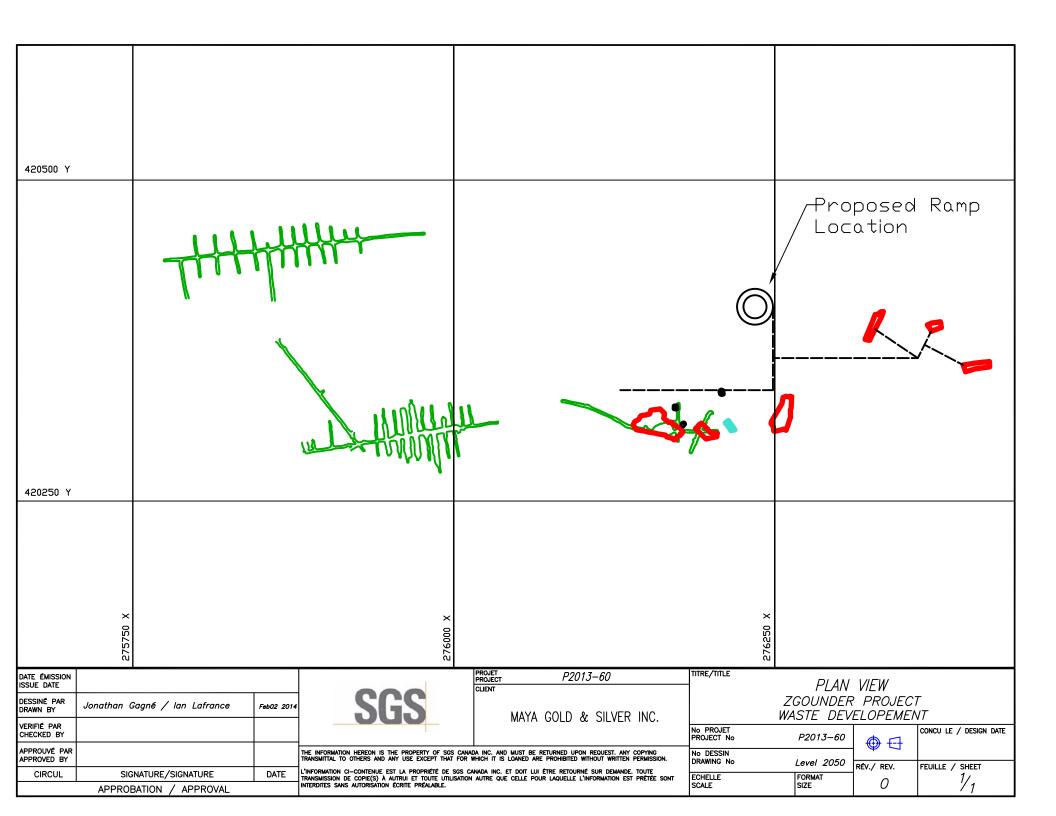


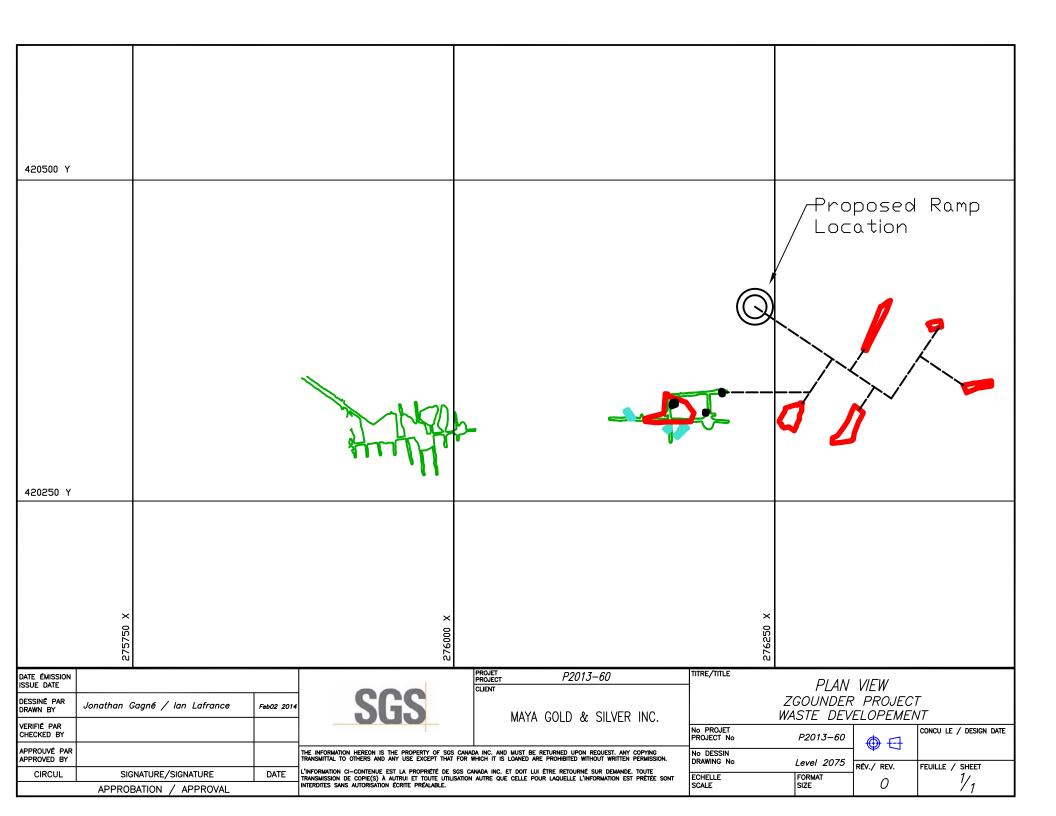


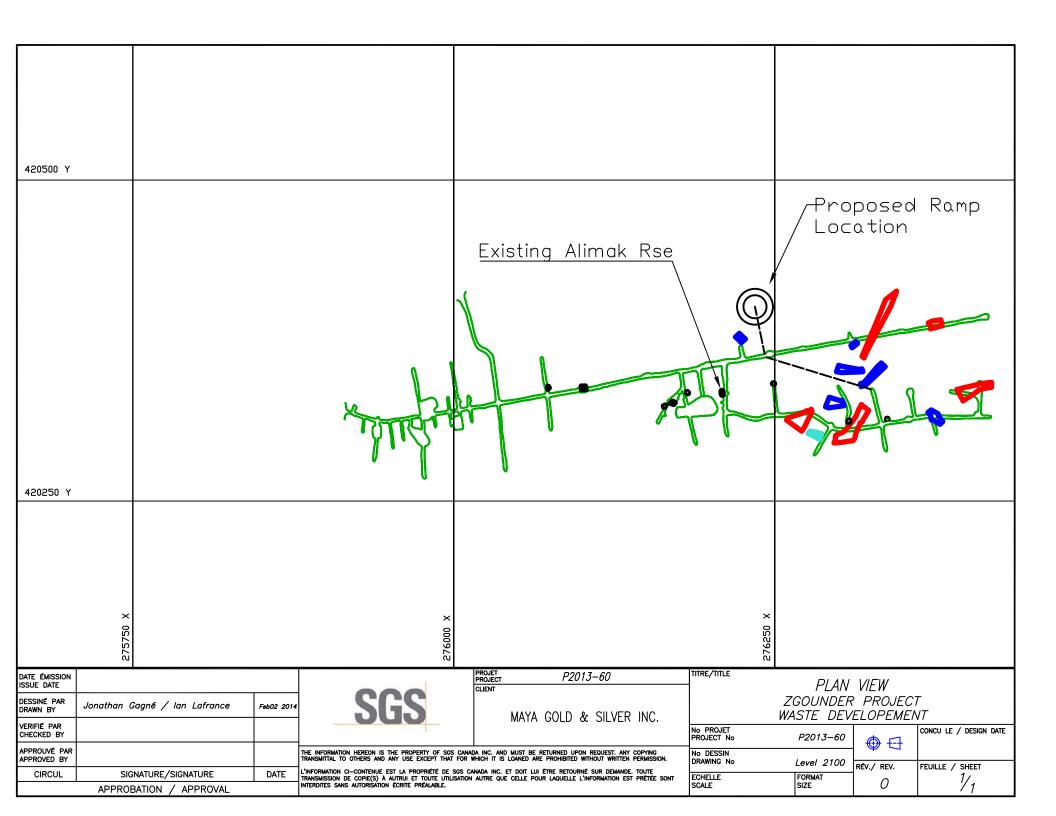


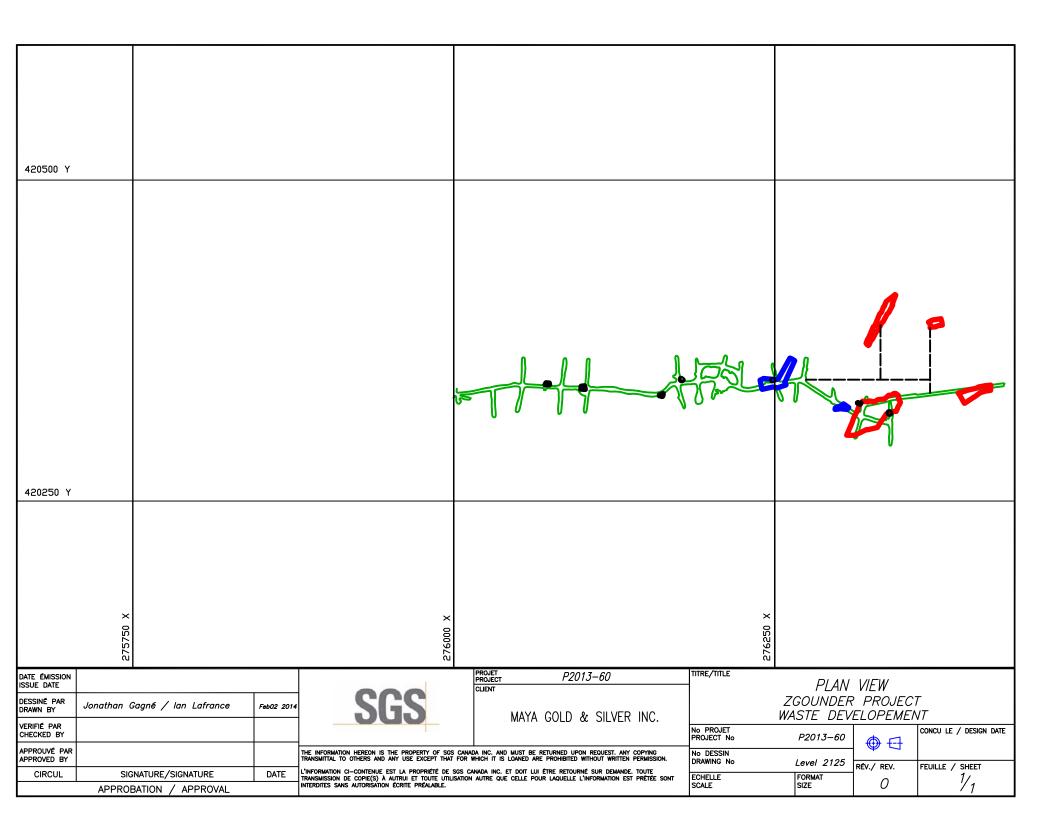












420500 Y						
420250 Y				The second secon		
	275750 X		276000 X	276250 X		
DATE ÉMISSION ISSUE DATE DESSINÉ PAR DRAWN BY	Jonathan Gagné / Ian Lafrance	F6b02 2014 SGS	PROJECT P2013-60 CLIENT MAYA GOLD & SILVER INC.		PLAN VIEW ZGOUNDER PROJ WASTE DEVELOPE	MENT
VERIFIÉ PAR CHECKED BY APPROUVÉ PAR APPROVED BY		THE INFORMATION HEREON IS THE PROPERTY OF TRANSMITTAL TO OTHERS AND ANY USE EXCEPT	SGS CANADA INC. AND MUST BE RETURNED UPON REQUEST. ANY COPYING THAT FOR WHICH IT IS LOANED ARE PROHIBITED WITHOUT WRITTEN PERMISSION.	No PROJET PROJECT No No DESSIN DRAWING No	P2013-60  Level 2150  RÉV./ REV.	
CIRCUL	SIGNATURE/SIGNATURE  APPROBATION / APPROVAL	DATE L'INFORMATION CI-CONTENUE EST LA PROPRIÉTÉ TRANSMISSION DE COPIE(S) À AUTRUI ET TOUTE INTERPUTES SANS AUTROISATION ÉCRITE PROFALAR	DE SGS CANADA INC. ET DOIT LUI ÊTRE RETOURNÉ SUR DEMANDE. TOUTE UTILISATION AUTRE QUE CELLE POUR LAQUELLE L'INFORMATION EST PRÈTÉE SONT E.	ECHELLE SCALE	FORMAT SIZE O	1/1

420500 Y							
420250 Y					12		
	275750 X		276000 X		276250 X		
DATE ÉMISSION ISSUE DATE DESSINÉ PAR DRAWN BY VERIFIÉ PAR CHECKED BY	Jonathan Gagné / Ian Lafrance	Feb02 2014	SGS	PROJECT P2013-60  CLIENT MAYA GOLD & SILVER INC.	No PROJET PROJECT No	PLAN ZGOUNDER WASTE DEVE P2013-60	PROJECT ELOPEMENT   CONCULE / DESIGN DATE
APPROUVÉ PAR APPROVED BY CIRCUL	SIGNATURE/SIGNATURE APPROBATION / APPROVAL			S CANADA INC. AND MUST BE RETURNED UPON REQUEST, ANY COPYING FOR WHICH IT IS LOANED ARE PROHIBITED WITHOUT WRITTEN PERMISSION.	No DESSIN DRAWING No ECHELLE SCALE		RÉV./ REV. FEUILLE / SHEET  O  1/1

420500 Y											
420250 Y	75750 X			276000 X				276250 X			
DATE ÉMISSION ISSUE DATE DESSINÉ PAR DRAWN BY VERIFIÉ PAR CHECKED BY	Jonathan G	agné / lan Lafrance	Feb02 2014	SGS	PRO PRO CLIE	MAYA GOLD & SILVER INC.	No PROJET PROJECT No		PLAN ZGOUNDER WASTE DEV P2013–60	P PROJEC ELOPEMEI I	T VT   CONCU LE / DESIGN DATE
APPROUVÉ PAR APPROVED BY CIRCUL		NATURE/SIGNATURE				nc. and must be returned upon request, any copying h it is loaned are prohibited without written permission. A inc. et doit lui être retourné sur demande. Toute dre que celle pour laquelle l'information est prétée sont	No DESSIN DRAWING No ECHELLE SCALE			RÉV./ REV.	FEUILLE / SHEET  1/ 1



**Appendix 3: CD-ROM of Project Database** 

