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HARMONY GOLD MINING COMPANY LIMITED

Technical Report Summary of the Mineral Resources and Mineral Reserves for Joel Mine Free State Province, South Africa

Effective Date: 30 June 2022
Final Report Date: 15 July 2022

IMPORTANT NOTICE

This Technical Report Summary has been prepared for Harmony Gold Mining Company Limited in support of disclosure and filing requirements with the United States Securities and Exchange Commission's (SEC) under Regulation S-K 1300; 229.601(b)(96). The quality of information, estimates, and conclusions contained in this Technical Report Summary apply as of the effective date of this report. Subsequent events that may have occurred since that date may have resulted in material changes to such information, estimates and conclusions in this summary. No other party is entitled to rely on this report beyond its intended use and any reliance by a third party on this report is done so at that party's own risk.

Signature Page

/s/ Fhulufhelo Muthelo

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Effective Date: 30 June 2022
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Units of Measure and Abbreviations

Unit / Abbreviation	Description or Definition
°	Degrees
°C	degrees Celsius
"	Inches
µm	Micrometres
3D	Three-dimensional
AE	Abnormal expenditure
AMIS	African Minerals Standards
AngloGold Ashanti	Anglo Gold Ashanti Limited
ARM	African Rainbow Minerals Limited
ARMGold	ARM Gold Division
Au	Gold
Avg.	Average
Beatrix	Beatrix Mine, owned and operated by Sibanye-Stillwater Limited
BMD	Below mine datum
c.	Approximately
CADSmine™	Mineral resource management tool
CBA	Core bedding angle
CIP	Carbon-In-Pulp
cm	Centimetre
cmg/t	Centimetre grams per tonne
CoC	Certificate of Competency
CODM	Chief Operating Decision-Maker
Company	Harmony Gold Mining Company Limited
COP	Code of Practice
COV	Coefficient of Variation
CRG	Central Rand Group
CW	Channel width
Datamine™	Datamine Studio RM or Datamine Studio OP
Digby Wells	Digby Wells Environment
DMRE	Department of Mineral Resources and Energy
DTM	Digital Terrain Model
DWS	Department of Water and Sanitation
EIA	Environmental Impact Assessment
EMPR	Environmental Management Programme
EMS	Environmental Management System
ESG	Environmental Social and Governance
ETF	Exchange traded fund
Excl.	Excluding
FAG mill	Fully autogenous mill
FY	Financial year
g	Gram
GHG	Greenhouse gas
GISTM	Global Industry Standard on Tailings Management
g/t	Grams per tonne
ha	Hectare
Harmony	Harmony Gold Mining Company Limited
HLS	Heavy Liquid Separation
Incl.	Including

Joel	Joel Mine
kg	Kilogram
kg/sec	Kilogram per second
km	Kilometre
km^2	Square kilometre
koz	Thousand troy ounces
LBMA	London Bullion Market Association
LOI	Loss on ignition
LOM	Life of Mine
Ltd	Limited
m	Metre
M	Million
MCC	Mining Charter Compliance
MCF	Mine Call Factor
MineralCorp	The Mineral Corporation Limited
Moz	Million troy ounces
MPRDA	Mineral and Petroleum Resources Development Act, 28 of 2002
Mt	Million tonnes
Mtpa	Million tonnes per annum
Mtpm	Million tonnes per month
MW	Megawatts
NEMA	National Environmental Management Act, 107 of 1998
No.	Number
NPV	Net present value
OCD	On-going capital development
OK	Ordinary kriging
OTC	Over the counter
oz	Troy ounce
oz/kg	Troy ounce per kilogram
Pty	Proprietary
QAQC	Quality Assurance/Quality Control
QEMSCAN	Scanning electron microscope
QP	Qualified Person
RAW	Return airway
RC	Reverse Circulation drilling
RCDD	Reverse Circulation Diamond Drilling
RD	Relative density
ROM	Run-of-Mine
SABLE	SABLE® Data Warehouse
SACNASP	South African Council for Natural Scientific Professions
SAMREC	The South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves
SANAS	South African National Accreditation System
SD	Standard deviation
SEC	Securities and Exchange Commission
SG	Specific gravity
SGS	SGS South Africa (Pty) Limited
SLP	Social Labour Plan
SMK	Simple macro kriging
SR	Slope of Regression
SRM	Standard Reference Material
t	Metric tonne

TCFD	Task Force on Climate-Related Financial Disclosure
t/m^3	Tonne per cubic metre
tpd	Tonnes per day
TMS	Trace mineral search
TRS	Technical Report Summary
TSF	Tailings storage facility
UCS	Unilateral compressive strength
USD	United States Dollars
USD/oz	United States Dollar per troy ounce
WUL(s)	Water Use Licence(s)
XRD	X-ray diffraction
ZAR	South African Rand
ZAR/kg	South African Rand per kilogram

Glossary of Terms

Term	Definition
Co-kriging	A method that is used to predict the value of the point at unobserved locations by sample points that are known to be spatially interconnected by adding other variables that have a correlation with the main variable or can also be used to predict 2 or more variables simultaneously.
Cut-off grade	Cut-off grade is the grade (i.e. the concentration of metal or mineral in rock) that determines the destination of the material during mining. For purposes of establishing “prospects of economic extraction,” the cut-off grade is the grade that distinguishes material deemed to have no economic value (it will not be mined in underground mining or if mined in surface mining, its destination will be the waste dump) from material deemed to have economic value (its ultimate destination during mining will be a processing facility). Other terms used in similar fashion as cut-off grade include net smelter return, pay limit, and break-even stripping ratio.
Dilution	Unmineralized rock that is by necessity, removed along with ore during the mining process that effectively lowers the overall grade of the ore.
Economically viable	Economically viable, when used in the context of Mineral Reserve determination, means that the qualified person has determined, using a discounted cash flow analysis, or has otherwise analytically determined, that extraction of the Mineral Reserve is economically viable under reasonable investment and market assumptions.
Head grade	The average grade of ore fed into the mill.
Indicated Mineral Resource	Indicated Mineral Resource is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of adequate geological evidence and sampling. The level of geological certainty associated with an Indicated Mineral Resource is sufficient to allow a qualified person to apply modifying factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit. Because an Indicated Mineral Resource has a lower level of confidence than the level of confidence of a Measured Mineral Resource, an Indicated Mineral Resource may only be converted to a probable Mineral Reserve.
Inferred Mineral Resource	Inferred Mineral Resource is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. The level of geological uncertainty associated with an Inferred Mineral Resource is too high to apply relevant technical and economic factors likely to influence the prospects of economic extraction in a manner useful for evaluation of economic viability. Because an Inferred Mineral Resource has the lowest level of geological confidence of all Mineral Resources, which prevents the application of the modifying factors in a manner useful for evaluation of economic viability, an Inferred Mineral Resource may not be considered when assessing the economic viability of a mining project, and may not be converted to a Mineral Reserve.
Kriging	A method of interpolation based on Gaussian process governed by prior covariances. It uses a limited set of sampled data points to estimate the value of a variable over a continuous spatial field
Mine Call Factor	The ratio, expressed as a percentage, of the total quantity of recovered and unrecovered mineral product after processing with the amount estimated in the ore based on sampling.
Measured Mineral Resource	Measured Mineral Resource is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of conclusive geological evidence and sampling. The level of geological certainty associated with a Measured Mineral Resource is sufficient to allow a qualified person to apply modifying factors, as defined in this section, in sufficient detail to support detailed mine planning and final evaluation of the economic viability of the deposit. Because a Measured Mineral Resource has a higher level of confidence than the level of confidence of either an Indicated Mineral Resource or an Inferred Mineral Resource, a Measured Mineral Resource may be converted to a Proven Mineral Reserve or to a Probable Mineral Reserve.
Mineral Reserve	Mineral Reserve is an estimate of tonnage and grade or quality of Indicated and Measured Mineral Resources that, in the opinion of the qualified person, can be the basis of an economically viable project. More specifically, it is the economically mineable part of a Measured or Indicated Mineral Resource, which includes diluting materials and allowances for losses that may occur when the material is mined or extracted.
Mineral Resource	Mineral Resource is a concentration or occurrence of material of economic interest in or on the Earth’s crust in such form, grade or quality, and quantity that there are reasonable prospects for economic extraction. A Mineral Resource is a reasonable estimate of mineralization, taking into account relevant factors such as cut-off grade, likely mining dimensions, location or continuity, that, with the assumed and justifiable technical and economic conditions, is likely to, in whole or in part, become economically extractable. It is not merely an inventory of all mineralization drilled or sampled.

Modifying Factors	Modifying factors are the factors that a qualified person must apply to Indicated and Measured Mineral Resources and then evaluate in order to establish the economic viability of Mineral Reserves. A qualified person must apply and evaluate modifying factors to convert Measured and Indicated Mineral Resources to Proven and Probable Mineral Reserves. These factors include, but are not restricted to: mining; processing; metallurgical; infrastructure; economic; marketing; legal; environmental compliance; plans, negotiations, or agreements with local individuals or groups; and governmental factors. The number, type and specific characteristics of the modifying factors applied will necessarily be a function of and depend upon the mineral, mine, property, or project.
Pre-Feasibility Study	A pre-feasibility study (or preliminary feasibility study) is a comprehensive study of a range of options for the technical and economic viability of a mineral project that has advanced to a stage where a qualified person has determined (in the case of underground mining) a preferred mining method, or (in the case of surface mining) a pit configuration, and in all cases has determined an effective method of mineral processing and an effective plan to sell the product.
	(1) A pre-feasibility study includes a financial analysis based on reasonable assumptions, based on appropriate testing, about the modifying factors and the evaluation of any other relevant factors that are sufficient for a qualified person to determine if all or part of the Indicated and Measured Mineral Resources may be converted to Mineral Reserves at the time of reporting. The financial analysis must have the level of detail necessary to demonstrate, at the time of reporting, that extraction is economically viable.
	(2) A pre-feasibility study is less comprehensive and results in a lower confidence level than a feasibility study. A pre-feasibility study is more comprehensive and results in a higher confidence level than an initial assessment.
Probable Mineral Reserve	Probable Mineral Reserve is the economically mineable part of an Indicated and, in some cases, a Measured Mineral Resource.
Proven Mineral Reserve	Proven Mineral Reserve is the economically mineable part of a Measured Mineral Resource and can only result from conversion of a Measured Mineral Resource.
Qualified Person	A qualified person is:
	(1) A mineral industry professional with at least five years of relevant experience in the type of mineralization and type of deposit under consideration and in the specific type of activity that person is undertaking on behalf of the registrant; and
	(2) An eligible member or licensee in good standing of a recognized professional organization at the time the technical report is prepared. For an organization to be a recognized professional organization, it must:
	(i) Be either:
	(A) An organization recognized within the mining industry as a reputable professional association; or
	(B) A board authorized by U.S. federal, state or foreign statute to regulate professionals in the mining, geoscience or related field;
	(ii) Admit eligible members primarily on the basis of their academic qualifications and experience;
	(iii) Establish and require compliance with professional standards of competence and ethics;
	(iv) Require or encourage continuing professional development;
	(v) Have and apply disciplinary powers, including the power to suspend or expel a member regardless of where the member practices or resides; and
	(vi) Provide a public list of members in good standing.
Tailings	Finely ground rock of low residual value from which valuable minerals have been extracted is discarded and stored in a designed dam facility.

1 Executive Summary

Section 229.601(b)(96) (1)

The Qualified Person(s) ("QP") of Harmony Gold Mining Company Limited ("Harmony" or the "Company") have prepared this Technical Report Summary ("TRS") to disclose the Mineral Resource and Mineral Reserve estimates for the Company's Joel Mine ("Joel Mine" or "Joel"). The TRS has been prepared in accordance with the U.S. Securities and Exchange Commission ("SEC") property disclosure regulations, S-K 1300, with an effective date as at 30 June 2022. No material changes have occurred between the effective date and the date of signature of this TRS.

Property Description

Joel is an intermediate-depth underground gold producing mine situated at the southern end of the Free State Goldfield, 40km south of the town of Welkom, Free State Province, South Africa. Construction of the twin-shaft system was completed by December 1987 and production has been ongoing since then.

Joel mines mainly the Beatrix Reef which is predominantly extracted using the scattered mining method. This method is deemed appropriate for the variable grades and geological complexity.

Joel holds a mining right which has been successfully converted and executed as a new order mining right and was registered at the Mineral and Petroleum Resources Titles Office on 6 August 2010. The mining right, number 30/5/1/2/2/13 MR, was successfully renewed on 15 February 2019 in terms of section 24 (1) of the Mineral and Petroleum Resources Development Act ("MPRDA") for a further 11 years, expiring on 14 February 2030.

Ownership

Harmony owns 100% of Joel Mine and its associated surface and underground assets.

Geology and Mineralisation

Joel is situated in the Free State Goldfield, on the southwestern margin of the Witwatersrand Basin of South Africa, one of the most prominent gold provinces in the world. The major gold bearing conglomerate reefs are mostly confined to the Central Rand Group ("CRG") of the Witwatersrand Supergroup.

The Free State Goldfield is structurally divided into two sections, cut by the north-south striking De Bron Fault, which has a downward vertical displacement to the west of about 1,500m in the region of Bambanani, as well as a dextral shift of 4km. This known lateral shift allows a reconstruction of the reefs to the west and east of the De Bron Fault. Several other major faults lie parallel to the De Bron Fault. Joel lies to the west of the De Bron Fault. Dips of the reef are mostly towards the east, averaging 30° but become steeper approaching the De Bron Fault. Between the east and west blocks lies the uplifted horst block of WRG sediments with no reef preserved.

The reef currently exploited at Joel is the Beatrix Reef, which covers approximately 90% of the mine. The other economic reef are the Hybrid BV ("HBV") reef and the footwall reef ("Aandenk") which cover the remaining 10% of Joel Mine.

Mineralisation is associated with the presence of medium to coarse, clast-supported oligomictic pebble horizons. The significant minerals in the deposit are pyrite (60%), quartz (35%) and garnets (5%) within medium to coarse, clast-supported oligomictic pebble horizons. Detrital carbon is also common.

Current Status of Exploration, Development and Operation

Active prospecting in the area began on the farms Leeuwbult 580 and Leeuwfontein 256 in 1981. Construction of the twin-shaft system began in September 1985 and was completed by December 1987. Joel South was designed to be a fully trackless mining operation.

Previously known as HJ Joel Mine, its name was changed to Joel in 1998 when the then Anglo Gold Ashanti Limited ("AngloGold Ashanti") was established. The mine's name changed again in 1999 to Taung and finally reverted to Joel in January 2002 when the Freegold Joint Venture between Harmony and African Rainbow Minerals Limited ("ARM") Gold Division ("ARMGold") assumed responsibility for the operation. In 2000 North Shaft operations were stopped and in 2001 Joel Mine faced closure. In 2002, Freegold purchased Joel Mine from AngloGold and thereafter full operation at South Shaft continued.

In 2003, Harmony and ARMGold (Freegold) joint venture took place and Joel Mine became part of the new Harmony. In 2006, Harmony Operations restructured and hoisting from North Shaft commenced and development continued. In 2012, deepening of 137 level through a decline system completed in 2019.

Mineral Resource Estimate

The current Mineral Resource estimate for Joel was generated using Datamine version 1.4.132.0 ("Datamine™") modelling software. The QP validated the Joel Mineral Resource model using visual comparisons with the raw drill hole data, comparisons of the raw drill hole data statistics with the model statistics, model volume, and visual assessment of the block model with drill hole intersections to ensure that the grades are locally honoured by the model. The QP did not identify any critical errors in the block model.

The Mineral Resources for Joel were originally prepared, classified and reported according to SAMREC, 2016. For the purposes of this TRS, the Mineral Resources have been classified in accordance with § 229.1302(d)(1)(iii)(A) (Item 1302(d)(1)(iii)(A) of Regulation S-K). The Mineral Resource estimate, as at 30 June 2022, exclusive of the reported Mineral Reserves is summarised in Table 1-1.

The QP compiling the Mineral Resource estimates is Ms FO Muthelo, Ore Reserve Manager at Joel Mine and employee of Harmony.

Table 1-1:Summary of the Joel Mineral Resources as at 30 June 2022 (exclusive of Mineral Reserves)[1-8]

METRIC

Mineral Resource Category	Tonnes (Mt)	Gold Grade (g/t)	Gold Content (kg)
Measured	1.650	9.17	15,138
Indicated	2.794	6.92	19,336
Total / Ave. Measured + Indicated	**4.444**	**7.76**	**34,474**
Inferred	7.043	5.11	35,954

IMPERIAL

Mineral Resource Category	Tonnes (Mt)	Gold Grade (oz/t)	Gold Content (Moz)
Measured	1.819	0.268	0.487
Indicated	3.080	0.202	0.622
Total / Ave. Measured + Indicated	**4.899**	**0.226**	**1.108**
Inferred	7.763	0.149	1.156

Notes:

1. Mineral Resources are reported with an effective date of 30 June 2022 were originally prepared, classified and reported according to SAMREC, 2016. For the purposes of this TRS, the Mineral Resources have been classified in accordance with § 229.1302(d)(1)(iii)(A) (Item 1302(d)(1)(iii)(A) of Regulation S-K). The Qualified Person responsible for the estimate is Ms FO Muthelo, who is Ore Reserve Manager at Joel, and a Harmony employee.
2. The Mineral Resource tonnes are reported as in-situ with reasonable prospects for economic extraction.
3. No modifying factors or dilution sources have been included to in-situ Reserve which was subtracted from the SAMREC Resource in order to obtain the S-K 1300 Resource.
4. The Mineral Resources are reported using a cut-off value of 558cmg/t determined at a 90% profit guidance, and a gold price of USD1,723/oz.
5. Tonnes are reported as rounded to three decimal places. Gold values are rounded to zero decimal places.
6. Mineral Resources are exclusive of Mineral Reserves. Mineral Resources are not Mineral Reserves and do not necessarily demonstrate economic viability.
7. Rounding as required by reporting guidelines may result in apparent summation differences.
8. The Mineral Resource estimate is for Harmony's 100% interest.

Mineral Reserve Estimate

The Mineral Reserves were originally prepared, classified and reported according to SAMREC, 2016. For the purposes of this TRS, the Mineral Reserves have been classified in accordance with § 229.1302(d)(1)(iii)(A) (Item 1302(d)(1)(iii)(A) of Regulation S-K).

Mineral Reserves are derived from the Mineral Resources, a detailed business plan and the operational mine planning processes. Mine planning utilises and takes into consideration historical technical parameters achieved. In addition, Mineral Resource conversion to Mineral Reserves considers Modifying Factors, dilution, ore losses, minimum mining widths, planned mine call and plant recovery factors.

Mineral Reserves are derived from the Mineral Resources, a detailed business plan and the operational mine planning processes. Mine planning takes into consideration historical technical parameters achieved as well as the Modifying Factors, such as cut-off grade, the Mine Call Factor (“MCF”), the stoping width, dilution and the Plant Recovery Factor (“PRF”).

The published Mineral Reserves reflect the estimated gold delivery to the processing plant solely from the in situ underground ore bodies at Joel Mine. The Mineral Reserve is based on the latest geological structure model, associated Mineral Resource estimation models and the selected mining method.

The QP compiling the Mineral Reserve estimates is Ms FO Muthelo, Ore Reserve Manager at Joel Mine and employee of Harmony.

The reported Mineral Reserve estimate as at 30 June 2022 is summarised in Table 1-2.

Table 1-2: Summary of Joel Mineral Reserves as at 30 June 2022 [1-5]

METRIC

Mineral Reserve Category	Milled Tonnes (Mt)	Gold Grade (g/t)	Gold Content (kg)
Proved	2.781	5.01	13,941
Probable	0.954	4.85	4,631
Total (Proved + Probable)	**3.735**	**4.97**	**18,572**

IMPERIAL

Mineral Reserve Category	Milled Tonnes (Mt)	Gold Grade (oz/t)	Gold Content (Moz)
Proved	3.066	0.146	0.448
Probable	1.052	0.142	0.149
Total (Proved + Probable)	**4.117**	**0.145**	**0.597**

Notes:

1. The Mineral Reserves were originally prepared, classified and reported according to SAMREC, 2016. For the purposes of this TRS, the Mineral Reserves have been classified in accordance with § 229.1302(d)(1)(iii)(A) (Item 1302(d)(1)(iii)(A) of Regulation S-K). The Qualified Person responsible for the estimate is Ms FO Muthelo, who is the Joel Ore Reserve Manager, and a Harmony employee.
2. Tonnes, grade, and gold content (oz) are declared as net delivered to the mills.
3. Figures are fully inclusive of all mining dilutions, gold losses and are reported as mill delivered tonnes and head grades. Metallurgical recovery factors have not been applied to the reserve figures.
4. Gold content is recovered gold content after taking into consideration the modifying factors.
5. Mineral Reserves are reported using a cut-off grade of 915cmg/t determined using a gold price of USD1,546/oz gold.

Capital and Operating Cost Estimates

The capital cost estimates for Joel are determined at a corporate level, using the business plan as the basis. The capital costs are associated with major equipment outside the main operating sections which is termed abnormal expenditure (“AE”), infrastructure development, as well as ongoing capital development (“OCD”), are presented in Table 1-3. Costs associated with the Mining Charter Compliance (“MCC”), as per South Africa’s Social Labour Plan (“SLP”) requirements are also included in the capital estimates. The capital and operating costs are reported in ZAR terms and on a real basis.

The capital and operating costs are reported for the period comprising financial year (“FY”) July - June.

The operating cost estimates for Joel are categorised into direct and re-allocated costs. A summary of the Joel operating cost estimates is shown in Table 1-4.

Table 1-3: Summary of Capital Cost Estimate for Joel

Capital Cost Element (ZAR'000s)	Total LOM (FY2023 - FY2030)
AE	**90,612**
Shaft Projects	**117,070**
Major Projects	**31,000**
OCD	**487,348**
Total (excluding MCC)	**726,030**
MCC (LEDs/housing etc.)	**56,607**
Total (including MCC)	**782,637**

Table 1-4: Summary of Operating Cost Estimate for Joel

Operating Cost Element (ZAR'000)	Total LOM (FY2023 - FY2030)
Wages - Payroll 1	**2,107,190**
Wages - Payroll 2	**3,205,091**
Stores and Materials	**1,711,715**
Electric Power and Water	**1,532,119**
Outside Contractors	**493,814**
Other	**358,404**
Direct Costs	**9,408,333**
Transport Allocation	**310,625**
Refining Charge	**27,308**
Assay Costs	**51,165**
Hostel Costs	**-24,971**
Plant Treatment Cost	**551,668**
Rail Transport	**74,285**
Re-allocated Costs	**990,080**
Mine Overheads Re-allocated	**502,495**
Total Cash Costs	**10,900,908**

Permitting Requirements

The permits and licences are summarised in Table 1-5. Joel has the following valid permits, administered and managed by various departments, and does not require any additional permits to continue with their mining operations.

An application has been submitted to the Department of Water and Sanitation to convert the current Water Permits to a Water Use Licence in terms of Section 21 of the National Water Act 36 of 1998. Joel is awaiting approval from the regulator at the effective date of this TRS. These pending environmental permits and licences do not pose a material risk to the continuation of the operation.

Table 1-5: Status of Environmental Permits and Licences

Permit / Licence	Reference No.	Issued By	Date Granted	Validity
EMPR	FS 30/5/1/2/3/2/1(14) EM	DMRE	16-Apr-2010	LOM
Water Permit	1459B (B33/2/340/116)	DWS	25-May-1991	LOM
Water Permit	1460B (B33/2/340/116)	DWS	15-Mar-1991	LOM
Waste Disposal Permit	1339N (B33/2/340/116/P35)	DWS	16-Sep-1991	LOM
Water Permit	3M	DWS	27-May-1991	LOM
Sewage Treatment Permit	QC404.00.XRO1	DWS	20-Aug-1986	LOM
Water Permit	1339N (B33/2/340/116)	DWS	15-Mar-1991	LOM

Note: LOM - Life of mine, DWS - Department of Water and Sanitation

All relevant underground mining and surface right permits, and any other permit related to the work conducted on the property have been obtained and are valid. There are no known legal proceedings (including violations or fines) against Joel or Harmony, which threaten its mineral rights, tenure, or operations.

Conclusions

Under the assumptions in this TRS, Joel shows a negative operating profit in the current year (FY2022-23) due to the major capital expenditure for the refrigeration plant. However, it indicates a positive cash flow over the life of mine ("LOM") as the grade and tonnages mined increase from the FY2023-24 onwards. The mine plan is supported by the Mineral Resource and Mineral Reserve estimates and is considered achievable under the set of assumptions and parameters used.

Joel is a marginal mine with low head grade (averaging less than 5.0g/t) which is affected by waste dilution resulting from the inability to hoist ore and waste separately. This makes Joel sensitive to the prevailing gold price and variability of the grade.

Recommendations

The Joel on-mine team recommends that additional capital drilling be planned for the 121 "Klippan" area as well as drilling towards 145 level, in order to prove the Beatrix Reef extensions below the current infrastructure and to confirm the grades, facies on the east of the shaft in 137 level. The estimated cost for drilling is ZAR6.3 million ("m").

2 Introduction

Section 229.601(b)(96) (2) (i-v)

This TRS for on Joel Mine has been prepared for the registrant, Harmony. The TRS has been prepared in accordance with the U.S. SEC Disclosure by Registrants Engaged in Mining Operations (disclosure regulations S-K 1300). It has been prepared to meet the requirements of Section 229.601(b)96 - Technical Report Summary. The purpose of this TRS is to provide open and transparent disclosure of all material, exploration activities, Mineral Resource and Mineral Reserve information to enable the investor to understand the operations at Joel, which forms part of Harmony's activities.

The purpose of this TRS is to provide open and transparent disclosure of all material, exploration activities, Mineral Resource and Mineral Reserve information to enable the investor to understand Joel operations which forms part of Harmony's activities.

This TRS has been prepared from the following sources of information:

- Mineral Resource and Reserve Statement, Joel Mine 2022, prepared by Ms. FO Muthelo, dated 30 June 2022;
- the 2021 and 2022 Harmony Corporate Business Plan;
- published 2021 and 2022 Integrated Annual Report; and
- published 2022 Harmony Operational Report.

The TRS was prepared by QPs employed on a full-time basis by the registrant. The QPs qualifications, areas of responsibility and personal inspection of the properties are presented in Table 2-1.

Table 2-1: QP Qualification, Section responsibilities and Personal Inspections

Qualified Person	Professional Organisation	Qualification	TRS Section Responsibility	Personal Insp.
Ms FO Muthelo	SACNASP	BSc Hons (Geol)	All Sections	Full time
Ms T Stocks	N/A	B.Tech. (Cost & Man Acc)	16, 18, 19	Full time
Mr M Kilian	AMMSA	B. Tech (Min Eng)	16	Full time
Mr K Tose	AMMSA	BSc (Min Eng)	13	Full time
Mr F Mufara	MVSSA	BSc (Comp Sci)	3 17	Full time
Mr S Taku	AMRE	G.C.C Electrical	15	Full time

This TRS has an effective date of 30 June 2022, and it is important to note that no material changes occurred between the effective date and the final date of this report.

3 Property Description and Location

Section 229.601(b)(96) (3) (i-vii)

Joel is an intermediate-depth underground gold mine that consists of two shaft complexes interconnected via a triple decline system, spanning four levels and mining at depths of at depths of 1,379m below mine datum ("BMD"). Joel currently has a LOM expectancy of nine years, which includes mining up to 137 level in a block of ground swapped with the neighbouring Beatrix Mine (Figure 3-1).

Joel is located on the southern edge of the Witwatersrand Basin in the Free State Gold Field and lies 270km south southwest of Johannesburg at a longitude of 26°48'40"E and latitude 28°16'17"S. Joel Mine is the most southern of the gold mines mined within the Harmony stable and is situated approximately 40km south of Welkom, 30km southeast of Virginia and 20km north of Theunissen (Figure 3-1). The mine has a common boundary with Beatrix Mine to the west of the mine property (Figure 3-2), but there are no underground connections between the two mines.

3.1 Mineral Tenure

South African Mining Law is regulated by the MPRDA which is the predominant piece of legislation dealing with acquisitions or rights to conduct reconnaissance, prospecting and mining. There are several other pieces of legislation which deal with such ancillary issues such as royalties (the Mineral and Petroleum Resources Royalty Act, 2008), title registration (the Mining Titles Registration Act, 1967), and health and safety (the Mine Health and Safety Act, 1996).

The current mining rights encompasses an area of 2,166.92ha (Figure 3-2) was successfully converted, executed and registered as a new order mining right at the Mineral and Petroleum Resources Titles Office on 6 August 2010. The right was granted on 3 December 2007 for a period of 11 years, ending on 2 December 2018. The right further renewed in terms of section 24 (1) of the Mineral and Petroleum Resources Development Act on 15 February 2019 for a further 11 years, ending on 14 February 2030 (Table 3-1). Joel Mine is 100% owned and operated by Harmony.

Table 3-1: Summary of the Mineral Tenure for Joel Mine

Licence Holder	Licence Type	Reference No.	Effective Date	Expiry Date	Area (ha)
Harmony/ARMGold Freegold Joint Venture Company (Pty) Limited	Mining Right	30/5/1/2/2/13 MR	15-Feb-2019	14-Feb-2030	2,166.92

There are no known legal proceedings (incl. violations or fines) against the Company which threatens its mineral rights, tenure, or operations.

3.2 Property Permitting Requirements

All relevant underground mining and surface permits, and any other permit related to the work conducted on the property have been obtained and are valid.

Harmony has access to all the properties it requires to conduct its current mining activities. The surface lease and surface right areas are sufficient in size and nature to accommodate the required surface infrastructure to facilitate current and planned mining and processing operations.

Harmony monitors complaints and litigation against the Company as part of its risk management systems, policies, and procedures. There is no material litigation (including violations or fines) against the Company as at the date of this report which threatens its property permitting. The Company is also not aware any land claims or other legal proceedings that may have an influence on the rights to mine the minerals.

Figure 3-1: Location of Joel Mine in the Free State Goldfield

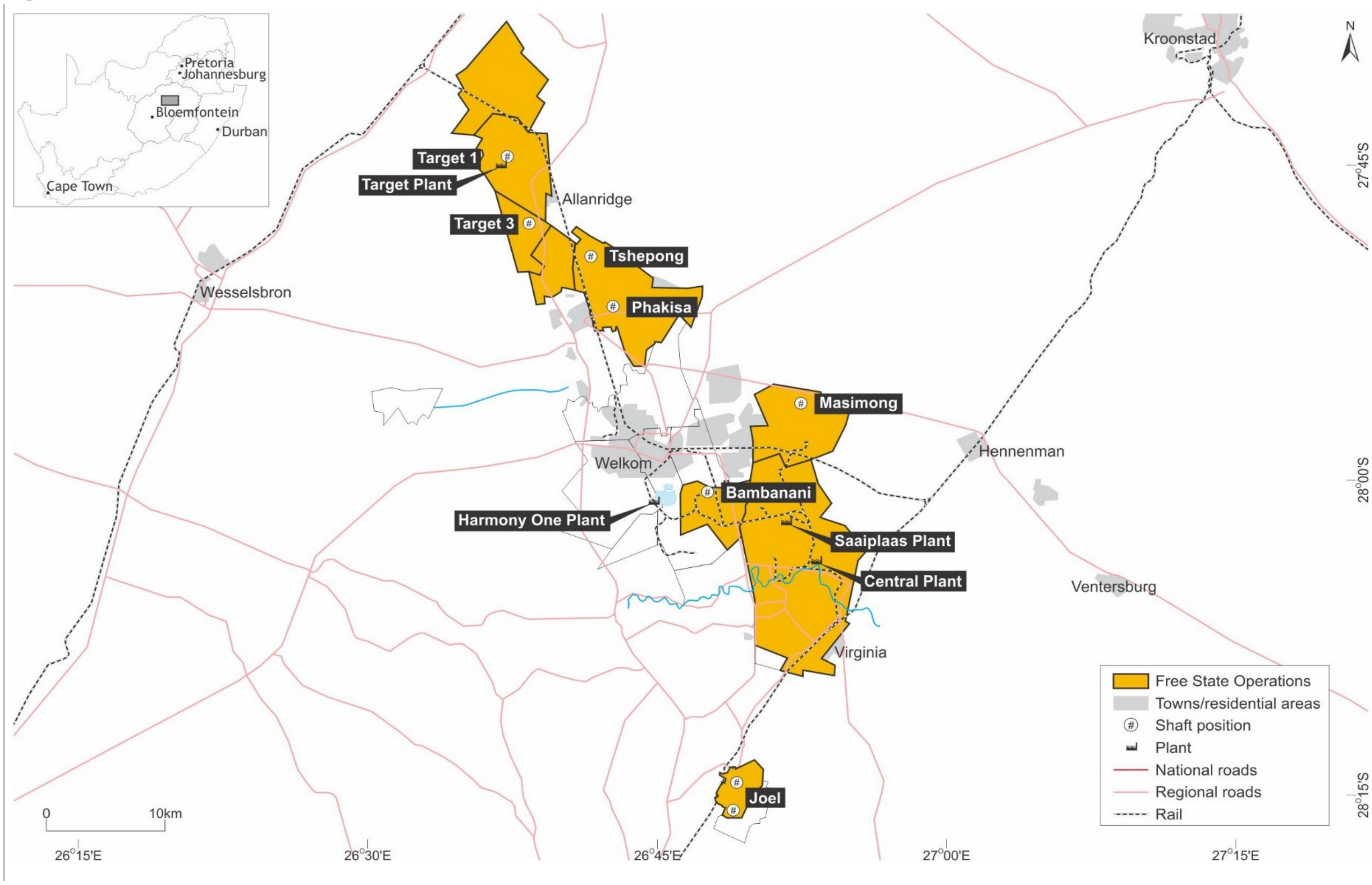
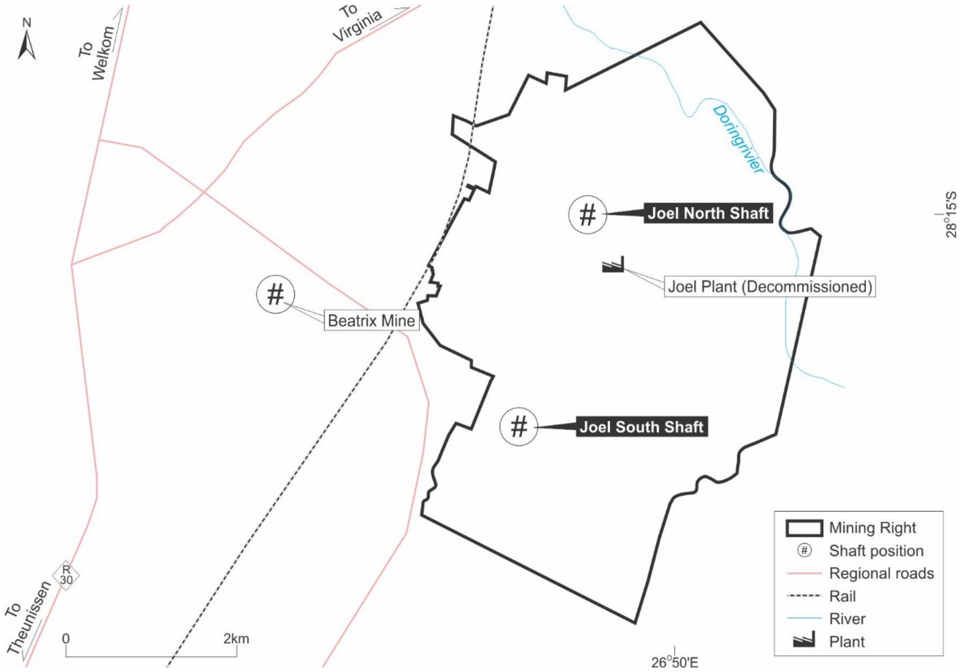


Figure 3-2: Mineral Tenure for Joel



4 Accessibility, Climate, Local Resources, Infrastructure and Physiography

Section 229.601(b)(96) (4) (i-iv)

4.1 Accessibility

Joel Mine is accessible via well-maintained tar roads, more specifically from the R30 road between Welkom and Theunissen (Figure 3-1, Figure 3-2). The area also has well-established rail links and a number of airfields, the nearest operational one being in Welkom.

4.2 Climate and Physiography

The mine lease area is flat with an average elevation of approximately 1,400m above sea level ("asl"). The area is relatively flat with gentle slope to the southwest. There are no prominent topographical landmarks in the area other than those which are man-made by slimes dams, waste rock dumps and solid waste disposal sites.

Joel is situated in the Free State, a semi-arid region with an annual rainfall of between 400mm and 600mm. Local thunderstorms and showers are responsible for most of the precipitation during summer – from October to March - with peak rainfall occurring in January. Hail is sometimes associated with thunderstorms.

In Welkom, the average annual temperature is 17.7°C. The warmest month is January, with an average temperature of 23.3 °C (range 17.3°C - 29.6°C). July is the coldest month, with temperatures averaging 9.7 °C (range 2.4°C - 17.7°C) (www.Climate-Data.org, accessed November 2021). For Joel specifically, January has a daily average of 19.2°C, whilst July has an average of 7.7°C.

Joel is not restricted by climatic or seasonal conditions.

4.3 Local Resources and Infrastructure

The surrounding areas of Welkom and Virginia are well developed in terms of access and mining-related infrastructure supporting the numerous operational gold mines in the area. The regional infrastructure includes national and provincial paved road networks, power transmission and distribution networks, water supply networks and communication infrastructure (Figure 3-1).

Joel has two operational shaft complexes namely North Shaft and South Shaft, which service and support the mining operation as defined in the LOM Plan. The Joel gold plant located near North Shaft was decommissioned in 2009 (Figure 3-2). Joel ore is currently transported by truck to the Harmony One Plant, a distance of 40km away by road, where it is processed (Figure 3-1).

Operations are powered by electricity from Eskom Holdings State Owned Company ("SOC") Limited.

Joel's surface and underground infrastructure, including its power and water supplies, are sufficient for the LOM plan production requirements.

5 History

Section 229.601(b)(96) (5) (i-ii)

5.1 Historical Ownership and Development

Active prospecting in the area began on the farms Leeuwbult 580 and Leeuwfontein 256 in 1981. Construction of the twin-shaft system began in September 1985 and was completed by December 1987. Joel South was designed to be a fully trackless mining operation.

Previously known as HJ Joel Mine, its name was changed to Joel in 1998 when the then AngloGold Ashanti was established. The mine's name changed again to Taung in 1999 and finally reverted to Joel in January 2002 when the Freegold Joint Venture between Harmony and ARMGold assumed responsibility for the operation. The historical ownership and associated activities related to Joel are summarised in Table 5-1.

Table 5-1: Summary of Historical Ownership Changes and Activities of Joel

Year	Asset History Highlights
1978	Johannesburg Consolidated Investment (JCI) Exploration obtained the mineral options on farms Leeuwbult 580 and Leeuwfontein 256, in the district of Theunissen.
1981	Active prospecting in the area began on the farms Leeuwbult 580 and Leeuwfontein 256. The first borehole LB1 was sited in 1981.
1985	Work began in the construction of the twin shaft system by Johannesburg Consolidated Investment Limited ("JCI"). The sinking of 3 and 4 shafts on H.J. Joel Mine commenced.
1988	First gold production from H.J. Joel Mine was achieved.
1992	The change over from trackless mining to track bound mining method was started and completed in 1994.
1996	Decision was made to unbundle JCI in September 1997. The company was restructured into two separate and autonomous base metal and gold companies, JCI Projects and JCI Gold. The gold assets, including H.J. Joel Ltd., were collapsed into JCI Gold.
1997	In November 1997, JCI Gold its 60% interests in H.J. Joel to Anglo American Corporation ("AAC") among other interests in exchange for De Beers' and AAC's 26% interest in Lonrho Plc. of the United Kingdom. The sinking of 1 shaft (now North Shaft) commenced.
1998	H.J. Joel project changed its name to Joel when AngloGold Ashanti Limited ("AngloGold Ashanti") was established. AngloGold was formed through a merger of the gold interests of AAC and its associated companies including H.J. Joel, creating the world's largest gold company. In July 1998, AngloGold subdivided its Vaal Reefs, Free State, Western Holdings, H.J. Joel, and West Wits gold mining complexes on a production shaft basis into 16 separate business centres, and Joel was renamed. The shafts were renamed Taung North and South.
1999	Joel project changed its name to Taung. Anglo Exploration drilled boreholes LB20 and LB21.
2000	North Shaft operations were stopped and in 2001 Joel Mine faced closure.
2001	AngloGold announced that it would be selling its assets (including Joel) in the Free State province to ARM and Harmony. ARM and Harmony would hold equal joint venture interests in the assets when the transaction took effect on 1 January 2002.
2002	In January, Taung project changed its name back to Joel when the Freegold joint venture between Harmony and ARMGold assumed responsibility for the operation. As part of a restructuring process the assets of the Joel mine were transferred from its holding company, JSE-listed HJ Joel Gold Mining Company Limited, which was subsequently de-listed. Full operations at South shaft continued.
2003	On May 2, Harmony Gold and ARMGold announced a merger, which effectively saw Harmony acquire ARMGold.
2005	Feasibility studies were conducted to determine options to extend Joel's Life of Mine specifically with the use of the North shaft.
2006	Harmony operations restructured and hoisting from North Shaft commenced and development continued.
2007	Harmony announced the Department of Minerals and Energy ("DME") had approved and granted the conversion of its old order mining rights into new order mining rights in terms of the MPRDA Act 28 of 2002. Harmony was granted 13 new order mining rights, in terms of the MPRDA, which covered all of its South African gold mining operations, including Joel.
2008	Redevelopment and re-equipping of the Joel North shaft was concluded.
2009	The Joel Plant was de-commissioned in November.
2011	Production at Joel progressively moved to the deeper portions of the mine. Retrospective infrastructure upgrades were made around this time.
2013	Supported by a successful drilling programme in 2009 and pre-feasibility study in 2010, a feasibility study on mining 137 level and testing the upside potential of 145 level was completed. The project was approved and began. Joel's future operating life was reliant upon successful completion of the decline shaft system.
2014	Harmony and Sibanye Gold Limited ("Sibanye") entered into an agreement whereby Joel mine exchanged two portions of its mining right for two portions of Sibanye's Beatrix mine's mining right, and acquired two additional mining right portions from Beatrix (sale portions). The transaction was completed in May 2014. The purchase consideration of the sale portions acquired by Joel was payable as a royalty of 3% on gold revenue generated from these two portions.

5.2 Historical Exploration

Since the inception of Joel Mine in 1986, 48 exploration drill holes have been drilled from surface. Forty of the holes were drilled by the previous owners of the mine and eight holes, totalling 10,800m, have been drilled during Harmony's tenure.

In 1978, JCI Exploration obtained the mineral options on farms Leeuwbult 580 and Leeuwfontein 256, in the district of Theunissen, and the first drill hole, LB1, was sited in 1981.

In 1999, Anglo Exploration drilled drill holes LB20 and LB21. LB20 was abandoned on a dyke and LB21 intersected Beatrix reef with a returned assay value of 640cmg/t over a channel of 19cm. In 2000 North Shaft operations were stopped and in 2001 Joel Mine faced closure.

In 2002, Freegold purchased Joel Mine from AngloGold and thereafter full operation at South Shaft continued.

In 2006, Harmony Operations restructured and hoisting from North Shaft commenced and development continued. In 2012, deepening of 137 level through a decline system was completed in 2019.

5.3 Previous Mineral Resource and Mineral Reserve Estimates

The previous Mineral Resource estimate for Joel was declared as at 30 June 2021 by Harmony, according to the definitions stipulated in the SAMREC Code, 2016. The previous Mineral Resource estimate summarised in Table 5-2, was reported exclusive of Mineral Reserves, and has been superseded by the current estimate prepared by Harmony in Section 11 of this TRS.

Table 5-2:Summary of the Previous Joel Mineral Resources as at 30 June 2021 (exclusive of Mineral Reserves)

METRIC

Mineral Resource Category	Tonnes (Mt)	Gold Grade (g/t)	Gold Content (kg)
Measured	1.611	9.96	16,041
Indicated	2.394	8.03	19,221
Total / Ave. Measured + Indicated	**4.005**	**8.80**	**35,262**
Inferred	7.337	5.13	37,607

IMPERIAL

Mineral Resource Category	Tonnes (Mt)	Gold Grade (oz/t)	Gold Content (Moz)
Measured	1.776	0.290	0.516
Indicated	2.639	0.234	0.618
Total / Ave. Measured + Indicated	**4.415**	**0.257**	**1.134**
Inferred	8.088	0.149	1.209

The previous Mineral Reserve estimate for Joel was declared by Harmony on 30 June 2021 in accordance with the SAMREC Code, 2016. Modifying Factors were considered and applied to the Mineral Resource to arrive at the Mineral Reserve estimate. These factors included the cut-off grade, the mine call factor ("MCF"), the stoping width, the mining width and the plant recovery factor.

The previous Mineral Reserve estimate is summarised in Table 5-3 and has been superseded by the current estimate prepared by Harmony as detailed in Section 11 of this TRS.

Table 5-3: Summary of the previous Joel Mineral Reserves as at 30 June 2021

METRIC

Mineral Reserve Category	Tonnes (Mt)	Gold Grade (g/t)	Gold Content (kg)
Proven	2.632	5.00	13,168
Probable	1.489	4.50	6,699
Total / Ave. Proven + Probable	**4.120**	**4.82**	**19,867**

IMPERIAL

Mineral Reserve Category	Tonnes (Mt)	Gold Grade (oz/t)	Gold Content (Moz)
Proven	2.901	0.146	0.423
Probable	1.641	0.131	0.215
Total / Ave. Proven + Probable	**4.542**	**0.141**	**0.639**

5.4 Past Production

Past production for Joel is presented in Figure 5-1 and Figure 5-2. The average tonnage has typically been over 400ktpa, except for FY2020 and FY2021 which were affected by lower production rates. Production returned to over 400kt in FY2022.

Figure 5-1: Graph of Past Production – Tonnes and Grade

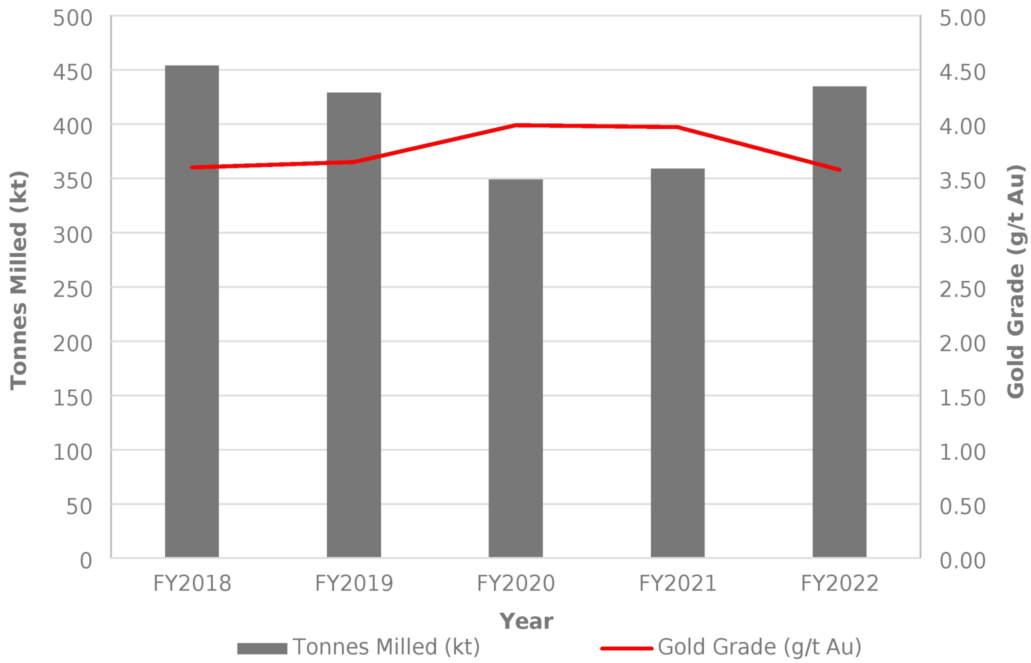
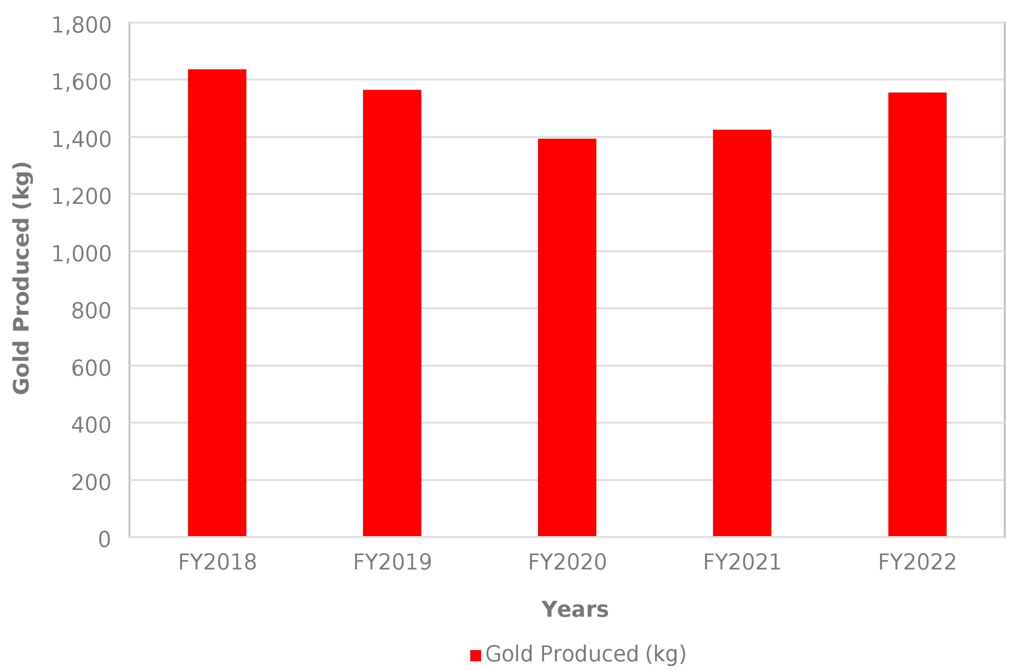


Figure 5-2: Graph of Past Metal Production



6 Geological Setting, Mineralisation and Deposit

Section 229.601(b)(96) (6) (i-iii)

6.1 Regional Geology

Joel is located on the southwestern margin of the Archean Witwatersrand Basin, one of the prominent gold provinces in the world. The Witwatersrand Basin is an approximately 7,000m thick terrigenous sequence comprising mainly arenaceous and argillaceous, together with minor rudaceous, lithologies deposited in a fluvio-deltaic environment in the centre of the Archaean Kaapvaal Craton of South Africa (Robb and Meyer, 1995). The regional geology of the Witwatersrand Basin is shown in Figure 6-1.

The Witwatersrand Basin hosts the Witwatersrand Supergroup, which either conformably or unconformably overlies the metamorphosed volcanic and minor clastic sediments of the Dominion Group (Tucker et al., 2016). The Dominion Group overlies the older granite-greenstone basement.

Majority of the Witwatersrand Supergroup is capped by the volcano-sedimentary sequence of the Ventersdorp Supergroup through an angular unconformity. The Ventersdorp Supergroup is in turn overlain by the dolomitic and quarzitic sequence of the Transvaal Supergroup, and sediments of the Karoo Supergroup (Tucker et al., 2016). Several suites of dykes and sills cut across the Archaean basement and the Witwatersrand, Ventersdorp, Transvaal and Karoo supergroups, and form important geological time-markers.

The Witwatersrand Supergroup is subdivided into the basal West Rand Group ("WRG") and overlying CRG (Robb and Robb, 1998). The WRG extends over an area of 43,000km^2 and is up to 5,150m thick. It is sub-divided into three subgroups, namely, from bottom upwards, the Hospital Hill Subgroup; Government Subgroup and Jeppestown Subgroup. The stratigraphic succession of the WRG mainly consists of shale sediments, with occasional units of banded iron formation and conglomerate.

The CRG is up to 2,880m thick and covers an area of up to 9,750km^2, with a basal extent of c.290km x 150km. It is sub-divided into the lower Johannesburg Subgroup and upper Turffontein Subgroup. These subgroups are separated by the Booysens Shale Formation. The stratigraphic succession of the CRG comprises coarse-grained fluvio-deltaic sedimentary rocks.

The major gold bearing (auriferous) conglomerates are mostly confined to the CRG, and these conglomerate horizons are known as reefs. The most important reefs within the CRG are at six stratigraphic positions, three within the Johannesburg Subgroup and three within the Turffontein Subgroup. The reefs are mined in seven major goldfields, and a few smaller occurrences, which extend for over 400km in what has been called "The Golden Arc". This arc is centred on the prominent Vredefort Dome (Figure 6-1), which is thought to be a major meteorite impact site in the centre of the Witwatersrand Basin (Therriault et al., 1997). The seven major goldfields (Figure 6-1) include East Rand, South Rand, Central Rand, West Rand, West Wits, Klerksdorp, Free State (Welkom) and Evander.

6.2 Local Geology

Joel is located within the Free State Goldfield (Figure 6-1). The stratigraphic column of the Free State Goldfield is presented in Figure 6-2. The Johannesburg Subgroup comprises the Virginia, St Helena, Welkom, Harmony and Dagbreek formations.

The Virginia Formation is up to 800m thick and is composed of a transition from the underlying finer-grained Jeppestown Quartzites into an alternating sequence of grayish green argillaceous quartzites with pebble lags.

The first pebble layer may be characterized by kerogen (carbon) known as the Beisa Reef. The St Helena Formation is a ±300m sequence of alternating mature quartzites and argillaceous, pebbly protoquartzites, with a distinct change from the khaki yellow sericitic quartzites (LF1) of the underlying Virginia Formation to coarse grained, light grey siliceous quartzites (MF4) at the base of the St Helena Formation. The top of this formation is marked by mineralised gravels up to 2m thick known as the Intermediate Reef or UF4 (base of Welkom Formation).

Figure 6-1: Geological setting of the Witwatersrand Basin

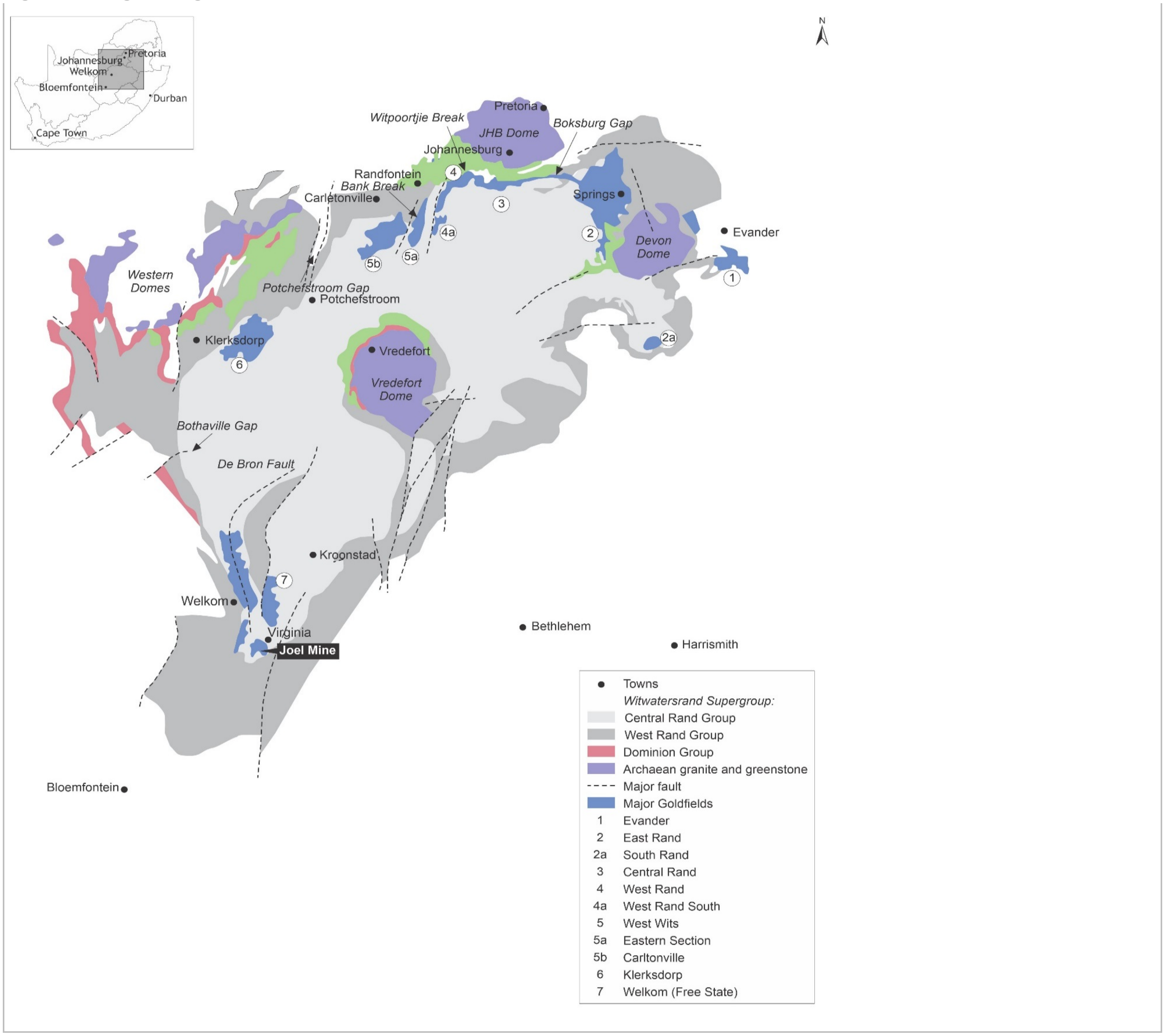
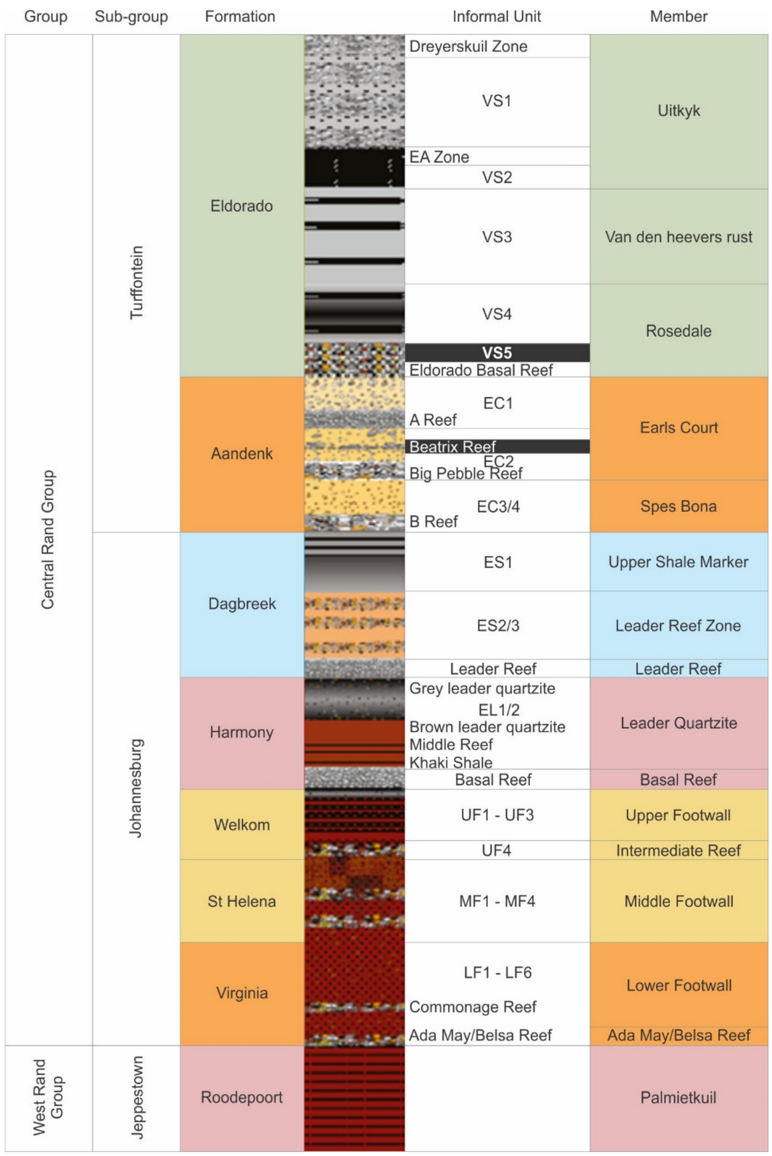


Figure 6-2: Stratigraphic Column of the Free State Goldfield



This unit both thins from west to east with a corresponding grain size decrease. The Harmony Formation contains the most important gold-producing reef in the Free State Goldfield, namely the Basal Reef representing the Basal and Steyn placers. It varies from a single pebble lag to channels of more than 2m thick. It is commonly overlain by shale, which thickens northwards. The Dagbreek Formation comprises a composite of oligomictic and polymictic conglomerate termed the Leader Reef, which caps the Harmony Formation. This is overlain by interbedded siliceous and argillaceous quartzites with lithic fragments (Leader Reef Zone).

The Turffontein Subgroup comprises the Kimberly (formerly Aandenk) and Eldorado (Elsburg) formations. The Kimberly Formation is sub-divided into the lower Spec Bona Big Pebble and upper Big Pebble (Earls Court) members. The Spec Bona Member consists of a basal polymictic conglomerate which may have associated kerogen (carbon) - B Reef, overlain by khaki-yellow coarse pebbly argillaceous quartzites with polymictic conglomerate horizons. The Big Pebble Member hosts two main conglomerate reefs, namely the basal Big Pebble Reef and the A Reef, referred to at Target Mine as the BP1a and BP6a reefs, respectively. These placers occur with a sequence of khaki to brown argillaceous quartzites with interbedded pebbly quartzites.

The Eldorado Formation is sub-divided into three members, namely the Rosedale, Heeversust and Uitkyk members. These members consist of argillaceous quartzwacke with interbedded siliceous quartzite. The Rosedale Member consists of a basal, polymictic immature conglomerate (VS5), overlain by immature dark grey, gritty quartzite, which increases in maturity northwards.

The Van Den Heevers Rust Member consists of a basal polymictic conglomerate overlain by yellowish argillaceous quartzite. The Uitkyk Member underlies the Ventersdorp lavas and is locally referred to as the Dreyerskuil (or Boulder Beds) which consist of a polymictic coarsening-up sequence with heterogeneous pebbles/cobbles of black, yellow and green shale, greenstones, porphyritic lava, chert quartzite and quartz.

The Free State Goldfield is structurally divided into two sections, cut by the north-south striking De Bron Fault (Figure 6-1). This major structure has a downward vertical displacement to the west of about 1,500m in the region of Bambanani, as well as a dextral shift of 4km. This known lateral shift allows a reconstruction of the reefs to the west and east of the De Bron Fault. Several other major faults lie parallel to the De Bron Fault.

Joel lies to the west of the De Bron Fault. Dips of the reef are mostly towards the east, averaging 30° but become steeper approaching the De Bron Fault. Between the east and west blocks lies the uplifted Horst block of WRG sediments with no reef preserved.

6.3 Property Geology

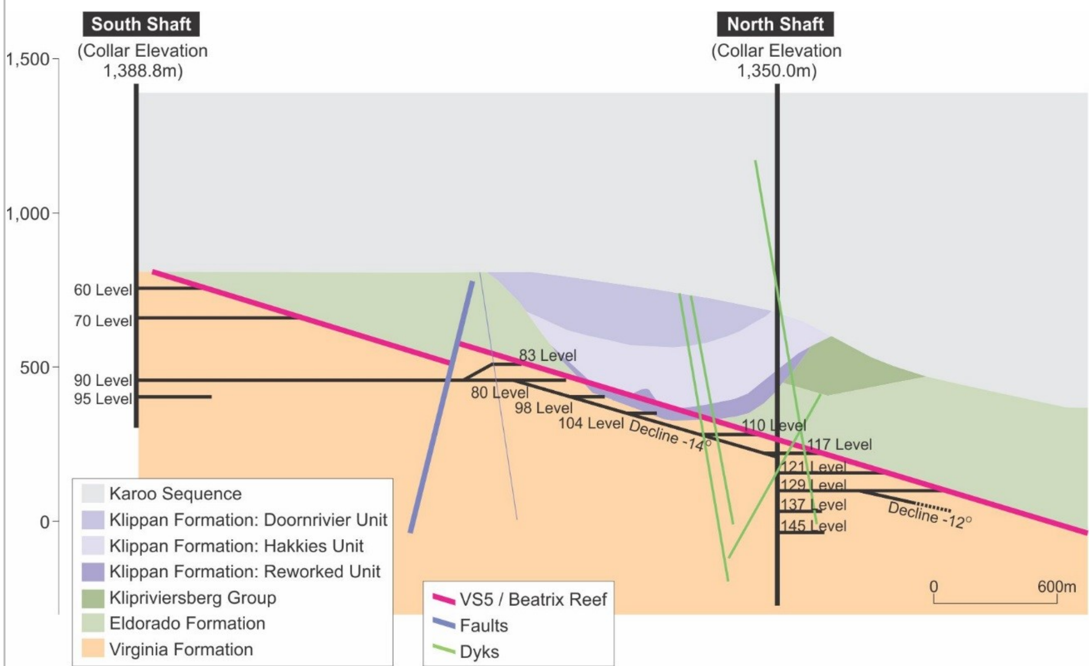
The Klippan Formation has been preserved as an east-west trending erosional channel that has eroded deeply through the Witwatersrand sediments and has eliminated the Beatrix/VS5 horizon in the eastern portion of the mine and cut out a significant chunk in an east-west direction through the middle of the mining right area. Regionally the Klippan Formation is preserved in the north-south striking basin, known as the Virginia Basin in the southern Free State, which parallels the De Bron Fault. The Beatrix/VS5 reefs suboutcrop against the Karoo towards the south. A schematic cross-section of Joel is shown in Figure 6-3.

A deep erosional channel of Platberg group volcano-sedimentary rock, known as the Klippan channel, truncates the Beatrix Reef approximately 1.8km to the north of South Shaft. This washout feature is wedge-shaped with its apex to the west and widening to the east. The estimated dimension from the apex to the eastern property boundary is approximately 1.8km. The reef has been shown to be continuous to the north of this feature.

Where unaffected by the Klippan channel, the reef is bounded to the east by the De Bron Fault, which strikes north-northeast. The CD Fault, which strikes north-east and is roughly halfway between the two shafts, has a 320m sinistral lateral displacement south of the fault towards the north-east.

The reef currently exploited at Joel is the Beatrix Reef, which covers approximately 90% of the Mine. The other economic reef types are the Hybrid BV ("HBV") reef and the footwall reef ("Aandenk") which cover the remaining 10% of the Mine.

Figure 6-3: Schematic Cross-Section through the Joel Mine



The reef types may be described as follows:

- VS5: Dark grey polymictic medium pebble conglomerate ("Mpc"), poorly sorted, poorly packed, no pyrite;
- Beatrix: Oligomictic Mpc, pebbles 25mm, smokey quartz predominating, garnets common;
- Aandenk: Oligomictic large pebble conglomerate ("Lpc"), 60mm pebbles, set in yellow argillaceous matrix;
- BV: Oligomictic Lpc, 50mm pebbles, white and smokey quartz, no yellows (Reworking of /Beatrix/Aandenk); and
- HBV: Polymictic Lpc, 50mm pebbles, white and smokey quartz, yellow shale's (Partial reworking of VS5/Beatrix/Aandenk).

6.4 Structure

The main structures at Joel are associated with the Platberg Extension. These faults are north-south striking, steeply dipping and typically have downthrows to the east of 10m to 100m. These downthrows form a graben against the De Bron Fault, which has a 450m upthrow to the east. East of the De Bron Fault, the reef has been either truncated or eroded against the Karoo Supergroup. The structural plan for Joel is presented in Figure 6-4.

Minor east-west striking faults are also present. However, displacements on these faults are generally less than 10m, which are believed to be Klipriviersberg in age. Low angle reverse faulting is also present. These structures trend north-south, have small displacements and dip towards the east. These structures may be related to the Central Rand Contractional event.

6.5 Mineralisation

The gold mineralisation in the Witwatersrand deposits is believed to have followed an episode of deep burial, fracturing and alteration. The mineralisation model is that Archean gold bearing hydrothermal fluid was introduced into the conglomerates and circulated throughout in hydrothermal cells. The fluids precipitated gold and other elements through reactions that took place at elevated temperatures along the reef horizons, which was the more favourable fluid conduit.

The generic mineralisation model for the reefs at Joel are based on structurally controlled fluid flow within a conglomerate hosted lithology. Fluid flow is dependent on the permeability of the host rock mass during mineralisation. Fluid flow, permeability and subsequent gold mineralisation are believed to be controlled by four key factors, including:

- mechanical stratigraphy;
- the presence or absence of mineralisation age thrust faulting;
- sedimentology; and
- precipitation agent.

Exploitable mineralisation at Joel Mine contains predominantly pyrite with some scattered buckshot, especially in the Beatrix Reef. The significant minerals in the deposit are pyrite (60%), quartz (35%) and garnets (5%) within medium to coarse, clast-supported oligomictic pebble horizons.

The complex nature of the reef has resulted in a highly irregular distribution of gold throughout the mining area. There are broad low and high-grade zones over hundreds of metres, which are considered likely to be repeated within the reef environment beyond the limits of the current development. However, the detailed grade distribution within these zones remains very unpredictable.

For the purposes of Mineral Resource estimation, a detailed facies model is used and is based on detailed sedimentological observations.

Figure 6-4: Structural Geology at Joel

6.6 Deposit Type

Joel may be classed as a sedimentary alluvial fan-type deposit. The major dykes have a trend east/west, whereas the major faults have a trend north/south. The paleo current direction indicate a north/south trend with an erosional channel between the east and the west.

6.7 Commentary on Geological Setting, Mineralisation and Deposit

The regional geological setting, local and property geology, mineralisation and deposit-type for Joel is well established through many decades of exploration and mining. Reliable geological models, maps and cross sections are available that support the interpretations and inform the Mineral Resource estimates.

Further drilling is being conducted to determine the structural complexity at Joel and the full potential of the Beatrix reef.

7 Exploration

Section 229.601(b)(96) (7) (i-vi)

Geological data has been obtained through initial surface drilling, followed by underground drilling, mapping and channel (chip) sampling.

7.1 Geophysical Surveys

No geophysical surveys have been conducted at Joel Mine.

7.2 Underground Mapping

Face and reef development mapping is undertaken by a team of samplers comprising two or more personnel. Face tapes are setup along gullies and the stope face and secured with the latest survey pegs installed in the workplaces. Reef position and other lithological and stratigraphic information is collected and measured relative to the reference tapes. The geological and structural information is captured in GMSI™ system.

Once at surface, the personnel transfer the information from the notebook into the system where a mapping report is produced for each mapped workplace. The mapping reports depict the geological information graphically relative to the survey measurement points. Data from the mapping is also incorporated into the geological models.

Geological mapping is open to the interpretation of stratigraphy by various geologists. Spatial inaccuracies are expected during the mapping, plotting, digitizing and subsequent alignment of the mapping in the StopeCAD™ system. Historically, these inaccuracies are not significant, and are mitigated through internal peer reviews, adherence to and continuous updates of the standard operating procedures at the Joel operations.

7.3 Topographic Surveys

No topographic surveys have been completed in the past, and in the opinion of the QP, these surveys are not required as this TRS relates to an underground operation.

7.4 Channel Sampling Methods and Sample Quality

Channel sampling is undertaken according to industry best practice, as well as Harmony's internal Underground Sampling Procedure. The procedure for the underground sampling is used to ensure quality of sampling information and safety in its collection. All samplers and sampling crews are trained based on the rules of the sampling standard. Particular attention is given to quality of information captured, and planned task observations are routinely carried out to ensure adherence to the standard.

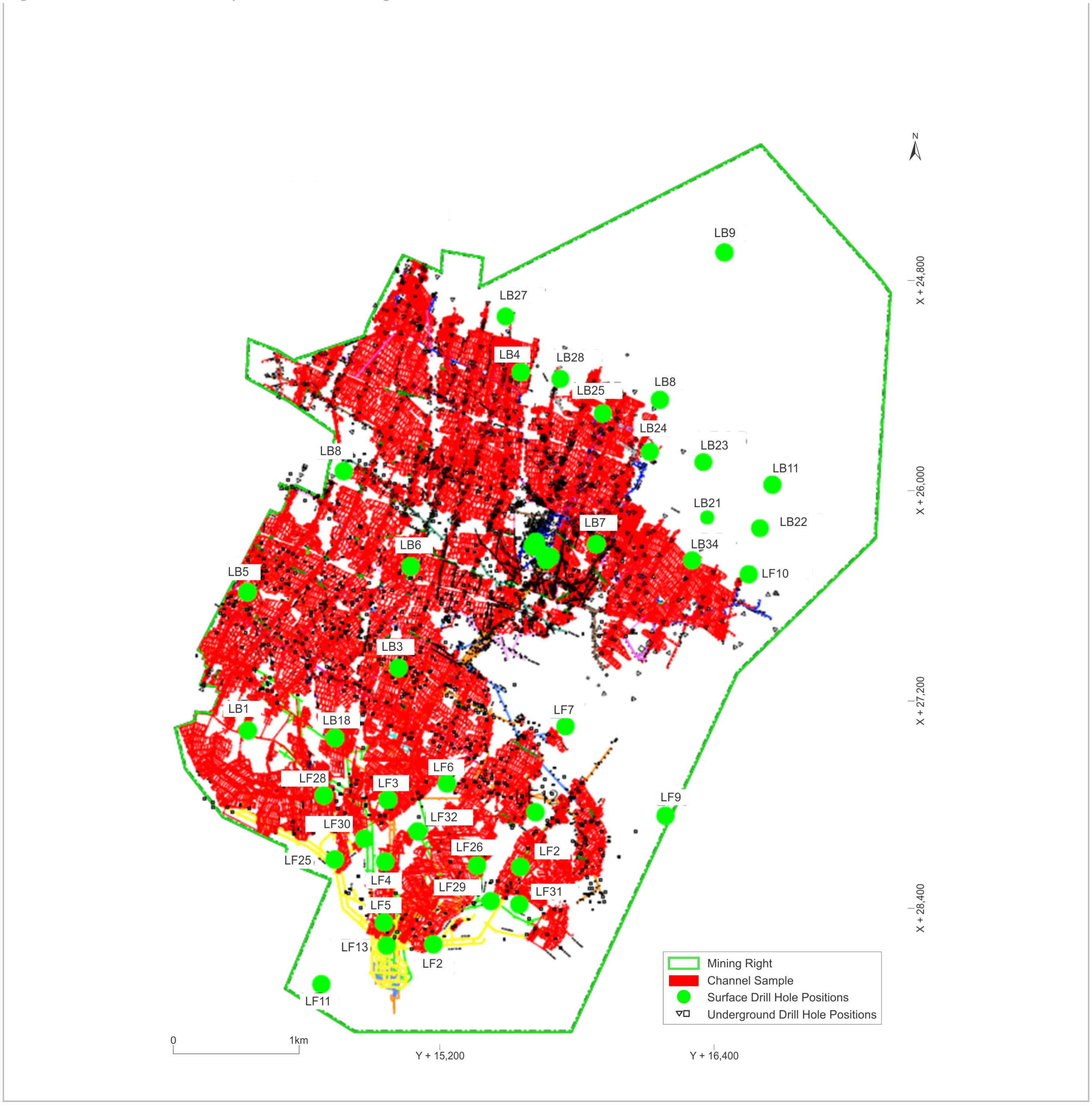
Two parallel lines, 10cm apart are drawn at right angles to the dip of the reef, across the reef exposure, from hanging wall to the footwall of the stope panel or development end. Another line is also drawn parallel to the average reef dip at the base of the reef package.

Sample intervals are marked, beginning at the base of the reef. The samples extend the full height of the face and extended beyond the parallel lines to ensure that the sampled position can be located after sampling is completed. Reef bands are marked off by drawing lines parallel to the reef contact, 2cm below and above the reef contacts. The sample width is demarcated at 10cm wide, with a minimum length of 8cm and a maximum length of 20cm, to a depth of 1-2 cm. The inclusion of such waste is essential to avoid loss of any gold which may be concentrated on the contact between the reef and waste.

Samples are chipped from basal contact upward to prevent contamination. Samples are weighed and submitted to the designated laboratory for assay. A detailed description of the sampling process is provided in Section 8.1.1.

The location of samples collected is indicated on Figure 7-1.

Figure 7-1: Location of Channel Samples in relation to Underground and Surface Drill Holes



7.5 Surface Drilling Campaigns, Procedures and Results

Since the inception of Joel Mine in 1986, 48 exploration drill holes have been drilled from surface. Forty of the holes were drilled by the previous owners of the mine and eight holes, totalling 10,800m, have been drilled during Harmony's tenure.

Surface exploration drilling by Harmony began in 2010, with the eight planned holes and their associated deflections. The purpose was to determine the facies and value in 137 level for the extension of the shaft to 137 level because at that time little information was known about 137 level. One drill hole was abandoned before intersecting the reef.

In 2019, five holes were drilled with the purpose was also to explore for the VS5 boundary in the eastern side of the shaft in 129 level and to determine the facies and value towards 145 level for the extension of the shaft to 145 level.

7.5.1 Drilling Methods

In 2010, the surface holes were drilled using a rotary blasthole drill rig with a core size of BQ (36.5mm).

7.5.2 Collar and Downhole Surveys

The drill holes are surveyed to confirm both collar position and trajectory. Drill hole collar and downhole surveys are conducted on all surface drill holes.

Surface drill hole collars are surveyed by internal Land Survey Department.

Downhole surveying is conducted using Electronic Multishot System and non-magnetic north seeking Gyro tools as supplied by a certified and specialised downhole survey company, Digital Surveying (Pty) Limited. The instrument is a magnetic based tool and as such all readings are relevant to magnetic north.

7.5.3 Logging Procedure

Upon arrival at the core yard located at the Joel Mine, drill core is marked at meter intervals. The core is then orientated so that the low point of bedding is coincident with the edge of the angle iron. The cut line is defined by the low point of the bedding at the base of the reef zone, when viewed as per convention, from left to right in the direction of increasing depth, is drawn parallel to the core. The core is then rotated through 90° and a yellow line was then drawn parallel to the core, to define the retention half core.

Core photography is not taken on all cores. Should there be information that warrants recording, photography of the core will be conducted prior to logging and sampling.

Drill core logging is quantitative and qualitative, and all pertinent features are logged, including stratigraphy, lithology, structure, alteration and mineralisation characteristics. The following information is recorded:

- lithology;
- packing density;
- roundness;
- sorting;
- contact type, grain/pebble size;
- sediment maturity; and
- mineralisation; and alteration.

The core is stored in a secure facility that is locked at all times to ensure integrity and kept for future reference.

The geologist responsible for logging the core is keeps the original paper record. Internal peer reviewing is undertaken on the interpretation of the stratigraphy and spatial correlation of drill holes.

Observations are captured on the diamond drilling database by geologists. The logs are checked by the Senior Geologist prior to sampling.

7.5.4 Drilling Results

A total of 48 drill holes were drilled on surface at Joel that intersected the Beatrix Reef. The surface drill holes were drilled to a maximum depth of 1,389 m below surface.

The location of the surface drill holes intersecting the Beatrix Reef is presented in Figure 7-2, whilst the results for those which intersected reef are presented in Table 7-1.

The results have been included into the geological modelling and Mineral Resource estimation process.

7.5.5 Core Recovery

Upon delivery to the core yard, and prior to logging and sampling, the drill core is checked to ensure 100% core recovery. Core recovery is determined by dividing the measured length of the recovered core by the total length of the core run.

An intersection is complete and representative if core recovery is greater than 99%. Drill holes with poor recovery are not sampled. Extra caution is taken during the drilling process to ensure maximum core recovery on reef intersections, to prevent sample bias.

Reef intersection acceptability is categorised as per the criteria summarised in Table 7-2 and is determined by geologists based on, amongst others, drill core condition and faulting. The acceptability is verified for each reef intersection before the assay results are used for Mineral Resource estimation.

The average core recovery was approximately 99%.

Table 7-1: Joel Surface Drilling Results

Drill Hole ID	Deflection	Hole Length (m)	Reef Channel Width (cm)	Reef Grade (g/t)	Reef Value (cmg/t)
LB1	0	1,461.57	24.60	8.23	203
	6	27.51	24.60	0.00	0
	7	47.20	21.70	5.36	116
	8	24.70	19.70	19.00	374
	9	26.13	19.70	4.73	93
LB2	0	1,155.80	19.70	0.00	0
	1	54.91	26.60	1.30	35
	2	167.98	29.50	2.55	75
	3	18.92	12.60	1.13	14
	4	29.28	24.60	1.40	34
	5	24.37	24.60	0.00	0
LB3	-	679.80	193.00	9.32	1,799
	1	15.06	199.90	12.87	2,573
	2	76.29	180.20	7.98	1,438
	3	36.38	197.00	19.93	3,926
LB4	-	1,299.83	46.30	12.74	590
	1	24.72	72.90	17.00	1,239
	2	69.00	64.00	16.42	1,051
	3	44.85	83.70	10.70	896
	4	47.15	76.80	12.38	951
LB5	-	886.60	166.40	9.47	1,576
	1	-	152.60	6.32	964
	2	-	153.60	7.33	1,126
	3	-	148.70	5.22	776
	4	-	157.60	7.08	1,116
LB6	-	1,046.30	64.00	25.62	1,640
	1	-	64.00	11.66	746
	2	-	66.00	2.07	137
	3	-	73.90	2.95	218
LF32	-	797.00	3.00	151.33	454

Drill Hole ID	Deflection	Hole Length (m)	Reef Channel Width (cm)	Reef Grade (g/t)	Reef Value (cmg/t)
LB7	-	1,256.70	222.60	3.46	770
	1	-	224.50	5.05	1,134
	2	-	213.70	5.56	1,188
	3	-	220.60	4.96	1,094
	4	-	246.20	3.39	835
LB8	-	1,415.10	42.30	23.27	984
	1	-	40.40	15.57	629
	2	-	62.00	2.79	173
	3	-	58.10	7.63	443
	4	-	60.10	17.24	1,036
LB9	-	1,584.90	231.40	1.03	238
	1	-	222.60	1.75	390
	2	-	231.40	0.77	178
	3	-	221.60	0.76	168
	4	-	221.60	0.65	144
LB11	-	1,430.10	122.10	1.32	161
	1	-	137.90	0.73	101
	2	-	131.00	1.17	153
	3	-	129.00	1.13	146
	4	1,380.00	118.20	0.99	117
LB18	-	732.00	1.00	13.00	13
LF3	-	746.80	80.80	76.81	6,206
	1	-	80.80	35.26	2,849
	2	-	95.50	10.59	1,011
	3	-	70.90	9.92	703
	4	-	76.80	7.07	543
LF4	-	786.20	39.40	40.39	1,591
	1	390.00	40.40	26.50	1,071
	2	-	41.40	31.08	1,287
	3	-	29.50	20.68	610

Drill Hole ID	Deflection	Hole Length (m)	Reef Channel Width (cm)	Reef Grade (g/t)	Reef Value (cmg/t)
LF5	-	683.30	36.40	28.31	1,031
	1	-	26.60	97.50	2,594
	2	-	34.50	182.60	6,300
	3	-	27.60	57.30	1,582
	4	-	28.60	35.10	1,004
	5	-	38.40	176.58	6,781
LF6	-	832.00	191.10	5.69	1,087
	1	-	118.20	5.59	661
	2	-	186.10	4.27	795
	3	-	171.40	2.92	501
	4	-	142.80	5.83	833
LF7	-	1,066.30	183.20	5.01	918
	1	-	168.40	4.06	684
	2	-	172.30	9.43	1,625
	3	-	150.70	5.08	766
	4	-	59.10	2.59	153
	5	-	57.10	10.14	579
LF10	-	1,360.20	213.70	6.06	1,295
	2	-	253.10	3.66	926
	3	-	251.10	6.80	1,708
	4	-	265.90	2.12	564
	5	-	256.00	8.11	2,076
	6	-	236.40	9.22	2,180
LF12	-	892.60	211.70	7.00	1,482
	1	-	225.50	4.64	1,046
	2	-	226.50	3.81	863
	3	-	221.60	3.39	751
	4	-	224.50	3.90	876
	5	-	215.70	4.98	1,074
LF30	-	673.00	6.00	16.00	96

Figure 7-2: Location of Surface and Underground Drill Holes

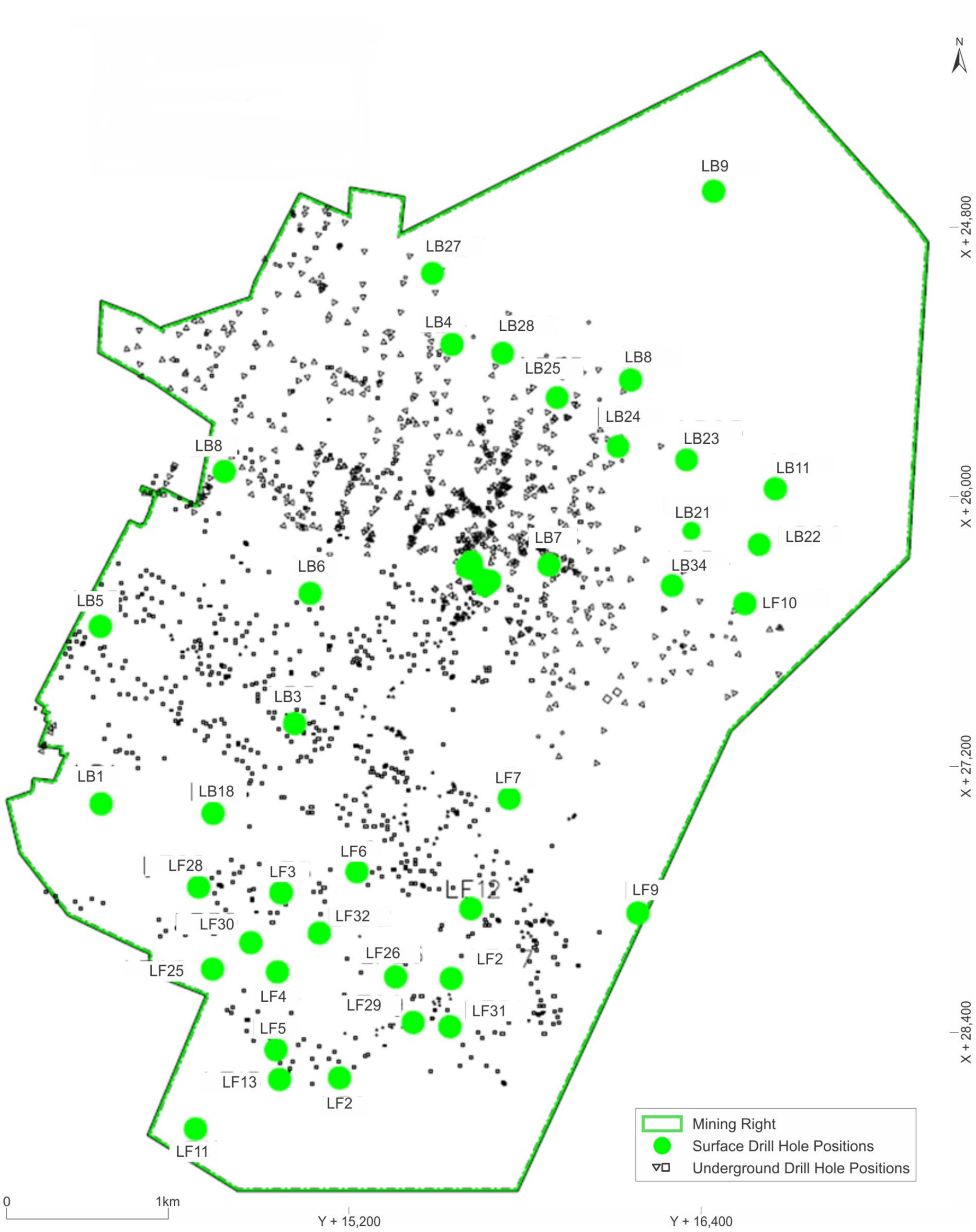


Table 7-2: Drill hole Acceptance Criteria

Category	Comment
Acceptable	100% core recovery in the reef zone, or very minor loss due to reef chipping. No evidence of faulting within the reef horizon or at either contact with hanging wall or footwall lithologies.
Minimum value	Light to moderate disking of core in the core barrel due to drilling and/or ground conditions. Visual observations indicate that the conglomerate portion of the reef is usually more prone to disking, resulting in possible gold loss.
Faulted minimum value	If the fault loss is considered to be minor, this term may be used if the geologist is certain that only low-value internal quartzite is missing from the intersection.
Not acceptable	Heavy disking of core which may indicate core loss, partial known core loss due to grinding. Also faulting of any description within the reef zone.

7.5.6 Sample Length and True Thickness

Mineralisation is perpendicular or at an angle to the drill holes. In the case of angled holes, all drill hole reef intersection widths are corrected to true thickness for gold value calculation.

7.6 Underground Drilling Campaigns, Procedures and Results

Underground exploration drilling has been ongoing throughout the operational life of Joel as the mine deepens. Underground exploration drilling is undertaken to supplement the surface drilling on a closer grid spacing. Underground drilling is undertaken ahead of the face to determine the location of the reef, the grade and the presence of structure. Underground drilling is use in the Mineral Resource estimation.

Over 1,000 underground drill holes have been drilled on Joel Mine (Figure 7-2).

The underground infill drilling system is in place to improve data density in specific areas and are drilled from the underground development access drives.

The drill hole spacing is typically every 25m along strike and 40m down dip, with higher density in the western limb of the asymmetric syncline to the north-west of the mine.

The underground drill holes are short drill holes rarely exceeding 200m in length.

7.6.1 Drilling Methods

Underground diamond core drilling is conducted using hydraulic-driven mamba rigs and pneumatic drill rigs, which typically deliver AXT size core (35.51mm). The mamba machine drills up to 300m and the pneumatic machine drills up to 120m in length. The drilling spacing for the pneumatic machine is every 110m as they are used to drill cover holes and therefore the overlap between cover holes should be 10m. The mamba machine does not have a specific grid because the holes are drilled based on the information required. In 2019, the underground holes were drilled with AXT core size (35.51mm).

Fans of drill holes are drilled from diamond drilling bays, which are developed at 50m intervals along the decline return airway ("RAW") decline. The drilling fans consist of up to ten individual drill holes at inclinations ranging from -15° to +30° of vertical, or as dictated by local geological structures.

The grid that is normally used is 30 x 30m in crosscuts and 60 x 60m between adjacent crosscuts.

7.6.2 Collar and Downhole Surveys

Drill holes are surveyed to confirm both collar position and trajectory. Drill hole collar and downhole surveys are conducted on all exploration drill holes completed on the mine.

Underground collar positions are surveyed by the Senior Surveyor by measuring the trajectory of the hole over two points and the elevation.

Underground drill hole collars are checked against layouts issued to diamond drilling contractors and confirmed by offsets taken underground in the workplaces.

Downhole surveying is conducted using Electronic Multishot System and non-magnetic north seeking Gyro tools as supplied by a certified and specialised downhole survey company, Digital Surveying (Pty) Limited. The instrument is a magnetic based tool and as such all readings are relevant to magnetic north.
All records received from the survey company are checked for accuracy and then captured and stored in the electronic databases.

7.6.3 Logging Procedure

Upon arrival at the on-site core yard, drill core is marked at meter intervals. The core is then orientated so that the low point of bedding is coincident with the edge of the angle iron. The cut line is defined by the low point of the bedding at the base of the reef zone, when viewed as per convention, from left to right in the direction of increasing depth, is drawn parallel to the core. The core is then rotated through 90° and a yellow line was then drawn parallel to the core, to define the retention half core.

Core photography is not taken on all cores. Should there be information that warrants recording, photography of the core will be conducted prior to logging and sampling.

Drill core logging is quantitative and qualitative, and all pertinent features are logged, including stratigraphy, lithology, structure, alteration and mineralisation characteristics. The following information is recorded:

- lithology;
- packing density;
- roundness;
- sorting;
- contact type, grain/pebble size;
- sediment maturity; and
- mineralisation; and alteration.

The core is stored in a secure facility that is locked at all times to ensure integrity and kept for future reference.

The geologist responsible for logging the core is keeps the original paper record. Internal peer reviewing is undertaken on the interpretation of the stratigraphy and spatial correlation of drill holes.

Observations are captured on the diamond drilling database by geologists. The logs are checked by the Senior Geologist prior to sampling.

7.6.4 Drilling Results

The location of underground drill holes for Joel Mine are indicated on Figure 7-2.

A total of 34 underground drill holes (3,513m) were drilled between July 2021 to May 2022 on 117 level, 121 level, 129 level and 137 level. The results are summarised as follows:

- 22x intersected reef;
- 3x did not intersect reef, as they intersected the Klippan erosion channel; and
- 9x were cover holes, holes drilled to find information like water, methane, geological structures ahead of the current mining areas.

With over 1,000 underground holes having been drilled since the start of the mining operation, the results are too voluminous to be presented in this report. The results have, however, been included into the geological modelling and Mineral Resource estimation process.

7.6.5 Core Recovery

Upon delivery to the core yard, and prior to logging and sampling, the drill core is checked to ensure 100% core recovery. Core recovery is determined by dividing the measured length of the recovered core by the total length of the core run.

An intersection is complete and representative if core recovery is greater than 99%. Drill holes with poor recovery are not sampled. Extra caution is taken during the drilling process to ensure maximum core recovery on reef intersections, to prevent sample bias.

Reef intersection "acceptability" is categorised as per the criteria summarised in Table 7-2 and is determined by geologists based on, amongst others, drill core condition and faulting. The acceptability is verified for each reef intersection before the assay results are used for Mineral Resource estimation.

The average core recovery is approximately 99% in length.

7.6.6 Sample Length and True Thickness

Mineralisation is perpendicular or at an angle to the drill holes. In the case of angled holes, all drill hole reef intersection widths are corrected to true thickness for gold value calculation.

7.7 Hydrogeology

A total of three underground drill holes have been drilled for dewatering purposes at various locations within the mine.

7.8 Geotechnical Data

Geological exploration drilling is not typically used to gather geotechnical data – these data are gathered independently by the Geotechnical Engineer. Geotechnical issues related to underground workings are discussed in more detail in Section 13.4.

7.9 Commentary on Exploration

Surface drilling was used as the initial exploration drilling, and this was later infilled to provide sufficient detail from undergoing exploration holes to get additional information closer to the reef intersections for geological modelling and Mineral Resource estimation.

The underground infill drilling system is in place to improve data density in specific areas and are drilled from the underground development access drives.

The QP is of the opinion that the quality and quantity of the exploration methods and information gathered is sufficient to support the estimation of Mineral Resources and Mineral Reserves.

8 Sample Preparation, Analyses and Security

Section 229.601(b)(96) (8) (i-v)

This section summarises information relating to the sample preparation on site through to the laboratory preparation and analysis.

8.1 Sampling Method and Approach

Sample types used to support both production and geological exploration include diamond drill core samples and channel (chip) samples.

8.1.1 Channel Samples

Channel sampling is undertaken according to industry best practice, as well as according to Harmony's Underground Sampling Procedure. A standard practice for the sampling of stopes and development ends is required to ensure quality of sampling information and safety in its collection. Such a document exists within Harmony, and all samplers and sampling crews are trained based on the rules of the sampling standard. The standard specifies all the steps and rules involved in the preparation of the face and the collection of samples, as well as all safety aspects of sampling.

The channel and sample lines are chipped out using a standard chisel and mallet. An electric saw has previously been used for taking samples in some development sections and is considered an excellent method of taking samples as it allows for an evenly cut and more representative sample. Practical difficulties and safety issues forced an end to sampling with the diamond saw.

The samples are individually chipped out to an even depth (1 to 2cm to replicate the same amount of sample as would be recovered from half BX core), commencing from the bottom sample. The remainder of the samples are chipped in succession up the face. Contamination of samples is reduced to a minimum by starting at the bottom.

A sampling dish is used to collect the chipped samples. If any contamination occurs from the surrounding rock, the sample is discarded and the section re-sampled. The samples are transferred from the sample dish to the sample bag. The sample dish is cleaned thoroughly before using it for the next sample.

All geological data (faults, dykes) between sampling sections are measured and recorded in the sampler's field book. The sampler also records the numbering and positions of samples. All samples are bagged and sealed.

Samples are taken from underground by the samplers. Before they are delivered to Harmony Assay Laboratory, each sampler submits samples to the Sampling Supervisor who checks the numbers of samples against the field book provided by the Sampler. Thereafter, a waybill is created for authorisation for samples to be transported to the laboratory. All inter-person transfers are recorded. This process continues until the samples are delivered to the laboratory, where the chain of custody form is signed evidencing the date and time of sample receipt.

8.1.2 Core Samples

Once core logging is completed, core is marked off and sampled. Reefs are sampled in such a way that the samples overlap the top and bottom contacts by 2cm to prevent dilution of the reef samples by unnecessary waste. The core yard assistants use the contacts marked by the Senior Geologist to demarcate the samples. The standard sample length is a minimum of 12cm and a maximum of 30cm, and the core is split along the apparent dip direction (low point) to preserve the apparent dip angles for the geologist to record. The split also follows-on from one tray to the next.

Core splitting is undertaken only on the surface drill holes.

Details of the samples are captured on the electronic database pending results from the designated laboratory. Details include the drill hole name, samples numbers, sample depths, from and to interval, and date on which the samples were submitted for assay.

8.2 Density Determination

A relative density ("RD") of 2.75 was historically determined for in situ rock at Joel. The relative density of broken rock was estimated at 1.67. No recent RD verification work has been carried as the mine continues to mine the same reefs.

8.3 Sample Security

Chip samples are bagged, sealed and transported to the core yard at the mine on the same day as they are collected. The core yard is a secure facility with access control measures in place. Samples are collected from the mine by dedicated laboratory personnel.

Cores are delivered to the core yard at the end of each day for secure storage. Sampling only takes place at the core yard. The samples are bagged and sealed and stored until they are delivered to the laboratory. All old core is sent to the main core yard at the main offices of Harmony in Welkom.

Samples can only be transported by a permit holder for transporting gold bearing material. Waybills and registers are checked and signed off by security. The samples are received at the laboratory from the mine in locked containers with seals.

The sample labels are scanned at the designated laboratory and the batches compared to the submitted sample sheets. The scanned bar codes are kept at the laboratory and compared to the work sheets that are automatically created on the system. Sample lists submitted by the mine are used to compare what is received at the laboratory.

8.4 Sample Storage

All pulp samples of surface exploration drill hole intersections and underground chip sample are kept for a few months at the laboratory and later discarded. The remaining half of the sampled core of exploration holes is kept at the core yard for future references. Underground cores are all sampled and therefore no core remains.

8.5 Laboratories Used

No information has been provided on the laboratories used for the historical drill holes.

Currently, core samples are sent to Harmony Assay Laboratory in Welkom for preparation and assay. The laboratory is ISO/IEC 17025:2017 certified for chemical analysis by the South African National Accreditation System (Accreditation No. T0520). Harmony Assay Laboratory is not an independent laboratory.

8.6 Laboratory Sample Preparation

Upon receipt at the laboratories, the samples are dried, crushed, pulverized and sorted. The main difference between the two laboratories is in the preparation and aliquot size used for analysis. Chip samples are pulverized, and the aliquot size of the samples is 25g. The core samples are milled to a pulp as per the internal Standard Operating Procedure document (reference no. M501). From the prepared pulp, an aliquot sample size of 50g is mixed with the prescribed flux and fused at a temperature ranging between 1,100°C to 1,200°C.

8.7 Assaying Methods and Analytical Procedures

All samples are assayed for gold by fire assay and gravimetric finish. Pulverised samples (85% passing 106 microns) are fused with a suitable flux. The flux combines with the gangue to form a fluid slag and the litharge in the flux is reduced to minute globules of lead.

The rain of lead globules, falling through the molten mass, collects the particles of precious metal and coalesces into a button at the bottom of the crucible. For effective collection, the composition of the flux, the temperature and its rate of increase is optimised. On cooling, the slag solidifies and is separated from the lead button containing the precious metals.

During cupellation, lead is oxidised to molten litharge, which wets the inner surface of the hot porous cupel and is absorbed. The molten precious metals are not absorbed because of their high surface tension, and because they do not oxidise. Parting is the separation of silver from gold alloys by acid dissolution of the silver. Where gold is not soluble, silver is readily soluble in hot nitric acid.

The prill after parting, has the black amorphous appearance of sponge gold which must be annealed at 800°C. After annealing, the gold contracts into the form of a coherent, malleable prill of the classic golden yellow colour. The mass of the prill is measured on an assay balance. To ensure that a high standard of analysis is maintained, each step of the analytical process and procedure, including the adherence to safety standards, is checked by a supervisor.

8.8 Sampling and Assay Quality Control ("QC") Procedures and Quality Assurance ("QA")

The assessment of assaying accuracy and precision is carried out using certified Standard Reference Materials ("SRM"), blanks and duplicates. SRMs, blank samples and duplicate samples are added to the underground chip samples and drill hole core samples sent to the assay laboratory.

A total of 23,379 samples were submitted to Harmony's laboratory during 2021, including 420 were blanks, 420 were duplicates and 420 were SRM samples.

8.8.1 Standards

A range of SRMs were sourced from the African Minerals Standards ("AMIS") and inserted into the sample sequence by the logging geologist.

For analysis of underground / surface drill holes one gold SRM is required for every 20 drill hole samples assayed, or 5% of the total drill hole samples analysed.

For analysis of underground chip samples, the total number of SRMs, blank samples and duplicate samples to be added to the daily underground samples equal approximately 5% of the total underground samples submitted for that day. Generally, this equates to approximately 2% of each type of QAQC sample.

Laboratory statistical control is deemed acceptable should SRMs be within two standard deviations of the recommended value. Investigative action is taken when reference materials returned exceed the standard deviation limit. If the SRM or blank sample has been deemed to have failed, the entire batch of samples assayed with this failed QAQC sample must be identified. A request must then be sent to the laboratory requesting the laboratory to repeat the assay procedure on all samples within the batch.

A second SRM or blank sample is provided to the laboratory to include with the batch of samples. Should the batch of samples fail the QAQC standards again, these samples are excluded from the sampling database (not captured in the sampling system), and the panel/drill hole will have to be resampled if necessary. In addition, regular audits of the laboratory processes and facilities are conducted by mine evaluators and regional experts to monitor compliance and quality controls.

A total of 420 SRM were submitted to Harmony Assay Laboratory during 2021, for which the results are summarised in Table 8-1. No SRMs failed with the first analysis.

Table 8-1: Summary of Harmony Assay Laboratory SRM Performance

SRM	No. Submitted	No. Failed	% Failed	% Bias
AMIS0729	12	0	0	-2
AMIS0553	86	0	0	1
AMIS0693	28	0	0	38
AMIS0785	174	0	0	0
AMIS0782	78	0	0	5
AMIS0705	42	0	0	6
Total/Average	**420**	**0**	**0**	**8**

8.8.2 Blanks

A total of 420 blank samples were submitted to the laboratory during 2021. The lowest detection limit at the laboratory is 0.063g/t. A control chart for performance of the blank samples indicates that no outliers (results outside three standard deviations) were observed from a total of 420 samples. Most of the results plot within two standard deviations.

8.8.3 Duplicates

A total of 420 duplicates were submitted during 2021, and results of duplicate analysis indicate that precision is within the required limits.

8.9 Commentary on Sample Preparation, Analyses and Security

It is the opinion of the QP that:

- the chip sampling method is appropriate for the mineralisation styles encountered at Joel;
- the drill core sampling method is appropriate for the mineralisation styles encountered at Joel;
- for the year 2021, no SRM samples failed;
- the sample preparation, security and analytical procedures followed for gold grade determination are adequate; and
- the results of the QAQC assessment have been appropriately addressed to ensure that the assay results of the primary samples are adequate for Mineral Resource estimation.

9 Data verification

Section 229.601(b)(96) (9) (i-iii)

9.1 Databases

Underground and surface drill hole data is stored in CADSMine version 8 ("CADSMine™") sampling database. The drill hole data is stored in real coordinate systems (True North is 0° and LO X, Y and Z above msl). This standard is used to facilitate the presence of both surface and underground drill holes in one database.

The channel sampling data is captured through the GMSI™ Sampling System. This system minimises errors, but all sample sheets are checked for obvious errors in spatial positioning of samples. Additionally, only authorised sample sheets are imported, being authorised that all information is correctly captured.

9.2 Data Verification Procedures

Data verification procedures included the following:

- the drill hole database was checked against the original logs;
- the database was checked for missing collar coordinates, collar position and elevation errors, downhole survey errors, interval errors and duplicate sample records;
- when assay results for drill holes were returned from the laboratory, they were captured into CADSMineTM by the Senior Valuator. The QC sample results were assessed for performance before the primary sample results could be used for Mineral Resource estimation;
- the primary assay results captured in the database were validated by spot checking a selection of drill holes used in the current Mineral Resource estimate; and
- all assays captured in the GMSITM and CADSMineTM databases were checked against the original laboratory certificates.

Duplicates, as well as any obvious inconsistencies were removed from the database. The extracted data was also visually checked in Datamine™ modelling software to ensure it at the correct position and elevation.

9.3 Limitations to the Data Verification

The are no limitations to the data verification process.

9.4 Comment on Data Verification

The QP is of the opinion that the Joel drill hole and sample database is reliable and adequate for the purposes of Mineral Resource estimation.

10 Mineral Processing and Metallurgical Testing

Section 229.601(b)(96) (10) (i-v)

The Harmony One plant and its processing facility have been in operation since 1986, as such the mineral processing method is considered well established for the style of mineralisation processed.

The most recent mineralogical test work done was in June 2020 (Mineralogical Report 19/699 and 19/648). The main objective of the investigation was to understand the mode of occurrence of the minerals present in samples that may influence lower recoveries of gold in the sample. Two samples taken from the Beatrix Reef were submitted for metallurgical test work.

10.1 Extent of Processing, Testing and Analytical Procedures

The mineralogical investigation consisted of head chemical analysis, X-ray diffraction ("XRD"), QEMSCAN analysis and heavy liquid separation ("HLS"). Each HLS fraction underwent automated mineralogical analysis by QEMSCAN (concentrate/sinks). The mineralogical investigation involved determining the gold species and their occurrence in the samples, including gold grain size distribution, liberation and association.

From the two submitted samples, a representative aliquot of each sample was sub-sampled for chemical analysis, mineralogical analysis and HLS. The aliquots were pulverised and homogenised for X-ray Diffraction analysis (XRD) and chemical analysis. The unpulverised portion was prepared into polished section for quantitative evaluation of minerals by scanning electron microscope (QEMSCAN) analysis and the other unpulverised 1kg of each sample was subjected to HLS

10.2 Test Results and Recovery Estimates

The chemical analysis of Beatrix Reef feed samples shows that they have a gold grade of 5.1g/t. The results also shows that, in relation to major element concentrations, samples are dominated by quartz (SiO_2 - c.87%) and aluminium oxide (Al_2O_3 - 4,2%) with minor to trace concentrations of potassium oxide (K_2O), iron oxides (Fe_2O_3), magnesium oxide (MgO), loss on ignition ("LOI") and calcium oxide (CaO) observed (<3%). These results suggest that the sample is composed of aluminium-silicate minerals (e.g., quartz, pyrophyllite, feldspar, chlorite and mica); limited to negligible concentrations of sulphides and carbonates and/or clays can be inferred from the relatively low LOI value of <2%.

Native gold is the only gold species detected in the two samples. From the bulk modal analysis, the presence of pyrite and carbonates were observed; these are known to be the reagent and oxygen consumers. Quartz was found to be the major mineral in the feed samples, with minor amounts of iron oxide minerals, mica, chlorite and pyrophyllite. However, the majority of the gangue minerals were upgraded to the floats fraction during HLS.

The trace mineral search ("TMS") bulk mineral composition shows that the Beatrix Reef is 1.11% of the mass waith pyrite as the main sulphide mineral at greater than 70% of the mass in all samples. The grains size distribution of Joel Reef ranges between <30 and 80µm. In general, the grain size distribution of gold grains is erratic. It is based on the premise that the phases of primary interest (i.e., target phases) have a higher back-scattered electron brightness than the bulk of the gangue phases. This enables each block to be scanned for particles containing the target phase, and only those of interest are fully analysed. As the entire block is scanned, this also produces the highest possible statistical population for the trace phase.

10.3 Degree of Representation of Mineral Deposit

Two samples were taken from different locations within the Beatrix Reef and as a result the samples may be considered representative.

10.4 Commentary of Mineral Processing and Metallurgical Testing

The metallurgical test work demonstrated there is potential to upgrade the ore through HLS. Notwithstanding there being insufficient material mass of Beatrix Reef to conduct gold fire assays, the QEMSCAN data showed that there was an upgrading of the gold grains.

The QEMSCAN data further showed that the majority of gold grains are associated with the sulphides. It is a particularly useful analysis method for determining losses of sulphides and precious metal phases to silicate-rich tails.

The process efficiency was determined to have total gold recovery typically ranging c.95-97% and gold not dissolved, typically c.4 %.

Two samples were taken from different locations within the Beatrix Reef and as a result the samples may be considered representative.

The reader is referred to the Modifying Factors in Section 12.2, which contain the recoveries used for the LOM Plans for Joel. A detailed description of the processing facilities is provided in Section 14.

11 Mineral Resource Estimate

Section 229.601(b)(96) (11) (i-vii)

The current Mineral Resources for Joel have been estimated using Datamine™. A scripting/macro system has been generated, which is linked to a customised scripting menu. This scripting menu allows for professional and easy managing of the data and building of geostatistical models.

Geological modelling is undertaken using wireframes of faults and the lower surfaces of mineralised packages.

Modelling is undertaken only for the Beatrix Reef and is estimated individually without data from adjacent reefs. Estimates are generally kriged into parent cells and then assigned to sub-cells, using associated variograms and estimation parameters.

11.1 Geological Database

The Joel geological model is based on historic and recent drill hole and chip sampling data collected up to and including 30 December 2021. The database was exported from the electronic database to Datamine™ modelling software.

11.2 Global Statistics

Histograms and statistics of the raw data are prepared for each geological domain for comparison purposes. The Coefficient of Variation ("COV"), calculated by dividing the standard deviation with the mean, gives a measure of the variability of the data. A high COV (>1) represents highly variable or highly skewed data, which may require some form of capping of extreme values to lower the COV to a more reasonable value (c.1).

A total of 148,483 drill hole samples (surface and underground) were used for the geological model. The global statistics, by geozone are presented in Table 11-1.

Table 11-1: Summary of the Gold Assay Descriptive Statistics

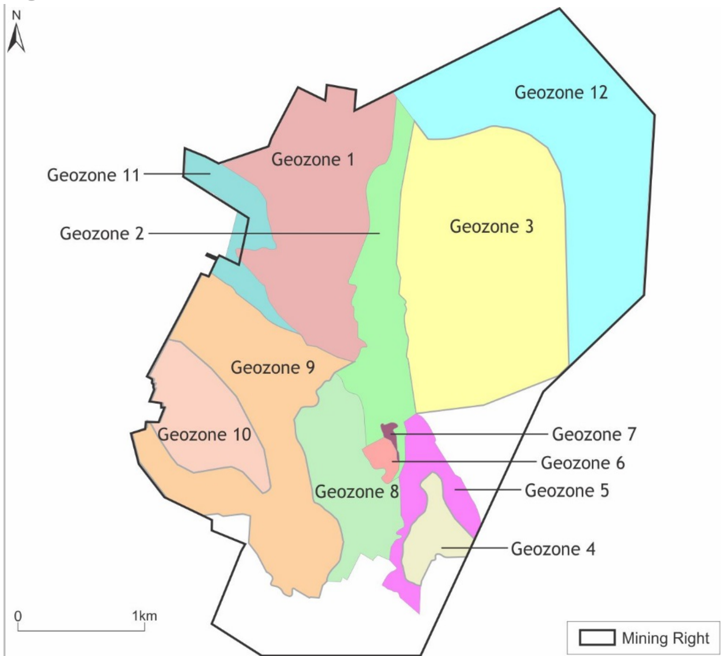
Geozone	No. Samples	Minimum (cmg/t Au)	Maximum (cmg/t Au)	Mean (cmg/t Au)	Variance	SD (cmg/t Au)	COV
1	41,414	0.48	6,176	997	197,367	444	0.445
2	7,785	1.00	5,388	945	222,753	471	0.499
3	23,529	0.32	6,184	1,108	283,549	532	0.480
4	2,618	3.00	4,187	1,040	192,334	438	0.428
5	1,551	3.00	2,714	688	111,892	334	0.494
6	1,060	4.00	6,532	1,376	244,362	494	0.364
7	96	83.00	3,947	1,237	156,447	395	0.328
8	10,343	3.00	5,037	1,078	224,142	473	0.447
9	33,724	1.00	4,491	961	156,399	395	0.418
10	11,875	0.54	4,527	847	128,874	358	0.434
11	14,332	0.12	3,578	618	142,408	377	0.623
12	156	148.00	553	553	362,960	602	0.733
Total	**148,483**						

11.3 Geological Interpretation

The imported data is attributed to geological domains or geozones. Geozones are selected based upon continuity in facies type, as well as gold grade and channel width distribution. Geozones may be constrained by geological structures. Geozones are identified for the Beatrix Reef only.

Twelve geozones have been modelled Joel, with mining predominantly concentrated in geozones 2 and 3. The location of the geozones is presented in Figure 11-1.

Figure 11-1: Location of the Mineral Resource Blocks Geozones



Geozones are continuously updated based on geological information, new sampling and drill hole results. Any proposed changes to the geozones presented, discussed and signed off by the geostatistical team.

No changes to the geozones were made between 2021 and 2022. However, due to the current development of raises and drilling that is taking place between geozone 3 and geozone 12, there is a possibility of adding another geozone (geozone 13) in this area. The type of facies intersected is different from geozone 3 and geozone 12. Further data is required prior to finalisation.

11.3.1 Wireframe and Structural Model

Geological sections, orthogonal to strike, were constructed and used as the basis of the geological wireframe model creation in Datamine™. The structural and geological styles were propagated from section to section, by superimposing successive sections on one another. When constructing sections, the following datasets were be utilised:

- drill holes from SABLE™;
- geological mapping from CADSMine™; and
- structural mapping from CADSMine™.

Base intersection positions for individual Zone Codes were utilised. Due to the abundance of small-scale structures (less than 2m), it was also necessary to simplify the interpretation to honour major structural features only. All the sections were interpreted in Datamine™ wireframing.

The wireframes were verified through visual inspection to check that the upper and lower surfaces do not intersect each other and that surfaces correspond to the relevant horizons in the drill holes and the development mapping.

11.4 Drill Hole De-survey

All data have been de-surveyed to their original position, prior to any faulting or folding, and relative to a reference point in the mineralised horizons.

Drill holes are de-surveyed utilising the Datamine™ HOLES3D de-survey process. An error log is generated as part of this process and any identified errors are repaired accordingly. A Datamine™ script is utilised to prepare the downhole surveys to add in a zero-position survey, which Datamine™ requires to de-survey a drill hole.

A core bedding angle ("CBA") field is also created, which is sourced from both the Assay and Geology SABLE™ logs. Missing CBA values are populated using an algorithm which utilises existing data. True channel widths are determined in later processes using the CBA field. The average gold grade for each sample is determined from the SABLE™ Assay Log.

11.5 Compositing

The drill hole and chip samples are composited over the full length of the reef intersection.

11.6 Capping

Capping allows for meaningful semi-variogram modelling and avoids potential over-estimation due to extreme sample values. aping parameters for both grade and CW are summarised in Table 11-2. Outlying values for both g/t Au and channel width ("CW") are calculated per geozone at an optimal percentile using the Quantile process.

Table 11-2: Grade and CW Capping Parameters

Geozone	Au Cut (g/t) (Max)	CW Cut (cm) (Max)
1	6,176	281
2	5,388	252
3	6,184	272
4	4,187	254
5	2,714	228
6	6,532	159
7	1,306	224
8	5,037	272
9	4,491	238
10	4,527	171
11	3,578	226
12	553	80

11.7 Experimental Semi-Variograms and Fitted Models

The experimental semi-variogram is a descriptive statistic diagnostic tool for spatially characterising regionalized variables and is central to the process of kriging with the set data that can be used. The semi-variogram is a mathematical function that describes how the spatial continuity of the sampled attribute changes as a function of distance and orientation.

Either an isotropic or an anisotropic model can be defined, comprising a nugget variance and up to nine individual structures, although it is rarely necessary to include more than three structures. Each structure may be either spherical, power, exponential, Gaussian or De Wijsian, although spherical models are deemed adequate for this shaft.

Point-support semi-variograms are modelled for the Measured Mineral Resources; 60m x 60m declustered-support semi-variograms are modelled for the Indicated Mineral Resources and 120m x 120m declustered-support semi-variograms are modelled for the Inferred Mineral Resources.

11.8 Block Model

Grade and thickness estimates are undertaken within the domains or geo-zones and informed by statistical and geostatistical analysis. Channel width and gold accumulation (cmg/t), which factors both reef thickness and grade, are the two variables estimated. No change of support corrections are considered necessary as it is assumed that the differing support sizes for chip samples and drill hole samples are negligible.

11.9 Mineral Resource Estimation Methods and Parameters

The estimation method used for the local Measured Mineral Resource estimates is Ordinary kriging (“OK”) and for the Indicated and Inferred estimates, simple macro kriging (“SMK”).

Estimates are generally kriged into 30m x 30m blocks for the Measured category, using point support data. The Indicated category estimates are kriged into 60m x 60m blocks, using the associated semi-variograms, utilising a macro kriging declustered data set. Similarly, the Inferred category estimates are kriged into 120m x 120m blocks, using the associated semi-variograms.

The current minimum and maximum of data points is 14 and 25 for Measured Mineral Resource estimation, 8 and 20 for indicated Mineral Resource estimation and 3 and 10 for Inferred Mineral Resource estimation. Any un-kriged areas in the Inferred category regions are then estimated using a global mean. For the search parameter files, the ellipsoid search is equivalent to the associate variogram angles and ranges.

The Measured Mineral Resource model is constrained using the Slope of Regression Estimation Confidence and merged together with the Indicated Mineral Resource and Mineral Resource models to produce a combined kriged block model.

Grade and thickness estimates are undertaken within the domains or geozones and informed by statistical and geostatistical analysis. Channel width and gold accumulation (cmg/t), which factors both reef thickness and grade, are the two variables estimated. No change of support corrections are considered necessary as it is assumed that the differing support sizes for chip samples and borehole samples are negligible.

The distribution of the gold grade is show in Figure 11-2.

11.10 Density Assignment

The RD applied at Joel is of 2.75. Reef volume is determined by block area multiplied by the thickness estimate. The tonnage of each reef horizon is determined by multiplying the volume by the RD.

11.11 Block Model Validation

The Joel block model was validated using the following:

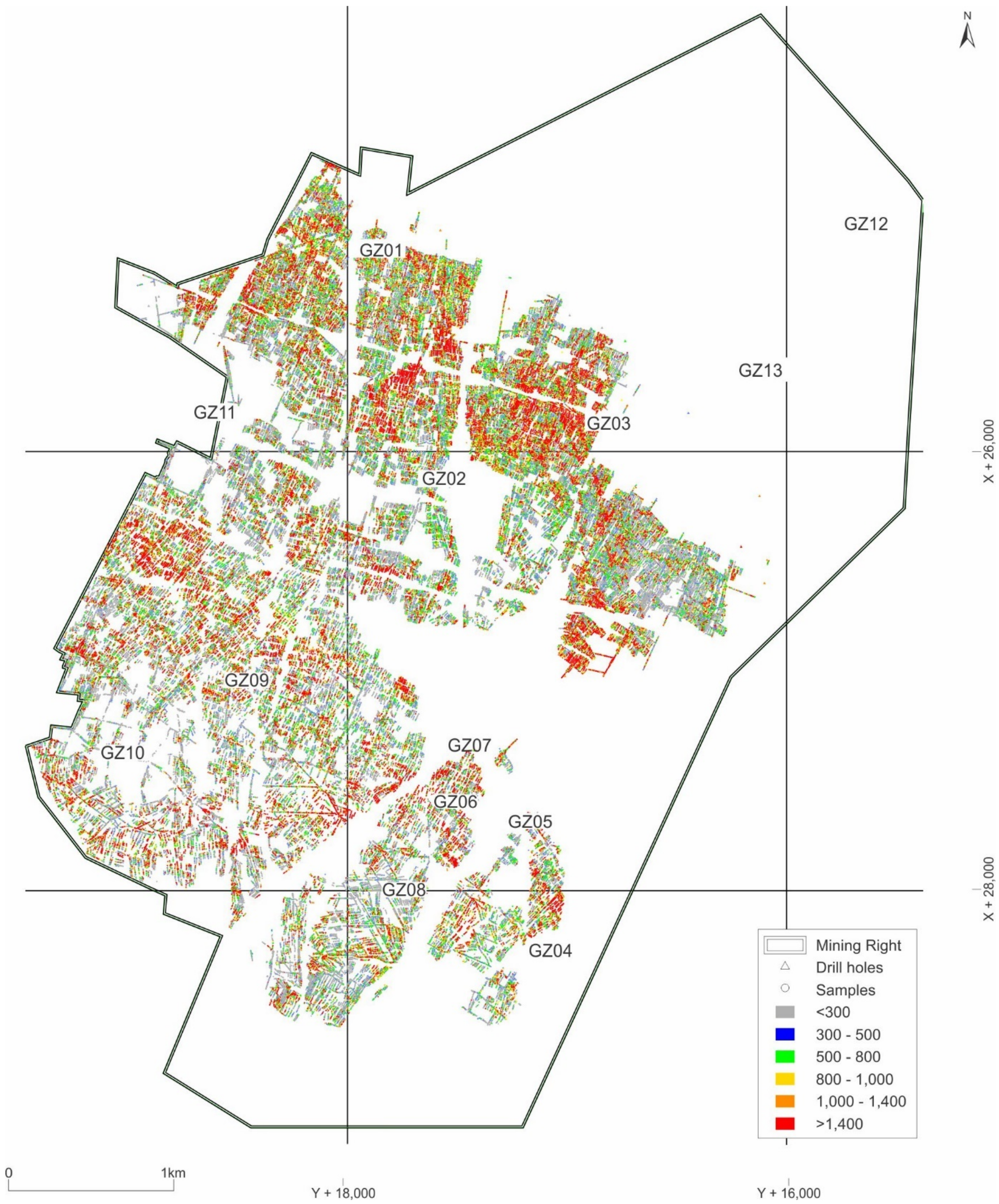
- visual comparisons with the raw drill hole data;
- comparisons of the raw drill hole data statistics with the model statistics;
- model volume; and
- visual assessment of the block model with drill hole intersections to ensure that the grades are locally honoured by the model.

Swath analysis strips were created for geozones 1 and 3 running north/south and east/west. These two geozones comprise the majority of the current Mineral Resource estimate. The resultant analysis of these swath strips are summarized as follows:

- in geozone 1 the swath plots suggest a strong correlation between model and data;
- in geozone 2 the swath plots suggest a strong correlation between model and data. This is a very narrow facies that is running almost North South; and
- the swath plots suggest a strong correlation between model and data. This is a very narrow facies that is running almost north / south.

In conclusion, the swath plots for geozone 3 did not indicate a strong correlation between model and data. However, when viewed spatially, the model did correspond to the data. One needs to consider that the data and models spatially do not always match perfectly. The slight mismatch between model and data raised a red flag, which was dispelled through additional visual checks.

Figure 11-2: Distribution of Gold Grade at Joel



11.12 Mineral Resource Evaluation

The Mineral Resource estimate at Joel is considered to have reasonable prospect for economic extraction by underground mining methods. This is demonstrated by the results of the cash flow for the mine. The cut-off grade for the Mineral Resource is determined at 558cmg/t gold based on the economic assumptions presented in Table 11-3 at the effective date of 30 June 2022. This cut-off grade represents typical costs for the mining method and preliminary mining and metallurgical recovery assumptions.

Table 11-3: Harmony Economic Assumptions (30 June 2022)

Description	Unit	Value
Gold Price	USD/oz	1 723
Exchange Rate	ZAR:USD	15.35
Gold Price	ZAR/kg	850 191
Plant Recovery Factor	%	94.18
Unit Cost	ZAR/t	3 194

Note: Unit cost includes cash-operating cost, royalty and on-going development capital.

The gold price was derived by the Harmony Executive Committee at Head Office. The QP considers the price to be appropriate for Mineral Resource estimation and is slightly higher than that used for estimating Mineral Reserves (USD1,535/oz). The operating costs (both mining and processing) are based on historical performance and budget.

11.13 Mineral Resource Classification and Uncertainties

Distinctions between the Mineral Resource categories, based on data density and spatial relationships of gold grades, are defined through variography.

Where block grades are estimated by data and separated by distances greater than the maximum grade continuity ranges, they have been classified as an Inferred Mineral Resource. Blocks are therefore not informed by the first kriging run (where the search ellipse was matched to grade continuity ranges) and entirely inferred. Delineation of blocks are based on the structure while the Mineral Resource classification is based on the slope of regression (“SR”). The classification for Joel Mineral Resource blocks is based on SR results and data spacing which is in line with the drilling grid. The classification criteria for Joel is summarised in Table 11-4 and, in general, the drill hole spacing used is based on the SR.

Table 11-4: Joel Mineral Resource Classification Criteria

Mineral Resource Category	SR	Drill Grid (m)
Measured	> 0.7	30 x 30
Indicated	> 0.6	60 x 60
Inferred	< 0.6	> 120

Historical data is used when classifying Mineral Resource blocks. No geological discounts are applied to either the geological or estimation models. Geological losses are already built in the wireframes of the Beatrix Reef.

Factors that may affect the Mineral Resource estimates include the following:

- actual RD values may be different to the single RD values of 2.75 for fresh and 1.67 for broken applied;
- gold price assumptions;
- exchange rate assumptions;
- operating and capital cost assumptions;
- gold recovery assumptions;
- geology-related risks; and
- operational risks.

11.14 Mineral Resource Estimate

The Mineral Resources for Joel were originally prepared, classified and reported according to SAMREC, 2016. For the purposes of this TRS, the Mineral Resources have been classified in accordance with § 229.1302(d)(1)(iii)(A) (Item 1302(d)(1)(iii)(A) of Regulation S-K).

The Mineral Resource estimate, as at 30 June 2022, exclusive of the reported Mineral Reserves is presented in Table 11-5. The location of the Beatrix Reef Mineral Resources is presented in Figure 11-3.

The QP compiling the Mineral Resource estimates is Ms FO Muthelo, Ore Reserve Manager at Joel, who is an employee of Harmony.

Table 11-5 :Summary of the Joel Mineral Resources as at 30 June 2022(exclusive of Mineral Reserves)[1-8]

METRIC

Mineral Resource Category	Tonnes (Mt)	Gold Grade (g/t)	Gold Content (kg)
Measured	1.650	9.17	15,138
Indicated	2.794	6.92	19,336
Total / Ave. Measured + Indicated	**4.444**	**7.76**	**34,474**
Inferred	7.043	5.11	35,954

IMPERIAL

Mineral Resource Category	Tonnes (Mt)	Gold Grade (oz/t)	Gold Content (Moz)
Measured	1.819	0.268	0.487
Indicated	3.080	0.202	0.622
Total / Ave. Measured + Indicated	**4.899**	**0.226**	**1.108**
Inferred	7.763	0.149	1.156

Notes:

1. Mineral Resources are reported with an effective date of 30 June 2022 were originally prepared, classified and reported according to SAMREC, 2016. For the purposes of this TRS, the Mineral Resources have been classified in accordance with § 229.1302(d)(1)(iii)(A) (Item 1302(d)(1)(iii)(A) of Regulation S-K). The Qualified Person responsible for the estimate is Ms FO Muthelo, who is Ore Reserve Manager at Joel, and a Harmony employee.

2. The Mineral Resource tonnes are reported as in-situ with reasonable prospects for economic extraction.

3. No modifying factors or dilution sources have been included to in-situ Reserve which was subtracted from the SAMREC Resource in order to obtain the S-K 1300 Resource.

4. The Mineral Resources are reported using a cut-off value of 558cmg/t determined at a 90% profit guidance, and a gold price of USD1,723/oz.

5. Tonnes are reported as rounded to three decimal places. Gold values are rounded to zero decimal places.

6. Mineral Resources are exclusive of Mineral Reserves. Mineral Resources are not Mineral Reserves and do not necessarily demonstrate economic viability.

7. Rounding as required by reporting guidelines may result in apparent summation differences.

8. The Mineral Resource estimate is for Harmony's 100% interest.

Factors that may affect the Mineral Resource estimates include the following:

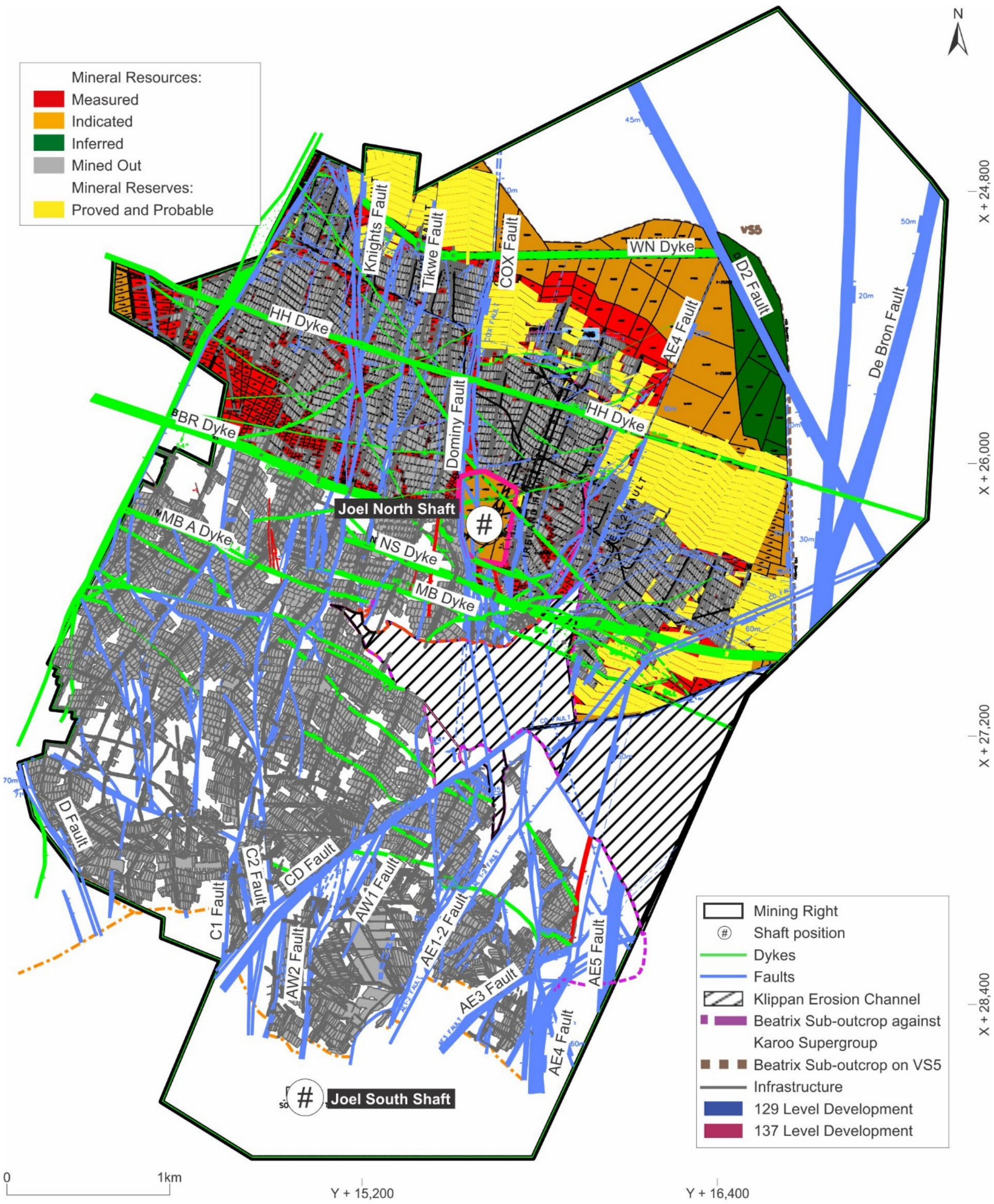
- gold price assumptions;
- exchange rate assumptions;
- operating and capital cost assumptions; and
- gold recovery assumptions.

11.15 Audits and Reviews

The Mineral Corporation Limited ("MineralCorp") carried out a Mineral Resource audit for Joel in 2020. The aim of the audit was to determine whether the geological model and the process followed are done correctly (Mineral Corporation, 2020).

MineralCorp concluded that there were no fatal flaws or material issues identified in relation to the input geological data, geological modelling and estimation of the 2020 Mineral Resource estimates.

Figure 11-3: Location and Classification of Joel's Mineral Resources and Mineral Reserves for the Beatrix Reef



The 2020 Mineral Resource estimates were supported by an extensive validated geological database, with the geological modelling underpinning the estimates guided by historical performance. Data collection and validation were performed by suitably trained geological personnel and signed-off by QPs according to internal standards.

11.16 Mineral Resource Reconciliation

The Mineral Resources of 30 June 2021, exclusive of Mineral Reserves, decreased from 1.209Moz to 1.156Moz.
This difference was primarily attributed to lower than expected grades in geozone 3 being intersected, which included 129 E11 raise line and 137 E4 raise line.

11.17 Commentary on Mineral Resource Estimate

The QP is of the opinion that Mineral Resources were estimated using industry accepted practices and conform to SAMREC, 2016. The Mineral Resources have also been reported in accordance with the S-K 1300 guidelines.

There are no other environmental, legal, title, taxation, socioeconomic, marketing, political or other relevant factors known to the QP that would materially affect the estimation of Mineral Resources that are not discussed in this TRS.

12 Mineral Reserve Estimate

Section 229.601(b)(96) (12) (i-iv)

The reported Mineral Reserves are derived through a business planning process and consideration by the Chief Operating Decision-Maker ("CODM"). The business planning process comprises multi-functional reviews inclusive of all mining, support and service departments that are involved in the verification of the inputs and the Modifying Factors. The CODM comprises various executive roles and responsibilities. These executives assess the profitability, the revenue and production costs. The CODM also considers capital expenditure, gold production and tonnes milled when assessing the overall economic sustainability.

12.1 Key Assumptions, Parameters, and Methods used to Estimate the Mineral Reserve

The results and assumptions derived from the business planning process extends over an 18-month period. The planning process carefully considers strategic plan directives; analysis of historical performance; realistic productivity, and cost parameters; Modifying Factors; and technical and economic studies that have demonstrated justified extraction, as applicable to specific portions of the Mineral Reserves.

The Mineral Reserve is based on the latest geological structure model, associated Mineral Resource estimation models and the selected mining method. A detailed mine design and schedule is done by the planner using CADSmine V8.0 taking into consideration geological structures that might affect mining. The final Mineral Reserve is derived from this schedule with appropriate Modifying Factors applied.

The cut-off grade is determined using the Optimiser, a purpose-built Excel spreadsheet developed a planning tool. All the blocks falling into the Measured and Indicated Mineral Resources are used to determine the cut-off grade. The ZAR per tonne, milled tonnes, MRF and the gold price are also taken into consideration when determining the cut-off grade. The cut-off grade for the financial year 2022 - 2023 is 915cmg/t. After the cut-off grade has been determined all the blocks that are below the cut-off grade will not form part of the Mineral Reserves.

12.2 Modifying Factors

An 18-month ore flow is used to determine the historic reliability of the Modifying Factors, however future strategy and changes in mining conditions are also taken into consideration in their determination.

The Modifying Factors are consistent with the modelling, planning and computing estimates used in determining the Mineral Reserves, which are also consistent with historical performance. The Modifying Factors used to convert the Mineral Resources to a Mineral Reserves for Joel are presented in Table 12-1. The Plant Recovery Factor is also consistent with the processing and recovery as defined in Section 14.

Table 12-1: Joel Mineral Reserves Modifying Factors (30 June 2022)

Modifying Factor	Unit	Value
Relative Density	t/m^3	2,75
Average Stoping Width	cm	156,00
Gully	%	4,50
Off reef	%	0,94
Waste to Reef	%	3,80
Flushing Tons	%	2,35
Discrepancy	%	0,27
Mine Call Factor (MCF)	%	84,00
Plant Recovery Factor (PRF)	%	94,18
Mine Recovery Factor	%	79,11
Plant Call Factor	%	100,00
Mineral Reserve Cut Off	cmg/t	915

12.3 Mineral Reserve Estimate

The Mineral Reserves for Joel were originally prepared, classified and reported according to SAMREC, 2016. For the purposes of this TRS, the Mineral Reserves have been classified in accordance with § 229.1302(d)(1)(iii)(A) (Item 1302(d)(1)(iii)(A) of Regulation S-K).

Mineral Reserves are derived from the Mineral Resources, a detailed business plan and the operational mine planning processes. Mine planning utilises and takes into consideration historical technical parameters achieved. In addition, Mineral Resource conversion to Mineral Reserves considers Modifying Factors, dilution, ore losses, minimum mining widths, planned mine call and plant recovery factors.

The Mineral Reserve estimate for Joel, as at 30 June 2022, is summarised in Table 12-2. The location and classification of Mineral Reserves is presented in Figure 11-3.

The QP compiling the Mineral Reserve estimates is Ms FO Muthelo, who is Ore Reserve Manager at Joel, and an employee of Joel Mine.

Table 12-2: Summary of Joel Mineral Reserves as at 30 June 2022 [1-5]

METRIC

Mineral Reserve Category	Milled Tonnes (Mt)	Gold Grade (g/t)	Gold Content (kg)
Proved	2.781	5.01	13,941
Probable	0.954	4.85	4,631
Total (Proved + Probable)	**3.735**	**4.97**	**18,572**

IMPERIAL

Mineral Reserve Category	Milled Tonnes (Mt)	Gold Grade (oz/t)	Gold Content (Moz)
Proved	3.066	0.146	0.448
Probable	1.052	0.142	0.149
Total (Proved + Probable)	**4.117**	**0.145**	**0.597**

Notes:

1. The Mineral Reserves were originally prepared, classified and reported according to SAMREC, 2016. For the purposes of this TRS, the Mineral Reserves have been classified in accordance with § 229.1302(d)(1)(iii)(A) (Item 1302(d)(1)(iii)(A) of Regulation S-K). The Qualified Person responsible for the estimate is Ms FO Muthelo, who is the Joel Ore Reserve Manager, and a Harmony employee.
2. Tonnes, grade, and gold content (oz) are declared as net delivered to the mills.
3. Figures are fully inclusive of all mining dilutions, gold losses and are reported as mill delivered tonnes and head grades. Metallurgical recovery factors have not been applied to the reserve figures.
4. Gold content is recovered gold content after taking into consideration the modifying factors.
5. Mineral Reserves are reported using a cut-off grade of 915cmg/t determined using a gold price of USD1,546/oz gold.

12.4 Mineral Reserve Reconciliation

The declared Mineral Reserve decreased from 639koz as at 30 June 2021 to 597koz as at 30 June 2022 The key differences were due to intersecting lower than expected grades in geozone 3.

12.5 Commentary on Mineral Reserve Estimate

The declared Mineral Reserves takes into consideration all Modifying Factors, respective to the mining area. The declared Mineral Reserves are depleted to generate the Joel cash flows. Although the economic analysis of the cash flows displays a positive result, there is a negative cash flow in the current year (FY2022-23) due to major capital expenditure for the refrigeration plant. The cash flows are, however, deemed both technically and economically achievable.

Any by-products that are recovered as part of the refining process, make up an immaterial component of the total metal inventory, and is thus not reported as part of the Mineral Reserve estimate.

There are no obvious material risks that could have significant effect on the Mineral Reserves, other than those risks mentioned in the LOM Plan.

In the opinion of the QP, given that Joel is an established operation, the modifying factors informing the Mineral Reserve estimates would at a minimum, satisfy the confidence levels of a Pre-Feasibility Study.

13 Mining Method

Section 229.601(b)(96) (13) (i-v)

Joel is an intermediate-depth underground gold mine that consists of two shaft complexes interconnected via a triple decline system, spanning four levels and mining at depths of up to 1350m BMD. Joel currently has a LOM expectancy of nine years, which includes mining up to 137 level in a block of ground swapped with the neighbouring Beatrix Mine.

Joel was originally designed to adopt trackless mechanised mining when production commenced at South Shaft, but in 1994 a decision was made to change to conventional mining mainly due to the high operating costs of trackless mining. Joel consists of two interconnected shaft complexes, the South Shaft complex which is the main operational shaft and the North Shaft which is available for hoisting ore.

13.1 Mining Operations

Joel's upper mining levels are in a mature phase of operation. The decline project development, from 129 to 137 levels, which started in 2011, is complete. This included mining up to 137 level and the Beatrix Mine block swap. The decline project to access the orebody from 137 level included two declines that were developed at 12° from 129 level – a chairlift decline and a conveyor belt decline. The belt, main tips and chairlifts have been completed. Primary footwall development is currently underway on 137 level and production from the 137 level E5 raise, 137 E4 raise and 137 E6 Raise is ongoing. Currently Joel us developing 137 E3 raise which scheduled to hole in August 2022.

Joel has adopted conventional breast mining on a scattered grid (or scattered mining) which is tailored to the variable grades intersected as well as the associated rock-related hazards anticipated at this depth.

The primary economic reef mined is the narrow tabular Beatrix Reef, accessed via conventional grid development.

13.1.1 Scattered Mining

Given the variable grades and geological complexity at Joel, mining is conducted mainly in terms of a pre-developed scattered mining method which provides for unpayable and geologically complex areas to be left unmined with some cognisance taken of the overall panel configuration and stability of footwall development. The layout of the scattered mining design is presented in Figure 13-1.

Stoping panel stability in an intermediate stress environment may require additional stabilising pillars be left to support the immediate hanging wall. These take the form of inter-panel crush pillars between neighbouring mining panels. The major rock-related risk is the occurrence of unexpected panel collapses. Minor falls of ground, due to geology, bedding, shale and jointing, do occur but are mostly addressed via a proven in-stope support system. As the largest portion of Joel's production is currently mined between 129 and 137 levels, production is focused mainly on four or five raise lines.

Mining consists of horizontal footwall development to access the reef horizon with inclined development on the reef plane to establish mining faces (Figure 13-2). Ore is cleared from the stopes through ore passes into the underlying cross-cuts.

Mining has also progressed into more complex geological areas where dip and strike-related structures are more commonly intersected. The change to a higher support resistance system, given the intersection of a more complex geological environment, has been largely successful and the occurrence of large geological "back breaks" and falls of ground are rare. Timber-based packs were installed along gullies and as breaker line support in panels to improve hanging wall stability. It is of utmost importance that geological structures are identified, mapped and properly supported using high-support resistance pack units to ensure a stable stoping horizon.

Figure 13-1: Plan View of the Scattered Mining Method and Grid Layout

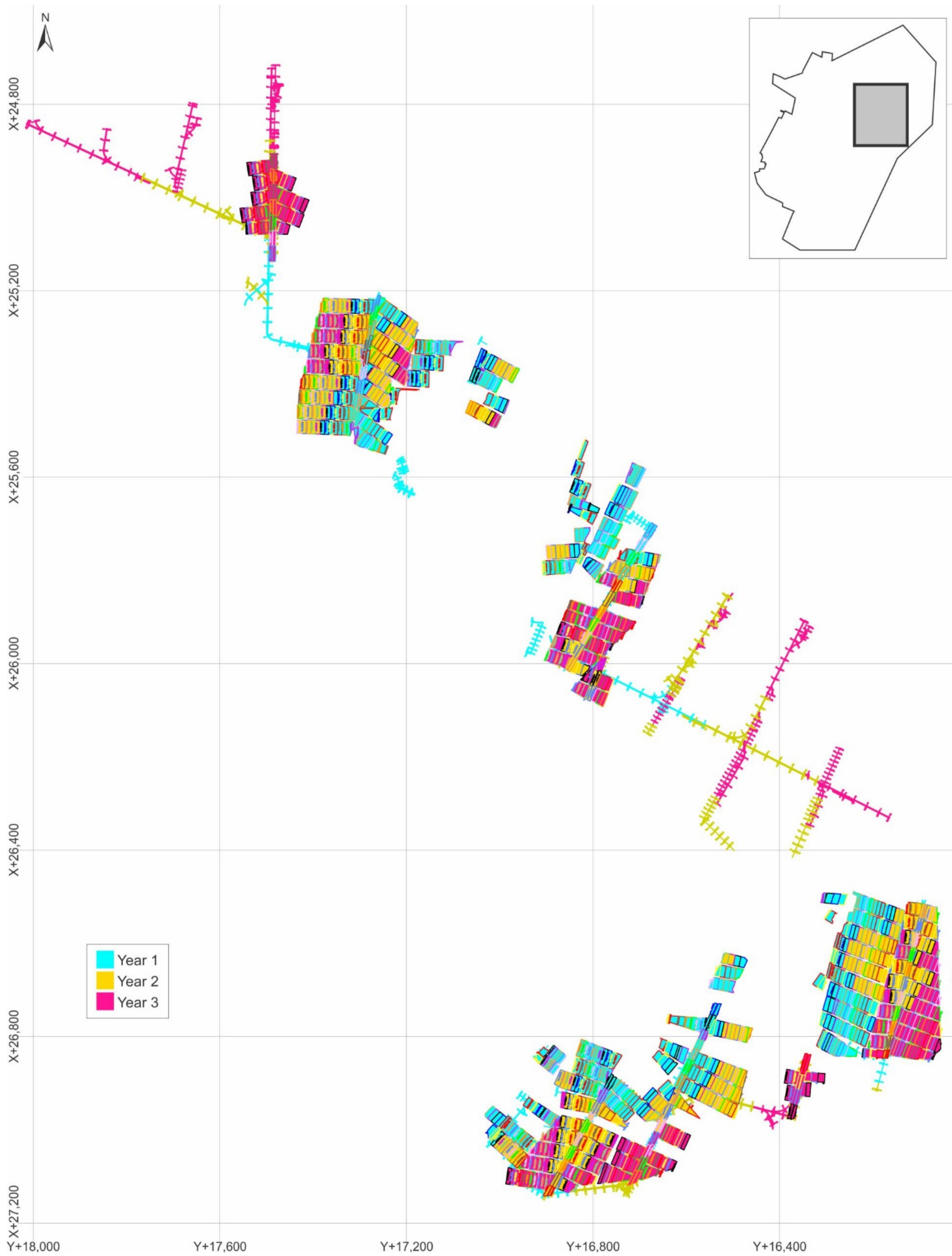
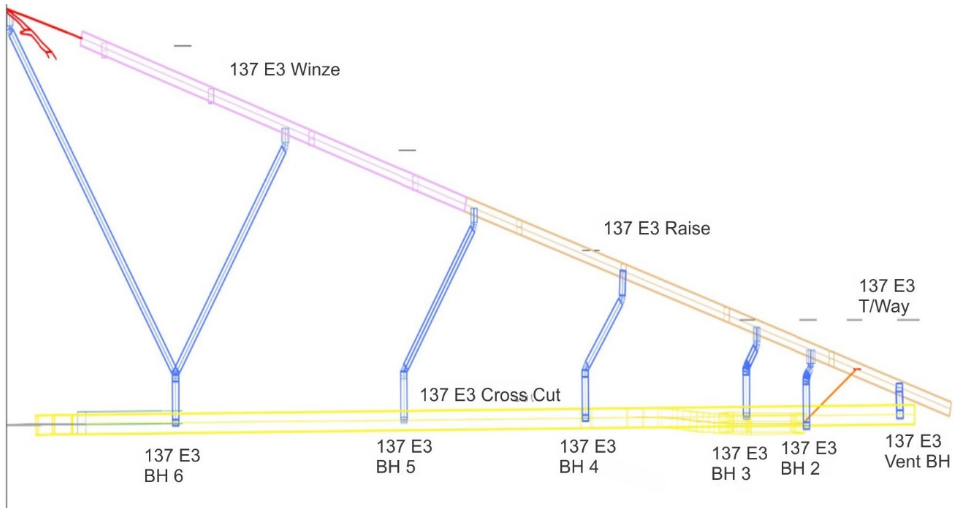


Figure 13-2: Schematic Section of Typical Footwall and On-Reef Development



13.2 Mine Design

The mine design strategy aims at maximising the safe extraction of ore, while minimising the risk of geotechnical failures, which can result in operational disruptions and dangerous working conditions. The Beatrix Reef is modelled and designed across Joel.

Mine design is done internally for the Beatrix done using the Datamine™ software. The geological models, and the geotechnical parameters formulated by the Rock Engineers, are used as a basis of the mine planning process.

13.2.1 Mine Design Parameters

The mine design parameters used for Joel are presented in Table 13-1.

Table 13-1: Joel Mine Design Parameters

Parameter	Unit	Value
Regional Stability		
Dip Stabilizing Pillar Dimensions		
Strike Span	m	120
Dip Span	m	4
Strike Stability Pillar Spacing[1]	m	8
Access Haulages Middling to Reef	m	60
Primary Development		
Advance	m/month	25
Crosscut Spacing	m	140
Secondary Development		
Advance	m/month	20
Stoping Parameters		
Average Channel Width	cm	110
Average Stoping Width	cm	156
Economic Parameters		
Relative Density	t/m^3	2.75
Cut-off Grade (planning)	cmg/t	915

Notes: 1. Pillar spacing is measured skin to skin.

13.3 Mine Plan Development and Life of Mine ("LOM") Schedule

The planning process is dependent on the input from the Mineral Resource department where responsibility is assigned for revision and signing-off of the Mineral Resource. The resource forms the basis for the subsequent design, planning and extraction of reserve into the LOM Plan. The block plan remains dynamic month on month and each month the new face positions are updated and blocks adjusted accordingly.

The blocking for the LOM was based on the monthly depleted blocks and closed structure in December 2021. Blocks above a cut-off of 915cmg/t were used to determine where the LOM blocks should be planned. Some unpay blocks were included in the LOM mainly for access purposes. This process was completed by using a combination of geological modelling, current production results, previous mine planning parameters and production scheduling, and then incorporated into CADSmine and finally exported into Datamine.

Threats to the LOM Plan include:

- the uncertainty of the layout of the VS5 block may result in the wrong evaluation of the orebody during planning;
- the orebody grade may be too low to be profitable during mining operations;
- uncertainty of the orebody during planning could result in incorrect decisions being taken regarding Joel LOM Plan; and
- the intersection of major water or methane bearing structures.

Currently South Shaft generates approximately 38ktpm of ore and 2ktpm of waste resulting in gold production of approximately 171kg per month. This is sustained from approximately 7,600m² of ore mined per month with mineable Reserves being replenished through 300m of development per month.

The production levels providing the ore to achieve this mining rate include 117, 121,129 and 137 levels. On 137 level there are currently five raise lines on reef (137 E5, 137 E4, 137 E6, 137 E6A and 137 E3). Raise lines 137 E4, E5 and E6 are in full production. Raise line 137 E6A and E3 are engaged with reef development. Raise line 137 E3 is scheduled to hole in August 2022. Raise line 137 E6A was temporarily stopped due to the rolling of the reef down and flooding as a rate of 22kL/h). Drilling has since been completed and the raise can start to mine.

The 3.74Mt of Mineral Reserves are included in the LOM Plan and are fully accessible through Joel's existing infrastructure. The mining rates used in determining the LOM Plan are based on the current and expected operational performance, notwithstanding any unforeseen underground mining constraints. The remaining LOM for the operation is eight years, with a planned mining rate averaging at approximately 466ktpa (milled tonnes) over the LOM period (Figure 13-3) producing an average of 70kozs of gold per annum (Figure 13-4). The extent of the Joel's LOM Plan is shown in Figure 13-5.

13.4 Geotechnical and Hydrological Considerations

With the marginal increase in depth and the more complex geological environment, the incidence of low magnitude (<1.5) seismic events has slowly increased. This activity has manifested mainly in reasonably low stress (45Mpa) strike-orientated dyke intersections with stoping excavations. The installation of a 10-station regional seismic network to highlight potentially unstable areas and structures prone to bursting was completed with the seismic data used to highlight potential problem areas. The seismic network is maintained, and its operational and health status are kept well above the 80% mark.

The change to higher support resistance systems due to the more complex geological environment has been largely successful and the occurrence of large geological driven "back-breaks" and falls of ground are few and far apart. Changes to support standards were implemented to ensure back area and gully stability by installing timber-based packs as gully support and pack breaker lines every 10m and 15m from the working face. From a management perspective it is of utmost importance that geological structures are reported, mapped and adequately supported using high support resistance pack units to ensure a stable stoping horizon.

The decline project and subsequent development of large excavations required that site specific additional support systems be introduced in the form of end-anchored and full-column grouted long anchors. The support systems are necessary to cater for the increase and subsequent risk of larger falls of ground due to the increase in excavation spans. As secondary support installation was limited in the past, specific secondary support crews were introduced.

Like many of the mines in the Free State Goldfield intersections of water and methane-bearing fissures are common, and therefore care is taken whenever there is a water intersection in the workings. Currently Joel has a contractor that is always on stand-by at the mine to seal any water intersections. Workings on 137 level have a high possibility of water intersections and consequently cover holes are always drilled into virgin ground ahead of mining. The holes are always drilled 120m ahead of current mining face to assist with forward planning in case there is any water intersected by these holes.

13.5 Dilution and Grade Control

Dilution is determined for stoping and development is based upon information taken from the historical 18-month ore flow. The calculated dilution factors for FY2023 were set at 0.94% from stopes and 3.80% from off reef development.

13.6 Ore Transport

In-stope rock movement of blasted ore is by electric-powered scraper winches to the tips/ore passes where it gravitates down to loading boxes in the crosscuts. This is similar for rock blasted in reef development ends. The ore which has been pulled into the tips/ore passes is loaded into the hoppers and trammed by train to the main tips/ore passes at the shaft where it is hoisted to surface.

Figure 13-3: Graph of Joel LOM Plan - Tonnes and Grade

Figure 13-4: Graph of Joel LOM Plan - Gold Produced (kg)

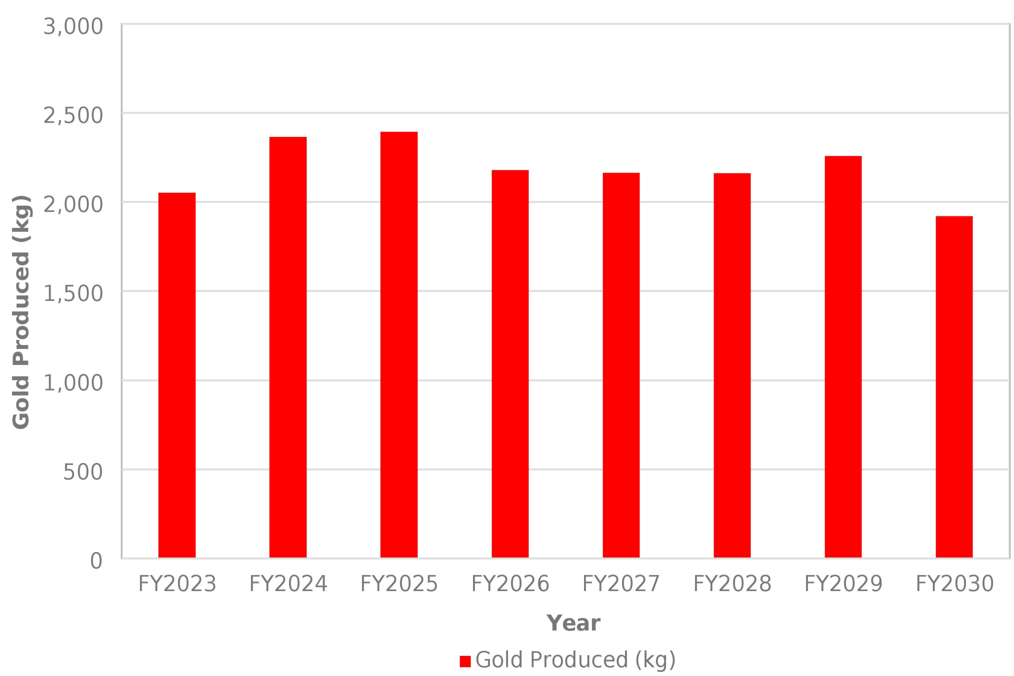
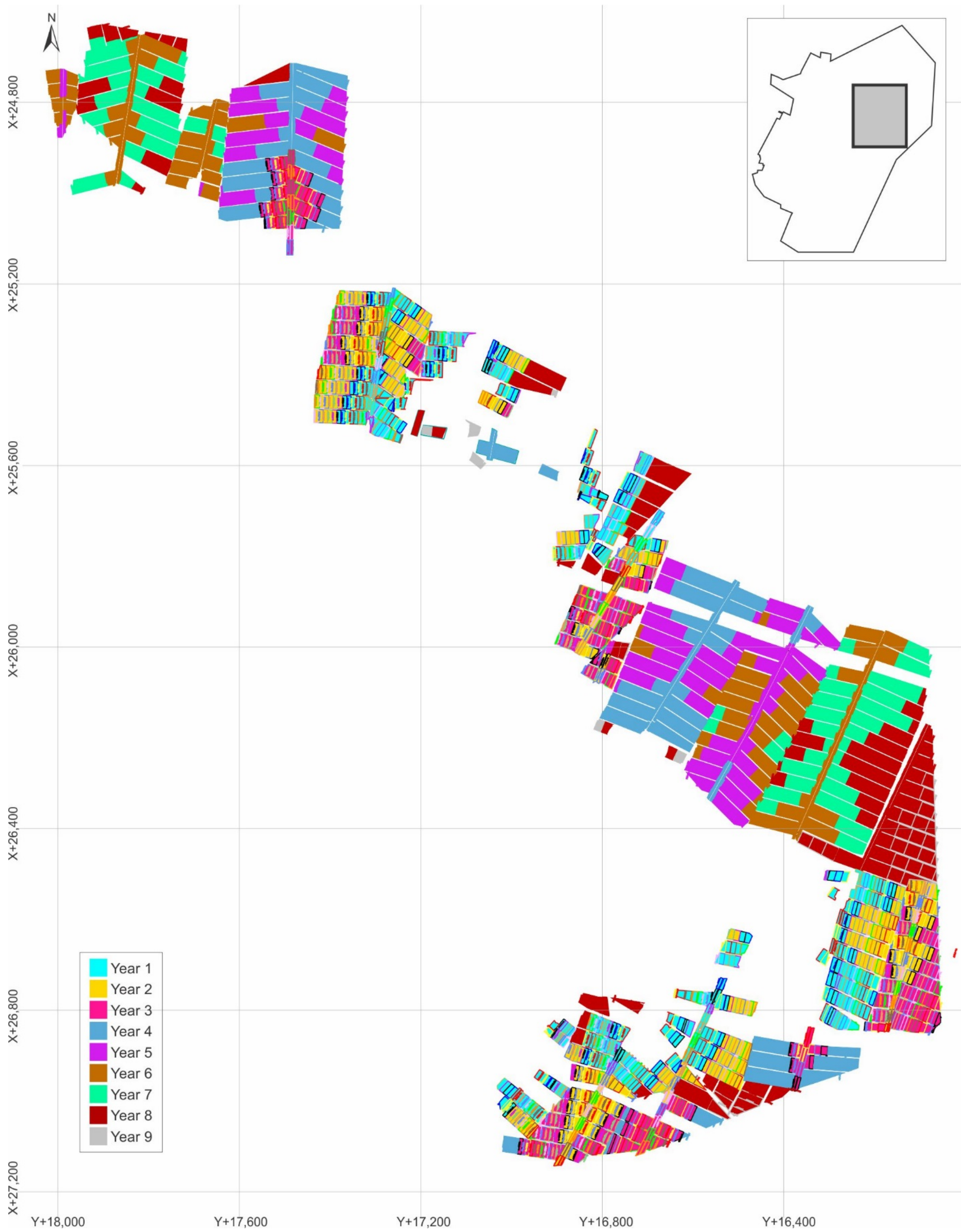


Figure 13-5: Joel LOM Plan - Mining Block and Sequence Detail



In off reef development ends pneumatic mechanical loaders are used to load the broken rock directly into hoppers which is trammed in the same fashion to the main tip/ore passes. There is no separate reef and waste system at Joel and all rock is hoisted as reef.

All rock blasted is hoisted at North Shaft during the afternoon and night shifts. The shaft has the capacity to hoist approximately 2,300tpd, giving a total of 55,200tpm over 23 shifts. The hoisting takes place from 137 level by means of long and short conveyor belts discharging into the bin, then directly into the skip. No measuring flask is used but there is a weightometer on the belt to measure and control the amount of tonnage discharged into the skips. An Onsetter or Timberman is always present at the loading station to ring the signals once the skip is full as the winder is not automated.

The hoisted ore is discharged into the headgear bins, and in turn discharged onto the sampling conveyor belt then into the trucks which transport the ore by road 40km to a pad outside Bambanani Mine. From here it is re-handled and railed to the nearby Harmony One Plant.

13.7 Mining Equipment and Machinery

The major mining equipment and machinery is presented in Table 13-2.

Table 13-2: Mining Equipment

Equipment Area	Equipment Type	Model	Quantity
Stoping and Development	Rockdrill machines	Seco 215	57
	Rockdrill steel rods	22mm hex rubber collar	500
Engineering	Locomotives	Goodman	23
	Rock hoppers	6-ton bottom discharge	70
	Electric winches	Sullivan	65
	Material cars		280

13.8 Mining Personnel

Joel's mining operations are labour intensive. The underground work force is essentially split into two categories that are either involved in production activities or they provide supporting services required underground. Production activities are directly related to the mining of ore and non-production personnel provide supporting services such as safety, engineering functions, maintenance, decline chairlift manning and underground store controls (Table 13-3).

Table 13-3: Mining Personnel

Labour Requirement	No. of Employees
Production	
Underground Employees	1,031
Contractors	222
Sub Total Production Employees	**1,253**
Underground Services	
Safety	
Stores	8
Mineral Reserves	35
Engineering Decline	
Production Engineering	480
Engineering Services	83
Other Contractors	5
Others	204
Total Services Employees	**815**
Grand Total Mining Employees	**2,068**

The underground mining operations uses an 11-hour shift system, operating a 2-shift cycle per day. The mining personnel operating on this shift cycle, comprise of workers performing development, stoping, and other additional tasks. These personnel are sub-divided and organised into support, breaking (also referred to as drill and blast), and cleaning crews. The supporting and breaking crew complete tasks during the day shift, while cleaning of ore and waste is done during the night shift.

13.9 Commentary on Mining Method

The scattered mining method is appropriate for the reef characteristics and the current mining depth and provides a good level of flexibility which is suitable for the variability in the grade. It should be noted that the lack of separate ore and waste handling arrangements does compromise the delivered head grade because of dilution from foot wall waste development.

The mine design, planning and scheduling for the mine is developed using the Datamine™ and CADSmine™ geological software, respectively, considering the geotechnical model and related parameters.

The main geotechnical and geohydrological risks at Joel include the presence of gas, ground water and moderate seismicity, which are managed through the integrated monitoring systems, and incorporated into working mining models that inform daily mine planning decision-making.

The mining rates, machinery and equipment, ore transport, grade and dilution control, and labour resourcing and optimisation are driven by the mine schedule and improvement initiatives at Joel.

14 Processing and Recovery Methods

Section 229.601(b)(96) (14) (i-iv)

The Joel gold plant designed and commissioned during the construction of the mine was decommissioned in FY2009 and all ore mined at Joel is now processed at the Harmony One plant (Figure 3-1).

In order to manage to movement of ore from Joel to Harmony One plant and the subsequent metal accounting, the following procedures are adhered to:

- ore hoisted at Joel's North Shaft is recorded by weightometer and belt sampling;
- ore is transported to the plant by truck, with each truck passes a weighbridge on departure;
- ore is received at a dedicated ore pad outside the Harmony One plant;
- it is re-handled and loaded into rail wagons for transport into the plant; and
- all hoppers pass a smart rail system in order to determine the weight and origin of each hopper before it is delivered into the plant.

Harmony One Plant is Harmony's largest gold processing plant and processes underground ore from multiple shafts, as well as surface ore from nearby mine waste facilities. The plant was commissioned in 1986 and comprises three independent modules, each consisting of four feed silos, two ROM mills, two conventional thickeners, cyanide leach, carbon in pulp ("CIP") adsorption, elution, zinc precipitation and smelting. The plant CIP process reflects the technology which was current at the time of construction.

14.1 Mineral Processing Description

The processing flow sheet is presented in Figure 14-1.

Ore delivered to the plant is fed from the concrete silos via two mill feed conveyors through vibrating feeders directly into the ROM mills. Fully autogenous ("FAG") milling is a process by which the entire ROM ore stream is fed directly into the mills and the grinding media is generated within the mill from suitably sized pieces of ROM ore itself. The average feed rate to the mills is 65tph. The milling circuit consists of two single stage ROM mills that are controlled on maximum power for optimum milling. Each ROM mill is 4.27m in diameter and 10m in length and grinds the ore to 75–90% passing minus 75 microns.

Milling is followed by a conventional gold leach process (cyanidation). The cyanidation process is one of the most utilised methods for the recovery of gold from auriferous ores. The use of cyanide leaching for gold recovery is based on gold's properties, mainly its solubility (ability to dissolve) in cyanide solutions. Once the gold is dissolved into the cyanide solution it has a higher ability to adsorb (attach) onto activated carbon through the application of carbon in pulp ("CIP") technology.

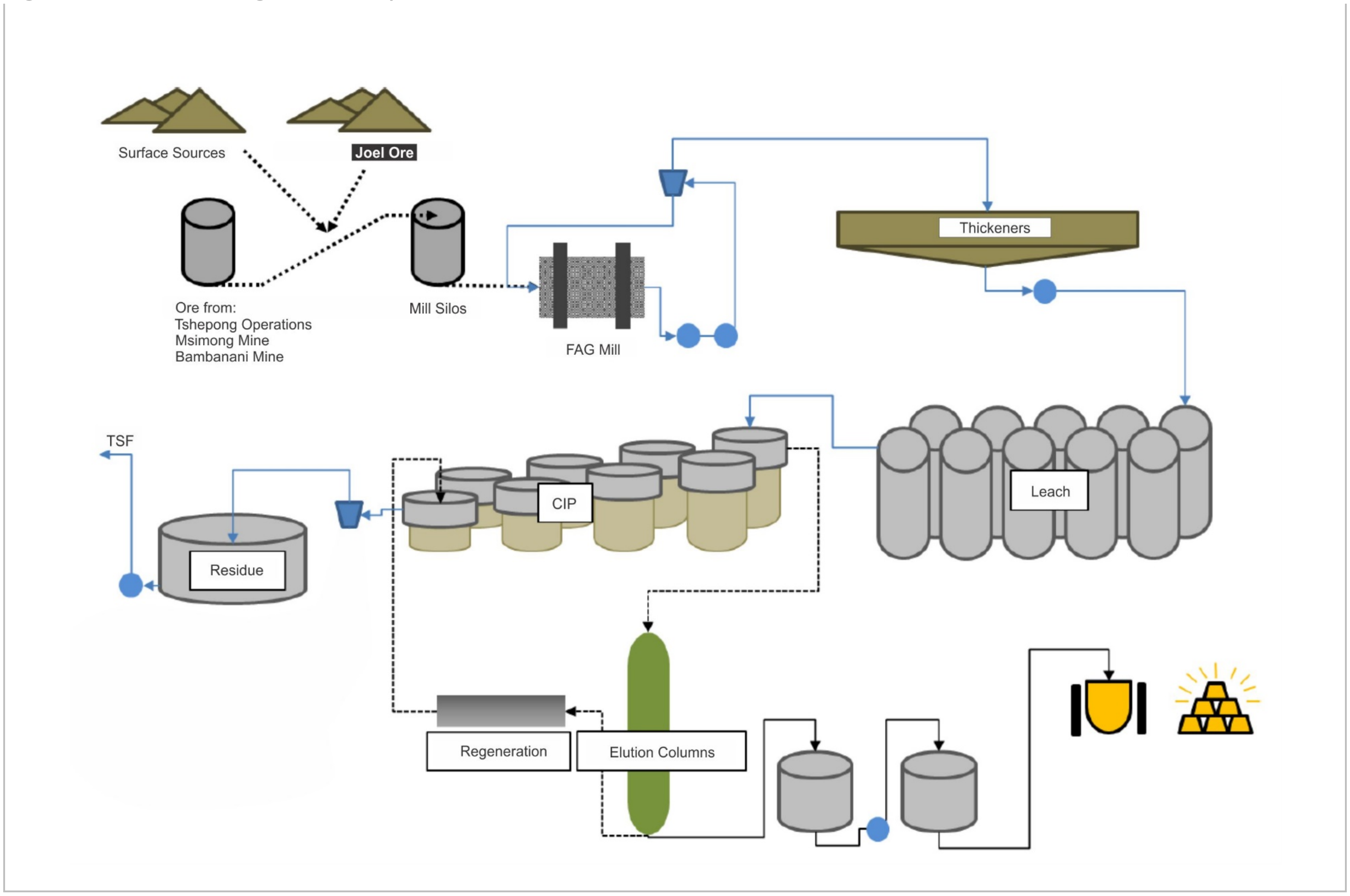
The loaded carbon then enters the elution columns, which are high pressure vessels that circulate the loaded carbon extracting the gold. The gold will "deabsorb" from the activated carbon and attach onto stainless-steel wool by means of electrowinning. The CIP circuit makes use of gravity flow of slime between the consecutive counter-flow stages in order to recover recirculate the activated carbon back into the system.

Following this process, the cathode steel wool is smelted (induction furnaces) after drying in the calcining ovens. The doré bars are then dispatched to Rand Refinery Limited, located near Johannesburg in Gauteng Province.

The tailings residue is pumped from the plant to one of two TSFs, the FSS8 West/East complex, which is the biggest facility with a total deposition capacity of 320,000tpm. The second TSF is the FSS2 facility with a capacity of 160,000tpm. The combined capacity of the two TSFs are 480,000tpm which is well above the plants designed capacity thus, creating some flexibility in the deposition strategy.

Both TSFs are conventional day wall paddock facilities with a fixed penstock tower arrangement that would be the primary means of draining excess water from the facility which is pumped back to the plant to be used in the process again.

Figure 14-1: Schematic Flow Diagram for Harmony One Gold Plant



14.2 Plant Throughput, Design, Equipment Characteristics and Specifications

The Harmony One Plant has a steady state design capacity of 390ktpm with its conventional CIP flowsheet. The design parameters and equipment specifications are presented in Table 14-1. The Harmony One plant is in good working condition and the equipment is also in good order with audits done on regular bases to check the operating performance of the plant.

Table 14-1: Key Design Parameters and Equipment Specifications

Process	Parameter	Unit	Value
Overall Plant	Recovery	%	95 -97
	Availability	%	99.99
Milling	Throughput ROM	t/hr	90 -100
Densification	Desired pH	pH	>7
	Desired density	g/cm^3	1.46
Leaching	Residence time	hr	27
Acid Wash and Elution	Elution temperature	°C	130

14.3 Energy, Water, Process Material and Personnel Requirements

14.3.1 Energy

The Harmony One Plant utilises 11,478,202KWhr of power per month.

14.3.2 Water

The Harmony One Plant requires 20,655kL per month

.

14.3.3 Process Material

The reagents and their consumption rates are presented in Table 14-2.

Table 14-2: Consumables

Reagent	Unit	Value
Lime	tpm	338
Flocculant	tpm	0.642
Carbon	tpm	9.06
Cyanide	tpm	190.00

14.4 Personnel

The personnel are presented in Table 14-3

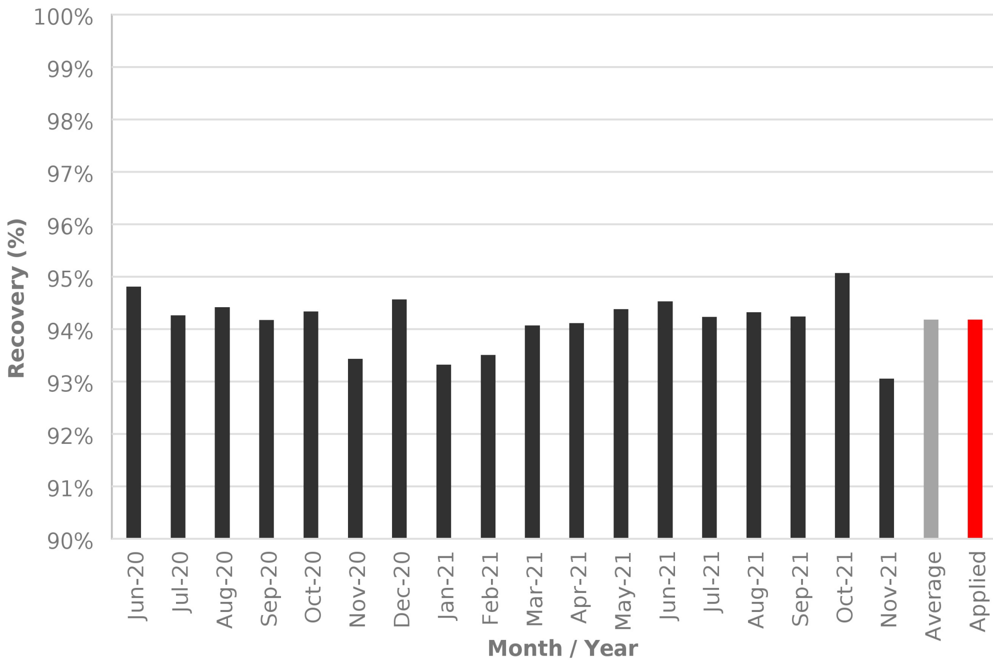
Table 14-3: Number of Personnel

Employee	Value
Joel employees	290
Contractors	107
Capital contractors	179
Total	**576**

14.5 Commentary on the Processing and Recovery Methods

The metallurgical process is a well-tested CIP technology which has been in operation at the Harmony One plant since 1986. Recoveries used in the business plan were based on historic performance. The methodology applied considered the historical metallurgical recovery over the preceding 18-month period (Figure 14-2) for the relevant ore sources at the plant.

Figure 14-2: Graph of Joel Historical Recovery Factor (18 month actual)



It should be noted that since the Harmony One plant processes ore from multiple sources a metal accounting operating procedure is required to manage the input feed delivered to the plant and gold output produced. A basic overview of the procedure is as follows:

- each operation delivers ore to the plant and is booked against each source;
- a delivery sheet reflects each shaft/operations figures; and
- from total ore processed, each shaft/operations equivalent proportion of gold is determined out of the monthly full gold produced.

15 Infrastructure

Section 229.601(b)(96) (15)

Joel has adequate access to the infrastructure required to meet the planned LOM production schedules.

15.1 Surface Infrastructure

The surface infrastructure associated with the Joel is to some extent superfluous since the processing plant and its associated infrastructure, tailings storage facility and waste rock dump have been decommissioned in recent years (Figure 15-1). Google Earth images for each of the shafts and Harmony One Plant are presented in Figure 15-2, Figure 15-3 and Figure 15-4.

The Joel mining area is well developed in terms of access and mining-related infrastructure. Access to the shafts are via well-maintained roads. Adequately maintained gravel roads is used to access other areas of the mine such as the explosives magazines, sewage works, slimes dam and the evaporation ponds.

The infrastructural layout includes hoisting facilities; logistical support for core handling, sampling, and transporting; a mineral processing plant (decommissioned); ore and waste facilities; tailings and leaching infrastructure; roads; water and power supply; ventilation and refrigeration systems; stores and workshop support; electrical supply; offices; housing and security.

15.1.1 Ore and Waste Rock Storage Facilities

All ore and waste rock is hoisted at North Shaft. The hoisted ore is discharged into the headgear bins, and in turn discharged onto the sampling conveyor belt then into the trucks which transport the ore by road 40km to a pad outside Bambanani Mine. From here the ore is re-handled and it trucked to the nearby Harmony One Plant.

The mine does not have separate reef and waste rock handling facilities and therefore are mixed during the transport process, which creates a dilution of the delivered head grade.

15.1.2 Tailings Storage Facilities

Joel's TSF became redundant when the processing plant was decommissioned in 2009. All rock mined and hoisted at Joel in transported to the Harmony One Plant.

Harmony One Plant pumps tailings as slurry to two TSFs namely FS2 and St Helena No.4, located to the south of the plant. All TSFs and are currently owned and operated by Harmony. The capacity remaining in the two TSFs is sufficient until 2024. Harmony is currently designing a new TSF to be located on the previous H1 Dam footprint which will have sufficient capacity for the remainder of the LOM.

The TSF sites have full engineering records including design, construction, operation, and maintenance plans.

15.1.3 Rail

Joel does not utilise rail to transport ore or waste, and there is no functional rail network on the mine.

15.1.4 Pipelines and Conveyors

Many of the pipelines and conveyors became redundant with the decommissioning of the processing plant. The only conveyor of importance and in use is the rock conveyor from the North Shaft headgear to the truck loading facility from where ore is transported by road to Harmony One plant.

15.2 Underground Infrastructure

The underground infrastructure that supports Joel's mining operations is presented in Figure 15-5.

Figure 15-1: Joel Surface Layout and Infrastructure

Source: Google Earth Image Date May 2021

Figure 15-2: Joel South Shaft Detailed Surface Infrastructure

Source: Google Earth Image Date May 2021

Figure 15-3: Joel North Shaft Detailed Surface Infrastructure

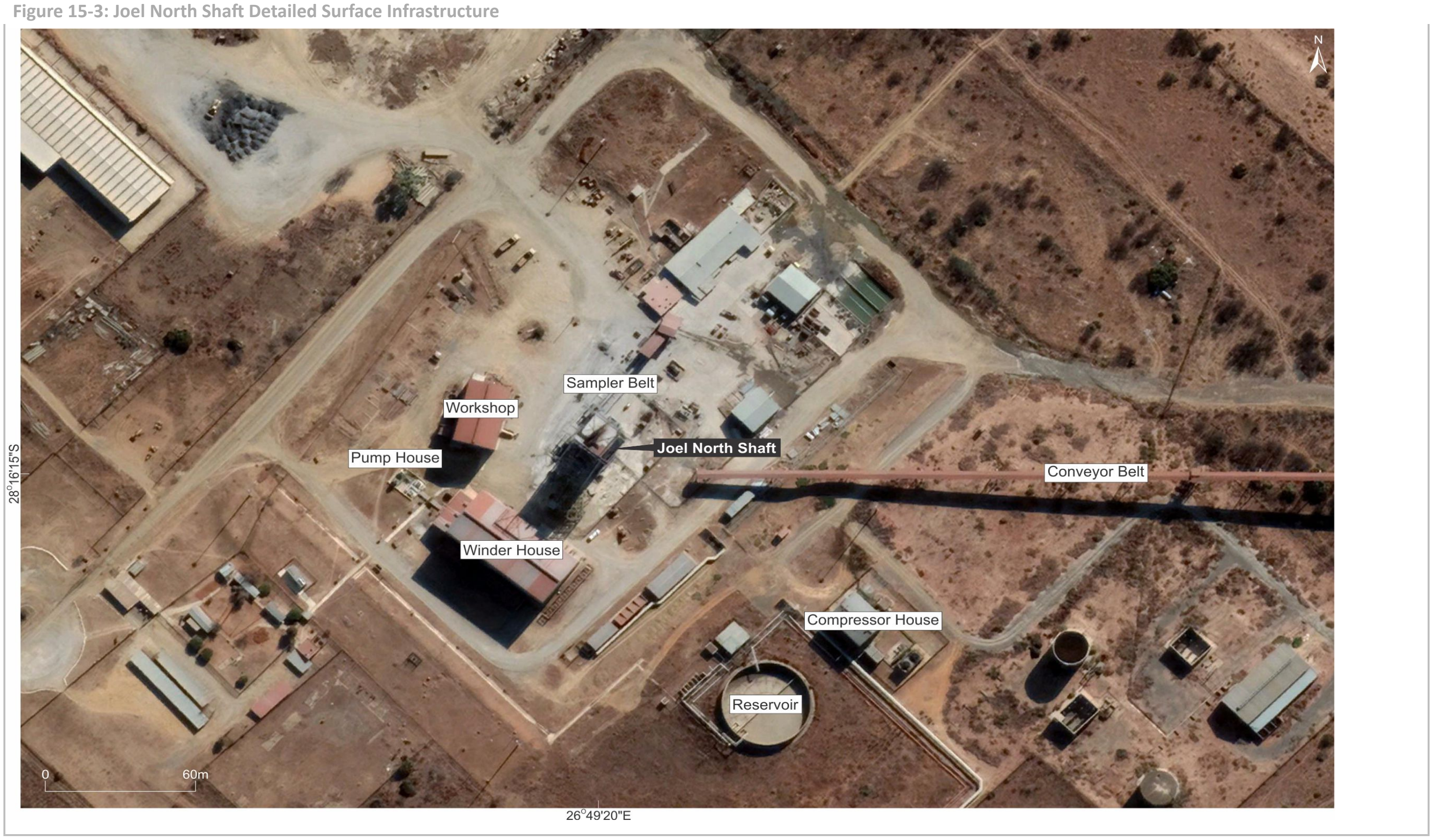
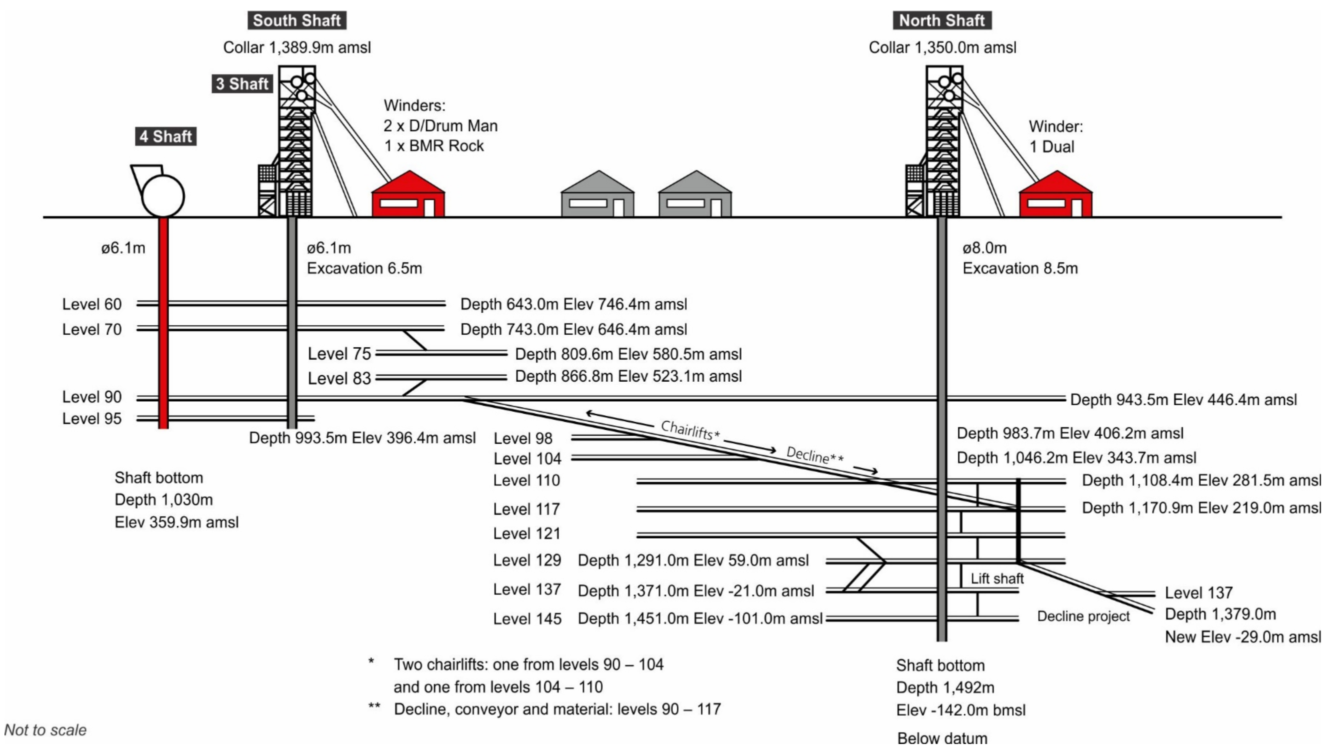


Figure 15-4: Harmony One Plant Detailed Surface Infrastructure

Source: Google Earth Image Date May 2021

Figure 15-5: Schematic Mine Design Layout for Joel



15.2.1 Shaft Systems

The South Shaft complex has two shafts, namely 3 Shaft (men and material) and 4 Shaft (ventilation) (Figure 15-5). This shaft system was sunk beyond the reef sub-outcrop and is located on the southern extremity of the orebody. These two shafts go down to 1,050m below collar and cover four levels, namely 60 and 70 levels (which are mined-out trackless levels), 90 level, which is the main transfer level, and 95 level, which houses the pumping and loading facilities.

The North Shaft complex is a single-shaft system, sunk and lined to 1,471m below collar, but is not equipped to hoist people. Feasibility studies were conducted in 2005 to determine whether this shaft could assist in extending Joel's life of mine by opening up 129 level. This shaft was upgraded in February 2006 to enable hoisting of ore through the north shaft barrel. Hoisting was halted in March 2007, owing to the deteriorating shaft infrastructure. The shaft has since been re-equipped to hoist ore and also acts as a second outlet for the mine.

A short one-compartment lift shaft from 110 level gives access to 121 level. The single drum winder at this level is used to transport men and material down to 121 level and for hopper hoisting of development and some stoping ore. The lift shaft has since been deepened to access 129 level. The lift shaft will service men and material only whereas the north shaft will be dedicated to hoisting ore.

The two shaft complexes (North and South) are connected via a triple decline system, spanning four levels and consisting of an approximately 1,600m belt decline (decommissioned), a chairlift decline to 110 level and two material declines in tandem down to 117 level. The decline levels are 98, 104, 110 and 117 with the last two connected to the North Shaft.

15.2.2 Ventilation

Ventilation intake air for Joel flows down South Shaft to 90 level and then down to 98 level through the chairlift and material declines, with some of the air ventilating engineering installations at 90 level then going back to the return airway ("RAW"). The main air intake is at North Shaft with air flowing down the shaft to 110, 117, 121, 129 and 137 levels with the majority going into 129 level. 145 level is ventilated by means of a fan and exhaust column.

The main return air routes are through the worked-out areas to 60 and 70 Levels then through the haulages to the up-cast shaft. There is also air that flows from the North Shaft up the lift shaft and then through the 110 level chairlift decline to 98 level then into the RAW.

All main ventilation fans are located on surface where there are a total of three Airtec Davidson, 3,250mm diameter fans with 1,000kW motors installed, with any two of the fans operating at any one time. One diesel standby fan, capable of handling c.120kg/sec of air at 0,59kPa is installed. In the past this fan was never required as the natural ventilation pressure has been sufficient to cause a flow of 120kg/s.

15.2.3 Pumping and Water Reticulation

Pumping from the bottom of North Shaft (145 level) is done with a 2 x 90kW flight pump to pump water up to 137 level, and then up to 129 level. Dirty water from mining operations on 137 level (Decline) is pumped to a skid dam situated in the 129 decline, and dirty water from mining operations at 129 level is also pumped to the same dam. From the 129 level dam, water is pumped to the 117 level dam and from there to the 90 level settlers via 104 level. There are standby pumps at the various level pump stations and the pumping capacity and set-up is adequate, provided the dams are cleaned regularly. The dam capacities are approximately 1,300m^3 each.

Each of the settlers on 90 level can handle 90L/s of water (525m^3 each). Two settlers are available but only one being at a time, and a third settler is currently in need of repair. No settling problems are currently being experienced. The clean overflow is transferred to two dams on 95 level via two 8 inch boreholes from where it is pumped to surface by means of multistage centrifugal pumps. Three pumps are installed of which only one is running at a time. Each of the pumps can deliver 270L/s and with a peak and average water usage of 180L/s and 90L/s respectively, the installed capacity is more than adequate. The clear water dam capacity on 95 level is 3.2 million litres (2 x 1.6ML) which is slightly inadequate. Two 450mm pumping columns are installed, one in each of the two main shafts; the 3 shaft column is currently in use.

Underflow from the settlers is collected in an 80m^3 mud storage dam on 95 Level (four hours storage capacity). Two Scamont PA8 mud pumps are installed, of which only one is required to run 6-8 hours per day. The mud is pumped to a receiving tank on surface, from where it is pumped to the surface settler. Water from this dam is sent back to the TK01 storage tank and dry mud is mixed with ore from underground before is transported to Harmony One Plant.

Sedibeng Water supplies potable water at an average consumption of 80MLpm. Sewage and wastewater is treated in a company-owned treatment plant operated by contractors.

15.3 Power and Electrical

The feed to the mine has capacity to supply of 29MW, however currently only 21MW is utilised. There are no identified risks related to continued supply of power which is supplied by Eskom. Joel's power supply is designed to satisfy the planned LOM production and service requirements with a surplus. Main power supply is managed and distributed via electrical sub-stations located adjacent to the respective shafts (Figure 15-2 and Figure 15-3).

15.4 Water Usage

Bulk water supply for the mine's operations provides a storage capacity of 70ML which is sufficient for 2 days consumption. Potable water usage is 70,000L/day.

15.5 Logistics and Supply

The procurement of supplies and equipment are handled centrally, via Harmony, and then delivered to Joel.

Harmony operates its own rail system which connects the shafts, reduction works, shaft stores, explosives magazine and the mine workshops. This system is used to transport ore between shafts and plant and to transport consumables between the surface stores to the respective locations, as required. It is also connected to the regional railway system.

15.6 Commentary on Infrastructure

The operational infrastructure including road, offices, security services, water and power supply is adequate. Operations are powered by electricity from Eskom. Overall, Joel's surface and underground infrastructure as well as the power and water services are designed to fully meet the planned LOM plan and service capacity requirements.

Joel was originally designed to operate at 120,000tpm, but is now a mature operation in which has been reduced to the current average of c.40,000tpm for the LOM. With the decommissioning of much of the mine's infrastructure, particularly the processing plant, it still has remaining infrastructure that will adequately support the operation for the remainder of its planned life.

16 Market Studies

Section 229.601(b)(96) (16) (i-ii)

Gold is traded in a variety of markets/exchanges both in physical form through over the counter ("OTC") markets, bullion banks and metal exchanges etc., and through passive investments such as exchange traded funds ("ETF's"), which are based on gold prices and units representing physical gold which may be in paper or dematerialised form. Demand is driven by the jewellery market, bar and coin, use in technology, ETF's and other financial products, and by central banks. An overview of the gold market is given in the following sections based mainly on data from the World Gold Council and GoldHub websites.

16.1 Market Overview

Unlike almost all mineral commodities, the gold market does not respond the same way to typical supply and demand dynamics which are founded on availability and consumption, but rather on global economic affairs, particular those of the major nations, industrial powerhouses and economic regions, such as the Eurozone. The gold market is affected by government and central bank policies, changes in interest rates, inflationary or deflationary environments and events such as stocking and de-stocking of central reserves. It is also largely affected by global events such as financial crises, geopolitical trade tensions and other geopolitical risks. Price performance is linked to global uncertainty prompted by the prolonged Russia-Ukraine war (GoldHub, Accessed July 2022). It is an asset that can preserve wealth and deliver price outperformance in an uncorrelated way and that makes it extremely attractive.

16.2 Global Production and Supply

Gold production and supply is sourced from existing mining operations, new mines and recycling.

16.2.1 New Mine Production

Gold mining is a global business with operations on every continent, except Antarctica, and gold is extracted from mines of widely varying types and scale. China was the largest producer in the world in 2021 and accounted for around 9-12% of total global production (Gold.org, Accessed 2022; USGS Mineral Commodity Summaries, 2022). Overall, global mine production was 3,000t in 2021, slightly lower than production levels in 2020 (3,030t), and the second annual decline in production after 2016. Recent decline has been largely attributable to COVID-19 interruptions. In 2021, the major producing gold countries in the world were China (370t), Australia (330t), Russian Federation (300t), USA (180t), Canada (170t), Ghana (130t), Mexico (100t), and Uzbekistan (100t). Indonesia, Peru and Sudan produced 90t each, followed by Brazil (80t). South Africa produced 100t in the same year (USGS Mineral Commodity Summaries, 2022).

16.2.2 Recycling

Annual global supply of recycled gold was 1,143.5t in 2021, a decline from the 2020 figure of 1,291.3t. Recycling supply responds to the gold price and its rate of change but experienced a modest increase during the year even as prices increased to all-time highs. India and China play large roles in the recycling market. In the first quarter of 2022, when gold demand was 34% higher than the previous year, the supply of recycled gold increased to 310t (a 15% increase y-o-y), and highest amount of activity for six years (Gold Demand Trends Q1 2022, Gold.org, April 2022).

16.3 Global Consumption and Demand

Gold consumer demand is expected to be supported by gradual economic recovery. Gold has performed well as a consequence of a high-risk environment, low interest rates and a high price. While continued improvement in markets is expected post-COVID in 2022, economic slowdown among other factors is anticipated to place some downward pressure on consumer demand in China and India.

16.3.1 Jewellery

Global annual jewellery demand increased from 1,329.7t in 2020 to 2,229.4t in 2021, amid a recovery of markets from the COVID-19 pandemic. As with recycling, the two largest markets, India and China, were major contributors to the decline in 2020, and markets were expected to improve with economic recovery in these geographies. In Q1 2022, recovery of demand was soft, down 7% y-o-y, after new lockdowns to contain COVID-19 (Gold Demand Trends Q1 2022, Gold.org, April 2022).

16.3.2 Investment

The COVID-19 pandemic, high inflation and recent period of heightened risk and geopolitical uncertainty, has driven the value of gold as a 'safe haven' investment (www.gold.org/goldhub). Bar and coin investment was 20% lower in Q1 2022, but 11% higher than a five-year quarterly average (Gold Demand Trends Q1 2022, Gold.org, April 2022).

A total annual gold investment of 1,006.42t was noted by the World Gold Council for 2021, a decline of 43% from the 2020 figure. Weaker investor interest in 2021 was seen with a net outflow of gold ETFs (-173.6t). Gold demand has since increased in Q12022 (34% higher than Q1 2021), driven by strong ETF inflows, and safe-haven demand (Gold Demand Trends Q1, 2022, Gold.org, April 2022).

Investment drivers also include low interest rates, a weakened US Dollar, and an economic slowdown. A consequentially favourable price means even greater investment, but momentum has slowed with gold reaching a USD 1,800/oz marker (Recent moves in gold, Gold.org, July 2022).

16.3.3 Currency

Gold holds an inverse relationship with the USD and is usually traded relative to its USD price. During the current period of uncertainty, and the rising influence of Chinese currency, central bank asset managers may likely increase their interest in gold as a result. This has been a prominent trend since the economic downturn in 2008.

Future performance of the gold market is expected to be supported by investment demand (a need for effective hedges and a low-rate environment) and will be driven by the level of risk observed in the recovery of the global economy from the effects of COVID-19, which may offset any lag in recovery of consumer demand.

16.4 Gold Price

16.4.1 Historical Gold Price

In early August 2020, the London Bullion Market Association ("LBMA") gold price reached historical highs and remained relatively high for the rest of the year (Figure 16-1).

16.4.2 Forecast Gold Price

The minimum and maximum consensus gold price range for the year 2021 Q4 to year 2025 is presented in Figure 16 2. The long-term gold prices are considered from year 2025 onwards. Forecasts as advised from various financial institutions show that gold is expected to trade in a range of USD1,652/oz - USD1,728/oz, for the period 2022 to 2025 with a long-term outlook of USD1,521/oz.

The gold price forecast of USD1,546/oz is conservative if corroborated against a long-term broker consensus gold price outlook (Figure 16 2).

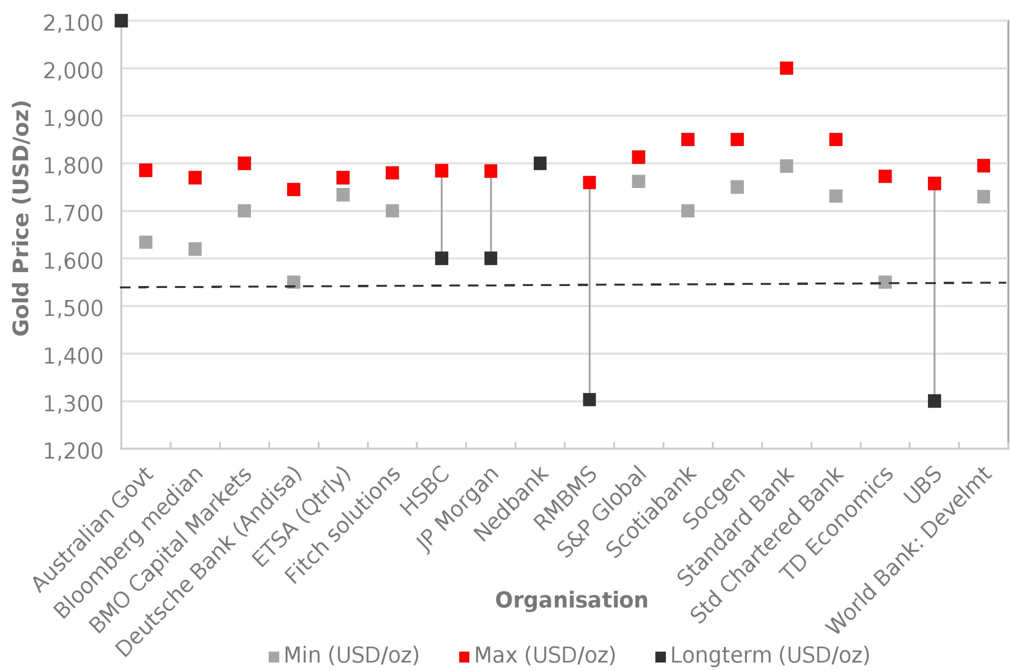
16.4.3 Harmony Group Gold Hedging Policy

Harmony has a hedging policy, which is managed and executed at Group treasury level on-behalf of its operating entities. The key features of the hedging programme are as follows:

- the policy provides for hedging (or forward selling) up to a maximum of 20% of expected gold production for a rolling 24-month period;
- the policy has no minimum quantity that should be hedged, and if an attractive margin above cost cannot be achieved (i.e., in a low gold price environment) then no hedges are entered into;
- Harmony enters into ZAR-denominated gold hedges for its South African operations (for the non-South African assets it enters into USD-denominated hedges);

Figure 16-1: Graph of Annual Gold Price History – ZAR/kg

Figure 16-2: Graph of Consensus View of Forecast Gold Price



- Joel does not enter into hedges in its own name but delivers bullion to Rand Refinery for refining on behalf of Harmony. Rand Refinery is one of the world's largest single-site precious metals refining and smelting complex in the world. Rand Refinery refine all of Harmony's gold to at least 99.5% purity, and acting as agent, sells the gold on the daily spot London fixing price and make payment to the Harmony two days later;
- gains and losses realised from the hedging program are accounted for at Group level and the financial benefit (or downside) is distributed amongst the operations proportional to their levels of gold sales; and
- Joel does its mine planning and financial forecasts based on the estimated future gold price provided by the Group treasury, but its year-end actual financial results reflect the received gold price inclusive of the benefit of the hedging programme. Therefore, in theory, Joel receives a hedged gold price for a maximum of 20% of its gold sales with the balance attracting the spot price.

16.5 Commentary on Market Studies

The factors which affect the global gold market are well-documented as are the elements which influence the daily gold price. The gold price recorded all-time highs during both 2020 and 2022, and although it has since moderated and retracted, the price remains well above the 5-year historical average.

The positive outlook for gold will likely be sustained. Key headwinds for gold are interest rate hikes, currently at near historically low levels, but continued geopolitical risk and underperformance of stocks and bonds will support gold (Gold Mid-Year Outlook 2022, Gold.org, Accessed 2022). The gold price has experienced weaker momentum in Q2 2022, but stabilised. The gold market is expected to remain supported, and prices elevated for the balance of the financial year running into FY2023. Harmony has a relatively conservative gold hedging policy in place, and this is used to take advantage of the movements in the gold price to maximise the average gold price received, with the benefit of this hedging programme flowing through to Joel.

16.6 Material Contracts

Harmony has contractual vendor agreements with various service providers and suppliers. A list of the most significant of these contracts, currently in place to support mining operations at Joel, is presented in Table 16-1. All of the listed contracts are currently valid and in good standing. Terms, rates and charges of contracts are considered consistent with industry norms. Contract management processes are in place and resourced so that contracts re-tendered and/or renewed as they approach expiry.

Table 16-1: Material Contracts

Vendor Name	Nature of Service / Supply
Khobela Construction & Projects	Ore trucking - Joel to Harmony One plant
Mega Bus	Transport of employees
AEL Mining Services Ltd	Explosives and Accessories
Sandvik Mining & Construction	Drill rods and bits
Schauenburg (Pty) Ltd	Lease of gas detecting equipment

17 Environmental Studies, Permitting and Plans, Negotiations, or Agreements w77ith Local Individuals or Groups start

Section 229.601(b)(96) (17) (i-vii)

The South African Government has an extensive legal framework within which mining, environmental and social aspects of the industry are managed. Harmony and Joel are primarily regulated and managed by certain principal Acts (Section 17.3) as well as corporate policies, management systems and certain industry-wide guidelines, including:

- Energy Efficiency and Climate Change Policy;
- Environmental Policy;
- Harmony Water Management Strategy;
- Biodiversity and Rehabilitation Position Statement;
- Socio-Economic Transformation Policy; and
- Corporate Social Responsibility Policy.

The latest sustainability policies and public environmental social and governance ("ESG") performance and disclosure report(s) are available on the corporate website. Harmony has identified the environmental risks for the business and has strategies and management systems in place to manage the risks.

17.1 Results of Environmental Studies

Joel has prepared multiple environmental impact assessments ("EIA") for regulatory approval, which under the current legal framework, require stakeholder engagement. The most recent EIA was undertaken 2009 and the results of the studies were incorporated into the mine design and planning process. The mitigation measures from all previous EIA are consolidated in the approved Environmental Management Programme report ("EMPR") dated 2009.

A detailed environmental impact and aspects register has been developed to identify all potential environmental impact of the operations. The main impacts were rated, and mitigation measures were proposed to minimise their impact on environment.

Harmony is committed to maintaining good relationships with regulatory authorities, industries, communities, business partners and surrounding stakeholders.

17.2 Waste and Tailings Disposal, Monitoring & Water Management

The process of mining and beneficiation produce significant waste, typically consisting of 1) solid waste in the form of waste rock and overburden, 2) liquid wastes in the form of wastewater and tailings slurry and 3) gaseous emissions such as liquefied petroleum gas.

Measures have been put in place for the handling and disposal of all hazardous chemicals (e.g., cyanide), hydrocarbons (i.e., hydraulic oils and diesel) and other chemicals to ensure the protection of human health and its potential impact on the environment.

Harmony recognises that responsible and effective waste management can positively reduce its environmental impacts and mitigate associated environmental liabilities. Waste management is thus a priority focus area. Internally, guidelines on mineral, non-mineral and hazardous waste materials are included in the environmental management systems ("EMS") implemented at Joel Mine.

Tailings comprises of crushed rock and process water emitted from the gold elution process in the form of slurry once gold has been extracted. As tailings contain impurities and pollutants, they are placed in TSF engineered to contain them, in line with Harmony's tailings management programme and the Global Industry Standard on Tailings Management. However, currently the Joel Plant is under care and maintenance and the associated TSF has a dormant status.

Harmony's overall tailings management strategy is to ensure robust, meticulous engineering and dam design, along with a continual focus on management of risks through layered assurance and oversight.

The focus areas include, but are not limited to:

- freeboard control;
- water management;
- maintaining stability and the safety factor as advised by the engineer of record;
- erosion controls; and
- monitoring and control measures implemented to ensure continued compliance (including regular inspections, audits and meetings on varying intervals with subsequent actions, minutes and reports).

As part of its mining, environmental and water approvals and licences, Harmony is required to implement monitoring programmes and plans to establish the operations impact on the environment. The compliance limits for the monitoring variable are included in the applicable EMPR(s), Water Permits and other environmental licences. The environmental monitoring implemented at Joel includes:

- ground and surface water monitoring
- biodiversity monitoring;
- waste classification and quantification;
- integrated waste and water management plan updates;
- water balance reviews;
- licence and authorisation compliance reviews; and
- air quality (i.e., noise and dust) and greenhouse gas emissions monitoring.

Joel has implemented Harmony's corporate water management strategy which applies to water in the entire mining lifecycle, including prospecting, project design and commissioning, operation and closure. This strategy has led to several positive outcomes with long-term target set to reduce the amount of water used for primary activities. The core strategy is to treat and recirculate groundwater through a series of underground dams at different levels. Excess fissure water from underground is pumped to surface and temporarily stored in an above ground water tank. Excess fissure water is then pumped back underground for reuse and/or pumped to the evaporation dams.

A surface and groundwater water monitoring program and network are established to ensure compliance with certain regulatory requirements and industry standards. Ground and surface water monitoring is conducted on regular intervals from strategically placed boreholes and surface water streams and dams around the operation. The quality of the drinking water is monitored daily to ensure compliance to the South African national drinking water quality standard (SANS 241:2015).

17.3 Permitting and Licences

In respect of environment, the following national Acts and the regulations promulgated thereunder provide the regulatory framework for mine permitting and licencing in South Africa:

- Mineral and Petroleum Resources Development Act, 2002 ("MPRDA");
- National Environmental Management Act, 1998 ("NEMA");
- National Environmental Management: Waste Act, 2008 ("NEM:WA");
- National Environmental Management: Air Quality Act, 2004 ("NEM:AQA"); and
- National Water Act, 1998 ("NWA").

A summary of the status of all environmental permits and licences issued at the effective date related to Joel Mine is presented in Table 17-1.

Table 17-1: Status of Environmental Permits and Licences

Permit / Licence	Reference No.	Issued By	Date Granted	Validity
EMPR	FS 30/5/1/2/3/2/1(14) EM	DMRE	16-Apr-2010	LOM
Water Permit	1459B (B33/2/340/116)	DWS	25-May-1991	LOM
Water Permit	1460B (B33/2/340/116)	DWS	15-Mar-1991	LOM
Waste Disposal Permit	1339N (B33/2/340/116/P35)	DWS	16-Sep-1991	LOM
Water Permit	3M	DWS	27-May-1991	LOM
Sewage Treatment Permit	QC404.00.XRO1	DWS	20-Aug-1986	LOM
Water Permit	1339N (B33/2/340/116)	DWS	15-Mar-1991	LOM

Note: LOM - Life of mine, DWS - Department of Water and Sanitation

All relevant mining, environmental and water-use permits are in place that cover the environmental, archaeological, and hydrological components of Joel Mine. All permits are audited regularly for compliance and no material risks to the operations have been identified.

An application will be submitted to the regulator should there be a need to apply for an amendment to an existing or for a new environmental permit alignment with operations LOM requirements. There are no pending applications for any environmental permits and licences at the effective date of this TRS.

17.4 Local Stakeholder Plans and Agreements

Harmony strives to create sustainable shared value within the communities it operates. Local stakeholder plans and agreements are based on the results from socio-economic information, government development strategies and EIAs undertaken. The socio-economic development programme commits to:

- contribute to areas that will have the most meaningful socioeconomic impact on communities, namely infrastructure, education and skills development, job creation and entrepreneurial development;
- enhance broad-based local and community economic empowerment and enterprise development initiatives;
- facilitate socio-economic development in local communities by means of social and labour plan(s) (“SLP”) and corporate social responsibility programmes;
- support arts, culture, and sports and recreation; and
- build relationships based on trust within host communities.

In South Africa, mining companies are required to have a SLP which forms an important component of Harmony's community investment plan. It sets out the Company’s obligation to develop and implement comprehensive human resource development programs, community development plans, housing and living condition plans and employment equity plans.

The aim of the SLP is to promote employment and advance the social and economic welfare of all South Africans. Joel’s SLP was approved in June 2018 and is valid for a period of five years (i.e., until June 2022) in which the Company has committed to spend approximately ZAR36m this period.

The SLP has made the following main commitments related to socio-economic development within surrounding local communities:

- infrastructure development – roads, electricity and water; community training and recreation facilities; and
- youth entrepreneurial and business development support.

The SLP will need to be renewed and resubmitted to the regulator for approval. Compliance is the SLP is a prerequisite to securing and maintaining a mining right, with progress required to be reported annually.

17.5 Mine Closure Plans

Harmony makes provision for closure and rehabilitation both for accounting purposes and as required under the MPRDA. The statutory obligation for all environmental rehabilitation at Joel is administered by the DMRE and requires the preparation of a closure plan, the development of a cost estimate, and financial assurance. The Company makes an annual submission to the DMRE setting out the cost of closure in accordance with the MPRDA and the regulations issued thereunder.

Harmony appointed Digby Wells Environment ("Digby Wells"), independent environmental consultants, to review and update the closure cost. The mine closure assessment was done in terms of regulation 53 and 54 of the MPRDA and in accordance with the requirements of NEMA. The closure cost as at 30 June 2022, was calculated at ZAR96m, including a 10% contingency allowance.

17.6 Status of Issues Related to Environmental Compliance, Permitting, and Local Individuals Or Groups

Most of the required environmental authorisations are in place and only require amendments to be made to reflect the planned infrastructure at Joel.

17.7 Local Procurement and Hiring

Harmony is committed to investing in the future of local communities beyond the LOM and not to only empower them, but also to mitigate the impacts its activities to ensure a positive legacy. The 2014 Mining Charter serves to guide the south African mining industry in socio-economic transformation. Local procurement (goods and services) and human resource management are key measures set under the Mining Charter and are reported on annually.

Portable skills are developed through expanded learning programmes, learnerships and other programmes opened only to operating communities and areas where labour is sourced. Local procurement is being supported where there is a skills shortage.

17.8 Commentary on Environmental Studies, Permitting and Plans, Negotiations, or Agreements with Local Individuals or Groups

Periodic inspections are conducted by the DMRE to verify compliance with applicable environmental laws, regulations, permits and standards. In addition, Joel has implemented an EMS in line with the ISO 14001 standard. The EMS is audited on an annual basis by a third party and includes the needs and expectations of interested parties.

As part of Harmony, Joel conducts its operation based on policies and systems that are aligned to its corporate sustainable development framework. Although Harmony is not a signatory to the International Council on Mining and Metals or the UN Global Compact, these form the guiding principles of the framework. Harmony discloses its sustainable development voluntarily in accordance with the guidelines issued by the Global Reporting Initiative ("GRI").

Further to this, Harmony discloses environmental information on the Carbon Disclosure Project ("CDP") for both climate change and water. The CDP runs the global environmental disclosure system that supports companies to measure and manage their risks and opportunities on climate change, water security and deforestation.

Harmony has a good understanding of the environmental and social aspects of the operations through baseline and specialist studies previously conducted. Risk management and mitigation measures were adequately addressed in the environmental management plans and will be effective to mitigate risks and impacts to acceptable levels should the measures be implemented according to the specialists' recommendations.

Most of the required environmental authorisations are in place and only require amendments to be made to reflect the planned infrastructure at Joel. Based on current industry norms, a realistic timeframe to obtain relevant authorisations is estimated between 12 and 18 months.

18 Capital and Operating Costs

Section 229.601(b)(96) (18) (i-ii)

Economic parameters for the Harmony Group, including capital and operating costs, are determined, and signed off by the CODM, before distribution to the business units, including Joel. The capital and operating costs are reported in ZAR terms and on a real basis. Rounding of figures may result in minor computational discrepancies.

18.1 Capital Costs

The estimated capital costs for the on-going LOM at Joel are reported according to costs associated with major equipment outside the main operating sections which is termed abnormal expenditure ("AE"), shaft projects related to ongoing capital development ("OCD") and costs related to Mining Charter Compliance ("MCC") such as LED's and housing projects as presented in Table 18-1. These estimated capital costs are carried forward and modelled in the Joel cash flow.

Costs associated with the MCC are determined because of Joel's SLP requirements and modelled as such. These costs are extracted from the SLP model.

18.2 Operating Costs

A summary of the direct and indirect operating costs for Joel are presented in Table 18-2. Operating costs are based on historic performance while applying any changes expected within the new financial year (such as electricity requirements, increased/decreased labour) and are used as an input into the Joel LOM forecast cash flow model.

18.3 Comment on Capital and Operating Costs

The capital and operating cost estimates for Joel are based on actual data, as well as budget forecasts. Therefore, the forecasted costs are reliable, and at minimum meet the confidence levels of a Pre-Feasibility Study. This approach of estimating capital and operating costs is consistent with industry practice. A record of the forecast and budget costs is maintained by the operation, allowing for an assessment of the alignment of the forecast and actual costs.

Table 18-1: Summary of Capital Cost Estimate for Joel

Capital Cost Element (ZAR'000s)	Total LOM (FY2023 - FY2030)
AE	**90,612**
Shaft Projects	**117,070**
Major Projects	**31,000**
OCD	**487,348**
Total (excluding MCC)	**726,030**
MCC (LEDs/housing etc.)	**56,607**
Total (including MCC)	**782,637**

Table 18-2: Summary of Operating Cost Estimate for Joel

Operating Cost Element (ZAR'000)	Total LOM (FY2023 - FY2030)
Wages - Payroll 1	**2,107,190**
Wages - Payroll 2	**3,205,091**
Stores and Materials	**1,711,715**
Electric Power and Water	**1,532,119**
Outside Contractors	**493,814**
Other	**358,404**
Direct Costs	**9,408,333**
Transport Allocation	**310,625**
Refining Charge	**27,308**
Assay Costs	**51,165**
Hostel Costs	**-24,971**
Plant Treatment Cost	**551,668**
Rail Transport	**74,285**
Re-allocated Costs	**990,080**
Mine Overheads Re-allocated	**502,495**
Total Cash Costs	**10,900,908**

19 Economic Analysis

Section 229.601(b)(96) (19) (i-iv)

19.1 Key Economic Assumptions and Parameters

The CODM forms, reviews, signs-off and distributes economic assumptions to its various business units. On an annual basis, during the period October to November, long-term commodity prices and exchange rates forecasts', are received from various financial institutions. In addition, a specialist in Economics from a reputable economics company based in South Africa, provides expert views on the global markets, forward looking commodity prices, exchange rates, consumer price index, production price index, electricity cost and consumable increases. All factors are analysed, cognisance is taken of the requirements of the NYSE and JSE markets, and a proposal is presented to the CODM for recommendation and approval. These assumptions are then applied at Joel, along with specific operational considerations.

19.1.1 Metallurgical Recoveries

The metallurgical recoveries used in the cash flow are provided in Table 12-1.

19.1.2 Gold Price

The proposed gold price (USD1,546/oz) is the price that is used by Harmony for the Joel annual planning cycle and forms the basis for the gold price assumptions used in the Joel cash flow. The reader is referred to Figure 16-2 for the consensus forecast gold price.

The conversions used in the calculation of the various gold prices is presented in Table 19-1.

Table 19-1: Conversions Used in Gold Price Calculations

Economic Factors	Gold Price (USD/oz)	Conversion Factor (oz/kg)	Exchange Rate (ZAR:USD)	Gold Price (ZAR/kg)
2022 Mineral Resource	1,723	32.15	15.35	850,191
2022 Mineral Reserve	1,546	32.15	15.35	763,000
2023 forecasted gold price	1,546	32.15	15.35	763,000

Notes: 1. Forecasted gold price as used in the Joel cash flow.

19.1.3 Exchange Rate

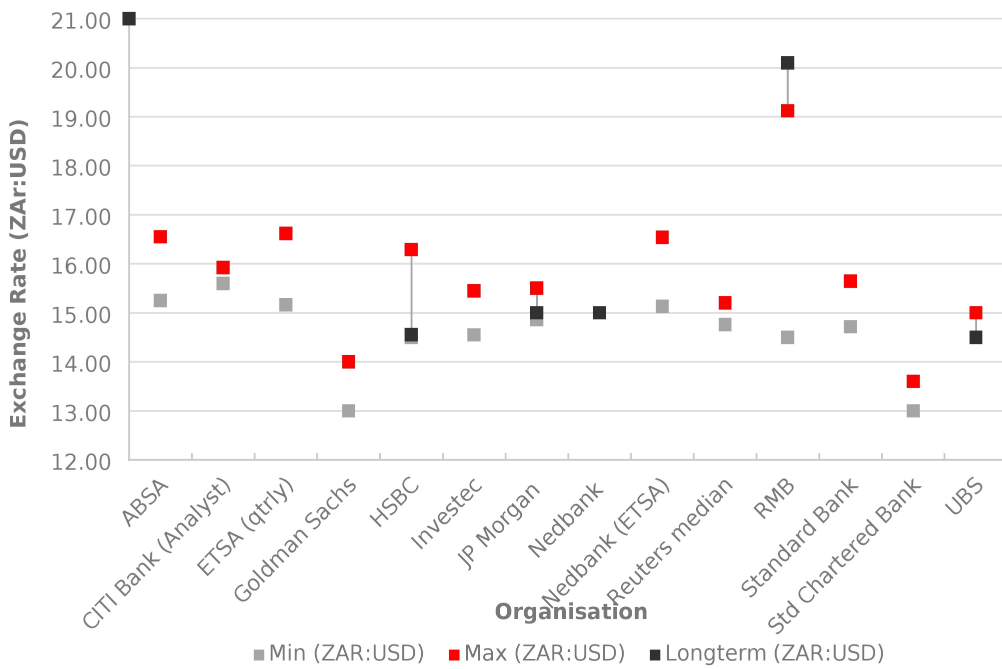
The consensus minimum and maximum ZAR:USD exchange rate for the year 2021 Q4 to year 2025 is presented in Figure 19-1. The long-term exchange rates are considered from year 2025 onwards. The volatility in the ZAR has continued against the USD resulting in the ZAR:USD exchange rate fluctuating. Forecasts as advised from various financial institutions show that the ZAR/USD is expected to trade in a range of ZAR15.13:USD – ZAR15.83:USD for the period 2022 to 2025 with a long-term outlook of ZAR15.83:USD in the short term.

In addition, the CODM has reviewed the ZAR:USD exchange rate performance over the past three years, for the period July 2019 - June 2022 (Table 19-2). The proposed spot exchange rate of 15.35 ZAR:USD is the exchange rate that is used by Harmony for the Joel annual planning cycle and forms the basis for the ZAR:USD exchange rate assumptions used in the Joel cash flow.

Table 19-2: ZAR:USD Exchange Rate Performance (June 2019 – June 2022)

Period	Average Exchange Rate (ZAR:USD)
July 2019 to June 2020	15.68
July 2020 to June 2021	15.41
July 2021 to June 2022	14.75
3-Year Ave. (not weighted)	**15.28**

Figure 19-1: Graph of Consensus ZAR : USD Exchange Rate Forecast



19.1.4 Royalties

Royalty is an expense paid to the government of South Africa and is accounted for in the Joel cash flow models. In terms of the mining ring-fencing application, each ring-fenced mine is treated separately, and deductions can normally only be utilised against mining income generated from the relevant ring-fenced mine.

19.1.5 Capital Expenditure

At Harmony, capital is allocated preferentially to the mines with a longer life. Joel is one of the smaller operations and currently has a medium-term LOM model, and therefore has lesser amounts dedicated to capital expenditure. Detailed capital costs are presented for Joel in Table 18-1.

19.1.6 Operating Expenditure

The operating costs are determined as a function of the cash working costs of the mining and mineral processing activities, and ongoing capital development for mining. Total costs are a function of the operating costs, capital costs, and royalties. Detailed operating costs can be found for Joel in Table 18-2.

19.1.7 Working Capital

Working capital is calculated at a Harmony Group level and not at an operational level.

19.1.8 Taxes

Mining tax on gold mining taxable income in South Africa is determined according to a formula, based on the taxable income from mining operations. Of that, 5% of total revenue is exempt from taxation while the remainder is taxable at a higher rate (34%) than non-mining income (28%). Accounting depreciation is eliminated when calculating the South African mining tax income. Excess capital expenditure is carried forward as unredeemed capital to be claimed against future mining taxable income.

19.1.9 Closure Cost and Salvage Value

The closure cost estimates are those provided in Section 17.4. No account has been taken of any potential salvage values.

19.1.10 Summary

The key assumptions used in the cash flow are summarised for Joel in Table 19-3.

Table 19-3: Key Economic Assumptions and Parameters for Joel Cash Flow

Parameter	Unit	Value
Production Rate (milled)	ktpa	467
Gold Recovery	%	94.89
Royalty	% of Revenue	2.00
Tax Rate	%	Formula
Gold Price	ZAR/kg	763,000
Exchange Rate	USD:ZAR	Variable
Discount Rate	%	9.00

19.2 Economic Analysis

Harmony's respective business units and its associated operating sites consider the economic assumptions discussed in Section 19.1 during their respective planning and analysis processes. The LOM financial model for Joel is presented in Table 19-4. Note that the cash flow includes the actuals for Q1 FY2022-23.

The discounted cash flow model is used to calculate the Net Present Value ("NPV") of the investments. The NPV for the metal price, for Joel is approximately ZAR954m at a discount rate of 9%.

Table 19-4: Joel Cash Flow

Item	Units	Total LOM	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029	FY2030
Mining advance	m^2	**779,541**	91,914	96,994	96,853	102,730	99,674	99,844	99,578	91,955
OCD	m	**14,081**	3,632	3,565	3,334	2,221	1,233	97	0	0
Milled Tons	t ('000)	**3,735**	494	511	507	495	459	452	432	386
Yield (Recovered Grade)	g/t	**4.68**	4.15	4.63	4.72	4.40	4.72	4.78	5.23	4.98
Gold Recovered	kg	**17,491**	2,052	2,365	2,393	2,179	2,164	2,161	2,258	1,920
Revenue	ZAR'000	**13,345,401**	1,565,486	1,804,167	1,826,210	1,662,305	1,650,974	1,648,510	1,722,741	1,465,005
Total Working Costs (including OCD)	ZAR'000	**11,586,649**	1,495,579	1,550,329	1,563,458	1,490,614	1,423,694	1,400,910	1,390,505	1,271,561
Total Capital (excluding MCC)	ZAR'000	**238,682**	67,082	36,923	32,980	28,304	26,194	24,900	22,300	0
MCC	ZAR'000	**56,607**	9,492	7,383	7,383	7,080	7,080	7,080	7,050	4,058
Total Costs (including capital and royalty)	ZAR'000	**11,881,938**	1,572,152	1,594,635	1,603,821	1,525,998	1,456,968	1,432,890	1,419,855	1,275,619
Operating Profit (after all capital and royalty)	ZAR'000	**1,463,463**	-6,666	209,532	222,389	136,308	194,007	215,621	302,887	189,386
NPV - (low discount rate - 9%)	@9%	**953,927**								
NPV - (medium discount rate - 12%)	@12%	**838,829**								
NPV - (high discount rate - 15%)	@15%	**742,250**								

The NPV is calculated on a cash flow that accounts for factors such as:

- mining and ore processing working costs;
- royalty payments;
- capital costs, including costs allocated to ongoing development;
- any significant project work considered as major projects; and
- costs deemed as abnormal expenditure.

19.3 Sensitivity Analysis

The economic assumptions, cash flow breakdown and economic analysis contribute to the basis for the sensitivity analysis. The sensitivities are calculated and analysed, as shown in Table 19-5, Table 19-6 and Table 19-7. The sensitivity analysis is completed for variations in gold price (ZAR/kg), working costs (ZAR) and variations in production; and a combined analysis considering variations in commodity price, total operating costs, and changes in production.

Harmony has reviewed its exposure in terms of South Africa's political instability, the currency exchange rate, and the gold price, on its financial assets and financial liabilities, and has determined the sensitivities for a ±15% variance. Management considers this range to be a reasonable change given the volatility in the market.

Capital expenditure in Joel is approximately 6.5% of total costs over the LOM and not expected to have any significant impact on the NPV and therefore not included in a sensitivity analysis, but the profit/loss is after all working and capital costs. The base case in the analysis below is the economic results emanating from the LOM plan.

Table 19-5: Gold Price Sensitivity Analysis

Sensitivity (%)	Production (kg)	Gold Price (ZAR/kg)	Revenue (ZAR'000)	Operating Cost (ZAR'000)	Profit / Loss (ZAR'000)	NPV (ZAR'000)
+10%	17,491	839,300	14,679,941	10,900,908	3,779,033	2,630,036
+5%	17,491	801,150	14,012,671	10,900,908	3,111,763	2,166,228
LOM plan	17,491	763,000	13,345,401	10,900,908	2,444,493	1,702,420
-5%	17,491	726,667	12,709,905	10,900,908	1,808,997	1,260,703
-10%	17,491	693,636	12,132,182	10,900,908	1,231,274	859,129

Table 19-6: Total Operating Cost Sensitivity

Sensitivity (%)	Production (kg)	Gold Price (ZAR/kg)	Revenue (ZAR'000)	Operating Cost (ZAR'000)	Profit / Loss (ZAR'000)	NPV (ZAR'000)
+10%	17,491	763,000	13,345,401	11,990,999	1,354,402	948,237
+5%	17,491	763,000	13,345,401	11,445,953	1,899,447	1,325,330
LOM plan	17,491	763,000	13,345,401	10,900,908	2,444,493	1,702,420
-5%	17,491	763,000	13,345,401	10,381,817	2,963,583	2,061,552
-10%	17,491	763,000	13,345,401	9,909,916	3,435,484	2,388,040

The sensitivity analysis shown in Table 19-5 and Table 19-6 is based on a change in a single assumption while holding all other assumptions constant. The insights that can be provided by this sensitivity analysis is that Joel is most sensitive to changes in the gold price (ZAR/kg).

In practice, this is unlikely to occur, as risks and/or opportunities will have an impact on the cash flows, and changes in some of these assumptions may be correlated. The impact of one or a combination of risks and opportunities occurring at the same time cannot be specifically quantified so an analysis considering multiple parameters is considered a more likely scenario.

In this way the general risks, with the aid of the sensitivity table (Table 19-7) are adequately covered. The sensitivity analysis considering the three variations of gold price (ZAR/kg), operating costs (ZAR) and variation in production (kg gold) show that the lowering of working costs, improvement in productivity and the benefits of a higher gold price can have positive impacts for Joel.

Table 19-7: Gold Price, Operating Costs, and Production Variation Sensitivity

Sensitivity (%)	Production (kg)	Gold Price (ZAR/kg)	Revenue (ZAR'000)	Operating Cost (ZAR'000)	Profit / Loss (ZAR'000)	NPV (ZAR'000)
+10%	19,240	839,300	16,147,935	11,990,999	4,156,936	2,893,192
+5%	18,365	801,150	14,713,304	11,445,953	3,267,351	2,272,465
LOM plan	17,491	763,000	13,345,401	10,900,908	2,444,493	1,702,420
-5%	16,658	726,667	12,104,672	10,381,817	1,722,855	1,201,550
-10%	15,901	693,636	11,029,257	9,909,916	1,119,340	780,758

20 Adjacent properties

Section 229.601(b)(96) (20) (i-iv)

Beatrix Mine is the only contiguous operation and lies immediately west of Joel Mine (Figure 3-1). It is a large, shallow to intermediate level gold mining and processing operation, owned and operated by Sibanye-Stillwater Limited. Although Beatrix and Joel have exchanged blocks of ground in the past which were more accessible from each other's respective infrastructure, there are no physical connections between the two mines. Beatrix operates on a similar mining method and layout to Joel, and also primarily extracts the Beatrix Reef.

21 Other Relevant Data and Information

Section 229.601(b)(96) (21)

Other relevant information includes public disclosure reports on Joel's operational, financial and environmental performance are available on the Company's corporate website. The following reports are relevant to this TRS:

- Integrated annual report 2022;
- ESG report 2022;
- Financial report 2022;
- Report to shareholders 2022;
- Operational report 2022;
- TCFD report; and

22 Interpretation and Conclusions

Section 229.601(b)(96) (22)

Joel is a well-established mine and has been in operation since the late 1980s. Harmony has no known risks to conduct mining activities over it permitted mining rights' areas. In addition, no known risks are posed over surface access and activities, regarding mining related activities.

Joel's regional geological setting, mineralisation and deposit is well understood. The geology is supported by historical geophysical surveys, surface diamond core drilling and underground channel (chip) sampling and mapping. The bulk of the mineralisation is specifically within Beatrix Reef of the Kimberly (Aandenk) Formation.

The complex nature of the reef has resulted in a highly irregular distribution of gold throughout the mining area. There are broad low and high-grade zones over hundreds of metres, which are considered likely to be repeated within the reef environment beyond the limits of the current development. The geological anomalies are identified, defined, and managed by the Joel Geology Department. Recommended drilling of the 121 "Klippan" area, drilling towards 145 level as well as drilling on the east side of the shaft at 137 level will prove the Beatrix Reef extensions below the current infrastructure and confirm the surface holes values and channel width on the east side in 137 level.

The complex nature of the reef has resulted in a highly irregular distribution of gold throughout the mining area. There are broad low and high-grade zones over hundreds of metres, which are considered likely to be repeated within the reef environment beyond the limits of the current development. However, the detailed grade distribution within these zones remains very unpredictable.

The holistic understanding of the regional geology, lithological and structural controls of the mineralisation at Joel is sufficient to support the estimation of Mineral Resources.

The sampling approach and management, density assumptions, laboratory procedures, and assaying and analysis are in keeping with industry standards and practices and is appropriate for the conglomerate type of mineralisation at Joel.

The data pertaining to the mineralisation, regional and geological setting, exploration findings, sample collection, preparation, and testing, inclusive of data verification and metallurgical test work gives rise to the Mineral Resource estimate.

The combined Measured and Indicated Mineral Resource, exclusive of Mineral Reserves, as at 30 June 2022 is 4.44Mt at 7.76g/t Au, containing 1.11Moz of gold, and the Inferred Mineral Resource contains is 7.04Mt at 5.11g/t Au, containing 1.16Moz of gold.

Mineral Reserves are derived from the Mineral Resources, a detailed business plan and operational mine planning processes. Mine planning utilises and takes into consideration actual historical technical parameters. In addition, conversion of the Mineral Resources to Mineral Reserves considers Modifying Factors, such as cut-off grade, the MCF, the stoping width, the mining width and the plant recovery factor. The Mineral Reserve estimate as at 30 June 2022 is 3.74Mt at a grade of 4.97g/t Au of milled ore containing 597koz of gold.

Joel is forecast to operate profitably, and the LOM plan based on the Mineral Reserve estimate indicates positive cash flows, other than the current FY. The current FY2022/23 cash flow indicates a negative operating profit due to major capital expenditure for the refrigeration plant. However, it indicates a positive cash flow over the LOM as the grade and tonnages mined increase from the FY2023-24 onwards.

The mine plan is supported by the Mineral Resource and Mineral Reserve estimates and is considered achievable under the set of assumptions and parameters used. There are no obvious material risks that could have significant effect on the Mineral Reserves.

The Mineral Reserves are extracted using a well-proven scattered mining, labour-intensive narrow reef stoping method, which is ideal for the complex geology and high variability of the Beatrix Reef in the Joel mining right area. Ore is hoisted together with waste rock and dilutionary effect of this practice does require strict management of the mining grade to maintain profitability.

Ore mined at Joel, which was previously treated at the now decommissioned Joel processing plant, is now transported by road to the Harmony One Plant 40km away. This is Harmony's largest processing facility and was commissioned in 1986, based on the latest CIP technology at the time, and test work as shown the processing method is considered well established for mineralisation at Joel.

Joel is accessed via national and provincial road networks and the mine's regional and local infrastructure is capable of fully supporting the mining and other surface related mining activities. The scale of Joel's operation for the remaining LOM plan is considerably smaller than the operation for which the infrastructure was originally designed to support. This provides a comfortable buffer from an infrastructure perspective.

Harmony and Joel are exposed to market risks such as exchange rate and gold price fluctuations which are partially offset by the Harmony Group hedging policy. The hedging programme considers factors affecting the global gold market and these, along with macro-economic conditions, are used to determine planning and forecasting inputs at group level for all of Harmony's operating business units. Other non-gold related risks are addressed to some extent by Joel when entering into vendor agreements for the provisions of supplies and services, which are done on a competitive basis with customary price adjustment, renewal, and termination clauses.

To successfully operate a mining operation in South Africa the state requires compliance with applicable environmental laws, regulations, permits and standards. Joel adheres to the relevant compliance and regulatory standards. As part of the Harmony group, Joel conducts its operations based on policies and systems that are aligned to its corporate sustainable development framework. This is guided by the principles of the framework from the International Council on Mining and Metals or the United Nations Global Compact. Harmony discloses its sustainable development voluntarily in accordance with the guidelines issued by the GRI. Further to this, Harmony discloses environmental information on the CDP for both climate change and water.

Harmony has a good understanding of the environmental and social aspects through baseline and specialist studies previously conducted. Risk management and mitigation measures were adequately addressed in the environmental management plans. All the required environmental authorisations are in place, and only require amendments to be made to reflect any relevant changes, none of which are pending at the effective date of this report. Based on current industry norms, a realistic timeframe to obtain relevant authorisations is estimated between 12 and 18 months.

The economics of Joel are based on the LOM discounted cash flow model which indicate a NPV of ZAR954m at a discount rate of 9%, at the planned gold price of ZAR763,000/kg. The NPV is calculated on cash flows that consider factors such as: capital and operating costs; working capital, royalties and taxes. The capital and operating cost estimates for Joel are based on historical data, as well as budget forecasts. This estimation technique allows for the forecast and actual costs to be reasonably well aligned and realistic.

Royalties and taxes are paid to the South African government and accounted for in the Joel cash flow and NPV analysis. There are also specific tax relief benefits that apply to gold mining companies, where 5% of total revenue is exempt from taxation, amongst other benefits. In addition, in response to challenges faced by companies during the COVID-19 pandemic, the government have implemented various stimulus packages to provide some tax relief to companies.

The economics of Joel are tested for its sensitivity to commodity price (ZAR/kg), operating costs (ZAR) gold production (kg). The insights provided by the sensitivity analysis is that Joel Mine is most sensitive to changes in the ZAR gold price, which is particularly pertinent in light the variability of the head grade and the marginal nature of the operation.

The TRS provides sufficient information as required and there is no other relevant data and information. The TRS was prepared by a team of experienced professionals. The TRS provides a summary of the material scientific and technical information concerning the mineral exploration, Mineral Resources, Mineral Reserves, and associated production activities of the mineral asset, including references to the valuation for Joel. Each QP was responsible for specific sections of this TRS which they have personally supervised and reviewed. This TRS contains the expression of the QP opinions, based on the information available at the time of preparation.

23 Recommendations

Section 229.601(b)(96) (23)

The Joel on-mine team recommends that additional capital drilling be planned for the 121 "Klippan" area as well as drilling towards 145 level, in order to prove the Beatrix Reef extensions below the current infrastructure and to confirm the grades, facies on the east of the shaft in 137 level. The estimated cost for drilling is ZAR6.3m.

24 References

Section 229.601(b)(96) (24)

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25 Reliance on Information Provided by the Registrant

Section 229.601(b)(96) (25)

Further to Section 24, in the preparation of this TRS, the principal QPs and authors relied upon information provided by the Registrant and other internal specialists with regards to mining rights, surface rights, contractual agreements, historical operating expenditures, community relations and other matters. The work conducted by these specialists was completed under the supervision and direction of the respective QPs. The specialists who assisted the principal authors and QPs are listed in Table 25-1.

Table 25-1: Other Specialists

Name	Specialist	Responsibility	Association / Company
S. Nkaletshane	Sectional Geologist	Exploration	Joel
J. Powell	Geostastician	Mineral Resource Estimation	Harmony Central
S. Sebotsa	HOD Survey	Mine Design	Joel
E. Matodi	Chief Safety Officer	Mining Method	Joel
T Itholeng	Rock Engineering Manager	Mining Method	Joel
M. Phahlamohlaka	Mining Manager	Mining Method	Joel
M. Nene	Engineer	Infrastructure	Joel
L Evans	Human Resource Leader	Mining Personnel	Joel