Goldfields.com

Technical Report – National Instrument 43-101

St Ives Gold Mine

Western Australia

Effective Date: 31 December 2021

Prepared by Gold Fields Limited

Qualified Person	Company	Date of Signing
Dr Julian Verbeek FAusIMM	Gold Fields	30 June 2022
Richard Butcher FAusIMM (CP)	Gold Fields	30 June 2022

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1 Summary

This Technical Report was prepared for Gold Fields Limited (Gold Fields, the Company or the Issuer) in accordance with the requirements of National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101) of the Canadian Securities Administrators, in relation to the St Ives Gold Mine, a production stage property located in the Eastern Goldfields region of Western Australia.

This Technical Report has been prepared for purposes of applicable Canadian securities laws (i) to support the scientific and technical information concerning the project which will be contained or in the management information circular of Yamana Gold Inc. (Yamana) for the special meeting of Yamana's shareholders to be held to approve the proposed acquisition by Gold Fields of all the issued and outstanding shares of Yamana pursuant to a plan of arrangement under the *Canada Business Corporations Act* (the Arrangement), and (ii) in connection with Gold Fields becoming a "reporting issuer" upon completion of that Arrangement for purposes of applicable securities laws in each of the provinces and territories of Canada.

The effective date of this Technical Report is 31 December 2021. This Technical Report does not purport to reflect new information regarding the project arising after such date.

Unless otherwise specified, all units of currency are in United States Dollars (US$). All measurements are metric with the exception of troy ounces (oz)

1.1 Property description and ownership

St Ives is located approximately 80 km south-southeast of the regional city of Kalgoorlie-Boulder and approximately 630 km east of the capital city of Perth in Western Australia (Figure 1.1).

Figure 1.1: Location of St Ives

Source: St Ives CPR, 2021

St Ives Gold Mining Company Pty Ltd (SIGMC), a wholly owned subsidiary of Gold Fields has 100 % ownership of 263 granted Mining Leases, 27 granted Exploration Licenses and 1 Prospecting Licence covering an area of 120,292 ha, and 24 Miscellaneous Licenses covering an area of 134,933 ha inclusive of 134,713 ha for water exploration.

SIGMC holds an interest in 49 non-managed leases totalling 6,747 ha and 13 joint venture tenements with Lefroy Exploration totalling 37,212 ha in which SIGMC is currently earning an interest.

The major components of the St Ives gold mining and processing operation are:

- The operating Invincible and Hamlet underground mines accessed by declines.
- The operating Neptune and Delta Island open pit mines.
- A 4.7 Mt/pa carbon-in-pulp (CIP) process plant with SAG mill.
- Tailings storage facilities (TSF).
- Administration centers.

Ore is trucked to the central processing facility via a network of haul roads and causeways.

1.2 Geology and mineralisation

The St Ives property lies within the Kalgoorlie Terrane, part of the Norseman-Wiluna Greenstone Belt of the Archean Yilgarn Craton, a 2.7 Ga granite-greenstone superterrane in southern Western Australia. Within the Kalgoorlie Terrance the Kambalda Domain is bound by the north-northwest trending Boulder-Lefroy Fault (Boorara Domain) and Zuleika Shear (Coolgardie Domain). The geology of the St Ives area is broadly divided into three main sequences:

- Late Meroguil Sequence - Late stage epiclastic sedimentary rocks.
- Middle Kalgoorlie Sequence - Felsic to intermediate volcano-sedimentary rocks.
- Early Kambalda Sequence – Ultramafic/mafic rock package.

Most of the known gold deposits are proximal to the axial plane of the gently south-plunging Kambalda Anticline, which extends 35 km from the southern end of the Kambalda Dome to the Junction mine.

A major second order structure known as the NNW trending Playa Shear splays off the Boulder-Lefroy Fault and strikes through the St Ives property for more than 10 km. Most of the gold orebodies at St Ives are associated with third order splays off the Playa Shear. Mineralisation typically occurs where these structures intersect favourable rock units with chemical or rheological contrasts combining with structural flexures to form the most important local controls to gold mineralisation. The most common host rock is granophyric dolerite of the Kambalda sequence (Defiance, Junction and Condenser Dolerite) and the Kapai Slate.

At least 80 individual deposits have been mined in the St Ives area to date. The current major production centres at St Ives are the Invincible deposits, the Neptune paleochannel and underlying lodes and the Hamlet deposit.

Invincible is hosted in northwest trending, steeply southwest dipping Archean volcaniclastic sediments of the Black Flag Mudstone and the Black Flag Andesite of the Kalgoorlie Sequence. Gold mineralisation occurs as stacked sub vertical quartz breccia lodes mainly within the Black Flag Mudstone, and extensional quartz vein stockworks in the footwall of the Black Flag Andesite. Quartz veining, combined with albite-pyrite alteration, is directly related to high-grade mineralisation. Two prominent shear zones are associated with the Invincible deposit, the Merougil shear and the Morgan Island shear.

The Neptune deposit consists of three main mineralisation styles: paleochannel, supergene and fresh lode material. The largest and most significant contribution comes from paleochannel gold deposited within a main east-west channel, minor tributaries and paleo-slope sheetwash. The underlying fresh lode structures trend roughly north-south and generally dip moderately to the east.

The Hamlet deposit is hosted within the Paringa Basalt and occurs in a north trending reverse shear zone. The gold mineralisation is associated with a biotite alteration halo hosting quartz-albite and quartz-carbonate veins. The high-grade portion comprises breccia zones and vein or stockwork vein arrays while the Hamlet North deposit is hosted in the Defiance Dolerite Unit 4 where the Hamlet shear intercepts this unit at high angles.

1.3 Exploration, development and operations

The St Ives operation currently comprises the Neptune open pit, Invincible South and Hamlet North underground mines with associated infrastructure and facilities that operate year-round.

The underground mines are accessed via declines. Mining contractors employ mostly long-hole stoping methods with paste/rock fill. The underground mines are relatively shallow and configured to mitigate geotechnical seismic risk through mine design, scheduling and defined ground support regimes.

The open pits are mined using conventional drill and blast with truck and shovel. Surface mining operations are conducted using an owner-operator mining fleet.

Ore from individual mining operations is transported with road trains to the central Lefroy processing facility.

The recent production performance of St Ives is summarised in Table 15-1.

There is a strong history of replacing and extending Mineral Resources and Reserves through down dip extensional drilling and exploration for additional proximal deposits at St Ives. Annual exploration programs are however limited in their ability to define mineralisation ahead of current workings because they rely increasingly on underground development to provide drill platforms as operations transition to a predominantly underground operation. Nevertheless, there remains a high probability that exploration will be able to sustain reserve growth beyond the current life of mine. Emphasis is currently on the continued expansion of the Invincible underground operations with full production now established. SIGMC is assessing the potential to expand Invincible production from the current 1.5 Mt/a to 2 Mt/a over the next three years. At Hamlet North, focus is on extending the mine down dip of the current Mineral Reserve following encouraging exploration drilling results. Open pit production continues at the Neptune complex, mining from pit Stages 5 and 6. Exploration drilling has significantly expanded the Neptune Stage 7 open pit, merging it with the main Neptune open pit. Pre-stripping of this cut-back commenced in late 2020.

Feasibility studies on Invincible Deeps underground and the Delta Island, Pistol Club and Justice open pits were progressed. Pre-feasibility studies are planned for the greater Invincible underground extensions and the Swiftsure and Santa Ana open pits.

Exploration drilling targeted additions to the Invincible and Neptune complexes. Drilling at Invincible is focused on the conversion of open pit resources at Invincible Footwall South and Lut into reserves. Growth in underground reserves at Invincible will be targeted by surface drilling at Invincible South and assessing strike extensions from underground drilling at Invincible South and the Link area between the Invincible and Invincible Deeps zones. Drilling completed at Hamlet North extended economic mineralisation down dip of the current reserve. Extensional drilling is ongoing at the Neptune Surface complex, targeting additional open pit stages.

Brownfield exploration continued to focus on the Lefroy Exploration joint venture, the Central Corridor, Kambalda West, and the Eastern and Western Basin areas. The Northern Speedway trend was explored for its open pit potential. A small resource was added at the Lut target adjacent to the Invincible Stage 7 open pit reserve as part of the Speedway North drilling.

1.4 Mineral Resource estimates

Mineral Resources exclusive of Mineral Reserves as at 31 December 2021 are summarised in Table 1-1. The Mineral Resources are 100 % attributable to Gold Fields and are net of production depletion up to 31 December 2021. The point of reference for the Mineral Resources is in situ gold mineralisation, except for underground Mineral Resources, which have minimum mining width applied.

Table 1-1: St Ives Gold Mine - summary of gold Mineral Resources as at 31 December 2021 based on a gold price of $1,500/oz

	Resources (exclusive of Mineral Reserves)			Cut-off grades/ (g/t Au)	Metallurgical recovery/ (%)
	Tonnes (kt)	Grades/ (g/t Au)	Gold (koz Au)		
Underground Mineral Resources					
UG Measured Mineral Resources	542	4.4	77	1.9 to 3.8	85 % to 96.6 %
UG indicated Mineral Resources	4,713	4.0	602	1.9 to 3.8	85 % to 96.6 %
UG Measured + Indicated Mineral Resources	5,255	4.0	678	1.9 to 3.8	85 % to 96.6 %
UG Inferred Mineral Resources	7,990	4.3	1,093	1.9 to 3.8	85 % to 96.6 %
Open Pit Mineral Resources					
OP Measured Mineral Resources	674	2.9	64	0.71 to 1.05	89.3 % to 97.7 %
OP Indicated Mineral Resources	4,665	2.3	350	0.71 to 1.05	89.3 % to 97.7 %
OP Measured + Indicated Mineral Resources	5,339	2.4	414	0.71 to 1.05	89.3 % to 97.7 %
OP Inferred Mineral Resources	1,806	2.7	158	0.71 to 1.05	89.3 % to 97.7 %
Stockpile Mineral Resources					
SP Measured Mineral Resources	-	-	-		
SP Indicated Mineral Resources	-	-	-		
SP Measured + Indicated Mineral Resources	-	-	-		
SP Inferred Mineral Resources	-	-	-		
Total St Ives Mineral Resources					
Total Measured Mineral Resources	1,216	3.6	140		
Total Indicated Mineral Resources	9,378	3.2	952		
Total Measured + Indicated Mineral Resources	10,594	3.2	1,092		
Total Inferred Mineral Resources	9,796	4.0	1,252		

Notes:
a) Rounding of figures may result in minor computational discrepancies.
b) Mineral Resources are exclusive of Mineral Reserves.
c) Mineral Resource categories are assigned with consideration given to geological complexity, grade variance, drillhole intersection spacing and proximity of mining development.
d) Quoted as diluted in-situ metric tonnes and grades. Metallurgical recovery factors have not been applied to the Mineral Resource estimates. The metallurgical recovery is the ratio, expressed as a percentage, of the mass of the specific mineral product recovered from ore treated at the process plant to its total specific mineral content before treatment. St Ives mining operations vary according to the mix of the source material (e.g. oxide, transitional, fresh and ore type blend).
e) The metal prices used for the 2021 Mineral Resources are based on a gold price of $1,500 per ounce (at an exchange rate of A$1:$0.75). Open pit Mineral Resources at the Australian operations are similarly based on revenue factor 1 pits and the underground Mineral Resources on appropriate mine design and extraction schedules. The gold price used for Mineral Resources approximates 15 % higher than the selected Mineral Reserve.
f) The cut-off grade may vary per shaft, open pit or underground mine, depending on the respective costs, depletion schedule, ore type, expected mining dilution and expected mining recovery. The average or range of cut-off grade values applied to the Mineral Resources are St Ives 1.9 g/t to 3.8 g/t Au mill feed (underground) and 0.7 g/t to 1.05 g/t Au (open pit).
g) The Mineral Resources are based on initial assessments at the resource gold price of $1,500/oz and consider estimates of all St Ives costs, the impact of modifying factors such as mining dilution and mining recovery, processing recovery and royalties. Mineral Resources are also tested through the application of Environmental, Social and Governance (ESG) criteria to demonstrate reasonable prospects for economic extraction.
h) The Mineral Resources are estimated at a point in time and can be affected by changes in the gold price, US Dollar currency exchange rates, permitting, legislation, costs and operating parameters.

Source: St Ives CPR, 2021

1.5 Mineral Reserve estimates

The St Ives Mineral Reserves as of 31 December 2021 are summarised in Table 1-2 The Mineral Reserves are 100 % attributable to Gold Fields and are net of production depletion up to 31 December 2021. The point of reference for the Mineral Reserves is ore delivered to the processing facility.

Table 1-2: St Ives - summary of gold Mineral Reserves as at 31 December 2021 based on a gold price of $1,300/oz

	Tonnes (kt)	Grades/ (g/t Au)	Gold (koz Au)	Cut-off grades/ (g/t Au)	Metallurgical recovery/ (%)
Underground Mineral Reserves					
UG Proven Mineral Reserves	1,734	5.1	287	2.5 to 3.5	92.8 % to 96.5 %
UG Probable Mineral Reserves	11,526	4.6	1,693	2.5 to 3.5	92.8 % to 96.5 %
UG Total Mineral Reserves	13,260	4.6	1,980	2.5 to 3.5	92.8 % to 96.5 %
Open Pit Mineral Reserves					
OP Proven Mineral Reserves	63	2.2	4	0.35 to 0.40	89.5 % to 97.6 %
OP Probable Mineral Reserves	3,852	2.3	282	0.35 to 0.40	89.5 % to 97.6 %
OP Total Mineral Reserves	3,915	2.3	286	0.35 to 0.40	89.5 % to 97.6 %
Stockpile Mineral Reserves					
SP Proven Mineral Reserves	2,906	1.6	146	0.35 to 0.40	89.5 % to 97.6 %
SP Probable Mineral Reserves	-	-	-		
SP Total Mineral Reserves	2,906	1.6	146	0.35 to 0.40	89.5 % to 97.6 %
Total Mineral Reserves					
Total Proven Mineral Reserves	4,703	2.9	437		
Total Probable Mineral Reserves	15,378	4.0	1,975		
Total St Ives Mineral Reserves 2021	20,081	3.7	2,412		
Total St Ives Mineral Reserves 2020	25,479	3.3	2,665		
Year on year difference (%)	-21%	15%	-9%		

Notes:
a) Rounding of figures may result in minor computational discrepancies.
b) Refer to Table 15-6 for year-on-year Mineral Reserve comparison
c) Quoted as mill delivered metric tonnes and run-of-mine (RoM) grades, inclusive of all mining dilutions and gold losses except mill recovery. Metallurgical recovery factors have not been applied to the reserve figures. The metallurgical recovery is the ratio, expressed as a percentage, of the mass of the specific mineral product recovered from ore treated at the process plant to its total specific mineral content before treatment. The recoveries for St Ives vary according to the mix of the source material (e.g. oxide, transitional fresh and ore type blend) and method of treatment.
d) The metal prices used for the 2021 LoM Mineral reserves are based on a gold price of $1,300 per ounce (at an exchange rate of A$1:$0.74). Open pit Mineral Reserves at St Ives are based on optimised pits and the underground operations on appropriate mine design and extraction schedules. The gold price used for Mineral Reserves is detailed in particularity in chapter 16 Marketing.
e) Dilution relates to planned and unplanned waste and/or low-grade material being mined and delivered to the process plant. Ranges are given for those operations that have multiple orebody styles and mining methodologies. The mine dilution factors are 5 % to 52 % (open pit) and 5 % to 57 % (underground).
f) The mining recovery factor relates to the proportion or percentage of ore mined from the defined orebody at the gold price used for the declaration of Mineral Reserves. This percentage will vary from mining area to mining area and reflects planned and scheduled reserves against actual tonnes, grade and metal mined, with all modifying factors, mining constraints and pillar discounts applied. The mining recovery factors are 90 % to 93 % (underground) and 91 % to 100 % (open pit).
g) The cut-off grade may vary per shaft, open pit or underground mine, depending on the respective costs, depletion schedule, ore type, expected mining dilution and expected mining recovery. The average or range of cut-off grade values applied in the planning process are St Ives 2.5 g/t to 3.5 g/t Au mill feed (underground) and 0.35 g/t to 0.40 g/t Au (open pit).
h) An ounces-based Mine Call Factor (metal called for over metal accounted for) determined primarily on historic performance but also on realistic planned improvements where appropriate is applied to the Mineral Reserves. A Mine Call Factor of 100 % has been applied at St Ives.
i) The Mineral Reserves are estimated at a point in time and can be affected by changes in the gold price, US Dollar currency exchange rates, permitting, legislation, costs and operating parameters.
j) St Ives is 100 % attributable to Gold Fields and is entitled to mine all declared material located within the properties mineral leases and all necessary statutory mining authorisations and permits are in place or have reasonable expectation of being granted.

Source: St Ives CPR, 2021

1.6 Capital and Operating costs

1.6.1 Capital

The capital costs for the Mineral Reserve LoM plan are based on detailed requirements for the next two years and have in general an order of accuracy of ±10 %. Capital estimates beyond two years, are based on pre-feasibility or better estimates for infrastructure and development requirements for individual projects. The forecast capital costs are summarised in Table 1-3.

Table 1-3: Capital costs (US$ million)

Capital cost	Units	2022	2023	2024	2025	2026	2027	2028	2029	2030
Capital	$ million	96.6	78.8	79.5	52.0	38.4	24.6	18.6	16.7	7.7

Note: a) The detailed capital cost schedule is presented in Table 21-1.
b) This capital summary estimate is for the Mineral Reserve LoM schedule.
c) Closure costs are included in operating costs.

Source: St Ives CPR, 2021

1.6.2 Operating costs

Operating costs are based on general planning assumptions or project-specific planning assumptions where applicable. Forecast operating costs for the Mineral Reserve LoM plan are summarised in Table 1-4.

Table 1-4: Operating costs (US$ million)

Operating cost	Units	2022	2023	2024	2025	2026	2027	2028	2029	2030
Operating costs	$ million	262.1	277.2	227.6	238.2	232.5	211.5	197.1	177.3	99.1

Note: a) The detailed operating cost schedule is presented in Table 21-2.
b) This operating cost summary estimate is for the Mineral Reserve LoM schedule.
c) Closure costs are presented from 2031 onwards.

Source: St Ives CPR, 2021

1.7 Permitting

SIGMC has security of tenure for all current exploration and mining tenements that contribute to Mineral Resources and Reserves. St Ives operates in compliance with relevant environmental legislation and remains compliant regarding key environmental risks, namely: TSFs, processing of ore, land disturbance, chemical blending and storage, sewage and landfill operations and mine dewatering. All other permitting and licensing requirements to start any future mining operation, including but not limited to, issues of Aboriginal cultural heritage, local disturbance, clearing, environmental, power and water extraction/disposal permitting, follow well established authorisation protocols with the relevant state authorities.

Current permitting consists of:

- Department of Water and Environmental Regulation:
  - Ministerial Statement 1128 provides approval for land access and disturbance over a defined part of the St Ives operation.
  - Environmental Licence L8485 provides authorisation of defined polluting activities.
  - Ground water licence 171060 provides for abstraction of raw water from our production bore field.
  - Ground water Licence 62505 and 205729 provide for dewatering of mining areas.

- Department of Mines, Industry Regulation and Safety:

- One Mining Proposal RegID 81919 provides for approval for mining related activities, other than exploration, within active and historic mining areas within the operating area.
- Mine Closure Plan RegID 88163 provides for progressive and end of mine closure and rehabilitation.
- A range of Programs of Works provide approval for exploration activities across all SIGM tenements.
- A range of Native Vegetation Clearing Permits for clearing not otherwise addressed by other approvals.

- Department of Planning, Lands and Heritage:
  - Aboriginal heritage surveys are conducted on an ongoing basis across much of the site.

Currently, there are no legal or stakeholder issues that are likely to impact the mining operations.

In 2014, a claim under the Native Title Act 1993 (Cth) by the Ngadju People (WAD6020/1998) over an area including part of the St Ives property was determined by the Federal Court.

In 2019, a Native Title claim by the Marlinyu Ghoorlie People (WAD647/2017) over a separate area also covering part of the St Ives property was registered. St Ives is currently engaged in early discussions with the Marlinyu Ghoorlie People under the 'right to negotiate' process with respect to certain exploration tenure.

SIGMC consults with relevant Aboriginal stakeholder groups (including the Ngadju and the Marlinyu Ghoorlie Peoples) to ensure that areas of Aboriginal cultural heritage are identified and recorded. Some of these processes are covered by heritage management agreements. SIGMC also engages on a range of development activities in the host communities in which the mines are situated.

The overall closure liability for St Ives is currently estimated at $118.2 million as disclosed in Item 20.5.

1.8 Conclusions and recommendations

The St Ives Mineral Reserves currently support a 9 year LoM plan that values the operation at $206.7 million NPV at the reserve gold price of $1,300/oz. SIGMC continues to discover and replace Mineral Reserves that contribute to sustained growth and extending the LoM profile. Ongoing investment in exploration and infrastructure is justified by the positive economic analysis.

It is recommended that further exploration is carried out at the following areas which have a good probability of extending mine life:

- Greater Invincible down dip and in the footwall.
- Central Corridor of the St Ives tenement package targeting new underground resources.
- Extension of existing Open Pit resources and conversion into reserves through mining studies.
- Early stage exploration at the Lefroy Joint Venture, Kambalda West, Eastern Basins and Western Basins searching for new Open Pit discoveries.

Gold Fields' commitment to materiality, transparency and competency in its Mineral Resources and Mineral Reserves disclosure to regulators and in the public domain is of paramount importance to the Qualified Person and the Issuers Executive Committee and Board of Directors continue to endorse the company's internal and external review and audit assurance protocols. This Technical Report should be read in totality to gain a full understanding of St Ives's Mineral Resource and Mineral Reserve estimation and reporting process, including data integrity, estimation methodologies, modifying factors, mining and processing capacity and capability, confidence in the estimates, economic analysis, risk and uncertainty and overall projected property value.

However, to ensure consolidated coverage of the company's primary internal controls in generating Mineral Resource and Reserve estimates a key point summary is provided in Item 24 for reference.

2 Introduction

2.1 Terms of reference and purpose of the Technical Report

This Technical Report was prepared for Gold Fields Limited (Gold Fields, the Company or the Issuer) in accordance with the requirements of National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101) of the Canadian Securities Administrators, in relation to the St Ives Gold Mine, a production stage property located in the Eastern Goldfields region of Western Australia.

This Technical Report has been prepared for purposes of applicable Canadian securities laws in connection with the proposed acquisition by Gold Fields of all the issued and outstanding shares of Yamana Gold Inc. (Yamana), a company incorporated under the *Canada Business Corporations Act* (the CBCA) whose shares are listed on the Toronto Stock Exchange, the New York Stock Exchange and the London Stock Exchange, pursuant to a plan of arrangement under the CBCA (the Arrangement). The management information circular of Yamana (the Yamana Circular) for the special meeting of Yamana's shareholders to be held to approve the Arrangement will contain certain information regarding the project, including estimates of Mineral Reserves and Mineral Resources for the project effective as of December 31, 2021. In addition, upon completion of the Arrangement, Gold Fields will become a "reporting issuer" for purposes of applicable securities laws in each of the provinces and territories of Canada. Accordingly, this Technical Report has been prepared (i) to support the scientific and technical information concerning the project which will be contained in the Yamana Circular, and (ii) in connection with Gold Fields becoming a reporting issuer in such jurisdictions of Canada. It is understood that this Technical Report will be filed on the System for Electronic Document Analysis and Retrieval (SEDAR) maintained by the Canadian Securities Administrators.

The effective date of this Technical Report is 31 December 2021. This Technical Report does not purport to reflect new information regarding the project arising after such date.

In addition to this disclosure being in line with NI 43-101, the Mineral Resources and Mineral Reserves stated in this Technical Report have also been reported in accordance with the South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves (SAMREC Code 2016). SAMREC is aligned to the Committee for Mineral Reserves International Reporting Standards (CRIRSCO) Reporting Template November 2019.

2.2 Qualified Persons and details of inspection

The Qualified Persons responsible for the preparation of this Technical Report are listed in Table 2-1. All the Qualified Persons are eligible members in good standing of a recognised professional organisation (RPO) within the mining industry and have at least five years of relevant experience in the type of mineralisation and type of deposit under consideration and in the specific type of activity that the Qualified Person is undertaking on behalf of the Company at the time this Technical Report was prepared.

Qualified Person has the same meaning as Qualified Persons and vice versa within this report.

2.2.1 Certificates

Dr Julian Verbeek, FAusIMM

CERTIFICATE OF QUALIFIED PERSON

This Certificate of the Qualified Person has been prepared to meet the requirements of National Instrument 43-101 Standards of Disclosure for Minerals Projects Part 8.

a. Name, Address, Occupation

Dr Julian Verbeek FAusIMM, Geologist

Registered Office, Johannesburg: Gold Fields Limited, 150 Helen Road, Sandown, Sandton 2196.

Postnet Suite 252, Private Bag X30500, Houghton 2041

b. Title and Effective Date of Technical Report

Technical Report – National Instrument 43-101 St Ives Gold Mine - 2021

Effective Date: 31 December 2021

c. Qualifications

PhD Geology, University of Natal 1991.

FAusIMM

I am a geologist with 35 years relevant experience in Mineral Resource estimation in multiple commodities including gold, copper and silver in deposit styles of placer, lode gold, porphyry and epithermal. I am currently in full time employment with Gold Fields, in which I have had overseeing involvement in geology and resource estimation at the operating mines and development projects for the Issuer.

As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43-101 for the sections of the technical report that I take responsibility for.

d. Site Inspection

Has attended site on the 6th to the 8th October 2021

e. Responsibilities

I am responsible for Items 1-28 of this Technical Report.

f. Independence

I am a full time employee of Gold Fields Limited and hence not independent in accordance with the application of Section 1.5 of National Instrument 43-101.

g. Prior Involvement

I have been employed by Gold Fields since September 2021. I have visited the St Ives site and have participated extensively in virtual reviews and in person reviews at Gold Fields office in Perth.

h. Compliance with NI 43-101

I have read National Instrument 43-101 and Form 43-101F1 and the Technical Report has been prepared in compliance with the same.

i. Disclosure

As of the effective date of the Technical Report, to the best of my knowledge, information, and belief, the parts of the Technical Report that I am responsible for, contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

"Signed and sealed by Julian Verbeek"

"Julian Verbeek" Date: June 30, 2022

Dr. Julian Verbeek

Richard Butcher, CEng, Msc (Eng), FAusIMM (CP), MIMMM, MSAIMM

CERTIFICATE OF QUALIFIED PERSON

This Certificate of Qualified Person has been prepared to meet the requirements of National Instrument 43-101 Standards of Disclosure for Minerals Projects Part 8.

a. Name, Address, Occupation

Richard Butcher, CEng, FAusIMM (CP), MIMMM, MSAIMM

Registered Office, Johannesburg: Gold Fields Limited, 150 Helen Road, Sandown, Sandton 2196.

Postnet Suite 252, Private Bag X30500, Houghton 2041

b. Title and Effective Date of Technical Report

Technical Report – National Instrument 43-101 St Ives Gold Mine - 2021

Effective Date: 31 December 2021

c. Qualifications

Msc (mining engineering)

CEng, FAusIMM (CP), MIMMM, MSAIMM

I am a mining engineer with 41 years relevant experience in Mineral Reserve estimation, assessment, evaluation and economic extraction in gold, copper and silver. I have worked in Resources and Reserves at Barrick, MMG, **SRK, IGL** and Gold Fields for the last **25** years. I also worked at SRK and other Consultancies in estimating Resources and Reserves. I have held various corporate positions and I am currently the Chief Technical Officer for Gold Fields, in which I have had overseeing involvement in mining engineering and technical services matters at various operating mines and development projects for the Issuer.

As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43-101 for the sections of the technical report that I take responsibility for.

d. Site Inspection

Has attended site 18th March 2021.

e. Responsibilities

I am responsible for Items 1-5, 13 & 15-28 of this Technical Report.

f. Independence

I am not independent of Gold Fields Limited in accordance with the application of Section 1.5 of National Instrument 43-101.

g. Prior Involvement

During my 6-year tenure at Gold Fields I have been responsible for providing leading levels of technical standards, technical assurance, technical excellence, operational leadership, project delivery and asset optimisation, to the Issuer. I have had oversight of planning and execution of technical programs for Gold Fields to ensure that all Group technical disciplines are optimised, standardised and leveraged in a manner that delivered benefit across Gold Fields assets, operations and projects. I have had communications with and attended meetings with discipline heads at site and the corporate level.

h. Compliance with NI 43-101

I have read National Instrument 43-101 and Form 43-101F1 and the Technical Report has been prepared in compliance with the same.

i. Disclosure

As of the effective date of the Technical Report, to the best of my knowledge, information, and belief, the parts of the Technical Report that I am responsible for, contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

"Signed and sealed by Richard Butcher"

"Richard Butcher" Date: June 30, 2022

Richard Butcher

Table 2-1 : List of Qualified Persons

Incumbent	Employer	Position	Affiliation in good standing	Relevant experience (years)	Details of inspection	Responsibility for which Items
Dr Julian Verbeek	Gold Fields	VP Geology and Mineral Resources	FAusIMM - 207994	34	6 - 8 Oct 2021 and virtual reviews	This document has been prepared under the supervision of and reviewed by Julian Verbeek. Chapters 1-28
Richard Butcher	Gold Fields	Chief Technical Officer GFL Group Technical Services	FAusIMM CP - 211182	41	18 Mar 2021	Overview and review of document. Chapters 1-5, 12-13 & 15-28

The Qualified Persons were able to attend site during 2021 for the Mineral Reserve and Mineral Resource reviews, and the Mineral Reserve and Mineral Resources were also reviewed according to the Item 24 descriptions.

2.3 Report version update

This is the maiden Technical Report filed by Gold Fields on the St Ives property in Western Australia.

3 Reliance on other experts

The Qualified Person has not identified any information provided by the Issuer for St6 Ives that requires noting under Item 27.

4 Property description and location

4.1 Area

The Company via its wholly owned subsidiary SIGMC controls Mining, Exploration and Prospecting Licences covering an area of 120,292 ha, and 24 Miscellaneous Licenses covering an area of 134,934 ha.

4.2 Location

The St Ives property is approximately 80 km south-southeast of the regional city of Kalgoorlie-Boulder at latitude 31 º 19’ 12.6” S and longitude 121 º 44’ 25.5” E. Kalgoorlie-Boulder is approximately 630 km east of the capital city of Perth in Western Australia (Figure 1.1). The nearest population centre is the town of Kambalda, situated 21 km by road, to the immediate north of the property. The closest major population centre is the city of Kalgoorlie-Boulder (population 30,000), approximately 70 km by road to the north.

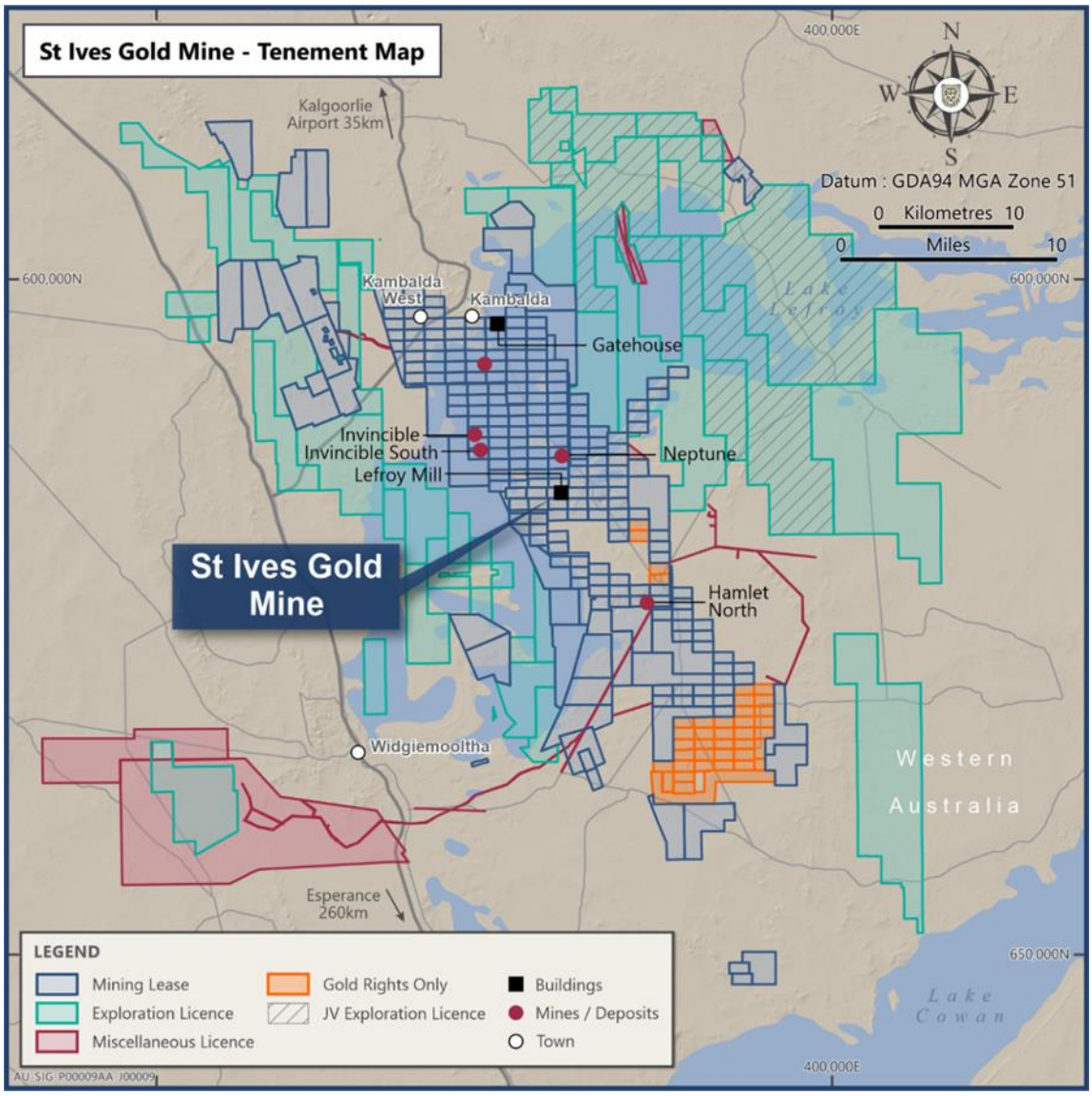
4.3 Type of mineral tenure

The Company via its wholly owned subsidiary SIGMC has 100 % ownership of 263 granted Mining Licences, 27 granted Exploration Licenses and 1 Prospecting Licence covering an area of 120,292 ha, and 24 Miscellaneous Licenses covering an area of 134,934 ha. All tenements are registered in the name of SIGMC which has security of tenure for all current exploration and mining leases that contribute to the Mineral Resources and Reserves described in this report. SIGMC does not have freehold ownership to any of the mining areas.

SIGMC holds an interest in 49 non-managed leases totalling 6,752 ha and 13 joint venture tenements with Lefroy Exploration (ASX: LEX) totalling 37,213 ha in which SIGMC is currently earning an interest. On 6 June 2018, St Ives entered into a Farm in Agreement with Hogans Resources Pty Ltd and Lefroy Exploration Ltd (LEX JV) where St Ives may earn up to a 70 % interest in the LEX JV tenements through the funding of exploration.

A summary of the tenements is shown in Table 4-1 and illustrated in Figure 4.1.

Figure 4.1: St Ives leasing outline and mining areas



Source: St Ives CPR, 2021

Table 4-1: List of St Ives mineral tenements

Number	Grant date	Expiry date	Area	Annual rent (US$)	Min annual Expenditure (US$)	Reporting Group	Term Granted
Exploration Licences							
E15/1010	20-Aug-08	19-Aug-22	11 BL	$5,511	$51,800	St Ives – C052/2002	5 Years (Extended)
E15/1347	27-Oct-21	26-Oct-26	3 BL	$324	$11,100		5 Years
E15/1385	22-Jan-14	21-Jan-24	1 BL		$14,800	Kambalda West – C115/2013	5 Years (Extended)
E15/1418	17-Dec-15	16-Dec-25	10 BL	$5,010	$37,000	Merougil – C015/2018	5 Years (Extended)
E15/1447	02-Aug-16	01-Aug-26	49 BL	$12,981	$72,520	Lefroy West – C106/2018	5 Years (Extended)
E15/1457 *	11-Aug-15	10-Aug-25	8 BL	$4,008	$37,000	Kambalda West – C115/2013	5 Years (Extended)
E15/1471	13-Jan-16	12-Jan-26	26 BL	$13,025	$38,480	St Ives – C052/2002	5 Years (Extended)
E15/1516	23-Oct-17	22-Oct-22	6 BL	$1,590	$22,200	Merougil – C015/2018	5 Years
E15/1517	21-Sep-17	20-Sep-22	3 BL	$795	$14,800	Merougil – C015/2018	5 Years
E15/1518	21-Sep-17	20-Sep-22	2 BL	$530	$14,800	Merougil – C015/2018	5 Years
E15/1519	21-Sep-17	20-Sep-22	2 BL	$530	$14,800	Merougil – C015/2018	5 Years
E15/1551	24-Feb-17	23-Feb-22	13 BL	$3,444	$22,200	No Group Reporting	5 Years

Number	Grant date	Expiry date	Area	Annual rent (US$)	Min annual Expenditure (US$)	Reporting Group	Term Granted
E15/1574	11-Oct-17	10-Oct-22	29 BL	$7,683	$32,190	No Group Reporting	5 Years
E15/1592	13-Oct-17	12-Oct-22	1 BL	$300	$7,400	Merougil – C015/2018	5 Years
E15/1593	13-Oct-17	12-Oct-22	1 BL	$300	$7,400	Merougil – C015/2018	5 Years
E15/1594	13-Oct-17	12-Oct-22	2 BL	$530	$14,800	Merougil – C015/2018	5 Years
E15/1595	13-Oct-17	12-Oct-22	2 BL	$530	$14,800	Merougil – C015/2018	5 Years
E15/1615	28-Mar-18	27-Mar-23	7 BL	$1,357	$22,200	Lefroy West – C106/2018	5 Years
E15/1638	09-Apr-19	08-Apr-24	44 BL	$8,531	$32,560	No Group Reporting	5 Years
E15/1685	17-Apr-19	16-Apr-24	3 BL	$582	$11,100	No Group Reporting	5 Years
E15/972 *	04-Jun-08	03-Jun-22	10 BL	$5,010	$51,800	Kambalda West – C115/2013	5 Years (Extended)
E15/973 *	19-May-08	18-May-22	7 BL	$3,507	$51,800	Kambalda West – C115/2013	5 Years (Extended)
E15/974 *	28-Jul-09	27-Jul-23	9 BL	$4,509	$51,800	Kambalda West – C115/2013	5 Years (Extended)
E15/975	03-Oct-08	02-Oct-22	21 BL	$10,521	$51,800	Kambalda West – C115/2013	5 Years (Extended)
E15/978	01-Apr-08	31-Mar-22	7 BL	$3,507	$51,800	St Ives – C052/2002	5 Years (Extended)
E15/980	01-Apr-08	31-Mar-22	10 BL	$5,010	$51,800	St Ives – C052/2002	5 Years (Extended)
E15/984	03-Jul-08	02-Jul-22	10 BL	$5,010	$51,800	Kambalda West – C115/2013	5 Years (Extended)
E26/131	10-Aug-09	09-Aug-23	8 BL	$4,008	$51,800	Lefroy West – C106/2018	5 Years (Extended)
E26/134	29-Mar-10	28-Mar-22	6 BL	$3,006	$51,800	Lefroy West – C106/2018	5 Years (Extended)
E26/150	15-Mar-11	14-Mar-23	1 BL	$300	$14,800	Lefroy West – C106/2018	5 Years (Extended)
E26/184	30-May-16	29-May-26	50 BL	$13,246	$74,000	Lefroy West – C106/2018	5 Years (Extended)
E26/193	18-Aug-17	17-Aug-22	7 BL	$1,854	$22,200	Lefroy West – C106/2018	5 Years
E26/196	03-Oct-17	02-Oct-22	9 BL	$2,384	$22,200	No Group Reporting	5 Years
E26/203	15-Mar-19	14-Mar-24	3 BL	$582	$11,100	No Group Reporting	5 Years
General Purpose Leases							
G15/22	14-Jun-11	13-Jun-32	89.05500 HA	$1,312		St Ives – C052/2002	21 Years
Miscellaneous Licences							
L15/117	10-Oct-89	09-Oct-24	2.20840 HA	$44			5 Years (Renewed)
L15/118	10-Oct-89	09-Oct-24	1.14510 HA	$29			5 Years (Renewed)
L15/137	19-Mar-90	18-Mar-25	0.72010 HA	$15			5 Years (Renewed)
L15/145	18-Oct-90	17-Oct-25	20.55950 HA	$306			5 Years (Renewed)
L15/146	18-Oct-90	17-Oct-25	10.76380 HA	$160			5 Years (Renewed)
L15/147	18-Oct-90	17-Oct-25	62.49570 HA	$918			5 Years (Renewed)
L15/178	08-Dec-92	07-Dec-22	4.74000 HA	$73			5 Years (Renewed)
L15/245	25-Sep-03	24-Sep-24	14,177.00000 HA	$6,295			21 Years
L15/250	01-Dec-03	30-Nov-24	51.20000 HA	$758			21 Years
L15/256	26-May-04	25-May-25	16.70000 HA	$248			21 Years
L15/263	19-Dec-05	18-Dec-26	41.00000 HA	$598			21 Years
L15/276	26-Nov-07	25-Nov-28	48.38500 HA	$714			21 Years
L15/279	24-Oct-08	23-Oct-29	24.00000 HA	$350			21 Years
L15/404	19-Mar-21	18-Mar-42	3,409.89349 HA	$1,514			21 Years
L15/416	19-Mar-21	18-Mar-42	62,791.86213 HA	$27,880			21 Years
L15/417	19-Mar-21	18-Mar-42	8,451.78423 HA	$3,753			21 Years
L15/418	19-Mar-21	18-Mar-42	8,454.36513 HA	$3,754			21 Years
L15/419	19-Mar-21	18-Mar-42	18,012.71334 HA	$7,998			21 Years
L15/420	19-Mar-21	18-Mar-42	19,415.31381 HA	$8,621			21 Years
L15/80	13-Oct-88	12-Oct-23	42.56470 HA	$627			5 Years (Renewed)
L15/85	16-Feb-89	15-Feb-24	1.60460 HA	$29			5 Years (Renewed)
L15/86	16-Feb-89	15-Feb-24	1.92540 HA	$29			5 Years (Renewed)
L26/178	18-Sep-91	17-Sep-26	4.81220 HA	$73			5 Years (Renewed)
Mining Licences							
M15/1065	23-Dec-10	22-Dec-31	9.68800 HA	$163	$7,400	Kambalda West – C115/2013	21 Years
M15/1221	26-Oct-04	25-Oct-25	981.65000 HA	$15,987	$72,668	Kambalda West – C115/2013	21 Years
M15/1222	26-Oct-04	25-Oct-25	869.90000 HA	$14,164	$64,380	Kambalda West – C115/2013	21 Years
M15/1223	26-Oct-04	25-Oct-25	210.40000 HA	$3,435	$15,614	Kambalda West – C115/2013	21 Years
M15/1224	26-Oct-04	25-Oct-25	913.75000 HA	$14,880	$67,636	Kambalda West – C115/2013	21 Years
M15/1226	01-May-01	30-Apr-22	852.85000 HA	$13,887	$63,122	St Ives – C052/2002	21 Years
M15/1227	01-May-01	30-Apr-22	832.65000 HA	$13,561	$61,642	St Ives – C052/2002	21 Years
M15/129	04-Feb-85	03-Feb-27	29.04000 HA	$488	$7,400	St Ives – C052/2002	21 Years (Renewed)
M15/1379	23-Dec-10	22-Dec-31	8.36500 HA	$147	$7,400	Kambalda West – C115/2013	21 Years
M15/1488	24-Dec-04	23-Dec-25	119.75000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1489	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1490	24-Dec-04	23-Dec-25	119.35000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years

Number	Grant date	Expiry date	Area	Annual rent (US$)	Min annual Expenditure (US$)	Reporting Group	Term Granted
M15/1491	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1492	24-Dec-04	23-Dec-25	121.30000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1493	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1494	24-Dec-04	23-Dec-25	121.30000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1495	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1496	24-Dec-04	23-Dec-25	121.30000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1497	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1498	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1499	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1500	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1501	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1502	24-Dec-04	23-Dec-25	121.25000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1503	24-Dec-04	23-Dec-25	121.50000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1504	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1505	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1506	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1507	24-Dec-04	23-Dec-25	121.30000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1508	24-Dec-04	23-Dec-25	121.20000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1509	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1510	24-Dec-04	23-Dec-25	121.15000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1511	24-Dec-04	23-Dec-25	121.45000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1512	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1513	24-Dec-04	23-Dec-25	121.20000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1514	24-Dec-04	23-Dec-25	120.95000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1515	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1516	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1517	24-Dec-04	23-Dec-25	121.45000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1518	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1519	24-Dec-04	23-Dec-25	121.05000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1520	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1521	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1522	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1523	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1524	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1525	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1526	24-Dec-04	23-Dec-25	121.45000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1527	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1528	24-Dec-04	23-Dec-25	121.45000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1529	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1530	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1531	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1532	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1533	24-Dec-04	23-Dec-25	95.21500 HA	$1,563	$7,400	St Ives – C052/2002	21 Years
M15/1534	24-Dec-04	23-Dec-25	121.30000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1535	24-Dec-04	23-Dec-25	115.30000 HA	$1,888	$8,584	St Ives – C052/2002	21 Years
M15/1536	24-Dec-04	23-Dec-25	96.69500 HA	$1,579	$7,400	St Ives – C052/2002	21 Years
M15/1537	24-Dec-04	23-Dec-25	77.96000 HA	$1,270	$7,400	St Ives – C052/2002	21 Years
M15/1538	24-Dec-04	23-Dec-25	120.65000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1539	24-Dec-04	23-Dec-25	121.30000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1540	24-Dec-04	23-Dec-25	120.60000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1541	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1542	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1543	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1544	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1545	24-Dec-04	23-Dec-25	121.30000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1547	24-Dec-04	23-Dec-25	121.20000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1552	24-Dec-04	23-Dec-25	121.30000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1554	24-Dec-04	23-Dec-25	120.85000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1555	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1558	24-Dec-04	23-Dec-25	120.95000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1560	24-Dec-04	23-Dec-25	121.20000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years

Number	Grant date	Expiry date	Area	Annual rent (US$)	Min annual Expenditure (US$)	Reporting Group	Term Granted
M15/1561	24-Dec-04	23-Dec-25	120.75000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1562	24-Dec-04	23-Dec-25	121.00000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1563	24-Dec-04	23-Dec-25	121.30000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1564	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1565	24-Dec-04	23-Dec-25	121.25000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1566	24-Dec-04	23-Dec-25	121.45000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1567	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1569	24-Dec-04	23-Dec-25	120.30000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1574	24-Dec-04	23-Dec-25	121.30000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1578	24-Dec-04	23-Dec-25	112.95000 HA	$1,840	$8,362	St Ives – C052/2002	21 Years
M15/1579	24-Dec-04	23-Dec-25	112.90000 HA	$1,840	$8,362	St Ives – C052/2002	21 Years
M15/1580	24-Dec-04	23-Dec-25	121.00000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1581	24-Dec-04	23-Dec-25	121.05000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1582	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1583	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1584	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1585	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1586	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1587	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1588	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1589	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1591	24-Dec-04	23-Dec-25	121.00000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1593	24-Dec-04	23-Dec-25	120.70000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1594	24-Dec-04	23-Dec-25	120.60000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1595	24-Dec-04	23-Dec-25	120.90000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1596	24-Dec-04	23-Dec-25	120.95000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1597	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1598	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1599	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1600	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1601	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1602	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1603	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1604	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1605	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1606	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1607	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1608	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1609	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1610	24-Dec-04	23-Dec-25	121.30000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1611	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1612	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1613	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1614	24-Dec-04	23-Dec-25	121.30000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1615	24-Dec-04	23-Dec-25	121.25000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1616	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1617	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1618	24-Dec-04	23-Dec-25	121.25000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1619	24-Dec-04	23-Dec-25	106.05000 HA	$1,742	$7,918	St Ives – C052/2002	21 Years
M15/1620	24-Dec-04	23-Dec-25	106.20000 HA	$1,742	$7,918	St Ives – C052/2002	21 Years
M15/1621	24-Dec-04	23-Dec-25	100.15000 HA	$1,644	$7,474	St Ives – C052/2002	21 Years
M15/1622	24-Dec-04	23-Dec-25	103.15000 HA	$1,693	$7,696	St Ives – C052/2002	21 Years
M15/1623	24-Dec-04	23-Dec-25	118.20000 HA	$1,937	$8,806	St Ives – C052/2002	21 Years
M15/1624	24-Dec-04	23-Dec-25	120.20000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1625	24-Dec-04	23-Dec-25	120.15000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1626	24-Dec-04	23-Dec-25	120.85000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1627	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1628	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1629	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1630	24-Dec-04	23-Dec-25	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1631	24-Dec-04	23-Dec-25	121.20000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years

Number	Grant date	Expiry date	Area	Annual rent (US$)	Min annual Expenditure (US$)	Reporting Group	Term Granted
M15/1632	24-Dec-04	23-Dec-25	121.45000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1633	24-Dec-04	23-Dec-25	121.45000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1634	24-Dec-04	23-Dec-25	121.10000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1635	24-Dec-04	23-Dec-25	120.40000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1636	24-Dec-04	23-Dec-25	120.05000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1637	24-Dec-04	23-Dec-25	120.20000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1638	24-Dec-04	23-Dec-25	120.20000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1639	24-Dec-04	23-Dec-25	32.42500 HA	$537	$7,400	St Ives – C052/2002	21 Years
M15/1640	24-Dec-04	23-Dec-25	119.65000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1641	24-Dec-04	23-Dec-25	120.15000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1642	24-Dec-04	23-Dec-25	120.15000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1643	24-Dec-04	23-Dec-25	119.90000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1644	24-Dec-04	23-Dec-25	119.80000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1645	24-Dec-04	23-Dec-25	120.05000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1646	24-Dec-04	23-Dec-25	119.95000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1647	24-Dec-04	23-Dec-25	120.25000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1648	24-Dec-04	23-Dec-25	120.20000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1649	24-Dec-04	23-Dec-25	119.75000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1650	24-Dec-04	23-Dec-25	120.35000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1651	24-Dec-04	23-Dec-25	119.95000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1652	24-Dec-04	23-Dec-25	8.25950 HA	$147	$7,400	St Ives – C052/2002	21 Years
M15/1653	24-Dec-04	23-Dec-25	119.70000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1654	24-Dec-04	23-Dec-25	71.44500 HA	$1,172	$7,400	St Ives – C052/2002	21 Years
M15/1655	24-Dec-04	23-Dec-25	112.40000 HA	$1,840	$8,362	St Ives – C052/2002	21 Years
M15/1656	24-Dec-04	23-Dec-25	117.45000 HA	$1,921	$8,732	St Ives – C052/2002	21 Years
M15/1657	24-Dec-04	23-Dec-25	65.67500 HA	$1,074	$7,400	St Ives – C052/2002	21 Years
M15/1658	24-Dec-04	23-Dec-25	110.30000 HA	$1,807	$8,214	St Ives – C052/2002	21 Years
M15/1659	24-Dec-04	23-Dec-25	112.15000 HA	$1,840	$8,362	St Ives – C052/2002	21 Years
M15/1660	24-Dec-04	23-Dec-25	112.10000 HA	$1,840	$8,362	St Ives – C052/2002	21 Years
M15/1661	24-Dec-04	23-Dec-25	112.05000 HA	$1,840	$8,362	St Ives – C052/2002	21 Years
M15/1662	24-Dec-04	23-Dec-25	112.00000 HA	$1,823	$8,288	St Ives – C052/2002	21 Years
M15/1663	24-Dec-04	23-Dec-25	111.90000 HA	$1,823	$8,288	St Ives – C052/2002	21 Years
M15/1664	24-Dec-04	23-Dec-25	53.11000 HA	$879	$7,400	St Ives – C052/2002	21 Years
M15/1665	24-Dec-04	23-Dec-25	16.00000 HA	$260	$7,400	St Ives – C052/2002	21 Years
M15/1666	24-Dec-04	23-Dec-25	107.80000 HA	$1,758	$7,992	St Ives – C052/2002	21 Years
M15/1667	24-Dec-04	23-Dec-25	107.70000 HA	$1,758	$7,992	St Ives – C052/2002	21 Years
M15/1668	24-Dec-04	23-Dec-25	107.55000 HA	$1,758	$7,992	St Ives – C052/2002	21 Years
M15/1669	24-Dec-04	23-Dec-25	119.90000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1670	24-Dec-04	23-Dec-25	67.27000 HA	$1,107	$7,400	St Ives – C052/2002	21 Years
M15/1671	24-Dec-04	23-Dec-25	105.50000 HA	$1,726	$7,844	St Ives – C052/2002	21 Years
M15/1672	24-Dec-04	23-Dec-25	104.65000 HA	$1,709	$7,770	St Ives – C052/2002	21 Years
M15/1673	24-Dec-04	23-Dec-25	104.10000 HA	$1,709	$7,770	St Ives – C052/2002	21 Years
M15/1674	24-Dec-04	23-Dec-25	120.60000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1675	24-Dec-04	23-Dec-25	69.34500 HA	$1,140	$7,400	St Ives – C052/2002	21 Years
M15/1676	24-Dec-04	23-Dec-25	75.79000 HA	$1,237	$7,400	St Ives – C052/2002	21 Years
M15/1677	24-Dec-04	23-Dec-25	116.85000 HA	$1,905	$8,658	St Ives – C052/2002	21 Years
M15/1678	24-Dec-04	23-Dec-25	109.95000 HA	$1,791	$8,140	St Ives – C052/2002	21 Years
M15/1679	24-Dec-04	23-Dec-25	120.00000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1680	24-Dec-04	23-Dec-25	110.10000 HA	$1,807	$8,214	St Ives – C052/2002	21 Years
M15/1681	24-Dec-04	23-Dec-25	120.00000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1682	24-Dec-04	23-Dec-25	110.20000 HA	$1,807	$8,214	St Ives – C052/2002	21 Years
M15/1683	24-Dec-04	23-Dec-25	120.00000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1684	24-Dec-04	23-Dec-25	120.00000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1685	24-Dec-04	23-Dec-25	110.35000 HA	$1,807	$8,214	St Ives – C052/2002	21 Years
M15/1686	24-Dec-04	23-Dec-25	120.00000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1687	24-Dec-04	23-Dec-25	120.00000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1688	24-Dec-04	23-Dec-25	110.50000 HA	$1,807	$8,214	St Ives – C052/2002	21 Years
M15/1689	24-Dec-04	23-Dec-25	120.00000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1690	24-Dec-04	23-Dec-25	120.00000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1691	24-Dec-04	23-Dec-25	108.15000 HA	$1,775	$8,066	St Ives – C052/2002	21 Years
M15/1692	24-Dec-04	23-Dec-25	117.30000 HA	$1,921	$8,732	St Ives – C052/2002	21 Years

Number	Grant date	Expiry date	Area	Annual rent (US$)	Min annual Expenditure (US$)	Reporting Group	Term Granted
M15/1693	24-Dec-04	23-Dec-25	117.30000 HA	$1,921	$8,732	St Ives – C052/2002	21 Years
M15/1694	24-Dec-04	23-Dec-25	110.85000 HA	$1,807	$8,214	St Ives – C052/2002	21 Years
M15/1695	24-Dec-04	23-Dec-25	120.00000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1696	24-Dec-04	23-Dec-25	120.00000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1697	24-Dec-04	23-Dec-25	119.70000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1698	24-Dec-04	23-Dec-25	7.74200 HA	$130	$7,400	St Ives – C052/2002	21 Years
M15/1699	24-Dec-04	23-Dec-25	110.95000 HA	$1,807	$8,214	St Ives – C052/2002	21 Years
M15/1700	24-Dec-04	23-Dec-25	119.45000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1701	24-Dec-04	23-Dec-25	120.00000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1702	24-Dec-04	23-Dec-25	110.40000 HA	$1,807	$8,214	St Ives – C052/2002	21 Years
M15/1703	24-Dec-04	23-Dec-25	120.00000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1704	24-Dec-04	23-Dec-25	119.20000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1705	24-Dec-04	23-Dec-25	42.39000 HA	$700	$7,400	St Ives – C052/2002	21 Years
M15/1706	24-Dec-04	23-Dec-25	119.80000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1707	24-Dec-04	23-Dec-25	120.10000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1708	24-Dec-04	23-Dec-25	121.30000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1709	24-Dec-04	23-Dec-25	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	21 Years
M15/1710	24-Dec-04	23-Dec-25	34.09500 HA	$570	$7,400	St Ives – C052/2002	21 Years
M15/1711	24-Dec-04	23-Dec-25	119.85000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1712	24-Dec-04	23-Dec-25	119.90000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1713	24-Dec-04	23-Dec-25	120.25000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1714	24-Dec-04	23-Dec-25	120.30000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1715	24-Dec-04	23-Dec-25	119.85000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1716	24-Dec-04	23-Dec-25	120.20000 HA	$1,970	$8,954	St Ives – C052/2002	21 Years
M15/1717	24-Dec-04	23-Dec-25	119.90000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1718	24-Dec-04	23-Dec-25	119.95000 HA	$1,954	$8,880	St Ives – C052/2002	21 Years
M15/1802	02-Nov-17	01-Nov-38	223.65000 HA	$3,647	$16,576	St Ives – C052/2002	21 Years
M15/206	10-Oct-86	09-Oct-28	617.55000 HA	$10,061	$45,732	St Ives – C052/2002	21 Years (Renewed)
M15/22	22-Feb-83	21-Feb-25	964.30000 HA	$15,710	$71,410	St Ives – C052/2002	21 Years (Renewed)
M15/230	27-Feb-87	26-Feb-29	118.75000 HA	$1,937	$8,806	St Ives – C052/2002	21 Years (Renewed)
M15/27	20-Apr-83	19-Apr-25	29.35000 HA	$488	$7,400	St Ives – C052/2002	21 Years (Renewed)
M15/28	20-Apr-83	19-Apr-25	88.60000 HA	$1,449	$7,400	St Ives – C052/2002	21 Years (Renewed)
M15/29	20-Apr-83	19-Apr-25	47.10000 HA	$781	$7,400	St Ives – C052/2002	21 Years (Renewed)
M15/300	29-May-92	28-May-34	777.55000 HA	$12,666	$57,572	Kambalda West – C115/2013	21 Years (Renewed)
M15/366	22-Apr-88	21-Apr-30	802.00000 HA	$13,057	$59,348	St Ives – C052/2002	21 Years (Renewed)
M15/367	22-Apr-88	21-Apr-30	839.65000 HA	$13,675	$62,160	St Ives – C052/2002	21 Years (Renewed)
M15/390	05-Oct-88	04-Oct-30	122.30000 HA	$2,002	$9,102	St Ives – C052/2002	21 Years (Renewed)
M15/432	24-Apr-89	23-Apr-31	580.90000 HA	$9,459	$42,994	St Ives – C052/2002	21 Years (Renewed)
M15/452	15-Aug-89	14-Aug-31	658.15000 HA	$10,729	$48,766	St Ives – C052/2002	21 Years (Renewed)
M15/453	15-Aug-89	14-Aug-31	865.55000 HA	$14,098	$64,084	St Ives – C052/2002	21 Years (Renewed)
M15/471	03-Aug-90	02-Aug-32	682.45000 HA	$11,119	$50,542	St Ives – C052/2002	21 Years (Renewed)
M15/472	03-Aug-90	02-Aug-32	683.45000 HA	$11,136	$50,616	St Ives – C052/2002	21 Years (Renewed)
M15/474	03-Aug-90	02-Aug-32	959.55000 HA	$15,629	$71,040	St Ives – C052/2002	21 Years (Renewed)
M15/475	03-Aug-90	02-Aug-32	959.95000 HA	$15,629	$71,040	St Ives – C052/2002	21 Years (Renewed)
M15/476	03-Aug-90	02-Aug-32	917.65000 HA	$14,945	$67,932	St Ives – C052/2002	21 Years (Renewed)
M15/493	22-Jan-90	21-Jan-32	832.80000 HA	$0	$61,642	St Ives – C052/2002	21 Years (Renewed)
M15/494	22-Jan-90	21-Jan-32	670.95000 HA	$0	$49,654	St Ives – C052/2002	21 Years (Renewed)
M15/495	22-Jan-90	21-Jan-32	944.75000 HA	$0	$69,930	St Ives – C052/2002	21 Years (Renewed)
M15/537	21-Sep-90	20-Sep-32	964.05000 HA	$15,710	$71,410	St Ives – C052/2002	21 Years (Renewed)
M15/538	21-Sep-90	20-Sep-32	725.15000 HA	$11,819	$53,724	St Ives – C052/2002	21 Years (Renewed)
M15/570	14-May-91	13-May-33	187.50000 HA	$3,061	$13,912	St Ives – C052/2002	21 Years (Renewed)
M15/575	12-Aug-92	11-Aug-34	8.40950 HA	$147	$7,400	Kambalda West – C115/2013	21 Years (Renewed)
M15/718	19-Sep-94	18-Sep-36	987.80000 HA	$16,085	$73,112	Kambalda West – C115/2013	21 Years (Renewed)
M15/719	19-Sep-94	18-Sep-36	768.15000 HA	$12,519	$56,906	Kambalda West – C115/2013	21 Years (Renewed)
M15/720	19-Aug-96	18-Aug-38	951.85000 HA	$15,499	$70,448	Kambalda West – C115/2013	21 Years (Renewed)
M15/759	03-Mar-95	02-Mar-37	488.50000 HA	$7,961	$36,186	St Ives – C052/2002	21 Years (Renewed)
M15/841 *	19-Aug-96	18-Aug-38	866.40000 HA	$14,115	$64,158	Kambalda West – C115/2013	21 Years (Renewed)
M15/842 *	19-Aug-96	18-Aug-38	983.85000 HA	$16,020	$72,816	Kambalda West – C115/2013	21 Years (Renewed)
M15/843 *	19-Aug-96	18-Aug-38	920.25000 HA	$14,994	$68,154	Kambalda West – C115/2013	21 Years (Renewed)
M15/882	06-Aug-04	05-Aug-25	881.90000 HA	$14,359	$65,268	St Ives – C052/2002	21 Years
M15/883	06-Aug-04	05-Aug-25	882.40000 HA	$14,375	$65,342	St Ives – C052/2002	21 Years

Number	Grant date	Expiry date	Area	Annual rent (US$)	Min annual Expenditure (US$)	Reporting Group	Term Granted
M15/884	01-May-98	30-Apr-40	912.15000 HA	$14,864	$67,562	St Ives – C052/2002	21 Years (Renewed)
M15/925	06-Aug-04	05-Aug-25	616.15000 HA	$10,045	$45,658	St Ives – C052/2002	21 Years
M26/514	06-Aug-04	05-Aug-25	854.00000 HA	$13,903	$63,196	St Ives – C052/2002	21 Years
M26/832	05-Nov-14	04-Nov-35	471.00000 HA	$7,668	$34,854	St Ives – C052/2002	21 Years
M26/842	18-Jul-18	17-Jul-39	377.55000 HA	$6,154	$27,972	Lefroy West – C106/2018	21 Years
Mining Leases							
ML15/141	01-Jan-67	31-Dec-29	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	
ML15/142	01-Jan-67	31-Dec-29	121.35000 HA	$1,986	$9,028	St Ives – C052/2002	
ML15/151	01-Jan-66	31-Dec-28	121.40000 HA	$1,986	$9,028	St Ives – C052/2002	
Prospecting Licences							
P26/3764	15-Mar-11	14-Mar-19	71.80000 HA	$176	$2,131	Lefroy West – C106/2018	4 Years (Extended)
P26/3765	15-Mar-11	14-Mar-19	133.00000 HA	$325	$3,937	Lefroy West – C106/2018	4 Years (Extended)
P26/3889	11-Jun-13	10-Jun-21	199.00000 HA	$486	$5,890	Lefroy West – C106/2018	4 Years (Extended)
P26/3890	11-Jun-13	10-Jun-21	200.00000 HA	$488	$5,920	Lefroy West – C106/2018	4 Years (Extended)
P26/3891	11-Jun-13	10-Jun-21	195.00000 HA	$476	$5,772	Lefroy West – C106/2018	4 Years (Extended)

Note: * These tenement have Applications for Forfeiture lodged against them by a third party.

a) Registered Holder - St Ives Gold Mining Company Pty Limited.

b) The Qualified Person's opinion is that licences and tenements can be renewed or extended as required.

Source: St Ives CPR, 2021

SIGMC maintains a tenement management auditing system that flags lease renewals to meet the renewal process timeline and to keep the tenement ownership in good standing by meeting expenditure and other commitments.

Two expired in 2019 (P).

Four expired in 2021 (one E and three P).

23 are due to expire in 2022.

4.4 Ownership

St Ives Gold Mining Company Pty Ltd (SIGMC), Australian Company Number I 098 386 273, was incorporated in Australia in 2001 as the legal entity holding and conducting mining activity on the St Ives property. Gold Fields holds 100 % of the issued shares of SIGMC through its 100 % attributable holding in the issued shares of Orogen Holding (BVI) Limited.

4.5 Mineral tenure description

The operation of mining and associated activities at St Ives are governed by numerous Western Australian Government Acts. This item summarises published information available from the Western Australian Department of Mines, Industry Regulation and Safety (DMIRS).

The Western Australian Mining Act 1978 (WA) (the Mining Act (1978)) is the principal legislation governing exploration and mining on land in Western Australia. Licenses and leases for, among other things, prospecting, exploration and mining must be obtained pursuant to the requirements of the Mining Act (1978) before the relevant activity can begin. Application fees and annual rental payments are payable in respect of each tenement. Where Native Title has not been extinguished, Native Title legislation may apply to the grant of tenure and some subsequent administrative processes. Heritage legislation may operate to preclude or regulate the disturbance of a particular area.

Prospecting licences are granted over a maximum area of 200 ha and have an initial period of four years and can be extended by one period of four years. Exploration Licences are granted for five years plus a possible extension of five years and further periods of two years thereafter with 40 % per cent of ground to be surrendered at the end of year six.

If the holder of a Prospecting or Exploration Licence establishes indications of an economic mineral deposit and expends a minimum level of investment, it may apply for a Mining Lease which gives the holder exclusive mining

rights with respect to all minerals on the property. It is possible for one party to own the surface of the property and for another to own the mineral rights.

An application for a Mining Lease must be accompanied by one of the following:

- A Mining Proposal completed in accordance with the guidelines.
- A statement of mining operations and a mineralisation report prepared by a Qualified Person.
- A statement of mining operations and a resource report that complies with the JORC Code that has been made to the Australian Securities Exchange (ASX).

The maximum initial term of a Mining Lease is 21 years, and the holder has the right to renew the lease for a further period of 21 years. Subsequent renewals are subject to the minister's discretion and the lease can only be assigned with the consent of the relevant minister.

Prescribed minimum annual expenditure commitments and activity reporting requirements apply to holders of Exploration and Prospecting Licences and Mining Leases.

Miscellaneous Licences are granted for purposes such as a roads and pipelines.

Mining operations on tenements in Western Australia must be developed and operated in compliance with various Commonwealth and State legislative requirements.

The operation of St Ives is under the control of the following Western Australian Government legislation:

- Mining Act (1978).
- Environmental Protection Act (1986) and Environmental Protection Amendment Act (2004).
- Contaminated Sites Act (2003).
- Environmental Protection (Clearing of Native Vegetation) Regulations (2004).
- Rights in Water and Irrigation Act (1914).
- Conservation and Land Management Act (1984).
- Wildlife Conservation Act (1950).
- Country Areas Water Supply Act (1947).
- Aboriginal Heritage Act (1972).
- Heritage of Western Australia Act (1990).
- Environmental Protection Regulations (1987).
- Environmental Protection (Unauthorised Discharge) Regulations (2004).
- Mining Rehabilitation Fund Act (2012).

The operation of St Ives is also under the authority of the following Commonwealth of Australia Government legislation:

- Environmental Protection and Biodiversity Conservation Act (1999).
- National Greenhouse and Energy Reporting Act (2007).

The governing Western Australian agencies are the Department of Water and Environmental Regulation (DWER), the Department of Planning, Lands and Heritage (DPLH) and the DMIRS.

St Ives also holds regulatory licences and registrations that govern various aspects of environmental management as disclosed in Item 20.

4.6 Royalties, back-in rights, payments, or other agreements and encumbrances

Mineral royalty rates are prescribed under the Mining Regulations 1981. For gold, an ad valorem royalty rate of 2.5 % is applied.

Third-party royalties apply to some mining leases, including M15/495, which covers the Incredible project. This 3 % production royalty is owned by Deterra Royalties (ASX: DRR).

SIGMC has a sub-lease agreement with the Beta Hunt Gold Mine owned by Karora Resources Inc (TSX: KRR) that in the northern part of the Central Corridor.

The Qualified Person has reviewed the limited non-managed tenements and is of the opinion that it has not been explored on in 2021. Any discoveries will be considered as attributable to Gold Fields.

Other regulatory requirements including those associated with the operation and management of mining, rehabilitation and exploration activities are managed under the Mining Act (1978) in the form of tenement conditions administered by the Western Australian Department of Mines, Industry Regulation and Safety DMIRS.

Item 20 discloses the remediation and reclamation guarantees that are pertinent to St Ives.

The Tenements Officer in Perth Office provides St Ives with current tenement spend and estimate of underspend on exploration tenements highlighting ones at risk, and exploration have to incorporate this spend into the exploration plan for the coming 6 to 12 months where possible.

SIGMC has received fines on two tenements a total of $9,600 during 2021 that had not been worked on in the previous year and were underspent with regards to their commitment. Heritage restrictions and land access have been the primary reasons for this lack of work.

During 2021 one of the tenements received a geophysical survey to accumulate costs and also provide a foundational dataset for further exploration while the other is planned to have initial exploration drilling in 2022 following heritage and flora surveys clearance.

Seven licences have applications for forfeiture by a third party against them in the Kambalda West area due to lack of expenditure on the tenement package since mining and rehabilitation was completed at the Cave Rocks Mine. If applications for forfeiture are successful, then St Ives would lose these tenements. No declared resources or reserves are on these tenements.

4.7 Environmental liabilities

Mineral rights and/or mining rights are subject to the necessary approvals and permits. The applicable permits are described in Item 20.

4.8 Permits

Mineral rights and/or mining rights are subject to the necessary approvals and permits. The applicable permits are described in Item 20.

4.9 Other significant factors and risks

There are no other significant factors and risks that may affect access, title, or the right or ability to perform work on the property and therefore execute the life of mine plan

If mine expansions are required into areas currently held under an Exploration Licence, conversion to a Mining Lease is required prior to the commencing mining. This may also trigger negotiations under the Native Title Act with relevant Traditional Owners, which must be undertaken prior to grant of tenure. Aboriginal cultural heritage consultation, surveys and approvals are required for most mining and exploration activities, which requires engagement with relevant Traditional Owners. In most cases, agreements exist to facilitate this process. The permitting and licensing requirements required to start a new mining operation (or to expand or modify existing operations) may include local disturbance, clearing, environmental, power, water extraction and waste disposal, which follow well established authorisation protocols with the relevant government authorities.

In 2014, the Ngadju People were successful in having their claim under the Native Title Act 1993 (WAD6020/1998) determined by the Federal Court over an area including part of the St Ives property. SIGMC has not been required to undertake the 'right to negotiate' process with the Ngadju People with respect to its tenure.

In 2019, a Native Title claim by the Marlinyu Ghoorlie People (WAD647/2017) was registered. This claim also covers part of the St Ives party. St Ives is currently engaged in early discussions with the Marlinyu Ghoorlie People under the 'right to negotiate' process with respect to certain exploration tenure.

Other permitting and licensing requirements required to start a new mining operation may include inter alia, heritage, local disturbance, clearing, environmental, power, water extraction and waste disposal, which follow well established authorisation protocols with the relevant government authorities.

The Qualified Persons are not aware of any other current or pending legal matters that may have an influence on the rights to explore or mine for minerals at St Ives. The Qualified Person has relied on information provided by the Registrant and company technical experts in preparing its findings and conclusions regarding other significant factors and risks.

A review of recent Company public disclosure documents including the annual report (Form 20-F for the 12 months ended 31 December 2021) do not contain any statements by the directors on any legal proceedings or other material conditions (other than as set out above) that may impact on the Company's ability to continue mining or exploration activities at St Ives.

In consideration of all legal aspects, the following statements are correct as at 31 December 2021:

- there are no legal proceedings that may have an influence on the rights to explore for minerals.
- the legal ownership of all mineral and surface rights has been verified.
- no significant legal issue exists which would have an effect on the likely viability of a project and/or on the estimation and classification of the Mineral Resources and Reserves as reported herein.

5 Accessibility, climate, local resources, infrastructure and physiography

5.1 Topography, elevation, and vegetation

The SIGMC tenure is located within the Eastern Goldfields Province in the Archaean Yilgarn Craton of Western Australia.

The regional topography is gently undulating with occasional ranges of low hills (generally less than 410 m ASL) with minor drainage channels feeding extensive salt lakes (Lake Lefroy) at approximately 286 m ASL. Soils are principally brown calcareous earths and are poorly developed over the gold-bearing greenstone belts. Saline and subsaline soils are common adjacent to drainage channels and salinas. Groundwater salinity in the region is generally in the range of 50,000 to greater than 300,000 mg/L Total Dissolved Solids (TDS).

Vegetation within the project area consists of mallee and acacia thickets with shrub-heaths on sandplains. Dwarf shrublands of samphires persist on salt lakes, surrounded by diverse Eucalyptus woodlands, which also occur on ranges and in valleys.

5.2 Access

Access to St Ives is via a sealed road 20 km from the Goldfields Highway, which links the town of Kambalda with Kalgoorlie to the north (Figure 4.1).

5.3 Proximity to population centre and transport

The closest population centre is the town of Kambalda with approximately 2,500 people. The town was established in 1970 as a dormitory town predominantly for workers at the nearby nickel mines. Facilities include a supermarket, post office, service station, primary school, tavern and various sporting facilities. The City of Kalgoorlie-Boulder with a population of ~30,000 lies approximately 80 km to the northwest and is serviced by road, rail and air services from the capital city of Perth 680 km to the west.

5.4 Climate and length of operating season

The Eastern Goldfields bioregion is characterised by a semi-arid climate with hot summers and mild winters, often described as a Mediterranean climate. The mean maximum temperature for City of Kalgoorlie-Boulder (CKB) ranges between 33.6ºC in January and 16.7ºC in July, as recorded at the Bureau of Meteorology (BOM 2017) Kalgoorlie-Boulder Airport weather station (BOM Station 012038).

The region experiences a semi-arid climate, with 266.8 mm of rainfall received on average. The BOM 78 year rainfall record indicates that the highest daily rainfall recorded to-date is 177.8 mm (BOM 2017). February is the wettest month with 31.1 mm on average received, although rainfall patterns can be quite variable. Remnant tropical cyclones and thunderstorms associated with cyclonic activities in the North of the WA can occasionally bring heavy rains and result in flooding in the summer period. Annual evaporation rates of 2400-2800 mm/year exceed rainfall and are the highest during the summer months when humidity is the lowest. Heavy rains occasionally cause localised flooding but surface water bodies typically remain only for short periods of time after rainfall.

No extreme climate conditions are experienced that materially affect operations.

5.5 Infrastructure

St Ives currently comprises one open pit (Neptune) and two underground (Invincible South and Hamlet North) mining operations with associated infrastructure and facilities that operate year-round. Major infrastructure owned and operated by SIGMC includes a 4.7 Mt/a carbon-in-pulp (CIP) processing facility, an in-pit tailings storage facility (TSF), haul roads and a centralised administration centre and engineering workshops (Figure 5.1).

Other significant facilities include:

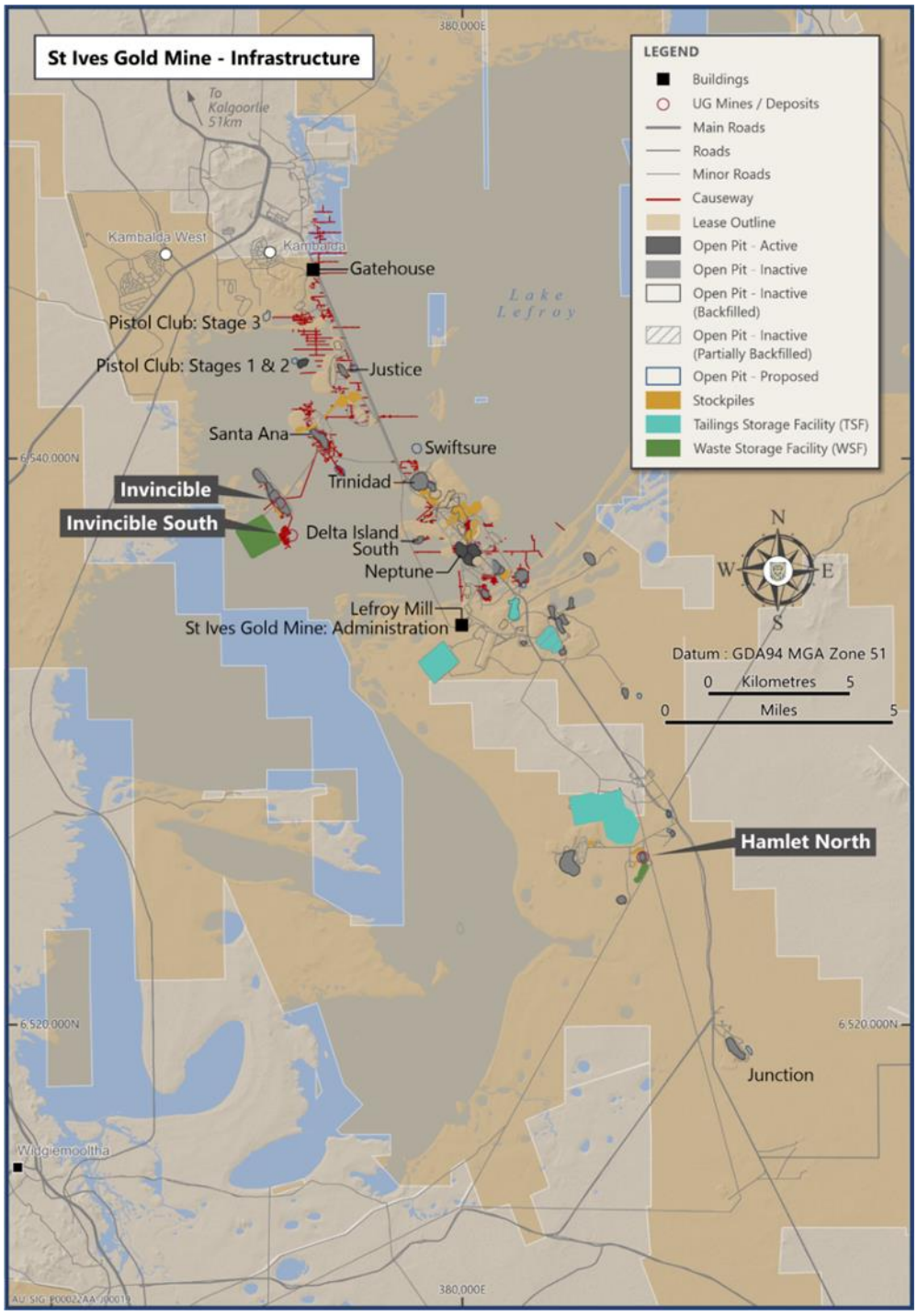
- Reagent storage and mixing facilities.
- Process laboratory.
- Process maintenance and warehouse facilities.
- Electrical infrastructure.
- Fuel storage.
- Raw water tanks and reverse osmosis water treatment system.
- Process water storage pond.
- Borefields.
- Paste plants at Invincible and Hamlet.

Supplies are delivered to site via road transport from either Kalgoorlie or Perth via the Goldfields Highway.

The St Ives workforce are a mix of residential employees residing predominantly in Kambalda and Kalgoorlie and fly-in fly-out (FIFO) from Perth. A mix of work rosters are in use with operational rosters predominantly based on 8 days on, 6 days off cycles and support service roles being 5 days on 2 days off; however, some contractors operate on longer rosters such as 2 weeks on, 1 week off.

Further details regarding the infrastructure are provided in Item 18.

Figure 5.1: St Ives operating sites and infrastructure



Source: St Ives CPR, 2021

6 History

Gold was discovered at the Kambalda Red Hill Camp in 1897 and, in the following decades, other gold-bearing locations including Victory and Ives Reward were discovered and mined.

In 1966, nickel sulphide mineralisation was discovered near the old Red Hill mine. Western Mining Corporation Limited (WMC) developed a mining and milling operation and between 1966 and 1996 mined approximately 34.0 Mt of ore at an average grade of 3.1 % Ni from the region.

An increase in the gold price during the 1970s led to a re-evaluation of the old gold prospects in the Kambalda area. In 1980, significant gold mineralisation was identified beneath the Hunt nickel shoot.

In 1981, the Victory-Defiance complex (Leviathan area) was discovered. Gold production commenced at St Ives using a 0.5 Mt/a treatment plant (later expanded to 1.2 Mt/a) located at the Kambalda Nickel Concentrator site. In 1988, a new 3.1 Mt/a carbon-in-leach (CIL) facility was constructed at St Ives, 25 km south of Kambalda. During 2001, a 2 Mt/a heap leach facility was commissioned during the period when Gold Fields acquired St Ives from WMC in 2001. In 2004, the currently operating 4.7 Mt/a Lefroy processing facility was constructed and commissioned in early 2005.

Gold Fields commenced an aggressive exploration program in 2006 with several economic deposits discovered and mined between 2007 and 2012. These include Cave Rocks (2007), Belleisle (2007), Hamlet (2009) and Athena (2010).

Ongoing exploration delivered the Invincible camp in 2013, which remains the mainstay of mine production. First production from Invincible started in 2015. In 2017, development commenced into the Invincible underground deposit with full production reached in 2018. Development of the access decline to the Invincible South underground deposit commenced in 2018 and level development was commenced in 2019.

Production from the Neptune paleochannel open pit commenced in 2013 and will continue through 2021.

During 2020, ongoing exploration saw the Invincible camp continue to grow and it remains a key focus area for exploration and resource extension drilling. Work continues at Invincible Underground, Invincible South, Invincible Deeps and Invincible South Extensions to assess the full potential of this major underground camp and maintain momentum on defining resource extensions and converting Mineral Resources to Mineral Reserves.

The Qualified Person is of the opinion that the historic exploration results have been superseded and supplemented by more recent exploration undertaken by Gold Fields for areas of current interest and that any historic errors or deficiencies will have little influence on the current Mineral Resource models or the life of mine reserves.

7 Geological setting and mineralisation

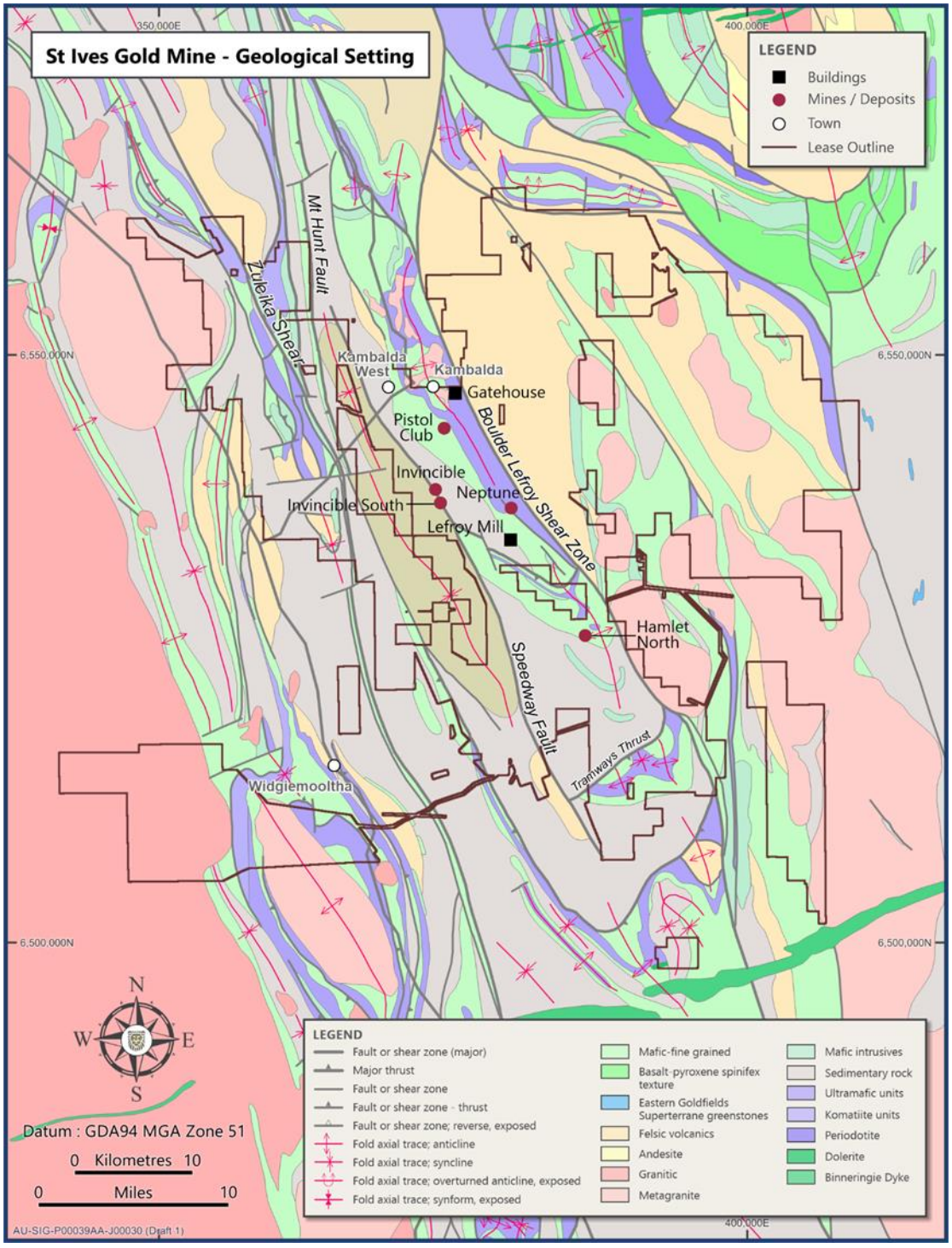
7.1 Regional geology setting

The St Ives property lies within the Kambalda Domain (Figure 7.1), a subset of the Norseman-Wiluna Greenstone Belt of the Archean Yilgarn Craton, a 2.7 Ga granite-greenstone terrane in southern Western Australia. The Kambalda Domain is bound by the north-northwest trending Boulder-Lefroy Fault and Zuleika Shear. The region has undergone four compressional events predated by early extension and is metamorphosed to upper greenschist or lower amphibolite facies.

Most of the known gold deposits are proximal to the axial plane of the gently south-plunging Kambalda Anticline, which extends 35 km from the southern end of the Kambalda Dome to the Junction mine. The stratigraphic succession in the Kambalda Domain comprises Kalgoorlie Group volcanic rocks and the Black Flag Group felsic volcanic and sedimentary rocks overlain by sedimentary units of the post-tectonic Merougil Beds.

A major second order structure known as the Playa Shear splays off the Boulder-Lefroy Fault and strikes through the St Ives property for more than 10 km. Most of the gold orebodies at St Ives are associated with third order splays off the Playa Shear. Notable exceptions are Invincible, Argo and Santa Ana situated on the western limb of the Kambalda Anticline. Mineralisation typically occurs where these structures intersect favourable rock units with chemical or rheological contrasts combining with structural flexures to form the most important local controls to gold mineralisation. At least 80 individual deposits have been mined in the St Ives area to date.

Figure 7.1: Regional geology of St Ives



Source: St Ives CPR, 2021

7.2 Local geology setting

Ore-hosting structures in deposits such as Greater Revenge, North Orchin, Argo and much of the Victory area are predominantly north-south striking, moderately to gently east-dipping or west-dipping reverse faults and shear zones with maximum displacements of a few tens of metres. Strike lengths of ore-hosting structures are seldom more than 1 km. The orientation of stretching lineations, curvature of shear zone foliations, associated gently dipping extension veins and stratigraphic separations indicate a reverse slip sense for most ore-hosting structures, especially in the Argo/Victory/Revenge area.

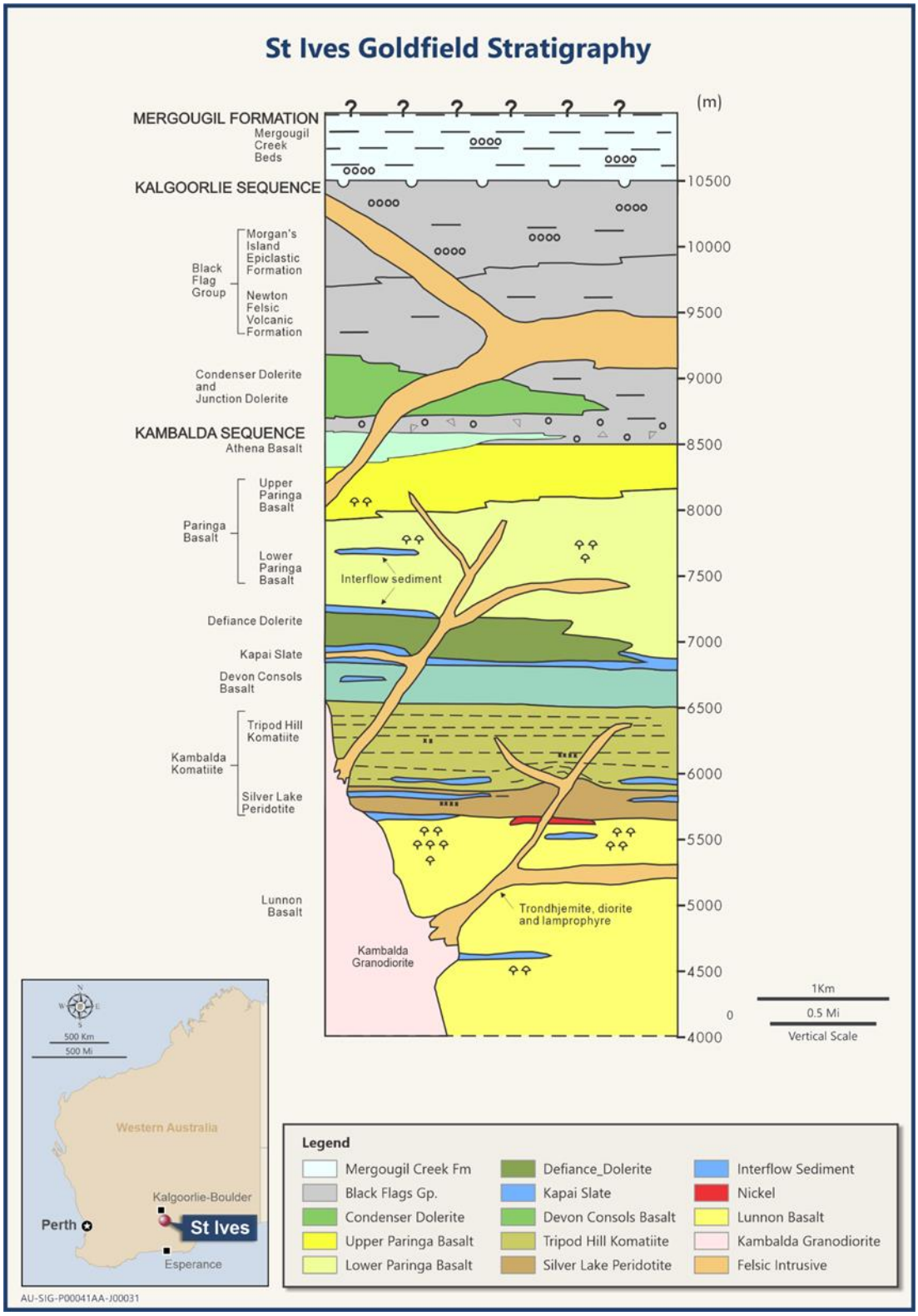
The most common host rock is dolerite, such as the Defiance, Condenser and Junction Dolerites. Granophyric dolerite and Kapai Slate tend to host the highest-grade gold mineralisation. The Paringa Basalt and Kambalda Komatiite host deposits in discrete shear structures that are moderate in both tonnage and grade. Low to moderate grade, high tonnage mineralisation is commonly developed in porphyries, which are found in almost all deposits. A stratigraphic section is shown in Figure 7.2 and a description of stratigraphy in Table 7-1.

Table 7-1: Description of stratigraphy

Sequence	Unit	Description
Merougil Formation	Merougil Creek Beds	The Merougil Formation is divided into the Early and Late Merougil Group. At St Ives only the Early Merougil Group is present. The Early Merougil Group is dominated by well-sorted quartz-rich sandstone that ranges from massive graded, planar stratified to trough corss-bedded in texture. Polymictic conglomerate beds can also be found, located with increasing abundance towards the unit's base (Squire et al, 2010).
Kalgoorlie Sequence	Junction and Condenser Dolerites	Both the Junction Dolerite and Condenser Dolerite are layered intrusions in the lower part of the Black Flag Group and are considered to be correlatives to the Golden Mile Dolerite (Blewett et al, 2010).
	Black Flag Group	The Black Flag Group of felsic volcano-sedimentary rocks is divided into the Late and Early Black Flag Group (Squire et al, 2010). The Early Black Flag Group consists of massive graded to moderately stratified feldspar-rich sandstones, siltstone, felsic cobble conglomerate and polymictic volcanic breccias and rare mudstone (McGoldrick et al, 2013). The Late Black Flag Group at St Ives consists of quartzo-feldspathic sandstone, polymictic conglomerate and interbedded mudstone-siltstone (McGoldrick et al, 2013).
Kambalda Sequence	Paringa Basalt	The Paringa Basalt consists of a 500 to 1500 m thick, variolitic pillow-basalt flows intruded at the base by the differentiated Defiance Dolerite. Laminated interflow chert-rich sedimentary rocks are more common towards the base. It is separated into a low MgO tholeiitic upper unit and high MgO komatiitic lower unit.
	Kapai Slate	The Kapai Slate is a distinctive stratigraphic marker separating the Devon Consols Basalt (below) from the Paringa Basalt (above). It is a black sulphidic to siliceous mudstone less than 10 m thick.
	Devon Consols Basalt	The Devon Consols Basalt is a pillowed to massive, variolitic series of lava flows. The lower contact with the Kambalda Komatiite is interfingered and locally sharp. Thickness varies from 60-100 m thick to greater than 150 m thick in the Revenge area. There are thin differentiated dolerites within the Devon Consols Basalt that are fine-grained basalt in the upper part, and coarse grained gabbroic in the lower zones.
	Kambalda Komatite	The Kambalda Komatiite is separated into the lower nickel-sulphide hosting Silver Lake Peridotite, which conformable overlies the Lunnon Basalt and the upper Tripod Hill Komatiite. The Kambalda Komatiite has been extensively hydrothermally altered, and then altered to talc-dominant mineral assemblages during CO_2 metasomatism. Spinifex textures are typically preserved and cumulate textures are typically destroyed.
	Lunnon Basalt	The tholeiitic (5-9 % MgO) Lunnon Basalt is a series of 2 to 30 m thick pillowed and massive lava flows, with sparse interflow sedimentary units. Work at the Kambalda Dome indicates thickness of at least 2 km, seismic modelling indicates a thickness greater than 5 km.

Source: St Ives CPR, 2021

Figure 7.2: Stratigraphic section through St Ives



Source: St Ives CPR

7.3 Mineralisation

There are four main styles of gold mineralisation at St Ives. Individual deposits may contain more than one style depending on the local structural and lithological conditions:

- Lode mineralisation: typically consists of a 0.5 cm to 50 cm wide cataclasite core surrounded by 0.1 cm to 3.0 m of foliated cataclasite.
- Quartz vein stockworks: irregular bodies of closely spaced and regularly oriented quartz veins.
- Composite style: variably developed quartz vein stockwork mineralisation localised in and around lode shear zones.
- Supergene: broad zones of flat-lying gold mineralisation hosted in deeply weathered Archean and overlying Tertiary rocks.

The current major production centres at St Ives are the Invincible deposits, the Neptune paleochannel and underlying lodes and the Hamlet deposit.

7.3.1 Invincible

Invincible is situated on Lake Lefroy, approximately 8 km northwest of the Lefroy process plant. The Invincible camp is dominated by a 2 km long open pit mined between 2014 and 2019, with mineralisation extending a further 1.9 km to the south of the pit (Invincible South) and >800 m depth (Invincible Deeps).

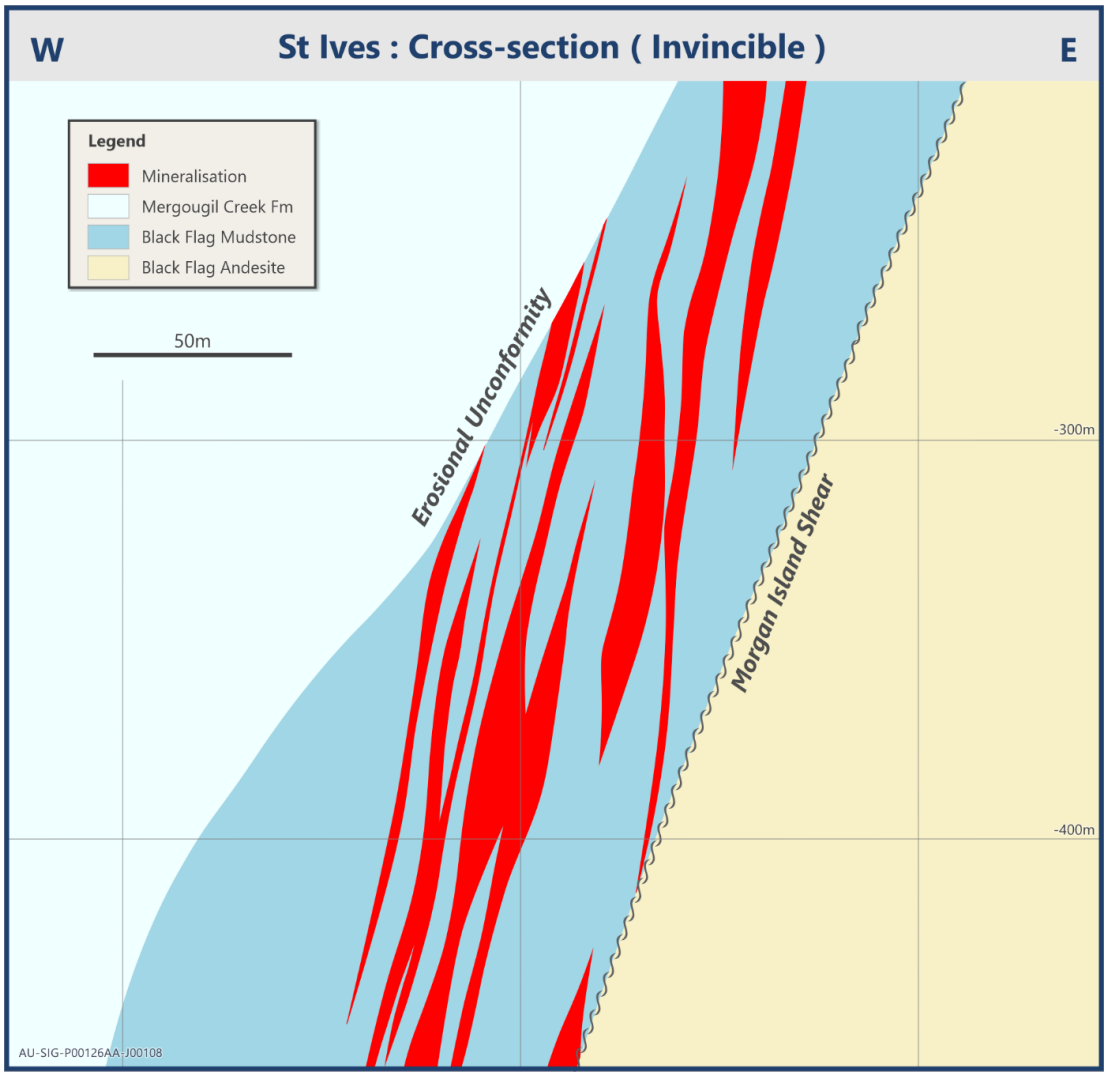
There are three major lithofacies identified at the Invincible Camp (Figure 7.3):

- The Black Flags Andesite (BFA): This unit forms the footwall sequence at Invincible and consists of volcanic quartz-rich sandstone with lenses of polymictic sub-rounded to sub angular pebble to cobble conglomerate.
- The Black Flags Mudstone (BFM): Is the main unit to the host mineralisation at Invincible and is comprised of fissile massive to laminated grey mudstone, planar laminated to thinly interbedded siltstone with graded beds and massive to diffusely laminated medium interbedded siltstone. The BFM is approximately 110 m thick at depth and narrows to around 50 m near the surface.
- The Merougil Group (MER): This unit form the tops of the Invincible sequence (hangingwall) and comprises medium to coarse grained quartz-rich sandstones, pebble to boulder polymictic conglomerates and very rare siltstone to mudstone

There are two main styles of mineralisation within the Invincible Camp: (Type 1) BFM hosted shear veins and breccias, with albite-pyrite alteration, directly related to the high-grade mineralisation and (Type 2) Footwall BFA hosted extensional veins and stockwork veining alteration selvages of medium to strong hematite ± albite ±sericite alteration. Veins range in width from a few centimetres to two meters with visible gold is common in these veins.

Two prominent shear zones are associated with the Invincible deposit: the Merougil shear and the Morgan Island shear. These structures exploit the both the hangingwall and footwall contacts and are not themselves mineralised but are thought to be conduits for the mineralisation.

Figure 7.3: Cross section showing the Geology at the Invincible Mine



Source: St Ives CPR, 2021

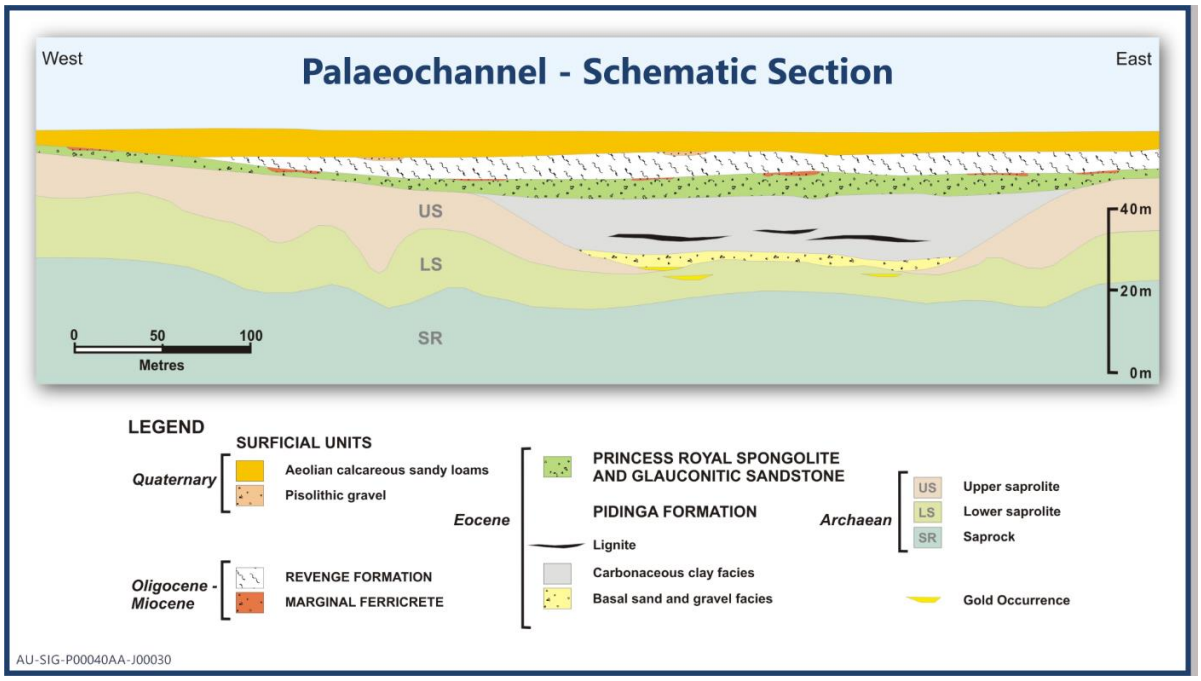
7.3.2 Neptune

The Neptune deposit consists of three main mineralisation styles: paleochannel, supergene and fresh lode material with the deposit located beneath Lake Lefroy with post mineralisation sedimentary cover to depths of 30 m to 60 m (Figure 7.4).

The majority of mineralisation mined at Neptune comes from paleochannel gold deposited within a main east-west channel, minor tributaries and paleo-slope sheetwash as free gold nuggets and gold entrained in quartz that is post Archean in age. Supergene mineralisation is derived from a combination of gold mobilised from the underlying fresh lode structures and from overlying paleochannel material (Figure 7.4).

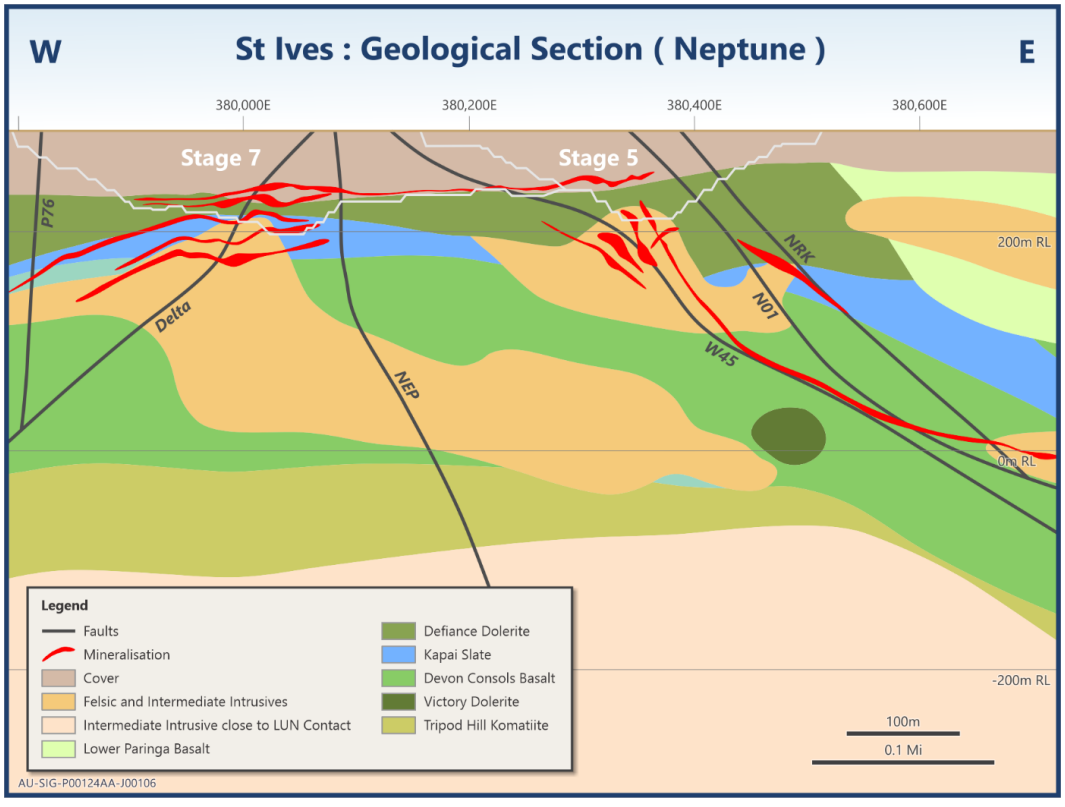
Archean lode structures within the Neptune Open Pit include the more significant N01 structure trend roughly north-south and generally dip moderately to the east and have been mined in the Stage 5 Pit at Neptune. In Stage 7 Neptune mineralised structures dip away to the west at a shallow trend with a north-south strike. Lodes are characterised by a pyrite + quartz + carbonate + gold assemblage. Host rocks vary with mineralisation at Neptune encountered in the lower Kambalda sequence geology (Defiance Dolerite, Devon Consols Basalt, Kapai Slate and various intrusives) (Figure 7.5).

Figure 7.4: Paleochannel schematic showing the geology at Neptune



Source: St Ives CPR, 2021

Figure 7.5: Long Section showing geology at the Neptune open pit

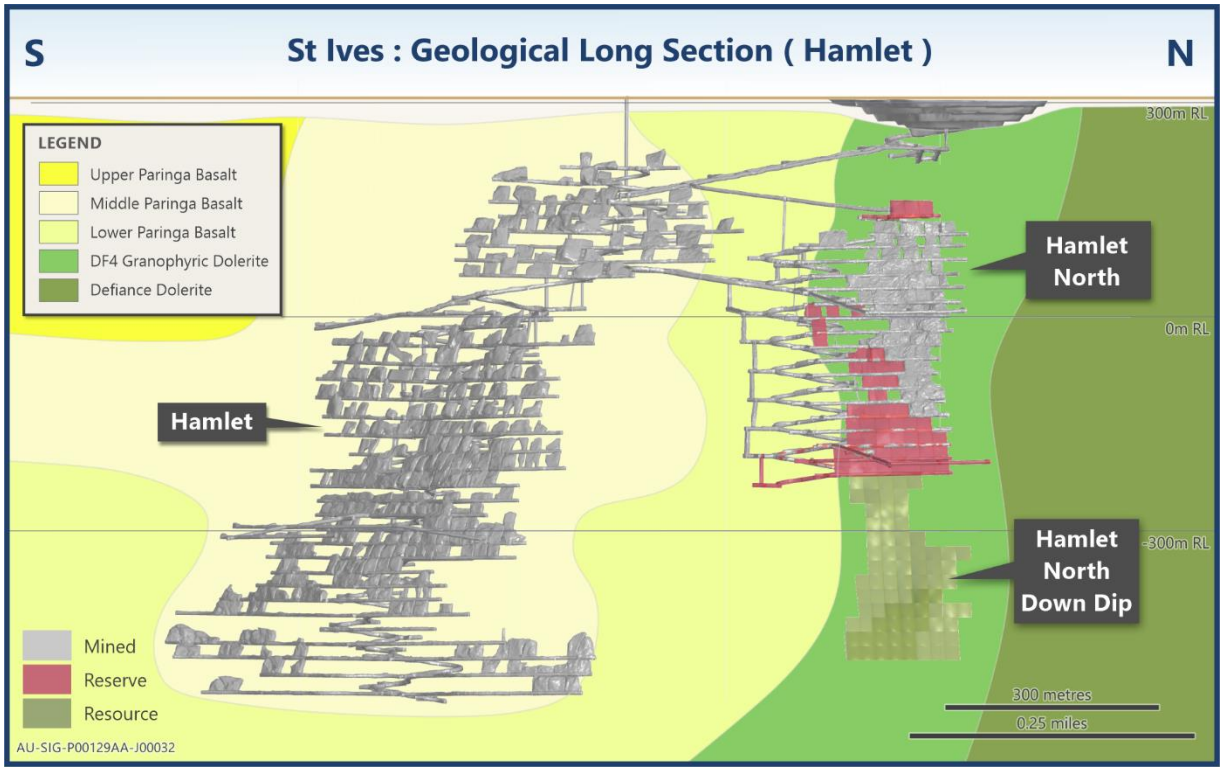


Source: St Ives CPR, 2021

7.3.3 Hamlet North

The Hamlet North deposit is located to the north of the historically mined Hamlet deposit and was discovered in 2018. It is a ~150 m in strike and 5-10 m wide orebody with a down plunge extent of >750 m located on the Hamlet Shear. The Hamlet Shear is a north-south trending reverse slip shear zone. Mineralisation occurs within the Defiance Dolerite Unit 4, a granophyric unit within the Defiance Dolerite (Figure 7.6). Gold mineralisation is associated with a biotite alteration halo hosting quartz-albite and quartz-carbonate veins. The high-grade zone comprises breccia zones (pods) and vein or stockwork vein arrays. The shallow to moderate dipping veins a widely spaced, generally discontinuous and form part of the halo mineralisation. A series of felsic and intermediate intrusive units occur within Hamlet North, although these are not volumetrically significant in the ore zone.

Figure 7.6: Long Section showing geology at the Hamlet Mine



Source: St Ives CPR, 2021

8 Deposit types

There are several styles of gold mineralisation at St Ives. Individual deposits and targets may contain more than one of the following styles:

- Lode mineralisation: Archaean orogenic lode mineralisation typically consisting of 0.5m – 20m-wide mesothermal vein complexes that may also have hydraulic breccias and/or mylonites. Mineralisation is typically discontinuous with short-range predictability

- Supergene mineralisation: Broad zones of flat-lying gold mineralisation in weathered Archaean and overlying tertiary sediments

- Palaeoplacer mineralisation: Placer deposits hosted by palaeochannels in the unconsolidated tertiary sediments that overlie the Archaean basement

9 Exploration

Near-mine (brownfields) exploration is key to Gold Fields' strategy as it offers one of the lowest-cost opportunities for adding ounces and growing cash- flow, particularly on a per share basis. The value in near-mine exploration lies in:

- Knowledge of the ore bodies, which enables our exploration teams to identify extensions or additional ore sources housed within the mining tenement.
- Operational capabilities, including Gold Fields' proven ability to develop and mine orogenic ore bodies.
- Regional and operational infrastructure, including existing process plants and regional management teams.

Gold Fields believe that brownfields exploration provides a robust platform for regional growth. In addition to growing Gold Fields' Mineral Resource and Mineral Reserve base, near-mine exploration also extends the life of the Group's existing assets and ensures that each region can continue leveraging its infrastructure.

St Ives spent $26.4 m on near- mine exploration during 2021, drilling 114,330 m. The mine's Mineral Reserves decreased by 9 % to 2.4 Moz and Mineral Resources declined by 2 % to 4.9 Moz. In 2021, extensional exploration targeted additions to the Invincible, Neptune and Hamlet complexes with significant growth in both Resources and Reserves in the Invincible complex.

9.1 Exploration

Exploration at St Ives is classified as either extensional (resource definition) or additional (early stage) exploring for a new orebody or testing for extensions on existing orebodies based on Gold Fields exploration procedures. St Ives exploration budget over the last 3 years has been over +$24 M invested annually. The 2022 exploration budget is $26.5 M.

Site exploration strategy following corporate direction is geared to replace reserves and resources annually through drilling by allocation of roughly 50 % of the exploration budget to extensional drill programs. Exploration programs were completed around the active mining complexes at Invincible, Neptune and Hamlet North during 2021. This drilling was largely successful with significant mineral inventory increases at the Invincible Complex and Hamlet. Additional drill programs were also completed in 2021 testing for extensions of existing mineralisation around the main mining complexes of Invincible, Hamlet and Neptune and will continue during 2022 as they continue to show continued potential for the expansion of the economic mineral inventory.

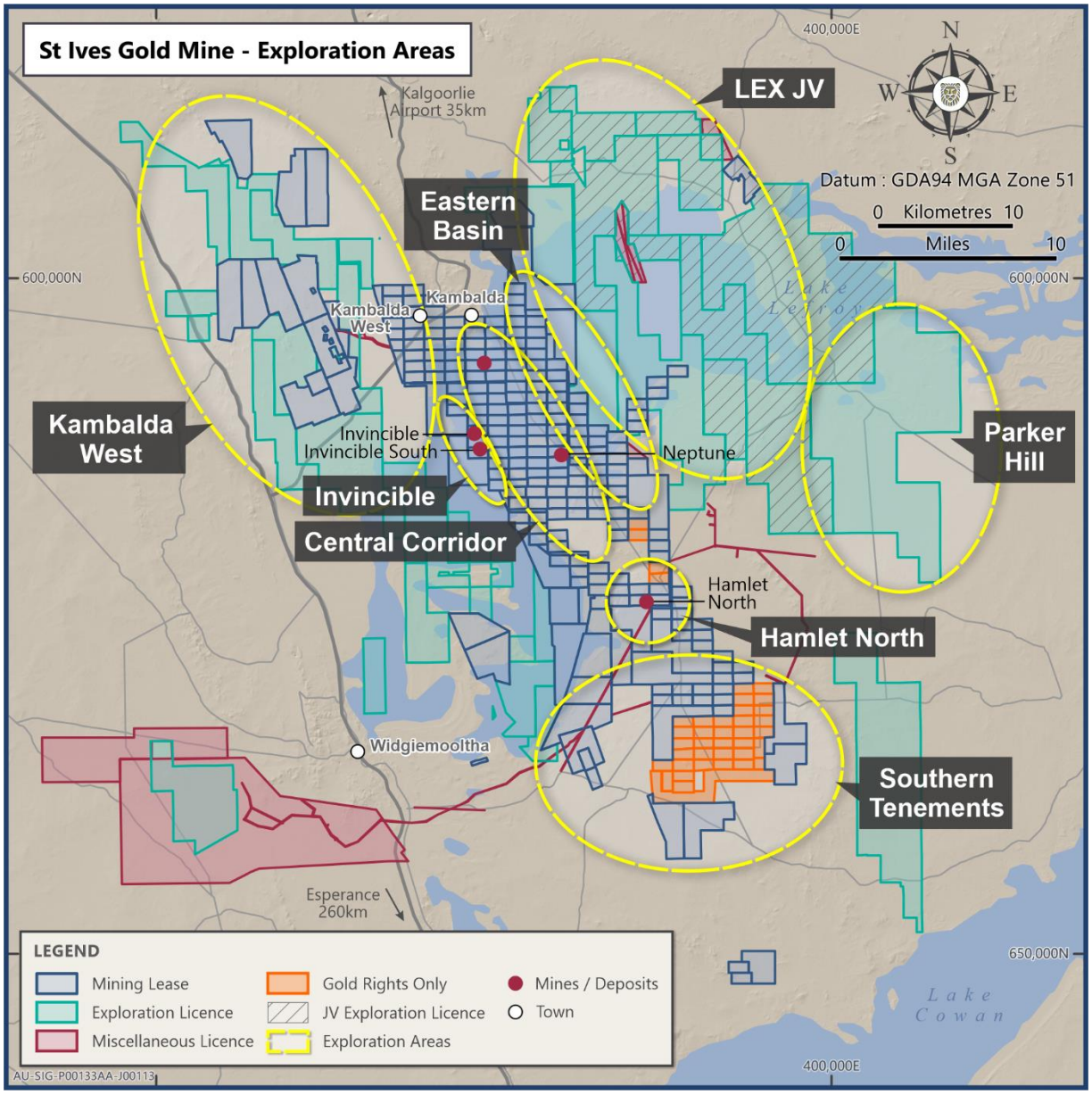
Additional exploration at St Ives invests significantly in the search for new deposits focussing on the collection of foundational geochemical datasets for gold and multi-elements using full field Air Core (regular 400 x 400 spaced drilling) across the tenement package. On regional tenements the focus is looking for large Open Pit targets that support the St Ives LoM and corporate strategy. Full field Aircore drilling in 2021 was completed in the Western Basins area and commenced on the land area of the LEX Joint Venture. Testing of follow up exploration targets during 2021 occurred in the Western Basins, Lex Joint Venture and Kambalda West areas using primarily RC and Diamond drilling.

Exploration strategy over the last few years has also pivoted to restart exploring the Central Corridor area of St Ives (13 million ounces mined historically from the Victory, Revenge, Athena, Argo, Hamlet and Junction areas) for underground targets with initial drilling completed in 2020-2021 at Neptune and around the Hamlet Complex. Drill testing is based on the completion of detailed geological and targeting models over the last few years that have allowed for the ranking of exploration targets for priority follow up based on their geological prospectively. This work is reviewed by corporate and technical specialists offsite to ensure the highest prospective targets are tested. Follow up work is planned in 2022.

Auger based geochemical programs have also been completed across large areas of the St Ives tenement package from 2018-2020. These programs enable the sampling of the calcrete soil horizon for gold identifying coherent geochemical anomalies. St Ives also completes regularly geophysical surveys including gravity, and magnetics. Foundational gravity geophysical datasets were collected in on regional tenements.

The location of the material exploration programs undertaken on the property during the period 1 January 2021 to 31 December 2021 are shown in Figure 9.1.

Figure 9.1: Location of exploration areas



Source: St Ives CPR, 2021

In underground mines face chip and wall chip samples are routinely collected. The face samples are collected from development faces approximately 3.5 m apart using a jumbo drill rig rattling the extent of the exposed face in approximate 1 m segments. The resulting sample is considered representative of the face. Most faces are mapped by a geologist and where the geometry or geology predicates, wall samples may also be collected. Faces that have had sampling under geological supervision maybe included in the resource estimation if QAQC criteria is met.

The Qualified Person's opinion of the 2021 exploration programs and results is:

a) All procedures and parameters applied to the surveys and investigations are appropriate for the style of mineralisation being prospected.

b) The exploration programs have confirmed continuity of geology and controls on gold mineralisation in key areas.

c) There were no material variations encountered during the 2021 exploration programs.

d) Based on the 2021 exploration and results a 2022 exploration budget has been approved to retain traction on the programs and to progress leading projects.

10 Drilling

10.1 Type and extent

Drilling at St Ives uses a number of different drilling processes based on the type of sample required. Drill testing during 2021 was split between resource definition (extensional) drill programs predominately around the active mining complexes at Invincible, Neptune and Hamlet and early stage (additional) drilling, searching for new deposits and extending existing programs.

The Qualified Person's opinion is that a register of individual drill results would be too voluminous, potentially misleading and not relevant to the current reporting of Mineral Resources and Mineral Reserves.

A summary of the surface exploration drilling physicals for 2021 is shown in Table 10-1.

Table 10-1: Summary of St Ives drilling – 2021

Area	Hole type (m)		
	AC	RC	DD
Invincible		8,938	48,595
Hamlet North			15,278
Neptune		3,967	3,719
Kambalda West		1,140	
Western Basin	4,444	4,868	
Lex JV	9,249	5,742	1,884
Central Corridor	3,426	2,043	
Total	**13,693**	**28,081**	**71,519**

Note: a) Infill exploration is reported separately from exploration.

Source: St Ives CPR, 2021

DD and RC are the main drilling techniques used to produce data for Mineral Resource estimation with Ausdrill the current drilling contractor. In the case of the paleochannel deposits, whole sample AC drilling data is used. Sonic core drilling of the paleochannel and unconsolidated material was used historically. This technique provided a more representative in situ sample of unconsolidated material. Surface DD holes are predominantly drilled using an HQ (96 mm) drill bit before transitioning to a smaller NQ (75.7 mm) bit. Underground mine definition and grade control DD holes are NQ size whilst grade control upholes are LTK60 in diameter. Historically, underground drilling included LTK48 DD holes.

Open pit Mineral Resources are predominantly defined by 5½ inch diameter RC drillholes supported by spatially representative DD holes to aid with the geological interpretation and validate the RC drilling results. Drill spacing within the open pits varies from 5 m x 10 m, 10 m x 10 m, 10 m x 20 m and 20 m x 20 m. This spacing is dependent on the orebody geometry, the stage of the project and mining method. AC drillhole results are generally excluded from all Mineral Resource estimates. In some earlier instances these results were used for inferred Mineral Resource estimates and were superseded by more representative RC or sonic holes. The exception is for paleochannel deposits where AC holes tend to represent the less consolidated material better than RC or DD holes. Limited drillhole data is used from non-SIGMC sources. Where external information is used, it is appropriately flagged with standard validation checks applied when imported into the St Ives database.

10.2 Procedures

10.2.1 Survey

All drillholes are initially set out using either a GPS or DGPS depending on the required accuracy of the drill collar. Drill rigs are aligned either with a digital instrument (AziAligner) or using marker pegs and flagging tape. When drilling is complete, all DD and RC collars to be used for resource estimation are re-surveyed using a DGPS and their final location is verified in the database. All drillholes used for resource estimation (except AC holes) have downhole surveys undertaken using either Reflex EMS (9 m intervals), multi-shot camera (18 m intervals), Eastman single-shot camera (30 m intervals) or downhole gyroscopic (18 m intervals) surveys. These surveys are validated for any potential errors and uploaded into the database.

All captured survey data is stored in a Datashed® database. Codes are stored that indicate the status of collar and downhole surveys. The project geologist is required to interpret the results of the downhole survey methods and compare the surveyed collar location against the planned collar position.

10.2.2 Sample collection

Sample collection procedures for the different hole types are:

- Diamond drill core is delivered by the drilling contractor to the core farm where it is cleaned of dirt and grease, laid out on the roller racks, measured and logged. Samples of the core are determined by the geologist and can vary in length from between 0.3 and 1.0 m with a maximum core length generally no longer than 1 m. The core is cut along its length by automated cutting saws (orientation line used as a guide for the cut line) and sampled by field staff at the core farm. The core without markings (meter marking or sampling marks) is chosen for sampling. In most instances, half core is collected for assay purposes retaining the other half for further geological investigation, but where volume support is important with respect to sample representivity, the core is sampled whole. Digital photographs of all the core is taken prior to cutting and sampling and stored for reference purposes.
- For RC drilling, the entire sample interval is split using a cyclone splitter attached drill rig with the aim of producing a ~3 kg sample for analysis. Most samples are dry but where wet samples are collected, this information is recorded in the database against the interval. Wet samples are mostly at rod changes where groundwater inundates the drill column. The wet samples are routinely sampled by using a metal scoop to deliver approximately 3 kg samples. The sample bags are removed from the drill site by SIGMC field technicians.
- For AC drilling, the entire 1 m interval of sample is recovered by the drill rig offsider in a bucket and laid on the ground in rows where each meter is represented by a single pile of sample. A scoop sample is collected per interval and two separate metre intervals are composited prior to being submitted for analysis. In certain instances (for testing of paleochannel deposits) more rigour is applied to the sample collection process. This includes homogenising the entire 1 m interval of sample through a riffle splitter to approximately 3 kg. In wet horizons the total sample is collected and manually subsampled utilising a fractional scooping technique carried out at the analytical laboratory. The method reduces overall sample bias. The sample bags are removed from the drill site by SIGMC field technicians.

10.2.3 Recoveries

Different drilling techniques have different recovery rates for the samples, as described below.

Exploration DD holes are anticipated to deliver 100 % sample recovery, however; if core loss occurs due to unconsolidated ground or poor drilling technique, it is measured and recorded by the drillers and geologist. Diamond drilling completed prior to 1995 did not use core blocks to demarcate intervals, resulting in unreliable core recovery estimates.

RC sample recoveries are between 70-95 % depending on the amount of fine material and groundwater encountered, while AC drilling recovers up to 90 % or the material.

Volume mass calculations suggest a theoretical RC sample interval mass of 37 kg and previous testwork evaluating the recovery across various RC drill rigs employed at St Ives returned an average sample recovery of 80 %. Analysis and monitoring of drill sample recovery is ongoing and part of the QAQC of rig management by the Geologist.

10.2.4 Core orientation

Core orientation refers to the technique of marking the diamond core so that it can be oriented at surface into the same relative position as in the ground. This is achieved by either using a simple metal spear that leaves an imprint on the end of the core or a electronic device that records the orientation of the core in the hole so it can be matched up on the surface. Once the core has an orientation mark, this can then be laid out and pieced together like a jigsaw. An orientation line can then be drawn along the core, which represents the bottom of the core. From this line, measurements of orientation (azimuth of the core) and the dip (angle of bedding and structures) can be determined.

Orientation of core can only be achieved on competent Diamond core, and intervals are determined by the geologist based on the requirements of the hole. Typically, early-stage holes are orientated for their entire length whereas resource holes are only orientated closer to the mineralised area.

10.2.5 Logging

Logging intervals vary from 1 m (AC/RC) to cm scale (DD). Data routinely collected includes lithology, structure, mineralisation, alteration, geophysical (magnetic properties) and geochemical properties (multi-element assays) and physical measurements (rock hardness, geotechnical RQD, density, acid rock drainage). The lithology, alteration, and structural characteristics of core and percussion chips are logged directly to a digital format and entered into the database after validation.

In addition to the above data, other requested work is completed off site by technical experts, providing services such as petrographic analyses, mineralogy studies and geochronology. This work often forms part of ongoing research development with cooperative ventures. This data is included in standard reports and databases for current and future use.

All half core is retained on-site for current and future reference at core storage facilities on the St Ives lease which may include application of new technologies and the review of theories. Assay pulps are stored at the Core Farm in labelled individual paper envelopes within catalogued cardboard boxes. AC and RC chips are stored in labelled sealed compartment trays for future reference. Appropriate procedures and controlled documents outline the retention, storage and material access processes.

The Qualified Person's opinion of the 2021 exploration and resource extension drilling is:

a) All drilling and exploration field activities are supervised to ensure health and safety and maintain appropriate technical standards.

b) The drillhole surveys are adequate by type and length for the intended purpose.

c) Utilising orientated core significantly enhances recorded information to assist with 3-D modelling

d) The drillhole database and subsequent modelling aligns to core recovery losses and should not cause material errors

e) Post QAQC screening and validation exploration results are incorporated into the estimation of Mineral Resources; the categorisation of Mineral Resources is described in Item 14.

f) Validated exploration results are used in the 31 December 2021 Mineral Resource estimation.

g) Individual exploration drillhole information is not viewed as significant or material to the Mineral Resource and Mineral Reserve reporting at St Ives and consequently exploration data is not presented.

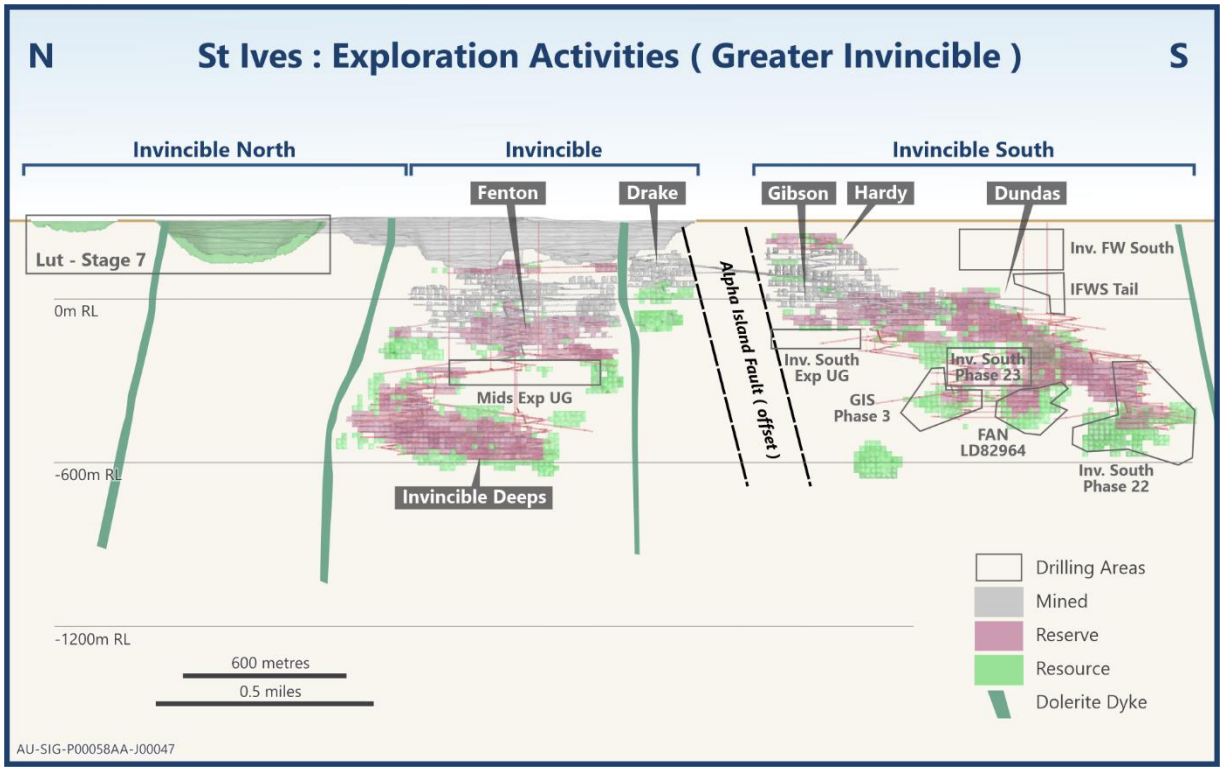
10.3 Results

The results discussed in this item are only results that are deemed to be material to resource and reserve estimate.

10.3.1 Invincible Mine

Exploration activity since 2015 has largely focused on mineralisation within the BFM, as the highest grade intercepts are typically hosted within this unit. Over the last two years the improved geological understanding on extensional veins has allowed these to be targeted for resource conversion and these now make up a large component of the exploration program at Invincible. Underground Mineral Reserve growth at Invincible for 2021 was by surface drilling at Invincible South and by underground drilling at Invincible South and the link area between the Invincible and Invincible Deeps zones (Figure 10.1). This drilling was largely successful Surface drilling tested the Invincible Footwall South and area for open pit potential

Figure 10.1: Schematic long-section through Invincible Mine



Source: St Ives CPR, 2021

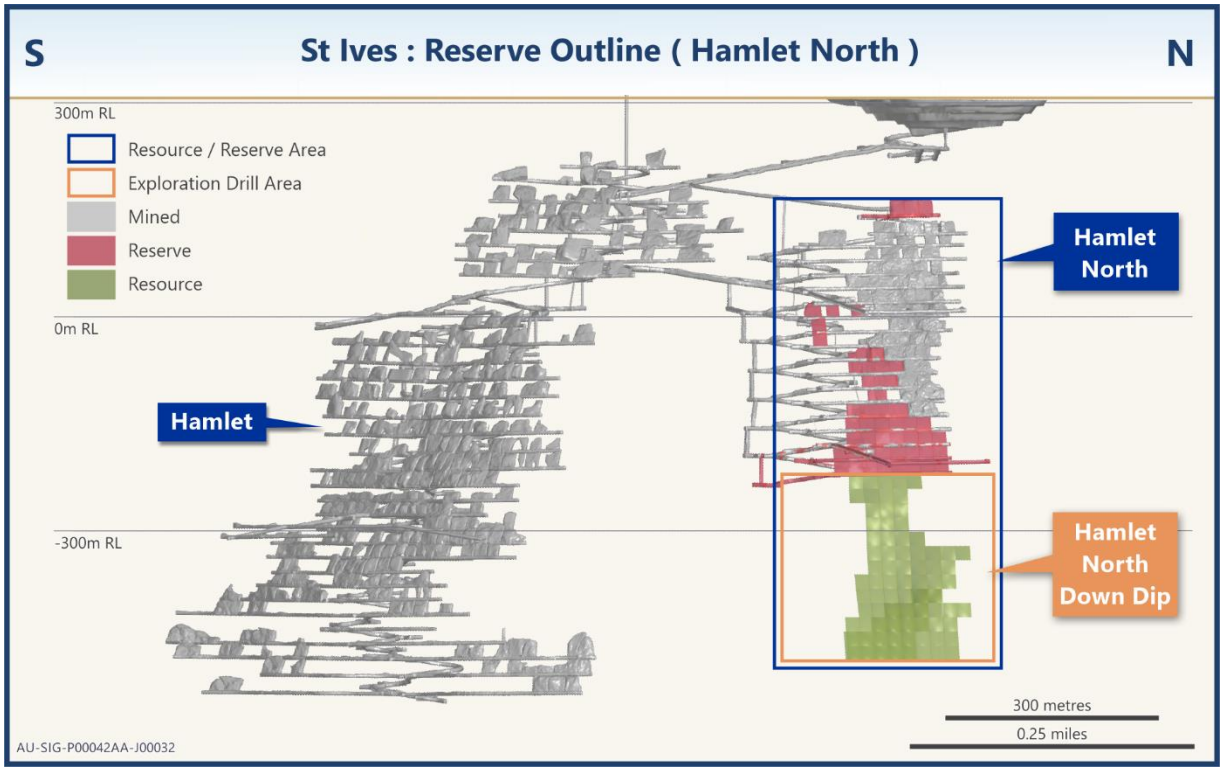
Exploration at Invincible for 2022 will focus on converting the footwall mineralisation into reserve extending mudstone mineralisation down plunge at Invincible South. This will be achieved through a combination of surface diamond and underground drilling.

10.3.2 Hamlet North

The Hamlet North deposit is located to the north of the existing Hamlet deposit and was discovered in 2017. It is situated within the Defiance Dolerite Unit 4, a granophyric unit within the Defiance Dolerite that has proven to be a strong geological host unit when interacting with the Hamlet Shear. It has a ~150 m strike and 10-15 m wide with a down plunge extent of >750 m.

Exploration during 2021 focussed on following up drilling that was completed in 2020 (Figure 10.2) that extended mineralisation 150 m down dip of the current reserve. This drilling converted this mineral inventory to resource from underground drilling. Exploration drilling for 2022 at Hamlet North is focused on testing for mineralisation in the DF4 granophyre at depth and working in advance of the mining front to convert mineral inventory to resource from underground drill platforms.

Figure 10.2: Schematic long-section through Hamlet North Mine



Source: St Ives CPR, 2021

10.3.3 Neptune Mine

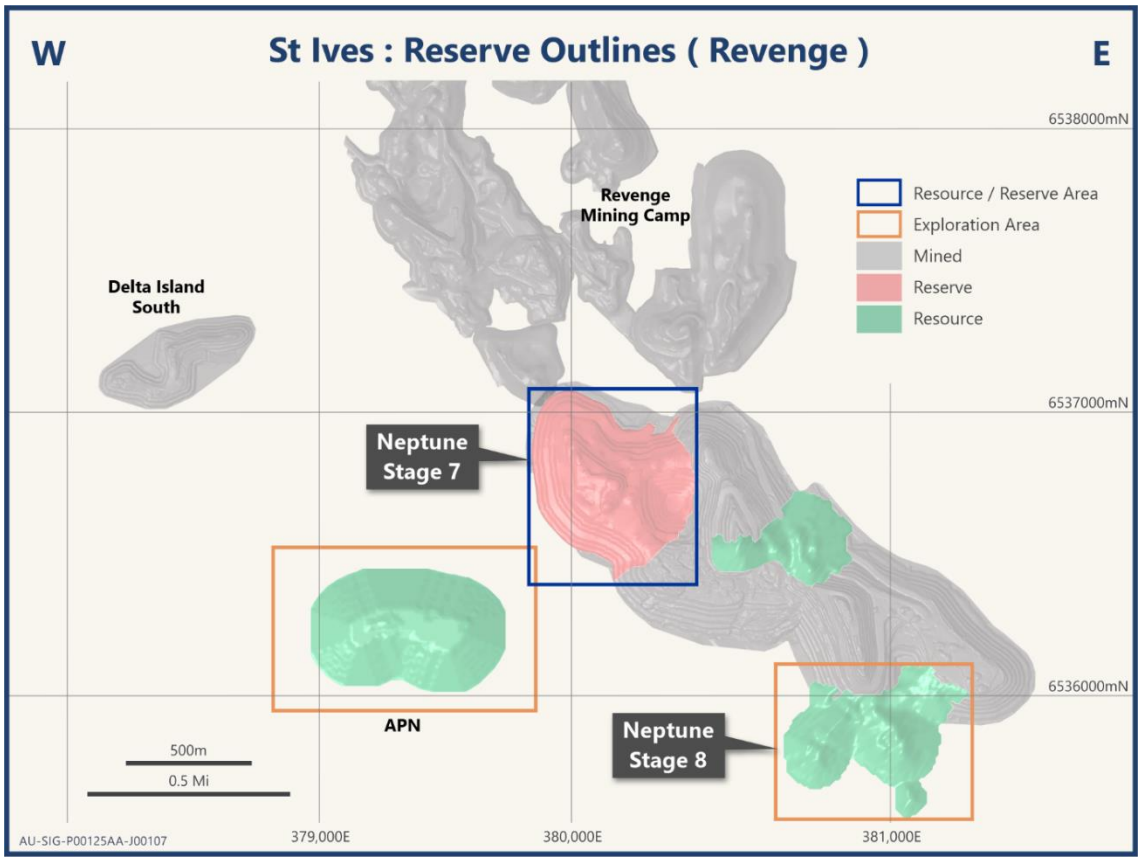
The Neptune deposit is located in the Revenge Mining Complex. This area has had extensive exploration for gold completed since the 1990's with over 3 Moz mined to date. The Neptune Open Pit Mine has produced 500 koz to date. Recent drilling over the last 3 years, combined with increased gold price expanded the Neptune Stage 7 reserve to 96 koz in 2020 (Figure 10.3).

Drilling completed during 2021 focused on upgrading the existing Neptune resource (Stage 8) and APN areas. The Stage 8 drilling focused on converting Inferred Resources to Indicated Resources and targeting a saddle area within the resource. 2021 mine cost assumptions meant that that there was no change reserve in this area as the optimised pit shell was above $1300.

The Qualified Person's opinion of the 2021 exploration and resource extension drilling is:

a) All exploration activities, including drilling, database management, validation and QAQC, prior to incorporating relevant data into the resource modelling and estimation process, is viewed as sufficient, appropriate, technically assured and suitable to support Mineral Resource estimates.

Figure 10.3: Schematic plan view of the Neptune Mine



Source: St Ives CPR, 2021

11 Sample preparation, analyses, and security

The majority of St Ives' samples are assayed externally by Australian Laboratory Services Pty Ltd (ALS) with support work being carried out by Bureau Veritas (KALASSAY) and SGS Laboratories in Perth. ALS has a laboratory accreditation number (825) and a site certificate of registration (C-90494). An agreement is in place for ALS to provide analytical services for all St Ives samples, including underground and open pit grade control, and exploration. KALASSAY and MinAnalytical are also used as umpire laboratories.

ALS is an independent testing, inspection, certification and verification company headquartered in Brisbane, Australia (Table 11-1 and Table 11-2). MinAnalytical was previously a subsidiary of the Perenti Group. It was announced in January 2022 that MinAnalytical had been purchased by ALS.

Table 11-1: Analytical laboratory accreditation

Laboratory	Certificate number Accreditation number	Independent testing inspection
ALS Perth	825	Yes
ALS Kalgoorlie	C-900494	Yes
MinAnalytical	18876	Yes

Note: a) Certificates were reviewed by the Qualified Person
b) The Qualified Person is of the opinion that the analytical laboratories are certificated and have sufficient process to minimise material errors

Source: St Ives CPR, 2021

All samples are submitted for gold analysis by fire assay supported by either screen fire assay or LeachWell analysis for certain mineralisation types. This is done to provide check assays and investigate any potential sample bias related to coarse free gold.

In 2022 St Ives will commence using Photon Assay as a standard analytical method for gold analysis. This methodology is considered preferable where coarse free gold is present. Testwork completed over the past two years has demonstrated that the assay method is robust. Photon assay allows large samples to be measured and provides a true bulk reading independent of the chemical or physical form of the sample. Using uniquely numbered sample jars, the process is completely non-destructive, and samples can be retained for further analysis if required with significant reduction in turn-around times.

There is a security gate and swipe card system to account for all mine personnel and numerous security video cameras placed around the site. Deposits known to contain visible gold renders the drill core susceptible to theft; however, the risk of sample tampering is considered low. Bagged samples are transported from a secured locality at the property by a St Ives owned truck to the laboratory facility for further preparation and assaying.

All samples received by the laboratory are physically checked against the despatch order and St Ives is notified of any discrepancies prior to sample preparation commencing. No company personnel are involved in the preparation or analysis process.

11.1 Sample preparation

Sample preparation is carried out according to the following procedure:

- Upon receipt, all samples are sorted and validated against the relevant documentation. Samples are weighed and entered into the Laboratory Information Management System (LIMS).
- Workflow through the preparation and analytical stages is tracked through LIMS according to assigned bar-coded sample labels. Samples are dealt with sequentially according to SIGMC requests.
- The samples within their calico bags are placed in a modern forced air oven and dried at 105 ºC.
- If required, as in the case of DD core, the samples are processed through a jaw crusher to 2/3 mm (90 % passing). If the resulting crushed product is greater than 3 kg, the sample is split using either a stainless steel riffle splitter or a rotary splitter. A 3 kg split is pulverised in a LM-5 pulveriser.
- A scoop of pulverised sample is placed in a labelled paper sample bag for analysis and the remainder returned to St Ives for cataloguing and storage.

The Qualified Person considers sample preparation procedures used by external laboratories contracted adequate for reserve and resource estimation. Laboratories used are all accredited with robust internal QAQC procedures. Sample preparation is subject to regular audit by St Ives and has its own QAQC procedures in place to ensure sample preparation is completed correctly.

The Qualified Person has reviewed the sample preparation and security procedures. The sample preparation is found to be adequate with effective supervision and in line with industry leading standards. No material bias is indicated that could potentially impact the sampling preparation and analysis. Sample security enforcement is reliable with low consequence if in the unlikely event of security protocols failure.

11.2 Sample analysis

Samples submitted to the ALS and MinAnalytical, laboratories are analysed by the following standard, analytical methods:

- Gold (ppm) by 50 fire assay with an atomic absorption spectrometry (AAS) finish (AA25 or AA26) and for low level (ppb) Au (AA22). The pulverised sample is weighed and mixed with a fluxing agent. In addition to the flux, Lead is added as a collector. The sample is then heated in a furnace where it fuses and separates from the collector. The Gold is then extracted through a process called cupellation and analysed.
- General geochemistry of a 56 element package (including rare earth elements) by inductively coupled plasma (ICP) analysis (ME-MS61r). The sample is digested with an acid. The residue is topped up with dilute hydrochloric acid and analysed by inductively coupled plasma-atomic emission spectrometry.
- Gold (ppm) determined through LeachWell analysis specifically targets ore sources with an expected higher coarse gold component (paleochannel). This is currently completed at ALS Perth. Samples are dried, pulverised and weighed into jars. An equal or greater known weight solution containing cyanide, Leach WELL and NAOH is then added to the jar. The jar is then rolled or tumbled for at least an hour the allowed to stand for approximately ten minutes until a layer of clear solution is available for sampling and reading by Atomic Absorption Spectrometer. The grade of the original is calculated from the solid/solution ratio and the AAS reading.
- Photon Assay – Samples are crushed to a nominal 2 mm then load into barcoded jar. Place jar into automated conveyor. Samples are hit by a high energy X-ray source enabling gold atoms to be detected and counted

The Qualified Person considers analytical procedures used by the external laboratories contracted adequate for reserve and resource estimation. Laboratories used are all accredited with robust internal QAQC procedures. Analytical method is subject to regular audit by St Ives and has its own QAQC procedures in place to ensure sample preparation is completed correctly.

The Qualified Person has reviewed the certificates and is of the opinion that the analytical laboratories are certificated and have effective process and protocol in place to ensure quality control and assurance and minimise any material errors.

Table 11-2: Analytical laboratory accreditation Analytical laboratory accreditation

Laboratory	Certificate number Accreditation number
MinAnalytical (MinA) Kalgoorlie	18876 ,21075 (ISO/IEC 17025)
Australian Laboratory Services (ALS) Kalgoorlie	QEC27912, C-90494 (ISO 9001:2015)
Australian Laboratory Services (ALS) Perth	825, 23001 (ISO/IEC 17025)

Source: St Ives CPR, 2021

The Qualified Person has reviewed the certificates and is of the opinion that the analytical laboratories are certificated and have effective process and protocol in place to ensure quality control and assurance and minimise any material errors.

11.3 Quality control procedures

QAQC is an integral aspect of the entire sampling and assaying process. It provides a measurement into the reliability of the collected data and specifically an understanding of the accuracy and precision of the results. QAQC monitoring ensures that best practice is followed throughout the drilling, sampling, preparation and analytical processes.

St Ives has implemented a comprehensive QAQC system, comprising of both written procedures and consistent monitoring by the QAQC officer and resource geology group supported by internal and external audits.

Most of the assay work is completed by ALS in Kalgoorlie under a formal contract. Routine interaction and periodic meetings are held between SIGMC staff and ALS management to ensure all obligations are met, with up to two laboratory audits per month. An example of the audits completed during June 2020 is shown in Table 11-3.

St Ives' QAQC protocol comprises the routine insertion of certified reference materials (CRM), duplicate samples and blanks to ensure sample quality. The QC sample types are summarised in Table 11-4.

St Ives' procedures guide the responsible geologist regarding the minimum frequency of QC samples to be inserted into their sampling programs. This is controlled during sample register creation and monitored continuously by the QAQC data controller and by the project geologist during drilling.

The QC samples are inserted at a rate of 1 in 20 for non-mineralised zones and 1 in 10 for mineralised areas. All standards used are CRMs that have been subject to internal 'round robin' analyses. Quartz washes (barren material) are inserted between and after extremely high-grade samples to prevent any carry over during sample preparation.

Table 11-3: Laboratory audits

Date	Auditor	Laboratory	Audit conclusions
24/02/2021, Q1	L.Smuts / M Caporossi	ALS Kalgoorlie	Large sample volumes, GFA volumes honoured as per contract, LM5 lid replacement program completed. ME/ASD sample TAT in Kal, Au priority to ensure ME/ASD within 21 days. New acting lab manager Brenen Christie under Greg Brosnan supervision. Face sample TAT priority remain important to GFA, also sample volumes to honour GFA contract volumes.
09/02/2021, Q1	L.Smuts / Samuel George / Kab Karuna / Kyle Wohlers	ALS Perth	Covid measure remain in place, LM5 No 33, 34 &36 operator had to be retrained. Supervisor conversation reiterating ALS cleaning procedures. New better sealing LM5 lids in place at all LM5s, sealing significantly improved. All GFA full core samples processed in Orbis 100's, no primary crushing required, improved workflow and contamination potential minimised.
21/05/2021, Q2	Gail Clark	ALS Perth	No actions required, complete lab overview provided by ALS lab manager, Lab expansion started in fire assay section, planned 25 % increase in capacity.
09/06/2021, Q2	L Smuts, SIGM Geology Team	ALS Kalgoorlie	James Egan, Claudia, Jesse Osborne, Thomas, Darren Murray and Andrew, Lab process review and training completed for sites. CRM performance, increased failures due to an operator not following procedure. TAT starting to blow out, Kal ALS struggle with sample throughput due to staff shortages.
05/09/2021, Q3	L Smuts	Perth ALS	TAT blow outs for GFA due to staff shortages, weekly meetings implemented to ensure priority samples processed. One operator on LM 5 was not cleaned as per procedure, poor cleaning practices.
06/09/2021, Q3	L Smuts	Kalgoorlie ALS	TAT blow outs for GFA due to staff shortages, weekly meetings implemented, Perth ALS loadshedding assisting TAT backlogs. Pb button slag separation observed, Boilovers, LM2 lid seals issue,
23/11/2021, Q4	L Smuts	Kalgoorlie ALS	Orbis internal cleaning improvements being reviewed, all Q3 audit issues was resolved except for ongoing testwork being completed in Perth ALS reviewing PB slag separation if it contain gold, as well as the wet lab temperature effects on gold results.
03/12/2021, Q4	L Smuts	Perth ALS	Lab capacity expansion ongoing, LM5 mill cleaning practices improvements, sample TAT backlog resolution plan reviewed and sample priority weekly meeting implemented. Ongoing testwork related to PB slag separation if it contains gold, as well as the wet lab temperature effects on gold results.

Source: St Ives CPR, 2021

Table 11-4: Quality control type summary

Sample description	QC Stage	Comments
Field duplicate	Monitors sample source and sampling procedure	Duplicate sample taken identically as the original sample (½ core; RC: duplicate split taken in field)
Laboratory duplicate	Preparation	Repeats taken by ALS to monitor the laboratory process
Coarse crush duplicate	Preparation after jaw crush, but before pulverising	Implemented October 2013 to ensure that whole diamond core samples can get a representative duplicate
Standard/Blank	Analytical	Certified sample of known concentration: pulps (standards), coarse crushed matrix-matched basalt (blank)
Pulp re-assay	Analytical	Repeated re-assay on the analytical pulp as requested by the QAQC geologist from a QC failure or as a lab check
Pulp umpire	Analytical (at the end of a program)	Random subset of pulps sent to an umpire laboratory to ensure analytical accuracy and precision

Source: St Ives CPR, 2021

To monitor accuracy across grade ranges, low, medium and high-grade CRM samples are inserted at relevant intersections. All sampling and quality management is supervised by the geologist responsible for the drilling program. If required, the responsible geologist may increase the quantity of QC samples.

For DD core, half of the original core is retained as a duplicate and a duplicate split is taken from the cyclone splitter for RC samples. Crush duplicates and pulp duplicates are taken during the sample preparation process and re-assayed by the primary laboratory. The rate of insertion for crush and pulp duplicates is 1 in 20.

Secondary check analyses through umpire sampling are completed with pulverised duplicate samples submitted to an independent umpire laboratory. The umpire sampling program covers both site wide as well as project specific data. No systematic long term sample bias has been identified from the umpire sampling process.

ALS and KALASSAY routinely insert their own blanks and two CRMs per batch. These QAQC results are available for review by SIGMC.

QAQC samples are analysed through the same process as all samples, and upon completion these assay results are loaded into the database and evaluated against the QAQC pass and fail criteria.

Results for all QAQC samples from every laboratory batch are analysed to determine assay accuracy, precision and repeatability. Assays which return results outside a standard set of control guidelines are flagged automatically and a warning notification is sent to the responsible geologist. If a batch fails, it is quarantined in the database until the geologist concerned has examined the data and determined the course of action. All QAQC results are collated and reported monthly to the geology team. The data analysed includes sample size (weight), CRM and blank performance and duplicate behaviour.

All geologists receive training in QAQC and use the QAQCR program to evaluate the data and are expected to actively monitor and maintain the quality of the data they are producing.

No systematic long term sample bias has been identified from the QAQC process. The data applied to the Mineral Resource estimates demonstrates sufficient accuracy and precision as deemed by the Qualified Person.

12 Data verification

The planning and execution of both mine and regional exploration programs at St Ives is to industry best practice and aligned with numerous developed standards and procedures reflecting local best practices. To ensure this ongoing compliance, the process consists of the development of consistent procedures, regular audits and appropriate sign-off documentation feeding into all key elements used in producing Mineral Resource estimates. The key components of the geological data acquisition framework include:

- Validity – Controls to ensure the validity of key activities.
- Accuracy – Controls to establish the accuracy of data inputs and outputs.
- Completeness – Controls to ensure the completeness of the process followed.
- Timing – Preventative and detective controls to identify potential risk and deviation of quality.
- Segregation of Duties/Sign-off – Key members of the senior team are responsible for different aspects of the process.

The Qualified Person is of the opinion that the data verification process and protocols are adequate to minimise any material errors, are in line with industry leading standards and underpin technical assurance.

12.1 Data management

Exploration, grade control and resource development data at St Ives is stored in an SQL database format using a proprietary front-end software interface (Datashed®). A central database geologist and database QAQC administrator manages all aspects of data entry, validation, development, quality control, training and specialist queries.

The majority of logging data is directly captured using Maxwell Logchief® software and linked to the Datashed® database. Geological face mapping in the underground mines and highwall mapping in the open pit is captured manually on paper logs and later transferred to digital format. Core logging is digitally captured directly onto field Toughbooks which are synced into the database via controllers.

Datashed® enables the control of tasks, permissions and database integrity. The SQL server database is configured for optimal validation through constraints, library tables, triggers and stored procedures. Data that fails these rules on import is rejected or stored in buffer tables until corrected. This meets industry best practice and is verified by an embedded risk and control matrix (RACM) .. A dedicated database geologist manages all aspects of data entry, validation, development, quality control and specialist queries.

All exploration data control is managed centrally, from drillhole planning to final assay, survey and geological capture. Most logging data (lithology, alteration, and structural characteristics of core and percussion chips) is captured directly to customised digital logging tools with stringent validation and data entry constraints. Geologists load data into buffer tables where initial validation of the data occurs. The data is uploaded into the database by the geologist after which an additional automated validation process is conducted on the data and the geologist is notified if there is an issue. The issue must be addressed, or the data may not be loaded into the database.

Each drillhole is allocated a unique identification number. This can only be uploaded into the database if it contains specific required metadata including spatial location, hole type and total depth. Individual samples collected for assay analysis from the holes are issued with a unique sample number and depth interval. The sample recoveries and collection dates are recorded for these samples. All intervals are logged and database captured against logging codes which provide specific and consistent information relating to lithology, alteration, veining and structure.

All assay data is automatically uploaded into the database in a text format known as a SIF file. These files include detailed information about the batch, methods, units, detection limits and elements assayed. The file also includes all QAQC data in the sequence of analysis. The assay data is in a normalised format to ensure all required information is stored for each sample, and to allow multiple assay result storage for each sample. Assay results are loaded against

each unique sample and represent the value for that sampled interval. Assays are only loaded once they pass quality testing.

Once all data for a drillhole has been entered into the database, the responsible geologist validates the drillhole. A validation extension has been developed in Datashed® to run queries against the database, which includes checks for incorrect collar locations, testing for overlapping, missing or incorrect downhole surveys, and incorrect collar location. Procedures and templates are available for all geological data.

Backups are made to the St Ives server on a regular schedule. A copy of the database also resides on the Gold Fields back-up server in Perth. Digital certified assay certificates in PDF format are backed up on the St Ives server on a regular schedule. The Qualified Person considers this meets industry best practice and fulfills embedded risk and control matrix (RACM) requirements.

The Qualified Person's opinion of the data management is:

a) The data management process and protocols are adequate to minimise any material errors.

b) Regular validation of the database and data management process is aligned with standard industry practices, verified through an embedded risk and control matrix (RACM) measure quarterly as a minimum

12.2 Drilling and sampling

A series of written standard procedures exists for all sampling and core cutting activities at St Ives. Daily visit by geologists and weekly visits to drill rigs and the core farm are carried out by project geologists to review sampling practices. These are also supported by quarterly routine risk and control matrix (RACM) walkthroughs conducted by Senior geological staff that review drilling, sampling procedures.

Sample registers are used to record sample recovery and type. After loading the data and corresponding assay results into the database, standard statistical comparisons are carried out on the information including Quantile-Quantile (Q-Q) plots which help explore potential bias between drilling techniques or drill programs. These findings are then recorded in the Mineral Resource reports.

Testwork has been completed at site to quantify the effects of wet sampling especially in paleochannel environments. Where it may be deemed needed holes may be twined or additional testwork completed to ensure sampling is of reasonable quality.

The Qualified Person considers drilling and sampling methodology to be adequate for reserve and resource estimation.

12.3 Survey

Drilling contractors are trained to used downhole survey equipment by the service providers and are referred to Item 10.2. Downhole survey tools have internal QAQC processes that are required for the survey to be considered valid. The tools are routinely calibrated on either fixed test stands or at the service providers facilities. Drillhole collars are either picked up by trained geological assistant personnel using a standardised procedure or the survey department. Daily visits by geologists and weekly visits to drill rigs and the core farm are carried out by project geologists to review survey practices. These are also supported by quarterly routine risk and control matrix (RACM) walkthroughs conducted by Senior geological staff. Survey data is checked electronically daily by a geologist and reviewed by project geologist per exploration program to ensure there are no survey errors.

The Qualified Person is of the opinion that the survey protocols are adequate to minimise material errors.

12.4 Sample analysis

Sample analysis methodology and procedures is discussed in Item 11.2 and Item 11.3. St Ives' process for sample analysis uses reputable companies to conduct the analysis who have robust procedures and are accredited. Audits are completed routinely to ensure sample analysis is done correctly. The Qualified Person considers that process used and

controls in place for sample analysis ensure that assay sample analysis meet the requirement for reserve and resource estimation.

The Qualified Person is of the opinion that the sample analysis protocols are adequate to minimise material errors.

12.5 Geological modelling

All acquired data is based on historic and current knowledge derived over many years of exploration and mining at St Ives. Peer reviews involving both internal and external corporate consultants and industry experts are routinely undertaken including site visits and continual review of best practices. Guidance from these visits help align current thinking and involve investigating new innovative methods to facilitate continued excellence in exploration, mining and resource estimation. In addition, appropriate internal and external training of new and existing staff to applied methods and techniques, together with management oversight, ensure on-going best practices.

A large amount of geological research has also been completed at St Ives. This includes academic and industry based publications, theses, internal reports and ongoing cooperative research development with industry experts.

Geological interpretations are produced considering both plan and sectional orientations. All geology and Mineral Resource model variations are documented and subject to a formal peer review and hand over procedures with the findings archived within a centralised electronic filing system.

Geological interpretation does have the potential to impact materially on the estimated quantity and quality of the Mineral Resources and Reserves. Incorrect assumptions regarding volume and geological and/or grade continuity will impact the estimated contained metal. Ongoing support from expert geologists, site and corporate peer reviewers, external reviews as well as the model change authorisation process, ensure that the geological interpretation is the best representation based on the data available and the knowledge and understanding of the mineralisation.

The current understanding of the geological setting, host lithologies, structural framework and alteration controls on mineralisation are considered by the Qualified Person to be appropriate to support the declaration of Mineral Resources and Reserves at St Ives.

The geological model is viewed in 3D, plan and cross-section to check if the geological units are constrained in the model. The geological model is also validated against mapping data if available. If logging data does not fit the conceptual model or surrounding holes in the interpretation, a validation/review of the original logging is carried out. This may result in re-logging of the hole or change to the model and interpretation depending on the outcome of the model.

Geological models for reserve and resource assessment are incorporated in the MCA (Model Control Authorisation) process that incorporates formalised peer review and signoff. A further layer of review is that all material geological models are reviewed by the Corporate Technical Services Team. The Qualified Person considers the modelling procedure and review process to be adequate for Resource and Reserve estimation. Models are updated as new data comes in and the geological interpretation may change as more information becomes available.

The Qualified Person's opinion of the geological modelling is:

a) The geological modelling protocols are adequate to minimise material errors

b) The controls have been reviewed and the adequacy is reasonable and that material bias or errors are unexpected

c) The systems to reduce human and procedural errors, checks and balances are adequate and minimise material errors

d) The protocols are adequate as reviewed and that the Mineral Resource models are based on sound data and are reasonable

13 Mineral processing and metallurgical testing

The St Ives mining operations currently includes the following:

- Two operating underground mining complexes; Invincible and Hamlet.
- One operating open pit mine; Neptune.
- Multiple potential future open pits reserves; Pistol Club, Justice, Trinidad and Swiftsure.
- Multiple mined ore stockpiles.

The various ore sources are all treated in the one processing facility, being the Lefroy Plant, which consists of a primary crusher, single-stage SAG mill, gravity recovery circuit, leaching, CIP, carbon elution, and goldroom processing stages.

Due to the blending of multiple ore sources into the crusher and mill feed, it is difficult to use existing plant performance information to assign directly to a single ore source and/or type. Therefore, plant forecasting is largely based upon results emanating from metallurgical testwork carried out on geological core samples. However overall plant recovery performance is tracked against the expectations derived from the testwork, to check for significant variances or discrepancies.

It should be noted that the following sub-items may refer to results associated with deposits that have not been declared as Reserves as at end-2021.

13.1 Testing and procedures

Routine metallurgical recovery testwork is undertaken on geological core samples selected from potentially prospective Mineral Reserve areas. Upon definition of discrete geological domains or lithologies, individual composite samples of diamond drill (DD) core are selected and collected by the relevant geologist for subsequent laboratory-scale metallurgical testwork. Samples are typically composited from DD core to obtain single continuous mineralised intercepts (including expected internal and external ore dilution) from a known single spatial location, typically (and more recently) representing single geological domains or lithologies.

The number of samples selected per potential mineralisation source is approximately based upon the nature (size and geological homogeneity) of the orebody, the study stage (i.e., scoping, pre-feasibility or feasibility), and the variability of the metallurgical recovery response, when known. St Ives follows the Gold Fields Australia Metallurgy Testwork Sampling Guideline.

The core samples are dispatched to an independent third-party laboratory for metallurgical testing, currently ALS Metallurgy, Balcatta, Western Australia which is an accredited laboratory. The Gold Fields standard testwork protocol is designed to reasonably reflect the performance of the existing process plant and typically includes:

- Head analysis multi-elemental scans (including Au (gold), Ag (silver), Cu (copper), As (arsenic), C-suite (carbon), S-suite (sulphur), Hg (mercury), Sb (antimony), Te (tellurium) and quantified x-ray diffraction (QXRD) analyses.
- Acid mine drainage (AMD) analysis, being Total S, Acid Neutralisation Capacity (ANC), Net Acid Generation (NAG), Total Acid Production Potential (TAPP), Net Acid Production Potential (NAPP), Net Acid Generation (NAG), and pH.
- Comminution characteristics including crushing work index, abrasion index (Ai), Bond BWI and SMC SAG milling parameters.
- Gravity recovery estimation by laboratory Knelson recovery, followed by mercury amalgamation of concentrate.

- Leaching profile of gravity/amalgam tails, including leaching profile of Au, Ag, Cu, pH, dissolved oxygen (DO), and free cyanide.
- Multi-elemental inductively coupled plasma mass spectrometry (ICP) scans of final leach solution.
- Leach solids residue analysis for Au, Ag and Cu.
- Slurry viscosity testing for oxide samples
- Diagnostic analysis of tailings residue if warranted.

For extensions to currently mined projects or the re-establishment of former mines, existing historic testwork is reviewed for sample representation across the remaining orebody, and additional samples are sought when required.

Metallurgical testwork programs are ongoing at St Ives, based upon progressive drilling and the definition of new or existing mining area extensions that are associated with the mine's exploration programs. Recent metallurgical programs undertaken in 2021 included testwork carried out on core samples taken from extensions of the Invincible underground mining complex.

For St Ives, the testwork methodology was altered in early 2021 to exclude the sulphides scavenging and regrinding testwork steps, since this section of the plant was recently decommissioned due to poor reliability and performance. This change to the testwork methodology has potentially slightly lowered the gold recovery test results for sulphide (fresh ores) but is considered to provide a better representation of the actual plant. Metallurgical investigations are currently in progress to determine the potential benefits to selected fresh ores of sulphides scavenging and regrinding, however such work is considered as being beyond the scope of, or requirements for, the end of 2021 reserves metallurgical studies.

13.2 Recovery estimates

A summary of the number and results of laboratory recovery tests carried out on samples taken from key selected mining areas is shown in Table 13-1. The average grades, tails and recoveries for each mining zone data is also shown for reference.

Table 13-1: Summary of metallurgical samples/tests quantities and summary of average recovery results

Mineral Reserve Area	No. of Samples Tested (1)	Average Grade of Samples (2)	Average Gravity Recovery	Finals Tails Grade	Average Total Gold Recovery (3)	Lowest Total Gold Recovery	Highest Total Gold Recovery
Underground							
Invincible South	31	8.12	49.29	0.37	95.39	86.86	98.44
Invincible Deeps	14	8.21	65.03	0.24	97.03	58.02	99.45
Invincible UG	13	4.37	44.89	0.30	93.24	83.73	97.93
Hamlet North	4	8.64	52.09	0.14	98.34	94.56	98.82
Open Pit							
Neptune - Oxide	14	2.41	65.61	0.13	94.72	56.01	99.45
Neptune - Sulphide	10	2.46	28.91	0.28	88.80	67.76	97.94
Santa Ana	6	13.49	0.00	0.76	94.38	89.81	96.79
Pistol Club	3	6.12	54.22	0.02	99.70	98.87	99.85
Invincible Pit	27	5.86	40.81	0.19	96.80	92.99	98.89
Justice	10	3.26	33.24	0.25	92.30	86.83	96.34
Incredible	4	2.01	47.67	0.10	95.15	90.66	96.99
Trinidad	6	4.84	60.16	0.12	97.52	92.40	99.80
Swiftsure	7	15.33	81.15	0.67	95.61	95.61	95.61
Delta Island South	4	2.88	81.52	0.01	99.65	97.63	99.87
Clifton	4	1.41	36.24	0.23	83.71	78.69	98.35
Idough East	3	1.32	40.69	0.03	97.48	96.46	98.25
Thunderer	5	2.98	54.70	0.22	92.50	89.20	94.93

Note: a) For samples where multiple tests carried out at different conditions on a single sample, the result used for this table was selected for conditions considered to most closely match the plant.

b) Grade reported is the back-calculated grade of the sample, based on gold mass balance.

c) This recovery reported is for information and comparative purposes only and is not used for reserves calculations. Reserves are instead calculated on the basis of grade-recovery models.

Source: St Ives CPR, 2021

Metallurgical recoveries are applied using recovery models which are informed by testwork and historical processing performance. Some projects contributing to Mineral Resources are estimated with a generalised recovery model. Recovery models are derived by visual fitting of the adopted form of model to the metallurgical test results by the site's Project Metallurgist.

Table 13-2 lists the contribution of mineralisation sources with the recovery models applied for Mineral Reserve or Mineral Resource estimation.

Table 13-2: December 2021 recovery estimation models by ore source

Mineral Reserve or Exclusive Mineral Resource* (excluding stocks)	Note	Tonnes (kt)	Grade	Ounces (koz Au)	Recovery at average grade	Recovery model Note 5
Open pits						
APN *	3	683	4.73	104	94.84 %	Recovery= 0.972 x (Grade - 0.115)/Grade
Bondi *	3	166	3.51	19	94.01 %	Recovery= 0.972 x (Grade - 0.115)/Grade
Clifton	1	191	2.05	13	91.75 %	Recovery= 0.922 x (Grade - 0.01)/Grade
Idough East *	1	172	1.70	9	92.89 %	Recovery= 0.987 x (Grade - 0.1)/Grade
Incredible *	1	902	1.34	39	89.29 %	Recovery= 0.977 x (Grade - 0.115)/Grade
Intrepide *	3	298	2.55	24	92.82 %	Recovery= 0.972 x (Grade - 0.115)/Grade
Invincible *	1	785	2.75	69	94.94 %	Recovery= 0.967 x (Grade - 0.05)/Grade
Junction *	3	189	3.38	20	93.89 %	Recovery= 0.972 x (Grade - 0.115)/Grade
Justice	1	442	2.56	36	93.17 %	Recovery= 0.947 x (Grade - 0.0415)/Grade
Neptune oxide	1,2	1,598	1.88	96	91.97 %	Recovery= 0.977 x (Grade - 0.11)/Grade
Neptune fresh	0	1,598	1.88	96	91.21 %	Recovery= 0.932 x (Grade - 0.04)/Grade
Pistol Club South	1	661	2.56	54	97.56 %	Recovery= 0.995 x (Grade - 0.05)/Grade
Santa Ana*	2	1,346	2.13	92	91.96 %	Recovery= 0.972 x (Grade - 0.115)/Grade
Swiftsure	1	285	4.08	37	96.28 %	Recovery= 0.987 x (Grade - 0.1)/Grade
Thunderer	1,2	246	2.00	16	89.49 %	Recovery= 0.957 x (Grade - 0.13)/Grade
Trinidad	1	493	2.09	33	93.97 %	Recovery= 0.977 x (Grade - 0.08)/Grade
Yorick *	3	420	3.41	46	93.92 %	Recovery= 0.972 x (Grade - 0.115)/Grade
Underground						
Argo *	1,2	780	4.53	113	94.89 %	Recovery= 0.977 x (Grade - 0.13)/Grade
Hamlet North	1,2	335	6.44	69	96.49 %	Recovery= 0.977 x (Grade - 0.08)/Grade
Invincible UG	1,2	1,924	3.71	230	92.77 %	Recovery= 0.932 x (Grade - 0.017)/Grade
Invincible Deeps	1	3,961	4.29	546	95.71 %	Recovery= 0.987 x (Grade - 0.13)/Grade
Invincible South	1,2	7,040	5.01	1,135	93.63 %	Recovery= 0.9515 x (Grade - 0.08)/Grade
North Orchin *	2	1,269	3.85	157	94.00 %	Recovery= 0.94 x (Grade - 0)/Grade
Sirius *	2	2,977	2.86	274	85.00 %	Recovery= 0.85 x (Grade - 0)/Grade
Surface						
Surface Stockpiles	4	2,906	1.56	146		

Note: * Projects reported as Mineral Resources only.

a) Current testwork program.

b) Historical or current plant performance.

c) Generalised default model.

d) Stockpile recoveries based on recovery models for mine sources.

Mineral Reserve or Exclusive Mineral Resource* (excluding stocks)	Note	Tonnes (kt)	Grade	Ounces (koz Au)	Recovery at average grade	Recovery model Note 5

e) Recovery model maxima are set at 96 % for pit and 95 % for underground.

Source: St Ives CPR, 2021

13.3 Processing factors or deleterious elements

13.3.1 Ore hardness

The metallurgical testing program at St Ives includes ore hardness testing, typically being the crushing work index, abrasion index (Ai), Bond BWI (ball work index) and SMC (Steve Morrell Consulting) SAG milling parameters (A, b, Axb, Mia). To estimate mill throughput expectations for future reserve ores from the hardness test results, the Morrell Total Power method is used, which provides an estimate of overall grinding circuit power requirement in kWhr per tonne using the SMC parameters (SAG mill, Mia and Ball mill, Mib) which are calculated from the Bond ball work index (BWI) test and the SMC drop weight index test results.

The grouped ore hardness indices and total milling power draw requirement estimates are shown in Table 13-3, for a final grind size of 125 µm.

Table 13-3: Summary of rock abrasion and hardness indices averages by deposit for St Ives samples

Mineral Reserve area	Rock SG (t/m³)	Abrasion Index, Ai	JK drop weight Test, Axb	SAG Work Index, Mia (kWhr/t)	Bond Ball Work Index (kWhr/t)	Ball Work Index, Mib (kWhr/t)
Underground						
Invincible South	2.74	0.26	36.5	21.35	16.0	19.0
Invincible Deeps	2.74	0.12	45.3	17.91	12.6	14.5
Invincible UG	2.74	0.11	41.3	19.15	14.4	16.9
Hamlet North	2.81	0.11	40.9	19.23	11.2	12.4
Underground						
Neptune – Oxide						
Neptune – Sulphide						
Santa Ana	2.56					
Pistol Club						
Invincible Pit	2.84	0.24	68.0		11.7	12.6
Justice	2.45	0.29	131.2	13.05	8.4	9.4
Incredible	2.77	0.16	46.6	19.75	21.7	26.1
Trinidad	2.44	0.10	243.7	10.15	12.6	14.5
Swiftsure		0.10	204.1		14.5	17.4
Delta Island South						
Clifton		0.18	67.9		11.9	13.4
Idough East					16.4	19.9
Thunderer			45.3		11.2	11.9

Source: St Ives CPR, 2021

From an operational perspective, the installed power capacity of the closed-circuit SAG mill, being 13 MW or 26 kWhr/t at 2021 typical mill throughput rates, exceeds the power requirements of the ores fed by a reasonable margin. Therefore, mill throughput at St Ives is typically not governed or constrained by installed mill power and is instead managed by feed blending on a short to medium term basis, considering mined ore supply availability, ore stockpile levels, material types, gold production targets, and the process plant's downstream constraints (e.g., leach/CIP flow rate capacity).

As such, currently the ore hardness test results are not used for the purpose of plant feed scheduling, but instead to keep check of the characteristics and mill throughput potential of the future ores as part of the pre-feasibility and feasibility level studies that are compiled and progressively undertaken as the existing mines develop, and new mines are identified.

13.3.2 Plant sampling

The Lefroy process plant currently sources ore from several underground and open pit mining operations. Daily composite samples of plant feed and tailings streams are taken to assist in gold accounting on-site. These are collected using a combination of automatic sampling stations as well as manual cuts using properly designed samplers. Analysis of the composites includes gold contained in solids, solution, and carbon. The analysis of samples used for accounting purposes is conducted by ALS Kalgoorlie. Solid sample composites are analysed using fire assay with an AAS finish. Carbon sample composites are assayed using high temperature ashing, acid digest and an AAS finish. Solution sample composites are assayed using DIBK extraction and an AAS finish. All laboratory assaying procedures are aligned with standard industry practices.

Bullion samples are taken when required by vacuum sampling from each gold pour. These samples are used as an estimate prior to receiving official outturn assays provided by the Perth Mint. Gold shipments occur on a regular basis to minimise gold stocks held on-site. All gold shipments are conducted by a registered security company in a completely secure environment inside the gold room.

In accordance with Gold Fields Plant Metal Accounting Standard, a gold in circuit survey is undertaken monthly to reconcile (by mass balance) and compare the back-calculated gold grade of the mill feed with the mill feed grade estimates obtained using plant samples and assays. The monthly variance between the assayed grade and the reconciled grade is monitored, and an investigation is required to be carried out if this variance exceeds the minimum allowable levels outlined in the Gold Fields Plant Metal Accounting Standard.

Observations of the open pit's ore samples results, potentially relevant to mineral processing, includes the following:

- Neptune (oxide) – relatively enriched in copper (Cu) and organic carbon.
- Neptune (fresh) – relatively enriched in copper (Cu), zinc (Zn), and sulphide sulphur (S sulphide).
- Justice (mixed) – relatively enriched in molybdenum (Mo), nickel (Ni), and lead (Pb).
- Invincible (mixed) – relatively enriched in antimony (Sb), tellurium (Te), and lead (Pb).
- Incredible (mixed) – relatively enriched in antimony (Sb), and lead (Pb).
- Pistol Club (oxide) & Trinidad (mixed) – slight relative enrichment in mercury (Hg).
- Clifton (mixed) – relatively enriched in copper (Cu) and zinc (Zn).

13.3.3 Deleterious elements

The testwork procedures include analysis for elements that could be deleterious to plant recovery (e.g., base metals, arsenic, tellurium, antimony, organic carbon). The following sub-items describe how St Ives manages specific deleterious elements.

Cyanide-soluble copper

Relatively higher concentrations of cyanide-soluble copper can be problematic to a gold leach/CIP plant, due to consumption of cyanide by the copper, and the generation of high concentrations of weak-acid dissociable (WAD) cyanide (CN) levels in plant tailings.

Some of the deposits at St Ives are enriched in cyanide soluble base metals, such as copper. There are specific known areas of problematic copper concentrations, including the Kapai Slate stratigraphic unit. This unit is intersected in Neptune (Stages 1, 2 and 5) pit. The spatial location of this geological unit is known, and ores sourced from this area are separately stockpiled and lightly blended into the plant feed, to avoid problems with free cyanide concentrations and tailings weak-acid dissociable (WAD) cyanide (CN) levels exceeding those permitted under the International Cyanide Management Code (ICMC).

In 2019, St Ives commissioned a new INCO partial tailings cyanide detoxification circuit to help manage tailings WAD CN levels and permit ores with high cyanide soluble copper to be safely blended into plant feed.

The St Ives geological department checks exploration samples for cyanide-soluble copper as a precautionary measure.

Mercury

Some minor enrichment in mercury is evident in sections of the Pistol Club and Trinidad open pits, however the measured concentrations still average less than 1 ppm within the metallurgical samples. Gold room technicians are regularly tested for mercury (and arsenic) as a precautionary measure.

Viscous clays

Some of the clays associated with the oxidised sections of the open pits can be problematic to slurry viscosity which reduces flowrate through the plant's trash screens and CIP interstage screens, which can then limit plant overall capacity.

The mining areas and ores containing problematic clays are known, and these ores are separately stockpiled, to allow controlled blending into plant feed.

The future ore's testwork program includes slurry viscosity testing on oxide samples to guide the site metallurgists to judge the need to blend, or otherwise.

Pyrrhotite (and other reactive sulphides)

Some of the fresh ores (particularly Neptune pit) are known to contain elevated concentrations of reactive sulphides, such as pyrrhotite. If proportionately too much of such ores are included in the plant feed blend, the leaching circuits dissolved oxygen levels become too low, and gold recoveries are subsequently reduced.

Like dealing with cyanide-soluble copper and viscous clays, for St Ives the solution to this deleterious species is blending which aims to ensure that the plant's oxygen supply capacity can meet the demand by the blended feed.

Preg-robbing carbonaceous materials

The Black Flag stratigraphic unit that runs through the St Ives leases is known to contain preg-robbing carbonaceous zones in places, that can be detrimental to gold recovery through a leach/CIP process plant.

The location of the carbonaceous zones within the Black Flag unit is known to St Ives geology and is not known to be associated with the existing reserves.

Carbonaceous materials are also known to be associated with the Paleochannel units; however, this natural carbon is considered as being inactive and does not show the observable ability to irreversibly preg-rob cyanide-soluble gold in the plant. Such ores have been processed for many years at St Ives without demonstrable deleterious impacts.

14 Mineral Resource estimates

St Ives uses Datamine Studio RM (Release 1.3.35) as the primary geological modelling and Mineral Resource estimation software. The geological interpretation is supported by Leapfrog Geo® and the resource estimation by ISATIS® and Snowden Supervisor® software.

St Ives's Mineral Resources undergo an initial assessment through the application of a range of assumed technical and economic factors to ensure reasonable prospects for economic extraction. The in situ cut-off grade has modifying factors applied and all material within the pit shell or MSO shape above the calculated cut-off grade is judged to have reasonable prospects for economic extraction. The Mineral Resources are 100 % attributable to Gold Fields and are net of production depletion up to 31 December 2021. The point of reference for the Mineral Resources is in situ over a minimum mining width with dilution applied. Open pit Mineral Resources are confined to pit shells and underground Mineral Resources are constrained to a practical mining shape and a minimum mining width.

14.1 Mineral Resource estimation criteria

14.1.1 Geological model and interpretation

Historical interpretation was via plans, cross sections, oblique sections and long sections/projections plotted on-site in appropriate orientations and spacing for each project. While this is still encouraged new technology is generally favoured to interpretate directly into the computer using appropriate views and software. Geological interpretations are routinely reviewed by senior geologists, corporate consultants and external auditors to ensure they are appropriate and technically sound. Consideration will be given for some or all of the following elements:

- Validated de-surveyed sampling data with geological logging and grade information plotted downhole.
- Topography.
- Mining excavations.
- Material type profiles (base of cover, base of oxidation, top of fresh rock).
- Existing geological information (lithology, structure, mineralisation).
- Block model information.
- Planned mining information (development/stope shapes or pit designs/ore block mark outs).
- Survey information (stations, lasers).

Geological mapping is used in conjunction with other available data used as the foundation for the geological interpretations. Where used, mapping data is georeferenced to ensure spatial correctness. These interpretations include but are not limited to alteration type and intensity, lithological host, structural orientation and quartz vein presence and abundance.

The information is loaded into spatial packages such as Leapfrog Geo® and Datamine® which visually plot multiple data sets simultaneously. This process, in combination with the regional geological understanding, provides the basis for producing reliable geological models.

The mineralisation modelling process (3D wireframing of geology) uses intersection width within the modelled data, regardless of drill angle intersection. Geological features, including topography, regolith, rock type and gold mineralisation are modelled using digital terrain models (DTM) and wireframes. In active open pit and underground operations, surveys of exposed geological features are incorporated into the models. All models are constrained by geological boundaries and where relevant, by surveys of existing open pit and underground excavations.

Geological interpretation and resource modelling at St Ives is an iterative process that evolves as new data and ideas become available. Generally, only one interpretation is submitted for resource model evaluation and is the

interpretation that most geologists would support. This is confirmed by ongoing peer, corporate and external audits and reviews, which support the existing methodologies and processes while suggesting small improvements.

14.1.2 Block modelling

3D block models are used to represent the volume of the in situ mineralisation and are constructed based on the geological interpretations. Volume is constrained by the wireframes and the block models utilises sub-celling to ensure the block model volume closely represents the volume of the wireframe model. The parent cell size applied in resource modelling at St Ives is dependent on the style of mineralisation, the selective mining unit and the drill spacing. Parent cells used for open pit resource models generally range from 20 m x 20 m x 5 m to 5 m x 10 m x 5 m. The underground parent cell size varies mostly from 20 m x 20 m x 5 m to 10 m x 10 m x 5 m. Sub-celling is set to 1 m where practical. Examples of the dominant parent cell and sub-cell block sizes used for each resource model are listed in Table 14-1.

Table 14-1: Summary of December 2021 Mineral Resource estimation parameters

Resource model	Search	Optimised search angles	Parent cell size (X, Y, Z)	Sub-cell max. size (X, Y, Z)	Estimation	Estimate sample type	Composite length	Top cuts	Date
invsep21a (Fenton)	SDIST1 = 111	SANGLE1 = 55	20, 20, 12 (Waste)	20, 20, 12	3D OK & SK	Surface RC	1 m	0.7–95 g/t	21/09/2021
	SDIST1 = 84	SANGLE2 = 105	10, 20, 6 (EXP)			Surface DD			
	SDIST1 = 15	SANGLE3 = -10	10, 10, 6 (MD)			UG DD			
			5, 5, 3 (GC)			Faces			
invsep21a (Deeps)	SDIST1 = 69	SANGLE1 = -130	20. 20, 12 (Waste)	20, 20, 12	3D OK & SK	Surface RC	1 m	21-70 g/t	21/09/2021
	SDIST1 = 46	SANGLE2 = 65	10, 20, 6 (EXP)			Surface DD			
	SDIST1 = 15	SANGLE3 = -155	10, 10, 6 (MD)			UG DD			
			5, 5, 3 (GC)			Faces			
isoct21a Invincible South	SDIST1 = 86	SANGLE1 = -130	10, 20, 20 (Waste)	10, 20,20	3D OK & SK	Surface RC	1 m	13-160 g/t	05/11/2021
	SDIST1 = 35	SANGLE2 = 70	5, 20, 10 (EXP)			Surface DD			
	SDIST1 = 20	SANGLE3 = -150	5, 10, 10 (MD)			UG DD			
			5, 5, 5 (GC)			Faces			
ssaug20a Swiftsure	SDIST1 = 39	SANGLE1 = 85	20, 20, 10 (Waste)	20, 20, 10	3D OK & SK	Surface RC	1 m	3-45 g/t	25/08/2020
	SDIST1 = 22	SANGLE2 = 5	10, 10, 5 (EXP)			Surface DD			
	SDIST1 = 20	SANGLE3 = -155	5, 10, 5 (MD)						
			5, 5, 5 (GC)						
Hnsep21a Hamlet North	SDIST1 = 73	SANGLE1 = 85	10, 20, 20 (waste)	10, 20, 20	3D OK	Surface DD	1 m	14-170 g/t	20/09/2021
	SDIST1 = 22	SANGLE2 = 5	10, 20, 20 (EXP)			UG DD			
	SDIST1 = 20	SANGLE3 = -155	10, 10, 10 (MD)			Faces			
			5, 5, 5 (GC)						
Gn1021a Neptune	SDIST1 = 73	SANGLE1 = 85	20,20,5 (Waste)	20, 20, 5	3D OK & SK 2D Accumulation OK	Surface AC	1 m Full Length	8-103 g/t	20/10/2020
	SDIST1 = 22	SANGLE2 = 5	20, 20, 5 (EXP)			Surface RC			
	SDIST1 = 20	SANGLE3 = -155	10, 10, 5 (MD)			Surface DD			
			5, 5, 5 (GC)			Sonic			

Note: a) Only Resource models with significant ounce contribution are listed above.
b) Estimation parameters are for main representative lodes only.

Source: St Ives CPR, 2021

14.1.3 Bulk density

Regular bulk density measurements are taken on exploration drill core according to a formal protocol. Representative samples are also collected from both underground and the open pits which further support the applied SG values. For new projects, where no local SG data is available, known densities from similar deposits and lithologies are applied and later validated against representative samples. All SG data is archived in the database.

The SG collection process for bulk samples is undertaken by trained St Ives staff applying the industry accepted immersion methodology (weight in and out of water). For unconsolidated material, SG measurements are completed at an accredited laboratory (E Precision, Perth) making use of the buoyancy method (Archimedes principle), wax buoyancy method and the calliper method (filling sample into a defined volume). Moisture estimates are critical due to the fact that dry density is applied to Mineral Resource tonnages. The Nuclear Moisture Density Gauge method was used in 2003 to establish SGs for material with a high moisture content.

Bulk density at St Ives behaves consistently within both lithology and ore types. This is on the basis of a 30 year mining history. The densities applied by domain are summarised in Table 14-2.

Table 14-2: St Ives density values

Domain	Density (t/m^3)
Lake sediment (overburden)	1.6-1.7
Oxide (deeply weathered Archean)	2.1
Transitional (weakly weathered Archean)	2.3-2.5
Black Flag sediments	2.5-2.7
Leviathan/Paddys fresh intrusive	2.7
Leviathan/Paddys fresh mafic	2.8

Note: a) The Qualified person considers the bulk density testing to be adequate for reserves and resource estimation. The tonnage estimation based on the bulk densities appear to have little bias.

b) The qualified opinion is that bulk densities are consistent with lithology and ore types estimated over a +25 year mining history.

Source: St Ives CPR, 2021

14.1.4 Compositing and domaining

The sample data is composited to regular intervals prior to estimation. This ensures that a consistent sample support is applied to the estimation. Samples, predominantly from Diamond and Reverse circulation drilling are composited to one metre intervals for broad mineralised zones which typically approximates the sample widths applied. For some narrow, mineralised lodes, compositing may be applied to full lode width and the length corrected to reflect the true width across the lode. The composite length is a function of sample spacing, data variance, deposit characteristics, parent cell size and mining method. The compositing method ensures no residual small lengths are created and that no sample portion is omitted.

The composited output drillhole assay file is coded by mineralised domain as defined by wireframe boundaries. Domaining is based on geological characteristics and a detailed investigation using histograms, cumulative histograms or probability plots is necessary to support the division into domains or sub-domains. The data from a domain is verified to make sure it can be treated to belong to one statistical distribution. Additional sub-domains are added where the distinct grade populations exist within the broader interpretation domains.

14.1.5 Top cuts

The objective of top cutting is to either cap the grades (where values above a selected cut-off grade are reset to this cut-off), restrict the search (where the influence of high grades is restricted during estimation) or a combination of both. Summary statistics are generated for all domains and analysed for existence of extreme grades.

Top cut analysis is carried out on composited data by reviewing population histograms, probability plots, mean and variance plots and the spatial distribution of each domain. A coefficient of variation (CV) value >1.5 normally signals the existence of outlier values and indicates the need for investigating and applying a top cut on the data or employing a sub domain strategy. Consideration is always given to the cut percentile and the cut mean compared to the uncut mean. The difference between the mean values is usually within 10 %.

14.1.6 Variography

To determine the spatial continuity of the mineralisation, variogram analysis is carried out on composited data for each domain. The process starts by understanding the major mineralisation directions as interpreted from the geological model. Thereafter the continuity analysis involves evaluating a series of fans in three principal directions (horizontal, across-strike vertical and dip planes). The fans are used to generate variogram contours that are used to select the direction of maximum continuity. Each direction is used to determine the placement of the next plane. The selected strike, dip and plunge directions are used to locate the three orientations for which experimental variograms are produced.

The nugget variance is modelled against the downhole experimental variogram. The principal direction is modelled by generally fitting a nested spherical model to the experimental variogram. The other two minor directions are modelled last. To provide a better understanding of the underlying spatial model, extreme values are cut to remove unnecessary noise and/or the model is transformed into gaussian space. The variance values are normalised to a sill, which represents the population variance, and where transformed variograms are modelled, the back transformed parameters are used in estimation. This variogram model forms the basis of various estimation methods to represent the correlation between grades and the expected variability of grades.

The modelled variability, particularly the direction, is tested against the geological interpretation to cross validate. This ensures geological understanding is the primary basis for determining spatial continuity.

The Qualified Person's opinion is that the variographies are practical reflection of the spatial continuity of the respective mineralisation grades and their application to the geostatistical analysis is adequate to minimize uncertainty and to derive appropriate resource block models for use by the planning engineers to complete mine design and production scheduling.

14.1.7 Grade estimation

Grade estimation techniques such as ordinary Kriging (OK) and Simple Kriging (SK) are utilised at St Ives (Table 14-1). The grade estimation technique is selected based on the geological model, data spacing and variance, and statistical analysis of the grade data. The grade estimation techniques by resource model are presented in Table 14-1.

The directional ranges determined from the variography analysis are used to guide the search distances applied during estimation. The ranges are also used as an aid in resource classification. Generally, if mineralisation is interpreted as open beyond the data extremities and providing there is geological support, the model will be extrapolated and extended beyond this data by a maximum of half the drillhole spacing. This portion will be appropriately classified.

A multiple pass approach is used for grade interpolation within the estimation domains. The first pass uses the optimised search parameters for the lode at the nominal drill spacing as summarised in Table 14-1. With each subsequent pass, the minimum number of samples is reduced, and the search volume is increased. This approach enables most blocks to receive a grade estimate within the domains. Octant searches are applied in some areas adjacent to underground development to mitigate sample clustering within the development.

Grades are estimated into block sizes (parent cells) optimised with respect to the nominal drill spacing. Dimensions of the parent cells are typically half to one quarter of the distance between drillholes at the nominal drill spacing. The parent cells are sub-celled to represent the volume within the domain. Different parent cells sizes are used in a model where there are distinct areas with different drill spacings.

Any model cells unsupported by data beyond the ranges of the variogram / search ellipse are not included in the Mineral Resource estimate.

The relationship between domains is assessed to determine how they are used during grade interpolation. Distinct domains utilise hard grade boundaries during interpolation. Where domains share similar gold distribution characteristics, a soft or gradational boundary is typically used for interpolation.

St Ives is a gold-only mine and as such no correlations between elements are made for Mineral Resource estimation. However, correlations of multi-element data are used to help classify different rock units for stratigraphic identification purposes.

The Qualified Person's opinion is that the variography criteria and application to the geostatistical analysis is adequate to minimise errors and to derive appropriate resource block models for use by the planning engineers.

14.1.8 Selective mining units

The selective mining unit (SMU) size (i.e. the smallest volume of material on which ore and waste classification is determined) varies from approximately 2.5 m x 5 m x 2.5 m to 5 m x 10 m x 5 m in open pit operations, and from 3 m x 10 m x 20 m to 10 m x 20 m x 10 m in underground operations, depending on the scale of mineralised zones.

14.1.9 Model validation

An established formal protocol for checking and validating models in in place at St Ives. The relevant geologist will complete the geological interpretation and resource model which is then reviewed and discussed with the senior staff member responsible for that area. Following any changes and modifications, the geology and associated resource model is formally peer reviewed. Any improvements arising from the peer review are updated prior to the model release.

Visual inspection and documented model reconciliations and reporting are the main procedures employed. This includes a review of sections and plans where models are checked for proper coding of drillhole intervals and block model cells. Interpolated grades are examined relative to drillhole composite values.

- Other model validation checks carried out include:
- Wireframe vs. block model volume checks.
- Comparative statistics.
- Global bias and local trends in the estimate.
- Comparative checks of grades between other interpolation methods.
- Comparison of composite vs. block model mean grades.
- Swath plots.
- Global change of support.
- Analysis of estimation quality (Including Kriging efficiency and slope of regression).

The results of the peer reviews are formally documented, and a final model change authorisation is completed with all relevant parties signing off. Internal corporate and regional reviewers will visit the site and formally review selected models with material changes. The implementation of past recommendations is also reviewed.

All files used for the resource models are stored in a dedicated project folder according to a formalised system incorporating naming protocols. Copies of peer reviews and model change authorisation forms are stored in a centralised electronic library for quarterly and annual review.

St Ives also has an extensive and proactive grade control and reconciliation process to review operational planning against actual performance. This encompasses model performance, dilution, mining mix and grade distributions and are comprehensively tracked and managed for each individual mining operation on-site. Monthly reports are compiled as part of monthly reviews, as well as tracking of the mine call factor and ore sources and submitted to corporate.

14.1.10 Cut-off grades

Cut-off grades for Mineral Resources are based on St Ives' current planning assumptions, updated annually, which are the best available estimates for forecast costs and metallurgical recoveries at the time of calculation. Gold price assumptions are provided by Gold Fields Technical Services.

Open pit

Cut-off grades are applied to modelled inventories constrained by mine planning processes, including pit optimisation. The cut-off grades used for the open pit Mineral Resources at St Ives by area are summarised in Table 14-3.

Table 14-3: Open pit resource cut-off grades

Area	Resource cut-off grade (g/t Au) RoM	Mining recovery (%)	Mining dilution (%)	Resource cut-off grade (g/t Au) In-situ
APN	0.67	100	52	1.02
Bondi	0.68	98	50	1.02
Clifton	0.60	99	25	0.75
Delta Is South	0.55	95	37	0.75
Idough	0.63	99	25	0.79
Incredible	0.68	98	5	0.71
Intrepide West	0.66	99	25	0.83
Invincible	0.61	99	25	0.76
Junction	0.68	95	37	0.93
Justice	0.60	99	25	0.75
Neptune LS OX	0.66	100	52	1.00
Neptune fresh	0.60	95	37	0.82
Pistol Club	0.62	100	52	0.94
Santa Ana	0.67	96	24	0.83
Swiftsure	0.63	99	25	0.79
Thunderer	0.68	99	25	0.85
Trinidad	0.63	99	25	0.79
Yorick	0.69	100	52	1.05

Note: Historical stockpiles excluded.

Source: St Ives CPR, 2021

The cut-off grade is calculated using the following formula:

$$\frac{\text{[Ore Premium Mining Costs (\$/t) + Process Costs (\$/t) + Site G\&A Costs (\$/t)]}}{\text{[Price x (100 \% - Ad valorem Royalty Rate) – All product related costs] x PRF x MCF x 0.03215075}}$$

Where:

- Ore Premium Mining Costs cover adjustments in ore haulage distances and differences in ore and waste drill and blast costs. All other mining costs are accounted for during the pit shell generation phase.
- Process Costs including sustaining capital.
- Site G&A Costs including off-site general and administration (G&A) costs directly related to site (e.g. accounting or payroll services).
- Price is the gold price per ounce ($1,500/oz).
- The ad valorem Royalty Rate is 2.5 %.
- All product related costs include management fees, refining costs and contributions to the Gold Fields Foundation per ounce.
- PRF is the plant recovery factor or metallurgical recovery as a percentage estimated at a grade close to the cut-off grade.
- MCF is the mine call factor or the percentage of actual mill produced metal against the claim of metal produced.
- 0.03215075 is the ratio of troy ounces per gram.

All material within the pit shell above the calculated cut-off grade is judged to have reasonable prospects for economic extraction.

Underground

The cut-off grades for the underground Mineral Resources at St Ives by area are summarised in Table 14-4.

Table 14-4: Underground resource cut-off grades

Area	Resource cut-off grade (g/t Au) RoM	Minimum mining width (m)	Mining recovery (%)	Mining dilution (%)	Resource cut-off grade (g/t Au) In-situ
Argo	2.6	3.0	90	20	3.2
Hamlet north	3.1	3.0	90	24	3.8
Invincible	2.2	3.0	93	19	2.6
Invincible South	2.2	3.0	93	17	2.6
Invincible South (Deeps)	2.5	3.0	93	17	3.0
Invincible Deeps	2.5	3.0	93	18	3.0
North Orchin	2.0	3.0	95	19	2.4
Sirius	1.7	3.0	97	12	1.9

Source: St Ives CPR, 2021

The underground Mineral Resource estimates are evaluated using the same formula and gold price of $1,500/oz.

$$\frac{\text{[Mining Costs (\$/t) + Process Costs (\$/t) + Site G\&A Costs (\$/t)]}}{\text{[Price x (100 \% - Ad valorem Royalty Rate) – All product related costs] x PRF x MCF x}}$$

Where:

- Mining Costs take account the mining method and area being mined inclusive of secondary development and sustaining capital.

The cut-off grade is applied to the deposit model as part of the assessment in relation to minimum mining width and reasonable prospects of extraction.

Minimum mining width and reasonable extraction are assessed using a mineable shape optimiser (MSO) routine available in Datamine Studio RM software. This routine generates a series of shapes related to a nominated SMU and a minimum width to maintain an average grade within the shape above the nominated cut-off grade. The SMU and minimum mining width are specified in line with current mining practices at St Ives.

MSO shapes are removed where they are judged too isolated and unlikely to be eventually economically extracted. This leaves a contiguous set of shapes. Small amounts of material below cut-off within the boundaries of the contiguous set of shapes are evaluated to determine if they would be extracted as part of a mining sequence.

When close to existing mining areas, a further assessment is made to ensure that material is potentially extractable. Remnant mining areas are coded using a stand-off distance to existing stopes. Mineralisation inside the stand-off zones is not reported as a Mineral Resource except where an engineering assessment has resulted in the design and potential extraction of planned stopes.

All material within the retained MSO shapes above the calculated cut-off grade is judged to have reasonable prospects for economic extraction and may include some material below the cut-off grade that is extracted as part of the sequence to mine the higher grade (above cut-off) material.

Gold Fields conducts an annual review of metal prices for Mineral Resource and Mineral Reserve reporting to monitor any significant changes that would warrant re-calibrating the price deck for strategic and business planning purposes. This review takes into account prevailing economic, commodity price and exchange rate trends, together with market consensus forecasts, including from global industry analysts and financial institutions, as well as Gold Fields' strategy and expectations for the mine operations.

The Mineral Resource and Mineral Reserve gold prices have been selected and justified by the Qualified Person at $1,500/oz per troy ounce (oz) for resource and at $1,300 per troy ounce (oz) for reserve (life of mine planning and reserve techno-economic modelling). This metal price deck has also been reviewed and endorsed by the Company executive team. For more information on the rationale applied to deriving the Mineral Resource and Mineral Reserve metal price deck refer to Item 19.

The selected resource gold price of $1,500/oz is at a 15 % premium to the reserve price with the differential being in general alignment with Gold Fields standard practice for setting the Mineral Resource price. The 15 % premium on resources is to provide useful information on the sites resource potential and its impact at higher gold prices and to indicate possible future site infrastructure, permitting, licencing, mining footprint and tailings and waste storage requirements. This information is important to determine the Reasonable prospects of economic extraction for the Mineral Resources.

The Qualified Person has concluded that reasonable prospects for economic extraction have been demonstrated through the application of an appropriate level of consideration of the potential viability of the Mineral Resources. These considerations include a reasoned assessment of the geological, engineering (including mining and processing parameters), metallurgical, legal, infrastructural, environmental, marketing, socio-political and economic assumptions which, in the opinion of the Qualified Person, are likely to influence the prospect of economic extraction.

14.1.11 Reasonable prospects of economic extraction

St Ives Mineral Resources are based on an initial assessment at the resource gold price of $1,500/oz using mine optimisation processes.

The evaluation includes assessment of the geological, engineering (including mining and processing parameters), metallurgical, legal, infrastructural, environmental, marketing, socio-political and economic assumptions which, in the opinion of the Qualified Person, are likely to influence the prospect of economic extraction. Mineral Resources are declared based on their economic optimisation at the Mineral Resource gold and based on cost estimates and other modifying factors (geotechnical factors, mining dilution, mining recovery, processing recovery and royalties).

Although all permitting may not be finalised for some Mineral Resources, there is no reason to expect that these permits will not be granted based on existing processes and protocols.

The Qualified Person has concluded that reasonable prospects for economic extraction has been demonstrated through the application of an appropriate level of consideration of the potential viability of Mineral Resources. Mineralisation that has not demonstrated reasonable prospects for economic extraction is excluded from the Mineral Resource statement.

a) Although all permitting may not be finalised for some Mineral Resources, there is no reason to expect that these permits will not be granted based on existing processes and protocols.

b) Wherever the mineral resources are stated as being exclusive of mineral reserves: mineral resources that are not mineral reserves do not have demonstrated economic viability.

14.1.12 Classification criteria

The Mineral Resources at St Ives are classified as Measured, Indicated and Inferred as defined in the SAMREC (2016) Code and CIM Definition Standards for Mineral Resources & Mineral Reserves (2014). Increasing levels of geo-scientific knowledge and confidence are generally based on geological understanding, grade variance, drillhole/sample spacing, mining development (amount of exposed and mapped mineralisation) and mining history.

Increasing levels of geo-scientific knowledge and confidence are generally based on geological understanding, grade variance, drillhole/sample spacing, mining development (amount of exposed and mapped mineralisation) and mining history. The quality of the estimate is also considered and is based on the values and spatial distribution of kriging efficiency and slope of regression calculated during kriging.

In general, the following criteria are used as a guide to definition of resource classification:

- Measured Mineral Resources:
  - Underground – minimum 15 m x 15 m DD hole spacing, developed, mapped and face and/or wall sampled. RC drilling may also be used, depending on the depth.
  - Open pit – 10 m x 5 m spacing for most of the pits with some 10 m x10 m and up to 20 m x 20 m RC drill spacing supported by mapping and additional sonic drilling information where available. Dedicated aircore drilling may also be used to infill near surface regolith style mineralisation. A variety of drill methods will typically be used and statistically compared to ensure no sample bias between methods. Potential core recovery issues may limit the application of diamond drilling in highly broken or weathered near surface areas.
- Indicated Mineral Resources:
  - Minimum drill spacing of 40 m x 20 m to 80 m x 80 m depending on geological and grade continuity.
  - If near surface, RC drilling may be supplemented with dedicated aircore and/or sonic drilling.
- Inferred Mineral Resources:
  - Minimum drill spacing of 40 m x 40 m to 110 m x 11 m depending on geological and grade continuity.

Surface stockpiles include short term run-of-mine (RoM) and longer term low-grade stockpiles. Stockpiles are reported based on pre-mining grade control and survey data, supported by monthly mine reconciliation processes at the time of mining. Surface stocks are therefore classified as a Measured Mineral Resource.

Increased drilling density improves confidence in geological understanding and grade distribution. Some drill methods are more suited to certain styles of mineralisation and a combination of methods is generally used to understand and reduce the risk of sample bias. Advanced estimation techniques such as simulation are used where possible to assist the process of identifying and quantifying risk. A higher resource category (eg. Measured) assumes a lower risk of actual variance against model estimates.

The Qualified Person is of the opinion that:

a) Inferred Mineral Resource has an even chance of converting to indicated Mineral Resource with continued exploration, additional empirical data and evolving geoscientific modelling.

b) The Mineral Resource demonstrates reasonable prospects for economic extraction over the indicated study time frame

c) The Mineral Resource gold price of $1,500/oz is at a 15 % premium to the Mineral Reserve price with the differential being in general alignment with Gold Fields standard practice for setting Mineral Resource price. The 15 % premium is to provide information on St Ives resource potential at higher gold prices and to indicate possible future site infrastructure, permitting, licencing, SLO, mining footprint and infrastructure requirements.

The Qualified Person's opinion is that, whilst effort and care are taken with the resource estimation and classification processes, increase in geological knowledge and available data will reduce the level of uncertainty, and therefore some inherent uncertainty will remain

14.2 Mineral Resources as of 31 December 2021

St Ives Mineral Resources exclusive of Mineral Reserves as at 31 December 2021 are summarized in Table 14-5. The Mineral Resources are 100 % attributable to Gold Fields and are net of production depletion up to 31 December 2021. The point of reference for the Mineral Resources is in situ gold mineralisation, except for underground Mineral Resources, which have minimum mining width applied.

Table 14-5: St Ives - summary of gold Mineral Resources as at 31 December 2021 based on a gold price of $1,500/oz

	Resources (exclusive of Mineral Reserves)			Cut-off grades/ (g/t Au)	Metallurgical recovery/ (%)
	Tonnes (kt)	Grades (g/t Au)	Gold (koz Au)		
Underground Mineral Resources					
UG Measured Mineral Resources	542	4.4	77	1.9 to 3.8	85 % to 96.6 %
UG indicated Mineral Resources	4,713	4.0	602	1.9 to 3.8	85 % to 96.6 %
UG Measured + Indicated Mineral Resources	5,255	4.0	678	1.9 to 3.8	85 % to 96.6 %
UG Inferred Mineral Resources	7,990	4.3	1,093	1.9 to 3.8	85 % to 96.6 %
Open Pit Mineral Resources					
OP Measured Mineral Resources	674	2.9	64	0.71 to 1.05	89.3 % to 97.7 %
OP Indicated Mineral Resources	4,665	2.3	350	0.71 to 1.05	89.3 % to 97.7 %
OP Measured + Indicated Mineral Resources	5,339	2.4	414	0.71 to 1.05	89.3 % to 97.7 %
OP Inferred Mineral Resources	1,806	2.7	158	0.71 to 1.05	89.3 % to 97.7 %
Stockpile Mineral Resources					
SP Measured Mineral Resources	-	-	-		
SP Indicated Mineral Resources	-	-	-		
SP Measured + Indicated Mineral Resources	-	-	-		
SP Inferred Mineral Resources	-	-	-		
Total St Ives Mineral Resources					
Total Measured Mineral Resources	1,216	3.6	140		
Total Indicated Mineral Resources	9,378	3.2	952		
Total Measured + Indicated Mineral Resources	10,594	3.2	1,092		
Total Inferred Mineral Resources	9,796	4.0	1,252		

Notes:
a) Rounding of figures may result in minor computational discrepancies.
b) Mineral Resources are exclusive of Mineral Reserves.
c) Mineral Resource categories are assigned with consideration given to geological complexity, grade variance, drillhole intersection spacing and proximity of mining development.
d) Quoted as diluted in-situ metric tonnes and grades. Metallurgical recovery factors have not been applied to the Mineral Resource estimates. The metallurgical recovery is the ratio, expressed as a percentage, of the mass of the specific mineral product recovered from ore treated at the process plant to its total specific mineral content before treatment. St Ives mining operations vary according to the mix of the source material (e.g. oxide, transitional, fresh and ore type blend).
e) The metal prices used for the 2021 Mineral Resources are based on a gold price of $1,500 per ounce (at an exchange rate of A$1:$0.75). Open pit Mineral Resources at the Australian operations are similarly based on revenue factor 1 pits and the underground Mineral Resources on appropriate mine design and extraction schedules. The gold price used for Mineral Resources approximates 15 % higher than the selected Mineral Reserve.
f) The cut-off grade may vary per shaft, open pit or underground mine, depending on the respective costs, depletion schedule, ore type, expected mining dilution and expected mining recovery. The average or range of cut-off grade values applied to the Mineral Resources are St Ives 1.9 g/t to 3.8 g/t Au mill feed (underground) and 0.7 g/t to 1.05 g/t Au (open pit).
g) The Mineral Resources are based on initial assessments at the resource gold price of $1,500/oz and consider estimates of all St Ives costs, the impact of modifying factors such as mining dilution and mining recovery, processing recovery and royalties. Mineral Resources are also tested through the application of Environmental, Social and Governance (ESG) criteria to demonstrate reasonable prospects for economic extraction.
h) The Mineral Resources are estimated at a point in time and can be affected by changes in the gold price, US Dollar currency exchange rates, permitting, legislation, costs and operating parameters.

Source: St Ives CPR, 2021

The Mineral Resources are exclusive of Mineral Reserves and the point of reference for the tonnages and grades is in situ. Open pit Mineral Resources are confined to $1,500 per ounce pit shells that are defined by the price, costs and relevant modifying factors used for the estimates. The pit shells are used to constrain the mineralisation to that which is potentially economically and practically extractable under assumed economic conditions. The Mineral Resources are quoted at an appropriate in situ cut-off grade. The pit shells take into account selective mining units and also include estimates of any material below cut-off grade (dilution) that needs to be mined to extract the complete pay portion of the Mineral Resource.

The Mineral Resources are based on initial assessments at the resource gold price of $1,500/oz and consider estimates of all St Ives costs, the impact of modifying factors such as mining dilution and recovery, processing recovery and royalties to demonstrate reasonable prospects for economic extraction.

14.3 Audits and reviews

All St Ives resource models compiled by site personnel are reviewed by Gold Fields regional technical staff and Corporate Technical Services (CTS) prior to release for mining and Mineral Reserve assessment.

The Mineral Resource estimate is underpinned by appropriate Mineral Resource management processes and protocols and verified through an embedded risk and control matrix (RACM). Technical and operating procedures developed for St Ives are verified through an embedded risk and control matrix (RACM).as adopted by Gold Fields' Mineral Resource management for Mineral Resource and Mineral Reserve estimation, reporting and auditing.

Gold Fields uses K2Fly Rcubed® propriety software in combination with SharePoint to ensure accuracy, governance and auditability in the reporting of Mineral Resources and Mineral Reserves.

An external audit by AMC Consultants of the St Ives resource models was completed in March 2021, with no material technical / non-compliance issues identified.

The Mineral Resource estimate was also subjected to internal review and scrutiny by the relevant Qualified Person and regional technical and financial disciplines, and peer reviewed for technical assurance and compliance in reporting by Gold Fields' Corporate Technical Services (CTS), Sustainable Development and Head Office Finance teams.

14.4 Comparison with 31 December 2020 against 31 December 2021 Mineral Resource

No Exclusive Mineral Resources were disclosed in 2020. For Inclusive Mineral Resources please refer to the Gold Fields Supplement to the Integrated Annual Report. Reporting of Exclusive Mineral Resources in this document is chosen to align with Gold Fields SK-1300 reports. Exclusive Mineral Resources have not been disclosed on any stock exchange previously; however, in the Qualified Persons opinion the 2021 to 2020 resource comparison changes are not material.

15 Mineral Reserve estimates

St Ives' Mineral Reserves are that portion of the Mineral Resources which, as technical and economic studies have demonstrated, can justify extraction as at 31 December 2021.

The Mineral Reserves are based on appropriately detailed and engineered life of mine plans and are supported by relevant studies completed to a minimum pre-feasibility study level. The life of mine plans are based on measured and indicated Mineral Resources converted through the application of appropriate modifying factors to derive Mineral Reserves estimates.

A pre-feasibility study has an estimated accuracy for operating and capital costs of ±25 % with a contingency of no more than 15 %.

All mine design and scheduling is completed by experienced engineers using appropriate mine planning software and incorporates relevant modifying factors, cut-off grades and the results from other techno-economic investigations.

Mining rates, fleet productivities, operational and plant capacities and constraints are accounted for in the plan and are typically based on historical performance trends. All geotechnical protocols and constraints are accounted for in the plan, including the provision for suitable mining geometries, mining losses, mining recovery and dilution. Provision is also made for sufficient waste rock and tailings storage with plans in place to meet the life of mine requirements. The Company's mine closure plans comply with in-country legal requirements and are approved by the regulator. Integrated mine closure plans provide appropriate cost parameters for operational and life of mine planning as well as end of life mine closure commitments.

The Mineral Reserve includes "incrementally costed" material to ensure the St Ives processing facility is operating at full capacity for the full life of the operation. The mining of this material covers the full cost of mining, variable costs of processing, administration, closure and rehabilitation, and positively contributes to covering fixed site overhead costs. The inclusion of incrementally costed material within the mine plan is viable at St Ives based on the following assumptions:

- The operation is mine constrained.
- The mining of incremental material does not extend the life of the overall operation.
- New projects will not be delayed due to lack of processing feed and capacity.
- Analysis has been completed to understand the nature of the fixed and variable costs of processing.
- Analysis has been completed that shows the positive cashflow contribution for this reserve.
- Time-based economics have been undertaken to show the positive NPV contribution.
- The point of reference for the Mineral Reserves is ore delivered to the processing facility, also known as the run-of-mine or RoM.

The Qualified Person's opinion of the 2021 Mineral Reserve estimates is:

a) The modifying factors are based on recent mining and processing extraction history and performance and are reasonable and appropriate to derive the reserves from the resources and minimise any estimation errors. The modifying factors are aligned with leading industry technical practice, for example, blended process recovery is used in the reserve estimate.

b) St Ives has grown its Mineral Reserves over the past three reporting cycles net of depletion. Infrastructure, environmental, permitting, closure, utilities and baseline studies are all aligned to support continued Mineral Reserves growth. St Ives's proactive study pipeline retains a focus on progressing all key work integral to supporting ongoing life of mine extensions so as to avoid any potential production delays. For example, a study has been completed to extend tailings disposal capacity.

c) The indicated and measured Mineral Resource is sufficient in geoscientific confidence to complete final life of mine designs. However, it is usual to complete a final phase of infill drilling to determine a high confidence 'mine defined' Indicated Mineral Resource with more detailed geoscientific information prior to final stope design, pillar layouts and detailed production scheduling.

d) The reported reserve is a 'point in time' or snapshot of the life of mine plan as at 31 December 2021. It is supported by a technically valid and economically viable mine design and schedule combining open pits and three underground mines. The techno-economic work is within the estimated accuracy of ±25 % and does not require more than 15 % contingency for both operating and capital costs.

e) Environmental compliance and permitting requirements have been assessed in detail with supporting baseline studies and relevant preliminary internal impact assessments completed. Detailed tailings disposal, waste disposal, reclamation, and mine closure plans are incorporated into the life of mine plan.

f) The life of mine plan, in toto, is completed to a minimum pre-feasibility level of study, although certain components of the plan have been completed to a feasibility level of study.

15.1 Mineral Reserve estimation criteria

15.1.1 Recent mine performance

The recent performance of the St Ives gold mine is summarised in Table 15-1.

Table 15-1: St Ives - recent operating statistics

	Units	2021	2020	2019
Open pit mining				
Total mined	kt	7,998	10,910	12,913
– Waste mined	kt	6,583	8,579	9,161
– Ore mined	kt	1,414	2,331	3,752
Mined grade	g/t Au	2.2	1.7	1.8
Strip ratio (tonnes)	w:o	4.7	3.7	2.4
Underground mining				
Total mined	kt	2,777	2,510	2,254
– Waste mined	kt	852	772	926
– Ore mined	kt	1,925	1,737	1,328
Mined grade	g/t Au	4.9	5.3	4.1
Processing				
Tonnes treated	kt	4,088	4,817	4,466
Head grade	g/t Au	3.2	2.7	2.8
Yield	g/t Au	3.0	2.5	2.6
Plant recovery factor	%	94	91	94
Total gold production	koz	393	385	371
	kg	12,224	11,971	11,527
Gold sold	koz	391	394	363
Financials				
Operating cost	$/oz	687	653	657
Total cash cost	$/oz	681	647	666
Capital expenditure	$/oz	259	205	283
Capital expenditure	$ m	102	79	104
All in sustaining cost (AISC)	$/oz	992	906	871
	$/oz	1,006	843	818
All in cost (AIC)	$/oz	1,026	938	1,026
	$/oz	1,040	873	963
Total employees costed (TEC)	No.	931	916	930

Note: a) The operating statistics are based on fiscal year measurements.
b) Total Employees Costed (TEC) includes project and capital employees.

Source: St Ives CPR, 2021

15.1.2 Key assumptions and parameters

The assumptions and parameters considered in the Mineral Reserve estimate are summarised in Table 15-2.

Table 15-2: Summary of material modifying factors

	Units	2021	2020	2019
Mineral Resource				
Mineral Resource gold price	$/oz	1500	1,500	1,400
	US$/A$	0.75	0.75	0.76
	A$/oz	2,000	2,000	1,850
Cut-off for oxide ore	g/t Au	0.79 - 1.05	0.69 – 1.02	0.74 – 1.03
Cut-off for fresh ore	g/t Au	0.71 - 3.8	0.69 – 3.1	0.74 – 3.6
Cut-off for mill feed	g/t Au	0.71 - 1.05	0.69 – 1.02	0.74 – 1.03
Cut-off for open pit	g/t Au	0.71 - 1.05	0.69 – 1.02	0.74 – 1.03
Cut-off for underground	g/t Au	1.9 – 3.8	2.0 – 2.1	2.0 – 3.6
Mineral Reserve				
Mineral Reserve gold price	$/oz	1,300	1,300	1,200
	US$/A$	0.74	0.74	0.75
	A$/oz	1,750	1,750	1,600
Cut-off for oxide ore	g/t Au	0.35 - 0.40	0.35 - 0.45	0.30 - 0.40
Cut-off for fresh ore	g/t Au	0.35 - 3.5	0.35 – 2.7	0.30 – 3.0
Cut-off for mill feed underground	g/t Au	2.5 - 3.5	1.9 – 2.7	2.0 – 3.0
Cut-off for mill feed open pit	g/t Au	0.35 - 0.40	0.35 - 0.45	0.30 - 0.40
Mining recovery factor (underground)	%	90 - 93	90 – 97	90 – 97
Mining recovery factor (open pit)	%	91 - 100	91 – 100	91 – 100
Strip Ratio	x:1	9.2	6.4	6.8
MCF	%	9.2	100	100
Dilution open pit	%	100	5 - 52	15 - 52
Dilution underground	%	5 - 52	11 – 25	12 – 25
Plant recovery factor (oxide)	%	5 - 57	66 – 96	61 – 96
Plant recovery factor (fresh)	%	65 – 96	66 – 96	61 – 96
Processing capacity	Mt/a	4.7	4.7	4.7

Note:
a) The 2021 fiscal modifying factors are valid as at 31 December 2021.
b) The cut-off grades are the lowest grade of mineralised rock which determines as to whether it is economic to recover its gold content by further concentration, calculated as per the Gold Fields cut-off grade guidance on methodology and protocol; see Section 11.1.10 for more information on cut-off grade calculation methodology.
c) The metal prices selected are the same for the past two annual reserve and resource estimates.
d) Relevant modifying factors are reported in ranges and vary based on open pit and underground extraction and estimated unit costs for depth and distance hauled.
e) The Qualified Person is of the opinion that the modifying factors are adequate for Mineral Reserve reporting and that the modifying factors are reported in ranges and vary based on open pit and underground extraction and estimated unit costs for depth and distance hauled.
f) Mineral Reserve plant recoveries are quoted as the range from the cut-off grade to the maximum recovery at high grade across all projects.

Source: St Ives CPR, 2021

Operating expenditures comprise:

- Cash Cost Components: these include direct mining costs, direct processing costs, direct G&A (general and administration) costs, consulting fees, management fees, transportation and realisation charges.
- Total Cash Costs: these include additional components such as royalties (excluding taxes where appropriate).
- Total Working Costs: these include terminal separation liabilities, reclamation and mine closure costs (the net difference between the total environmental liability and the current trust fund provision) but exclude the salvage value on closure and non-cash items such as depreciation and amortisation.
- Total Costs: these include total working costs plus net movement in working capital plus capital expenditure.
- Major Capital Projects: In addition to long-term capital projects, the life of mine capital expenditure programs generally include detail based on approved expenditure programs.

The terminal benefits liabilities are not included in overhead costs as per Company policy and directives. Rehabilitation and appropriate mine closure costs are included following completion of mining.

Capital expenditure estimates beyond the next two years are based on pre-feasibility estimates for infrastructure and development requirements for individual projects, and unit-rate average historical costs where applicable. A pre-feasibility study has an estimated accuracy for operating and capital costs of ± 25 % with a contingency of no more than 15 %.

Details of the forecast operating and capital expenditures are provided in Item 21.

As disclosed in Item 14.1.10, Gold Fields conducts an annual review of metal prices for Mineral Resource and Mineral Reserve reporting to monitor any significant changes that would warrant re-calibrating the price deck for strategic, business or life of mine planning purposes. This review considers prevailing economic, commodity price and exchange rate trends, together with market consensus forecasts and Gold Fields' strategy and expectations for the mine operations.

The Mineral Reserve gold price of $1,300/oz is detailed in particularity in Item 19 Marketing.

The Qualified Person is of the opinion that the gold price applied to the estimation of the Mineral Reserves is reasonable and suitable for life of mine planning and is an appropriate reflection of recent historical trends and importantly provides a metal price that mitigates the risk of short to medium term price fluctuations with the potential to impact on the execution of the life of mine reserve plans. The gold price used provides a reasonable long-term delta to current spot prices and incorporates into the life of mine plan appropriate contingency to offset possible short term lower price cycles.

For the operating mines, 6 to 18 month trailing average actual costs form the basis of the unit rates applied to the reserve financial model, with consideration for expected variations in operating and capital costs. This timeframe is selected based on alignment with recent business planning data. For new mines, costs are based on estimates from a range of recent sources and are deemed appropriate and representative by the Qualified Person.

The Mineral Reserve estimates may be materially affected based on changes to the cost and price assumptions, in addition to changes in the modifying factors. The reserve is assessed at multiple scales, including individual stope or pit, level, orebody, mine, and operation. As such, the Qualified Person is of the opinion that the reserve plan should be viewed as a consolidated entity, as removal of key components of the reserve may have a material and disproportionate impact on the overall value and viability of the plan.

In addition to changes to modifying factors, additional data acquired into the future may materially impact the reserve estimate. Examples include, but are not limited to, acquisition of additional drilling data, changes to interpretation of the data, mining studies, internal and external approvals and operating strategies.

15.1.3 Cut-off grades

Cut-off grades for Mineral Reserves are based on St Ives' current planning assumptions, updated annually, which are the best available estimates for forecast costs and metallurgical recoveries at the time of calculation. Gold price assumptions are provided by Gold Fields Technical Services.

Open pit

The cut-off grades for St Ives' Mineral Reserves are summarised in Table 15-3.

Table 15-3: Open pit reserve cut-off grades

Area	Reserve cut-off grade (g/t Au) RoM
Clifton	0.35
Delta Is South	0.30
Justice	0.35
Neptune LS OX	0.40
Neptune fresh	0.35
Pistol Club	0.35
Swiftsure	0.40
Thunderer	0.40
Trinidad	0.40

Note: a) The cut-off grades are estimated based on the reserve price, reserve modifying factors and are not expected to change materially over the life of mine reserve.
b) The cut-off grades, price and modifying factors are incorporated in the estimation of the reserve shell.
c) The Qualified Person is of the opinion that the detailed design of the selected reserve shells that are incorporated into the reserve estimation minimise estimation errors.

Source: St Ives CPR, 2021

Underground

The cut-off grades for St Ives' underground Mineral Reserves are summarised in Table 15-4.

Table 15-4: Underground reserve cut-off grades

Area	Reserve cut-off grade (g/t Au) RoM
Hamlet North	3.5
Invincible	2.5
Invincible South	2.5
Invincible South (Deeps)	2.9
Invincible Deeps	2.8

Note: a) The underground cut-off grades are estimated based on the reserve price, reserve modifying factors and are not expected to change materially over the life of mine reserve.
b) The estimated cut-off grades are adjusted for increased unit costs associated with depth and support type costs.
c) The Qualified Person is of the opinion that the estimated life of mine schedule contains sufficient diligence to minimise errors.

Source: St Ives CPR, 2021

15.1.4 Mine design

Mineral Reserves are defined by the application of mine planning and optimisation processes to 3D models of in situ gold mineralisation (inventory models).

A range of technical constraints are considered in the design and evaluation process. Geotechnical constraints affect the size and orientation of the various excavations that can be created in the underground mines and the wall angles in the open pit mines. Metallurgical constraints determine the proportion of contained gold that can be recovered from processed ores. Economic constraints including mining and processing costs and gold price determine the limits of profitable extraction.

Cut-off grades are applied to define potentially economic blocks or panels based on direct mining and/or processing costs, commodity prices, processing recoveries and other parameters. The economic viability of mining blocks is then tested by determining whether the margin above cut-off is sufficient to cover the required capital development costs and provide a positive return on investment in a process of mine optimisation.

Open pit mine optimisation software is used to apply economic parameters and physical constraints to inventory models to identify the limits of extraction which provide maximum cashflow. Detailed design is then undertaken to validate the results of the optimisation. The process is iterated until an acceptable level of correlation is achieved between the optimal shell and detailed design.

The open pit slope parameters or wall slope angles are based on the geotechnical considerations described. These include weathering, rock mass strength, frequency and orientation of fracturing.

The geotechnical and hydrogeological parameter are discussed in Item 16.

Underground mining methods are largely determined by the geometry of the mineralised zones and the evaluation may involve review of more than one method to select the optimal conceptual mining method. Underground optimisation relies on the creation and evaluation of potential mining increments utilising mine design software. The infrastructure required to access the mineralisation is then designed before evaluation of the project. Discrete zones within the defined areas of interest are further evaluated to ensure they satisfy overall economic criteria including any additional capital requirements.

Allowances are made for minimum mining width, dilution and ore loss appropriate to the mining method being considered. Historical performance measures are considered in the determination of these modifying factors. Infrastructure, waste disposal and ore stockpile management requirements are incorporated into the planning process. The following standard development dimensions are used:

- Decline and truck accesses – 5.5 mW × 5.8 mH
- Ore drives (requiring truck Accesses) -5.0 mW x 5.5 mH
- Other level accesses, Ore drives – 5.0 mW × 5.0 mH

The underground mines operate with a primary ventilation circuit that is designed to maintain sufficient airflow to safely support the mining activity. The primary ventilation circuits are powered by large capacity exhaust fans that are mounted on the surface or underground. The main access decline, escapeways and dedicated intake drives act as intake airways and dedicated exhaust shafts act as the return airway. Primary ventilation fans are selected to provide sufficient primary ventilation flow to satisfy the relevant mining regulations and the planned diesel equipment to be used at the mine.

The underground mines at St Ives are relatively shallow, so refrigeration and cooling are not required. The potential requirement for refrigeration and cooling is considered in the mine planning process.

15.1.5 Mine planning and schedule

The company's annual mine planning process is anchored by a corporate planning calendar that sets out the sequence of events to be followed that ensures a strong linkage between the strategic planning phase and the life of mine plan itself that defines the Mineral Reserves. During the first half of the year the preferred strategic plan is confirmed and approved by the company Executive Committee. This provides guidance for required investment and business and operational planning to position the mine to deliver on the strategic intent for the property. The detailed two-year operational plan and budget is informed by financial parameters determined by the Executive Committee and is the anchor to the longer-term planning and equates to the first two years of the life of mine plan.

The overall planning process schedules key work to be completed and stage gated before subsequent work can be continued and includes the metal prices, geology and estimation models, resource models, mine design, depletion schedules, environmental and social aspects, capital and operating costs and finally the cashflow model and financial valuation. Capital planning is formalised pursuant to Gold Fields' capital investment and approvals process.

Projects are categorised and reviewed in terms of total expenditure, return on investment, net present value (NPV) and impact on All-in Costs (AIC) per ounce and all projects involving amounts exceeding $40 million are submitted to the Board for approval. Material changes to the plans are referred back to the Executive Committee and the Board. Post-investment reviews are conducted to assess the effectiveness of the capital approvals process and to leverage continuous improvement opportunities going forward.

The Mineral Reserve estimates are based on an appropriately detailed and engineered life of mine plan that is supported by relevant studies completed to a minimum PFS level of work. All design and scheduling is completed by experienced engineers using appropriate mine planning software and incorporates all relevant modifying factors, the use of cut-off grades and the results from other techno-economic investigations. Mining rates, fleet productivities and all key operational and plant capacities and constraints are accounted for in the plan and are typically based on historical performance trends. All geotechnical protocols and constraints are accounted for in the plan, including the provision for suitable mining geometries and ground support, mining losses in pillars, mining recovery and dilution. The provision of sufficient waste storage and tailings capacity is engineered into the plans to meet the life of mine requirements.

Mine planning is driven primarily by personnel at the mine who are best positioned to determine the technical and commercial objectives for the site based on the parameters, objectives and guidelines issued by the corporate office. The site-based planning is supported by regional technical services functions, as well as from corporate technical services (CTS) and the corporate finance and sustainable development teams which provide overall oversight and assurance.

Underground

Underground mine schedules are based on 3D block Mineral Resource models (inventory models), with allowances made for minimum mining widths, dilution and ore loss appropriate to the mining method being considered and geotechnical considerations. Historical performance measures are considered in determination of these modifying factors.

Underground mining equipment availability and utilisation data are collated as part of the scheduling and equipment allocation process. Actual and planned equipment availability ranges from 80 % to 90 % for most machinery. The required equipment utilisation is generally between 60 % and 82 %. Availability and utilisation are based on calendar hours

- Invincible
- Invincible South
- Invincible Deeps
- Hamlet North

Open pit

Open pit mine design and scheduling is based on 3D Mineral Resource block models. The ore is assigned to selective mining unit SMU mining shapes based on equipment size and practical selectivity. The selective mining unit SMUs are accumulated into ore dig plans.

The selected pit shells are subjected to detailed mine design and extraction sequencing to optimise the waste: ore strip ratio and with benches recovering ore above the reserve cut-off grade. The access ramps are ideally placed to minimise ore loss below the ramp and can be outside the selected shell.

The open pits are sequenced to derive the best possible integrated plan and to blend feed to the plant to assist with life of mine tail end management.

- Neptune
- Clifton
- Invincible
- Justice
- Pistol Club
- Swiftsure
- Thunderer
- Trinidad

St Ives generates a 'Mine Planning Assumptions' document on a quarterly basis which defines the operating strategies for each mine. It pursues to document operational inputs, production targets, mining constraints/parameters and the planning assumptions that are used the generates the LoM plan.

Refer to Item 22.1 for details on the LoM mine schedule.

The Qualified Person is of the opinion that the mine plan and schedule incorporate appropriate assessment of all relevant technical, environmental, social and financial aspects to ensure the Mineral reserve complies with the CIM instructions and requirements. After reasonable assessment there is no unresolved material matter that could have a significant impact on the mines ability to execute the life of mine plan. The mine plan and schedule incorporate consideration of the following key criteria:

- Production depletion up to 31 December 2021
- Application of cut-off grades to determine mineable ore
- Application of appropriate modifying factors to convert resource to reserve
- Allocation of suitable mining equipment and costs
- Incorporation of realistic mining rates and efficiencies
- Practical and realistic mine design and mining methods
- Integrated production scheduling taking account of capacities, constraints and bottlenecks
- Use of appropriate paste filling rates for stope voids
- Integrated project management and execution
- Security of water and energy for the life of mine
- Provision for mine rehabilitation and mine closure costs

- Consideration of all environmental, social and legal aspects to enable life of mine plan execution
- Appropriate life of mine tail end management
- Security of current and future land tenure and relevant leasing agreements, permits and licences
- Life of mine cashflow model and economic viability

15.1.6 Processing schedule

The processing schedule is derived from the Mineral Reserve schedule. The individual ore type recovery formulas as detailed in Item 13.2 are used in the mine schedule to aggregate into an overall process recovery.

Ore stockpile management at St Ives is based around optimising the blend requirements to the processing facilities with regard to material types and grade management. Some low-grade surface stockpiles are incorporated into the LoM plan on a marginal cut-off basis towards the end of the mine life to provide volume and is part of the overall environmental site restoration.

Refer to Item 22.1 for details on the LoM processing schedule.

15.1.7 Classification criteria

St Ives' Mineral Reserves are classified as either Proven or Probable as defined in the SAMREC (2016) Code and CIM Definition Standards for Mineral Resources & Mineral Reserves (2014).

The estimation of reserves for both underground and open pit operations is based on exploration and sampling information gathered through appropriate sources, primarily from DD, RC, AC and sonic drilling techniques. The locations of sample points are spaced close enough to deduce or confirm geological and grade continuity. Generally, drilling is undertaken on grids, which range between 10 m by 25 m for Proven Mineral Reserves and up to 40 m by 60 m typically for Probable Mineral Reserves, although this may vary depending on the type and continuity of the orebody. In underground operations, mapping and sampling of development excavations where the orebody is exposed is used to supplement the initial drilling information. Where required supplementary close spaced mine definition drilling (infill) is undertaken to enable final detailed production design and extraction sequencing.

At St Ives, a proven Mineral Reserve is also assigned if it is flagged as a measured Mineral Resource and if the reserve block is covered by sufficient infill drillholes and/or exposed development face mapping. A probable Mineral Reserve is assigned if it is flagged as an indicated Mineral Resource, is only covered by exploration / resource definition drillholes, and has no development face mapping.

Mineral Reserve statements include only Measured and Indicated Mineral Resources modified to produce Mineral Reserves contained in the life of mine plan.

15.1.8 Economic assessment

The basis for establishing economic viability is discussed in Item 22.

15.2 Mineral Reserves as at 31 December 2021

The St Ives Mineral Reserves as at 31 December 2021 are summarised in Table 15-5. The Mineral Reserves are 100 % attributable to Gold Fields and are net of production depletion up to 31 December 2021. The point of reference for the Mineral Reserves is ore delivered to the processing facility.

Table 15-5: St Ives - summary of gold Mineral Reserves as at 31 December 2021 based on a gold price of $1,300/oz

	Tonnes (kt)	Grades (g/t Au)	Gold (koz Au)	Cut-off grades/ (g/t Au)	Metallurgical recovery/ (%)
Underground Mineral Reserves					
UG Proven Mineral Reserves	1,734	5.1	287	2.5 to 3.5	92.8 % to 96.5 %
UG Probable Mineral Reserves	11,526	4.6	1,693	2.5 to 3.5	92.8 % to 96.5 %
UG Total Mineral Reserves	13,260	4.6	1,980	2.5 to 3.5	92.8 % to 96.5 %
Open Pit Mineral Reserves					
OP Proven Mineral Reserves	63	2.2	4	0.35 to 0.40	89.5 % to 97.6 %
OP Probable Mineral Reserves	3,852	2.3	282	0.35 to 0.40	89.5 % to 97.6 %
OP Total Mineral Reserves	3,915	2.3	286	0.35 to 0.40	89.5 % to 97.6 %
Stockpile Mineral Reserves					
SP Proven Mineral Reserves	2,906	1.6	146	0.35 to 0.40	89.5 % to 97.6 %
SP Probable Mineral Reserves	-	-	-		
SP Total Mineral Reserves	2,906	1.6	146	0.35 to 0.40	89.5 % to 97.6 %
Total Mineral Reserves					
Total Proven Mineral Reserves	4,703	2.9	437		
Total Probable Mineral Reserves	15,378	4.0	1,975		
Total St Ives Mineral Reserves 2021	20,081	3.7	2,412		
Total St Ives Mineral Reserves 2020	25,479	3.3	2,665		
Year on year difference (%)	-21%	15%	-9%		

Notes:
d) Rounding of figures may result in minor computational discrepancies.
e) Refer to Table 15-6 for year-on-year Mineral Reserve comparison
f) Quoted as mill delivered metric tonnes and run-of-mine (RoM) grades, inclusive of all mining dilutions and gold losses except mill recovery. Metallurgical recovery factors have not been applied to the reserve figures. The metallurgical recovery is the ratio, expressed as a percentage, of the mass of the specific mineral product recovered from ore treated at the process plant to its total specific mineral content before treatment. The recoveries for St Ives vary according to the mix of the source material (e.g. oxide, transitional fresh and ore type blend) and method of treatment.
g) The metal prices used for the 2021 LoM Mineral reserves are based on a gold price of $1,300 per ounce (at an exchange rate of A$1:$0.74). Open pit Mineral Reserves at St Ives are based on optimised pits and the underground operations on appropriate mine design and extraction schedules. The gold price used for Mineral Reserves is detailed in particularity in chapter 16 Marketing.
h) Dilution relates to planned and unplanned waste and/or low-grade material being mined and delivered to the process plant. Ranges are given for those operations that have multiple orebody styles and mining methodologies. The mine dilution factors are 5 % to 52 % (open pit) and 5 % to 57 % (underground).
i) The mining recovery factor relates to the proportion or percentage of ore mined from the defined orebody at the gold price used for the declaration of Mineral Reserves. This percentage will vary from mining area to mining area and reflects planned and scheduled reserves against actual tonnes, grade and metal mined, with all modifying factors, mining constraints and pillar discounts applied. The mining recovery factors are 90 % to 93 % (underground) and 91 % to 100 % (open pit).
j) The cut-off grade may vary per shaft, open pit or underground mine, depending on the respective costs, depletion schedule, ore type, expected mining dilution and expected mining recovery. The average or range of cut-off grade values applied in the planning process are St Ives 2.5 g/t to 3.5 g/t Au mill feed (underground) and 0.35 g/t to 0.40 g/t Au (open pit).
k) An ounces-based Mine Call Factor (metal called for over metal accounted for) determined primarily on historic performance but also on realistic planned improvements where appropriate is applied to the Mineral Reserves. A Mine Call Factor of 100 % has been applied at St Ives.
l) The Mineral Reserves are estimated at a point in time and can be affected by changes in the gold price, US Dollar currency exchange rates, permitting, legislation, costs and operating parameters.
m) St Ives is 100 % attributable to Gold Fields and is entitled to mine all declared material located within the properties mineral leases and all necessary statutory mining authorisations and permits are in place or have reasonable expectation of being granted.

Source: St Ives CPR, 2021

The St Ives Mineral Reserves are the economically mineable part of the measured and indicated Mineral Resources based on LoM schedules and pre-feasibility studies completed at the reserve gold price of $1,300/oz to justify their economic viability at 31 December 2021 (refer to Item 22 for details on the supporting economic analysis).

15.3 Audits and reviews

Audits and reviews completed at St Ives during 2021 included:

- Site based internal peer reviews, validation and reconciliation of geology models, wireframes, estimates process and outputs with senior geology MRM staff and department managers.
- Ongoing routine integrated routine drilling, sampling, geology audits, reviews and coaching of geological staff by senior geologists and MRM department heads to ensure due process and verified through an embedded risk and control matrix (RACM).in line with site and Gold Fields' documented processes, procedures and methodologies.
- Perth corporate technical audits and review of geology, estimation and mine planning models.
- Gold Fields Group geology technical team reviews and site visits for validation and compliance evaluation of the resources and reserves process, detail and output.
- External audit on the December 2020 Mineral Resources and Reserves by AMC Consultants in March 2021. No material technical / non-compliance issues were identified. Several continuous improvement recommendations were made.
- ISO14001 surveillance audit by recognised external auditors.
- OHSAS 45001 certification audit by recognised external auditors.
- TSF annual geotechnical audit.
- Global Reporting Initiative third party (KPMG).
- Ongoing routine internal audits (Gold Fields Johannesburg Internal Audit).
- Annual external financial and non-financial audits (PWC).
- Sustainable Development Audit (ERM).
- Gold Fields Mine Closure Guideline Gap Assessment (MSA).
- External Closure and Rehabilitation audit (PWC).
- Internal legal compliance and ethics policy review.
- Internal risk and control matrix (RACM). compliance (Perth and GFL Corporate auditors).
- External risk and control matrix (RACM). compliance (ERM).
- WA inspectorate audits (DMIRS, DWER).
- ISO45001 surveillance audit
- ISO27001 Certification
- External Financial Audits (KPMG to 2018, PWC from 2019)

No adverse findings were recorded from any of the audits with minor improvements, adjustments and best practice continuing to be implemented. Records of audits are filed electronically on-site in relevant departments and physically for major audit signoffs reported in the Gold Fields annual report.

15.4 Comparison with 31 December 2020 to 31 December 2021 Mineral Reserve

The difference in Mineral Reserves between 31 December 2020 and 31 December 2021 is -253 koz Au or -9 % (Table 15-6).

Table 15-6: Net difference in Mineral Reserves between 31 December 2020 and 31 December 2021

Proven and Probable Reserve	Unit	Change %	Gold on the RoM
As at 31 December 2020	koz		2,665
Depletion 2021	koz	-15 %	-406
Gold price	koz	0 %	-
Cost	koz	-14 %	-385
Discovery	koz	20 %	534
Conversion	koz	0 %	-
Inclusion / exclusion	koz	0 %	4
As at 31 December 2021	koz	-9 %	2,412

Note: n) The Qualified Person opinion the year-on-year reserve changes are not material.

Source: St Ives CPR, 2021

Depletion was dominated by production from Invincible South, Neptune, Hamlet North and Invincible.

The net effect of increases in mining cost assumptions, with lesser variations in processing and administration costs, and metallurgical recovery assumptions contributed an overall negative contribution to Mineral Reserves compared to December 2020. Projects with significant overall variances affected by these changes are Santa Ana, Invincible pit and Incredible.

Discovery in Mineral Reserves was dominated by the conversion of Mineral Resources at the Invincible underground projects.

A series of overlapping internal processes exist at Gold Fields to review and validate the modifying factors, input assumptions, cut-off grades, designs, schedules, economic evaluation, and other technical assessments. These reviews include site, regional and group technical assessments, internal audits, and trained Qualified Person authorisations. Multiple external audits of the Gold Fields reserves declarations and processes for St Ives have been completed within the past 5 years.

These processes are designed to reduce the likelihood of a significant or material error in the reserves estimation process and associated reserves declaration, although potential for error exists. The Qualified Person for Reserves is not aware of any material error or omission that at the time of writing would be deemed likely to have a significant impact on the operation's ability to deliver the reserve mine plan.

16 Mining methods

16.1 Mining methods

The gold mineralisation at St Ives is mined via both open pit and underground methods to depths generally not exceeding 1,000 m below surface. Some projects involve mining deposits on or under the Lake Lefroy salt lake so that extraction requires construction of bunds and other earthworks to provide access, stockpile areas and to prevent surface water incursion.

Open pit

Open pit mining at St Ives is by conventional drill and blast / truck and shovel extraction. Grade control is generally by inclined RC drilling on approximately 5 m x 10 m centres in plan projection. Production drilling ranges from 3.0 m x 3.5 m up to 5.0 m x 6.0 m patterns. Pre-split blasting in hard rock is utilised on 10 m to 20 m benches in fresh rock where required.

Open pit projects may include 10 m to 50 m of unconsolidated sedimentary overburden which require hard rock for sheeting to enable equipment traffic capability during mining and/or dewatering of the sedimentary overburden prior to mining.

Load and haul are completed by 90 t to 150 t dump trucks with 120 t to 300 t excavators in backhoe configuration mining benches varying from 5 to 10 m. The benches are generally excavated in passes (flitches) of 2.5 to 3.0 m (including heave). Gold mineralisation is mined selectively to cut-off and segregated into grade ranges as required to balance the ore production and processing capacities.

Open pit operations are undertaken by St Ives employees following the transition to owner mining in mid-2012. This includes drill and blast and loading and hauling aspects of the open pit operations. Contactors and hire equipment are utilised to supplement the St Ives fleet when needed to meet production requirements.

The Qualified Person considered the following factors when selecting the open pit mining method:

a) The geotechnical and rock behaviour models, see Item 16.2 for detail.

b) The hydrological surveys as described in Item 16.3.

c) The open pits are supplementary to the underground and are completed within twelve months of commencing.

d) The modifying factors including strip ratios as stated in Table 15-2 and the open pit cut-off grades as stated in Table 15-3.

e) Practical mining rates, selective mining unit dimensions, mining dilution and mining recovery.

Underground

The underground mines at St Ives are often extensions to the open pit mines. Underground operations are characterised by common features which allow a high-level of standardisation in operating strategy, mine design, stoping methods and mining equipment utilisation.

Underground mining portals are generally cut into unweathered ground at the lowest practicable level in the walls of the precursor pits. Underground mines are accessed via declines, with additional development of raises for return airways and ladderways as a secondary means of egress. Standard gradients of the declines are 1 in 7 and decline dimensions sized appropriately for the fleet of underground haul trucks (generally 5.5 m wide by 5.8 m high with arched backs).

Ore drives are developed to access the ore and future stoping production areas. Ore drive dimensions are sized appropriately to the long hole drilling and the loading fleet utilised for the extraction of the mineralisation that is

present. All underground development is supported in line with the ground conditions present and the planned use and life of the development. There are two ore drive dimensions used at St Ives:

- Ore drives requiring truck Access -5.0 mW x 5.5 mH
- Ore drives not requiring truck Access – 5.0 mW × 5.0 mH

Underground mining methods are largely determined by the geometry of the mineralised zones and the evaluation may involve a review of more than one method. Underground mining is dominated by mechanised mining by long-hole open stoping (LHOS), with subordinate cut and fill and room and pillar methods for shallower dipping orebodies. The use of paste fill in conjunction with LHOS is applied where mandated by geotechnical factors or where the grade of the ore provides economic benefit.

Due to the mining methods employed at St Ives, a few pillars are created, especially within areas mined by LHOS and cut and fill methods. In the flatter dipping lodes where room and pillar mining methods are employed, pillars are used to ensure long term geotechnical stability. These pillars effectively reduce the proportion of mineralisation above cut-off that can be extracted. Permanent pillars in underground mine designs are excluded from the reported Mineral Reserves.

The underground mining is carried out with standard trackless equipment including electric-hydraulic drilling jumbos and long-hole drills, rubber-tyred diesel-powered load haul dump (LHD) units and underground specific haul trucks.

Underground production operations are carried out by St Ives employees (Hamlet North) and contractors (Invincible, Hamlet North). Contactors and hire equipment are utilised to supplement the owner miner fleet when needed to meet production requirements. Specialist underground activities including development, diamond drilling and rise mining are outsourced to specialist contractors to best utilise specialist equipment and skills.

The Qualified Person considered the following factors when selecting the underground mining method:

a) The geotechnical and rock behaviour models, see Item 16.2 for detail.

b) The hydrological surveys as described in Item 16.3.

c) The modifying factors including underground cut-off grades as stated in Table 15-2.

d) Practical mining rates, stope size dimensions, mining dilution and mining recovery.

e) Infrastructure and operating capacities and constraints.

f) Capital and operating costs and economic viability.

16.2 Geotechnical parameters

A representative number of all resource diamond drill core is geotechnically logged before the core is cut and sampled for laboratory testing, preferably using a HQ core size. In addition, targeted, dedicated geotechnical holes are required for any study and are planned by the responsible Geotechnical Engineer.

St Ives Gold Mine guidelines for open pit studies are a minimum of one drillhole per 100 m of pit crest, or one drillhole pierce point per 4 ha of pit slope surface. The entire recovered oriented core is logged to determine representative rock-mass.

Studies for underground projects is a pierce point density of 50 m x 50 m for non-oriented rock-mass logging and 100 m x 100 m for oriented logging. Logging may be limited to 100 m either side of the orebody if no mine infrastructure is likely outside these limits.

Where insufficient core logging data is available, line or cell mapping is conducted at surface or underground exposures. The minimum representative level of data is 100 m per kilometre of pit wall bench or underground drive exposed, per geotechnical domain; however, this is largely dependent on-site specific conditions and shall be dictated

by the responsible Geotechnical Engineer. Representative numbers of core samples for laboratory tests are shown in Table 16-1.

Table 16-1: Laboratory testing of core samples

Type of test	Samples	Underground	Open pit
Direct Shear (for weathered rock, saprolite, fault gouge, etc.)	5 per domain	☒	☑
Uniaxial Compressive Strength (UCS) (with Youngs Modulus and Poisson's ratio determination)	5 per lithology	☑	☑
Triaxial Compressive Tests (5 suites at four confining pressures)	20 per lithology	☑	☑
Brazilian Tensile Strength	5 per lithology	☑	☒
Acoustic Emission (AE)	3 per site	☑	☒

Source: St Ives CPR, 2021

Ground control systems for the underground excavations use both rock mass reinforcement and surface support components. Each mine at St Ives has a specific Ground Control Management Plan, which outlines the systems and processes used to address and manage the risks associated with ground control. The underground life of mine plans adapts to incorporate the evolving geoscientific information.

There are levels of standard and elevated support that apply in different circumstances. The primary underground support generally consists of 3.0 m or 2.4 m long galvanised split-set rock bolts in the backs, the shoulders and sidewalls. Galvanised mesh is also used as a surface support in conjunction with the split-sets. High level support is defined for areas with high stress and/or risk of seismic activity and includes cable bolts, fibrecrete, resin bolts, hybrid anchor/friction rock bolts and other solid anchors.

The St Ives area has a history of seismic activity in mining areas below 400 m depth. Seismic monitoring using geophones is conducted in areas where higher levels of seismicity are expected. Support and stoping methods as well as the extraction sequencing and stand-off distances to infrastructure take into account the increased risk for seismic events in the deeper areas.

Poor rock mass quality reduces the design hydraulic radius of the stope walls. Stope spans are calculated using a combination of the empirical 'Mathews Stability Graph method' with back analysis of previous stopes with similar rock mass conditions and equivalent radius factor (ERF) modelling. For deeper mines numerical stress modelling is also undertaken.

Table 16-2 provides a summary of the stope and development design parameters used at each of the current underground mining areas.

Backfill is emplaced in some instances as rock fill, either using current development waste or surface waste rock sources. Where paste fill is utilised, the paste is transported through drillholes and horizontal reticulation pipes to the stope. The paste fill is gravity fed or pumped as required.

More than 40 open pits have been mined at St Ives to date with very few major slope stability issues. The pits within Lake Lefroy excavate up to several tens of metres of lake sediments before encountering oxidised basement rock. The lake sediments generally require flatter overall wall angles.

Pit walls are commonly developed in competent mafic rock, although occasional weak ultramafic material or blocky felsic-intermediate rock mass is exposed. Laser scan modelling is used, along with 3D photogrammetry and/or radar monitoring of whole walls or work areas as required. Slope design, hydrogeological planning and water management are the primary risk and opportunity areas identified for the open pits.

Table 16-2: Stope and development parameters for current underground mines

Item	Parameter	Geotechnical recommendation
Stope	HR	INV Deeps – 20 m strike with HR of between 5 and 5.3 for LHOS with Paste Fill
	Inter-lode pillar	INV Deeps – Multiple inter-lode pillars with minimum pillar width 7 m when filling with paste. INV South & Fenton – when not using paste 10 m, using paste 7 m HNO – 10 m when using paste
	Level Spacing	All – 20 m Floor to floor with access drives offset.
	Stope Pillars – Rib	INV Deeps – No rib pillars. INV South & Fenton – 0.5 x width of largest stope, with a minim of 7.5 m. HNO – 5 m minimum to 9064. No rib pillars designed thereafter.
	Stope Pillars – Sill	INV Deeps – None in the current design. INV South & Fenton – Minimum of 7.5 m. HNO – No sill pillars in design.
	Stope HW/FW support	INV Deeps – Drives will be campaign cabled and will provide HW and FW support. INV South & Fenton – HW cables where open stopes are stacked. HNO – HW cables where intercepting major structures and contact with halo.
	Stope Brow support	INV Deeps – Cables 9 x 6 m for all brows. INV South & Fenton – 3x 6 m for interim brows and 9 x 6 m for all final brows. HNO – 3x 6 m for interim brows and 9 x 6 m for all final brows.
	Preferred sequencing options	INV Deeps – Macro: Top down, 45 ° centre out sequence with Footwall drive access to the North and end on access to the South. Micro: Interlode lead lag of 1 stope length maximum with Footwall stopes taken first. INV South and Fenton – Top down, 45 ° extracting into a central pillar. HNO – Top down, 45 ° extracting to end on access.
	Estimated dilution	INV Deeps – 1 m (ELOS) total from the hangingwall and footwall from all geotechnical domains. INV South & Fenton – 0.8 m (ELOS) from combined HW and FW. HNO – 0.9 m (ELOS) from combined HW and FW where not influenced by Brittle Fault and 3.3 m when influenced by Brittle Fault.
Operating Development	Min Pillar width	All – 1.5 m x width of largest opening for non-seismic conditions and 3 m x width of largest drive for seismic conditions.
	Ore Drives	INV Deeps – MDX Bolts, osro straps, mesh and cable bolts. INV South and Fenton – Split sets and mesh to 8850 and 8862, then MDX bolts, osro straps and mesh below these levels. HNO – Garock bolts, osro straps and mesh.
Capital Development	Decline offset	INV Deeps – Minimum 80 m standoff to the ore zone from 8690 Level or 590 m below surface to the bottom of the current LoM. INV South & Fenton – 30 m up to 400 m below surface and 45 m to the current extent of the orebody. HNO – 40 m to 400 m below surface and 60 m at 600 m below surface.
	Minimum Pillar Width	Same as operating development.
	Decline & Access Support	All – Split sets, 2.4 m + 3.0 m long, spaced 1.1 x 1.4 m with mesh to 3.2 m off floor in good ground. Split sets, 2.4 m + 3.0 m long, spaced 1.1 x 1.4 m with mesh to 1.8 m off floor in poor ground.
Vertical Development	Exhaust LH rise, raise-bore	All – No support. All large diameter raise bores (greater than 2.5 m wide) to have dedicated geotechnical drillhole and stability analysis completed.
	Escapeway raise-bore	INV Deeps – No Support as all raise bores is expected to be drilled in fresh material (Diameter 1.1 m). INV South and Fenton – All raises in current designs are situated in fresh material. HNO – All raises in current designs are situated in fresh material.

Source: St Ives CPR, 2021

The slope design configurations for Neptune are provided in Table 16-3.

Table 16-3: Neptune slope configurations

Material	From (mRL)	To (mRL)	Batter height (m)	Batter angle (deg.)	Berm width (m)	IRA (deg.)
Lake sediments	Surface	275	10	70	10	36.2
Oxides	275	215	10	45	7.5	29.7
				55		34.6
Transitional	215	195	10	65	7	40.6
Fresh	195	Bottom	10	70	5	49.2
			15	70	5	55.1
			15	75	6.5	55.0
			20	70	6.5	55.4
			20	75	7	58.3

Source: St Ives CPR, 2021

Historically several of the open pits at St Ives have mined through voids left from previous underground mining. A downhole laser cavity survey tool is used to aid in the definition and detection of underground voids. The largest stopes are backfilled with spent heap leach material via surface drillholes to assist stability and future mining around voids.

Calculation of slope angles is undertaken using both kinematic analysis and limit equilibrium modelling using both semi-deterministic and probabilistic methods and are based on assumed performance control by ubiquitous structure. New slope designs are compared with empirical performance information under varying slope and ground conditions to ensure slopes are not overly aggressive or conservative.

Pit inspection processes are reviewed to ensure operational ground control management options are identified and utilised effectively should design slope angles become more aggressive.

Scat management, hydrological issues and mining through underground excavation voids are the greatest geotechnical challenges for the open pit operations.

The Qualified Person's opinion of the 2021 geotechnical work is:

a) St Ives has completed all appropriate testing for the current life of mine reserve and continues to test all new significant discoveries

b) Geotechnical domains and lithologies are based on core logging and modelled by the Geology department

c) Sample testing is adequate for the purposes of this report

d) The quality of the sampling and laboratory testing is adequate to support the Mineral Resource and Mineral Reserve estimates.

16.3 Hydrological parameters

The most significant groundwater system in the Lake Lefroy area is the Lefroy Paleo-drainage system, comprising a series of channelled, fine to coarse grained sand horizons representing infilled paleochannels. Generally, the paleo-channel consists of an upper paleochannel aquifer (fine silts grading with depth to fine to medium sands, a middle aquitard (clays) and a lower paleochannel aquifer (coarse sand and gravel).

Groundwater is also encountered in the basement rocks, where enhanced permeability has been developed, due to weathering, fracturing, shearing or faulting. Weathering of the upper basement in the St Ives area has largely resulted in a saprolite regolith, with low permeability material and limited aquifer potential, although the transition zone from saprolite to basement rocks (saprock) can be moderately permeable depending on the host rock type. There have also been some significant groundwater inflows to some of the existing pits from fractured basement, typically associated with shear zones hosting the orebodies. In some cases, inflows of around 1 Ml/d have been recorded with some dewatering bores (targeting these shears) yielding in excess of 5 l/s. Some of the existing pits have also experienced measurable groundwater inflows from fractured granitoids, with bore yields of up to 3 l/s.

For open pit reserves, an estimate of rock-mass permeability and pre-mining phreatic surface shall be determined using geotechnical and/ or exploration holes. Airlift or packer testing shall be carried out for this purpose. All open pits currently in reserve have been subject to hydrogeological studies and their depth and transmissivity quantified for the aquifers and groundwater. The current open pit activity is situated on Lake Lefroy and uses advanced dewatering techniques through the use of temporary sumps, situated at the bottom of the pit. The water is pumped out of the sumps and discharged into an approved location.

With over 40 open pits successfully mined to date, should any additional open pit designs be proposed in the future, information will be drawn on from the active pits / pits already investigated which are situated in close proximity.

Water inflows into the current underground mines are relatively low and are handled by staged mono pump mine drainage arrangements. The groundwater across all sites is hypersaline. Mine water is deposited onto the salt lake surface in line with the environmental permitting.

All appropriate geotechnical and hydrogeological parameters have been suitably considered and risk assessed to support the mining method selection and extraction sequencing and this information is embedded in St Ives's Ground Control Management Plan which is routinely updated as new empirical information becomes available. The mine plan is geotechnically robust from a local and regional stability perspective.

The Qualified Person's opinion of the 2021 hydrology is:

a) St Ives has reliance on appropriate hydrological studies conducted at all relevant sites

b) Hydrology is not viewed as presenting a material risk to St Ives or the December 2021 Mineral Resource and Mineral Reserve estimates.

16.4 Mining fleet and machinery requirements

Open pit mining and underground mining equipment utilised at St Ives is summarised in Table 16-4. For open pit equipment, excavator utilisation is typically 75 % with an availability of 88 %. Open pit truck utilisation is typically 73 % with an availability of 85 %. Underground loader utilisation is typically 65 % and availability is approximately 85 %. For underground trucks, utilisation is typically 70 % with an availability at approximately 85 %.

Table 16-4: St Ives mining fleet

Equipment class		Equipment type	units
Open pit	Excavator	Komatsu PC3000	2
	Excavator	Komatsu PC2000	1
	Dump truck (90t)	Komatsu HD785	0
	Dump truck (150t)	Komatsu HD1500	9
	Crawler bulldozer	Komatsu D375	4
	Motor grader	Komatsu GD825	2
	Wheel dozer	Komatsu WD900	1
	Blast hole drill	Sandvik Panterra DP1500i	3
	Grade control drill	DRA GC 600	1
Underground	Underground trucks		16
	Underground loaders		10
	Underground jumbos		7
	Underground production drills		5

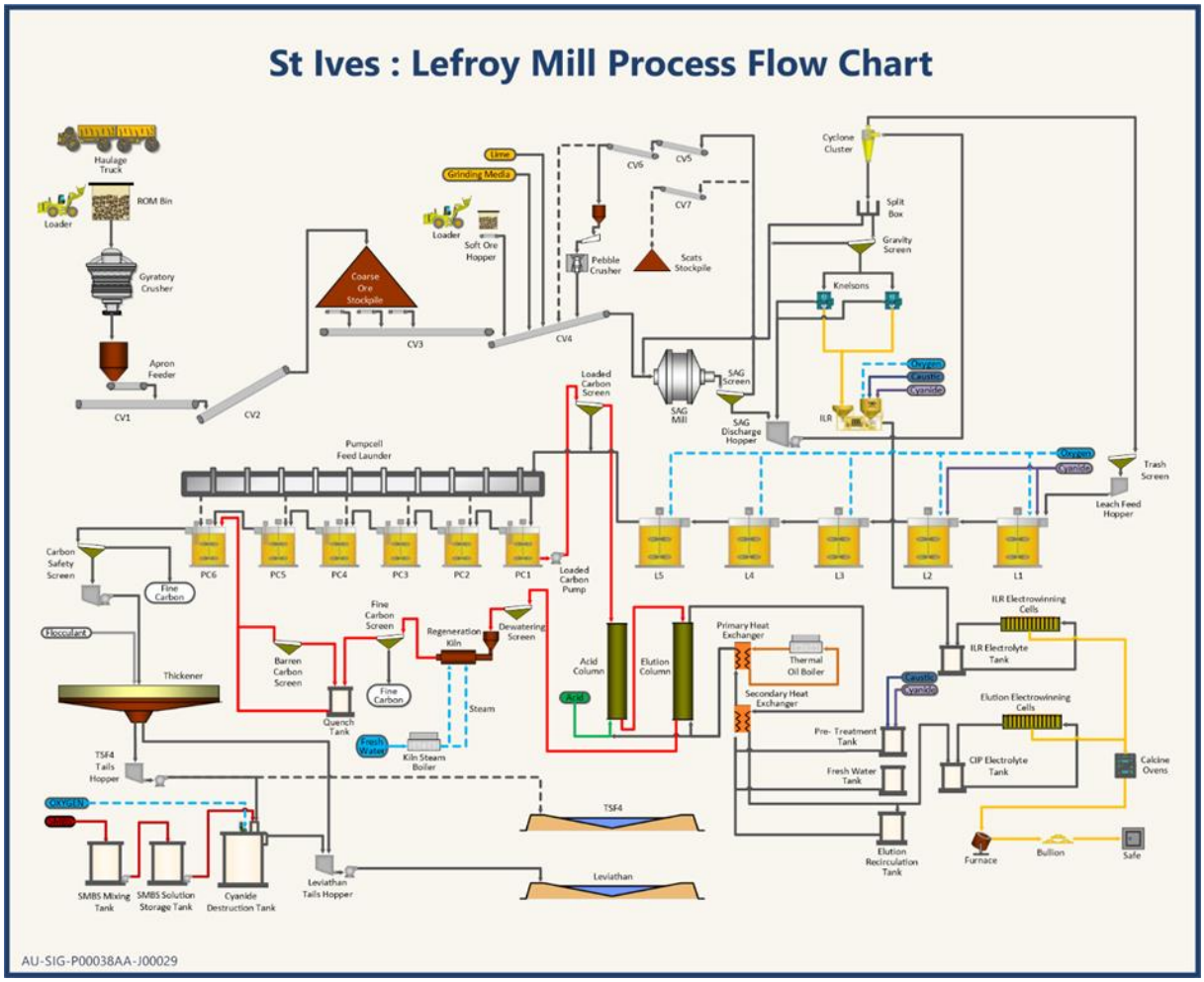
Source: St Ives CPR, 2021

17 Recovery methods

17.1 Flow sheet and design

The centrally located 4.7 Mtpa Lefroy CIP process plant was commissioned in early 2005 with a flow sheet like the previous facility incorporating improvements resulting from an increased understanding of the ore mineralogy and metallurgical characteristics, along with newly available technological and equipment advances. A schematic flow sheet for the process plant is shown in Figure 17.1.

Figure 17.1: Schematic flow diagram of St Ives Lefroy process plant



Source: St Ives CPR,2021

Ore from both the open pit and underground operations is transported from local surface ore pads at each project to the to the run-of-mine (RoM) pad at Lefroy via surface road trains. Surface haulage works are carried out by a specialist contractor utilising dedicated on-road and off-road multiple trailer road trains.

The ore is fed into the primary crusher as a blend via a loader or direct tipped from the road train. The ore blend is managed according to grade and physical characteristics to optimise throughput and recovery in the process plant.

The ore is primary crushed using a 54/77 gyratory crusher and transported to a coarse ore stockpile. Crushed product is transferred via feeders from the stockpile and ground to an 80 % passing 125 µmusing a 13 MW single stage variable speed 36 ’x 20’ SAG mill and 315 kW pebble crusher in closed circuit. Classification of the mill discharge is performed

by ten 20” hydro-cyclones. Cyclone overflow reports to the leaching circuit while the cyclone underflow returns to the mill with a split directed to the gravity recovery circuit.

The gravity recovery circuit comprises a gravity screen, two Knelson QS40 concentrators and an In-line Leach Reactor. Portions of the cyclone underflow slurry flow at a nominal 280 t/hour is fed to two Knelson QS40 concentrators after screening. The concentrate from the centrifugal concentrators is collected and subjected to intensive cyanidation in an In-line Leach Reactor (ILR 3000BA) with the tailings recycled to the milling circuit.

Leaching of the cyclone overflow is carried out in five 3,400 m³ sequential leach tanks, and gold adsorption utilises a six-stage carousel AAC Pump Cell CIP circuit. Gold recovery from loaded carbon is via a 5 t split AARL elution, electrowinning and smelting circuit. Gold wool is stripped from both the gravity and CIP electrowinning circuits and calcined at high temperature. The calcine is further refined through smelting and crude doré is poured with the purity varying depending on the source.

Gold produced from the gravity circuit averages approximately 36.4 % of total gold produced with the leach circuit producing approximately 56.0 %, contributing to an overall processing reconciled recovery of 94.6 % for 2021. Mineralogy, metallurgical characteristics and grades of ores from various areas are known to be variable, with total plant recovery being generally a function of ore source.

Gravity doré bars are approximately 90 % to 95 % gold whereas CIP doré bars are dependent on ore feed characteristics and can vary between 80 % to 90 % gold. The doré is dispatched to the Perth Mint refinery for further processing into gold bullion.

Tailings from the CIP section is thickened prior to being pumped to an in-pit TSF. Process plant tailings are thickened to a target slurry density of 55 % solids w/w in the tailings thickener. The final tailings slurry is pumped via two-stage pumps to the TSF. When required, hypersaline water from the North Orchin bore is injected into the tailings slurry at the tailings pump box to maintain the total dissolved salts (TDS) above 50,000 ppm, which is deemed acceptable for Cyanide Code compliance as an alternative to cyanide destruction. The installation of a cyanide detoxification circuit using the INCO method was commissioned in 2019.

Standard practice at the process plant is to ensure all spillages are captured within bunds and are hosed into sumps for pumping back into the process. There are two main areas for gold to collect outside the electrowinning/smelting and tailings streams: the gold room sump and mill liners and chutes. The gold room sump is cleaned out monthly whilst mill liners are pressure cleaned back into the circuit when removed from service following a reline. Estimation of the exact amount of gold recovered during clean-up is difficult to determine as the material is returned to the circuit without measurement. No gold is currently assumed as being locked up in the circuit that is not able to be accounted for through end-of-month measurement, sampling, and analysis.

The heap leach facility was closed at the end of 2012. The heap leach wet plant continued operations to May 2016 when it was decommissioned following irrigation of the historic cells. The heap leach crushing, agglomeration, stacking, and wet plant was subsequently sold. The heap leach drainage system and water collection ponds continue to be maintained and operated in accordance with all government regulations and International Cyanide Management Code (ICMC) requirements.

The spent heap leach material is flushed and categorised to a Class I landfill criteria for causeway construction, stemming and sheeting. All potential heap leach ore is either stockpiled or assessed for processing through the Lefroy facility during the remainder of LoM plan.

17.2 Recent process plant performance

The recent performance of the Lefroy process plant is provided in Table 15-1.

17.3 Processing risks

In the opinion of the Qualified Person, the combination of a well-established process plant with a known operating history of treating ores mined from the associated mining leases, together with the ongoing and active metallurgical testwork program assessing core samples selected from future local mineralisation areas, provides a reasonable platform for estimating the associated metallurgical and processing modifying factors underpinning the 2021 reserves.

However, the reader should be aware that uncertainties remain, and some key potential areas of risk and uncertainty are discussed below.

17.3.1 Sample representativity

Metallurgical sample selection is an important aspect of the process of developing resources into reserves. The results of the testwork undertaken on those samples are often used directly as input into plant performance estimates that are then used for the life of mine and reserve's financial evaluations. It is important that the metallurgical samples are representatively selected, for example, to cover a suitable range of gold head grades, to consider the different geological lithologies and domains expected to be encountered, and to appropriately incorporate internal and external material dilution expected during the mining process. Individually testing different head grades ranges and geological domains improves the ability to see the metallurgical response variability of the orebody, which improves the ability to make better judgements and estimates about how the material could perform in the process plant.

As new potentially economic mineralised areas are identified at the mine, the site's exploration geologists and metallurgists will select a few, to several, core composite samples of each new mineralisation area, and submit to a commercial metallurgical laboratory for the undertaking of a defined testwork program including, head assays, recovery, and physical properties analyses.

Whilst effort and care are taken with the sample selection process, there are practical constraints to samples numbers due to core availability and overall testwork cost, and therefore it is not possible for the Qualified Person to guarantee that the proposed reserves have been fully representatively sampled, and therefore some inherent uncertainty will remain.

17.3.2 Laboratory test methods and scale-up

The laboratory test results require scale-up to estimate performance through the industrial processing facility.

The metallurgical testing regime adopted has been specifically tailored to provide results that reasonably and practically represent the actual installed processing facility. This regime has been developed from experience gained over many years of undertaking such work, culminating in eventual mining, and processing of ores that have been historically metallurgically tested.

Gravity and leach recoveries achieved in the laboratory are assumed to be achievable within the plant. Overall laboratory recovery results are typically model-fitted to a bounded head grade relationship, and this resulting model is assumed to be reasonably achievable at plant scale.

Hardness properties are applied to the Morrell Total Power method to estimate grinding mill throughputs.

However there remains potential risk associated with the delivery of these metallurgical testing results associated with the differences between laboratory methods and full-scale processes, and miscellaneous and unidentified errors associated with undertaking the testing.

The selected laboratory (ALS Metallurgy, Balcatta, Western Australia) that is undertaking the metallurgical testwork is highly regarded within the local gold mining industry, and has an established history of performing well, with both Gold Fields and the Qualified Person.

No pilot-plant testing is carried out prior to reserve declaration and subsequent mining, and the metallurgical properties are based on bench scale test results only. The sample requirements and cost for pilot testing are considered as being prohibitive. However, given the relative simplicity of the St Ives processing facility, a history of successful operation, and in being consistent with practices adopted for other similar operations, it is the opinion of the Qualified Person that pilot plant testing is not required for the estimation of plant modifying factors for the 2021 reserves.

Despite reasonable efforts and care in the application of scale-up factors and modeling methods, there remains some inherent uncertainty in actual performance of the industrial facility predicted from a small volume of small-scale laboratory tests. One of the key challenges in confirming scale-up is the practice of ore blending of the plant feed (undertaken to optimise overall performance of the plant) which can limit the quality of regular direct comparison of plant performance and laboratory test results over the longer term.

17.3.3 Deleterious Elements

The routine metallurgical testwork program includes detailed head analysis (multi-element ICP-MS scan) to check for quantities of potentially deleterious elements to the plant, such as mercury, arsenic, organic carbon, antimony, tellurium, base metals, etc.

Whilst this assessment is carried out on the limited number of metallurgical composite samples, it is not typically undertaken on individual exploration samples.

The multi-elemental assay results obtained from the metallurgical samples are used as a guide to identify if there are any deleterious elements at concentrations that would be of reasonable concern that could materially impact plant performance. If such a species is identified then the option to submit a larger number of individual exploration samples for detailed analysis, to better quantify and locate the deleterious species, is readily available.

However, it needs to be recognised that the relatively low number of metallurgical samples initially checked for deleterious elements means that some inherent risk remains of unexpectedly encountering such a species during subsequent mining and processing operations, despite such elements not being identified during metallurgical testing.

17.3.4 Major equipment failure

Industrial mineral process plants consist of a series of dedicated unit processes, e.g. crushing, grinding, leaching, carbon-in-pulp (CIP), and carbon elution. There is inherent risk associated with catastrophic failure of one (or more) of the key equipment items associated with these unit processes, whereby such failure could lead to a significant period of plant downtime until repairs are completed, resulting in the inability of the processing plan or forecast to be achieved and/or higher operational costs incurred than anticipated.

Catastrophic failures could be associated with the structural, mechanical, or electrical components of the key processing equipment items. Key equipment items could include the crushers, grinding mills, or leach/CIP tanks.

Risk minimisation activities to reduce the likelihood of such occurrences adopted by St Ives includes:

- Dedicated on-site maintenance department which undertakes condition monitoring activities, preventative maintenance, and repairs.
- Selected critical maintenance spares.
- Contingency operational plans (e.g., contract/mobile crushing plant, leach/CIP tank by-passing).
- Fire suppression systems.
- Insurances.

Decisions associated with asset management, critical spares, insurances, etc. are outside the responsibility and accountability of the Qualified Person, and that some inherent risk and uncertainty associated with catastrophic failure of processing equipment remains.

17.3.5 Plant operational management

The processing facilities are managed and operated by dedicated teams of personnel, who are required to make many operational and maintenance decisions every day.

For example, a decision to process ores at a higher throughput could result in a coarser grind size from the grinding circuit, resulting in a lowering of the plant recoveries. Similarly, the choice to operate the leaching circuit at lower free cyanide concentrations to reduce cyanide usage rates, could result in lower plant recoveries being achieved than anticipated.

It needs to be recognised that plant management and the associated decisions made by plant operating personnel, are outside the responsibility and accountability of the Qualified Person, and that such decisions and actions taken by plant management can influence the achieved performance of the plant (e.g., throughput, costs, availability and recoveries).

17.3.6 Operating costs, plant consumables and reagents

The operating cost of the process plant represents a significant cost element to the overall financial evaluation of the life of mine plan. The processing facilities use relatively large quantities of power, reagents and consumables, including fuels, cyanide, grinding steel media, lime, caustic, etc.

The estimation of future processing costs is required as input into the cut-off-grade calculations and economic assessments of the reserves and resources. To estimate the processing costs, require assumptions to be made concerning consumables consumption rates, unit prices and inflation rates.

Metallurgical testing undertaken on Mineral Reserves and recent process plant performance provide reasonable guidance of potential reagent consumption rates and mill throughput expectations, and this information is considered and reviewed by the plant metallurgist and the Qualified Person.

St Ives, like many other operating gold process plants that have a reasonable operating history, do not allow for a discreet operating cost contingency in their future operating cost forecast. The absence of contingency is considered by the Qualified Person as being a common and reasonable approach to operational process plant cost forecasting.

Consumables, commodity pricing and inflation are subject to external influences that are outside the control or predictive capability of the Qualified Person.

Further to this, operational decisions made by plant management, or unexpected variances in the nature of the ores being processed could unexpectedly impact reagent and consumables usage rates. Such variances are outside the control or predictive expectations of the Qualified Person.

17.4 Process plant requirements

Being commissioned in 2005, the Lefroy process plant is relatively new. Key changes and upgrades implemented since the original 2005 installation includes:

- Upgrade of the pre-existing gravity concentrators to late model Knelson Concentrators
- Decommissioning of the sulphides recovery and regrind circuit
- Installation of a partial INCO cyanide destruction circuit, using sodium metabisulphite (SMBS) and oxygen
- Relocation and upgrade of the main plant control room
- Replacement of the linear trash screens with vibrating screens

Key work associated with the 2021 life of mine plan includes:

- Replacement of the gravity concentrate ILR

A structural refurbishment program is ongoing to ensure structural steel and concrete remains in good condition, and that the plant remains compliant with the International Cyanide Management Code (ICMC).

The key process plant requirements estimated for the Mineral Reserve LoM plan are summarised in Table 17-1. These consumables quantities have been estimated using guidance from the 2022 Budget LoM, prorated based on plant feed mass. The number of plant employees required is in the range of 40 to 50.

Table 17-1: Lefroy process plant – key requirements

	Units	2022	2023	2024	2025	2026	2027	2028	2029	2030
Ore Processed	kt	4,210	4,011	2,247	2,267	1,799	1,700	1,669	1,479	700
Plant Power draw	MWhr	108	103	58	58	46	44	43	38	18
Grinding Media	t	1,684	1,605	899	907	719	680	668	592	280
Lime	t	19,790	18,855	10,562	10,654	8,454	7,991	7,846	6,953	3,289
Sodium Cyanide	t	1,942	1,850	1,036	1,045	830	784	770	682	323
Caustic	t	401	382	214	216	171	162	159	141	67
Activated Carbon	t	168	160	90	91	72	68	67	59	28
Hydrochloric Acid	t	221	210	118	119	94	89	88	78	37
SMBS	t	632	602	337	340	270	255	250	222	105
Raw Water	kL	1,600	1,524	854	861	684	646	634	562	266

Source: St Ives CPR, 2021

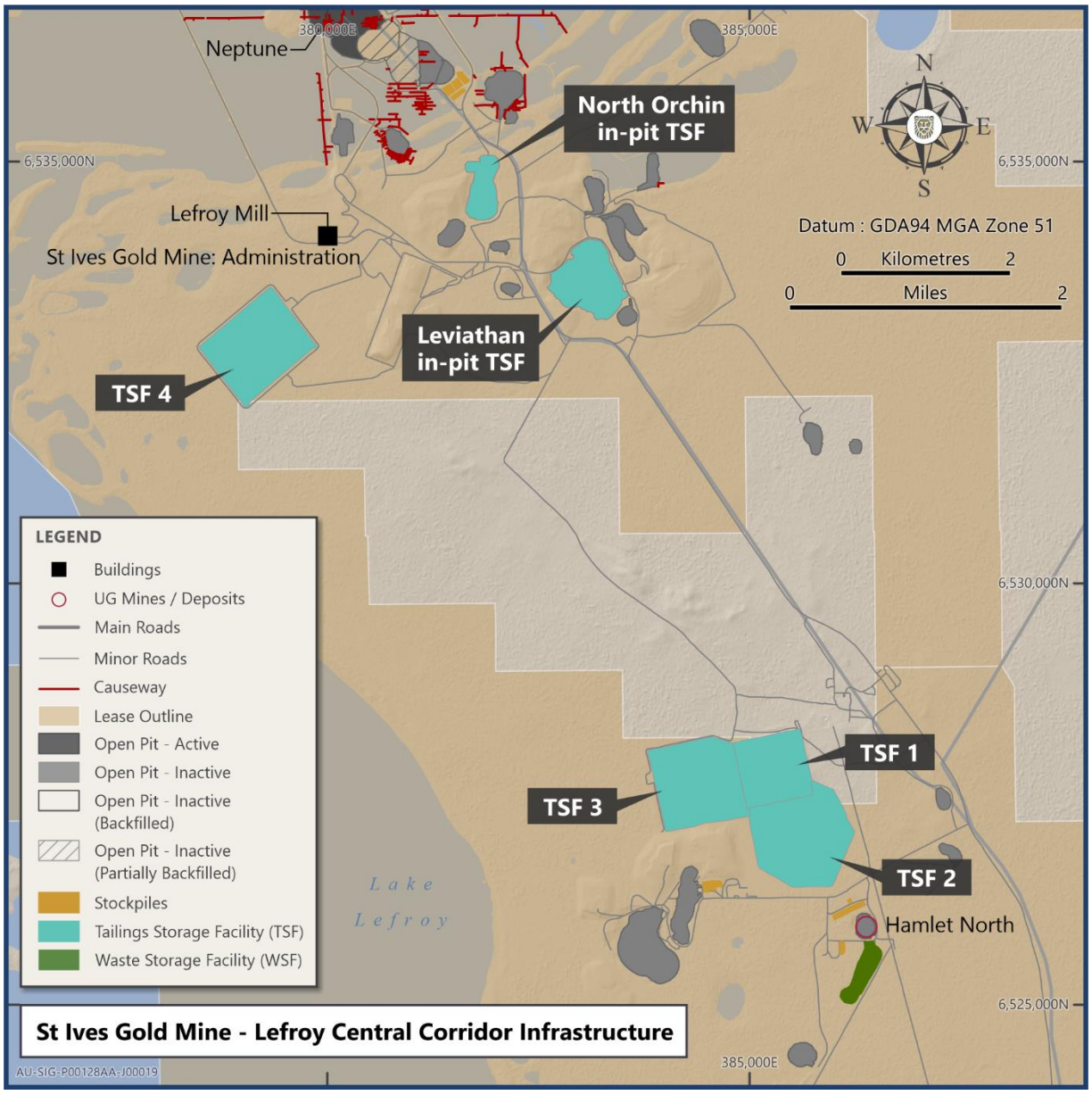
18 Project infrastructure

Details on each major item of non-process infrastructure is discussed in this item. The site infrastructure layout is shown in Figure 5.1. The administration offices are located at the Lefroy process plant complex.

18.1 Tailings storage facilities (TSF)

The layout of the TSFs is shown in Figure 18.1.

Figure 18.1: Lefroy Central Corridor Infrastructure



Source: St Ives CPR, 2021

St Ives operates one active TSF known as the Leviathan In-Pit TSF. All other TSF's are decommissioned and awaiting rehabilitation (i.e., TSF 1, 2 & 3 and the North Orchin in-pit TSF); or inactive and for emergency use only (TSF 4).

TSF 1 has been decommissioned and used for tailings reclamation for underground paste backfill material, using excavators, loaders, and trucks.

TSF 2 has been filled to the final design height and decommissioned. The TSF 2 embankments were at their final design level of RL333.7 mKNO (KNO = Kambalda Nickel Operations datum), and the facility was decommissioned in 2010.

The starter embankments of TSF 2 were constructed to a nominal crest level of RL315 mKNO using sandy clay borrow material. The embankments were subsequently raised in eight stages to a nominal crest level of RL333.7 mKNO via upstream construction techniques, generally using compacted dried tailings (the initial raises used sandy clay).

The downstream or outer batter slopes of the perimeter embankments have a slope of 1:2.5 with intermediate benches at RL318.5 mKNO, RL323.5 mKNO, and RL328.7 mKNO. The downstream batters, including the upstream raises to the RL328 mKNO level, are top-soiled. The upper 5 m is capped with waste rock. TSF 2 is currently inactive.

The TSF 3 embankments are at their final design level of RL325.0 mKNO, and the facility was decommissioned in 2016.

TSF 3 is a paddock-type facility located immediately west of and abutting TSF 1 and northwest of TSF 2. The starter embankment was constructed to crest level RL305.9 mKNO. Embankment construction was completed in October 2002, utilising clayey fill material borrowed from the facility.

The perimeter embankments were subsequently raised using upstream construction techniques in eight stages to crest level RL325.0 mKNO. Stage 2 construction utilised clayey fill sourced from within the facility. Stage 3 construction utilised dried tailings and clayey fill (for part of the northern embankment only). Stages 4 to 8 construction utilised dried tailings. Stage 8 construction was completed in December 2014.

The facility has a current maximum embankment height of approximately 27.5 m. The batter slopes on the perimeter embankment are 1:2.75 downstream and 1:1.75 upstream. Therefore, the lower downstream batters of the perimeter embankment below the RL309.9 mKNO bench level (bench confined to western and southern embankments) were top-soiled. However, the embankment batters above RL309.9 mKNO were capped with competent mine waste, have not been top-soiled.

TSF 3 is not in operation, and SIGM has completed the removal of the tailings delivery pipelines in preparation for planned rehabilitation. A rehabilitation design is currently underway (by Stantec) to close TSF 3. The rehabilitation design will be completed later in 2021, with construction scheduled to commence in early 2022. Coffey, as the EoR, needs to endorse all designs on TSF 3 that could impact facility safety. Therefore, Coffey requires to review the rehabilitation design and be involved in the design process.

TSF 4 is a paddock-type facility approximately 1.5 km southwest of Lefroy Mill. The starter embankment of the first cell of TSF 4 was constructed between October 2011 and July 2012, with a crest level at RL309.0 mAHD (Australian Height Datum). The starter embankment was a zoned embankment constructed from Zone 1A and 1B materials sourced from the Diana open pit, approximately 12 km south-east of TSF 4. Zone 1C material was sourced from the TSF 4 return water pond area. In addition, mine waste rock was used as surface protection and erosion prevention material at the perimeter embankments' downstream face.

The Stage 1 embankment raising of TSF 4A by 2.5 m from RL309.0 mAHD to RL311.5 mAHD was carried out between March 2015 and November 2015. The earthworks comprised raising the perimeter embankments, decant access-way, and decant structure. In addition, tailings sourced from within the TSF 4 floor area were used as a construction material with mine waste capping around the perimeter embankment. TSF 4 is currently inactive.

The facility has a current maximum embankment height of approximately 14.5 m. The perimeter embankment batter slopes are 1:2.25 downstream and 1:2 upstream. The embankment crest width is 8 m.

The North Orchin In-Pit TSF has reached capacity and was decommissioned in 2015. The Leviathan In-pit TSF was commissioned in early 2017 and is currently active. Leviathan tailings storage volume will total 36.5 Mm^3 at 296.50 RL

with approximately 2 m of freeboard, providing 0.9 Mm³ of emergency capacity. As of Q3 2021, the pit has a remaining capacity of ~25.671 Mm³ (28.24 Mt) and 53.91 m freeboard remaining to reach the target RL.

The Engineer of Record (EoR) for the St Ives TSFs is Coffey (Tetra Tech), based in Perth. All TSFs need to be compliant with the Global Industry Standard on Tailings Management (GISTM) by August 2025. A gap analysis has been completed, and the GISTM compliance program is underway in collaboration with the EoR.

18.2 Waste storage facilities (WSF)

The parameters to be used for designing waste dumps at SIGM are outlined below in Table 18-1. They are based on data from the Geotechnical Department and are applicable to oxide, transitional and fresh material types. Lake sediments should be backfilled into mined pits/voids. Encapsulation may be an option depending on the quantity, but this will require consultation with the Geotechnical and Environmental Departments.

Table 18-1: Waste Storage Facility Design Criteria

Parameter		Units	Value
Material Characteristics	Angle of Repose	deg	37
	In-situ Density (avg waste density assumed)	t/m³	2.5
	Swell	%	25
	Tipped Density	t/m³	2.0
Design Criteria	Lift Height	m	10
	Berm Width	m	24
	Maximum Dump Height	m	40
	Ramp Gradient	1:n	9
Rehabilitation Criteria	Rehabilitated Batter Slope	deg	15
	Overall Rehabilitated Slope	deg	19
	Lift Height	m	10
	Maximum Dump Height	m	40

Source: St Ives CPR, 2021

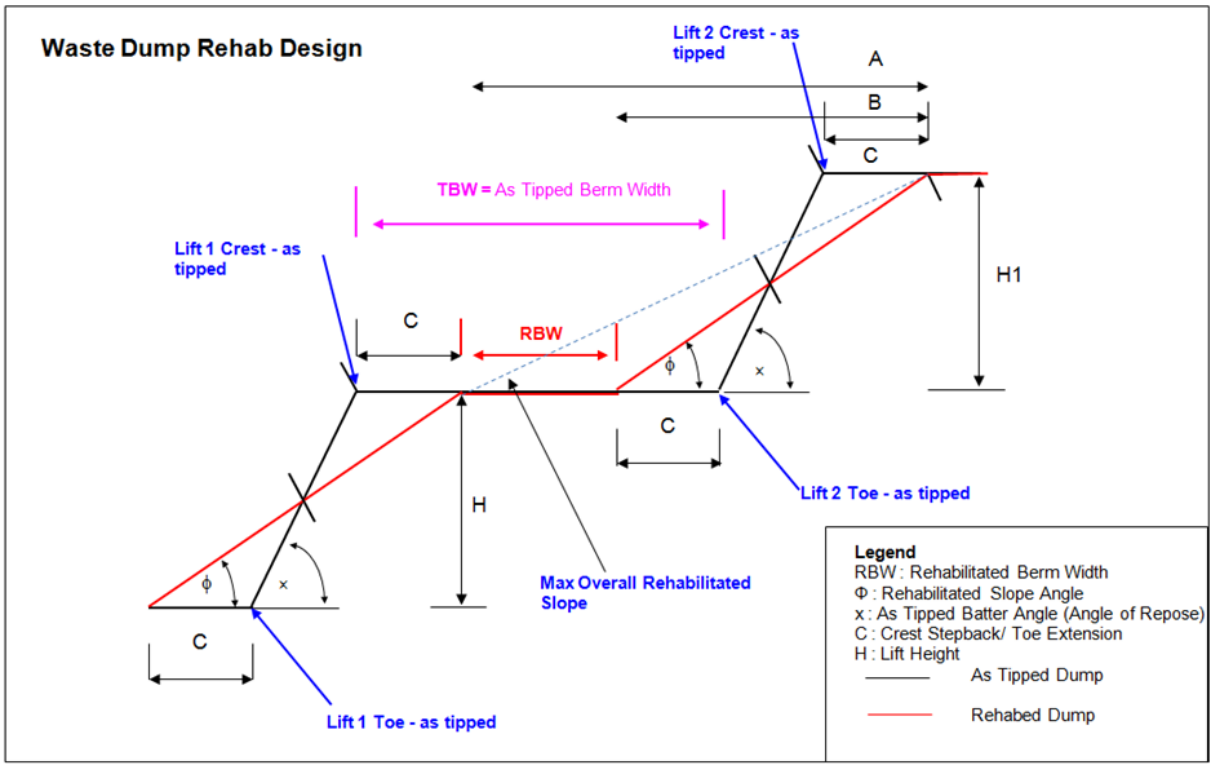
The rehabilitation design requirements for a waste rock dump are specified below in Table 18-2 and Figure 18.2.

Table 18-2: Calculation of berm width based on overall rehabilitation angle

Parameter	Units	Value
Overall Rehabilitated Slope Angle	deg	15.0
Rehabilitated Slope Angle	deg	19.0
Lift Height	m	10.0
Angle of Repose	deg	37.0
C	m	8.0
B	m	29.0
A	m	37
RBW (+A-B)**	m	8.0
TBW (=C + C + RBW)	m	24

Source: St Ives CPR, 2021

Figure 18.2: Waste Storage Facility design definitions



Source: St Ives CPR, 2021

18.3 Water

St Ives' water supply comes from three different sources to support processing, mining and drinking water for human consumption.

Potable water is sourced from the Perth to Kalgoorlie scheme via a branch line to Kambalda. A holding tank in East Kambalda supplies St Ives by gravity feeding to various outlets to meet mining, milling and human consumption needs. SIGMC has an agreement with utility Water Corporation for the supply of 909 kL/day of potable water until June 2050.

Groundwater comes from the Widgiemooltha borefield approximately 25 km west of the Lefroy processing facility. Twelve bores pump from an underground paleo-valley aquifer to a centralised transfer tank approximately 30 km from St Ives. This water is pumped at up to 100 L/s, providing an annual entitlement of 4,015 ML. Borefield water is only of sufficient quality for processing operations with a TDS of approximately 40,000 ppm and a pH 3.25 – 6.4.

Moorebar dam is a catchment dam, approximately 20 km northwest of the Lefroy mill, on crown land over which SIGMC has an agreement to harvest and extract water. The availability of water to pump is weather dependent, but typically provides some water per annum with minimal pumping required from the associated borefield. The quality of the Moorebar dam water is brackish to fresh, being low turbidity and with a TDS under 5,000 ppm. When water is available in Moorebar Dam, and required by processing, it is pumped in 355 mm poly welded pipeline approximately 5 km to a holding tank and then approximately 20 km to the mill.

18.4 Power

St Ives derives most of its power from BHP Nickel West via a stable energy grid operated by private power provider TransAlta Energy Corporation. The agreement currently in place to 1 January 2024 provides for a maximum supply of 33 MW. Recent average demand for the operation has been less than 25 MW. Power is distributed across the St Ives property by a combination of SIGMC-owned infrastructure and TransAlta Energy Corporation owned infrastructure at system voltages of 132 kV, 66 kV and 11 kV.

Power is supplied at transmission voltage to zone substations at the various mining and processing areas where it is reduced to working voltages of 1 kV and 415 V.

Small load centres located in areas not easily accessible to the main power distribution network are powered by small generator type arrangements.

18.5 Accommodation

St Ives is a mix of residential and fly in fly out work force. The residential workforce predominantly reside in nearby Kambalda and Kalgoorlie. Accommodation for the fly in fly out workforce is provided by three privately operated (ESS, Civeo, Lan Franchi) camps located in Kambalda and south of the Lefroy administration building.

18.6 Site access

St Ives constructs and maintains a network of haulage and access roads across the site. Mining on Lake Lefroy requires the construction of causeways, protective bunds and other earthworks to provide access, stockpile areas and to prevent surface water incursions.

18.7 Other infrastructure

The administrative centre is located in offices adjacent to the Lefroy processing facility. Office facilities are also maintained at each mining location to support production, statutory and legal requirements. St Ives also has several workshop and washing facilities for the maintenance of vehicles and mining equipment.

The mine is supported by fibre optic and wireless networks for telecommunications and information technology. A UHF digital radio network also exists across site for mobile and emergency communications

The Qualified Person is of the opinion that the infrastructure for the St Ives mining operation is fit for the life of mine reserve estimation and that the Mineral Reserve quantities are tested against dump and disposal capacities.

19 Market studies and contracts

19.1 Market studies

A review of metal prices for planning purposes is undertaken annually to monitor any significant changes in price trends or exchange rates that would warrant re-calibrating the price deck before the Strategic Planning process transitions into the Business Planning cycle.

This review of the metal price deck has taken account of the prevailing economic, commodity price and exchange rate (Fx) trends, together with market consensus forecasts, in addition to consideration of the Gold Fields' strategy and expectations for the operations.

Our strategy is to (1) mitigate annual volatility by holding planning metal prices as long as warranted to support stability in mine planning, notably regarding the underground MSO and open pit shell selections; (2) maintain appropriate margins on spot and long-term price forecasts to support the Group's Balanced Score Card (BSC) metrics; (3) protect against accelerating mining sector inflation and, (4) to confirm a separate gold price to be used specifically for the Operational Pan (budget) revenue streams and cashflows in Q3 each year.

The outcome of the pricing analysis was to use a gold price of $1,300/oz for Mineral Reserves and $1,500/oz for gold Mineral Resources for the December 2021 disclosure of estimates. The relevant copper and silver prices in US Dollars are shown in Table 19-1. Note the A$/oz gold prices applied to the estimates in Australia are included for transparency.

Table 19-1: Reserve and Resource metal prices

Units		December 2021 Metal price Deck	
Metal	**Unit**	**Mineral Reserve 31 Dec 2021**	**Mineral Resource 31 Dec 2021**
Gold	US$/oz	**1,300**	**1,500**
	A$/oz	1,750	2,000

Source: St Ives CPR 2021

The above price deck comparison to market long-term forecasts assessed at the time of analysis is consistent with the Registrants approach to retaining good discipline in support of the Company strategy; this approach ensures Gold Fields' Mineral Resources and Reserves are not too volatile year-on-year and that the company is protected against possible downside scenarios if the gold price falls up to ~25 % in any specific year. Ensuring a sufficient buffer to maintain our margins at prices that could be incrementally lower than the spot price ranges seen in 2021 is also important. Equally, with annual mining sector inflation estimated at $30-40/oz, we need to ensure we mitigate this escalation risk in the life of mine plans and Mineral Reserve estimates.

Sensitivity analysis on gold price for project financial evaluation is done to provide flexibility/range analysis for all regional studies and site growth opportunities and investment purposes.

The Mineral Resource gold price premium to the Mineral Reserve price is circa 15 % and the differential is in general alignment to our peer group and industry standard practice. The Mineral Resource price premium is to provide information on each operation's potential at higher gold prices and to indicate possible future site infrastructure and mining footprint requirements.

19.2 Metal price history

Gold prices London Metals Exchange afternoon close

- Gold spot 30 December 2021 - $1,805.85/oz - A$2,484.32/oz
- Fx 30 December 2021 A$1:$0727c
- Gold spot 24 month average - $1,784.45/oz (for the period ending 31 December 2021)
- Gold spot 36 month average - $1,653.71/oz (for the period ending 31 December 2021)
- Gold spot 60 month average - $1,497.48/oz (for the period ending 31 December 2021)

19.3 Contractual Agreements

All gold produced at St Ives is refined by the Perth Mint in Western Australia. The Perth Mint applies competitive charges for the collection, transport and refining services. The Perth Mint takes responsibility for the unrefined gold at collection from the operation where it engages a sub-contractor, Brinks Australia. Brinks delivers the unrefined gold to the Perth Mint where it is refined, and the refined ounces of gold and silver are credited to the relevant metal accounts held by the operating company with the Perth Mint. The contractual arrangement with the Perth Mint continues until terminated by either party upon 90 days' written notice.

Gold Fields' treasury department in the corporate office in Johannesburg, South Africa sells all the refined gold produced by the operating company. On collection of the unrefined gold from a mine site, the relevant operating company will notify Gold Fields' treasury department of the estimated refined gold content, expressed in troy ounces, available for sale. After such confirmation, the treasury department sells the refined gold to authorised counterparties at a price benchmarked against the London Bullion Market Association PM gold auction price. All silver is sold to the Perth Mint at the London Bullion Market Association silver price on the last business day of each month.

Gold Fields may periodically use commodity or derivative instruments to protect against low gold prices with respect to its production. Variations in gold price, currency fluctuations and world economics can potentially impact on the revenue received. No gold derivative instruments are in place at the date of this report.

The majority of gold production is used for jewellery and for investment purposes, in the latter case because the market views it as a store of value against inflation. In addition, certain physical properties of gold, including its malleability, ductility, electric conductivity, resistance to corrosion and reflectivity, make it the metal of choice in a number of industrial and electronic applications.

Supply of gold consists of new production from mining, the recycling of gold scrap and releases from existing stocks of bullion. Mine production represents the most important source of supply, typically comprising 75 per cent. each year. Annual demand requires more gold than is newly mined and the shortfall is made up from recycling. Management believes that long-term gold supply dynamics and global economy trends will support the gold price at levels above or aligned to $1,300 per ounce in the long-term.

The market for gold is relatively liquid compared to other commodity markets, with London being the world's largest gold trading market. Gold is also actively traded via futures and forward contracts. The price of gold has historically been significantly affected by macroeconomic factors, such as inflation, exchange rates, reserves policy and by global political and economic events, rather than simple supply/demand dynamics. Gold is often purchased as a store of value in periods of price inflation and weakening currency. The price of gold has historically been less volatile than that of most other commodities.

Significant service contracts and/or leases that are in place to enable execution of the life of mine plan include:

- Perth Mint - Refining
- Mining & Drilling
- MLG – Ore Haulage
- Coastal Midwest Transport - Freight haulage
- RUC Cementation – Raise boring
- APA Operations – Gas Transportation
- EDL – Power supply
- Alliance Airlines – Flights
- Action Industrial Catering – Camp Services
- ALS Global – Assay Services

The Qualified Person has relied on information provided by the Company in preparing its findings and conclusions regarding market studies related to gold sales from St Ives. Refining services are based on well-established long-term agreements and expediting gold sales over the life of the asset does not represent any significant uncertainty. Service contracts, lease agreements and goods contracts e.g., diesel, cyanide and cement, necessary to develop the property as planned, are in place and have the capability to support the full projected cashflow period.

20 Environmental studies, permitting and and social or community impact

Climate change is an integral part of the Mineral Reserve generation process and incorporating relevant costs associated with climate change, primarily decarbonisation, mitigation and adaptation to the changing climate, is a key theme for the Company. Integration of these key elements into the Mineral Reserve process is being carried out progressively and simultaneously across all of Gold Fields' sites.

20.1 Environmental studies

Environmental impact assessments for the St Ives operation were undertaken through the permitting processes and site risk management plans and procedures.

St Ives is entitled to mine all declared material falling within its respective Mining Leases with all necessary statutory mining authorisations and permits in place. The large number of environmental and social studies (inclusive of Aboriginal cultural heritage surveys) conducted across the site environmental are described in the Beyond 2018 Project Public Environmental Review and the current approved St Ives Mine Closure Plan. These documents are current and address:

- Fauna and flora surveys.
- Heritage surveys.
- Closure planning review and updates.
- Contamination/ecotox/hazard investigations.
- Surface water hydrology and hydrogeological/groundwater modelling.
- Landform design and engineering for waste landforms.
- Waste characterisation.
- Landform decommissioning plans.

The Qualified Person is of the opinion that the closure and environmental studies are in good standing and are not seen as material to the life of mine reserve

20.2 Waste disposal, monitoring and water management

20.2.1 Tailings storage facilities (TSF)

The ANCOLD consequence classification of the St Ives TSFs are:

- TSFs 1 and 3 – Low
- TSFs 2 and 4 – High C
- North Orchin pit and Leviathan pit – Low

The previous stability analyses for TSF 2, TSF 3, and TSF 4 were reviewed as part of the recent Coffey audit conducted in September 2021. The stability of all TSFs is acceptable in meeting the minimum required factors of safety. The stability of TSFs 2,3 and 4 will be re-assessed as part of the upcoming GSTM classification study.

WAD Cyanide levels in all monitoring wells were below the compliance limit of 0.5 mg/L, with most readings under 0.04 mg/L.

Due to the use of hypersaline process water at St Ives, there are site-specific Cyanide Code (ICMC) WAD CN levels set for tailings discharge. These limits require the achievement of the 80th percentile of less than 112 ppm and the 90th percentile of 132 ppm, assessed quarterly. These requirements are being met.

InSAR satellite ground stability baseline scans were carried out during Q3 2021 for St Ives, and the results determined that no deformations have been identified on the walls of TSFs 1-4.

The piezometric levels for all surface TSFs are almost static, which is consistent with the care and maintenance status of the TSFs and indicates levels are unaffected by seasonal rainfall. The EoR is currently conducting a water management strategy review to improve water management at the Leviathan pit to maximise water return and improve the in situ density.

As of October 2021, the Leviathan pit has an available storage capacity of 28.24 Mt, compared to an LoM tailings throughput of ~29.3 Mt.

Five pits, namely Leviathan, Sirius & Britannia, Britannia Footwall & Paddy's pits, have already received DWER's approval to receive tailings under existing licence L8485/2010/2. The other pits, including Thunderer, Bellerophon, Africa and Pinnace, will require a DWER permit should they be required for tailings storage.

Assuming a stored tailings density of 1.1 t/m³ and total throughput of 29.3 Mt, the Leviathan, Sirius & Britannia pits are required, which will provide a total storage capacity of 31.88 Mt. Therefore, there is no need to obtain additional approval for tailings storage unless reserve requirements change.

The TSF s at St Ives are being well managed from a facility safety and governance perspective.

The Qualified Person has the opinion that the procedures and monitoring, water management practices are adequate for the life of mine reserve estimate

20.2.2 Waste storage facilities (WSF)

Design and construction parameters for waste rock landforms are determined through "best practice" materials characterisation and erosion testing and modelling. For new landforms, this process is undertaken as part of the Mining Proposal preparation process and for the existing and "legacy" landforms, these are undertaken as required, for remedial and closure planning. Unless indicated otherwise, each landform/project area has a specific set of design and construction parameters developed, representing a closure concept. The Mine Closure Plan is updated with these details as required at each review.

The Qualified Person is of the opinion that the waste rock dumps at St Ives are adequate for this life of mine reserve plan. Regular waste rock inspections are performed to assess safety.

20.2.3 Water management

St Ives holds three groundwater abstraction licences (GWL62505, GWL205729 and GWL171060) administered by the Department of Water and Environmental Regulation (Table 20-1). This allocation allows annual combined abstraction of 30,000 ML and adequately covers St Ives' maximum possible water abstraction requirements. Current groundwater extraction is below 10,000 ML/annum.

Groundwater monitoring is managed by the site environmental department and is conducted regularly as part of the Department of Water and Environmental Regulation licence and Mining Lease conditions, and Mining Proposal commitments. These monitoring programs include groundwater levels and water quality at the borefields, dewatering pits and surrounding the TSFs.

SIGMC obtains groundwater for its processing operations from the Widgiemooltha borefield under licence GWL 171060. Mine dewatering is licenced under GWL 62505(7) and was renewed to allow up to 30 GL of water abstraction and discharge onto Lake Lefroy.

Groundwater is pumped from the Widgiemooltha borefield using a buried pipeline. Leak detection is installed to minimise uncontrolled loss and inspections are undertaken every two days.

Mine dewatering is undertaken at all operations through a series of sumps. Particle settlement is achieved using in-pit sedimentation basins as well as lined turkey's nests prior to discharge to Lake Lefroy.

Wastewater from the sewage treatment systems is discharged by irrigation to the land.

Water is used primarily for processing (approximately 2 - 3 GL per annum). Water is recycled to the extent possible from tailings facilities using return water dams and holding ponds.

Most of the water at St Ives is reused within the mining areas and processing circuits. Storage is largely in settling and storage ponds as well as disused open pits. The key operational areas are also supported with tanks that contain enough surge volume to ensure minimal interruption to business in the event of a pump failure at one of the ponds.

Discharges to the environment are licenced under Department of Water and Environmental Regulation licence L8485/2010 (Table 20-1). This licence covers the following regulated processes:

- Processing or beneficiation of metallic or non-metallic ore.
- Mine dewatering.
- Vat or in situ leaching of metal.
- Sewage facility.
- Used tyre storage
- Putrescible landfill sites.

St Ives undertakes a range of water and groundwater monitoring as required by permitting and as good environmental practice to prevent environmental harm. Monitoring includes:

- Ground water level.
- Ground water quality (metals, acidity, hydrocarbons).
- Water treatment discharge (metals, hydrocarbon, nutrients)
- Results from monitoring are reported annually to the relevant regulator.

The Qualified Person is of the opinion that the water balance and procedures are adequate and support the life of mine reserve estimate

20.3 Permitting

Mining operations on tenements in Western Australia must be developed and operated in compliance with the following Commonwealth and State environmental legislative requirements.

20.3.1 Commonwealth

The Environmental Protection and Biodiversity Conservation ("EPBC") Act 1999 is administered by the Department of the Environment, Water, Heritage and the Arts. Commonwealth approval is required for matters of national significance, as defined in the Act, including the presence of migratory birds, federally listed rare flora or fauna, Commonwealth land, nuclear actions and marine areas.

Currently, the Clean Energy Regulator oversees the administration of the Large-scale Renewable Energy Target and the Small-scale Renewable Energy Scheme to encourage additional generation of electricity from renewable energy sources. The Renewable Energy Target legislation provides an incentive for investment in renewable energy power stations and smaller systems while ensuring the energy sources used are ecologically sustainable. The Clean Energy Regulator Act, 2011 regulates and convenes the Clean Energy Regulator.

The Carbon Farming Initiative is a voluntary carbon offsets scheme. It is an integral component of the Emissions Reduction Fund and allows land managers to earn carbon credits by changing land use or management practices to store carbon or reduce greenhouse gas emissions under the Carbon Credits (Carbon Farming Initiative) Act 2011.

The National Greenhouse and Energy Reporting Act 2007 sets out the reporting framework for calculating carbon emissions from industry. National Greenhouse and Energy Reporting will form the basis for calculating permits under any proposed Carbon Pollution Reduction Scheme to be introduced into Australia in the future.

20.3.2 State

The Mining Act (1978) is administered by the Department of Mines, Industry Regulation and Safety (DMIRS). Before commencement of any mining operation, a proponent is required to submit a Mining Proposal to the DMIRS. The Mining Proposal describes the project, surrounding environment, potential environmental impacts and proposed prevention and mitigation measures. Commitments made within the Mining Proposal are binding on any future operations within the tenements unless a request for an amendment to the relevant Government authorities is accepted.

The Environmental Protection Act 1986 (and Environmental Protection (Amendment) Act 2004) is administered by the Department of Water and Environment Regulation (DWER) and Office of the Environmental Protection Authority (OEPA). There are two key components to this Act that affect St Ives' operations, being Parts IV and V of the Act. Under Part IV of the Act, projects referred to the former Environmental Protection Authority which are considered likely to have a significant environmental impact may be subject to assessment in accordance with Environmental Impact Assessment, Part IV Division 1. This part of the Act provides for Ministerial Approval for an activity. Part V of the Act provides for the regulation and licencing of environmental harm and the conduct of potentially polluting activities.

The DWER regulates industrial emissions and discharges to the environment through a Works Approval and licensing process under Part V of the EP Act. Industrial premises with potential to cause emissions and discharges to air, land or water are known as 'prescribed premises' and trigger regulation under the Environmental Protection Act. Prescribed premises categories are outlined in Schedule 1 of the Environmental Protection Regulations 1987.

The Environmental Protection Act requires a Works Approval to be obtained before constructing a prescribed industrial premise and makes it an offence to cause an emission or discharge unless a licence or registration is held for the premises. Typically, Works Approval documentation is submitted concurrently with the Mining Proposal. On completion of construction of such infrastructure, completion certificates are required to be submitted to DWER to confirm the infrastructure was constructed in accordance with approved design criteria.

In addition, the Contaminated Sites Act 2003 (administered by DWER) has environmental investigation and reporting requirements required by mining operations under this legislation.

The Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (administered by DMIRS and DWER) was gazetted in 2004 as part of amendments to the Environmental Protection Amendment Act (2003). It requires all individuals, corporate bodies and private companies to gain formal approval for vegetation clearing in Western Australia prior to any ground disturbing activities commencing. All disturbances relating to mining, processing and related infrastructure require approval under both this framework (including clearing permit exemptions) as well as under the Mining Act.

The Rights in Water and Irrigation Act 1914 as administered by DWER is responsible for issuing groundwater licences (GWL) and licences to construct or alter wells (CAW).

All tenement holders operating on Mining Act 1978 tenure (except for tenements covered by State Agreements not listed in the regulations) are required to report disturbance data and to contribute annually to the Mining Rehabilitation Fund (MRF). Entry into the MRF was made compulsory for all tenement holders in 2014, with all disturbance data from the Mining Rehabilitation Levy Period 1 July 2014 to 30 June 2015 entered into the DMIRS Environmental Assessment and Regulatory System (EARS) before the end of June 2015.

Other key relevant legislation includes:

- Biodiversity Conservation Act 2016.
- Conservation and Land Management Act 1984.
- Country Areas Water Supply Act 1947.
- Aboriginal Heritage Act 1972.
- Heritage of Western Australia Act 1990.
- Environmental Protection Regulations 1987.
- Environmental Protection (Unauthorised Discharge) Regulations 2004.

20.3.3 SIGMC permitting

Approvals for the mining and processing operations on the St Ives Mining Leases were obtained from the DMIRS using the Mining Proposal process. Where applicable, this included referral to Environmental Regulation and Environmental Protection Agency Services (EPAS) Sections of DWER.

St Ives is licenced by DWER in accordance with Part V of the Environmental Protection Act 1986 (WA) (Licence number L8485/2010/2). Formal assessment of lake-based mining activities by the former Environmental Protection Authority (now a section of DWER) was undertaken in September 1999 under Part IV of the Environmental Protection Act 1986 with the submission of a Public Environmental Review for mining activities on Lake Lefroy. Ministerial Statement 548 was issued approving the project, subject to conditions, in 2000. Ministerial Statement 879 was issued in November 2011, to replace Ministerial Statement 548, allowing for the expansion of lake-based operations and transfer of the Ministerial Statement from Western Mining Corporation to Gold Fields.

The 2011 approval for the lake-based expansion was amended and approved by the former Environmental Protection Authority in December 2016 allowing for further development of the lake-based Mineral Reserves. A new approval proposal was referred to the Environmental Protection Authority in December 2016 and was focused on securing approvals or mining lake-based reserves beyond 2018. Findings from this process were supported by the need for more effective site rehabilitation activities. Ministerial Statement 1128 was issued in March 2020 to supersede Ministerial Statement 879.

During January 2021, St Ives received approval of the One Mining Proposal from DMIRS aligned with the Mining Proposal Guidelines 2016. The One Mining Proposal consolidates the obligations and conditions from over 200 separate mining approvals for St Ives.

An overview of current statutory permitting is provided below. No environmental permitting applications are currently under assessment.

- Department of Water and Environmental Regulation.
    - Ministerial Statement 1128 provides approval for land access and disturbance over a defined part of the St Ives operation.
    - Environmental Licence L8485 provides authorisation of defined polluting activities including processing of ore and dewatering discharge.
    - Ground water licence 171060 provides for abstraction of raw processing water from our production bore field.
    - Ground water Licence 62505 and 205729 provide for dewatering of mining areas.
- Department of Mines, Industry Regulation and Safety

- One Mining Proposal RegID 81919 provides for approval for mining related activities, other than exploration, within active and historic mining areas within the operating area.
- Mine Closure Plan RegID 88163 provides for progressive and end of mine closure and rehabilitation.
- A range of Programs of Works provide approval for exploration activities across all SIGM tenements.
- A range of Native Vegetation Clearing Permits for clearing not otherwise addressed by other approvals.

- Department of Planning, Lands and Heritage
  - Aboriginal heritage surveys are conducted across the site the support mining and exploration activities.

A summary of all current SIGMC permits is provided in Table 20-1.

Table 20-1: List of SIGMC permits

Number	Purpose	Registered holder	Status	Grant date	Expiry date	Fines
MS1128	Access to and disturbance of defined land areas	SIGMC	Granted	18/03/2020	NA	Nil
L8485/2010	Operating Licence for polluting activities	SIGMC	Granted	07/10/2013	06/10/2032	Nil
RegID 81919	One Mining Proposal	SIGMC	Granted	06/01/2021	NA	Nil
RegID 88163	Mine Closure Plan	SIGMC	Granted	16/07/2021	16/03/2025	Nil
GWL62505	Mine dewatering	SIGMC	Granted	02/02/2016	01/02/2026	Nil
GWL205729	Mine dewatering	SIGMC	Granted	12/04/2021	11/04/2031	Nil
GWL171060	Mt Morgan bore field	SIGMC	Granted	02/02/2016	01/02/2026	Nil
4696/3	Clearing permit	SIGMC	Granted	04/02/2012	30/04/2025	Nil
3143/4	Clearing permit	SIGMC	Granted	29/08/2009	31/01/2025	Nil
4696/3	Clearing permit	SIGMC	Granted	04/02/2012	30/04/2025	Nil

Note:
a) The Qualified Person has selected a few permits to demonstrate permitting.
b) The Qualified Person is of the opinion that the licences are in good standing and that any current or future licensing can and will be obtained for the Mineral Reserve or the Mineral Resource.
c) The Qualified Person is of the opinion that St Ives has a good standing with licensing authorities, community groups and that licensing is not expected to be material to reserves or resources.
d) St Ives is conducting continues rehabilitation and has a large closure liability (Section 17.6). The Qualified Person is of the opinion that the closure estimates and duration are reasonable and practical

Source: St Ives CPR, 2021

In addition to making provision and commitment to rehabilitation following mining, West Australia tenement holders with a calculated rehabilitation liability of $50,000 or more are required to pay a levy to the state run Mine Rehabilitation Fund. The payment is based on the operations reported ground disturbance data and is used to fund the safe closure of abandoned mining operations across the state.

20.4 Social and community

20.4.1 Social and community

The Indigenous Peoples Strategy provides the framework for a consistent approach to engagement with Aboriginal peoples to improve relationships and mitigate risks to the business.

Through the implementation of a Reconciliation Action Plan (RAP), Gold Fields' sites are in the process of developing appropriate strategies to improve and increase Aboriginal employment outcomes within its workplaces and increase supplier diversity.

In 2014, the Ngadju People were successful in having their claim under the Native Title Act 1993 (Cth) (WAD6020/1998) determined by the Federal Court over an area including part of the St Ives property. St Ives was not required to undertake the 'right to negotiate' process with the Ngadju People with respect to its tenure.

In 2019, a Native Title claim by the Marlinyu Ghoorlie People (WAD647/2017) was registered. This claim also covers part of the St Ives property. SIGMC is currently engaged in early discussions with the Marlinyu Ghoorlie People under the 'right to negotiate' process with respect to certain exploration tenure.

SIGMC consults with relevant Aboriginal stakeholder groups (including the Ngadju and the Marlinyu Ghoorlie Peoples) to ensure that areas of Aboriginal cultural heritage are identified and recorded. The sites identified during cultural heritage surveys are both archaeological (e.g. flake scatter artefacts) or ethnographic (e.g. an area linked to a story line). Such sites are catalogued and managed in accordance with the Aboriginal Heritage Act (1972) (WA) under site and regional procedures and standards.

A number of agreements exist to govern and manage the identification and protection of Aboriginal cultural heritage sites. The Heron leases are subject to such agreements and St Ives is currently negotiating access to these areas with both the Marlinyu Ghoolie and Ngadju Peoples.

There is currently a land access and compensation agreement in place with the Mt Monger pastoral station on which much of the St Ives operational area is situated.

SIGMC also engages in a range of people-related development activities in the communities in which the mines are situated.

Ongoing support for host communities includes health improvement and school retention programs, support of regional community events, Indigenous procurement and employment, and the promotion of STEM (science, technology, engineering and mathematics) at schools.

St Ives has a scorecard to ensure host community procurement and employment meet internal targets.

Gold Fields partners with Football West. The commitment and support to Football West is based on their impressive record of growth of the sport in Western Australia, their commitment and focus at a regional level, cultural diversity, inclusiveness and gender diversity. Gold Fields also sponsors Netball WA.

Gold Fields is also a member of the Gold Industry Group that represents the interests of gold producers, explorers and service providers to collectively champion, educate and promote the importance of the gold sector in Australia.

20.4.2 Native Title and heritage

The Indigenous Peoples Strategy provides the framework for a consistent approach to engagement with Aboriginal peoples to improve relationships and mitigate risks to the business.

Through the implementation of a Reflect Reconciliation Action Plan (RAP), Gold Fields sites are in the process of developing appropriate strategies to improve and increase Aboriginal employment outcomes within its workplaces and increase supplier diversity.

In 2014, the Ngadju People were successful in having their claim under the Native Title Act 1993 (Cth) (WAD6020/1998) determined by the Federal Court over an area including part of the St Ives property. St Ives was not required to undertake the 'right to negotiate' process with the Ngadju People with respect to its tenure.

In 2019, a Native Title claim by the Marlinyu Ghoorlie People (WAD647/2017) was registered. This claim also covers part of the St Ives property. SIGMC is currently engaged in early discussions with the Marlinyu Ghoorlie People under the 'right to negotiate' process with respect to certain exploration tenure.

SIGMC consults with relevant Aboriginal stakeholder groups (including the Ngadju and the Marlinyu Ghoorlie Peoples) to ensure that areas of Aboriginal cultural heritage are identified and recorded. The sites identified during cultural heritage surveys are both archaeological (e.g. flake scatter artefacts) or ethnographic (e.g. an area linked to a story line). Such sites are catalogued and managed in accordance with the Aboriginal Heritage Act (1972) (WA) under site and regional procedures and standards.

A number of agreements exist to govern and manage the identification and protection of Aboriginal cultural heritage sites. St Ives is currently negotiating access to various areas across the tenement package with both the Marlinyu Ghoolie and Ngadju Peoples.

There is currently a land access and compensation agreement in place with the Mt Monger pastoral station on which much of the St Ives operational area is situated.

SIGMC also engages in a range of people-related development activities in the communities in which the mines are situated.

Ongoing support for host communities include health improvement and school retention programs, support of regional community events, Indigenous procurement and employment, and the promotion of STEM (science, technology, engineering and mathematics) at schools.

St Ives has a scorecard to ensure host community procurement and employment meet internal targets.

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Gold Fields is also a member of the Gold Industry Group that represents the interests of gold producers, explorers and service providers to collectively champion, educate and promote the importance of the gold sector in Australia.

20.5 Mine closure

St Ives has an up-to-date mine closure plan, approved by DMIRS in 2021. The plan has been developed in accordance with legal requirements and Gold Fields guidance, which aligns with the International Council of Mining and Metals (ICMM) guidance The Mine Closure Plan determines the mine closure requirements and calculates the financial or closure cost liability associated with closure. The Mine Closure Plan identifies the baseline description, the closure vision or objectives, risks and opportunities, and closure activities, which include stakeholder engagement, decontamination, dismantling, re-profiling and revegetation of land or landforms, maintenance and monitoring, including post closure water monitoring (after rehabilitation is completed).

The operation has a Progressive Rehabilitation Plan (PRP), developed in accordance with the approved Mine Closure Plan and Group guidance. The operation sets annual targets for the implementation of the PRP and tracks performance against these targets. These include the recent rehabilitation of Diana, Bellerophon and West Idough waste rock landforms, as well as Blue Lode, Junction open pits and the former St Ives processing mill. Monitoring of closure objectives is undertaken utilising an in-house Closure Monitoring Protocol. Monitoring data and results are reported annually as part of St Ives's Annual Environmental Report. Existing cash resources are utilised to fund the progressive rehabilitation activities. St Ives, as a tenement holder, is required to report disturbance data, and to contribute annually to the Mining Rehabilitation Fund (MRF) in accordance with the requirements of the Mining Act.

St Ives have developed their closure cost estimate using the Standardised Reclamation Cost Estimator (SRCE) model. Closure costs are reviewed every year to reflect actual and proposed disturbances and changes in closure requirements. The estimated closure cost for life-of-mine is calculated, as of 31 December 2021, as $ 116 m (excluding taxes).

Financial provision for rehabilitation, closure and post closure obligations is met through existing cash reserves. The SRCE closure cost estimate, developed for asset retirement obligation purposes, is updated and reviewed externally annually, by an independent consultant, and reviewed annually as part of the Group financial assurance.

The Qualified Person is of the opinion that the status of St Ives current Mine Closure Plan is in good standing and will allow for the development to meet its rehabilitation and closure obligations and remain in good standing with the community and regulators.

21 Capital and operating costs

The operating and capital cost estimates are based on recent historic performance and the Mineral Reserve techno-economic study.

21.1 Capital costs

The capital costs are based on detailed requirements for the next two years and have in general an order of accuracy of ±10 %. Capital estimates beyond two years, are based on pre-feasibility or better estimates for infrastructure and development requirements for individual projects.

The capital costs for St Ives includes items classified as project capital, sustaining capital and development capital. The forecast capital costs are summarised in Table 21-1.

Table 21-1: Capital costs

Capital cost	Units	2022	2023	2024	2025	2026	2027	2028	2029	2030
Mining MP&Dev	$ million	73.7	36.1	44.2	30.5	16.6	3.1	0.0	0.0	0.0
Mining Capital Works	$ million	13.4	21.7	14.8	15.6	15.9	16.4	16.0	14.1	6.7
Processing (incl. TSFs)	$ million	2.2	2.8	2.5	3.0	3.0	2.2	1.2	1.2	0.0
G&A Capital	$ million	6.3	17.1	17.0	1.9	1.9	1.9	0.4	0.4	0.0
Exploration	$ million	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Capital	$ million	96.6	78.8	79.5	52.0	38.4	24.6	18.6	16.7	7.7

Note:
a) The capital costs are based on the 31 December 2021 life of mine schedule for proven and probable reserves. The Mineral Resource and exploration required to replace depletion is not included in this techno-economic assessment.
b) No inferred Mineral Resource is included in the life of mine processing schedule or techno-economic evaluation.
c) Exploration costs are limited to one year when scheduling life of mine Mineral Reserves. Over and above the reserve Gold Fields is expecting to spend between $80 million and 100 million per annum on reserve generation exploration to replace depletion with approximately a quarter share going to St Ives.
d) Closure cost is 'Day of Assessment' as at 31 December 2021 with life of mine disturbance rehabilitation added.
e) Tailings storage facilities are costed according to the life of mine requirements. The current in-pit tailings storage facility is expected to have reached capacity before the reserve life of mine is consumed. The cost of the replacement facility is included in the tecno-economic model.

Source: St Ives CPR, 2021

21.2 Operating costs

Operating costs are based on general planning assumptions, or project-specific planning assumptions where applicable. The unit operating cost for processing is $14.28/t (A$19.29/t) with additional costs applied for surface haulage, capital works and rehabilitation. Operating costs for the Lefroy processing facility are expected to remain steady over the next few years. The risk of upward pressure on operating costs arises from potential rises in the cost of power and labour, and the effect of water quality on reagent consumption.

The forecast operating costs are summarised in Table 21-2.

Table 21-2: Operating costs

Operating cost	Units	2022	2023	2024	2025	2026	2027	2028	2029	2030
Mining	$ million	146.0	163.0	142.6	153.2	155.6	136.3	122.5	105.8	52.3
Processing	$ million	69.6	68.0	48.9	48.8	43.3	42.1	41.8	39.8	19.5
G&A Operating	$ million	46.4	46.2	36.2	36.3	33.6	33.0	32.9	31.8	27.4
Other operating costs	$ million	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Operating costs	$ million	262.1	277.2	227.6	238.2	232.5	211.5	197.1	177.3	99.1

Note: a) The operating costs are based on the 31 December 2021 life of mine schedule for Proven and Probable Reserves. The Mineral Resource and exploration required to replace depleted reserves is no included in this techno-economic assessment

b) No inferred Mineral Resource is included in the life of mine processing schedule or techno-economic evaluation.

c) Costs are first principles based on the Mineral Reserve life of mine schedule.

Source: St Ives CPR, 2021

Qualified Person's notes on capital and operating costs:

a) The Qualified Person is of the opinion that recent historic performance and the Mineral Reserve tecno-economic study. The levels of accuracy are the same as a pre-feasibility study at an estimated accuracy of ±25 % and require no more than 15 % contingency. The specific engineering estimation methods are equal or better than estimated

b) St Ives has improved capital estimation and capital delivery through the application of Group Capital Standards, review or capital projects by a select team, and improved implementation planning. Gold Fields also perform post investment reviews across the capital studies and share key learnings. The review team are adapted at analysing capital studies.

c) The group strategic planning cycle helps align the business plans and Mineral Reserves. At St Ives there is a blend of three underground mining areas and open pits. The strategic planning assists with optimising the blend and balancing of capital expenditure.

d) Gold Fields two-year business planning cycle captures operating and capital costs along with key physicals and revenue. The business plans are internally reviewed, presented to the executive for approval, prior to sanctioning by the Gold Fields board of directors. The business plans are aligned with the Registrant's strategic direction. The business planning and strategic planning balance the groups planned capital expenditure, by ranking capital requirements.

e) Capital expenditure once sanctioned must follow the group capital reporting standard. Monthly and quarterly reviews are held to interrogate capital, operating, unit cost, physicals, plan execution and revenue streams.

f) The Mineral Reserves are supported by this review process. Reserves follow a similar review and approval process. Mineral Reserves are only approved if they have the required level of study.

22 Economic analysis

22.1 Key inputs and assumptions

The Mineral Reserve LoM physical inputs are summarised in Table 22-1.

Table 22-1: LoM physical, operating cost and capital cost inputs and revenue assumptions

Sources	Units	2022	2023	2024	2025	2026	2027	2028	2029	2030
Underground										
LoM Processed	koz	296.7	220.5	192.9	232.7	232.8	242.1	266.0	233.9	98.5
Plant Recovery	%	94.0	93.3	94.0	94.0	94.2	94.3	94.2	94.3	94.1
Metal Sold	koz	284.0	205.6	182.6	218.7	220.3	228.4	250.7	221.2	97.1
Open Pit										
LoM Processed	koz	62.7	156.3	68.8	55.3	12.5	0.0	0.0	0.0	0.0
Recovery	%	94.0	92.7	94.0	94.3	92.1	0.0	0.0	0.0	0.0
Sold	koz	60.0	144.9	65.6	52.3	11.5	0.0	0.0	0.0	0.0
Stockpiles										
LoM Processed	koz	37.6	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recovery	%	94.0	81.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sold	koz	36.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sold	koz	380.0	352.7	248.2	271.0	231.8	228.4	250.7	221.2	97.1
Costs, Revenue and Cashflow										
Revenue	$ million	494.8	458.5	322.6	352.3	301.3	296.9	325.9	287.6	126.3
Operating Costs	$ million	262.1	277.2	227.6	238.2	232.5	211.5	197.1	177.3	99.1
Capital Costs	$ million	96.6	78.8	79.5	52.0	38.4	24.6	18.6	16.7	7.7
Other	$ million	12.4	32.0	44.0	38.7	25.3	18.9	13.7	7.1	28.6
Royalties	$ million	12.3	15.1	10.6	11.6	9.9	9.8	10.8	9.5	4.2
Government levies	$ million	0	0	0	0	0	0	0	0	0
Interest (if applicable)	$ million	0	0	0	0	0	0	0	0	0
Total Costs (Excluding Tax)	$ million	383.4	403.1	361.8	340.6	306.2	264.8	240.1	210.6	139.6
Taxes	$ million	18.1	12.8	0.0	0.0	0.0	4.1	23.4	18.3	0.0
Cash flow	$ million	54.4	24.2	-17.3	30.7	12.8	39.0	68.4	58.4	5.1
Discounted cashflow at 3.8 % (NPV)	$ million	93.3	41.1	-36.4	10.4	-4.2	23.3	49.8	45.2	-9.9

Note: a) The capital costs are based on the 31st December 2021 life of mine schedule for proved and probable Reserve only. The Mineral Resource and exploration required to replace dealation is no included in this techno-economic assessment.

b) No Inferred Mineral Resource is included in the life of mine processing schedule or techno-economic evaluation.

Source: St Ives CPR, 2021

The financial assumptions on which the economic analysis is based include:

- All assumptions are on 31 December 2021 money terms consistent with the valuation date.
- Royalties on revenue is consistent with relevant legislation (2.5 % ad valorem).
- Gold Fields operations are considered as a unit for taxation purposes and assessed losses and capital expenditure can be offset against corporate taxes.
- The real base-case discount rate of 3.8 % is determined by Gold Fields Corporate Finance annually.
- A 30 % corporate tax rate.
- A closure liability of $118.3 million.

- Discounted cashflow (DCF) applied to post-tax, pre-finance cashflows and reported in financial years ending 31 December.

Table 22-2 shows the breakdown of ESG expenditure included in Table 21-1, Table 21-2 and Table 22-1.

Table 22-2: LoM cost and revenue assumptions – Breakdown of ESG

Sources	Units	2022	2023	2024	2025	2026	2027	2028	2029	2030
Progressive Closure*	$ million	17.6	16.6	18.8	20.5	19.7	12.5	8.7	4.1	0.8

Note: * Costs included in capital costs (Table 21-1, Table 21-2 and Table 22-1).

Source: St Ives CPR, 2021

22.2 Cash flow forecast

The cash flow forecast for St Ives is shown in Table 22-1. The NPV for St Ives based on the DCF forecast at a 3.8 % discount rate using the scheduled Mineral Reserves in the LoM plan is $206.9 million.

22.3 Sensitivity analysis

Sensitivity analyses were performed to ascertain the impact on NPV to changes in capital, operating costs, discount rate and gold price as summarised in Table 22-3 to Table 22-6.

Table 22-3: NPV sensitivity to changes in gold price

Gold Price	-15 %	-10 %	-5 %	0 %	+5 %	+10 %	+15 %	+25 %	+31 %
Gold Price ($/oz)	1,105	1,170	1,235	1,300	1,365	1,430	1,495	1,625	1,700
NPV ($ million)	-54.6	48.7	131.9	206.9	281.1	354.9	428.6	257.0	660.3

Source: St Ives CPR, 2021

Table 22-4: NPV sensitivity to changes in grade

Grade	-15 %	-10 %	-5 %	0 %	+5 %	+10 %	+15 %
NPV ($ million)	-127.8	-15.7	95.8	206.9	218.3	229.7	564.1

Source: St Ives CPR, 2021

Table 22-5: NPV sensitivity to changes in capital costs

Capital costs	-15 %	-10 %	-5 %	0 %	+5 %	+10 %	+15 %
NPV ($ million)	223.6	218.1	212.6	206.9	201.2	195.3	189.3

Source: St Ives CPR, 2021

Table 22-6: NPV sensitivity to changes in operating costs

Operating costs	-15 %	-10 %	-5 %	0 %	+5 %	+10 %	+15 %
NPV ($ million)	219.8	215.5	211.2	206.9	202.7	198.4	194.1

Source: St Ives CPR, 2021

Table 22-7: NPV sensitivity to changes in discount rate

Discount rate	2 %	3 %	3.8 %	5 %
NPV ($ million)	217.5	211.4	206.9	200.3

Source: St Ives CPR, 2021

The Qualified Person is of the opinion that:

a) The tecno-economic model is based on the Mineral Reserve physicals.

b) The Recent historic assumptions are used to test the Mineral Reserve economic assumptions.

c) The material assumptions have been found to be valid and used in the tecno-economic studies.

d) The discounted cashflow has economic viability and a NPV of $206.9 million at a discount rate of 3.8 %.

e) The IRR has not been presented for this tecno-economic study.

f) The tecno-economic study for the Mineral Reserves excludes all inferred Mineral Resource material.

23 Adjacent properties

There are many companies and individuals that control tenements adjacent to St Ives. Material adjacent gold properties include:

- Karora Resources Inc (TSX: KRR) - operator of the Beta Hunt Gold Mine to the immediate north of St Ives under a sub-lease agreement with SIGMC.
- Northern Star Resources Ltd (ASX: NST) - operator of the South Kalgoorlie Gold Mine to the north of St Ives.
- Anglo Australian Resources NL (ASX: AAR) at its Mandilla Gold Project to the west of St Ives.
- Maximus Resources (ASX MXR) at Wattle Dam.
- Adjacent nickel properties include:
- Black Mountain Metals at its Lanfranchi Nickel Project to the south of St Ives.
- Lunnon Metals Ltd (ASX: LM8) at Foster and Jan within the St Ives property (SIGMC retains certain gold rights).
- Mincor Resources Ltd (ASX: MCR) at Long, Otter and Durkin to the north of St Ives.

The Qualified Person is unable to verify the information and that the information is not necessarily indicative of the mineralisation on the property that is the subject of the Technical Report.

The Qualified Person is of the opinion that St Ives is essentially stand alone and has no or little reliance of neighboring properties.

The Qualified Person is of the opinion that the proximity of workings are not expected to interact in any way.

The Qualified Person is of the opinion that the lease and permit areas are not overlapping in any way.

24 Other relevant data and information

Gold Fields' commitment to materiality, transparency and competency in its Mineral Resources and Mineral Reserves disclosure to regulators and in the public domain is of paramount importance to the Qualified Person and the Issuers Executive Committee and Board of Directors continue to endorse the company's internal and external review and audit assurance protocols. This Technical Report should be read in totality to gain a full understanding of St Ives's Mineral Resource and Mineral Reserve estimation and reporting process, including data integrity, estimation methodologies, modifying factors, mining and processing capacity and capability, confidence in the estimates, economic analysis, risk and uncertainty and overall projected property value.

However, to ensure consolidated coverage of the company's primary internal controls in generating Mineral Resource and Reserve estimates the following key point summary is provided:

- A comprehensive quality assurance and quality control (QAQC) protocol is embedded at St Ives and all Gold Fields operations. It draws on industry leading practice for data acquisition and utilises national standards authority accredited laboratories which are regularly reviewed. Analytical QAQC is maintained and monitored through the submission of sample blanks, certified reference material and duplicates and umpire laboratory checks.
- Corporate Technical Services (CTS), based in Perth, comprises subject matter experts across the disciplines of geology, resource estimation, geotechnical, mining, engineering, modernisation, capital projects, processing, metallurgy, tailings management and Mineral Resource and Reserve reporting governance. The CTS team budget for regular site visits to all operating mines when emphasis is placed on-site inspection and direct engagement with the technical staff to drive protocols and standards and enable on-site training and upskilling. CTS provides technical oversight and guidance to the operating Regions and mines and ensures an additional level of assurance to the Mineral Resource and Reserve estimates to supplement the mine sites and Regional technical teams.
- Independent audit review of fixed infrastructure is conducted annually with the appointed insurance auditor focussed on plant, machinery and mine infrastructure risks. An effective structural and corrosion maintenance program with benchmark inspections is in place supported by equipment condition monitoring major critical component spares. Focus areas include the primary jaw crusher, ball mill shell or motor failure, structural failure of plant or conveyor, process tank failure and large transformer failure. Critical spares are well resourced and there are no large items not supported by on-site spares holdings.
- Mobile equipment is largely owned and well maintained by the mining contractor, with development and haulage units at owned by St Ives. There is some spare capacity in most of the fleets with the option of hire units that are readily available in the region.
- Processing controls include the preparation of quarterly plant metal accounting reconciliation reports by the mine sites which are reviewed by the Regional Metallurgical Manager and VP Metallurgy in the CTS team. Any monthly reconciliation variance outside the limits provided within the Gold Fields Plant Metal Accounting Standard is flagged for follow up assessment and remediation if warranted.
- St Ives has a tailings management plan that promotes risk minimisation to operators and stakeholders over the lifecycle of each tailings storage facility (TSF). St Ives's TSF's are operated in accordance with the company TSF Management Guidelines which are aligned with the International Council on Metals & Mining's (ICMM) Position Statement on preventing catastrophic failure of TSFs (December 2016). Active TSFs are subject to an independent, external audit every three years, as well as regular inspections and formal facility safety reviews by formally appointed Engineers of Record (EoR). Further improvements in tailings management are expected through achievement of compliance with the new independently developed Global Industry Standard for Tailings Management (GISTM) issued in 2020.
- The integration of Environmental, Social and Governance (ESG) themes into the estimation process continues as an important consideration for modifying factors, reasonable prospects for economic extraction (RPEE) assessments and to underpin the integrity of the Mineral Resources and Mineral Reserves. The company's

ESG Charter, issues and priorities are fully considered in the life of mine plan with particular emphasis on tailings management, integrated mine closure planning, security of energy and water and the social and regulatory licence to operate.

- Gold Fields also follows an embedded process of third-party reviews to provide expert independent assurance regarding Mineral Resource and Mineral Reserve estimates and compliance with relevant reporting rules and codes. In line with Gold Fields policy, every material property is reviewed by an independent third-party on average no less than once every three years, or when triggered by a material year-on-year change. Certificates of compliance are received from the companies that conduct the external audits which are also configured to drive continuous improvement in the estimation process.
- Importantly, Gold Fields endorses a well embedded risk and control matrix (RACM) configured to provide an annual assessment of the effectiveness of the issuers' internal controls concerning the life of mine planning process and Mineral Resource and Reserve estimation and reporting.
- The internal controls include coverage of the following (inter alia):
    - Reasonableness of parameters and assumptions used in the Mineral Resource and Reserve estimation process
    - Reasonableness of the interpretations applied to the geological model and estimation techniques
    - Integrity in the mine design and scheduling, including reasonableness of the mine planning assumptions, modifying factors, cut-off grades, mining and processing methods and supporting key technical inputs such as year-on-year reconciliation, geotechnical, mining equipment, infrastructure, water, energy and economic analysis
    - Provision of the necessary skills, experience and expertise at the mine sites and the Regions to undertake and complete the work with the required level of technical ability and competency, including professional registration as a Qualified Person
    - Alignment with the CIM guidance and instruction for the reporting of Mineral Resources and Reserves
    - Review of the disclosure of the issuers' Mineral Resources and Reserves process.
- Because of its inherent limitations, internal controls may not prevent or detect all errors or misstatements. Also, projections of any valuation of effectiveness to future periods are subject to risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with policies and procedures may deteriorate

RCubed® is a proprietary cloud-based reporting system adopted by Gold Fields in 2021 to enhance the level governance and data security concerning Mineral Resource and Reserve reporting across all company properties. It ensures transparency and auditability for all data verification checks, information stage gating, the approvals process and confirmation of Qualified Person credentials. The RCubed® reporting system is being incorporated into the risk and control matrix RACM matrix to support the December 2021 Mineral Resource and Reserve reporting.

25 Interpretation and conclusions

25.1 Conclusions

The views expressed in this Technical Report are based on the fundamental assumption that the required management resources and management skills are in place to achieve the Mineral Reserve LoM plan projections for St Ives. The St Ives Mineral Reserves currently support a 9 year LoM plan that values the operation at $206.9 million at the reserve gold price of $1,300/oz.

Climate change is an integral part of the Mineral Reserve generation process and incorporating relevant costs associated with climate change, primarily decarbonisation, mitigation and adaptation to the changing climate, is a key theme for the Company. Integration of these key elements into the Mineral Reserve process is being carried out progressively and simultaneously across all of Gold Fields' sites.

SIGMC continues to discover and replace Mineral Reserves that contribute to sustained growth and extending the LoM profile. Ongoing investment in exploration and infrastructure is justified by the positive economic analysis.

The Mineral Reserve estimates contained in this report should not be interpreted as assurances of the economic life or the future profitability of St Ives. Mineral Reserves are only estimates based on the factors and assumptions described herein, thus future Mineral Reserve estimates may need to be revised. For example, if production costs increase or product prices decrease, a portion of the current Mineral Resources, from which the Mineral Reserves are derived, may become uneconomic and would therefore result in a lower estimate of Mineral Reserves. The LoM plan includes forward-looking technical and economic parameters and involve a number of risks and uncertainties that could cause actual results to differ materially.

The LoM plan for St Ives has been reviewed in detail by the Qualified Person for appropriateness, reasonableness and viability, including the existence of and justification for departure from historical performance. The Qualified Person considers that the Technical Economic Parameters and Financial Models are based on sound reasoning, engineering judgement and technically achievable mine plan, within the context of the risk associated with the gold mining industry.

The business of gold mining by its nature involves significant risks and hazards, including environmental hazards and industrial accidents. In particular, hazards associated with Gold Fields' underground mining operations include:

- Rock bursts.
- Seismic events.
- Underground fires and explosions.
- Cave-ins or gravity falls of ground.
- Discharges of gases and toxic substances.
- Flooding.
- Accidents related to the presence of mobile machinery.
- Ground and surface water pollution.
- Ground subsidence.
- Other accidents and conditions resulting from drilling, blasting and removing and processing material from an underground mine.
- Hazards associated with Gold Fields' surface operations may include:
- Accidents associated with operating a rock dump and production stockpile, and rock transportation equipment.
- Production disruptions due to weather.

- Tailings facility collapses.
- Ground and surface water pollution.

Gold Fields may also be subject to actions by labour groups or other interested parties who object to perceived conditions at the mines or to the perceived environmental impact of the mines. These actions may delay or halt production or may create negative publicity related to Gold Fields. If Gold Fields experiences losses of senior management or is unable to hire and retain sufficient technically skilled employees, its business may be materially and adversely affected. Gold Fields may also suffer adverse consequences from:

- The reliance on outside contractors.
- Changes in environmental and health and safety laws and regulations.
- Native Title claims and Aboriginal heritage sites.

Gold Fields is at risk of experiencing any of these hazards. The occurrence of any of these hazards could delay or halt production, increase production costs and result in a liability for Gold Fields.

25.2 Risks

The major risks and mitigation actions at St Ives are based on a formal risk review and assessment using risk ranking software are summarised in Table 25-1. Senior management review and update the risk register on a routine basis and is reported on a quarterly basis.

Table 25-1: Risks and mitigating actions

Risk description		Risk mitigating action
Revenue	Gold Fields' revenues are primarily derived from the sale of gold that it produces. To the extent that Gold Fields does not enter into forward sales, derivatives or other hedging arrangements in order to establish a price in advance of the sale of its gold production, it is exposed to changes in the gold price, which could lead to variation in LoM cashflow, Mineral Reserves and mine life.	Business restructuring and modernisation initiatives to improve safety, increase efficiency and reduce costs. Business planning process with execution monitored through regular cost, capital and production reviews. Ongoing portfolio optimisation for cash generation. Gold and copper production hedging in selected areas.
Exploration	Exploration activities are focused on replacing production depletion and on growth in Mineral Reserves to maintain operational flexibility and sustainability. Exploration for gold and other metals associated with gold are speculative in nature involves many risks and is frequently unsuccessful.	The Company focuses on the extension of existing orebodies and the discovery and delineation of new orebodies both at existing sites and at undeveloped sites. Best practices exploration techniques, technical peer reviews and technical specialists are employed to assist in conceptual targeting, execution and interpretation of the exploration programs. Geological, geochemical, geophysical, geostatistical and geo-metallurgical techniques are constantly refined to improve effectiveness and the economic viability of prospecting and mining activities. Once a potential orebody has been discovered, exploration is extended and intensified in conjunction with comprehensive infill drilling to enable clearer definition of the orebody and its technical and economic probability. Reserves published do not require any additional discovery.
Geology & estimation	The primary assumptions of continuity of the geologically homogenous zones are driven by the geological model, which is updated when new information arises. Any changes to the model are subject to peer and internal technical corporate review and external independent consultant review when deemed necessary.	At the Australian operations, the estimation of Mineral Reserves for both underground and open pit operations is based on exploration and sampling information gathered through appropriate techniques, primarily from DD, RC and AC drilling techniques. Gold Fields and the sites have well documented processes, procedures and systems to ensure appropriate drilling, logging, sampling interpretation, geology orebody and lithological modelling, and estimation are appropriately completed. Overall staff focus is on geology recruitment with required expertise and skills training coupled with field and peer reviews by both site and corporate staff are integrated into routine exploration and mining geology. Internal and external corporate audits, procedures and systems all enhance and support ongoing periodic review. All models are documented with peer reviews and model on model reconciliations to explore and understand the impacts of additional information, data and interpretation / methodology to support delivery of the most appropriate and best informed outcomes. Applications of alternative estimation methods to evaluate deposits are also routinely compiled to ensure the most relevant and appropriate estimation for mine planning is delivered. This may include considering OK, SK, and simulation. Conditional estimation techniques to validate and inform options and decisions are also considered.

Risk description		Risk mitigating action
		The locations of sample points are spaced close enough to deduce or confirm geological and grade continuity. Generally, drilling is undertaken on grids, which range between 10 m by 10 m up to 50 m by 50 m, although this may vary depending on the continuity of the orebody. Due to the variety and diversity of mineralisation at the Australian operations, sample spacing may also vary depending on each particular ore type.
Mine planning & scheduling	Changes in assumptions underlying Gold Fields' Mineral Reserve estimates risk.	Modifying factors used to calculate the cut-off grades include adjustments to mill delivered amounts due to dilution and ore loss incurred in the course of mining, expected return on investment, and sustaining capital. These may change but typically are reviewed and managed through detailed reconciliation processes to minimise variations and impacts. Modifying factors applied in estimating reserves are primarily based on historical empirical information, but commonly incorporate adjustments for planned operational improvements. Mineral Reserves also take into account operating cost levels as well as necessary capital and sustaining capital provisions required at each operation and are supported by LoM plans. Detail planning protocols and review processes by qualified and experienced technical staff both on-site and regional levels are held to ensure consistency and applicability of due process.
Mining execution	The ability to achieve anticipated efficiencies and production plans due to nature of risk and impacts associated with normal mining routine activities. These could include geotechnical, equipment and maintenance, explosives, staffing, power and water supply.	Benchmarking and technical reviews of all mine plans to validate and test assumptions are normal Mineral Resource & Reserve processes. Assumptions applied in estimating mine planning for Mineral Reserves are primarily based on historical empirical information, but commonly incorporate adjustments for planned operational performance. Equipment planned schedule and maintenance programs and condition monitoring processes are in place to ensure production capability.
Geotechnical		Geotechnical evaluation and monitoring, seismic systems and slope wall rock monitoring are all normal processes to mitigate risk. Underground geotechnical risk includes the impact of seismicity on operations, which may result in unplanned delays, closure, or falls of ground. Worse than predicted overbreak or poor mining recovery, due to geotechnical failures in stoping may also result in lower than predicted gold production. Ground control management plans are used to manage the geotechnical risk at St Ives.
Social licence to operate	Many mining companies face increasing pressure over their "social licence to operate" which can be understood as the acceptance of the activities of these companies by local stakeholders. While formal permission to operate is ultimately granted by host governments, many mining activities require social permission from host communities and influential stakeholders to carry out operations effectively and profitably. This aspect could impact future Mineral Reserves & Resources, mining activity and delivery.	To maintain its social licence to operate, Gold Fields may need to design or redesign parts of its mining operations to minimise their impact on such communities and the environment, either by changing mining plans to avoid such impact, by modifying operations, changing planned capital expenditures or by relocating the affected people to an agreed location. Responsive measures may require Gold Fields to take costly time-consuming remedial measures, including the full restoration of livelihoods of those impacted.
Staffing & technical capability	Gold Fields' ability to operate or expand effectively depends largely on the experience, skills and performance of its senior management team and technically skilled employees.	Gold Fields Australia operates in a good labour market and stable political jurisdiction which adapts recruitment, staff development / retention policies to meet labour and staffing demand to support and deliver on operations.
Environmental and industrial accidents	Gold mining by its nature involves significant risks and hazards, including environmental hazards and industrial and mining accidents. These may include, for example, seismic events, fires, cave-ins and blockages, flooding, discharges of gases and toxic substances, contamination of water, air or soil resources, radioactivity and other accidents or conditions resulting from mining activities including, among other things, blasting and the transport, storage and handling of hazardous materials.	Gold Fields has appropriate staffing structures and processes and programs which manage, monitor and report on key environmental, health and safety compliance. Gold Fields also subscribes to a number of international regulatory frameworks (e.g. ISO14001, ISO18001, ISO45001, Cyanide Code) which include process and external audits review and monitoring for compliance.

Note: c) The Qualified Person is of the opinion that the risks identified have reasonable risk mitigations and that action plans current and future will not materially affect the life of mine reserve estimation.

Source: St Ives CPR, 2021

26 Recommendations

Ongoing exploration and geological interpretation suggest that the St Ives property has the potential to extend and replace existing Mineral Resources and Reserves. It is recommended that further exploration is carried out at the following areas which have a good probability of extending mine life.

The Qualified Person is of the opinion that the reserve life of mine as a single phase and is costed accordingly.

27 References

The primary reference documents that have written consent to be used by the appointed Gold Fields Lead Qualified Persons for this Technical Report are:

Primary reference is the St Ives Competent Person Report 31 December 2021 for Mineral Resources and Mineral Reserves. This report has written consent from Mike Fitzgerald who is the Gold Fields appointed lead Qualified Person for St Ives Gold Mine. Mike has accepted responsibility for the Competent Person Report 31 December 2021 for Mineral Resources and Mineral Reserves as a whole.

The St Ives Competent Person Report 31 December 2021 for Mineral Resources and Mineral Reserves is referred to in this document as “St Ives CPR 2021”.

28 Glossary of technical terms and abbreviations

$	United States dollars unless otherwise stated
°C	Degrees Celsius
µm	micron or micrometre
2D, 3D	two-dimensional, three-dimensional
%	percent
AAS	Atomic absorption spectroscopy analytical technique
AC	Air core drilling technique
Ag	Silver
Ai	Abrasion index laboratory test
All-in costs or **AIC**	A non-IFRS measure which means all-in sustaining costs plus additional costs relating to growth, including non-sustaining capital expenditure and exploration, evaluation and feasibility costs not associated with current operations.
All-in sustaining costs or **AISC**	A non-IFRS measure which means operating costs excluding amortisation and depreciation, plus all costs not included therein relating to sustaining current production including sustaining capital expenditure.
ANCOLD	Australian National Committee on Large Dams
As	Arsenic
ASL	Above sea level
Au	Gold
bcm	bank cubic metres
Brownfield	Exploration conducted in areas where mineral deposits have already previously been discovered and is also termed near mine or extensional exploration.
BWi	Bond ball mill work index laboratory test
Capex	Capital expenditure
CCD	Counter-current decantation
Cu	Copper
Cut-off grade	The lowest grade of mineralised rock which determines whether it is economic to recover its precious or base metal content by further concentration.
CIL, CIP	Carbon-in-leach, carbon-in-pulp
CIM	The Canadian Institute of Mining, Metallurgy and Petroleum
CN	Cyanide
CPR	Competent Person's Report
CRM	Certified reference material
CTS	Gold Fields Corporate Technical Services team
CO, CO_2	Carbon monoxide, carbon dioxide
dB	Decibel(s)
DCF	Discounted cash flow
De-stress	By mining a two-metre slice through the orebody package an optimal position is achieved to ensure a destressed window of 50 to 60 m above or below the associates stope to provide the necessary safe geotechnical stress conditions for extraction.
DD	Diamond core drilling technique
Dilution	Low or zero grade (waste) material that is mined during the course of mining operations and forms part of the reserve.

Dissolution	The process whereby a metal is dissolved and becomes amenable to separation from the gangue material.
dmt	Dry metric tonne(s)
doré	Unrefined gold and silver bullion bars which will be further refined to almost pure metal.
DTM	Digital terrain model
EIA	Environmental impact assessment
Electrowinning	The process of removing mineral from solution by the action of electric currents, known as electrolysis.
EM	Electromagnetic geophysical technique
EMP	Environmental Management Plan
EMS	Environmental Management System
EoR	Engineer of Record
EPA	Environmental Protection Agency
ESG	Environmental, social and governance
ESIA	Environmental and social impact assessment
FA	Fire assay analytical technique
FCF	Free cash flow
Fe	Iron
Feasibility Study or **FS**	A Feasibility Study is a comprehensive technical and economic study of the selected development option for a mineral project that includes appropriately detailed assessments of applicable modifying factors together with any other relevant operational factors and detailed financial analysis that are necessary to demonstrate, at the time of reporting, that extraction is reasonably justified (economically mineable). The results of the study may reasonably serve as the basis for a final decision by a proponent or financial institution to proceed with, or finance, the development of the project. The confidence level of the study will be higher than that of a Pre-feasibility Study.
FIFO	Fly-in/fly-out
Footwall	The bottom side of a geological structure or mineral deposit
FOS	Factor of safety
Fx	Foreign exchange rate
g, µg, mg, kg, g/t	Gram(s), microgram(s), milligram(s), kilogram(s), grams per tonne
Ga	Giga annum or billion years
G&A	General and administration
Gangue	Commercially valueless or waste material remaining after ore extraction from rock.
GC	Grade control
GPS, DGPS	Global positioning system, Differential global positioning system
Grinding	Reducing rock to the consistency of fine sand by crushing and abrading in a rotating steel grinding mill.
ha	Hectare(s)
Hangingwall	The top side of a geological structure or mineral deposit
HME	Heavy mining equipment
HSE, HSEC	Health, safety and environment, Health, safety, environment and community
Hypogene	Ore or mineral deposits formed by ascending fluids occurring deep below the earth's surface, which tend to form deposits of primary minerals, as opposed to supergene processes that occur at or near the surface and tend to form secondary minerals.
ICMC	International Cyanide Management Code
ICP	Inductively coupled plasma analytical technique
ILR	InLine Leach Reactor

Indicated Mineral Resource	An Indicated Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of modifying factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit. Geological evidence is derived from adequately detailed and reliable exploration, sampling and testing and is sufficient to assume geological and grade or quality continuity between points of observation. An Indicated Mineral Resource has a lower level of confidence than that applying to a Measured Mineral Resource and may only be converted to a Probable Mineral Reserve.
Inferred Mineral Resource	An 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. Geological evidence is sufficient to imply but not verify geological and grade or quality continuity. An Inferred Mineral Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.
Initial assessment	A preliminary technical and economic study of the economic potential of all or parts of mineralisation to support the disclosure of Mineral Resources. The initial assessment must be prepared by a Qualified Person and must include appropriate assessments of reasonably assumed technical and economic factors, together with any other relevant operational factors, that are necessary to demonstrate at the time of reporting that there are reasonable prospects for economic extraction. An initial assessment is required for disclosure of Mineral Resources but cannot be used as the basis for disclosure of Mineral Reserves.
In situ	Within unbroken rock or still in the ground.
IP	Induced polarisation geophysical technique
ISO	International Organization for Standardization.
km, km^2	kilometres, square kilometres
Kriging	A geostatistical estimation technique used in the evaluation of Mineral Reserves.
L, kL, L/s	litre(s), kilolitres, litres per second
lb	Pound(s)
Leaching	Dissolution of gold from the crushed and milled material, including reclaimed slime, for adsorption and concentration onto the activated carbon.
Level	The horizontal tunnels of an underground mine used to access the workings or orebody.
Life of mine or **LoM**	The expected remaining years of production, based on production schedules and Proven and Probable Mineral Reserves.
Life of mine plan or **LoM plan**	A design and financial/economic study of an existing operation in which appropriate assessments have been made of existing geological, mining, metallurgical, economic, marketing, legal, environmental, social, governmental, engineering, operational and all other modifying factors, which are considered in sufficient detail to demonstrate that continued extraction is reasonably justified. This is completed to a minimum pre-feasibility level of study.
LHD	Load haul dump
LHOS	Long-hole open stoping
LIMS	Laboratory information management system
London afternoon fixing price	The afternoon fixing by the new electronic London Bullion Market Association, or LBMA price-discovery process. The price continues to be set twice daily, at 10:30 and 15:00 London time.
m, mm, cm, m^2, m^3	metre(s), millimetre(s), centimetre(s), square metre(s), cubic metre(s)
M	Million(s)
Ma	Mega annum or million years
MCP	Mine Closure Plan
Measured Mineral Resource	A Measured Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of modifying factors to support detailed mine planning and final evaluation of the economic viability of the deposit. Geological evidence is derived from detailed and reliable exploration, sampling and testing and is sufficient to confirm geological and grade or quality continuity between points of observation. A Measured Mineral Resource has a higher level of confidence than that applying to either an Indicated Mineral Resource or an Inferred Mineral Resource. It may be converted to a Proven Mineral Reserve or to a Probable Mineral Reserve.

Metallurgical recovery factor	The proportion of metal in the ore delivered to the mill that is recovered by the metallurgical process or processes.
Metallurgy	The science of extracting metals from ores and preparing them for sale.
Mill delivered tonnes	A quantity, expressed in tonnes, of ore delivered to the metallurgical plant.
Mine call factor or **MCF**	The ratio, expressed as a percentage, of the specific product accounted for at the mill (including residue), compared to the corresponding specific product 'called for' based on an operation's measuring and valuation methods.
Mineralisation	The presence of a target mineral in a mass of host rock. A concentration (or occurrence) of material of possible economic interest, in or on the earth's crust, for which quantity and quality cannot be estimated with sufficient confidence to be defined as a Mineral Resource. Mineralisation is not classified as a Mineral Resource or Mineral Reserve and can only be reported under exploration results. The data and information relating to it must be sufficient to allow a considered and balanced judgement of its significance and the process or processes by which a mineral or minerals are introduced into rock, resulting in a potentially valuable deposit. Mineralisation generally incorporates various terms, including fissure filling, impregnation and replacement, among others.
Mineral Reserve	The economically mineable part of a Measured and/or Indicated Mineral Resource converted into Proven and Probable Mineral Reserves. It includes diluting minerals and allowances for losses, which may occur when the material is mined or extracted and is defined by studies at Pre-feasibility or Feasibility level as appropriate that include application of modifying factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified. The reference point at which Mineral Reserves are defined, usually the point where the ore is delivered to the processing plant, must be stated. It is important that, in all situations where the reference point is different, such as for a saleable product, a clarifying statement is included to clarify what is being reported.
Mineral Resource	A concentration or occurrence of solid 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 eventual economic extraction. The location, quantity, grade, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling. Gold Fields reports **Inclusive Mineral Resource** (IMR) which is the entire Mineral Resource from which the Mineral Reserve has been generated and **Exclusive Mineral Resource** (EMR) which is the Mineral Resource remaining after the Mineral Reserve has been generated. It should not be expected that IMR-Mineral Reserve is numerically equal to EMR as Mineral Reserve has had modifying factors applier and Mineral Resources have not. While some of the EMR may be converted to Mineral Reserves through additional drilling or other means, there it should not be expected that all of the EMR can be converted to Mineral Reserves.
Modifying factors	Modifying factors are considerations used to convert Mineral Resources to Mineral Reserves. These include, but are not restricted to, mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social and governmental factors.
MSO	Mineable shape optimiser
NaCN	Sodium cyanide
Net smelter return or **NSR**	The volume of refined mineral sold during the relevant period multiplied by the average spot mineral price and the average exchange rate for the period, less refining, transport and insurance costs.
NI 43-101	National Instrument 43-101 Standards of Disclosure for Mineral Projects published by the Canadian Securities Administrators.
NO_2	Nitrogen dioxide
NPV	Net present value
NSR	Net smelter return
OHS	Occupational health and safety
Open pit or **OP**	Mining where the ore is extracted from a surface mining operation or "pit". The geometry of the pit may vary with the characteristics of the orebody.
Opex	Operating expenditure
Ore	A mixture of material containing minerals from which at least one of the minerals can be mined and processed profitably.
Orebody	A well-defined mass of material of sufficient mineral content to make extraction economically viable.
Ore grade	The average amount of mineral contained in a tonne of mineral-bearing ore expressed in grams per tonne (g/t), or percent (%) per tonne.

Ounce or **oz, koz, Moz, oz/a**	One troy ounce which equals 31.1035 grams, kilo-ounces (or thousand ounces), million ounces, ounces per annum.
Overburden	The soil and rock that must be removed in order to expose an ore body.
P_x	Percentage (x) of material passing a specified size.
Pa, kPa, MPa	pascal(s), kilopascals, megapascals. A unit measurement of stress or pressure within the earth's crust used to profile tectonic stress, which can impact ground stability and ground support requirements in underground mining.
Paste fill or **back fill**	A technique whereby cemented paste fill is placed in mined-out voids to improve and maintain ground stability, minimise waste dilution and maximise extraction of the ore.
pH	Scale used to specify the acidity or basicity of an aqueous solution.
ppb, ppm	Parts per billion, parts per million
Pre-feasibility Study or **PFS**	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 preferred mining method, in the case of underground mining, or the pit configuration, in the case of an open pit, is established and an effective method of mineral processing is determined. It includes a financial analysis based on reasonable assumptions on the modifying factors and the evaluation of any other relevant factors which are sufficient for a Qualified Person, acting reasonably, to determine if all or part of the Mineral Resource may be converted to a Mineral Reserve at the time of reporting. A Pre-feasibility Study is at a lower confidence level than a Feasibility Study.
Probable Mineral Reserve	The economically mineable part of an Indicated, and in some circumstances, a Measured Mineral Resource. The confidence in the modifying factors applying to a Probable Mineral Reserve is lower than that applying to a Proven Mineral Reserve.
Prospecting or exploration right	Permission to explore an area for minerals.
Proven Mineral Reserve	The economically mineable part of a Measured Mineral Resource. A Proven Mineral Resource implies a high degree of confidence in the modifying factors.
PV	Photovoltaic
QAQC	Quality assurance quality control
RC	Reverse circulation drilling technique
Refining	The final stage of metal production in which final impurities are removed from the molten metal by introducing air and fluxes. The impurities are removed as gases or slag.
Rehabilitation	The process of restoring mined land to a condition approximating its original state.
RF	Revenue factor(s)
RL	Reduced level
RO	Reverse osmosis
RQD	Rock quality designation
Run of mine or **RoM**	When used with regard to grade, is a term to describe the average grade of the ore mined.
SAMREC Code 2016	The South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves, 2016 Edition
Seismicity	A sudden movement within a given volume of rock that radiates detectable seismic waves. The amplitude and frequency of seismic waves radiated from such a source depend, in general, on the strength and state of stress of the rock, the size of the source of seismic radiation, and the magnitude and the rate at which the rock moves during the fracturing process.
Semi-autogenous grinding or **SAG mill**	A piece of machinery used to crush and grind ore which uses a mixture of steel balls and the ore itself to achieve comminution. The mill is shaped like a cylinder causing the grinding media and the ore itself to impact upon the ore.
Shotcrete	A sprayed concrete or specialist cement type product applied through a hose or similar device and pneumatically projected at high velocity on the surface of excavations, as a geotechnical ground support technique to reinforce the stability of underground faces.
Slimes	The finer fraction or tailings discharged from a processing plant after the valuable minerals have been recovered. Also see 'Tailings'
Slurry	A fluid comprising fine solids suspended in a solution (generally water containing additives).

Smelting	Thermal processing whereby a mineral is liberated from molten beneficiated ore or concentrate, with impurities separating as lighter slag.
SMU	Selective mining unit
SO_2	Sulfur dioxide
SOX	Sarbanes-Oxley Act of 2002
Spot price	The current price of a metal for immediate delivery.
Stockpile or **SP**	A store of unprocessed ore, which is material resulting from mining or processing operations.
Stope	The underground excavation within the orebody where the main mineral production takes place.
Stratigraphic	The study of rock layers (strata) and layering (stratification) and is primarily used in the study of sedimentary and layered volcanic rocks. Stratigraphic modelling is often important in profiling the regional and local geology that has played a controlling role in mineralisation and orebody generation.
Stripping	The process of removing overburden (waste material) to expose the ore for mining.
Sulphide	A mineral characterised by the linkages of sulphur with a metal or semi-metal, such as pyrite (iron sulphide). Also a zone in which sulphide minerals occur.
Supergene	Ores or ore minerals formed where descending surface water oxidises the primary (hypogene) mineralised rock and redistributes the ore minerals, often concentrating them in zones. Supergene enrichment occurs at the base of the oxidised portion of the ore deposit.
Tailings	Finely ground rock from which the bulk of valuable minerals have been extracted by metallurgical processes. Also see 'Slimes'.
Tailings storage facility or **TSF**	A dam used to store by-products or tailing from mining operations after separating the ore from the gangue.
TCRC	Treatment charges and refining charges
TDS	Total dissolved solids
Tonne or **t, kt, Mt, t/a, Mt/a**	One tonne is equal to 1,000 kilograms (also known as a "metric" tonne), kilo-tonnes (or thousand tonnes), million tonnes, tonnes per annum, million tonnes per annum.
Tonnage	The quantity of material where the tonne is an appropriate unit of measure. Typically used to measure reserves of mineral-bearing material, or quantities of ore and waste material mined, transported or milled.
Underground or **UG**	Mining where the ore is extracted from an underground mining operation.
V, kV, kVA	Volt(s), kilovolt, kilovolt-ampere
W, kW, kWh, MW	Watt, kilowatt, kilowatt-hour, megawatt
WAD CN	Weak acid dissociable cyanide
Waste	Rock mined with an insufficient mineral content to justify processing.
Waste storage facility or WSF	A rock dump used to store accumulations of waste or low-grade material derived in the course of mining.
wmt	Wet metric tonne(s)
wt%	weight percent
XRD	X-ray diffraction analytical technique
XRF	X-ray fluorescence analytical technique
Yield	The actual grade of ore realised after the mining and metallurgical treatment process.