Independent Technical Report on the Yixiang Graphite Project

China Graphite Group Limited

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EXECUTIVE SUMMARY

SRK Consulting (Hong Kong) Limited (SRK) has been commissioned by China Graphite Group Limited (China Graphite or the Company) to prepare an Independent Technical Report (ITR or Report) on the Yixiang Graphite Project (the Project). The Project comprises the Beishan graphite mine (the Mine), a beneficiation plant and a spherical graphite processing plant, located in Yanjun Farm, Luobei County, Heilongjiang Province of the People's Republic of China (PRC). The Mine and the spherical graphite processing plant are held by Yixiang New Energy Materials Co., Ltd., while the beneficiation plant is held by Yixiang Graphite Co., Ltd. Both companies are wholly owned subsidiaries of China Graphite.

SRK understands that this Report will be included in a document relating to an [REDACTED] of [REDACTED] in the Company and associated capital raising on The Stock Exchange of Hong Kong Limited (Stock Exchange). This Report has been prepared in accordance with the Listing Rules of the Stock Exchange, which permit reporting in accordance with the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the JORC Code). In addition, the Report has been prepared to the standard of, and is considered by SRK to be, a Technical Assessment under the guidelines of the 2015 edition of the Australasian Code for the Public Reporting of Technical Assessments and Valuations of Mineral Assets (the VALMIN Code).

The scope of work for this Report includes a review of the following technical aspects relating to the Project:

- Geology and Mineral Resource
- Mining and Ore Reserve
- Beneficiation and spherical graphite processing
- Environmental and social aspects
- Market study
- Capital and operating costs.

A risk assessment has also been included.

Work program

SRK has reviewed information supplied by China Graphite, including production records, sales contracts, technical studies, a market study, drilling information, test reports and various other documents. SRK's consultants visited the Project site in July and August 2020 and January 2022. This Report documents the results of SRK's review of the Project.

Yixiang Graphite Project

Commercial operations commenced at the Yixiang Graphite Project in 2006, with the beneficiation plant, located at the Luobei Graphite Industrial Park, processing graphite ores from third parties and producing flake graphite concentrates. The throughput capacity in 2006 was 0.1 Mtpa (million tonnes per annum). In 2011, the spherical graphite processing plant was constructed, and production commenced. Spherical graphite was manufactured from flake graphite concentrates produced from the beneficiation plant. In 2013, debottlenecking and upgrades at the beneficiation plant led to the throughput capacity being raised to 0.4 Mtpa. In 2019, a mining license was granted, with an approved annual graphite mining capacity of 0.5 Mtpa (the Mine). The Mine is located at Beishan 10 km to the northwest of the beneficiation plant and the spherical graphite processing plant complex. The mining license covers an area of 0.2615 km^2, with approved elevations of between 274 and 150 m above sea level (masl). In 2019, first ore was mined from the Mine and the beneficiation operation began to process graphite ore from China Graphite's own mine in addition to ores from third parties. By the third quarter of 2021, further expansion of the beneficiation plant was completed. The upgraded plant has a throughput capacity of 0.5 Mtpa. The spherical graphite processing graphite is currently being upgraded. The upgrade is expected to be completed by 2022 and the spherical graphite production capacity will be raised to 6,500tpa.

The major products from the Project include flake graphite concentrate and spherical graphite. As by-products of the spherical graphite processing, micro graphite powder and high-purity graphite powder are also produced. At the Mine, marble rock is also extracted as a by-product of graphite ore mining.

Since its inception in 2006, China Graphite has grown from being able to produce a graphite concentrate only to a company with capacity to produce a wide range of products (graphite concentrate, spherical graphite, micro graphite powder, high-purity graphite powder and marble).

SRK considers the Project to be a successful vertically integrated operation, spanning mining and beneficiation to spherical graphite processing. China Graphite is proposing to grow its operations.

Key initiatives include:

Exploration: The current mining license restricts graphite ore mining capacity to 0.5 Mtpa (maximum) and to a maximum mining depth of 150 masl. The Company plans to conduct additional technical studies and prepare relevant documents to support an application to increase the graphite ore mining capacity to 1.0 Mtpa and lower the minimum mining depth to 60 masl when the market conditions are favorable.

Mining: The Company will ramp up the graphite ore mining capacity to 0.5 Mtpa by 2023.

Beneficiation: The Company will construct a new beneficiation plant with a throughput capacity of 0.5 Mtpa in proximity to the Mine to increase total beneficiation capacity to 1.0 Mtpa.

Spherical graphite processing: The Company will upgrade the existing spherical graphite plant by installing new equipment and build a spherical graphite processing plant at Beishan with a target flake graphite processing capacity of 17,000 t to produce 6,000 t spherical graphite and 10,000 t micro graphite powder.

New products: The Company will strengthen its research and development efforts in order to launch new products such as coated spherical graphite and graphitized spherical graphite for the anode material market.

China Graphite has developed a financial model based on these key initiatives and is seeking to [REDACTED] and [REDACTED] to [REDACTED] the Company's development plan and initiatives.

Geology and exploration

The Mine area is underlain by rocks of the Proterozoic Dapandao Group that consists of quartzo-feldspathic schist, graphitic schist, feldspathic schist, impure crystalized marble and a subordinate amount of quartzite and migmatite. The metamorphic rocks trend north-northeast and dip gently to moderately to the west-northwest. The graphitic schists are micaceous, fine grained, silvery gray with a schistose texture, and boudinage features. Graphitic schist and marble are the target economic units. Flake graphite is hosted by micaceous graphitic schist, with at least ten graphitic schist bands identified. These bands trend northwest to north-northeast and extend 50–380 m along strike and 80–300 m down dip. Most of the graphite flake size is classified as fine to very fine (<147 μm).

Exploration carried out in 2015 included geological mapping and a very low frequency electromagnetic geophysical survey. The identified targets were tested by trenching and diamond drilling at a nominal 100 m by 50 m spacing. The 2-year exploration program totalled approximately 6,000 m (36 holes) of diamond drilling and 10,000 m^3 of trench excavation.

In 2020, SRK conducted a review of the previous exploration work and recommended a verification program. The work program comprised a topographical survey, geological mapping, trenching and 1,647 m (11 holes) of diamond drilling.

Mineral Resource estimation

Based on the verified exploration results, SRK conducted geological modeling and performed Mineral Resource estimation. The graphite and marble Mineral Resource for the Yixiang Graphite Project within the elevation limits of the mining license as at 31 December 2021, being reported in accordance with the JORC Code (2012) are presented in Table ES-1 and Table ES-2, respectively.

Table ES-1: Graphite Mineral Resource Statement within the approved mining license elevation limits — Yixiang Graphite Project as at 31 December 2021

Mineral Resource Category	Tonnage *(kt)*	TGC *(%)*
Indicated	13,753	9.59
Inferred	997	11.24
Total	14,750	9.70

Notes:

- The Mineral Resources are reported on an in situ basis at a 3.5% total graphitic carbon (TGC) cut-off.
- Bulk density: weathered zone: 2.31 t/m^3; M1:2.70 t/m^3; M: 2.76 t/m^3; M3:2.69 t/m^3; M4:2.71 t/m^3; M5:2.70 t/m^3; M6:2.62 t/m^3; M7:2.59 t/m^3; M8:2.63 t/m^3.
- Tonnages are reported in metric units, and grades are reported in percentage TGC. Tonnages and grades are rounded appropriately. Rounding, as required by reporting guidelines, may result in apparent summation differences between tonnes, grade and contained mineral content. Where these differences occur, SRK does not consider them to be material.

Table ES-2: Marble Mineral Resource Statement within mining license elevation limits — Yixiang Graphite Project as at 31 December 2021

Mineral Resource Category	Tonnage *(kt)*
Indicated	1,541
Inferred	582
Total	2,072

Notes:

- Rounding, as required by reporting guidelines, may result in apparent summation differences between tonnes, grade and contained mineral content. Where these differences occur, SRK does not consider them to be material.

As advised by the Company's legal advisers, upon completion of the agreed transfer process regarding an increase in mining scope under current applicable PRC Laws, there is no material legal impediment for China Graphite to obtain the mining rights below the current approved mining limit. On this basis, SRK considers there is a reasonable prospect for eventual economic extraction of material below 150 masl. The graphite and marble Mineral Resource for the Yixiang Graphite Project below the mining license elevation limits as at 31 December 2021 are presented in Table ES-3 and Table ES-4, respectively.

Table ES-3: Graphite Mineral Resource Statement below the approved mining license elevation limits — Yixiang Graphite Project as at 31 December 2021

Mineral Resource Category	Tonnage *(kt)*	TGC *(%)*
Indicated	20,937	10.59
Inferred	8,393	11.16
Total	29,330	10.75

Notes:

- The Mineral Resources are reported on an in situ basis at a 3.5% TGC cut-off.
- Bulk density: weathered zone: 2.31 t/m^3; M1:2.70 t/m^3; M2: 2.76 t/m^3; M3:2.69 t/m^3; M4:2.71 t/m^3; M5:2.70 t/m^3; M6:2.62 t/m^3; M7:2.59 t/m^3; M8:2.63 t/m^3.
- Tonnages are reported in metric units, grades are reported in percentage TGC. Tonnages and grades are rounded appropriately. Rounding, as required by reporting guidelines, may result in apparent summation differences between tonnes, grade and contained mineral content. Where these differences occur, SRK does not consider them to be material.

Table ES-4: Marble Mineral Resource Statement below the approved mining license elevation limits — Yixiang Graphite Project as at 31 December 2021

Mineral Resource Category	Tonnage
	(kt)
Inferred	135

Notes:

- Rounding, as required by reporting guidelines, may result in apparent summation differences between tonnes, grade and contained mineral content. Where these differences occur, SRK does not consider them to be material.

Mining and Ore Reserve

The Mine commenced overburden stripping in 2019 and produced first ore in the same year. The Mine has adopted an open pit mining method, consisting of conventional drilling, blasting, loading and hauling, with a target annual graphite ore production rate of 0.5 Mtpa. In 2019, the total materials moved was 1.02 Mt, and reached 1.65 Mt and 1.55 Mt in 2020 and 2021 respectively. The production history over the past three years has provided China Graphite with a solid understanding of the likely operating conditions, mining equipment required and the operability of the pit, as well as the beneficiation plant's response to the mined ore.

SRK conducted an optimization using the Lerchs-Grossman 3D algorithm in Whittle software based on the previous technical studies, including a Chinese preliminary design, considered by SRK equivalent to a pre-feasibility study and current operational conditions as well as SRK's Mineral Resource estimate. Based on the results and detailed mine design, the production profile has been rescheduled. The life-of-mine (LoM) is 20 years. The average graphite grade is 10.15% TGC and the LoM stripping ratio is 1.15.

Applying the Modifying Factors, including an economic viability analysis, the graphite and marble Ore Reserve at the Yixiang Graphite Project as reported as at 31 December 2021 in accordance with the JORC Code (2012) is presented in Table ES-5 and Table ES-6, respectively, inclusive of Mineral Resources. The economically mineable parts of the Indicated Mineral Resources within the open pit design and the current mining license limits, allowing for ore loss and dilution, were classified as Probable Ore Reserves.

Table ES-5: Graphite Ore Reserve Statement within mining license elevation limits — Yixiang Graphite Project as at 31 December 2021

Type	Ore Reserve Category	Tonnage	TGC
		(kt)	*(%)*
Graphite	Probable	9,549	10.15

Table ES-6: Marble Ore Reserve Statement within the mining license elevation limits — Yixiang Graphite Project as at 31 December 2021

Type	Ore Reserve Category	Tonnage
		(kt)
Marble	Probable	1,152

Metallurgy and mineral processing

The Project includes a beneficiation plant and a spherical graphite processing plant, located in the Luobei Industrial Park, 10 km to the west of the Mine. The beneficiation plant uses a conventional flowsheet that includes crushing, grinding and a single-stage rougher, single-stage scavenger, 10-stage regrinding on primary (rougher) concentrate followed by 11-stage cleaning and collective middlings recycling. The graphite concentrate undergoes 2-stage 'filtering and drying' to dewater the product. This product is then packaged and stored as flake graphite concentrate. The average graphite concentrate grades range between 94% and 95% TGC and the graphite recovery is above 90%. Approximately 75% of the flake graphite concentrate produced is sold to customers directly and the remaining 25% is used as feedstock for the spherical graphite processing plant.

The operation's history of steady plant capacity has allowed the annual throughput capacity to be increased from the initial 0.1 Mtpa to the current 0.4 Mtpa. The throughput capacity has been ramped up and reached 0.5 Mtpa by the third quarter of 2021. Prior to the Mine commencing production in 2019, the feed ore was fully sourced from third parties.

The spherical graphite processing plant commenced operation in 2013. It has four workshops. Facilities include a micronizing and rounding circuit, purification circuit, acid-and-alkali circuit, drying circuit, iron removal circuit, packaging plant and maintenance workshop. In 2019, an additional production line was installed. The current production capacity is 5,200 tpa of spherical graphite product and will be raised to 6,500 tpa when the upgrade is completed by 2022. The major product is spherical graphite (10 μm radius) and by-products are micro graphite powder and high-purity graphite powder.

New beneficiation plant development plan

China Graphite's overall strategy is to establish a vertically integrated production capacity at Beishan (from graphite ore mining to beneficiation and spherical graphite processing) and to maintain the beneficiation and spherical graphite processing operation at the current site. China Graphite plans to implement this strategy in phases. The first phase of the strategic development is to establish a 0.5 Mtpa beneficiation plant at Beishan to build up a combined beneficiation capacity of 1.0 Mtpa by 2025, with 0.5 Mtpa capacity at Beishan and 0.5 Mtpa at the current plant. Half of the feed ore will be sourced from the Mine and the remaining 50% will be from third parties.

Capital and operating costs

China Graphite has allocated RMB218.6 million in capital expenditure to be incurred in the next four years. An allowance of RMB0.8 million has been included for purchasing additional mining equipment for the development of the mining operation. The existing spherical graphite plant is currently being upgraded to an annual production capacity of 6,500 t spherical graphite. RMB3.1 million is to be incurred in 2022. The Project has a LoM of 20 years and as such the equipment at the beneficiation plant and spherical graphite processing plant will require ongoing replacement and refurbishment over that period. China Graphite has budgeted approximately RMB5-6 million per year as the sustaining capital for major plant and equipment replacement, as well as refurbishment.

China Graphite has prepared a capital cost estimate for the construction of the 0.5 Mtpa new beneficiation plant in the first phase of strategic development at Beishan. The cost estimate incorporates a land acquisition cost (RMB34.0 million) and a quotation from an EPCM company, indicating that the cost for the plant construction, equipment procurement and installation totals RMB72.0 million. Other costs include RMB2.0 million.

In the second phase of development at Beishan, China Graphite will construct a spherical graphite processing plant, with an annual flake graphite processing capacity of 17,000 t. The spherical graphite plant will produce 6,000 t of spherical graphite and 10,000 t of micro graphite powder annually. The cost estimate for constructing this plant is RMB93.2 million.

China Graphite has prepared an operating cost forecast over the LoM. In 2023, when all of the graphite ore is sourced from the Beishan Mine, the cash operating costs for mining cost (per tonne of graphite ore) are forecast at RMB/t 18.8, while the cash costs for flake graphite concentrate and spherical graphite are forecast at RMB/t 1,161 and RMB/t 10,212, respectively.

Environment, permits and social impacts

The status of the key operational licenses and permits for the Project is shown in Table ES-9.

Table ES-9: Status of key operational licenses and permits

Business License	Mining License	Safety Production Permit	Real Estate Certificate	Water Use Permit	Site Discharge Permit
Granted	Granted	Granted	Granted	Granted	Granted

Note: The water use permit as provided to SRK relates to surface water abstraction from the Yadan River and does not include groundwater at the plant or water abstraction from the tributary of the Yadan River.

In addition to the real estate certificates, SRK has sighted two approvals for use of forest land and two pre-approvals of land use for Project construction. The status of the environmental assessments and approvals for the Yixiang Graphite Project is shown in Table ES-10.

Table ES-10: Status of environmental assessments and approvals

Environmental Impact Assessment Report (EIA)	Approval for EIA	Environmental Final Checking and Acceptance Approval
Approved	Approved	Approved

Based on its review, SRK opines that the Environmental Impact Assessment (EIA) report for the Project has been compiled in accordance with the relevant Chinese laws and regulations.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

DISCLAIMER

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (Hong Kong) Limited (SRK) by China Graphite Group Limited (China Graphite). The opinions in this Report are provided in response to a specific request from China Graphite to do so. SRK has exercised all due care in reviewing the supplied information. While SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this Report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

GLOSSARY

Abbreviation	Meaning
°	Degrees
°C	degrees Celsius
AIG	Australian Institute of Geoscientists
ARD	acid rock drainage
asl	above sea level
AusIMM	Australasian Institute of Mining and Metallurgy
CaO	calcium oxide
cm	Centimeters
CRM	Certified Reference Material
EIA	Environmental Impact Assessment
EPCM	Engineering, Procurement and Construction Management
EPMP	Environmental Protection and Management Plan
ESHS	Environmental, Social, Health and Safety
EU	European Union
FCA	Environmental Final Check and Acceptance
Filtering and drying	filtering, dehydration and heat-drying are employed to dry the product. Dust and tiny particles are also removed during the heat-drying
IDW	inverse distance weighted
IFC	International Finance Corporation
[REDACTED]	[REDACTED]
ITR	Independent Technical Report
JORC Code	2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves

Abbreviation	Meaning
km	Kilometers
km^2	square kilometers
LoM	life-of-mine
m	Meters
m^2	square meters
m^3	cubic meters
mm	Millimeters
masl	meters above sea level
MPa	Megapascals
Mtpa	million tonnes per annum
OHS	Occupational Health and Safety
OK	Ordinary Kriging
PPE	personal protective equipment
PRC	People's Republic of China
QA/QC	Quality Assurance and Quality Control
RMB	Chinese Yuan Renminbi
RQD	Rock Quality Designation
Ruifa	Harbin Ruifa Mineral Exploration Co., Ltd.
Scavenging	Collection of minerals that are attached to the graphite and could not be further processed. Such minerals shall be pumped away to a previous stage for re-possessing.
SMU	selective mining unit
SRK	SRK Consulting (Hong Kong) Limited
Stock Exchange	The Stock Exchange of Hong Kong Limited
swath plot	A swath plot shows the average grade for the blocks in the swath, along with the average sample values in the swath. Swath plots are an common validation tool for providing comparisons between sample points and estimated values to identify any potential bias.
t	Tonnes

Abbreviation	Meaning
t/m^3	tonnes per cubic meter
TGC	total graphitic carbon
the SRK Group	SRK Global Limited
tpa	tonnes per annum
TSF	tailings storage facility
VLF-EM	very low-frequency electromagnetic
WRD	waste rock dump
WSCP	Water and Soil Conservation Plan

1 INTRODUCTION AND SCOPE OF REPORT

SRK Consulting (Hong Kong) Limited (SRK) is an associate company of the international group holding company, SRK Global Limited (the SRK Group). SRK has been commissioned by China Graphite Group Limited (China Graphite, hereafter also referred to as the Company) to prepare an Independent Technical Report (ITR or the Report) on the Yixiang Graphite Project (the Project).

The Project comprises the Beishan graphite mine (the Mine), a beneficiation plant and a spherical graphite processing plant, located in Yanjun Farm, Luobei County, Heilongjiang Province of the People's Republic of China (PRC). The Mine and the spherical graphite processing plant are held by Yixiang New Energy Materials Co., Ltd, while the beneficiation plant is held under Yixiang Graphite Co., Ltd. Both companies are wholly owned subsidiaries of China Graphite.

1.1 Reporting standard

SRK understands that this Report will be included in a document relating to [REDACTED] of [REDACTED] in the Company and associated capital raising on the Hong Kong Stock Exchange (Stock Exchange). This Report is to be prepared in accordance with the Listing Rules of the Stock Exchange, which permits reporting in accordance with the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the JORC Code).

In addition, the Report has been prepared to the standard of, and is considered by SRK to be, a Technical Assessment under the guidelines of the VALMIN Code (2015).

The authors of this Report are Members or Fellows of either the Australasian Institute of Mining and Metallurgy (AusIMM) and/or the Australian Institute of Geoscientists (AIG) and, as such, are bound by both the VALMIN Code and JORC Codes.

For the avoidance of doubt, this Report has been prepared according to:

- the 2015 edition of the Australasian Code for Public Reporting of Technical Assessments and Valuations of Mineral Assets (VALMIN Code)
- the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code).

All references to currency in this Report are expressed in terms of Chinese Yuan Renminbi (RMB). All years are calendar years (1 January to 31 December). The projection of all coordinates relies on the XIAN 80 44N datum.

1.2 Scope of work

The scope of work for this Report includes a review of the following technical aspects relating to the Project:

- Geology and Mineral Resource
- Mining and Ore Reserve
- Beneficiation and spherical graphite processing
- Environmental and social aspects
- Market study and contracts
- Capital and operating costs.

A risk assessment has also been included.

1.3 Project team

This Report has been prepared by a multidisciplinary team, comprising consultants and associates from various SRK offices. Their roles, responsibilities and involvement in the ITR are listed in Table 1–1. The lead office for this Report is SRK Consulting (Hong Kong) Limited.

Table 1–1: SRK team members and responsibility

Consultant/ Associate	Role	Office	Date of site visit
(Gavin) Heung Ngai Chan	Project management; geology and Mineral Resource estimation; economic viability review; Competent Person for Mineral Resources and assuming overall responsibility	SRK Hong Kong	4/1/2022
Jinhui Liu	Geology review and Mineral Resource estimation	SRK Hong Kong	15–19/7/2020, 26–27/08/2020
Falong Hu	Mining review and Ore Reserves estimation, Competent Person on Ore Reserve	SRK China	15–19/7/2020
Nan Xue	Environment, permitting and social impact review	SRK China	15–19/7/2020
Lanliang Niu	Beneficiation and spherical graphite processing review	SRK China	15–19/7/2020
Michael Cunningham	Peer review — Mineral Resource and Overall Report	Associate Principal Consultant	No site visit
Simon Walsh	Peer review — Metallurgy and mineral processing	Associate Principal Consultant	No site visit

Consultant/ Associate	Role	Office	Date of site visit
Alex Thin	Peer review — Mining	SRK Australasia	No site visit

Details of the consultants and associate involved in the preparation of this Report is provided below.

(Gavin) Heung Ngai Chan, General Manager (Hong Kong) and Principal Consultant (Geology), PhD, FAIG

Gavin has over 17 years of academic and commercial experience in geosciences and has worked on numerous deposit styles including precious metals, base metals, industrial minerals and dimension stones. Gavin has previously worked in China, Africa, Europe, Southeast Asia and Australia. His expertise lies in geological mapping, geological modelling, resource estimation, geological due diligence, valuation, fatal flaw and project analysis.

Jinhui Liu, Principal Consultant (Geology), PhD (Mining Engineering), MSc (Ore Geology), MAIG

Jinhui has over 17 years' experience in geological modelling, resource estimation and ore reserve estimations. He is experienced in the review of geology and resource projects in a variety of deposit styles. He has completed many due diligence projects in various countries and prepared public reports for the Hong Kong, Australia and Toronto Stock Exchanges.

Falong Hu, Senior Consultant (Mining), BEng, MAusIMM

Falong holds a Bachelor's degree in Mining Engineering from China Central South University. Before joining SRK he worked as an onsite and head office mining engineer at Sino Gold Mining Limited (which later merged with Eldorado Gold Corp.) and Silvercorp Metals Inc. He is familiar with underground mine production systems and has been involved in mine design, scheduling, and development; underground mining production; longhole blasting; rock mechanics; ventilation; backfill; and cost estimation. He is also proficient in digital modelling using Gemcom Surpac.

Lanliang Niu, Principal Consultant (Processing), BEng, MAusIMM

Lanliang has over 30 years' experience in processing testing and studies, production management and technical consultancy service. Lanliang has been involved in the new development and application of processing technologies, facilities, and reagents and has received two national awards for his achievements in this area. Since joining SRK, he has been involved in hundreds of independent technical review projects for fund raising and acquisition and has accumulated profound experience on technical review of mining project.

Nan Xue, Senior Consultant (Environmental) MSc, MAusIMM

Nan holds a Master's degree in environmental science from Nankai University in Tianjin, China. He has over 10 years' experience in environmental impact assessments (EIAs), environmental planning and environmental management. He has been involved in a number of large EIA projects and pollution source surveys for SINOPEC, as well as the environmental planning project funded by UNDP. He has particular expertise in construction project engineering analysis, pollution source calculations and impact predictions. Nan also has been involved in many due diligence projects.

Michael Cunningham, Associate Principal Consultant (Geology), BSc Hons (Geoscience), PhD (Geology), MAusIMM, MAIG, MGSA, FGSL, MMGEI

Michael (Mike) has over 15 years' experience as a geologist. His post-doctoral research involved evaluation and modelling of active oceanic slope processes and related hazards. Mike has worked in the Irish and British civil services. He has consulted on projects in Australia and overseas (Indonesia, Laos, Sri Lanka, Kyrgyzstan, Mongolia, Tanzania, Congo, Liberia and Malaysia), and on a variety of commodities including gold, iron, graphite, lead-zinc, antimony and coal. His expertise covers 3D modelling of vein, epithermal and banded iron formation (BIF) styles of mineralisation, drill targeting, modelling, Mineral Resource estimation, and modelling and evaluation of Exploration Targets. Mike has also been involved in preparation of Independent Geologists Reports (IGRs), due diligence and valuation studies, and is a well accomplished project manager.

Simon Walsh, Associate Principal Consultant (Metallurgy and Processing) BSc, MBA, MAusIMM

Simon has over 25 years in the metallurgy and processing industry. He has extensive design and operational expertise across a range of mineral processing and hydrometallurgical processes, including nickel, cobalt, alumina, copper, gold, zinc, lead and iron ore. His broad range of skills and experience includes management, supervisory and technical roles in plant operations, commissioning, troubleshooting, process simulation, acting as technical lead or project manager for studies from scoping level through to detailed design engineering, metallurgical testwork management and competent person reporting. Since 2007, Simon has worked in a consulting role providing metallurgical testwork, processing, infrastructure capital and operating cost support for independent technical reviews, due diligence assessments and other forms of competent person reporting. In this time, he has contributed to over 200 reviews of varying nature across a range of mineral commodities.

Alex Thin, Principal Consultant (Mining) BEng Hons (Mining), FAusIMM, FIMMM, FSAIMM

Alex is an experienced mining professional, with over 30 years' experience. His strategy and leadership experience spans feasibility studies, mineral asset audits and evaluations, independent technical reports and techno-economic studies. His industry experience spans operational (underground and open pit), technical, consulting and corporate within the metalliferous resources sector, covering precious metals, base metals and bulk commodities.

1.4 Effective Date and Publication Date

The Effective Date of this Report is 31 December 2021.

As informed by the Company, as at the Publication Date of this Report, there has been no material change to the status of the Project since the Effective Date. This includes no material change to the stated Mineral Resource and Ore Reserve estimates of the Project as outlined elsewhere in this Report.

1.5 Work program

SRK's work program completed under this commission included:

- Review of the supplied information
- Site visits by SRK consultants in July and August 2020 and January 2022
- Estimation of Mineral Resources and Ore Reserves
- Preparation of this Report.

1.6 Corporate capability

SRK is an independent, international group providing specialised consultancy services. Among SRK's clients are many of the world's mining companies, exploration companies, financial institutions, Engineering, Procurement and Construction Management (EPCM) and construction firms, and government bodies.

Formed in Johannesburg in 1974, the SRK Group now employs some 1,400 staff internationally in over 45 permanent offices in 20 countries on 6 continents. A broad range of internationally recognized associate consultants complements the core staff.

The SRK Group's independence is ensured by the fact that it is strictly a consultancy organization, with ownership by staff. SRK does not hold equity in any projects or companies. This permits SRK's consultants to provide clients with conflict-free and objective support on crucial issues.

1.7 Stock Exchange public reports

SRK has prepared many public reports for the Stock Exchange. Selected examples are listed in Table 1–2.

Table 1–2: Public reports prepared by SRK for disclosure on the Stock Exchange

Company	Year	Nature
Zijin Gold Mining	2004	Listing on Stock Exchange
Lingbao Gold	2005	Listing on Stock Exchange
China Coal Energy Company	2006	Listing on Stock Exchange
Sino Gold Mining Limited	2007	Dual Listing on Stock Exchange
Xinjiang Xinxin Mining Industry	2007	Listing on Stock Exchange
United Company RUSAL	2010	Listing on Stock Exchange
Citic Dameng Holdings	2011	Listing on Stock Exchange
China Hanking Holdings	2011	Listing on Stock Exchange
China Nonferrous Metal Mining	2012	Listing on Stock Exchange
Wise Goal Enterprises	2013	Very Substantial Acquisition
Future Bright Mining	2014	Listing on Stock Exchange
Agritrade Resources	2015	Very Substantial Acquisition
Feishang Non-metals	2015	Listing on Stock Exchange
China Unienergy	2016	Listing on Stock Exchange
China Mining Resources	2016	Major transaction
Pizu Group	2020	Major transaction

Source: SRK compilation

1.8 Statement of SRK independence

Neither SRK nor any of the project team members of this Report have any material present or contingent interest in the outcome of this Report, nor do they have any pecuniary or other interest that could be reasonably regarded as being capable of affecting their independence or that of SRK.

SRK has no prior association with China Graphite regarding the mineral assets that are the subject of this Report. SRK has no beneficial interest in the outcome of the technical assessment and valuation being capable of affecting its independence.

1.9 Legal matters

SRK has not been engaged to comment on any legal matters.

SRK notes that it is not qualified to make legal representations as to the ownership and legal standing of the tenements that are the subject of this Report. SRK has not attempted to confirm the legal status of the tenements with respect to joint venture agreements, local heritage or potential environmental or land access restrictions.

SRK has been provided with legal documentation obtained by China Graphite from Tian Yuan Law Firm. The document, 'PRC Legal Opinion', dated [●], comments on China Graphite's legal rights to the Project, which are the subject of this Report.

SRK's understanding of the current tenure situation is set out in Section 3.3 of this Report.

1.10 Warranties

China Graphite has represented in writing to SRK that full disclosure has been made of all material information and that, to the best of its knowledge and understanding, such information is complete, accurate and true.

1.11 Indemnities

China Graphite has provided SRK with an indemnity under which SRK is to be compensated for any liability and/or any additional work or expenditure resulting from any additional work required:

- which results from SRK's reliance on information provided by China Graphite or to China Graphite not providing material information; or
- which relates to any consequential extension workload through queries, questions or public hearings arising from this Report.

1.12 Reliance on other experts

SRK has not performed an independent verification of the mining license and land titles nor the legality of any underlying agreements that may exist concerning the permits, commercial agreements with third parties or sales contracts and instead has relied on information as provided to SRK by China Graphite's independent legal advisers.

1.13 Source of information

This Report is based on information made available to SRK by China Graphite, and on information collected during the site visits.

1.14 Consents

SRK consents to this Report being included, in full, in the document, in connection with the [REDACTED], in the form and context in which the technical assessment is provided, and not for any other purpose. SRK provides this consent on the basis that the technical assessment expressed in the Summary and in the individual sections of this Report is considered with, and not independently of, the information set out in the complete report.

1.14.1 Practitioner consent

The competent person who has overall responsibility for this Report and Mineral Resources is Dr. (Gavin) Heung Ngai Chan. He is a Fellow of the Australasian Institute of Geoscientist ("AIG"), and a full-time employee of SRK Consulting (Hong Kong) Limited. Dr. Chan has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a competent person as defined in the 2012 edition of the JORC Code. (Gavin) Heung Ngai Chan consents to the inclusion in the Report of the Mineral Resources in the form and context which it appears.

The information in this Report that relates to Ore Reserves is based on information compiled by Falong Hu, who is a Member of The Australasian Institute of Mining and Metallurgy (AusIMM). He is a full-time employee of SRK Consulting (China) Limited and has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a competent person as defined in the 2012 Edition of the JORC Code. Falong Hu consents to the inclusion in the Report of the Mineral Resources in the form and context which it appears.

1.14.2 Stock Exchange requirements

(Gavin) Heung Ngai Chan meets the requirements of competent person, as set out in Chapter 18 of the Stock Exchange Listing rules. Dr. Chan is a Fellow of good standing of AIG; has more than five years' experience relevant to the style of mineralisation and type of deposit under consideration; is independent of the issuer applying all the tests in section 18.21 and 18.22 of the Listing Rules; does not have any economic or beneficial interest (present or contingent) in any of the reported assets; has not received a fee dependent on the findings of this ITR; is not officer, employee of a proposed officer for the issuer or any group, holding or associated company of the issuer; and takes overall responsibility for the ITR.

1.15 Limitations

SRK, after due enquiry and subject to the limitations of this Report hereunder, confirms the following:

- The input, handling, computation, and output of the geological data and Mineral Resource and Ore Reserve information has been conducted professionally and accurately and to the high standards commonly expected within the geoscience profession.

- In conducting this assessment, SRK has assessed and addressed all activities and technical matters that might reasonably be considered to be relevant and material to such an assessment conducted to internationally accepted standards. Based on observations, interviews with appropriate staff and a review of available documentation, SRK is, after reasonable enquiry, satisfied that there are no outstanding relevant material issues other than those indicated in this Report. However, it is impossible to dismiss absolutely the possibility that parts of the site or adjacent properties may give rise to additional issues.

- The conclusions presented in this Report are professional opinions based solely on SRK's interpretations of the documentation received, interviews and conversations with personnel knowledgeable about the site, and other available information, as referenced in this Report. These conclusions are intended exclusively for the purposes stated herein.

For these reasons, prospective readers should make their own assumptions and assessments of the subject matter of this Report. Opinions presented in this Report apply to the site's conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions cannot necessarily apply to conditions and features that may arise after the effective date of this Report, about which SRK had no prior knowledge, nor had the opportunity to evaluate. Certain amounts and percentage figures included in this Report have been subject to rounding adjustments. As a result, any discrepancies in any table or chart between the total shown and the sum of the amounts listed are due to rounding. Where information is presented in thousands or millions of units, amounts may have been rounded up or down.

1.16 Consulting fees

SRK's fee for completing this Report is based on a fixed price contract. The fee payable to SRK for this engagement is estimated at approximately HK$[REDACTED]. The payment of that professional fee is not contingent on the outcome of this Report.

2 GRAPHITE

Graphite has been declared a strategic mineral by China, the United States of America (USA) and the European Union (EU), due to its potential applications within these jurisdictions, its unique physical and chemical properties and its growing importance in high technology applications and green energy initiatives. The strategic mineral status of graphite also acknowledges the dominance of China.

2.1 Graphite characteristics

Graphite is a natural form of carbon (chemical formula, C) and is characterized by its hexagonal crystalline structure. The two main forms of graphite are natural and synthetic.

Graphite's key physical and chemical characteristics include:

- high melting temperature
- stability and strength at high temperatures
- high thermal and electrical conductivity
- chemical inertness
- high resistance to thermal shock
- high conductivity in the solid form and low conductivity in porous foam, cloth and tape forms
- low coefficient of thermal expansion
- good electrical conductivity — it is the only non-metal that is a good conductor of electricity
- high radiation emissivity
- flame retardance
- high compressive strength
- stiffness of the solid form, and flexibility of filament, cloth or tape forms
- high resistance to erosion
- good machinability
- low friction, self-lubrication
- high resistance to chemical attack and corrosion.

Natural and synthetic graphite is processed at temperatures of up to 2,500°C to produce high-purity graphite with up to 99.9% total graphitic carbon (TGC). This permits the introduction of selected promoter elements, such as boron and silicon, into the graphite structure, which enhances its consistency, lubricant properties and conductivity. While crystalline graphite is preferred for making crucibles, amorphous graphite is used in foundry facings, steelmaking and refractories.

Natural graphite also has a low coefficient of friction rendering it suitable for coatings, pencils, powder metallurgy, refractories, lubricants and batteries. Low-quality graphite can also be used in advanced technology applications that were once the domain of synthetic material.

Natural graphite offers significant cost advantages over synthetic graphite but has limited recycling capacity, as it tends to be gradually consumed during use in applications, such as refractories or brake linings. However, recycling applications include renewal of used electrodes or use as a substitute for amorphous graphite. Hence, the use of recycled graphite refractories in such products as brake linings and thermal insulation is growing but, due to the abundance of natural graphite in the world markets, there is currently no great incentive for, or value in, recycling graphite on a mass scale.

Substitution of graphite by other minerals is currently low as no other mineral is so versatile while possessing such unique and important physical and chemical properties.

2.2 Flake graphite

For natural graphite, there are three main forms of commercial significance (Harben & Kužvart, 1996):

1. Flake (or crystalline/disseminated flake)

2. Crystalline vein (or lump)

3. Amorphous (microcrystalline).

For the purposes of this Report, SRK has only provided details relating to flake graphite, as this is the only form of graphite occurring at the Project.

The formation of graphite flake occurs from an amorphous precursor in rocks at or beyond amphibolite grade metamorphism. It occurs as flat, plate-like crystals with angular rounded or irregular edges, typically disseminated throughout an originally carbonaceous metasedimentary horizon. Host rocks principally include quartz-mica schist, feldspathic or micaceous quartzite and gneiss.

Coarse and fine or super jumbo to fine lake graphite deposits are usually stratabound, with individual beds or lenses ranging in thickness from 30 cm to more than 30 m, and mineralisation lenses can extend over strike lengths of >2 km or more. Mineralized zones are normally tabular, occasionally lenticular and occur locally as irregular bodies in the hinge zones of folds. Most economic deposits of flake graphite are of Archaean (4–2.5 billion years) to late Proterozoic (540 million years) age. These rocks may contain up to 90% TGC, although 10% to 15% TGC is more typical. Flake sizes can range from 1 mm to 25 mm, with an average size of 2.5 mm.

The main regions of occurrence include China, East Africa, Europe, North America, and predominantly Canada and Brazil.

Commercially, flake graphite is divided into the types listed in Table 2–1. Fine flake may be further sub-divided into medium flake, fine flake and powder. Impurities include minerals commonly found in metasedimentary units, usually quartz, feldspar, mica, garnet and calcite, with occasional amphiboles, pyrrhotite, pyrite and magnetite.

Table 2–1: Graphite flake size classification

Flake type	Flake size *(μm)*	Mesh
Super jumbo	>500	<35
Jumbo	300–500	50–35
Large	180–300	80–50
Medium	150–180	100–80
Fine	75–150	200–100
Amorphous	<75	>200

Source: Benchmark Intelligence

Flake graphite constitutes a unique set of properties, accredited to its molecular structure. It is a crystalline form of carbon, which is (i) a solid-state lubricant; (ii) the only non-metallic conductor; and (iii) can sustain temperatures greater than 3,000 degree Celsius. Though it is a non-metal, it has unique properties of both metal and non-metal. Given these molecular characteristics, graphite flake is the preferred and mostly non-replaceable choice in various industries, products and applications. China Graphite's flake graphite concentrate product is mainly used as heat resistant materials such as magnesia carbon brick.

2.3 Spherical graphite

Spherical graphite is manufactured from flake graphite concentrate. Flake graphite concentrate is processed to spherical graphite through micronizing, rounding and purifying. Flake graphite concentrate is micronized to approximately 10–15 μm. The micronized graphite is then made rounded to form spheres. The spherical graphite is further purified through a leaching process to remove impurities. Spherical graphite is widely used as anode material in lithium-ion batteries for electronic devices and electric vehicles.

During the micronizing and rounding stages, the reject, representing up to 60%-70% of the feed materials, is collected and is saleable as a micro graphite powder by-product. A subordinate amount of high-purity graphite powder by-product is also collected during the purifying stage and is also saleable.

3 PROJECT OVERVIEW

3.1 Background

The Yixiang Graphite Project has been in operation since 2006. Commercial operations commenced with the beneficiation plant processing graphite ores from third parties. The plant produced flake graphite concentrates with grades primarily between 94.0% and 96.8% TGC (-100 mesh), with a recovery of over 90%. The plant is located at the Luobei Graphite Industrial Park. The Plant's initial throughput capacity was 0.1 Mtpa.

In late 2011, the spherical graphite processing plant commenced production. Spherical graphite was manufactured from graphite concentrate produced from the beneficiation plant.

In 2013, debottlenecking and upgrades completed at the beneficiation plant enabled the throughput capacity to be increased to 0.4 Mtpa.

In 2019, a mining license was granted, which allowed an approved graphite mining capacity of 0.5 Mtpa (the Mine), located 10 km to the northwest of the beneficiation plant and the spherical graphite processing plant complex.

In 2019, first ore was mined from the Mine and the beneficiation operation began to process graphite ore from China Graphite's own mine in addition to ores from third parties.

By the third quarter of 2021, the beneficiation plant upgrade was completed with a throughput capacity of 0.5 Mtpa.

The major products from the Project include flake graphite concentrate and spherical graphite. As by- products of the spherical graphite processing, micro graphite powder and high-purity graphite powder are also produced. At the Mine, marble rock is also extracted as a by-product of graphite ore mining.

Since 2006, China Graphite has grown from being able to produce a flake graphite concentrate mainly used as heat resistant materials only to a company with capacity to produce a wide range of products with further added-values (graphite concentrate, spherical graphite, micro graphite powder, high-purity graphite powder and marble). The spherical graphite is used as anode materials in lithium-ion batteries for electronic devices and vehicles.

Looking ahead, China Graphite has prepared a development plan to unlock further value from the Project. The key initiatives are listed below.

Exploration:

The current mining license restricts graphite ore mining capacity to 0.5 Mtpa (maximum) and to a maximum mining depth of 150 m above sea level (masl). The Company plans to conduct additional technical studies and prepare relevant documents to support an application to raise the graphite ore mining capacity to 1.0 Mtpa and lower the minimum mining depth to 60 masl when the market conditions are favorable.

Mining:

Ramp up the graphite ore mining capacity to 0.5 Mtpa by 2023.

Beneficiation:

Construct a new beneficiation plant with a throughput capacity of 0.5 Mtpa in proximity to the Mine to increase total beneficiation capacity to 1.0 Mtpa by 2025.

Spherical Graphite Processing:

Upgrade the existing beneficiation plant and spherical graphite plant by installing new equipment with a target production capacity of 6,500tpa spherical graphite. Build a spherical graphite processing plant at Beishan with a target flake graphite processing capacity of 17,000 t to produce 6,000 t spherical graphite and 10,000 t micro graphite powder.

New products:

Strengthen research and development efforts in order to launch new products such as coated spherical graphite and graphitized spherical graphite for the anode material market.

China Graphite has developed a financial model based on these key initiatives and is seeking to [REDACTED] and [REDACTED] on the Stock Exchange to [REDACTED] the Company's development plan and initiatives.

3.2 Property location and accessibility

The Project is located in Yanjun Farm, approximately 28 km northwest of the town of Luobei in Heilongjiang Province of the PRC and approximately 135 km north of Jiamusi, the largest city in the region (Figure 3–1). The Project is connected to a well-maintained road system. Access to the Project area from Luobei is through a series of paved roads via the village of Yanjun Farm.

The towns of Luobei and Yilan, and city of Jiamusi are the major sources of supplies, including coal, diesel and other consumables for the Project. These supplies are trucked to the Project area, and the current infrastructure in the area is considered sufficient for such purpose. There is an airport in Jiamusi, from which there are regular flights to Beijing and other major cities in China.

Figure 3–1: Project location

Source: SRK, ESRI maps

The principal assets supporting the Project comprise the Mine, the beneficiation plant and the spherical graphite processing plant. The graphite beneficiation plant and the spherical graphite processing plant are situated in the same location, while the Mine is located approximately 10 km to the west. The proposed new beneficiation plant is located near the Mine. The connecting road between the plants and the Mine consists of 10 km of paved road (Figure 3–2). The existing connecting road between the mine and the beneficiation and spherical graphite processing plants is considered adequate to support the operation.

The Mine and the beneficiation plant and spherical graphite processing plant complex are connected to the local grid, which provides a reliable supply of power to the operation. The water supply for the mining and processing operation is sourced from the Yadan River and its tributaries. The water source for domestic use is groundwater wells. The power and water supplies are reliable and sufficient to support the operation.

Figure 3–2: Location of beneficiation plant, processing plant and open pits

Source: SRK

3.3 Mining License

The Mine is held under a Mining License (No. C2300002018097110146712), which was granted to Yixiang New Energy Materials Co., Ltd., the wholly owned subsidiary of China Graphite in April 2019. The license is valid until August 2024. The mining license covers an area of 0.26 km^2 and its approved mining elevations are 274–150 masl. Details are given in Table 3–1. The license boundaries are shown in Figure 3–3.

Table 3–1: Mining License details

Mining License No.	**C2300002018097110146712**
Owner of Mining License	Yixiang New Energy Materials Co., Ltd.
Name of Mine	Beishan Graphite Mine
Mining Method	Open pit
Production Volume	0.50 Mtpa
Area of Mine	0.2615 km^2
Mining Elevations	274–150 masl
Period of Validity	April 2019 to April 2024

Source: Mining License, compiled by SRK

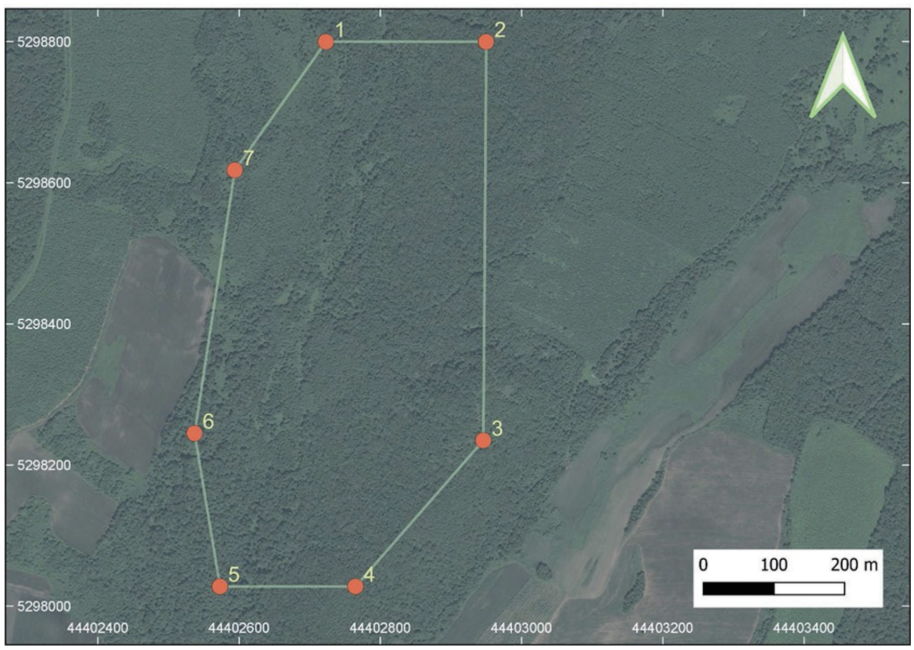

Figure 3–3: Mining License boundaries

Source: SRK, Google satellite image acquired in 2013

3.4 Climate, local resources and infrastructure

The Mine area is characterised by a humid-continental climate, with average minimum and maximum temperatures of -21°C and 21°C, respectively, and an average temperature of 2°C. The annual precipitation ranges from 400 mm to 700 mm. The winter extends from mid-October to late April.

The Mine area is covered by woodland (predominantly pine) and an undulating landform. The elevations in the Project area vary between 300 and 500 masl.

Mining operations are scheduled 260 days per year due to sub-zero and snowy weather in winter, while the beneficiation plant and spherical graphite plant are scheduled 240 days per year.

4 GEOLOGY

4.1 Regional geology

The Mine area forms part of the Jixi-Boli metallogenic zone in the southern portion of the Proterozoic Jiamusi-Xingkai Block. Here the Langjiagou anticline structure is developed, and its strata consist of regionally metamorphosed metasedimentary and igneous rocks. These rocks cover much of the eastern part of Heilongjiang Province and have undergone amphibolite- to granulite-facies metamorphism and polyphase deformation.

The subject flake graphite deposit is hosted by micaceous schist, which is sandwiched between quartzo-feldspathic schist, marble and gneiss. The graphitic schist is stratiform and is commonly deformed to form pinch and swell boudinage features (Ruifa, 2017, 2020; Sun et al., 2018). The structural trends are mainly northeast-northwest (Figure 4–1).

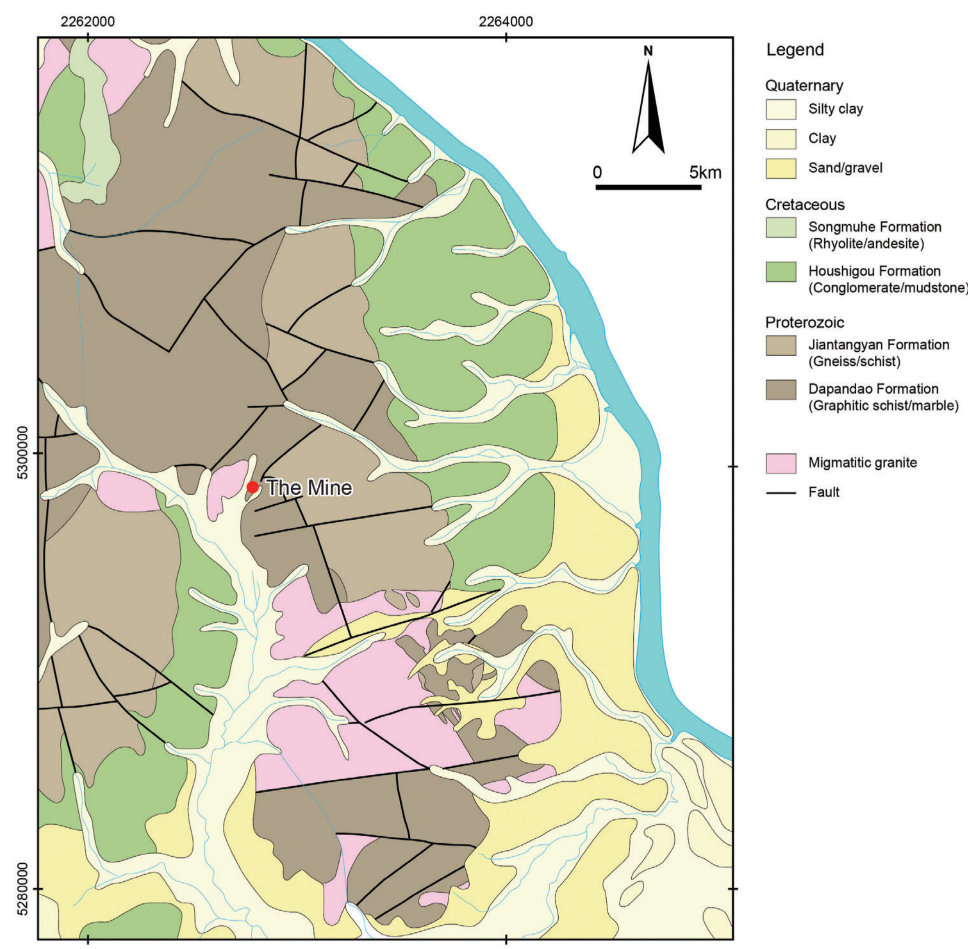

Figure 4–1: Regional geological map

Source: Modified after Ruifa (2015)

4.2 Local geology

The geology of the Mine area is represented by the Proterozoic Dapandao Group that consists of quartzo-feldspathic schist, graphitic schist, feldspathic schist, impure crystalized marble and a subordinate amount of quartzite and migmatite. These metamorphic rocks have a pelitic protolith (origin). The metamorphic rocks trend north-northeast and dip gently to moderately to the west-northwest. The entire metamorphic sequence is capped by 5–10 m thick Quaternary sediments in places. The graphitic schists are micaceous, fine grained, silvery grey with a schistose texture, and have boudinage features. Marble and graphitic schist are the target economic units (Figure 4–2).

Key structures mapped within the Mine area comprise minor shear zones along lithological contacts and minor faults. The latter trends east-northeast and dips sub-parallel to the schistosity. Field observations show that the metamorphic rocks have undergone polyphase deformation. It is not uncommon to observe fold closures, superimposed folds and flexures (Ruifa, 2015, 2020).

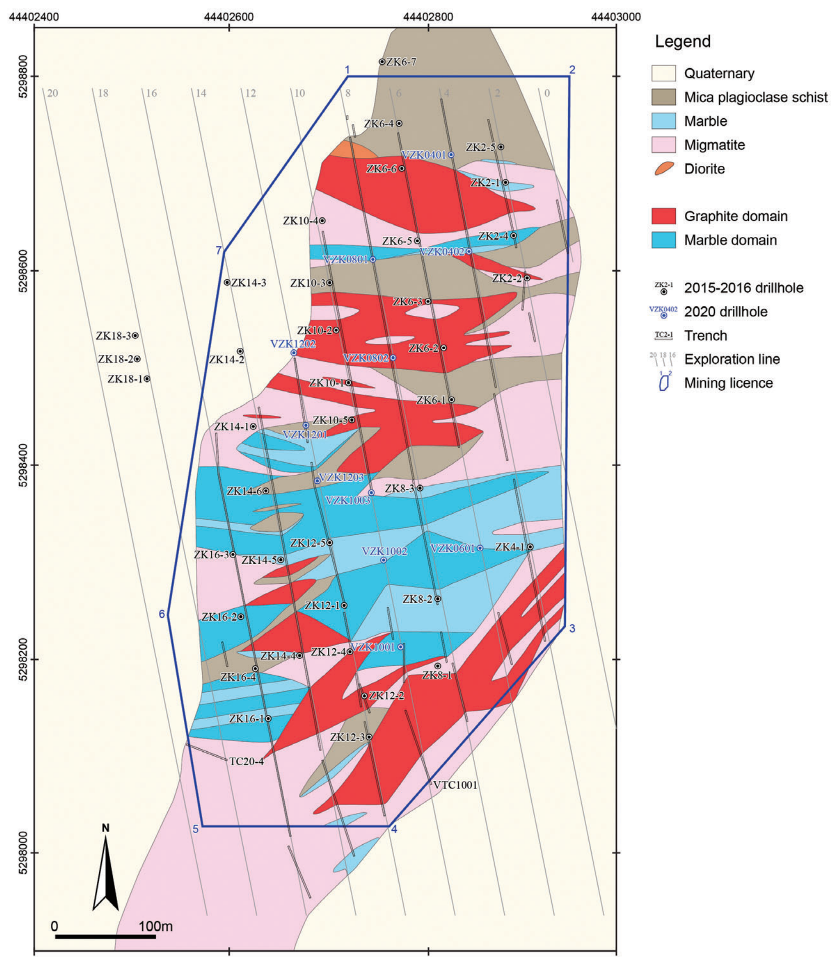

Figure 4–2: Simplified geological map of the Project area

Source: modified after Ruifa (2017)

4.3 Mineralisation

In the Mine area, flake graphite is hosted by micaceous graphitic schist. At least ten graphitic schist bands have been identified. These bands trend northwest to north-northeast and extend 50–380 m along strike and 80–300 m down dip (Figure 4–3 and Figure 4–4). The graphitic schist mineral assemblage consists of quartz, plagioclase mica, graphite, hornblende and tremolite. Other metallic minerals include pyrrhotite, pyrite, hematite, limonite and occasionally chalcopyrite. Polished thin sections show that graphite minerals appear black to brownish grey and exhibit as twisted leaf shape (Figure 4–5).

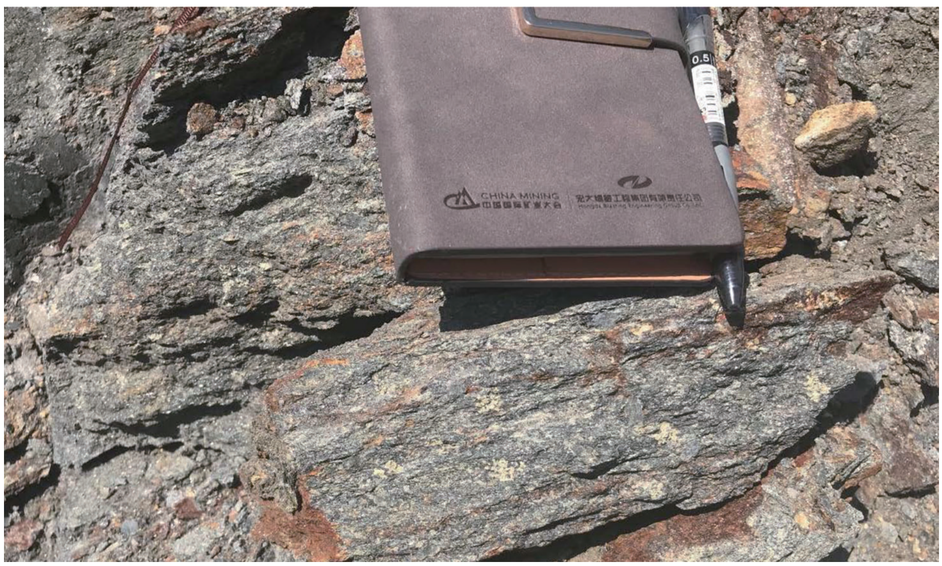

Figure 4–3: Graphitic schist

Source: SRK site visit July 2020

Figure 4–4: Graphitic schist intersected by drillhole VZK0402

Source: SRK site visit July 2020

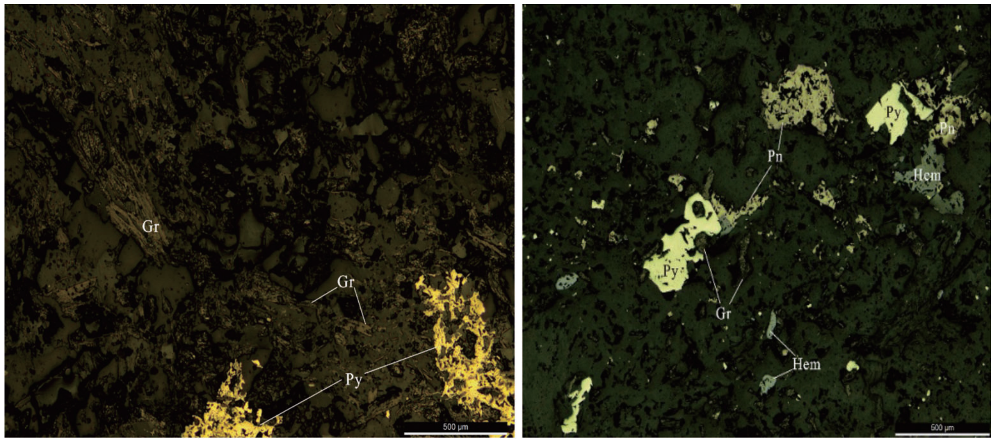

Figure 4–5: Petrographical analysis

Notes: Gr : graphite, Py: pyrite, Pn: pyrrhotite, Hem: hematite

Source: Ruifa (2017)

Table 4–1 and Figure 4–6 show the flake size distribution of graphite at the Mine taken in 2016 and 2020. Most of the graphite flake size is classified as fine to very fine according to the Chinese standard.

Table 4–1: Flake size distribution

Year	Classification	Mesh	Flake size (μm)	Proportion (%)
2016	Jumbo	<50	>287	6.85
	Large	50–100	175–287	14.14
	Medium	100–80	147–175	8.23
	Very fine and fine	>100	<147	70.78
2020	Jumbo	<50	>287	12.07
	Large	50–100	175–287	24.27
	Medium	100–80	147–175	8.4
	Very fine and fine	>100	<147	55.27

Source: Rufia (2016, 2020)

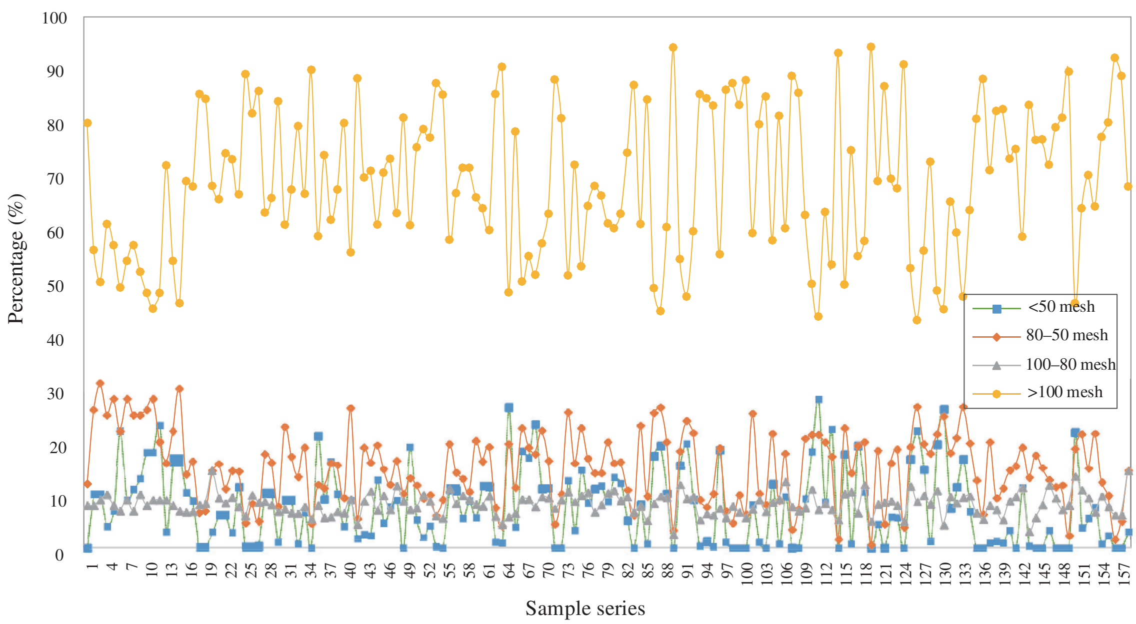

Figure 4–6: Flake size distribution histogram

Source: SRK analysis

4.4 Exploration history

Graphite mineralisation in the surrounding area was discovered during a regional exploration program in 1979, but no systematic exploration was conducted over the Project area until 2015.

In 2015, a reconnaissance exploration of the potential graphite mineralisation was performed by Harbin Ruifa Mineral Exploration Co., Ltd. (Ruifa), an independent exploration company. The assessment comprised geological mapping and a very low-frequency electromagnetic (VLF-EM) geophysical survey. The identified targets were tested by trenching and diamond drilling at a nominal 100 m by 50 m spacing.

In 2016, the identified stratiform graphitic schist bands were further explored by trenches at a spacing of 50–100 m and in-fill diamond drilling at a spacing of 100 m. The 2-year exploration program totalled approximately 6,000 m of diamond drilling and 10,000 m3 of trench excavation.

In July 2020, SRK conducted a review of the previous exploration work and recommended a verification program. In July-August 2020, China Graphite retained Ruifa to perform the verification program. The work program comprised a topographical survey, geological mapping, trenching (2 trenches for 148 m^2) and diamond drilling (11 validation holes for a total of 1,647 m). SRK visited the site while the drilling and trenching were in progress (Figure 4–7 and Figure 4–8). The validation program included the re-assay of 57 graphite pulp samples.

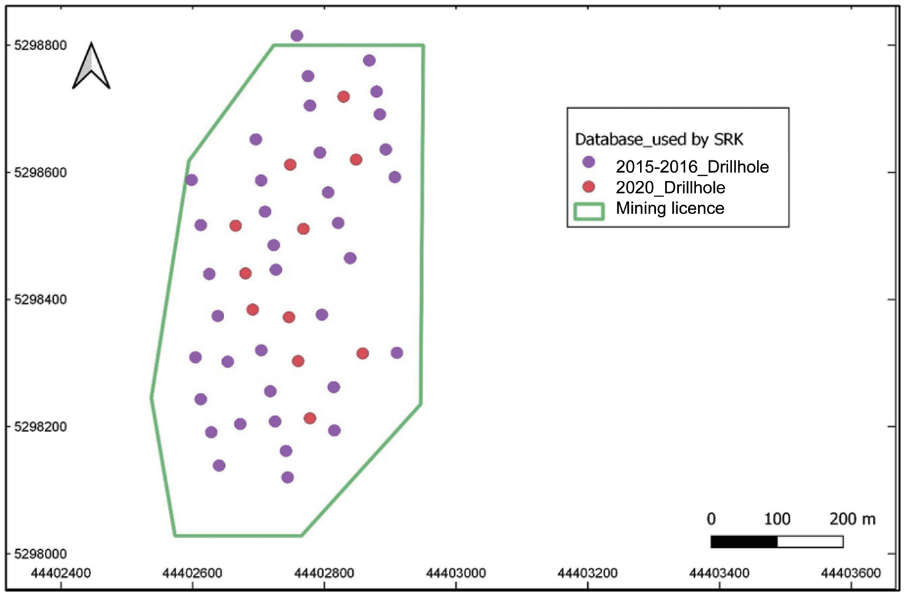

Figure 4–7: Drillhole locations

Source: SRK

Figure 4–8: Verification drilling

Source: SRK site visit, July 2020

4.5 Survey

The drillhole collars were surveyed using a real-time kinematic (RTK) geographic positioning system (GPS).

4.6 Geological mapping

Geological mapping at a 1:2,000 scale and structural mapping were carried out at exposed outcrops and trenches, where there was good exposure of fresh faces. The mapping was undertaken by Ruifa in 2016 and updated in 2020.

4.7 Drilling and trenching

Given the nature of the gentle to moderate dipping succession, exploration lines were spaced 50–100 m apart. The orientation of these exploration lines was north-northwest (at an angle of approximately 300°).

During the 2015–2016 exploration program, trenches were excavated along each exploration line prior to mapping and sampling. Five or six diamond drillholes were completed along each exploration line. Additional geological mapping was carried out over the area to support the drill findings.

In 2020, a further 11 verification diamond drillholes were completed between the existing exploration lines to validate the previous drilling results and confirm earlier geological interpretations.

All drillholes were initially completed using an HQ-sized (63.5 mm diameter) diamond drill bit, which was subsequently reduced to an NQ-sized (47.6 mm diameter) drill bit, after passing through the weathered zone (0.5–24.2 m, with average thickness of 8.0 m).

In 2015–2016, all holes were drilled vertically, whereas the azimuth and dip angle of the validation holes drilled in 2020 were 169° and 080°, respectively. The drill depth ranged from 64.1 m to 313 m. All holes were confirmed by a downhole survey taken every 50 m by the mean azimuth and inclined angle readings from two XJL-42 compass inclinometers. There is generally little deviation in azimuth and dip within each hole. The core recovery of the historical drilling and verification programs ranged from 96% to 100%, which SRK considers acceptable for resource estimation purposes. All the completed drillhole collars have been sealed with cement and marked by drillhole number, depth and end date.

The nominal dimensions of the trenches were 1 m in width and to a depth of 1 m. Some of the trenches were extended to a depth of 3 m to ensure that fresh bedrock was reached. All drillholes and trenches have been geologically logged, including lithology, minerals, mineral shape, color, core recovery. The Rock Quality Designation (RQD) was also estimated by the Ruifa geologists.

4.8 Sampling

4.8.1 Sampling techniques

Trenches were surveyed and logged prior to sampling. The trench channel sampling was described as being conducted by hand-cut channels with dimensions of 2 m by 3 cm by 5 cm. The samples were collected on a plastic sheet laid on the trench floor. The samples were bagged and weighed before dispatch to the laboratory.

The drill core was logged and photographed. Based on the logging results, the sample intervals were determined. The nominal sample length was 2 m and sampling did not cross lithological boundaries. The drill core was cut in half using a saw. Half of the core was taken for assay and the remaining half core was preserved.

4.8.2 Sample preparation

The drill core and trench samples were placed in sample bags marked with unique sample numbers and dispatched in batches to the laboratory of the 6th Geological Survey Institute (the 6th Laboratory), in Jiamusi for both the 2015–2016 and 2020 programs. The laboratory is independent of China Graphite and holds Chinese accreditation for rock and mineral analysis.

4.8.3 Assay methodology

Carbon in the graphite ores may have different origins, including organic, carbonates and/or graphitic. Application of an appropriate method is critical to determine the actual content of graphitic carbon. At the 6th Laboratory, carbonates were removed from the samples using nitric acid 1:1, followed by removal of organic carbon. The sample was dried in a furnace at 400°C for 3 hours. Once the carbonates and organic carbon were removed, the residual material sample was analyzed by a high- frequency infrared carbon and sulfur analyzer.

Marble is extracted from the Mine area mainly for use in the local aggregate market. An assessment of its physical properties according to the Chinese standard for Pebbles and Crushed Stone for Construction (GB/T 14685–2011) was conducted. In 2015–2016, a total of 12 marble samples were subjected to compressive and flexural strength tests at the Laboratory of Jiamusi Engineering Investigation Institute. Strength tests measure the ability of stone to carry loads in buildings and other applications and are thus required by architects and engineers. Compressive strength is the maximum compressive load that a stone can withstand without crushing or deforming. Flexural strength is a measure of the bending strength of the stone. It is measured by applying a load to a specimen that is supported near the ends.

In addition, chemical analysis was also performed by the gravimetric method to determine the composition of major elements of silicon dioxide (SiO_2), calcium oxide (CaO) and magnesium oxide (MgO).

4.9 Quality assurance and quality control

4.9.1 Laboratory duplicates

For the 2015–2016 exploration program, 139 laboratory duplicates were used as a standard quality control to test the reproducibility of the laboratory analysis, which represents 5.0% of all analyzed samples. Figure 4–9 presents the results, showing that the duplicates had good reproducibility.

In the 2020 verification program, laboratory duplicates were inserted at a frequency of one duplicate in every 25 samples. The result shows that there is no significant bias (Figure 4–10).

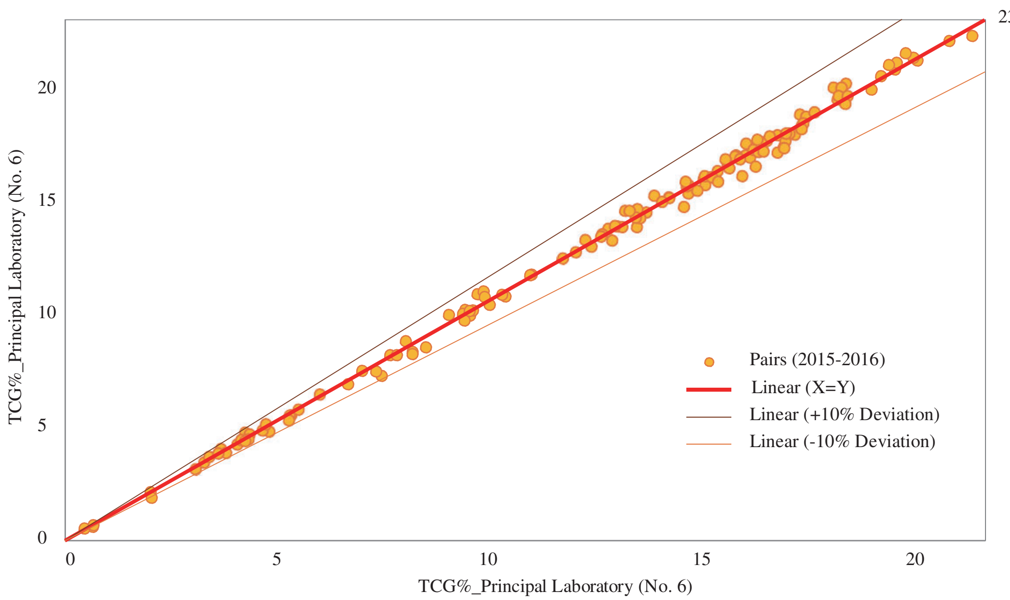

Figure 4–9: Correlation diagram between original and duplicate assays (2015–2016)

Source: SRK analysis

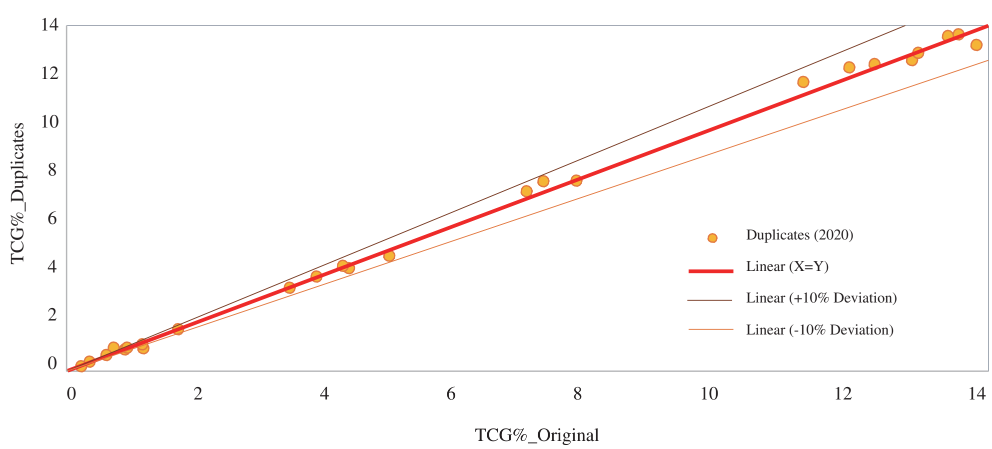

Figure 4–10: Correlation diagram between original and duplicate assays (2020)

Source: SRK analysis

4.9.2 Inter-laboratory check

An inter-laboratory check was also part of the standard quality control protocol.

In 2015–2016, a total of 134 samples, representing 4.3% of all analyzed samples were sent to the Laboratory of Heilongjiang Provincial Geology and Mineral Resources Test and Application Institute (HPTI) in Harbin (Heilongjiang Province). The HPTI is an independent Chinese accredited laboratory. The result is shown in Figure 4–11, indicating that no systematic bias is present.

In 2020, HPTI was retained as the check laboratory and a total of 33 samples were assayed. The results are also presented in Figure 4–11. Most of the samples are within the 10% deviation buffer, with the exception of four samples, which represent 2% of total check samples.

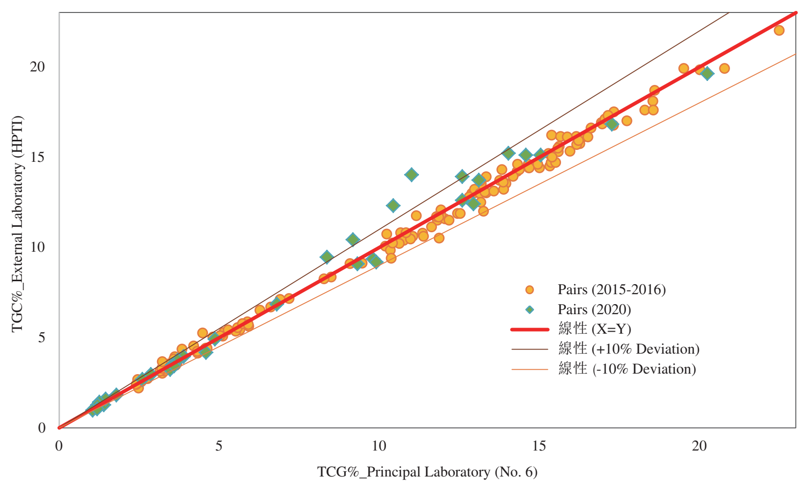

Figure 4–11: Correlation diagram between original and inter-laboratory assays

Source: SRK analysis

4.9.3 Blanks

No blanks were inserted in the samples collected in the 2015–2016 exploration program.

In the 2020 verification program, a total of 24 quartzite blanks were inserted in the sample batches at a frequency of one in every 25 samples. The results were returned with values of the detection limits (Figure 4–12).

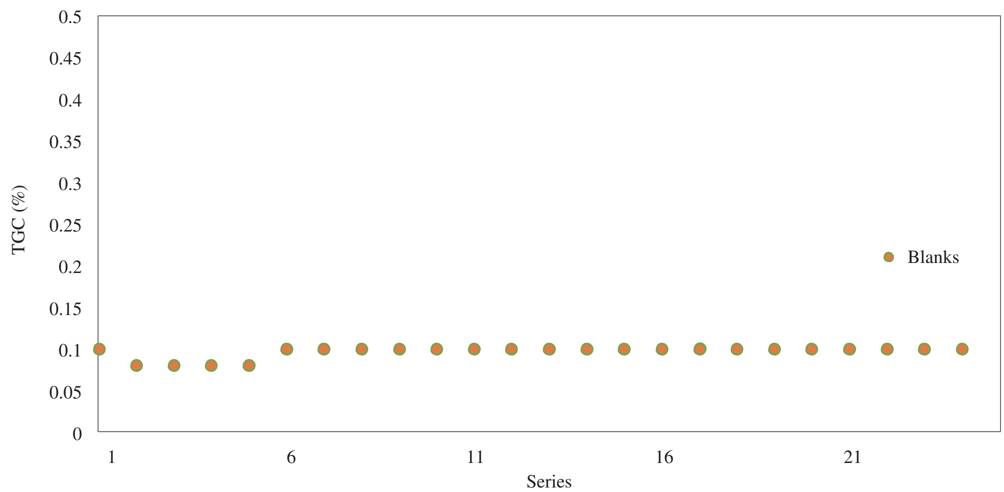

Figure 4–12: Blanks inserted in the field sampling program

Source: SRK analysis

4.9.4 Certified reference materials

Certified reference materials (CRMs) were not inserted in the samples for the 2015–2016 program. In the 2020 program, the CRMs comprised two graphite Chinese standard CRMs. The expected values and their acceptable limits are presented in Table 4–2.

Table 4–2: Chinese standard CRMs

Standard	Certified mean	Acceptable deviation limit	Unit	Number of samples
GBW03118	2.91	± 0.12	TGC %	8
GBW03119	9.91	± 0.08	TGC %	18

Source: SRK compilation

The graphite CRM results are presented in Figure 4–13. All the results are within the expected values except one of the GBW03119 samples that yielded a value slightly below the expected value.

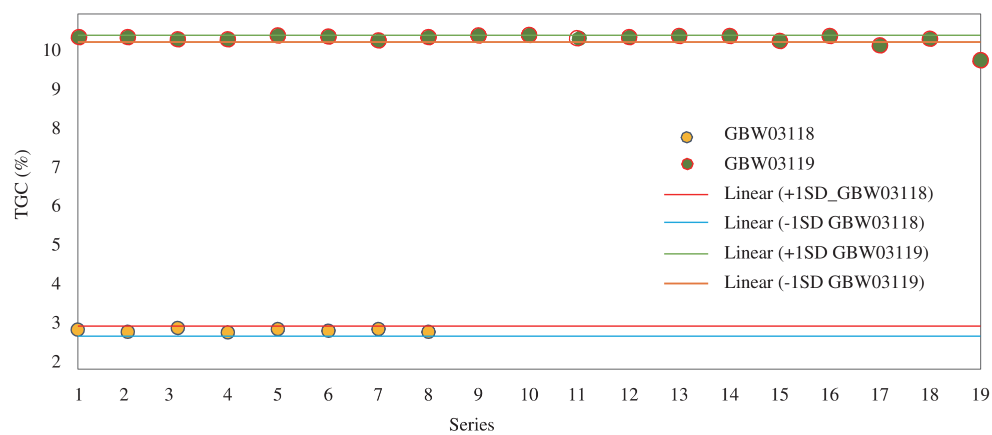

Figure 4–13: Graphite CRM results

Source: SRK analysis

4.10 Bulk density

Samples of graphite and marble collected for bulk density testing were dried and bulk density was determined using the water immersion method.

In the 2015–2016 exploration program, 232 graphitic schist bulk density samples were collected from the trenches and drill cores, 32 samples of which were from the weathered zone. The weathered zone yielded an average bulk density of 2.31 t/m^3, while the fresh zones had an average bulk density of 2.67 t/m^3.

During the 2020 verification program, 24 bulk density samples were taken from the drill cores in the fresh zone, with an average bulk density of 2.72 t/m^3.

A total of 42 marble samples were taken; the average bulk density value is 2.69 t/m^3 (Table 4–3).

Table 4–3: Graphite and marble dry bulk density values

Domains	Number of samples	Average density (*t/m^3*)
Weathered zone	32	2.31
V1	24	2.70
V2	9	2.71
V3	65	2.69
V4	13	2.71
V5	49	2.70
V6	11	2.65
V7	32	2.60
V8	12	2.64
Marble	42	2.69

Source: SRK analysis

4.11 Sample security

Samples were numbered and bagged and sent directly from the site to the relevant laboratories. No special measures were taken to secure the sample bags. Samples were weighed on dispatch from the site and on receipt at the laboratory.

4.11.1 Verification

The data from the 2015–2016 exploration program included drilling and trenching data, core pictures, geological maps, core pictures and associated reports. SRK undertook a review of such data and recommended a verification program. The verification program included ground-truthing of the geological mapping results, spot-checking of drill cores against core photographs and a review of the procedures for sample collection, preparation and analysis. SRK also visited the 6th Laboratory on 19 July 2020.

As part of the verification program, 11 holes were drilled, and 57 graphite pulp samples and 9 marble pulp samples stored at the 6th Laboratory were selected and re-assayed. The pulp samples show a good correlation to the original sample. SRK is confident in the repeatability of the sample preparation and analysis of the samples (Figure 4–14).

A comparison between the 2015–2016 and 2020 verification drilling results has also been made. The result shows that mineralized intervals and TGC values intercepted during two exploration programs are similar. For instance, Figure 4–15 is a long section of domain

V5, showing verification drillhole VZK1201 and three other drillholes drilled in the 2015–2016 program. The verification drillhole has confirmed the geometry of the mineralized envelope and the grade distribution.

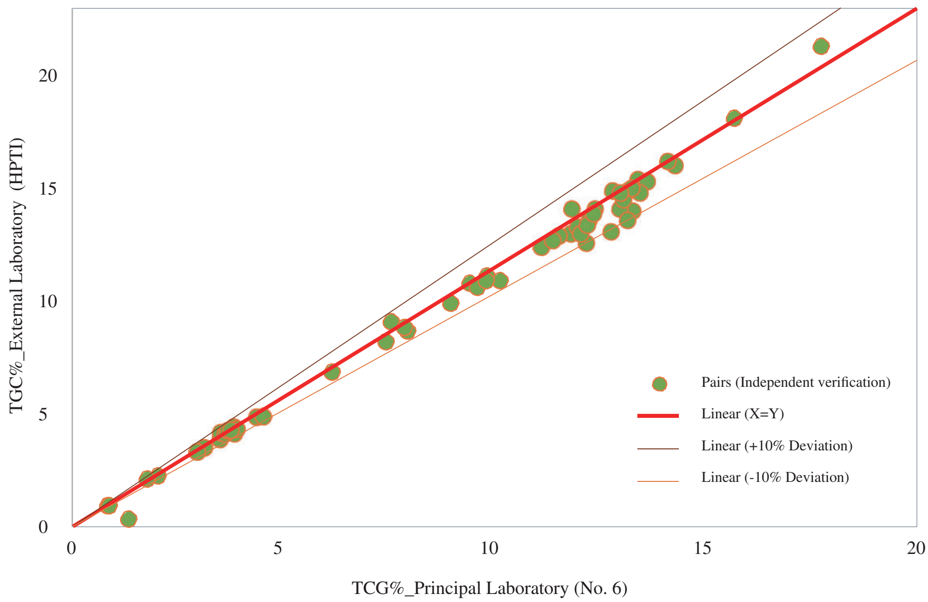

Figure 4–14: Correlation graph between original data and check duplicates

Source: SRK analysis

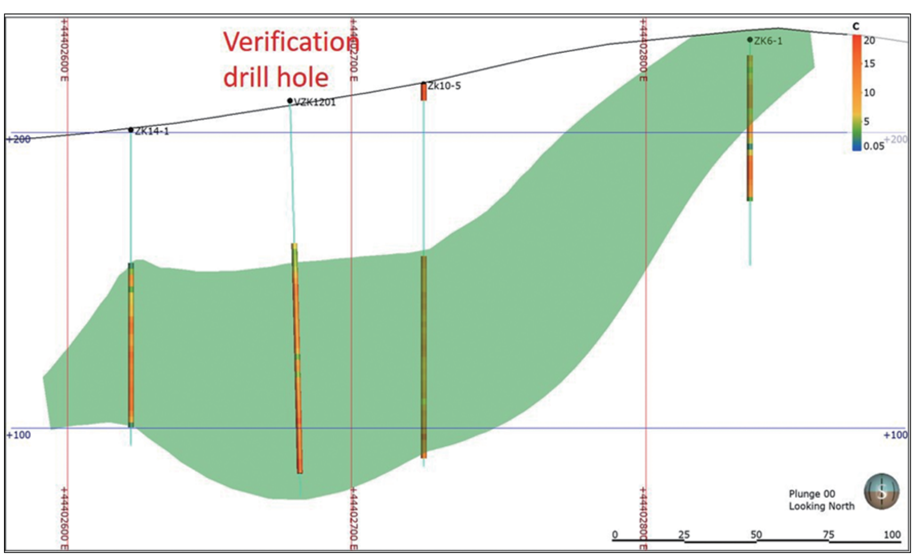

Figure 4–15: Long section of domain V5 showing verification drillhole VZK1201

Source: SRK analysis

5 MINERAL RESOURCE ESTIMATION

5.1 Introduction

Through the verification program and geostatistical analysis, SRK is of the opinion that the data collected from the 2015–2016 exploration program are reasonable. All the exploration data taken together are of a suitable accuracy and precision to be used for Mineral Resource estimation in accordance with the JORC Code (2012).

The JORC Code (2012) states that '*A Mineral Resource is 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*'. Mineral Resources are classified as Inferred, Indicated and Measured according to increasing degrees of geological confidence.

5.2 Mineral Resource estimation procedures

The resource evaluation involves the following steps:

- database compilation and verification
- construction of wireframe models for the boundaries of the graphite and marble mineralisation
- definition of resource domains
- data conditioning (compositing and capping) for geostatistical analysis and variography
- block modelling and grade interpolation
- Mineral Resource classification and validation
- assessment of 'reasonable prospects for economic extraction' and selection of appropriate cut-off grades
- preparation of the Mineral Resource Statement.

5.3 Database compilation and validation

Collar, assay and survey data, as well as logs from the 2015–2016 and 2020 programs, were compiled into a Microsoft Excel sheet and validated using Leapfrog software packages to search for errors such as missing or overlapping intervals and duplicated samples.

5.4 Geological modelling

The wireframe models for the deposits were built using Leapfrog software. A 2% TGC was used as a nominal cut-off to define the graphite mineralized intervals. On rare occasions, these cut-offs were not strictly adhered to in order to ensure the continuity of graphitic lodes. The marble boundary was defined by a 45% CaO cut-off and confirmed by lithological logging records. The contact points between mineralisation and waste on each cross section were picked up using the 'vein selection' function, and the mineralized envelopes were built by the 'vein modelling' and 'domain' functions. In total, eight graphite domains (V1 to V8) by geological logging and threshold grade of 2% TGC, and six marble units (M1 to M6) were modelled. The domains are shown in Figure 5–1 and Figure 5–2.

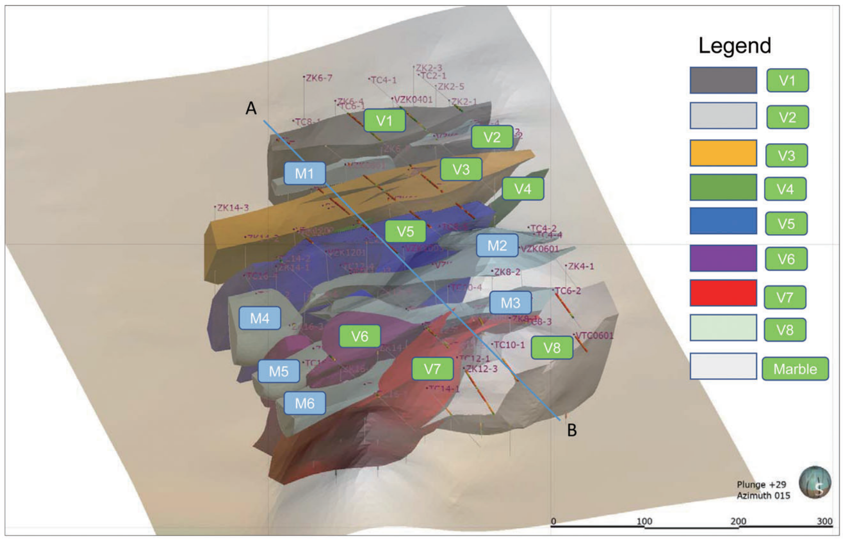

Figure 5–1: 3D perspective of interpreted graphite and marble domains

Source: SRK

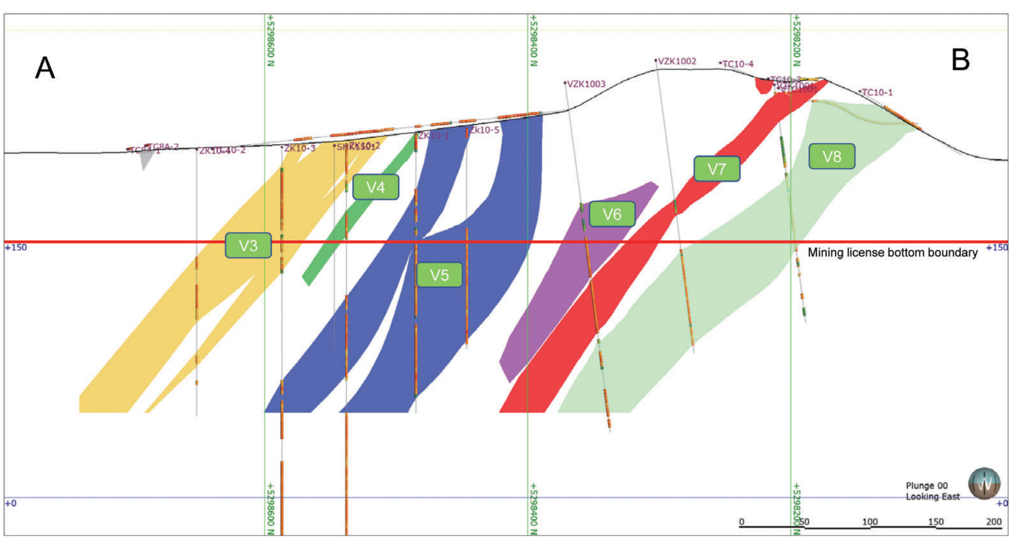

Figure 5–2: Cross section along line A-B

Source: SRK

SRK also constructed wireframe surfaces corresponding to weathering profiles. The surfaces were modelled based on drillhole logging results and sectional interpretation. The maximum depth of the weathering zone is 24.2 m, with an average of 8 m from the surface to the surface below the fresh zone. Figure 5–3 shows a cross section across the deposit, illustrating the relationship between the topography and interpreted weathering surface.

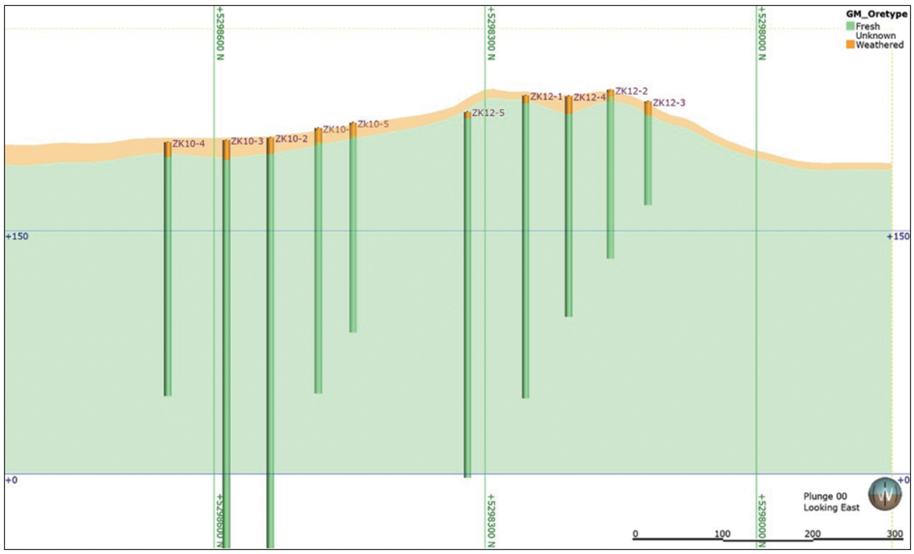

Figure 5–3: Modelled weathering profile

Source: SRK

5.5 Exploratory data analysis

All drillhole and trench samples were flagged with a domain code and checked in sections to ensure that all grades >2% TGC and >45% CaO were included in the appropriate domains.

5.5.1 Compositing

Drillhole and trench sample data were extracted from each of the domains. These data were examined to select an appropriate composite length. Block model cell dimensions and anticipated mining methods were also considered. Sample lengths for drillholes and trenches are mainly 2.0 m. A composite length of 2.0 m was applied to all data from the graphite and marble domains.

5.5.2 Top-capping

The impact of outliers on composite data in all domains was examined individually using log probability plots and cumulative statistics. A three-dimensional visual validation of the selected capping levels was also performed to assess the three-dimensional distribution of the higher-grade values. TGC values of 22%, 23% and 22% were capped for domains V1, V3 and V8, respectively. No grade capping was applied for other domains due to no significant outliers being observed.

The basic statistics for original, composites and capped composites are shown in Table 5–1. The frequency histograms and cumulative probability plots for capped composites are shown in Figure 5–4 to Figure 5–11.

Table 5–1: Summary statistics of original, composite and capped composite data of graphite samples

Type	Domains	Count	Mean TGC %	Standard deviation TGC %	Coefficient of variation	Variance TGC %	Minimum TGC %	Maximum TGC %	Top-capping TGC %
Original	V1	289	7.53	5.53	0.73	30.53	0.36	30.82	—
	V2	38	7.47	4.6	0.62	21.18	1.07	17.68	—
	V3	425	11.44	5.55	0.49	30.82	0.05	28.15	—
	V4	28	11.81	5.5	0.47	30.3	2.03	23.19	—
	V5	526	12.6	4.62	0.37	21.31	0.45	22.68	—
	V6	286	9.58	5.53	0.58	30.54	0.4	21.26	—
	V7	470	8.53	5.4	0.63	29.2	0.41	19.52	—
	V8	475	10.25	6.14	0.6	37.75	0.23	26.5	—
Composites	V1	294	7.53	5.47	0.73	29.95	0.59	30.82	—
	V2	43	7.41	4.12	0.56	16.94	1.14	15.83	—
	V3	444	11.43	5.26	0.46	27.63	0.05	25.89	—
	V4	32	11.81	5.34	0.45	28.47	2.03	23.19	—
	V5	536	12.59	4.34	0.35	18.87	0.53	22.68	—
	V6	288	9.58	5.47	0.57	29.89	0.55	21.26	—
	V7	485	8.53	5.25	0.62	27.57	0.45	19.52	—
	V8	485	10.25	6	0.59	35.97	0.23	26.5	—
Capped composites	V1	294	7.47	5.33	0.71	28.44	0.59	22	22
	V2	43	7.41	4.12	0.56	16.94	1.14	15.83	—
	V3	444	11.31	5.27	0.47	27.76	0.05	23	23
	V4	32	11.81	5.34	0.45	28.47	2.03	23.19	—
	V5	536	12.59	4.34	0.35	18.87	0.53	22.68	—
	V6	288	9.58	5.47	0.57	29.89	0.55	21.26	—
	V7	485	8.53	5.25	0.62	27.57	0.45	19.52	—
	V8	485	10.19	5.96	0.59	35.55	0.23	22	22

Source: SRK analysis

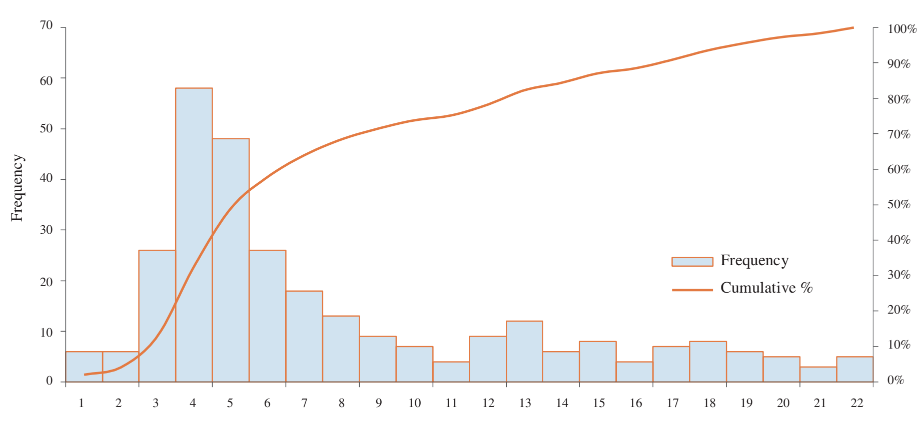

Figure 5–4: Frequency and cumulative probability plot — Domain V1

Source: SRK analysis

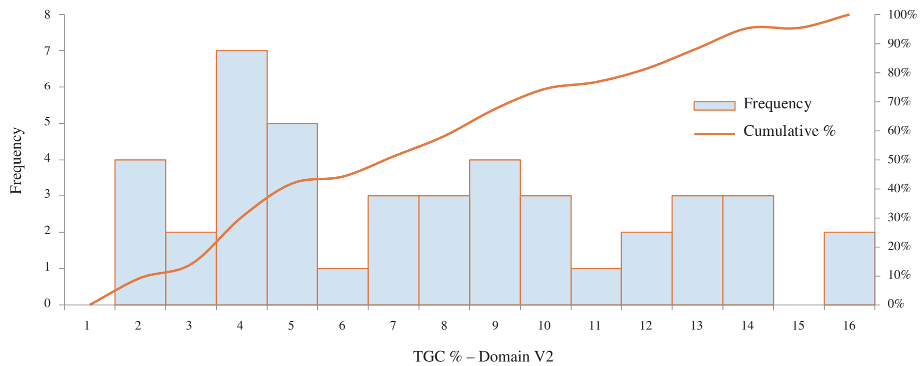

Figure 5–5: Frequency and cumulative probability plot — Domain V2

Source: SRK analysis

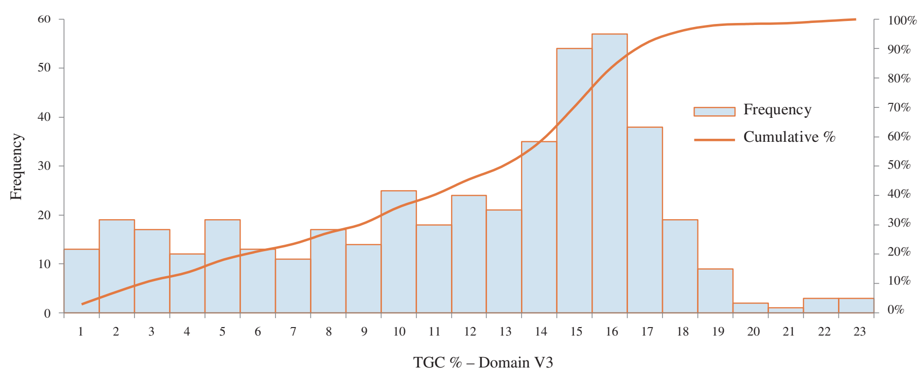

Figure 5–6: Frequency and cumulative probability plot — Domain V3

Source: SRK analysis

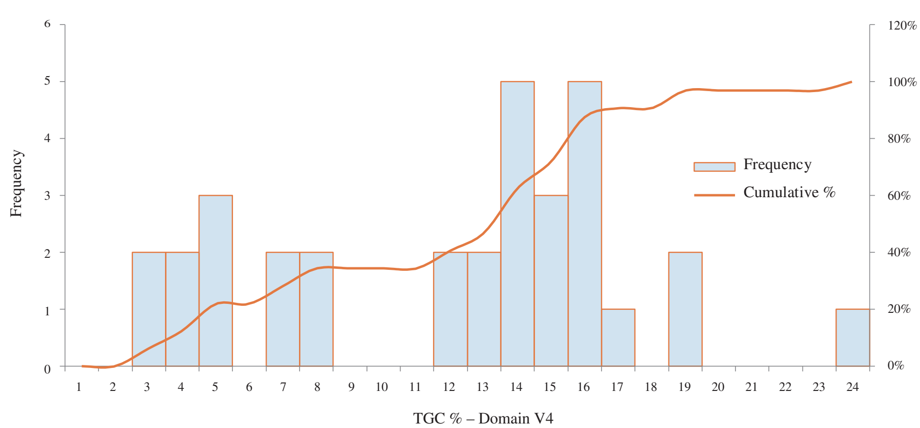

Figure 5–7: Frequency and cumulative probability plot — Domain V4

Source: SRK analysis

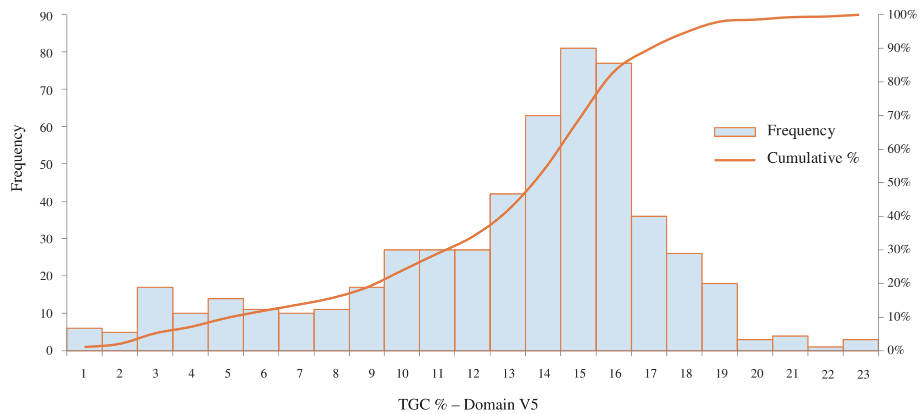

Figure 5–8: Frequency and cumulative probability plot — Domain V5

Source: SRK analysis

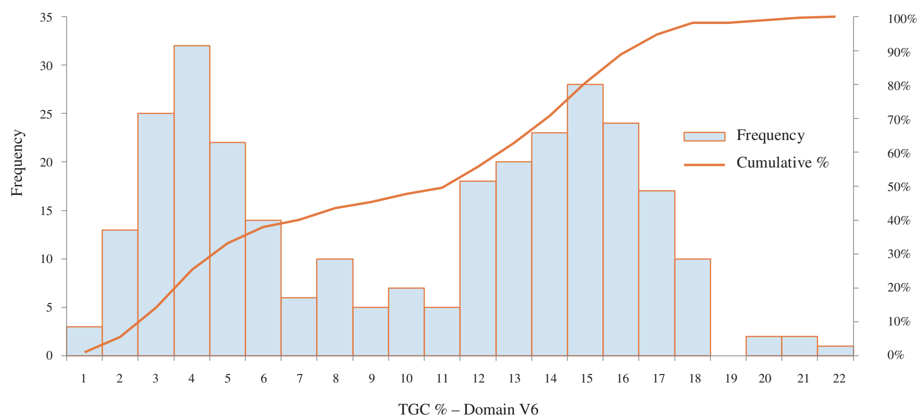

Figure 5–9: Frequency and cumulative probability plot — Domain V6

Source: SRK analysis

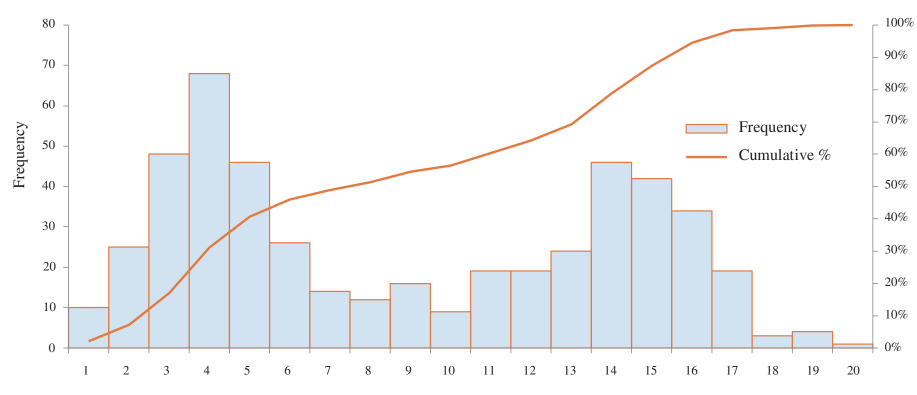

Figure 5–10: Frequency and cumulative probability plot — Domain V7

Source: SRK analysis

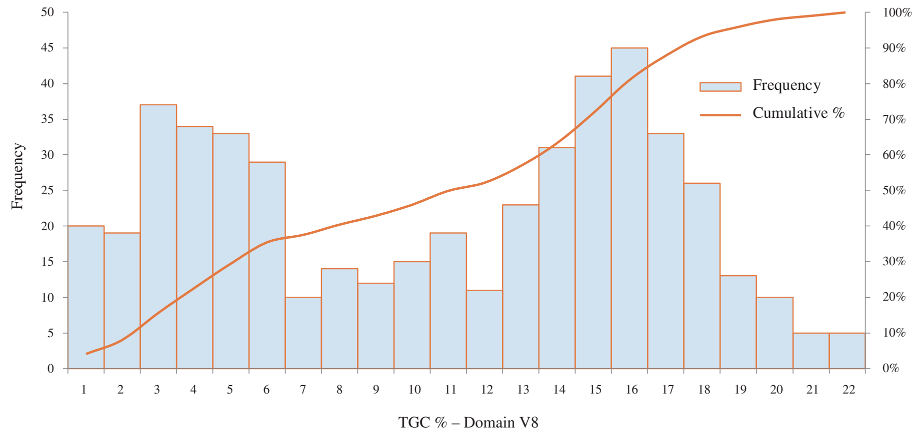

Figure 5–11: Frequency and cumulative probability plot — Domain V8

Source: SRK analysis

The marble is primarily intended for the local aggregate market. Compressive strength of the 12 samples analyzed from the 2015–2016 program range from 35.59 to 102.78 MPa, with an average of 73.17 MPa. Flexural strength spans between 1.40 and 4.05 MPa, with an average of 2.89 MPa (Table 5–2). The results indicate that the marble is suitable for use as aggregate.

Table 5–2: Physical properties of marble

	Compressive strength *(MPa)*	**Flexural strength** *(MPa)*
Minimum	35.59	1.40
Maximum	102.78	4.05
Average	73.17	2.89

Source: Ruifa (2017), compiled by SRK

The basic statistics of the assay of the marble samples are presented in Table 5–3.

Table 5–3: Basic statistics for marble assays

Type	Domains	Count	Mean	Standard deviation	Coefficient of variation	Variance	Minimum	Maximum
	CaO	410	49.63	4.63	0.09	21.44	9.11	54.95
Raw data	MgO	410	0.64	0.43	0.67	0.19	0.18	3.25
	$fSiO_2$	406	5.22	4.32	0.83	18.64	0.44	28.96

Source: Ruifa (2017), compiled by SRK

5.5.3 Variography

Variogram modelling was performed using Leapfrog Edge for all domains except Domain V4 as the number of samples was insufficient to warrant the construction of a meaningful variogram.

Variogram fitting was completed in the following steps:

- The nugget was determined by the downhole variogram.
- The variogram anisotropy ellipsoid was set on the horizontal plane based on data scatter features.
- The direction of maximum continuity within the sample plane was taken as the major axis of the variogram anisotropy ellipsoid, and the perpendicular direction (within the plane) was taken as the semi-major axis of the anisotropy ellipsoid.
- The direction perpendicular to the plane was used as the minor axis of the anisotropy ellipsoid.
- The variogram model was set to fit the three principal directions and checked against other directions.

Figure 5–12 shows an example of the variogram map and fitted variogram model of Domain V8.

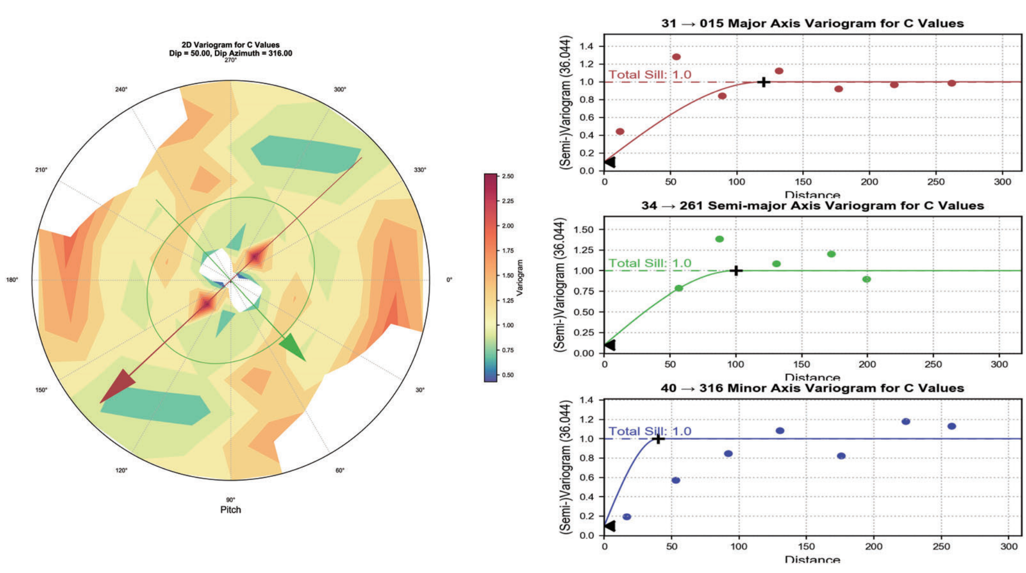

Figure 5–12: Variogram map and fitted model — Domain V8

Source: SRK analysis

5.5.4 Grade and tonnage estimation

A three-dimensional block modelling approach has been used to estimate the tonnage and grade at a range of cut-off grades. The coordinates and dimensions of the block model are presented in Table 5–4. No rotation has been applied.

Table 5–4: Block model parameters

Dimension	Base point	Rotation	Block size *(m)*	Minimum sub-block
Easting	44402370	N/A	5	N/A
Northing	5297850	N/A	5	N/A
Z (RL)	274	N/A	2	NA

Source: SRK

5.5.5 Grade estimation

The block values were interpolated using ordinary kriging (OK) on domains V1, V2, V3, V5, V6, V7 and V8, and the Inverse Distance Weighted (IDW) method was used for Domain V4 as there were insufficient samples to construct meaningful variograms. The parameters used for the grade estimation are summarized in Table 5–5. Grade estimation was not performed for the marble domains.

Table 5–5: Parameters used for grade estimation

	Variogram					Ellipse					
Domain	Nugget	Sill	Range *(m)*	Major/ Semi-major	Major/ minor	Dip *(°)*	Dip azimuth *(°)*	Pitch *(°)*	Minimum number of samples	Maximum number of samples	Search distance *(m)*
V1	4.5	29.8	100	1	10	49	11	62	2	16	100
V2	10.2	17	75	1.25	7.5	46	8	85	2	16	70
V3	5.6	28.1	150	1.25	3.75	44	354	149	2	16	150
V4	—	—	—	—	—	46	346	96	2	12	50
V5–1	6.8	15.8	100	1.25	2	52	250	163	2	16	100
V5–2	4.5	17.9	120	1	2.4	52	334	167	2	16	120
V6	3.1	31	150	1.5	3	53	322	158	2	16	150
V7	5.5	27.5	100	1.25	2.5	46	324	160	2	16	100
V8	3.6	36	120	1.2	3	50	316	137	2	16	144

Source: SRK

5.5.6 Model validation

SRK undertook block model validation to confirm the reasonableness of the estimation parameters and estimation results. SRK adopted the following methods for the validation:

- visual validation of block grades against drillhole grades

- statistical comparison of mean grades between composites and block
- trend analysis.

SRK conducted visual validation of the cross section view of the drillhole and trench grades and block model grades (Figure 5–13), which shows a good correlation between local block estimations and nearby samples, without excessive smoothing in the block model.

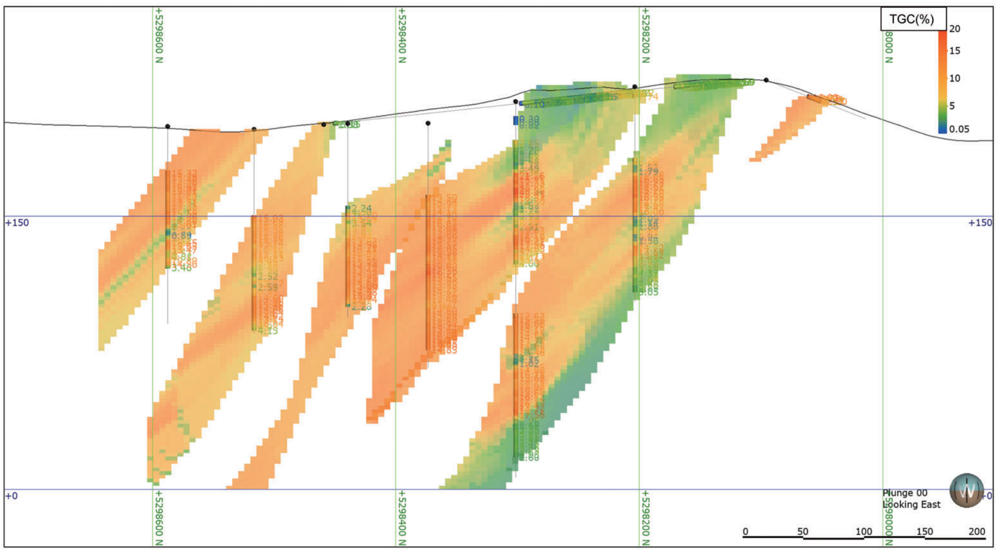

Figure 5–13: Visual check of selected cross section (looking east)

Source: SRK

The arithmetic mean values of the composite and the block were also compared, showing that the deviations are within an acceptable level (Table 5–6).

Table 5–6: Composite and block means comparison

Domain	Composite mean	Block mean	Absolute deviation	Relative deviation (%)
V1	7.47	7.64	0.17	2%
V2	7.41	7.31	0.10	–1%
V3	11.31	10.92	0.40	–3%
V4	11.81	11.64	0.17	–1%
V5	12.59	12.27	0.32	–3%
V6	9.58	9.74	0.17	2%
V7	8.53	8.41	0.12	–1%
V8	10.19	10.08	0.11	–1%

Source: SRK analysis

Figure 5–14, Figure 5–15 and Figure 5–16 present the grade swath plots for Domain V8 in the east- west, north-south and vertical directions. The swath plots show that the composite and block grades generally correlate at an acceptable level.

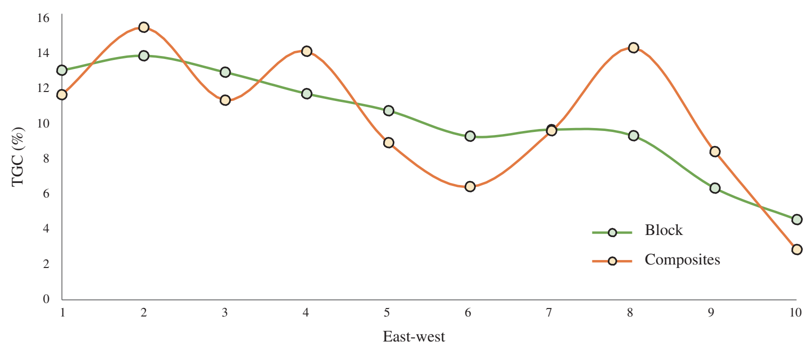

Figure 5–14: Swath plot along the east-west direction

Source: SRK analysis

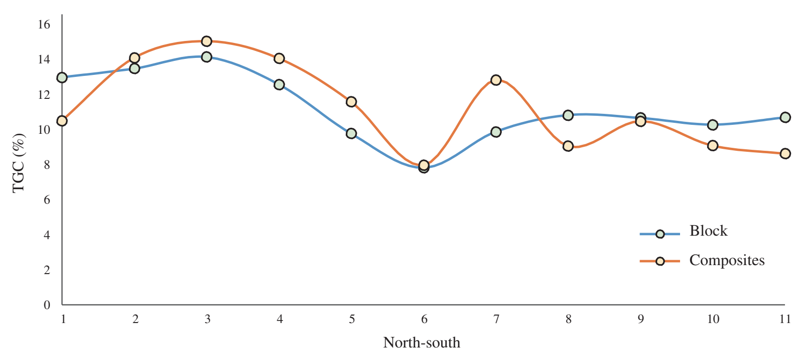

Figure 5–15: Swath plot along the north-south direction

Source: SRK analysis

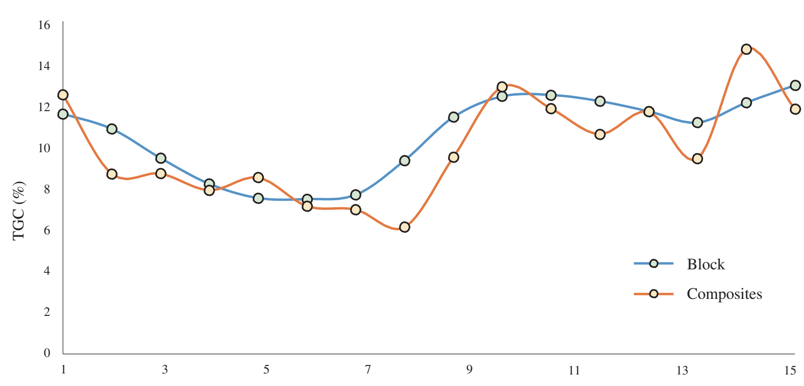

Figure 5–16: Swath plot along the elevation direction

Source: SRK analysis

5.6 Classification

Mineral Resource classification should consider the confidence in the geological continuity of the mineralized structures, the quality and quantity of exploration data supporting the estimates, and the geostatistical confidence in the tonnage and grade estimates. Appropriate classification criteria should aim to integrate all these concepts to delineate regular areas under similar resource classifications.

The following guidelines have been applied in classifying the Mineral Resources:

- geological continuity
- quality of the historical exploration campaign data and the validation results
- classification criteria as shown in Table 5–7.

Table 5–7: Mineral Resource classification criteria used in the estimation

Category	Graphite Mineral Resource classification criteria	Marble Mineral Resource classification criteria
Indicated	Drill spacing is 50 m along strike and 50–80 m in the dip direction and high confidence in the geological continuity in V1, V2, V3, V5, V6, V7 and V8 domains.	Drill spacing is 50 m along strike and 50–80 m in the dip direction and high confidence in the geological continuity in the M2 and M3 domains.
Inferred	All Mineral Resources within the Domain V4; the adjoining area of the Indicated Mineral Resource or drill spacing is more than 50 m along strike and 50–80 m in the dip direction.	All Mineral Resources in the M1, M4, M5 and M6 domains; the adjoining area of the Indicated Mineral Resource or drill spacing is more than 50 m along strike and 50–80 m in the dip direction.

Source: SRK

Figure 5–17 shows the classified graphite and marble Mineral Resources based on the criteria listed in Table 5–7.

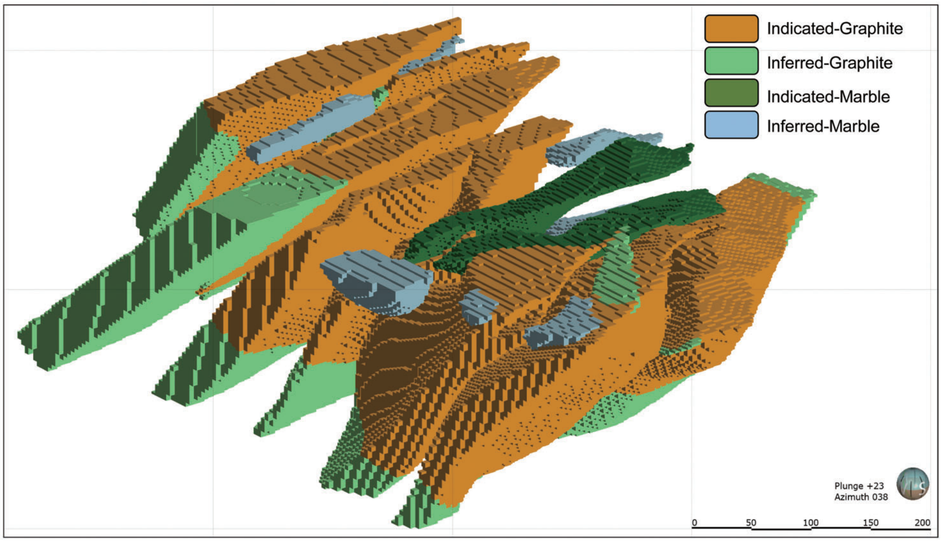

Figure 5–17: Oblique view of the classified graphite and marble Mineral Resources

Source: SRK

5.7 Mineral Resource reporting

The JORC Code (2012) defines a Mineral Resource as:

'a concentration or occurrence of material 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 (or quality), continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling. Mineral Resources are sub-divided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories.'

The 'reasonable prospects for eventual economic extraction' requirement generally implies that the quantity and grade estimates meet certain economic thresholds and that the Mineral Resources are reported at an appropriate cut-off grade, taking extraction scenarios and processing recoveries into account. In order to meet this requirement, SRK considers that major portions of the Mine are amenable for open pit extraction.

Clause 49 of the JORC Code also states:

'When reporting information and estimates for industrial minerals, the key principles and purpose of the JORC Code apply and should be borne in mind. Assays may not be relevant, and other quality criteria may be more applicable. If criteria such as deleterious elements or physical properties are of more relevance than the composition of the bulk mineral itself, then they should be reported accordingly.

'The factors underpinning the estimation of Mineral Resources and Ore Reserves for industrial minerals are the same as those for other deposit types covered by the JORC Code. It may be necessary, prior to the reporting of a Mineral Resource, to take particular account of certain key characteristics such as likely product specifications, proximity to markets and product marketability.'

5.7.1 Cut-off assumptions

In order to determine the quantities of materials offering reasonable prospects for eventual economic extraction, SRK has adopted certain assumptions to evaluate the proportions of the block model (Indicated and Inferred blocks) that could be reasonably expected to be mined from an open pit.

The most important parameters related to the graphite sales price are grade (TGC %) and flake size. Table 5–8 shows the assumptions applied by SRK for flake size distribution, concentrate specification and concentrate sales price. Other assumed parameters, including mining dilution, mining loss, and processing recovery are shown in Table 5–9. These parameters have been reviewed and adjusted by SRK for the conceptual cut-off grade calculations.

The conceptual economic cut-off grade for each graphite block is 3.5% TGC. Here, cut-off grade specifically means the grade that is applied to the block model to determine which portion of the model qualifies as a Mineral Resource.

Table 5–8: Graphite concentrate flake size distribution and assumed sales price

	Item	Unit	Value
Flake size	-325 mesh	%	42.5
	+100 mesh	%	8.6
TGC		%	95
Graphite concentrate specification		mesh	-194
Concentrate sales price		RMB/t	3,000

Source: SRK

Table 5–9: Other assumed parameters

Parameter	Unit	Value
Mining loss	%	5
Dilution rate	%	5
Processing recovery	%	90
Mining cost	RMB/t	25
Processing cost	RMB/t	45
General and Administration (G&A) cost	RMB/t	10
Selling expense	RMB/t	10
Graphite concentrate price	RMB/t	3,000
Processing cut-off grade	TGC %	3.50

Source: SRK

5.7.2 Industrial minerals considerations

Graphite ores have been mined or sourced from third parties and processed at the Company's beneficiation plant and spherical graphite processing plant. Flake graphite concentrate, spherical graphite and other by-products have been sold to various customers. The potential development of the market has also been supported by a market study (Frost & Sullivan, 2021).

The marble blocks are separated and stockpiled during graphite mining activities as a by-product. These marble blocks are then sold to nearby aggregate companies at the mine gate.

5.7.3 Mining License elevation limits

The approved mining elevations of the mining license are between 274 and 150 masl. As advised by the Company's legal advisers, upon completion of the agreed transfer process regarding an increase in mining scope under current applicable PRC Laws, there is no material legal impediment for China Graphite to obtain the mining rights below the current approved mining limit. On this basis, SRK considers there is a reasonable prospect for eventual economic extraction of material below 150 masl.

5.7.4 Mineral Resource Statement

The Mineral Resource estimates prepared by SRK as at 31 December 2021 for the Mine within and below the elevation limits of the mining license are tabulated in Table 5–10 and Table 5–11 (graphite) and Table 5–12 and Table 5–13 (marble). The graphite and marble Mineral Resources have been classified as Indicated and Inferred in accordance with the JORC Code (2012) and are based on the analysis and assumptions outlined in this Report. Production in 2021 has been depleted from the Mineral Resource.

Table 5–10: Graphite Mineral Resource Statement within the mining license elevation limits — Yixiang Graphite Project as at 31 December 2021

Domain	Mineral Resource Category	Tonnage *(kt)*	TGC *(%)*
V1	Indicated	1,740	7.86
	Inferred	138	12.62
V2	Indicated	229	7.71
	Inferred	48	7.97
V3	Indicated	3,333	10.99
	Inferred	656	11.81
V5	Indicated	2,440	11.86
V6	Indicated	1,348	8.37
	Inferred	107	8.87
V7	Indicated	2,123	8.14
	Inferred	29	4.98
V8	Indicated	2,539	8.83
	Inferred	20	12.59
	Indicated	**13,753**	**9.59**
	Inferred	**997**	**11.24**
	Total	**14,750**	**9.70**

Notes:

- The Mineral Resources are reported on an in situ basis at a 3.5% TGC cut-off.
- Bulk density: weathered zone: 2.31 t/m^3; M1:2.70 t/m^3; M2: 2.76 t/m^3; M3:2.69 t/m^3; M4:2.71 t/m^3; M5:2.70 t/m^3; M6:2.62 t/m^3; M7:2.59 t/m^3; M8:2.63 t/m^3.
- Tonnages are reported in metric units, grades are reported in percentage TGC. Tonnages and grades are rounded appropriately. Rounding, as required by reporting guidelines, may result in apparent summation differences between tonnes, grade and contained mineral content. Where these differences occur, SRK does not consider them to be material.

Table 5–11: Graphite Mineral Resource Statement below the mining license elevation limits — Yixiang Graphite Project as at 31 December 2021

Domain	Mineral Resource Category	Tonnage *(kt)*	TGC *(%)*
V1	Indicated	1,417	6.61
	Inferred	218	8.86
V2	Indicated	118	6.97
	Inferred	115	6.47
V3	Indicated	3,820	9.83
	Inferred	1,474	9.82
V5	Indicated	5,410	12.11
	Inferred	2,541	12.12
V6	Indicated	2,152	12.25
	Inferred	986	11.63
V7	Indicated	4,284	9.95
	Inferred	578	10.87
V8	Indicated	3,737	10.59
	Inferred	2,480	11.27
	Indicated	**20,937**	**10.59**
	Inferred	**8,393**	**11.16**
	Total	**29,330**	**10.75**

Notes:

- The Mineral Resources are reported on an in situ basis at a 3.5% TGC cut-off.
- Bulk density: weathered zone: 2.31 t/m^3; M1:2.70 t/m^3; M2: 2.76 t/m^3; M3:2.69 t/m^3; M4:2.71 t/m^3; M5:2.70 t/m^3; M6:2.62 t/m^3; M7:2.59 t/m^3; M8:2.63 t/m^3.
- Tonnages are reported in metric units, grades are reported in percentage TGC. Tonnages and grades are rounded appropriately. Rounding, as required by reporting guidelines, may result in apparent summation differences between tonnes, grade and contained mineral content. Where these differences occur, SRK does not consider them to be material.

Table 5–12: Marble Mineral Resource Statement within the mining license elevation limits — Yixiang Graphite Project as at 31 December 2021

Mineral Resource Category	Tonnage *(kt)*
Indicated	1,541
Inferred	582
Total	2,123

Note: Rounding, as required by reporting guidelines, may result in apparent summation differences between tonnes, grade and contained mineral content. Where these differences occur, SRK does not consider them to be material.

Table 5–13: Marble Mineral Resource Statement below the mining license elevation limits — Yixiang Graphite Project as at 31 December 2021

Mineral Resource Category	Tonnage *(kt)*
Inferred	135

Note: Rounding, as required by reporting guidelines, may result in apparent summation differences between tonnes, grade and contained mineral content. Where these differences occur, SRK does not consider them to be material.

5.7.5 Grade-tonnage sensitivities

The stated Mineral Resources are sensitive to the selection of the reporting cut-off grades. To illustrate this sensitivity, the global model quantities and grade estimates are presented in Table 5–14 at different cut-off grades. The figures presented in this table are not equivalent to a Mineral Resource Statement; they are presented for information purposes only and are intended to show the sensitivity of the block model estimates to the selection of cut-off grade only. Figure 5–18 presents this sensitivity as grade- tonnage curves.

Table 5–14: Global block model quantities and grade estimates — Yixiang Graphite Project at various cut-off grades within the mining license area

Grade cut-off (TGC %)	Tonnage *(Mt)*	Grade *(TGC %)*
2.0	16.2	9.33
2.5	16.1	9.38
3.0	15.9	9.49
3.5	15.4	9.69
4.0	14.7	9.96
4.5	14.1	10.21
5.0	13.5	10.46
5.5	12.9	10.69
6.0	12.4	10.91
6.5	11.8	11.12
7.0	11.3	11.34
7.5	10.7	11.56
8.0	10.1	11.79

Note: The reader is cautioned that the figures in this table should not be misconstrued with a Mineral Resource Statement. The figures are presented to show the sensitivity of the block model estimates to the selection of cut-off grade only.

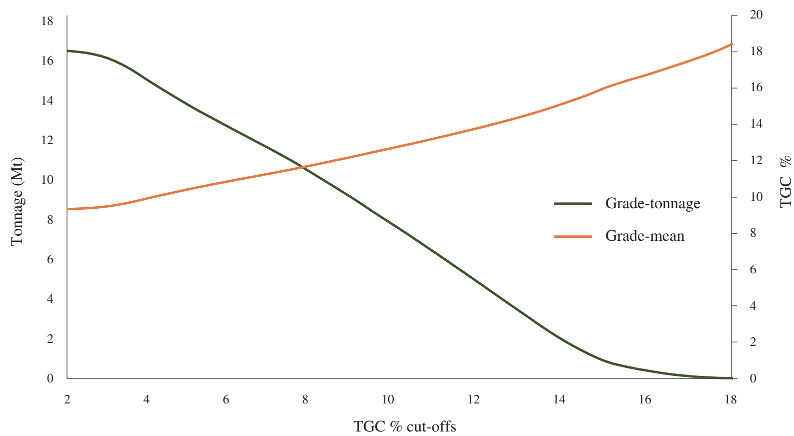

Figure 5–18: Grade-tonnage curve for Yixiang Graphite Project within the mining license area

Source: SRK analysis

6 MINING

6.1 Introduction

The existing Mine is an open pit operation, consisting of conventional drilling, blasting, loading and hauling, with a target annual graphite ore production rate of 0.5 Mtpa. China Graphite plans to reach this targeted production rate by 2023.

The construction of the Mine commenced in mid-2019 with early waste stripping and produced first ore in the same year. The total materials moved attained 1.02 Mt in 2019, 1.65 Mt in 2020 and 1.55 Mt in 2021 respectively. The production history over the past three years has provided China Graphite with a solid understanding of the likely operating conditions, mining equipment selected and operability of the pit, as well as the beneficiation plant's response to the mined ore. The operation's statistics are given in Table 6–1.

At the time of SRK's site visit in January 2022, the Mine was positioned as a hilltop mining area. Four benches were developed in the southern part of the Mine area at 240 masl, 225 masl, 210 masl and 195 masl. The dimensions of the 195 masl and 240 masl benches measure approximately 350 m and 200 m, respectively (Figure 6–1).

Table 6–1: 2019–2021 operation statistics

Year	Waste removal *(Mt)*	Graphite ore *(Mt)*	Marble ore *(Mt)*	Total material mined *(Mt)*
2019	0.56	0.26	0.20	1.02
2020	0.72	0.21	0.72	1.65
2021	0.95	0.26	0.34	1.55

Source: China Graphite, compiled by SRK

Figure 6–1: Development at bench 195 masl

Source: SRK site visit, July 2020

6.2 Technical studies

The technical work and studies undertaken for the Mine are described in two reports as outlined below. These studies support the current open pit operation, the currently approved production capacity of 0.5 Mtpa and the lowest mining elevation limit at 150 masl (Table 3–1):

- Feasibility Study on the Beishan Graphite Mine with 0.5 Mtpa Mining Capacity, by Suzhou Sinoma Design and Research Institute of Non-metallic Minerals Industry Co., Ltd. (Sinoma) dated December 2017, referred to as the '2017 FS'.

- Preliminary Engineering Design for the Beishan Graphite Mine with 0.5 Mtpa Mining Capacity, by Heilongjiang Province Metallurgical Design and Planning Institute (MDPI) dated January 2019 and updated in December of the same year, referred to as the '2019 FS'.

SRK considers the level of accuracy of the Modifying Factors described in the 2017 FS and 2019 FS to be similar to a pre-feasibility study (PFS) as defined by the JORC Code (2012). Based on the current operational conditions and Company's forecast together with other Modifying Factors described in the previous technical studies, SRK conducted an open pit optimisation, mine design and production schedule.

6.3 Optimisation

To develop an optimal open pit design for the Mine, an optimized open pit shell was prepared using the Lerchs-Grossman 3D algorithm in Whittle software (LG 3D). The LG 3D open pit optimizer determines a set of resource blocks with the maximum value per tonne, creating an optimized open pit shell from a 3D resource block model.

The range of open pit shells varies according to the value of the Revenue Factor applied. At a Revenue Factor of 1.0, the ultimate open pit shell is found where the marginal cost for an additional unit of product is equal to the net revenue received for that additional unit of product. This solution is specific to the revenue and project cost assumptions. Revenue Factors greater than 1.0 will generate larger open pits that decrease in profitability until the open pits become sub-economic. Open pit shells based on Revenue Factors lower than 1.0 will typically target higher-grade areas, as the revenue per product is artificially depressed by multiplying the Revenue Factor by the base product price. For the lower Revenue Factor shells to be viable, similar revenue is required to offset similar mining costs to the Revenue Factor 1.0 case and, as such, will need to be generated by higher-grade blocks.

With defined open pit optimisation parameters, including saleable product prices, mining, processing and other indirect costs, graphite and marble material recoveries, open pit slopes and other project- related constraints, the open pit optimizer searches for the open pit shell with the highest undiscounted cashflow. In accordance with the guidelines of the JORC Code (2012), only blocks classified as either Measured or Indicated are allowed to drive the open pit optimizer. Open pit shells are used as a guide for subsequent practical open pit mine designs.

6.3.1 Optimisation inputs

SRK conducted a review of the 2019 FS, and considers the Company's forecast based on the actual operating statistics appropriate for the optimisation. The key open pit optimisation inputs used in LG 3D are presented in Table 6–2.

Table 6–2: Open pit optimisation inputs

Item	Unit	Input
Mining cost	RMB/t total material moved	6.3
Processing cost	RMB/t feed ore	125.7
G&A cost	RMB/t feed ore	14.0
Graphite transport cost	RMB/t feed ore	15.0
Graphite concentrate sales (95% TGC) price	RMB/t	2,578
Marble sales price	RMB/t	7
Graphite recovery	%	91.5
Marble block recovery	%	97
Mining dilution	%	10
Mining loss	%	5
Overall slope angle	degrees	43

Source: China Graphite information memorandum, compiled by SRK

The graphite processing recovery rate relies on the actual production records from the beneficiation plant. The sales price for the graphite concentrate relies on the Company's forecast, supported by recent sales contracts. Marble is mined as a by-product during the mining process and sold as unprocessed blocks. The marble block recovery, representing the saleable proportion of mined marble, is reliant on the production records over 2020.

The mining dilution was designed at 5% in the 2019 FS; however, information provided by the Company indicates that 10% dilution is more practical, based on the actual production records.

As proposed by the 2019 FS, the overall slope angle (OSA) is 43°; the permanent bench face angle (BFA) is 65°, and temporary BFA is 70°. SRK considers the recommended slope angles are reasonable. As mining progresses deeper, an independent geotechnical review and guidance on actual and recommended mining should be conducted to validate the FS design.

The Mineral Resource model (MRM) within the current mining elevation limit (Table 5–10) was re-coded and validated in Whittle. The difference between the original MRM and the re-coded MRM is within 0.3% in both grade and tonnage, which in SRK's opinion is acceptable.

The re-coding included:

- re-blocking the MRM from 5 × 5 × 2 (X × Y× Z) into 10 × 10 × 5 to represent the selective mining unit (SMU) and an efficient Whittle processing timeframe
- adding waste rock at a specific gravity of 2.68 t/m^3
- other minimum re-coding for the Whittle optimisation requirements, such as rock type coding based on both ore type and resource classification.

The mining license spatial limit was also considered during the optimisation.

6.3.2 Optimisation results

Using the inputs described above, the LG 3D open pit optimizer tool was run and produced an optimum open pit at different product prices, which are referred to as Revenue Factors (RFs), for the Mine.

Revenue Factor 1.0 was achieved for open pit shell 30, which was selected as the base case because the ultimate open pit shell was achieved at RF 1.0 when the Whittle economic return is maximized. At Revenue Factor 1.0, the marginal cost for an additional unit of product is equal to the net revenue received for that additional unit of product. The isometric view of the optimisation result of open pit shell 30 is presented in Figure 6–2.

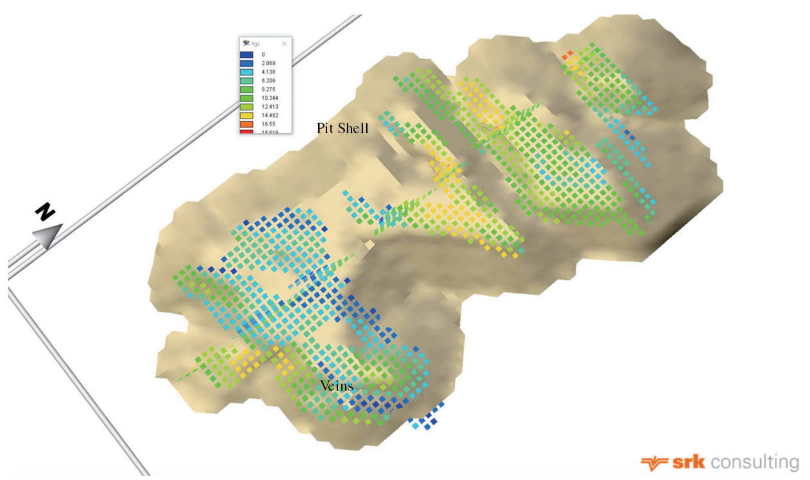

Figure 6–2: Isometric view of open pit shell 30 (RF 1.0)

Source: SRK

6.3.3 Detailed mine design

The detailed mine design was carried out using the selected LG 3D open pit shell (RF 1.0) as a guide. The proposed open pit design includes the practical geometry required in the Mine, including open pit access and haulage ramp to all open pit benches, open pit slope design, benching configurations, smoothed open pit walls and catch berms. The major design parameters used are described in Table 6–3. The plan view of the open pit design is presented in Figure 6–3, while the comparison between the open pit design and LG 3D shell is shown in Figure 6–4. The open pit design indicates that above 195 masl, the mining operation will require the removal of a hill. Below 195 masl, the operation will be an open pit excavation. The open pit access is at 195 masl on the southeast pit edge.

Table 6–3: Detailed open pit design parameters

Item	Unit	Parameter
Bench height	m	15
BFA	degrees	65
Catch berm	m	8
Ramp width	m	13
Road gradient	%	10
OSA	degrees	43

Source: 2019 FS, compiled by SRK

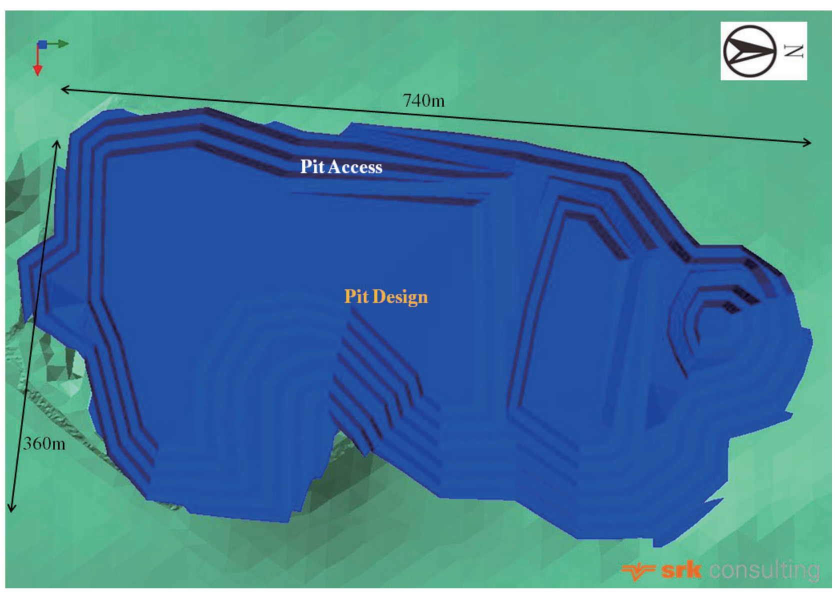

Figure 6–3: Plan view of open pit design

Source: SRK

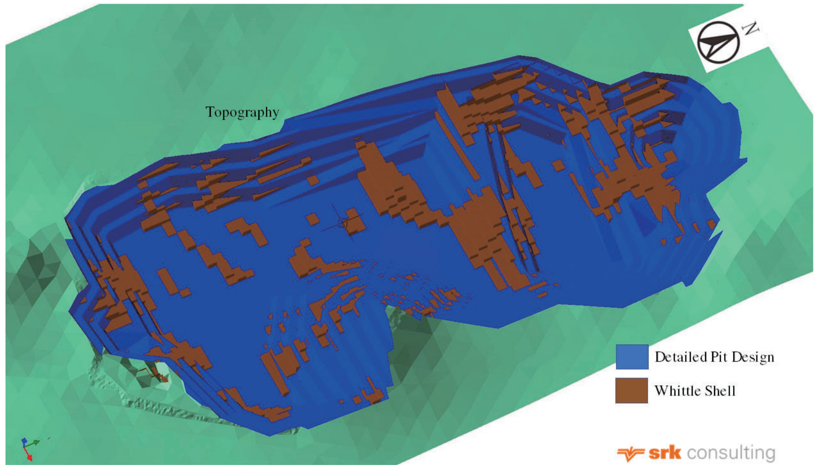

Figure 6–4: Isometric view of open pit design and Whittle optimisation

Source: SRK

The Mineral Resources and waste materials within the open pit design on each beach are presented in Table 6–4, at a zero cut-off grade. The mine design against the current mining operation is shown in Figure 6–5.

Table 6–4: Materials within the open pit design

Bench	Toe elevation (masl)	Indicated Mineral Resource (kt) — Graphite	Inferred Mineral Resource (kt) — Graphite	Indicated Mineral Resource (kt) — Marble	Inferred Mineral Resource (kt) — Marble	Waste (kt)
B240	240	—	—	37	33	96
B225	225	255	0	288	15	984
B210	210	1,335	24	476	24	1,892
B195	195	2,392	57	453	28	2,783
B180	180	2,655	184	229	12	2,942
B165	165	2,596	70	56	—	1,687
B150	150	2,427	11	0	—	528
Total		**11,661**	**347**	**1,540**	**112**	**10,913**

Source: SRK

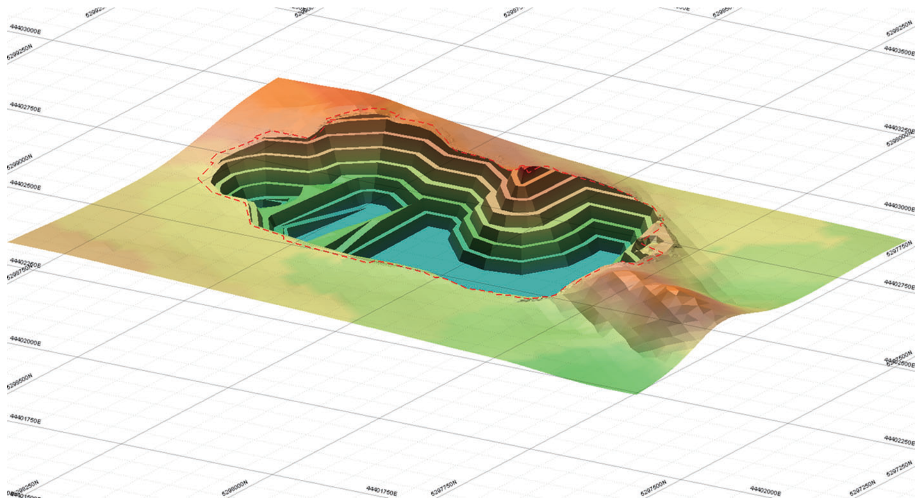

Figure 6–5: Oblique view of the mine design, looking northeast

Source: SRK

6.4 Mining method

The 2019 FS considers a conventional mining sequence proceeding downwards and two benches being worked simultaneously. A conventional open pit mining methodology is currently used, comprising drilling, blasting, loading, and haulage. The mine is run as an owner operation, except for blasting work which is contracted to a professional contractor. The blasting contractor provides hole survey, explosive transportation, charging, and blasting works. No magazine has been built on site.

Two down-the-hole (DTH) drills (model KGH6) are used for drilling based on the physical characteristics of the orebody and the mine production rate, with bore diameters of 140 mm and vertical hole depths of 16.5 m, including sub-drilling of 1.5 m. Blasting holes are arranged in rectangular or quincunx shapes, with spacing of 5.5 m and burden of 4.5 m.

The maximum acceptable lump size of the mined materials is 750 mm, and the oversize proportion is designed at 5%. Large waste rocks will be transported directly to the waste dump without re-crushing, while large lumps of mineralized materials will be stockpiled and re-crushed by hydraulic hammers.

Loading is carried out using 2.5 m^3 hydraulic excavators (Model CAT349/345 and Sany550) supported by a bulldozer and a front-end loader (FEL) to clean and pile the working face. Broken ore and waste are loaded by the excavators into 30 t or 50 t dump trucks and hauled to the beneficiation plants (~10 km away).

SRK considers the mining and stripping method adopted to be mature mining technology commonly used in open pit mining operations. The designed bench height and bench slope angle are considered reasonable.

6.5 Mining equipment

China Graphite currently has the following mining equipment to support the mining operation:

- Drilling: 1 set of KGH6 DTH drill with mobile air compressor (Atlas Copco brand)
- Mining: 3 sets of excavators, 1 × CAT349, 1 × CAT345, and 1 x Sany550
- Hauling: 10 dump trucks with a nameplate capacity of 30 t and 10 dump trucks with a nameplate capacity of 50 t.
- 1 hydraulic hammer equipped on a CAT340 excavator
- 1 modified watering tank truck
- 1 FEL.

China Graphite plans to purchase an additional FEL in 2022. SRK considers the chosen equipment fleet is reasonable for the graphite ore mining capacity of 0.5 Mtpa and 1.7 Mtpa total material moved. However, the LoM is 20 years, and the equipment should be replaced every 7–10 years.

6.6 Mine service

A flood prevention channel is to be gradually constructed as open pit stripping progresses, and a temporary channel will be established if required as a temporary measure during mining activities.

Provision has been made in the mine design for water sumps to be constructed at the lowest point in the open pit to capture water, which is then discharged in a suitable manner, or pumped to the elevated water tank associated with the processing concentrator. The maximum water discharge capacity of proposed drainage facilities is 300 m3 per day.

Water consumption is mainly attributable to dust suppression and for drilling purposes. A 300 m^3 head tank is proposed in the 2019 FS on a 235 masl bench.

The electric power requirement of the mine site is minimal, and its main uses are the dewatering pump, air compressor and lighting. A 10 kV/0.4 kV substation is located on the mine site and is connected to the national electricity grid.

Maintenance of mobile mining equipment is proposed to be outsourced to the graphite industrial park, where the beneficiation plant and the spherical graphite processing plant are located.

SRK considers the existing water supply and electricity infrastructure to be sufficient for the current and planned operation.

6.7 Mine scheduling

Based on the 2019 FS, the Mine was designed to operate 200 working days per year, with three shifts per day of 8 hours each to account for the snowy weather that usually stops mining activities or reduced mining productivity in the winter months. The designed production rate is 500 ktpa graphite ore mining, and the total material mining capacity is 1.2 Mtpa. During the site visit in July 2020, SRK was informed by site technicians that the operation was currently 12 hours per day by 1 shift, during daylight hours. The arrangement resulted in 1.6 Mt of total material moved in 2020.

SRK has re-scheduled the production based on the parameters and mining sequence proposed in the 2019 FS against SRK's Mineral Resource estimate and open pit design, and the project goal proposed by China Graphite, which plans to achieve the target graphite feed ore capacity of 0.5 Mtpa by 2023.

To reach this target, the annual profile of total material mined has been left unconstrained within reason. The total material mined is expected to attain, 1.78 Mt in 2022 and 1.51 Mt in 2023 respectively, and gradually reduce to 1.42 Mt to 1.38 Mt from 2023 onwards. The current and proposed mining fleet is sufficient to meet the required capacity.

The annual LoM open pit mining schedule for the Mine is presented in Table 6–5 and Figure 6–6. The LoM is 20 years, with an LoM average graphite grade of 10.15% TGC and LoM stripping ratio of 1.15 (waste divided by graphite feed ore plus by-product marble material).

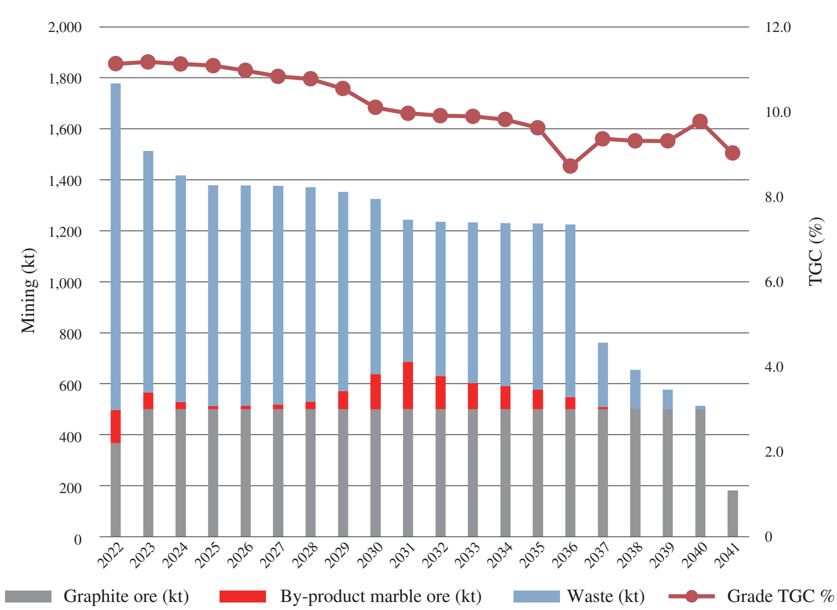

Figure 6–6: Production schedule over LoM

Source: SRK

Table 6–5: Production schedule

Item	Unit	LoM total	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Graphite ore	kt	9,549	367	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	181
Graphite ore grade	TGC %	10	11	11	11	11	11	11	11	11	10	10	10	10	10	10	9	9	9	9	10	9
Marble ore by-product	kt	1,151	130	65	28	12	13	19	30	72	138	185	131	103	92	77	47	7	1	0	0	0
Stripping waste	kt	12,273	1,281	948	889	866	865	857	842	781	687	557	605	629	639	652	678	254	153	77	13	0
Total materials	kt	22,974	1,778	1,514	1,417	1,379	1,378	1,376	1,371	1,353	1,325	1,243	1,236	1,232	1,231	1,229	1,225	761	655	577	513	216
Stripping ratio (S/R)	t/t	1.15	2.58	1.68	1.68	1.69	1.69	1.65	1.59	1.37	1.08	0.81	0.96	1.04	1.08	1.13	1.24	0.50	0.31	0.15	0.03	—

Source: SRK

7 ORE RESERVE ESTIMATION

The definition of Ore Reserves in accordance with the JORC Code (2012) is as follows:

An 'Ore Reserve' is the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes diluting materials 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 conversion from Mineral Resources to is Ore Reserves is presented in Figure 7–1.

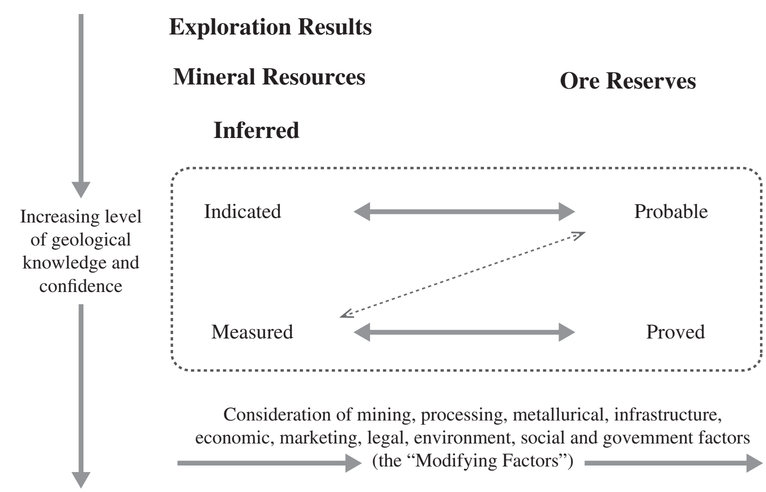

Figure 7–1: General relationship between Mineral Resources and Ore Reserves

Source: JORC Code (2012)

The definition of economically mineable ore is based on the results of open pit optimisation. Open pit optimisation was used to identify the optimum economic open pit shape based on the highest projected cashflow. The marginal cut-off grade (MCOG) of graphite is defined by the destination for material within designed open pit. If the material has a grade higher than the MCOG, the material is trucked to the beneficiation plant, otherwise it is considered waste and dumped onto the waste dump. The marble material within the open pit is by-product, and its contribution to the mine economics has been considered during open pit optimisation process.

The following formula was applied by SRK to estimate the MCOG for the graphite ore, by applying the inputs presented in Table 7–1. The calculation shows that materials within the open pit that have more than 6.6% TGC can be processed economically, and the Ore Reserves at the MCOG will have positive revenues. These assumptions may change in the future, which will affect the MCOG calculation, which will then impact the mine inventory estimation.

$$A = \frac{C^p + C^g + C^t}{R * P}$$

Table 7–1: Estimates of MCOG for graphite ore

Item	Unit	Input	Description
A	%	6.6	Graphite MCOG
Cp	RMB/t Feed Ore	125.7	Processing cost
Cg	RMB/t Feed Ore	14.0	G&A cost
Ct	RMB/t Feed Ore	15	Graphite transport cost
R	%	91.5	Processing recovery for graphite in concentrate
P	RMB/t	2,578	Forecast (95%) graphite concentrate prices

Source: SRK

7.1 Modifying Factors

The following Modifying Factors were used by SRK to determine the Ore Reserve.

- Optimal pit shell: included the Mineral Resources within the economic pit limits.
- Open pit design: the conversion factor for the Ore Reserve between the optimized open pit shell and the practical mine design has been accounted for in this parameter.
- Dilution: mining dilution was estimated as 5% by the 2019 FS but recorded as 10% in the 2020 production record. A 10% dilution rate was adopted for Ore Reserve estimation purposes.
- Mining recovery: a 5% mining loss rate was applied in the 2019 FS, which is consistent with the operational records.

7.2 Ore Reserve estimates

The estimated Ore Reserve based on the Mineral Resource estimate and Modifying Factors to the tonnage and contained graphite is summarized in Table 7–2, and illustrated in the waterfall chart shown in Figure 7–2.

Table 7–2: Ore Reserve estimation

Description	Tonnage *(kt)*	Grade *(TGC %)*
Indicated Mineral Resource (at a 3.5% TGC grade cut-off)	14,158	9.6
Indicated Mineral Resource in optimal pit shell	10,196	10.3
Open pit design	11,326	10.1
Indicated Mineral Resource in open pit design (at a 6.6% TGC MCOG)	9,385	11.2
Allowance for dilution	936	—
Mining loss	(516)	10.2
Mining inventory	9,808	10.2
2021 Depletion	(258)	10.9
Ore Reserve	9,549	10.1

Source: SRK

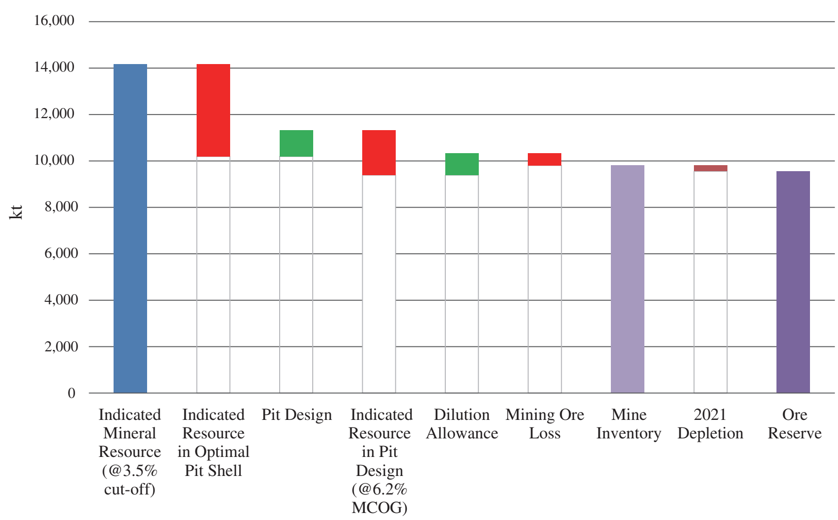

Figure 7–2: Ore Reserve estimation waterfall chart

Source: SRK

7.3 Ore Reserve Statement

Applying the Modifying Factors, SRK estimated the Ore Reserve of the Mine in accordance with the JORC Code (2012) and presents them in Table 7–3, inclusive of Mineral Resources. The economically mineable parts of the Indicated Mineral Resources within the open pit design and the current mining license limits, including diluting materials and allowances of losses, were classified as Probable Ore Reserves. Production in 2021 has been depleted from the Ore Reserve.

Table 7–3: Graphite Ore Reserve Statement within the mining license elevation limits — Yixiang Graphite Project as at 31 December 2021

Ore Reserve Category	Ore Reserve *(kt)*	Grade *(TGC %)*
Probable	9,549	10.15

Table 7–4: Marble Ore Reserve Statement within the mining license elevation limits — Yixiang Graphite Project as at 31 December 2021

Ore Reserve Category	Ore Reserve *(kt)*
Probable	1,152

8 METALLURGY AND MINERAL PROCESSING

8.1 Introduction

The Project is an existing graphite mining and processing operation.

In 2006, China Graphite built a beneficiation plant and began processing ores from third parties and producing flake graphite concentrates. As a result, it has an established historical operating basis on which to base future upgrades. The existing plant adopted a flotation flowsheet incorporating primary grinding, rougher flotation, multiple stages of regrinding on the primary concentrate and multiple stages of cleaning, to produce high-carbon graphite concentrates. Debottlenecking and upgrades completed in 2013 expanded the processing capacity to 0.4 Mtpa. From the historical production records, the graphite grade of concentrate was above 94% TGC and the graphite recovery was over 90%. A second phase of expansion was completed in the third quarter of 2021 and the upgraded processing capacity is nominally 0.5 Mtpa.

Between 2006 to 2018, the feed ore was provided by third parties. In 2019, the operation began to process graphite ore from its own Mine and reduced reliance on third parties' ores.

In 2011, China Graphite built a spherical graphite processing plant to the west of the current beneficiation plant. It processes graphite concentrate from the beneficiation plant to produce spherical graphite, a graphite anode material used in lithium-ion batteries. In 2019, an additional production line was installed. The current production capacity is 5,200 tpa spherical graphite. Since the fourth quarter of 2021, the spherical graphite processing plant has been being upgraded. The upgrade is expected to be completed by the second quarter of 2022 with a nominal capacity of 6,500 tpa spherical graphite.

To date, the major products from the Project comprises flake graphite concentrate and spherical graphite. As by-products of the spherical graphite processing, micro graphite powder and high-purity graphite powder are also produced (Figure 8–1 and Figure 3–2).

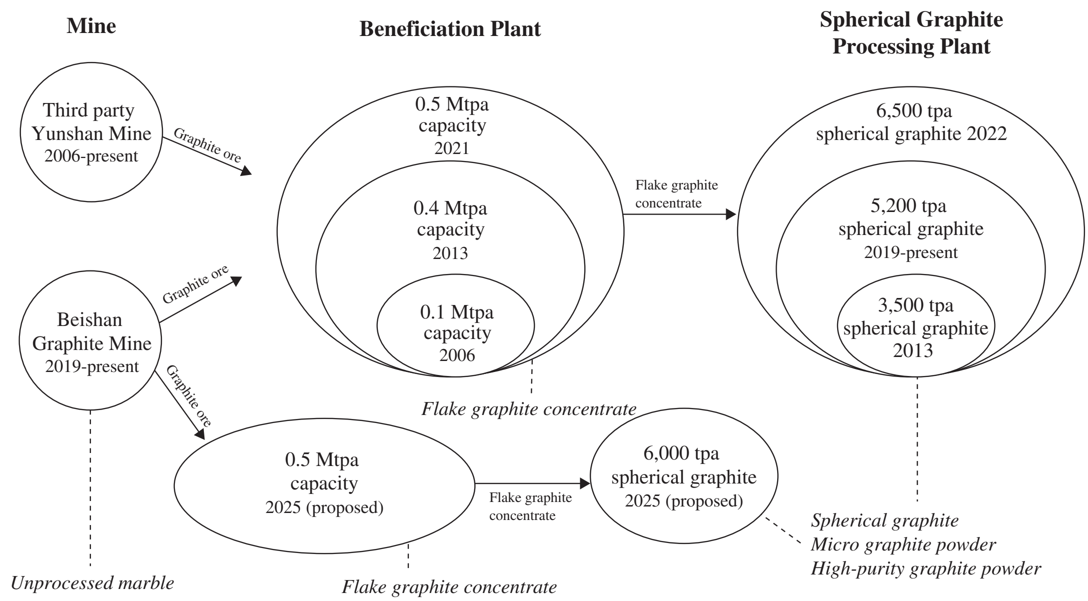

Figure 8–1: China Graphite production workflow

Source: China Graphite information memorandum, compiled by SRK

China Graphite plans to build a new beneficiation plant with a throughput capacity of 0.5 Mtpa located beside the Mine to increase the total beneficiation capacity to 1.0 Mtpa by 2025. A new spherical graphite processing plant with an annual processing capacity of 17,000 t is also proposed. The new plant targets an annual production of 6,000 t of spherical graphite and 10,000 t of micro graphite powder. The target date for commissioning of the new plant is 2025.

8.2 Metallurgical testwork

8.2.1 Testwork samples

China Graphite planned to commence processing third party ores and use ores from its own Mine. In order to facilitate this plan, China Graphite commissioned Suzhou Sinoma Design and Research Institute of Non-metallic Minerals Industry Co., Ltd. (Sinoma) to conduct metallurgical testwork on the weathered and fresh ores from the Mine in 2016. The test samples were collected by Ruifa.

Two composite samples were collected. The weathered ore composite was collected from surface trenches and the fresh ore composite was collected from multiple drill core intervals at a depth of at least 30 m below the surface. Each of the weathered and fresh ores composites were combined with hangingwall and footwall waste rock to represent typical dilution levels encountered during mining. This waste component represented 8% of the total sample weight. The sample numbers and collection locations are shown in Table 8–1 and Table 8–2 and Figure 8–2, respectively. The average grades of the weathered and fresh ore composites were 10.23% and 10.30% TGC, respectively. The samples were composited to reflect different parts of the orebody. They are regarded as representative and allows the variability of behaviour between fresh and oxidized domains to be determined.

Table 8–1: Metallurgical samples of weathered ore

Trench ID	Sampling location From *(m)*	To *(m)*	Sample weight *(kg)*	Grade *(TGC %)*
TC6–1	24.00	104.00	64.00	10.05
TC8–1	167.00	210.00	34.64	9.82
TC6–1	195.20	251.50	45.04	9.82
TC8–1	276.20	325.50	39.44	14.11
TC14–2	210.00	258.00	38.40	4.89
TC10–1	21.50	54.00	26.00	10.72

Trench ID	Sampling location From *(m)*	To *(m)*	Sample weight *(kg)*	Grade *(TGC %)*
TC8–3	10.70	53.00	33.84	6.54
TC10–2	92.00	141.00	39.20	15.50
TC4–1	208.00	233.50	20.40	14.03
Ore			361.36	10.23
Wall rock			80.00	
Total			**441.36**	

Source: Sinoma, compiled by SRK

Table 8–2: Metallurgical samples of fresh ore

Drillhole ID	Sampling location From *(m)*	To *(m)*	Sample weight *(kg)*	Grade *(TGC %)*
ZK6–1	30.00	54.70	18.53	10.85
ZK6–2	30.00	43.60	10.20	12.04
ZK6–3	30.80	85.00	10.65	10.54
ZK6–4	49.10	97.00	35.93	8.87
ZK10–5	58.15	126.40	51.19	13.23
ZK10–1	31.90	59.10	20.40	10.81
ZK10–1	64.20	106.00	31.35	11.96
ZK10–3	30.30	74.00	32.78	8.99
ZK10–2	39.00	56.15	12.86	12.08
ZK12–1	45.00	173.00	96.00	8.69
ZK12–2	30.00	86.00	42.00	9.76
Ore			391.89	10.30
Wall rock			40.00	
Total			**431.88**	

Source: Sinoma, compiled by SRK

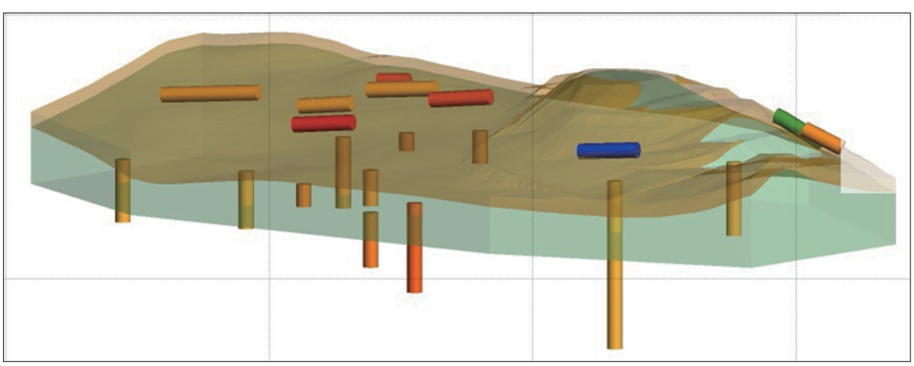

Figure 8–2: Beishan Mine graphite orebody and relative metallurgical sampling locations

Source: SRK

8.2.2 Mineralogy

The results of the head grade analysis of the composite samples are shown in Table 8–3. The key chemical composition is silica, aluminum oxide, graphitic carbon and iron oxide as well as trace amounts of titanium, phosphorus and sulfur. The chemical composition of weathered ore and fresh ore are very similar. Mineral composition and content of the ore are shown in Table 8–4.

Table 8–3: Composite sample head grade analysis

	Element content (%)									
Sample	Graphitic carbon	SiO_2	Fe_2O_3	Al_2O_3	K_2O	Na_2O	CaO	MgO	TiO_2	Loss of Ignition (LOI)
Weathered ore	10.22	54.17	5.03	13.16	2.45	2.8	3.79	2.07	0.68	15.94
Fresh ore	10.15	53.01	5.18	13.11	2.41	2.8	4.16	2.18	0.63	16.53

Source: Sinoma, compiled by SRK

Table 8–4: Principal mineral assemblage

Mineral	Graphite	Quartz	Mica	Albite	Microcline	Chlorite	Tremolite	Calcite
Content (%)	10	44	13	8	9	6	5	5

Source: Sinoma, compiled by SRK

The ore is hosted in a mica-graphite-plagioclase schist. The graphite component is in a flake graphite form. The oxidized ore is relatively loose and soft with extensive joint fissures. Feldspar, muscovite and pyrite are commonly turned into kaolin, sericite and limonite. Its loose and soft nature makes it easy to mine and process. Fresh ore has the same mineral composition as weathered ore, but is harder than the weathered ore.

The ore has a flaky metamorphosed texture under a microscope. Principal minerals are graphite, quartz, calcite, tremolite and diopside, with minor garnet, rutile, muscovite, allanite and pyrite. Graphite is the target mineral. It is opaque and flaky under polarized light. The mineral is grey under a reflecting microscope, with obvious pleochroism and directional distribution. The graphite grain size ranges from 0.050 mm to 0.150 mm, i.e. is relatively fine, with a maximum size of 0.8 mm. Graphite is interlocked with gangue minerals such as pyrite, quartz and calcite with straight edges, while a trace amount of graphite is deformed. The thickness of graphite flakes is uneven, ranging from 0.005 mm to 0.124 mm. The modal content of graphite is approximately 10% (Table 8–5).

Table 8–5: Particle size distribution of the Yixiang graphite ore samples

Particle size		Grain distribution		Area distribution (%)	
µm	mesh	Traversing number of grains	%	Distribution rate	Cumulative distribution
+600	+30	5	0.38	5.42	5.42
–600+300	–30+50	14	1.07	7.58	13
–300+150	–50+100	79	6.06	21.4	34.4
–150+75	–100+200	194	14.89	26.27	60.67
–75+37	–200+400	354	27.17	23.97	84.64
–37+20	–400+800	300	23.02	10.16	94.8
–20+10	–800+1,250	257	19.72	4.35	99.15
10	1,250	100	7.67	0.85	100
Total		1303	100	100	

Source: Sinoma, compiled by SRK

8.2.3 Metallurgical testwork

Grinding and flotation are two important processes in graphite beneficiation. The purpose of grinding is to liberate the graphite from other gangue minerals so that it can be subsequently separated. Flotation aims to enrich the liberated graphite through utilizing the natural hydrophobicity of the graphite surface in order to separate it from the other waste minerals with the application of flotation reagents.

Sinoma has conducted systematic flotation tests over a range of conditions, including rougher feed (primary grind) size, flotation feed solids concentration, flotation residence times, regrind size feeding cleaner flotation, different reagent types and strengths, open circuit and locked-cycle flotation testing, to define the optimum flowsheet and conditions for graphite beneficiation. This benefits from the experience gained by the historical operation.

The processing flowsheet of weathered and fresh ore is the same as shown in Figure 8–3, with a single-stage rougher, single-stage scavenger, 5-stage regrinding on primary concentrate and 7-stage cleaning and collective middlings recycling. The primary grind size is -75 µm (60% passing -200 mesh). Paraffin is used as a collector of graphite, 2# oil as a frothing agent and sodium silicate as an inhibitor of gangue minerals. The results of the locked-cycle test are shown in Table 8–6. The graphite concentrate grades of both composite samples are over 95%, achieving a high-purity graphite product specification (94.0% ≤ graphitic carbon content ≤ 99.9%). The graphite recovery of weathered ore is 94.5%, while the fresh ore is 93.7%. The metallurgical test results of the two types of ores are very similar.

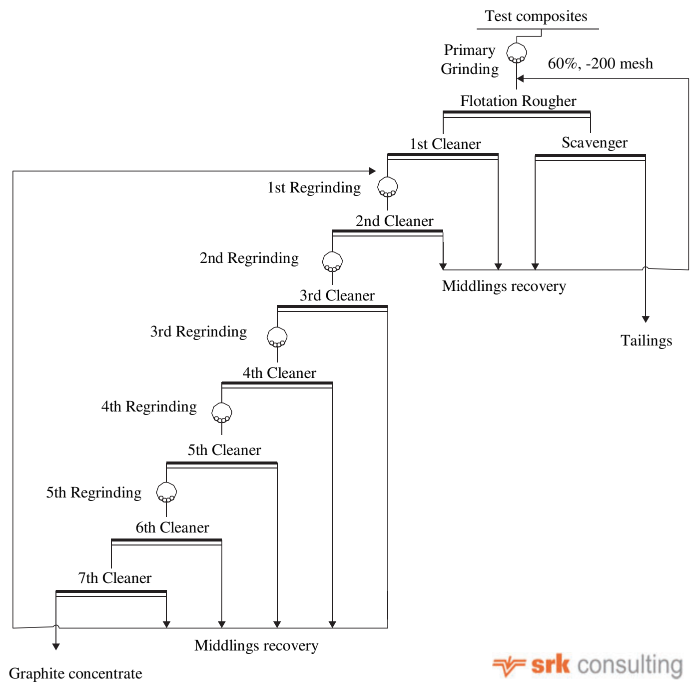

Figure 8–3: Testwork flowsheet for the Yixiang graphite composite samples

Source: Sinoma, compiled by SRK

Table 8–6: Results of locked-cycle test

Ore	Product	Yield (%)	Grade (%)	Recovery (%)
Weathered	Concentrate	10.12	95.45	94.52
	Tailings	89.88	0.62	5.48
	Raw ore	100	10.2	100
Fresh	Concentrate	10	95.11	93.7
	Tailings	90	0.71	6.3
	Raw ore	100	10.15	100

Source: Sinoma, compiled by SRK

X-ray diffraction (XRD) analysis showed that the major impurities in the concentrate are mica and kaolin. The multi-chemical analysis showed that the impurities composition is predominantly made up of SiO_2, Al_2O_3 and Fe_2O_3, as shown in Table 8–7.

Table 8–7: Major chemical composition of the graphite concentrate

Composition	Graphitic carbon	SiO_2	Al_2O_3	Fe_2O_3	K_2O	Na_2O	CaO	MgO	TiO_2	LOI
Content (%)	95.45	2.49	1.34	0.18	0.13	0.11	0.12	0.17	0.03	0.005

Source: Sinoma, compiled by SRK

The particle size analysis of the concentrate is shown in Table 8–8. The grain size of the concentrate is 10%-16% larger than +100 mesh (150μm) and 84%-90% less than -100 mesh that includes 34%-42% of 325 mesh (45μm), as shown in Table 8–8.

Table 8–8: Particle size analysis of the graphite concentrate

Particle size (μm)	Yield (%)	TGC (%)
+300	0.06	94.01
–300+150 (100 mesh)	0.36	94.2
–150+100	1.92	95.11
–100+45	27.15	96.13
45 (325 mesh)	70.51	95.21
Total	100	95.45

Source: Sinoma, compiled by SRK

8.2.4 Testwork conclusions

The Mine contains a flake graphite which is amenable to processing through conventional beneficiation processes. Treatment is through crushing and grinding, rougher and scavenger flotation of the primary mill product, followed by 5-stage regrinding and 7-stage cleaning on the primary (rougher) concentrate. A high-carbon grade graphite concentrate can be produced with a grade above 95% TGC and a graphite recovery over 93%. The final graphite concentrate product, which is thickened and filtered, has a 10%-16% larger than +100 mesh (150 µm) and 84%-90% less than -100 mesh that includes 34%-42% of 325 mesh (45 µm).

The beneficiation behaviours of the weathered and fresh samples are very similar. This allows the same processing flowsheet to be used for both ore types, to obtain, in general, the same graphite recovery and graphite concentrate grade results. Therefore, in practice, the two ores do not require separate treatment.

8.3 Beneficiation plant

8.3.1 History and current status

Luobei County is rich in graphite resources and is one of China's largest graphite producing centers. The Yunshan graphite mine in Luobei County is regarded as one of the largest graphite mines in Asia (Li et al., 2016). The Yunshan graphite mine was the major source of third-party ores for China Graphite. In 2005, China Graphite commenced construction of a beneficiation plant in the Luobei Graphite Industrial Park, which began processing graphite ore from the Yunshan graphite mine to produce graphite concentrate.

The initial processing capacity of the beneficiation plant was 0.1 Mtpa feed which produced 10,000 tpa of graphite concentrate. In 2013, Heilongjiang Metallurgical Design and Planning Institute redesigned the plant to increase the processing capacity. Based on the design, the beneficiation plant was upgraded to include two separate crushing lines, three grinding lines, two flotation lines and three concentrate dewatering-drying lines which were able to produce graphite concentrate from the Yunshan graphite mine ores. The two crushing circuits use 3-stage and 4-stage open-circuits flowsheets respectively, to produce final products with a particle size of less than 20–30 mm. The three grinding circuits all incorporate the same single-stage closed circuit configuration to generate product with 60%-70% passing -75 µm fineness.

The flotation flowsheet involves a single-stage rougher, single-stage scavenger, 10-stage regrinding on primary (rougher) concentrate followed by 11-stage cleaning and collective middlings recycling. The graphite concentrate undergoes 2-stage 'filtering and drying' to dewater the product. This is then packaged, inspected, and stored as flake graphite concentrates that are saleable, or alternatively, can be used as feedstock for further processing. The quality of the product, including graphitic carbon content, flake size and other physical parameters is checked to ensure industry and national standards are met. (Figure 8–5).

In 2019, the plant began to process graphite ores from the Mine, in addition to ores purchased from third parties. In order to match an increase of the mining production rate from the Mine, China Graphite has recently completed a plant expansion in the third quarter of 2021. The new flotation circuit has been installed beside the existing grinding and flotation workshop. The processing capacity has reached 0.50 Mtpa to produce approximately 50,000 t of graphite concentrate.

Figure 8–4: Panoramic view of China Graphite's beneficiation plant, tailings storage facility and spherical graphite processing facility

Source: SRK site visit, July 2020

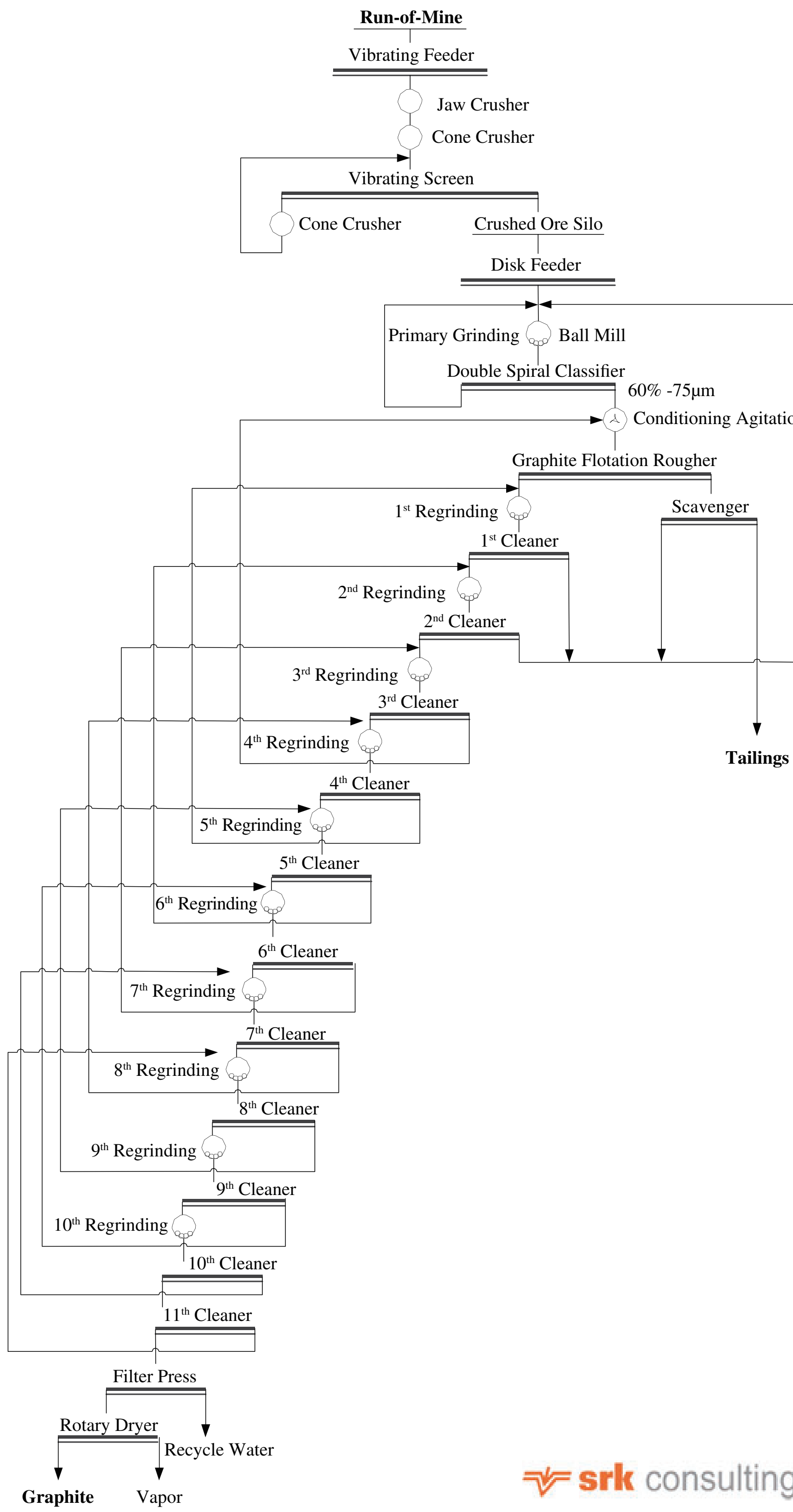

Figure 8–5: Current beneficiation plant flowsheet

Source: China Graphite information memorandum

8.3.2 Beneficiation plant mechanical equipment

The current beneficiation plant has a run-of-mine (RoM) pad, RoM bin, crushing circuit, crushed ore storage, primary grinding circuit, flotation plant, concentrate dewatering circuit and concentrate storage shed (Figure 8–6). The key mechanical equipment of the beneficiation plant is listed in Table 8–9 and Table 8–10, while the flotation equipment related to the expansion is also listed.

The beneficiation plant has undergone a number of phases of development and upgrading since 2005. The set-up comprises a large amount of small-scale equipment which appears not to perform in an optimal condition.

Table 8–9: Crushing and primary grinding equipment in the current beneficiation plant

Item	Equipment name	Model/specification	Power *(kW)*	Amount
1	Heavy plate feeder	GBZ150-6	22	2
2	Medium plate feeder	HBG1200×3000	11	1
3	Disk feeder	CK20	7.5	2
4	Jaw crusher	PEF750×1060	110	2
5	Jaw crusher	PE600×900	75	1
6	Jaw crusher	PEX250×1200	45	1
7	Jaw crusher	PEX300×1300	75	2
8	Jaw crusher	PEV950×1250	160	1
9	Hammer crusher	Φ2m	160	2
10	Ball mill	GMC2745	570	1
11	Spiral classifier	FG-24	30	1
12	Ball mill	MQS2145	280	2
13	Spiral classifier	FG-20	28	2

Source: China Graphite information memorandum

Table 8–10: Flotation and concentrate regrinding equipment

Item	Equipment	Model/specification	Power *(kW)*	Amount
13	Ball mill	MQS1530	95	1
14	Ball mill	MQS18.3×4.5	95	1
15	Ball mill	MQS1245	55	2
16	Spiral classifier	FG-12	15.4	2
17	Wet ultrafine mill	SDM12	150	3
18	Vertical mill	Φ800	15	42
19	Stirring tank	Φ2000×2300	11	1
20	Stirring tank	Φ2500×2500	15	1
21	Flotation machine	BSK-8	19.6	18
22	Flotation machine	FS-4	16.5	36
23	Flotation machine	XJ-2.8	5	98
24	Flotation machine	XJ-1.1	4	32
25	Flotation machine	BF-24	55	3
26	Flotation machine	JJF-24	45	9
27	Flotation machine	BF-16	45	10
28	Flotation machine	JJF16	37	22
29	Ultrafine mill	1750×1750	75	9
30	Vertical sand mill	Φ1000	37	14
31	Vacuum filter	GD-12	4	4
32	Vacuum filter	GD-24	7.4	1
33	Rotary dryer	Φ2.2×23m	30	1
34	Rotary dryer	Φ1.8×23m	28	1
35	Rotary dryer	Φ2.4×23m	35	1

Source: China Graphite information memorandum

Figure 8–6: New flotation machines

Source: China Graphite information memorandum

8.3.3 Production and sales records

The actual production figures between 2018 and 2021 are presented in Table 8–11. The amount of processed ores was approximately 0.32 Mt and 0.42 Mt in 2018 and 2019, respectively. In 2020, the production volume was 0.39 Mt. In the third quarter of 2021, the expanded processing capacity is expected to reach a throughput capacity of 0.5 Mtpa, with a concentrate recovery of approximately 91.5%. The average graphite concentrate grades range between 94% and 95% TGC, and the graphite recovery is above 90%. This is consistent with the sales records which shows the majority of the concentrate sales were type -194, -195 and -196, indicating the mesh size of these products are below 100 mesh with grades between 94.0% and 96.8% TGC (Table 8–12). The forecast production profile is shown in Table 8–13.

From 2019, the raw ores processed in the plant have been mined from the Company's Beishan graphite mine and from third parties. The new Beishan beneficiation plant will reach its designed production capacity of 0.5 Mt by 2025, the existing plant will continue its operation with ores from third parties, while the new plant will be dedicated to ores from the Mine.

Table 8–11: 2018–2021 flake graphite concentrate production records

Items	Unit	2018	2019	2020	2021
Feed ore volume	Mt	0.32	0.42	0.39	0.51
Feed ore grade	%	9.33	7.97	10.27	9.58
Concentrate output	kt	27	31	38	48
Average concentrate grade	% TGC	94.52	93.96	94.01	95.28
Concentrate yield	%	8.5	7.4	10	9.50
Concentrate recovery	%	86	87.4	91.4	94.5
Flake graphite concentrate direct sales	kt	15	18	34	37
Spherical graphite processing feed	kt	10	8	10	12

Source: China Graphite information memorandum

Table 8–12: 2019–2021 flake graphite concentrate sales records

Type	2019 *(t)*	2020 *(t)*	2021 *(t)*
–194	8,396	11,132	18,102
–195	4,007	13,837	15,803
–196	2,002	3,671	1,339
Other	3,996	5,494	2,015
Total	18,401	34,134	37,259

Source: China Graphite information memorandum

Table 8–13: Beneficiation plant forecast production profile

Production Profile	Unit	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Third party ore volume	—	0.13	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Beishan ore volume	—	0.37	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.22
Total feed ore volume	Mt	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.22
Feed ore grade	% TGC	10.70%	11.18%	11.12%	11.08%	10.97%	10.83%	10.77%	10.54%	10.10%	9.97%	9.91%	9.89%	9.82%	9.63%	8.73%	9.37%	9.32%	9.32%	9.78%	7.59%
Flake graphite concentrate output	kt	51.51	53.82	53.56	53.37	52.81	52.15	51.85	50.75	48.62	47.99	47.71	47.65	47.30	46.37	42.03	45.14	44.90	44.88	47.10	15.77
Flake graphite concentrate grade	% TGC	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
Flake graphite concentrate direct sales	kt	35.01	36.82	36.56	36.37	35.81	35.15	34.85	33.75	31.62	30.99	30.71	30.65	30.30	29.37	25.03	28.14	27.90	27.88	30.11	13.77
Spherical graphite processing plant feed	kt	16.50	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	2.00

Source: China Graphite information memorandum, compiled by SRK

8.3.4 Current tailings storage facility

The tailings storage facility (TSF) is located on the northern bank of Yadan River, adjacent to the north of the beneficiation plant and spherical graphite processing facility. The TSF was constructed on flat ground. The wall is a one-off compacted embankment dam. The designed storage capacity is 1,592,000 m^3. Applying the utilization factor of 0.75, the effective storage capacity is 1,194,000 m^3. The highest point of the dam is 21.5 m; the width of the dam crest is 4–10 m. The elevation of the dam bottom is 228.5 m, while the dam crest is 280.5 m. The water level inside the storage facility is 245 m. The storage facility has already accumulated approximately 572,000 m^3 of tailings or 760,760 t. Tailings are pumped from the beneficiation plant to the TSF through a pressurized pipeline, and settle along the northern, eastern and southern faces (Figure 8–7).

A 70 m × 130 m × 2 m decant water pond has been constructed at the western dam toe. A 70 m × 35 m × 2 m overflow pond is built north of the backwater pond as a flood control. Clarified water in the TSF is drained into the decant pond using a well-pipe drainage facility and pumped back for use in the beneficiation plant. The 325 mm diameter central decant (drainage) well and the 267 mm diameter drainage pipe are able to drain water via gravity under normal working conditions. A 0.8 m diameter overflow pipe is laid inside the western dam (the discharge outlet is connected to a metal chute to prevent the influx of water during flooding). Two water pumps have been installed in the western dam as auxiliary discharge equipment.

The Yadan River is located to the south of the TSF. To prevent the river eroding the dam and discharging the seepage water of the dam, prism drainage is designed at the toe of the southern dam. The prism is built with waste rock. It is 3.0 m in height with a 1:15 outer slope. Its surface width is 3.0 m.

To meet the LoM operation requirements of the beneficiation plant, China Graphite signed a 'Tailings Comprehensive Utilization Agreement' on 3 January 2015 with an independent third party, which is responsible for re-using the tailings to produce bricks. In July and August 2021, similar agreements were signed with two other companies. China Metallurgical Mining Anshan Metallurgical Design and Research Institute Co., Ltd. has designed a workflow in the 'Design on the reconstruction of the flat ground tailings storage into a safety facility for Heilongjiang Baoquanling Nongken Yixiang Graphite Co., Ltd.'. Dredging, re-mining and refurbishment are being collectively carried out during the winter break period every year to free up new storage required for the next year. Part of the cleared tailings is also stored at a secondary TSF. The secondary TSF is located approximately 3 km to the east of the current TSF. The designed capacity is 900,000 m^3.

Figure 8–7: Current tailings storage facility, looking from the southeast to northwest

Source: SRK site visit, July 2020

8.3.5 Conclusion and recommendations

- The current beneficiation plant has a processing capacity of nominally 0.4 Mtpa, producing a high- purity graphite concentrate powder. The expansion program was completed on the existing processing facility in the third quarter of 2021 with a throughput capacity of 0.5 Mtpa.

- The current beneficiation plant has been gradually scaled up from the original 0.1 Mtpa capacity. The current set-up comprises a large amount of small-scale equipment. This arrangement is not as efficient as a plant that has larger mechanical equipment and is more complex to operate, with associated higher operating costs. The production capacity can be maintained but the operation rate is not optimized, and maintenance and operation costs are high. SRK recommends to gradually replace the old equipment with larger-scale alternatives when the conditions are favorable. Adopting larger equipment to upgrade the current plant can expand the processing capacity and achieve the amount of production required for further processing.

- The current TSF of the beneficiation plant is a paddock-style TSF, constructed on flat ground with fixed storage capacity. Tailings are required to be reclaimed during the 3–4 months operation break time in winter, to free up tailings storage space for next year. The reclaimed tailings were sent to local construction companies for use as raw materials in brick production. Some of the reclaimed tailings are also stored temporarily at a secondary TSF, located 3 km to the east of the current TSF.

8.4 Spherical graphite processing plant

8.4.1 History and current status

The current processing plant is located west of the existing beneficiation plant. It started operation in 2011 and has four spherical graphite workshops. Facilities include a micronizing and rounding circuit, purification circuit, acid-and-alkali circuit, drying circuit, iron removal circuit, packaging plant and maintenance workshop. In 2019, an additional production line was installed. The current production capacity is 5,200 tpa of spherical graphite product. China Graphite has applied for a patent for the processing flowsheet generating a micro-spherical product, namely 'A processing flowsheet on fine-grained highly vibrated spherical graphite'. China Graphite's office and the processing plant building are shown in Figure 8–8.

Figure 8–8: Spherical graphite processing plant

Source: SRK site visit, July 2020

The rounding circuit at the spherical graphite processing plant is shown in Figure 8–9. The processing plant uses the high-carbon flake graphite concentrate as raw material, upgrading the flake graphite concentrate through a flowsheet of 'pulverizing-rounding-classifying-purifying-drying-iron removal', producing spherical graphite and the by-products, micro graphite powder and high-purity graphite powder.

The graphite concentrate of 95% TGC is pulverized and rounded on the pulverising (micronizing)- rounding production line, and then separated into micro graphite powder and spherical graphite by an air classifier. The spherical graphite is produced through purification by leaching impurities from the graphite with hydrochloric acid and nitric acid, is washed to pH 5 using deionized water, filter pressed, dried, and undergoes any final iron removal by a high intensity magnetic separator. A small amount of high-purity graphite powder by-product is collected during the drying stage (Figure 8–10).

The pulverising (micronizing)-rounding production line consists of 162 ultrafine pulverizer, 52 classifiers, 18 double cyclone separators, 23 pulsed dust collectors, 23 roots blowers and 2 air compressors (12 m^3/0.8 MPa). The above equipment is connected to piping. The whole production process is carried out in a complete locked automated network operation. Spherical graphite and micro graphite powder with different specifications are produced after 18 stages of grinding and 14 stages of classifying. The historical production volume is presented in Table 8–15. SG10 (denotes the radius of 10 μm for each spherical graphite), is one of the key products. As by- products of the spherical graphite process, micro graphite powder and high-purity graphite powder are also produced. Table 8–16 summarizes the sales volume of spherical graphite and by-products between 2019 and 2021.

Since the fourth quarter of 2021, China Graphite has commenced an expansion program of the spherical graphite processing plant and such work is expected to be completed by the second quarter of 2022. Upon completion of the expansion and being fully operational, the total processing capacity will be raised to 6,500 tpa.

Table 8–14 shows the current and new processing mechanical equipment. Table 8–15 and Table 8–16 show the historical production and sales records. The historical production figures show that the spherical graphite processing yields range from 28.1% in 2018, 35.3% in 2019 and 36.1% in 2020 to 36.8% in 2021. The forecast production profile of the spherical graphite plant with an expected processing yield of 35% is shown in Table 8–17.

Figure 8–9: Rounding circuit in the spherical graphite processing plant

Source: SRK site visit, July 2020

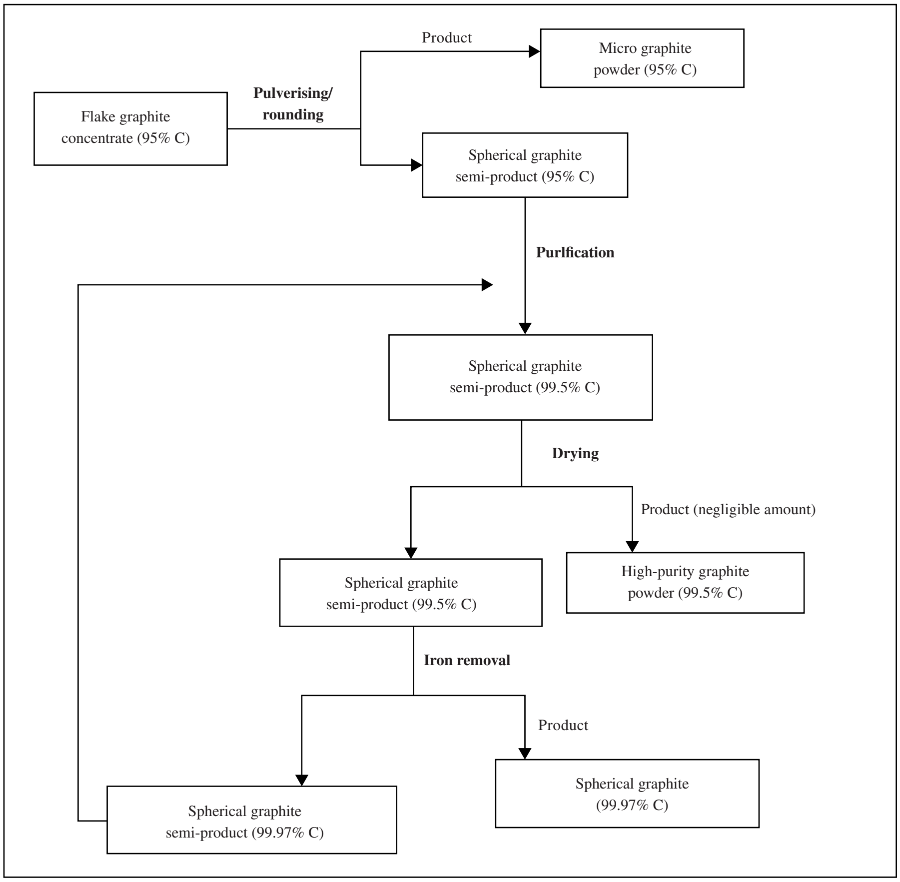

Figure 8–10: Spherical graphite flowsheet

Source: China Graphite information memorandum

Note:

Pulverizing and rounding — flake graphite concentrate is pulverized to around 40 microns. Once ground, the graphite undergoes further shaping and classification processes to produce spheroidal shaped particles with a "cabbage" structure. The round shape is necessary for them to be spread thinly and uniformly during the high-speed manufacturing process. The reject during this process is collected as micro graphite powder by-product.

Purification and drying — spherical graphite is then purified using hydrofluoric and nitric acid through leaching impurities. After purification, it will be dehydrated first via a press filter, and then with a centrifuge. Spherical graphite with 99.5% graphitic carbon is produced. The reject during this process is high-purity graphite powder.

Iron removal — iron removal was undertaken to remove any remaining magnetic iron impurities that have an impact on the commercial use of spherical graphite.

Table 8–14: Spherical graphite processing plant current and new

Item	Equipment	Model	Unit
1	Ultrafine pulverising unit	GWFL50/GWFL70	162
2	Classifier	FJJ-3.5	52
3	Pure water equipment	6 m^3/h	1
4	Acid tank	Acid-resistant FRP material	3
5	Measuring tank	Acid-resistant PP material	3
6	Material tank	Acid-resistant PP material	8
7	Reactor kettle	Acid-resistant PP material	18
8	Centrifuge	PAUT1600S	4
9	Filter press	Acid-resistant material	4
10	Feeder pump	Acid-resistant material	8
11	Tunnel kiln	Gas type	1
12	Stainless steel disk	304 stainless steel	75*24
13	Mixer	3 m^3	1
14	Rotary vibrating screen	XZKS-0.8–1F	3
15	Ultrasonic shaking sieve	JXZS-1	3
16	Magnetic separator	10000GS or above	3
17	Packaging scale		1
Expansion equipment			
18	Ultrafine pulverising unit	GWFL40/C/50/70	31
19	Classifier	GWFJ230/260	17
20	Cyclone separator	2–650	15

Source: China Graphite information memorandum

Table 8–15: Historical spherical graphite processing plant production records

Materials	**TGC**	**2018**	**2019**	**2020**	**2021**
	%	*(t)*	*(t)*	*(t)*	*(t)*
Flake graphite concentrate feed	95%	9,957	8,446	10,243	12,419
Spherical graphite product	99.97%	2,437	3,267	2,668	3,992
Micro graphite powder by-product	95%	6,165	6,073	6,202	7,600
High-purity graphite by-product	99%	172	7	157	1
Processing yield		28.1%	35.3%	36.1%	36.8%

Note: Semi-finished products are not shown in this table.

Processing yield is derived from each workshop (pulverizing/rounding, purification, drying and iron removal) performance.

Source: China Graphite information memorandum

Table 8–16: 2019–2021 spherical graphite and by-products sales records

Type	**2019**	**2020**	**2021**
	(t)	*(t)*	*(t)*
Spherical graphite			
SG-10	2,343	3,479	3,059
Other specifications	645	444	3,002
Subtotal	2,988	3,923	6,061
Micro graphite powder	5,049	6,296	7,733
High-purity graphite powder	282	134	48
Total	**8,319**	**10,353**	**13,842**

Note: Sales volume includes: (i) finished products; and (ii) unfinished products.

Source: China Graphite information memorandum

Table 8–17: Spherical graphite plant forecast production profile

Production Profile	Unit	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Spherical graphite processing plant feed	kt	16.50	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	2.00
Spherical graphite product	t	5,780	5,955	5,955	5,955	5,955	5,955	5,955	5,955	5,955	5,955	5,955	5,955	5,955	5,955	5,955	5,955	5,955	4,904	5,955	701
Micro graphite powder	t	9,683	9,976	9,976	9,976	9,976	9,976	9,976	9,976	9,976	9,976	9,976	9,976	9,976	9,976	9,976	9,976	9,976	9,976	9,976	1,174
High-purity graphite powder	t	230	237	237	237	237	237	237	237	237	237	237	237	237	237	237	237	237	237	237	28

Source: China Graphite information memorandum, compiled by SRK

8.5 New beneficiation plant development plan

China Graphite's overall strategy is to establish a vertically integrated production capacity at Beishan, the same location of the mine site, from graphite ore mining to beneficiation and spherical graphite processing. Further research and studies will also be conducted to investigate the economic and technical viability of producing high value products, such as high-purity graphite, coated spherical graphite and graphitized spherical graphite.

China Graphite plans to implement this strategy in phases. The first phase of the strategic development is to develop a 0.5 Mtpa beneficiation plant at Beishan to establish a combined beneficiation capacity of 1.0 Mtpa by 2025, with 0.5 Mtpa capacity at Beishan and 0.5 Mtpa at the current plant. Half of the feed ore will be produced from the Company's Mine and the remaining 50% will be from third parties. At Beishan, the second phase of the strategic development is to construct a spherical graphite processing plant. The spherical graphite processing plant targets to processing of 17,000 t of flake graphite concentrate annually, representing approximately one-third of the flake graphite concentrate being produced by the new beneficiation plant, and production of 6,000 t of spherical graphite and 10,000 t of micro graphite powder. The spherical graphite processing plant targets commencement of production in 2025.

A feasibility study, 'Beishan Graphite 0.5Mtpa Beneficiation Plant', was prepared in March 2021 (the Beishan Study), by Yantai Oriental Metallurgical Design Institute. SRK considers the level of detail and accuracy of the Beishan Study is commensurate with a pre-feasibility study study. The spherical graphite processing plant is supported by a business study, prepared by Yantai Oriental Design Institute in April 2021, with conceptual targets, key technical parameters and a high-level financial evaluation. SRK considers the level of detail and accuracy of the business study is at a conceptual stage.

Based on the resources of the Mine, the Beishan Study has included a study of the product plan, construction plan, beneficiation, TSF, public and auxiliary facilities, environment, safety and technical economic aspects. The new beneficiation plant will be located 300 m to the southeast of the Mine. The planned location of the beneficiation plant is on farmland and its current location is shown in Figure 8–11.

The designed beneficiation plant has a processing capacity of 0.5 Mtpa to produce 50,000 t of flake graphite concentrate with grades between 94% and 96% TGC. The estimated detailed design and construction time is two years, while the actual construction schedule depends on the time required to obtain a real estate certificate and other required permits and approvals. China Graphite plans to commence the two-year period of preparation and construction in the fourth quarter of 2022. Trial production is targeted to commence in fourth quarter of 2024. Commissioning will begin in 2025 when the new plant will reach its full designed throughput capacity of 0.5 Mtpa.

Figure 8–11: The planned beneficiation plant at Beishan, looking to the southeast

Source: SRK site visit, July 2020

8.5.1 Beneficiation flowsheet

In accordance with the existing processing plant flowsheet and the metallurgical testwork results, the designed processing flowsheet is similar to the current workflow of the existing beneficiation plant but with larger equipment and streamlined set-up. The crushed ores will go through floatation which involves a single-stage rougher, single-stage scavenger, 5-stage regrinding and 6-stage cleaning and collective middlings recycling. The graphite concentrate undergoes 2-stage 'filtering and drying' to dewater the product. This is then packaged and stored as flake graphite concentrates that are saleable, or alternatively, can be used as feedstock for further processing.

8.5.2 Production facilities and equipment

Production facilities in the beneficiation plant include a RoM pad, primary crushing circuit, secondary and tertiary crushing circuit incorporating crushed ore screening, crushed ore storage silo, main concentrator plant (grinding and flotation circuits, dewatering and drying circuit), product classification and packaging facility, product conveyor, product storage shed, warehouse, deep well pump room, water processing station, process water pond, process water recycle pond, power substation, boiler room, maintenance workshop and laboratory.

The mechanical equipment selected for the new beneficiation plant is based on a design processing capacity of 0.5 Mtpa, an overall crushing circuit uptime (availability and utilization) of 49.32% and a grinding-flotation-dewatering operation uptime of 65.8%. Considering the local climate and with reference to the current operation rate, the operation rate of the designed equipment is 65.8%, working 240 days per annum. No production is carried out in winter.

8.5.3 Beneficiation production criteria

The beneficiation production criteria selected and designed for in the Beishan Study are shown in Table 8–18. The annual ore processing volume is 0.5 Mtpa, and the average feed grade is 10.28%. The annual production is 0.05 Mtpa of 95% TGC flake graphite concentrate and graphite recovery is 92%.

Table 8–18: Designed production criteria

Product	**Production** *(Mtpa)*	**Yield** *(%)*	**Grade** *(%)*	**Recovery** *(%)*
Concentrate	0.05	9.7	95.00	92
Tailings	0.45	90.3	0.91	8
Raw ore	0.50	100	10.28	100

Source: Beishan Study

8.5.4 New tailings storage facility

A new TSF is proposed to be located 800 m southeast of the beneficiation plant. The designed TSF is designed to be constructed in stages. The proposed TSF is a valley-style facility. Its initial dam height is designed at 70 m. It is a pervious earth fill dam constructed in three phases using the downstream construction method.

The Phase 1 dam crest elevation is at 270 m, dam height 35 m, crest width 5 m and dam axis length 400 m. The Phase 2 dam crest elevation is at 290 m, crest width 10 m and dam axis length 597 m. The Phase 3 dam crest elevation is at 310 m, crest width 10 m and dam axis length 807 m. Filters are inserted in the inner slope of each phase. After the outer slope is leveled, the filter structure from the inner to outer dam is as follows: (1) 200 mm of thick rock transition layer; (2) 300 mm of thick gravel lining bed; (3) 500 g/m^2 geotextile layer; (4) 300 m thick gravel upper lining bed; (5) 300 mm thick dry arranged slope protection block. The initial outer slope has built a 5 m berm for every 10 m height increment. When the waste rock is abundant, the initial outer slope can be expanded using the discharged waste rock. The final initial outer slope is installed with a 300 mm thick, dry arranged slope protection block.

A tailings dam is constructed using the upstream construction method above the initial dam until reaching the design elevation at 318 m. The tailings accumulation dam is 8 m in height and divided into four-phase sub-dams; each phase is 2 m in height and 3 m in crest width.

8.5.5 Production schedule

China Graphite's development plan assumes a production schedule for the period of 2022–2026, a summary of which is given in Table 8–19. In developing the production schedule, China Graphite has made the assumptions that the new beneficiation plant will take 3 months to ramp-up operation to reach its peak. The supply of third party ores will attain 0.13Mt in 2022. From 2025 onwards, 0.50 Mt of third party ores are required annually.

Table 8–19: Preliminary production and ramp-up schedule 2022–2026

Year	Beishan Mine graphite ore *(Mt)*	Third parties' ore *(Mt)*	New beneficiation plant throughput capacity *(Mt)*	Current beneficiation plant throughput capacity *(Mt)*	Total beneficiation plant throughout capacity *(Mt)*
2022	0.37	0.13	—	0.50	0.50
2023	0.50	—	—	0.50	0.50
2024	0.50	0.30	0.30	0.50	0.80
2025	0.50	0.50	0.50	0.50	1.00
2026	0.50	0.50	0.50	0.50	1.00

Source: China Graphite information memorandum and Beishan Study

8.5.6 Spherical graphite processing plant

China Graphite proposes to apply the same flowsheet as it currently applies in its spherical graphite plant. The flowsheet includes micronizing, rounding, purification, acid-and-alkali, drying and iron removal. The designed annual processing capacity is 17,000 t to produce 6,000 t of spherical graphite and 10,000 t of micro graphite powder.

8.5.7 Conclusion and recommendations

- Both the third-party (Yunshan) mines and the Beishan graphite mine contain flake graphite which is suitable as feed for the production of spherical graphite. The current production capacity is about 5,200 tpa and will increase to 6,500 tpa by the second quarter of 2022. In SRK's opinion, the production flowsheet and equipment that have been installed are reasonable. The spherical graphite product yield is approximately 38% of the feed. Optimisation of the production flowsheet might improve the product yield.

- The Beishan Study has proposed a new beneficiation plant, and the TSF's location adjacent to the open pit mine. The new beneficiation plant is designed with a 0.5 Mtpa capacity to produce approximately 50,000 tpa of high-purity flake graphite concentrate at 92% graphite recovery. The selected location is favorable, and the designed beneficiation flowsheet and historical production data are well supported with metallurgical testwork undertaken.

- The business study on the spherical graphite is preliminary in nature, but the proposed flowsheet has been applied by China Graphite successfully over the years. SRK considers the plan proposed is reasonable, but further technical studies are required.

- The location of the proposed TSF is favorable. Waste rock from the mine stripping can be used to construct the dam foundation. The downstream method is adopted to raise the dam from the foundations in order to provide additional future capacity.

9 COSTS

9.1 Capital costs

SRK has reviewed the capital cost forecast over the next four years of the Project. These capital costs have been estimated by China Graphite from actual costs associated with the mining, beneficiation and processing operations to date as well as a series of indicative prices received from equipment manufacturers and suppliers.

In 2020 and 2021, the total materials moved at Beishan reached 1.65 Mt and 1.55 Mt respectively. The total materials moved will reach 1.78 Mt in 2022. China Graphite has allocated an allowance of RMB0.8 million for purchasing additional mining equipment to support the ramp-up of mining operations.

The spherical graphite processing plant is currently being upgraded to an annual production capacity of 6,500 tpa spherical graphite. China Graphite expects an amount of RMB3.1 million to be incurred in 2022.

The Project has a LoM of 20 years and as such the equipment at the beneficiation plant and spherical graphite processing plant will require ongoing replacement and refurbishment over that period. China Graphite has budgeted approximately RMB5–6 million per year as the sustaining capital for major plant and equipment replacement as well as refurbishment.

China Graphite has also prepared a capital cost estimate for the construction of the 0.5 Mtpa new beneficiation plant in the first phase of strategic development at Beishan (RMB108.0 million). The cost estimate incorporates a land acquisition cost (RMB34.0 million) and a quotation from an EPCM company, indicating that the cost for the plant construction, equipment procurement and installation, which totals RMB72.0 million. Other costs total RMB2.0 million.

In the second phase of development at Beishan, China Graphite will construct a spherical graphite processing plant, with an annual flake graphite processing capacity of 17,000 t. The spherical graphite plant will produce 6,000 t of spherical graphite and 10,000 t of micro graphite powder annually. The cost estimate for constructing such plant is RMB93.2 million.

In general, SRK considers that appropriate capital has been allocated for the proposed mine production expansion to 0.5 Mtpa graphite ore by 2023 and the upgrade of the spherical graphite plant in 2022. Sufficient sustaining capital has also been allocated to support the operation. The cost estimate for the proposed beneficiation plant and spherical plant requires further evaluation at a feasibility study or detailed design level to further support the adequacy of the budget.

Table 9–1: Capital cost estimate 2022–2025

	2022 *(RMB million)*	**2023** *(RMB million)*	**2024** *(RMB million)*	**2025** *(RMB million)*
Mining equipment	0.8			
Current spherical graphite plant expansion	3.1			
New beneficiation plant	39.5	54.7	13.8	
New spherical graphite processing plant			57.8	35.4
Sustaining capital	5.1	5.7	5.9	6.1
Total	**48.5**	**60.4**	**77.5**	**41.5**

Source: China Graphite information memorandum

9.2 Operating costs

An operating cost estimate has been developed for the Project by China Graphite's financial team. The key activities accounted for include mining, flake graphite beneficiation and spherical graphite processing, general and administrative expenses, and government levies and resource tax (Table 9–2).

The forecast operating costs are based on the following items:

- Historical operation records
- The third-party Yushan's graphite ore contract
- Contracts with consumable providers
- VAT of 13% levied for the sale of the products
- City maintenance and construction levy of 1% of the net amount of VAT generated by the Project
- Education levy of 5% of the net amount of VAT generated by the Project
- Resource tax of 12% of sales revenue of graphite ore and 6% sales revenue of marble ore.

China Graphite is forecasting the mining cash cost (per tonne of graphite ore) to RMB/t 27.0 in 2022 to RMB/t 18.8 in 2023. Between 2024 and 2041, the average mining cash cost is forecast at RMB/t 15.5, within a minimum of RMB/t 10.3 and RMB/t 18.8. The forecast mining cash cost used for the China Graphite LoM model is supported by the previous three years' operations. It appears to be reasonable, although SRK notes that the cash unit cost is on the low side, compared with other similar projects.

The cash cost for flake graphite beneficiation (per tonne of flake graphite concentrate) is forecast at RMB/t 1,342 in 2022 and RMB/t 1,161 in 2023. The cost reduction is mainly related to the source of graphite ore, which would be supplied from China Graphite's own Beishan mine and an increase of the average grade of feed ore. SRK considers the forecast is reasonable and well supported by historical performance.

The spherical graphite processing cash cost (per tonne of spherical graphite) is forecast at RMB/t 10,507 in 2022 and remains similar throughout the LoM. In SRK's opinion, the spherical graphite assumption and forecast is reasonable.

The forecast operating costs as provided by China Graphite and reviewed by SRK are shown in Table 9–2, Table 9–3 and Figure 9–1.

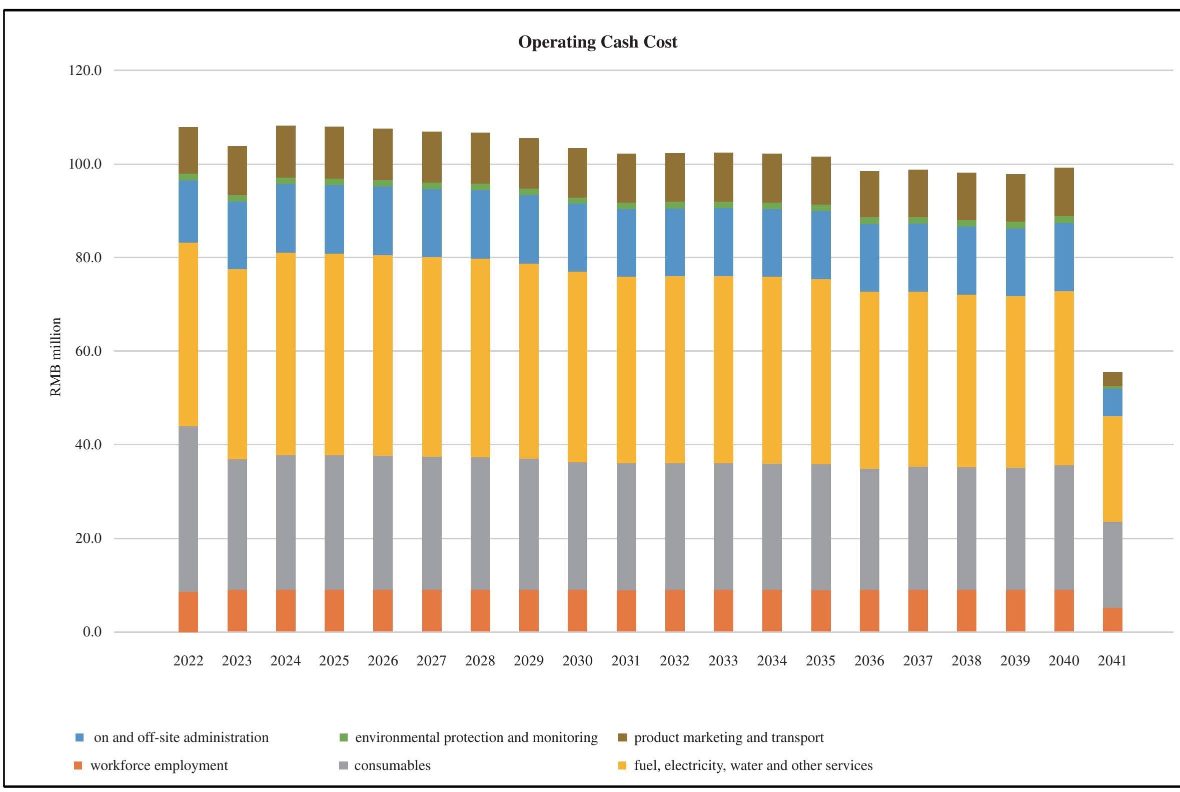

Figure 9–1: Operating cost forecast by categories

Source: China Graphite and SRK analysis

Table 9–2: Historical and forecast operating cash cost

Operating Cash Cost	Unit	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Mining	RMB million	8.2	6.0	8.3	10.7	9.8	9.6	9.4	9.4	9.4	9.4	9.3	9.1	8.7	8.7	8.7	8.7	8.7	8.7	6.4	5.9	5.5	5.2	1.9
Less: marble by-product revenue	RMB million	–	–6.9	–2.2	–0.8	–0.4	–0.2	–0.1	–0.1	–0.1	–0.2	–0.5	–0.9	–1.2	–0.8	–0.7	–0.6	–0.5	–0.3	–	–	–	–	–
Net mining cost	RMB million	8.2	–0.9	6.1	9.9	9.4	9.4	9.3	9.3	9.3	9.2	8.8	8.3	7.6	7.9	8.0	8.1	8.2	8.4	6.4	5.9	5.5	5.2	1.9
Flake graphite beneficiation cost	RMB million	53.3	61.2	65.7	59.2	53.1	53.8	53.6	53.1	52.5	52.3	51.3	49.4	48.8	48.5	48.5	48.2	47.3	43.3	46.2	45.9	45.9	48.0	12.6
Spherical graphite processing	RMB million	31.5	36.4	52.9	49.8	52.9	56.6	56.6	56.7	56.8	56.8	57.0	57.3	57.4	57.5	57.5	57.5	57.7	58.4	57.9	57.9	57.9	57.5	52.6
Less: micro graphite powder by-product revenue	RMB million	–7.1	–6.3	–8.0	–10.4	–10.9	–10.9	–10.9	–10.9	–10.9	–10.9	–10.9	–10.9	–10.9	–10.9	–10.9	–10.9	–10.9	–10.9	–10.9	–10.9	–10.9	–10.9	–10.9
Less: high-purity graphite powder revenue	RMB million	–2.1	–0.7	–0.2	–0.9	–0.9	–0.9	–0.9	–0.9	–0.9	–0.9	–0.9	–0.9	–0.9	–0.9	–0.9	–0.9	–0.9	–0.9	–0.9	–0.9	–0.9	–0.9	–0.9
Net spherical graphite processing cost	RMB million	22.3	29.4	44.7	38.6	41.1	44.7	44.8	44.8	44.9	45.0	45.1	45.5	45.6	45.6	45.6	45.7	45.8	46.6	46.0	46.1	46.1	45.7	40.7
Total	RMB million	83.8	89.7	116.5	107.7	103.6	107.9	107.7	107.3	106.7	106.4	105.2	103.1	101.9	102.0	102.1	101.9	101.3	98.2	98.6	97.9	97.5	98.9	55.2

Operating Cash Unit Cost	Unit	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
Materials moved	RMB/t materials moved	8.2	3.5	5.2	6.0	6.5	6.8	6.8	6.8	6.8	6.8	6.9	6.9	7.0	7.0	7.1	7.1	7.1	7.1	8.4	9.0	9.6	10.2	10.3
Graphite ore	RMB/t graphite ore	27.3	–4.5	20.3	27.0	18.8	18.8	18.6	18.6	18.5	18.3	17.6	16.5	15.1	15.7	16.1	16.2	16.3	16.7	12.7	11.8	11.1	10.5	10.3
Flake graphite concentrate	RMB/t concentrate	1,994	1,576	1,496	1,342	1,161	1,180	1,179	1,182	1,185	1,185	1,184	1,185	1,174	1,182	1,186	1,189	1,197	1,228	1,164	1,155	1,147	1,129	921
Spherical graphite	RMB/t spherical graphite	14,265	10,406	10,175	10,507	10,212	10,881	10,884	10,905	10,929	10,936	10,962	11,020	11,107	11,036	11,047	11,066	11,112	11,331	11,052	11,033	11,010	10,898	9,466

Source: China Graphite and SRK analysis

Note: By-product revenue is credited to the primary product

Table 9–3: Historical and forecast operating cash cost by categories

Operating Cash Cost	Unit	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
workforce employment	RMB million	8.2	7.0	8.5	8.6	8.8	8.9	8.9	8.9	8.9	8.9	8.9	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	5.0
consumables	RMB million	24.3	30.9	40.4	35.3	27.8	28.7	28.7	28.5	28.4	28.3	27.9	27.3	27.1	27.1	27.1	27.0	26.9	25.9	26.3	26.2	26.1	26.6	18.4
fuel, electricity, water and other services	RMB million	29.1	32.9	45.0	39.2	40.6	43.2	43.0	42.8	42.5	42.4	41.7	40.6	39.9	39.9	39.5	40.0	39.5	37.8	37.4	36.9	36.6	37.3	22.5
on and off-site administration	RMB million	7.6	8.5	10.5	13.3	14.5	14.6	14.6	14.6	14.6	14.6	14.5	14.5	14.4	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	5.9
environmental protection and monitoring	RMB million	0.3	1.0	1.0	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	0.5
transportation of workforce	RMB million	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
product marketing and transport subtotal	RMB million	14.3	9.4	10.1	9.9	10.4	11.0	11.0	11.0	10.9	10.9	10.7	10.5	10.4	10.4	10.4	10.3	10.3	9.8	10.1	10.1	10.1	10.3	2.9
contingency allowances	RMB million	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	RMB million	83.8	89.7	116.5	107.7	103.6	107.9	107.7	107.3	106.7	106.4	105.2	103.1	101.9	102.0	102.1	101.9	101.3	98.2	98.6	97.9	97.5	98.9	55.2

Source: China Graphite and SRK analysis

9.3 Economic viability analysis

SRK has conducted an analysis of the economic viability of the Project. The analysis was based on capital and operating costs, the production schedules as presented in this Report. A base case scenario of the Project over the LoM (1 January 2022 to 2041) on an annual basis was constructed. The base case is based on the mining, beneficiation and spherical graphite processing schedules as outlined in Table 6–5, Table 8–13 and Table 8–17. It envisages an integrated operation, from mining, beneficiation to spherical graphite processing. It does not include the proposed new beneficiation and spherical graphite processing plants at Beishan.

In the base case analysis presented in real terms, SRK adopted the forecast sales prices provided by the Company (see Section 10.3.5) and a discount rate of 10%. The discount rate was based on the considerations of the real, risk free long-term interest rate (2.59% for the 5-year PRC Government bond yield), mining project risk (2% to 4%) and country risk (2% to 4%).

It is important to note that the purpose of SRK's techno-economic analysis is to demonstrate the potential to provide a positive net present value (NPV) and hence the economic viability of the Project in support of the declaration of the Ore Reserve. The techno-economic analysis is not a financial valuation and the derived NPVs are not intended to represent the market value (i.e. the cash equivalent value that may be obtained were the project placed up for sale through a structured process) or likely profitability of the Project.

SRK's discounted cashflow (DCF) analysis shows that the Project's after tax (25% corporate income tax) NPV at a discount rate of 10% returned a positive NPV of RMB923 million at 31 December 2021. A straight-line depreciation method was used; financing costs, capital raising expenses or company debts have not been considered and a 100% equity has been assumed in this analysis.

A sensitivity analysis (after tax) has also been undertaken by SRK with respect to the flake graphite recovery, capital and operating costs and flake graphite concentrate and spherical graphite sales prices (Figure 9-2).

The results reveal the following changes:

- A 1% increase in flake graphite recovery will result in a positive 1.09% change in NPV.
- A 1% increase in operating cost will result in a negative 1.18% change in NPV.
- A 1% increase in capital cost will result in a negative 0.06% change in NPV.
- A 1% increase in flake graphite concentrate sales price will result in a positive 0.87% change in NPV.
- A 1% increase in spherical graphite sales price will result in a positive 1.04% change in NPV.

Of these parameters, the operating cost is the most sensitive parameter, followed by flake graphite recovery.

The economic analysis of the Project over the LoM, together with the sensitivity analysis, has demonstrated that the Project is technically feasible and economically viable, thereby justifying the reporting of Ore Reserves as declared in Section 7.3.

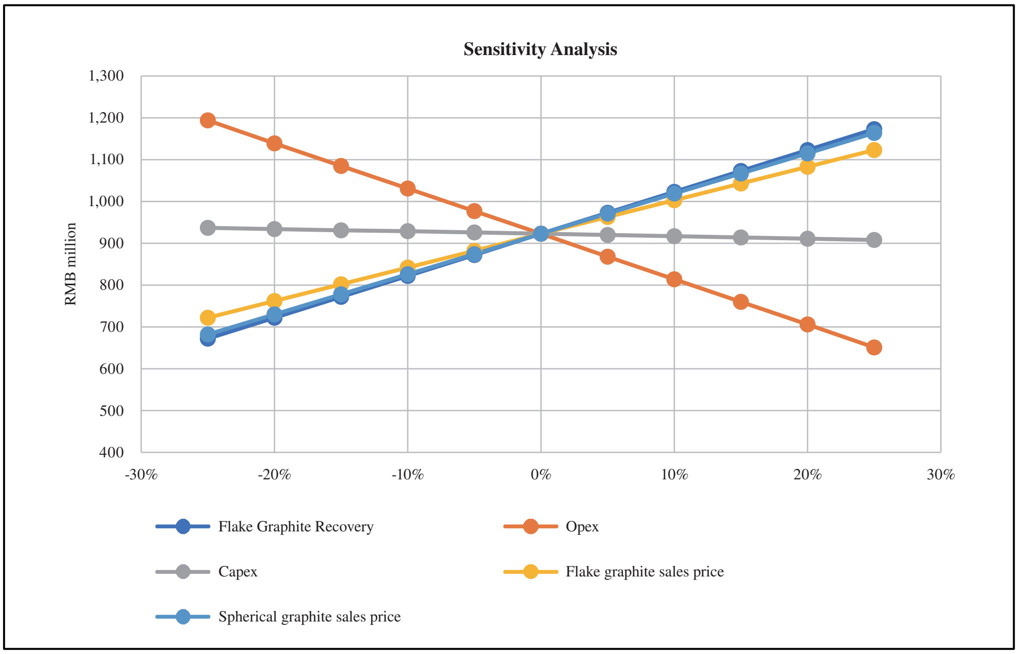

Figure 9–2: After-tax NPV sensitivity analysis of the Project

Source: SRK analysis

Table 9–4: After-tax NPV sensitivity analysis of the Project

Variance	Flake Graphite Recovery	Opex	Capex	Flake graphite sales price	Spherical graphite sales price
25%	1,173	651	908	1,123	1,164
20%	1,123	706	911	1,083	1,115
15%	1,073	760	914	1,043	1,067
10%	1,023	814	917	1,003	1,019
5%	973	868	920	963	971
0%	923	923	923	923	923
–5%	872	977	926	882	874
–10%	822	1,031	929	842	826
–15%	772	1,085	931	802	778
–20%	722	1,139	934	762	730
–25%	672	1,194	937	722	682

Source: SRK analysis

10 MARKET STUDY

10.1 Introduction

China Graphite commissioned Frost & Sullivan, an independent market research and consulting company to:

- conduct a market study on the Chinese graphite market
- provide a forecast on prices of natural graphite, flake graphite and spherical graphite for the period from 2021 to 2025
- assess market size, growth and opportunities.

China Graphite's major graphite products include flake graphite concentrates, spherical graphite, micro graphite and high-purity graphite powder (by-products of spherical graphite process).

The Market Study report (Frost & Sullivan, 2022) relies on sources such as the International Monetary Fund (IMF), Chinese National Bureau of Statistics (NBSC), United States Geological Survey (USGS), China Association of Automobile Manufacturers General administration of Customers of the PRC, as well as its own research. The following notes draw on the Market Study where sources are considered reliable, as well as other sources, as noted.

10.2 World markets and trade

According to the International Monetary Fund (IMF, 2022), the global economy remains highly uncertain since the COVID-19 pandemic began in 2020. The COVID-19 pandemic has had high human costs worldwide and is severely impacting economic activity. Economic recoveries are diverging across countries and sectors, reflecting variation in pandemic-induced disruptions and the extent of policy support.

At present, the IMF has projected a strong global growth of 5.9% in 2021, followed by moderate growth of 4.4% in 2022. The projected strong growth reflects additional fiscal policies in a few large economics including China and the anticipated vaccine-driven recovery in the second half of 2021 and continued adaption of economic activity with limited mobility.

According to the IMF (2022), advanced economies contracted -4.5% in 2020, but are expected to rebound to 5.0% in 2021 and 3.9% in 2022. Emerging markets and developing economies, including China, contracted, at -2.0% in 2020, but are forecast to grow significantly by 6.5% in 2021, recovering at approximately 4.8% in 2022.

Considerable uncertainty exists in the global economy, especially regarding the path of the pandemic and the road to recovery under the influence of a range of stimulus measures. Economic output growth in China is projected by the IMF (2022) to moderate from 8.1% in 2021 to 4.8% in 2022.

10.3 Chinese graphite market

10.3.1 Flake graphite

The key applications for flake graphite comprise batteries, refractories, foundries and lubricants. The flake graphite industry is forecast to grow, primarily driven by the lithium-battery, steelmaking and refractory markets.

The sales volume of flake graphite has increased from 401,000 t in 2017 to approximately 542,000 t in 2021. Frost & Sullivan forecasts the sales volume to continue to increase to approximately 827,000 t in 2026, representing a compound annual growth rate (CAGR) of 8.2% from 2022.

10.3.2 Spherical graphite

China Graphite's spherical graphite is mainly used as the anode materials for lithium-ion batteries. There has been a significant increase in the shipment volume of electronic vehicle from approximately 0.5% million units in 2016 to approximately 3.3 million units in 2021, with a CAGR of 45.7%. The rapid development of the electronic vehicle market has driven the demand for lithium-ion batteries, which in turn has supported the growth of the spherical graphite market. The Chinese sales volume of spherical graphite has increased at a CAGR of 20.8% from 61,000 t in 2017 to 130,000 t in 2021. Frost & Sullivan forecast the sales volume to increase from 150,000 t in 2022 to 237,000 t in 2026, with a CAGR of 12.0%.

10.3.3 Competition

Frost & Sullivan's Market Study report shows that China Graphite currently ranks as the fifth largest flake graphite producer in the world and the sixth largest producer of spherical graphite according to its sale revenues in 2021. With the commercial production of graphite ore from its own mine in 2019, China Graphite will become less dependent on the supply of third-party ores and has an advantage over many of its competitors in terms of its lower operating cost.

10.3.4 China Graphite's current markets

China Graphite is currently producing a range of flake graphite concentrates, including the key products -193, -194, -195 and -196 (which represents -100 mesh with grades between 93% and 96% TGC). These products represent approximately 95% of the Company's revenue in 2021. From 2019 to 2021, the average price received by China Graphite fell by approximately 16% from 3,118 RMB/t to 2,621 RMB/t (delivered price) in line with increased sales volumes, as shown in Table 10–1.

Table 10–1: 2019–2021 flake graphite sales records

	For the year ended December 31,								
	2019			2020			2021		
Type	Revenue	Sales volume	Average selling price	Revenue	Sales volume	Average selling price	Revenue	Sales volume	Average selling price
	(RMB'000)	*(Tonnes)*	*(RMB/tonne)*	*(RMB'000)*	*(Tonnes)*	*(RMB/tonne)*	*(RMB'000)*	*(Tonnes)*	*(RMB/tonne)*
194	26,479	8,396	3,154	28,288	11,132	3,541	47,268	18,102	2,611
195	14,139	4,007	3,529	35,525	13,837	2,567	41,804	15,803	2,645
196	7,968	2,002	3,980	10,218	3,671	2,783	3,889	1,339	2,904
Others	8,788	3,996	2,199	11,678	5,494	2,126	4,709	2,015	2,337
Total	**57,374**	**18,401**		**85,709**	**34,134**		**97,672**	**37,259**	

Source: China Graphite memorandum

One of the key spherical graphite products produced by China Graphite is SG-10, a 10μm diameter product. Compared with flake graphite concentrate, the average price of spherical graphite has decreased 22% from 2019 (20,112 RMB/t) to 2021 (15,638 RMB/t). In addition, two by-products, namely micro graphite powder and high-purity graphite powder, were also sold. Their average sales prices in 2021 were 1,040 RMB/t and 3,771 RMB/t, respectively (delivered price), as shown in Table 10–2.

Table 10–2: 2019–2021 spherical graphite and by-products records

	For the year ended December 31,								
	2019			2020			2021		
	Revenue generated	Sales volume	Average selling price	Revenue generated	Sales volume	Average selling price	Revenue generated	Sales volume	Average selling price
	(RMB'000)	*(Tonnes)*	*(RMB/tonne)*	*(RMB'000)*	*(Tonnes)*	*(RMB/tonne)*	*(RMB'000)*	*(Tonnes)*	*(RMB/tonne)*
Spherical graphite									
SG-10	47,122	2,343	20,112	63,926	3,479	18,375	47,842	3,059	15,638
Other models	9,998	645	15,501	5,237	444	11,795	42,443	3,002	14,138
Subtotal	**57,120**	**2,988**		**69,163**	**3,923**		**90,285**	**6,061**	
Micro graphite powder	7,103	5,049	1,407	6,284	6,296	998	8,043	7,733	1,040
High-purity graphite powder	2,139	282	7,585	712	134	5,313	181	48	3,771
Total	**66,362**	**8,319**		**76,159**	**10,353**		**98,509**	**13,842**	

Source: China Graphite memorandum

In 2020 and 2021, China Graphite also completed commercial sales of marble ore to local customers at an average price (ex-works) of 10 RMB/t and 6 RMB/t respectively (Table 10–4).

Table 10–3: 2020–2021 marble sales records

	2020			2021		
Type	Sales volume *(t)*	Revenue *(million RMB)*	Average selling price *(RMB/t)*	Sales volume *(t)*	Revenue *(million RMB)*	Average selling price *(RMB/t)*
Marble	675,202	6.9	10	341,700	2.2	6

Source: China Graphite memorandum

10.3.5 Prices

The market study by Frost & Sullivan (2022) included a price forecast for unprocessed graphite, flake graphite and spherical graphite. The specifications of each product, including flake size, graphitic content as well as the physical properties of spherical graphite were not specified in the study.

The unprocessed graphite is expected to raise 4% in 2022. For the flake graphite, the price is forecast to increase 4% and remains steady until 2025. The spherical graphite will receive an increase of 4% in 2022, followed by a modest annualized growth of 1% to 2% in the period of 2023–2025.

The forecast prices by China Graphite are shown in Table 10–4. In 2022, China Graphite forecasts modest growth of 3% for all graphite products from the previous year. In 2023, 2% growth of all graphite products is expected. The forecast sales price of marble remains the same from 2022 to 2023. The prices of all products are assumed to remain the same from 2023 over the LoM (Table 10–4). Based on a review of the historical prices, recent contracts and the Frost & Sullivan forecast, SRK considers the forecast by China Graphite is reasonable.

Table 10–4: Historical and forecast weighted average sales price

		Historical				Forecast		
Type	Unit	2018	2019	2020	2021	2022	2023	Long-term price
Flake graphite concentrate	RMB/t	3,679	3,118	2,511	2,621	2,700	2,754	2,754
Spherical graphite	RMB/t	19,055	19,117	17,631	14,895	15,342	15,649	15,649
Micro graphite powder	RMB/t	2,220	1,407	998	1,040	1,071	1,093	1,093
High-purity graphite powder	RMB/t	7,823	7,582	5,306	3,771	3,884	3,962	3,962
Marble ore	RMB/t	—	—	10	6	6	6	6

Source: China Graphite memorandum

11 ENVIRONMENT, PERMITS AND SOCIAL IMPACTS

SRK's review of environmental and social aspects is presented below.

11.1 Operational licenses and permits

11.1.1 Business License

The Business License details for the Project are presented in Table 11–1.

Table 11–1: Details of the Business License

License no.	Issued to	Issued by	Issue date	Expiry date	Licensed business activities
91233001569893325G	Yixiang New Energy Materials Co., Ltd.	Hegang City Market Supervision Bureau Baoquanling Branch	05/01/2021	19/04/2031	Manufacture, wholesale and retail of graphite and carbon products; quarrying, wholesale and retail of graphite ores, slag, limestone and stones for building and decoration

Source: China Graphite information memorandum, SRK compilation

11.1.2 Mining License

Details of the Mining License for the Project are shown in Table 11–2.

Table 11–2: Details of the Mining License

License no.	Issued to	Issued by	Issue date	Expiry date	Area *(km^2)*	Mining type	Production rate *(Mtpa)*
C2300002018097110146712	Yixiang New Energy Materials Co., Ltd.	Heilongjiang Province Natural Resources Bureau	08/04/2019	08/04/2024	0.2615	Open pit	0.50

Source: China Graphite information memorandum, SRK compilation

11.1.3 Safety Production Permit

The Safety Production Permit for the Project is presented in Table 11–3.

Table 11–3: Details of the Safety Production Permit

Permit no.	Issued to	Issued by	Issue date	Expiry date
(Hei)FM[2020]HG3729	Yixiang New Energy Materials Co., Ltd.	Heilongjiang Province Emergency Management Bureau	19/03/2020	18/03/2023
(Hei)FM[2020]HG3050	Yixiang Graphite Co.	Hegang City Emergency Management Bureau	10/01/2020	09/01/2023

Source: China Graphite information memorandum, SRK compilation

11.1.4 Water Use Permit

Details of the Water Use Permit for the Project are shown in Table 11–4.

Table 11–4: Details of the Water Use Permit

Permit no.	Issued to	Issued by	Issue date	Expiry date	Water supply source	Water use allocation *(m^3)*
Qushui (Heikenbao) Zi[2018] 11410	Yixiang Graphite Co.	Heilongjiang Agricultural Reclamation Baoquanling Administration Water Bureau	19/06/2018	31/12/2022	Surface water	39,000

Source: China Graphite information memorandum, SRK compilation

The water use permit provided to SRK relates to surface water abstraction from the Yadan River and does not include the groundwater at the plant or the water abstraction from the tributary of the Yadan River.

11.1.5 Site Discharge Permit

Details of the Site Discharge Permit for the Project are presented in Table 11–5.

Table 11–5: Details of the Site Discharge Permit

Permit no.	issued to	Issued by	Issue date	Expiry date
91233001569893325G001Q	Yixiang New Energy Materials Co., Ltd.	Hegang City Ecological Environment Bureau	19/06/2020	18/06/2023
912330017905010282001Q	Yixiang Graphite Co.	Hegang City Ecological Environment Bureau	21/07/2020	20/07/2023

Source: China Graphite information memorandum, SRK compilation

11.1.6 Real Estate certificates

Details of the Real Estate Permit for the Project are presented in Table 11–6.

Table 11–6: Details of the real estate certificates

Permit no.	Issued to	Issued by	Issue date	Expiry date	Land use	Area (m^2)
Hei (2020)0002418	Yixiang New Energy Materials Co., Ltd.	Heilongjiang Province People's Government	24/12/2020	19/04/2061	Industrial use	24,610
Hei (2021)4000135	Yixiang Graphite Co.	Heilongjiang Province People's Government	26/11/2021	01/04/2071	Industrial use	25,264.59
Hei (2020)0002419	Yixiang Graphite Co.	Heilongjiang Province People's Government	24/12/2020	19/10/2036	Industrial use	16,000

Source: China Graphite information memorandum, SRK compilation

SRK has been provided with the following Forest Land Use approvals/agreements for the Project:

- Approval for use of Forest Land No. [2019]15, which was issued by Heilongjiang Provincial Forestry and Grassland Bureau on 24 January 2019. The approval is valid for 2 years and the permitted forest land area is 9.5746 hectares.

- Pre-approval of Land for Construction Project No. [2019]4, which was issued by Luobei County Land and Resources Bureau on 2 February 2019. The approval is valid for 3 years and the permitted forest land area is 9.5746 hectares.

- Forest Land Compensation Agreement, which was signed by Yixiang New Energy Materials Co., Ltd. and Luobei Yunshan Forest Farm on 27 November 2018. The total cost for the forest land compensation is RMB2,596,470.

- Approval for Use of Forest Land No. [2020]186, which was issued by Heilongjiang Provincial Forestry and Grassland Bureau on 31 July 2020. The approval is valid for 2 years and the permitted forest land area is 9.4303 hectares.

- Pre-approval of Land for Construction Project No. [2020]37, which was issued by Luobei County Natural Resources Bureau on 31 July 2020. The approval is valid for 3 years and the permitted forest land area is 9.4287 hectares.

- Forest Land Compensation Agreement, which was signed by Yixiang New Energy Materials Co., Ltd. and Luobei Yunshan Forest Farm on 12 May 2020. The total cost for the forest land compensation is RMB2,629,512. Land lease agreement, which was signed by Yixiang New Energy Materials Co., Ltd. and Heilongjiang Yanjun Farm on 24 February 2021. The lease term is three years and the leased land area is 7.530343 hectares.

- Temporary land use approval for waste dump, which was issued by Luobei County People's Government on 7 December 2021. The permitted land area is 6.5004 hectares.

- Temporary land use compensation agreement, which was signed by Yixiang New Energy Materials Co., Ltd. and Heilongjiang Yanjun Farm on 4 December 2021. The lease term is two years and the leased land area is 58,119.71 m^3.

11.2 Environmental, social, health and safety review process, scope and standards

The process for the verification of the environmental compliance and conformance for the Project comprised a review and inspection of the Project's environmental management performance against:

- Chinese national environmental regulatory requirements
- Equator Principles (World Bank/International Finance Corporation (IFC) environmental and social standards and guidelines) and Internationally Recognized Environmental Management Practices.

The methodology applied for this environmental review of the Yixiang Graphite Project consisted of documentation review, a site visit, and interviews with Company technical representatives. The site visit for the environmental review was undertaken on 15 and 16 July 2020.

11.3 Status of ESHS approvals and permits

The details of the Environmental Impact Assessment (EIA) reports and Environmental, Social, Health and Safety (ESHS) approvals for the Project are presented in Table 11–7.

Table 11–7: EIA reports and ESHS approvals

Area	Produced by	Report date	Approved by	Approval date
Beishan Graphite Mine	Heilongjiang Qingze Environmental Technology Company Limited	May 2018	Hegang City Environmental Protection Bureau	31/05/2018
Beneficiation Plant	Hegang Environmental Protection Institute	July 2005	Heilongjiang Agricultural Reclamation Bureau — Environmental Protection Bureau	30/08/2005
Beneficiation Plant Expansion	Heilongjiang Bohuan Scientific and Technological Consulting Company Limited	December 2020	Hegang Bureau of Ecology and Environment	25/3/2021
Spherical graphite processing plant	Heilongjiang Academy of Agricultural Sciences	January 2011	Heilongjiang Province Environmental Protection Bureau, Agricultural Branch	24/01/2011
Tailings Storage Facility (Secondary)	Heilongjiang Kedaxinxin Environmental Protection and Technological Company Limited	January 2022	Hegang Bureau of Ecology and Environment	27/01/2022

Source: China Graphite information memorandum, SRK compilation

SRK has sighted the Water and Soil Conservation Plan (WSCP) for the Beishan Graphite Mine and its approval that was issued by Luobei County Water Bureau on 17 December 2021. In addition, the WSCP approval for the Yixiang Graphite was issued by Luobei County Water Bureau on 17 December 2021 as well.

The details of the Environmental Final Check and Acceptance (FCA) Approvals for the Project are presented in Table 11–8.

Table 11–8: Environmental Final Check and Acceptance Approvals

Area	Approved by	Approval date
Beneficiation Plant	Heilongjiang Province Environmental Protection Bureau, Agricultural Branch	05/11/2008
Spherical graphite processing plant	Heilongjiang Province Environmental Protection Bureau, Agricultural Branch	17/01/2014

Source: China Graphite information memorandum, SRK compilation

Self environmental FCA process has been conducted for the Beishan Graphite Mine and Beneficiation Plant Expansion.

SRK has sighted the following project safety assessments for the Yixiang Graphite Project:

- Safety Design Modification Report for the tailings storage facility (TSF)
- Safety Design Modification Report for the open pit
- Safety Final Check Assessment Report for the open pit
- Safety Final Check Assessment Report for the TSF renovation.

11.4 Environmental conformance and compliance

SRK notes that the EIA reports for the Project have been compiled in accordance with the relevant Chinese laws and regulations. SRK has reviewed the provided EIA reports and approvals and conducted an environmental site visit in Luobei County against Chinese legislation and recognized international industry environmental management standards, guidelines, and practices.

At the time of SRK's July 2020 site visit, the Project was in operation. SRK recommends the Company develops the Project in accordance with the Project's EIA approval conditions. In the following sections, SRK provides comments in respect of the Project's existing and proposed environmental management measures, and their conformance to recognized international industry environmental management standards, guidelines and practices.

11.5 Key environmental, social, and health and safety aspects

11.5.1 Site ecological assessment

The landform and topography in the mining area is commonly modified by open pit mining, waste rock dumping, haul roads, office buildings and dormitories, and other facilities. The development of the Yixiang Graphite Project may also result in impacts to or loss of flora and fauna habitat. If effective measures are not taken to manage and rehabilitate the disturbed areas, the surrounding land can become polluted and the land use function will be changed, causing an increase in land desertification, water loss and soil erosion.

The EIA of the open pit introduced the baseline of the ecological environment, which includes current land use, and information in vegetation, animal resources and soil erosion. The Project area is dominated by man-made forest, natural secondary forest and shrubs. The EIA report also indicates that there are no rare and endangered species identified within the Project area. The main vegetation in the Project area is pine, birch, oak, yellow pineapple, low shrubs and weeds in the understorey. The main animals in the Project area are sika deer, horse deer, black bear, wild boar, roe deer, fox, small house mouse, frogs, snakes and sparrows. The Project's EIA reports proposes conceptual measures to reduce and manage the potential impacts on the ecosystem. SRK recommends the Company follows the requirements of EIA report during the Project's operation.

According to the EIA report, the total disturbed area for the mine site is estimated to be 0.3163 km2. At the time of writing, no other documented, estimated, and/or currently surveyed areas of land disturbance for the Project's mine site have been sighted as part of this review. The Company stated that measures and programs will be developed to strike a balance between mining development and ecology. In addition, the Company will commission qualified parties to conduct annual assessment.

*11.5.2 **Waste rock and tailings management***

According to the EIA report, the waste rock should be temporarily discharged to the waste rock dump (WRD), located to the west of the mine site which has a capacity of only 53,000 m^3. The EIA report states that the volume of waste rock is estimated to be 373,100 m^3 per annum, which will be temporarily stored in the WRD and sold periodically for use as construction material. At the time of the site visit in July 2020, SRK observed that a small amount of stripped topsoil and waste rock had been discharged on site and no WRD had been sighted as part of this review. The Company stated that most of the waste rock produced in the period of 2019–2020 at the Mine was sold to local developers, and a small amount was used to maintain its TSF of the beneficiation plant. The Company is of the opinion that such use will continue consuming the majority of waste rocks. The Company has also leased a piece of land, located 2 km to the west of the mine site with a capacity of hosting approximately 1,000,000 m^3 of waste rocks temporarily. The construction of the new TSF associated with the new beneficiation plant, located in the proximity of the Mine will also provide opportunity for further consumption of waste rock. The current waste rock management plan appears to have worked successfully, however, SRK recommends long term contracts to be secured with local developers to ensure the waste rocks are disposed accordingly. The tailings generated by the processing plant is discharged to a TSF on site. According to the latest TSF design, the TSF has a total storage capacity of 1,591,800 m^3 and an effective storage capacity of 1,193,850 m^3. The TSF design states that the stability of the dam should be protected due to the increased risk during the highest flood of the Yadan River. The TSF consists of a sedimentation pond, a recycle pond and an overflow pond, and the tailings is used for brick making. SRK has sighted a tailings use agreement which was signed by Heilongjiang Baoquanling Farmland Yixiang Graphite Company Limited and an independent third party on 3 January 2015. The agreement stipulates the Project needs to provide a minimum of 300,000 tonnes of tailings per annum. Similar agreements were signed with two other companies in July and August 2021. Some of the reclaimed tailings is also stored temporarily at the secondary TSF, located 3 km to the east of the current TSF. The secondary TSF has a designed capacity of 900,000 m^3. SRK sighted an environmental impact assessment report and associated government approval.

A potential risk to the environment from waste rock and TSF is acid rock drainage (ARD) created when reducing sulfide minerals are exposed to air, precipitation and bacteria and, through an oxidation reaction, produce sulfuric acid, during mining, transportation, processing, waste rock discharge, and tailings storage, etc. ARD has the potential to introduce acidity and dissolved metals into water, which can be harmful to surface and groundwater. The EIA states that according to the leaching test conducted by Gansu Geological Engineering Laboratory on waste rock in the Project area on 6 July 2016, the waste rock generated from the Project belongs to solid waste Class I, the pollutants in the leachate are mainly conventional pollution factors and the concentration of heavy metals is low.

11.5.3 Water management

The nearest surface water body to the mine site and processing plant is the Yadan River and its tributary. The Yadan River eventually feeds into the Heilongjiang River. According to information obtained from site visits and interviews, the Project's water source for production comes from the Yadan River next to the processing plant and a tributary of the Yadan River near the mine site, while the water source for domestic use is groundwater wells. No production or domestic water use is currently recorded for the Project.

SRK recommends implementation of a sustainable water supply management plan to minimize the Project's impact on natural systems through the management of water use, avoid the depletion of aquifers, and reduce the impact on water users. Alternative water sources can be provided if the development affects the surrounding community's access to water.

The potential negative impact of the Project on surface water and groundwater is mainly due to the arbitrary discharge of untreated production and domestic wastewater. In addition, mining activities may also cause changes in groundwater levels. The main wastewater pollution sources of the project include mine water, processing wastewater, return water from TSF, waste rock leachate, wastewater from maintenance workshop, industrial site rainwater, domestic sewage, etc.

The EIA for the mine site proposes to collect the mine water in the settling pond and then discharge outside within the limit of standards. During this site visit, SRK noted that the mine water is collected and re-used for dust suppression. The EIA for the beneficiation plant and spherical graphite processing plant requires all production wastewater to be discharged to the TSF. The Company also states that production wastewater from the plants is collected and discharged to the TSF.

Based on the observations made during the site visit, SRK recommends that surface drains be installed around the open pit and adequate stormwater diversion facilities be established at the plant to separate surface runoff from contaminated areas and clean areas. SRK also recommends implementing a monitoring program to assess the quality of surface water and groundwater within the Project area (including upstream and downstream areas, especially Yadan River and its tributary). Measures such as ground hardening, cofferdam, water-collecting ditch, leachate collection pool and accident pool in the processing plant area, temporary storage of hazardous waste, topsoil dump and TSF are recommended to mitigate the contamination risk of surface water and groundwater. The Company has already planned a plant optimisation program which will start with the sedimentation pond, and then gradually improve other facilities, including the stormwater diversion facilities. The Company also stated that qualified parties will be commissioned to conduct water quality monitoring every year.

11.5.4 Air quality and noise

The dust emission sources are mainly from open pit mining, loading and unloading, WRD, TSF, crushing, screening, drying, packaging and movement of vehicles and mobile equipment. Dust management measures for the mine site and plants proposed in the EIA reports mainly comprise wet drilling, watering of roads and stockpiles, greening on site and using dust remover for the process of crushing, screening and drying. During the site visit, SRK did not observe obvious fugitive dust emissions in the open pit area and the fleet includes a water truck for dust suppression. The EIA report states the fumes from the boiler during the graphite drying process need to be treated by a cyclone dust collector and then discharged. The EIA also proposes installation of a waste treatment facility to treat the exhaust gases from the coating surface treatment and charring processes which release smoke, dust, bituminous fumes and benzopyrene.

The main sources of noise are from the operation of rock drill, explosion, pump, crane, crusher, ball mill, dryer, loader and vehicles. The EIA reports for the mine site and plants propose the following noise management measures:

- enclosure of high noise equipment
- selection of low noise equipment
- use of vibration damping facilities
- time and speed limit on transportations
- greening and optimizing the layout.

It is SRK's opinion that the noise prevention measures mentioned in the EIA reports are feasible.

11.5.5 Hazardous materials management

Hazardous materials are corrosive, reactive, explosive, toxic, flammable and potentially biologically infectious, which poses a potential risk to human and/or environmental health. The hazardous materials will be generated mainly by the Project's construction, mining, and include of hydrocarbons (i.e. fuels, waste oils and lubricants), chemical and oil containers, batteries, medical waste, and paint.

During the site visit, SRK did not observe any evidence of any significant hydrocarbon (i.e. fuel and oils) spillage in the open pit area. However, there is no separate facility for storage of hazardous wastes on site. SRK recommends that the Company collects the waste oil generated by the Project and hands it over to a qualified contractor for disposal. SRK also recommends that management of the collected waste oil, fuel tanks, acid storage tanks and mineral processing chemicals includes measures such as hardening the ground and setting up secondary containment facilities to reduce the risk of pollution caused by leakage. The Company stated that there is currently no waste oil generated at the mine site, and if there is, the Company will set up separate containment facilities and commission a qualified contractor to dispose of it.

11.5.6 Occupational health and safety

A well developed and comprehensive safety management system comprises site inductions, site policies, safe work procedures, training, risk/hazard management (including signage), use of personal protective equipment (PPE), emergency response process, incident/accident reporting, an onsite first aid/medical center, designated safety responsibilities for site personnel, regular safety meetings and a work permit/tagging system.

SRK has reviewed the safety assessment reports and safety production procedures as provided by the Company, and is of the opinion that the reports cover items that are generally in line with recognized Chinese industry standard practices and Chinese safety regulations. The safety assessment reports and safety production procedures cover the basic safety production managements for mining, processing and TSF operation. SRK notes that these proposed safety management measures are the basis for the operational Occupational Health and Safety (OHS) management system/procedures. During the site visit, SRK observed that safety signs were in place, safety provisions and rules were also displayed within the work areas, guard railings were installed on all gantries, and proper PPE, such as hardhats and dust masks, was provided and was being used by the workers.

SRK has not sighted, as part of this review, any operational OHS records for the current construction of the Project. SRK recommends the Company maintains safety records and develops incident analysis reports for possible injuries. The proposed reports analyze the cause of injuries and identifies measures to prevent a recurrence, which is in line with internationally recognized OHS accident monitoring practice.

11.5.7 Environmental protection and management plan

The purpose of an operational Environmental Protection and Management Plan (EPMP) is to direct and coordinate the management of the Project's environmental risks. The EPMP documents the establishment, resourcing, and implementation of the Project's environmental management programs. The site environmental performance should be monitored, and feedback from this monitoring could then be used to revise and streamline the implementation of the EPMP.

No such plan has been developed for Project operations that cover the aforementioned components. However, the EIA reports reviewed by SRK describe the various components of a comprehensive operational EPMP for the Project, such as environmental administration, regular air/water/noise/ecology monitoring to be conducted by the qualified contractor and site environmental management. The EIA reports also specify the monitoring points, analysis items and monitoring frequency. The proposed monitoring covers groundwater, wastewater, PM10, total suspended particles, SO_2, ecology and noise.

11.5.8 Site closure planning and rehabilitation

The Chinese national requirements for mine closure are covered under Article 21 of the Mineral Resources Law of People's Republic of China (2009), the Rules for Implementation of the Mineral Resources Law of the People's Republic of China (1994), the Mine Site Geological Environment Protection Regulations (2019), and the Land Rehabilitation Regulation (2011) issued by the State Council. In summary, these legislative requirements cover the need to conduct land rehabilitation, to prepare a site closure report, and submit a site closure application for assessment and approval.

The internationally recognized industry practice for managing site closure is to develop and implement an operational site closure planning process and document this through an operational closure plan. While this site closure planning process is not specified in the Chinese national requirements for mine closure, the implementation of this process for a Chinese mining project will:

- facilitate achieving compliance with these Chinese national legislative requirements
- demonstrate conformance to internationally recognized industry management practice.

There is currently no overall operational closure planning process in place for the Project that is in line with internationally recognized industry management practices. However, SRK has sighted a Geological Environment Protection and Land Reclamation Plan developed by Heilongjiang 625 Territorial Resources Survey Technical Services Company Limited in March 2018. The Plan describes the proposed treatment measures, schedule, monitoring, cost estimation, etc. The Plan also stated that the total cost for the geological environment protection and land reclamation is estimated to be RMB4,797,400, which comprises geological environment protection of RMB2,924,300 and land reclamation of RMB1,853,100. According to the Chinese legal requirements, the Company is required to establish a mine geological environment treatment and restoration fund account. SRK has sighted an agreement for the aforementioned fund account which was signed by the Company, Luobei County Natural Resources Bureau and China Postal Savings Bank Luobei Branch dated December 2019. In addition, the Company provided a receipt voucher which shows RMB317,100 land reclamation fees.

11.5.9 Social aspects

The Project is located in Luobei County, Hegang City, Heilongjiang Province. The land surrounding the Project are generally comprises forest and farmland.

The main administrative body for the Project is the Heilongjiang Provincial Government, with some delegation of environmental regulation to the city of Hegang and Luobei County. According to the provided documentation and Company statement, SRK has not sighted any historical or current non-compliance notices and or other documented regulatory directives in relation to the development of the Project. The Company states that there are no natural reserves or significant cultural heritage sites within or surrounding the Project area; and the EIA reports also do not report any natural reserves or protected cultural heritage sites within the mine site.

The EIA reports for the Project provided public participation survey for the mine site and processing plant construction. The survey results showed 100% support for the Project's construction. The EIA reports also state the local residents believe the Project will improve the development of local economy. The local residents did raise water, air and noise pollution as the key environmental concerns for the Project's development. No other documented public consultation process for the development of the Yixiang Graphite Project has been sighted as part of this review.

As part of this review, SRK has not sighted any documentation in relation to any actual or potential impacts of non-governmental organizations on the sustainability of the Project. SRK recommends that the Company designs and implements a public consultation and disclosure plan to ensure ongoing community engagement. The Company stated that annual public consultation will be implemented to ensure the social responsibility requirements are met.

12 RISK ASSESSMENT

SRK has undertaken a risk assessment and provided a qualitative assessment of the likelihood and consequence of each specific risk identified for the Project.

Risk has been classified from major to minor:

- Major risk: the factor poses an immediate danger of a failure which, if uncorrected, will have a material effect (>15% to 20%) on the project cashflow and performance and could potentially lead to project failure
- Moderate risk: the factor, if uncorrected, could have a significant effect (10% to 15–20%) on the project cashflow and performance unless mitigated by some corrective action
- Minor risk: the factor, if uncorrected, will have little or no effect (<10%) on project cashflow and performance.

In addition to the risk factor, the likelihood of risk must also be considered. Likelihood of occurrence within a 7-year timeframe can be considered as:

- likely: will probably occur
- possible: may occur
- unlikely: unlikely to occur.

The degree or consequence of a risk and its likelihood are combined in an overall risk assessment as presented in Table 12–1. The risk assessment including a risk rating is presented in Table 12–2.

Table 12–1: Risk assessment rating

Likelihood	Consequence		
	Minor	**Moderate**	**Major**
Likely	Medium	High	High
Possible	Low	Medium	High
Unlikely	Low	Low	Medium

Table 12–2: Risk assessment

Risk	Description	Control Recommendations	Likelihood	Consequence	Rating
Graphite flake size	Smaller flake size and lower graphitic content, resulting in lower head grade	Regular production grade control and feed ore grade monitoring as well as ore grade reconciliation	Unlikely	Moderate	Low
Geological structure	Geological continuity is disrupted by much complicated geological structures	Production in-fill drilling to further constrain areas with complex geological structures	Unlikely	Moderate	Low
Mineral Resource	Lower Mineral Resource to support Ore Reserve conversion	Lower the current mining elevation limit	Unlikely	Moderate	Low
Mine plan	Failure to meet production targets	Ensure adequate planning to supervision to ensure maximum efficiency, and identify and address issues that may cause production delays	Unlikely	Moderate	Low
Waste rock management	Inadequate space for waste rock storage	An alternative waste rock disposal plan should be developed before the storage space is full	Possible	Moderate	Medium
Water management	Pollution of surface and/or groundwater	Develop a comprehensive water monitoring program and prevention of wastewater leakage	Unlikely	Moderate	Low
TSF management	Failure to reclaim tailings in winter, resulting insufficient space for tailings storage in the next year	Develop a long- term plan on winter tailings excavation program	Unlikely	Moderate	Low
Capital and operating costs	Higher capital and operating costs, resulting in poor financial performance	Secure long-term contracts with contractors and confirm advanced procurement orders with suppliers	Possible	Moderate	Medium
Processing equipment efficiency	Lower throughput and performance due to the lower processing efficiency	Gradually replace aged equipment and streamline the flowsheet	Unlikely	Moderate	Low
Graphite recovery	Lower graphite recovery than the designed targets, inducing lower product outputs	Feed ore blending and flowsheet optimisation	Unlikely	Moderate	Low

Risk	Description	Control Recommendations	Likelihood	Consequence	Rating
Product quality	Lower quality product produced, reducing the profit margin	Process monitoring and flowsheet optimisation	Possible	Moderate	Medium
Sales & pricing	Forecast sales not achieved at expected prices, reducing cashflow	Modify production volume; actively seek new customers and establish long-term contracts	Possible	Moderate	Medium
Increased competition	Competition and possible reduction of price and sales volume leading to reduced cashflow	Market and prices be monitored to ensure the prices received are maximized	Possible	Moderate	Medium

Source: SRK analysis

It is SRK's opinion that the above risks are generally manageable if China Graphite properly implements the control recommendations and strictly adheres to the standards and regulatory requirements in the PRC. A regular update of the risk assessment is also recommended.

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Appendices

Appendix A: Table 1 — JORC Code (2012)

Section 1: Sampling Techniques and Data

Criteria	Commentary
Sampling techniques	• The main source of information, which supports the declaration of Mineral Resources, is from vertical drilling in 2015–2016 and inclined core drilling in 2020. • Downhole surveys were measured every 50 m. • The surface mineralisation was determined from trenches. • The channel sampling method was used for the trench sampling, at general length intervals of approximately 2 m. • The drill core sample intervals were determined according to the geological logging and observation. • The sample length is generally 2 m, with a minimum length of 1 m and maximum length of 3.5 m. • The samples do not cross the different lithology units. • The drill core was cut into two equal halves by a core saw. One half was taken as basic samples for assaying, and the remaining half was left in the core box for further checking.
Drilling techniques	• The rigs used the wireline diamond drilling technique with a single core barrel inside the drilling rods to take diamond core. The diameter of drill started at 110 mm, and the diameter of 75 mm drill was then used to the end after penetrating through the surface fracture zone.
Drill sample recovery	• The mineralized core recovery was approximately 96% and overall core recovery was approximately 90%.
Logging	• Geological logging (lithology, minerals crystal morphology, minerals color and approximate content, core recovery, etc.) was logged by the site geologist of Ruifa. • The Rock Quality Designation (RQD) was also logged as well as the basic geotechnical logging.
Sub-sampling techniques and sample preparation	• For the two exploration campaigns of 2015–2016 and 2020, the laboratory of the No.6 Geological Survey Institute (No.6 laboratory) undertook basic analysis for the total graphitic carbon (TGC) and marble chemical contents for CaO, MgO and free SiO_2. The sampling preparation before testing was as follows: — The samples were dried, and then crushed to 1 mm by a jaw crusher, mixed evenly, shrunk, and then divided into two splits by a riffle splitter. — One of the splits was ground into 300 mesh, and then a 300 g sample was taken to use for basic analysis. — The remaining splits were taken approximately 500 g to be reserved as duplicates.

Criteria	Commentary
Quality of assay data and laboratory tests	• 2015–2016: The No.6 laboratory used internal and external check procedures to carry out the QA/QC procedure, which met the China industry standard practice. • 2020: The control samples including the Certified Reference Materials (CRMs), blanks and duplicates were inserted into the sample batches, at a frequency of one in every 25 samples. • Graphite assay methodology: The TGC analysis procedure used in the internal and external two laboratories was generally divided into three steps as follows: — Step 1 — Carbonate carbon removal: 1:1 nitric acid was added to the sample to remove the carbonate carbon with low temperature heating. — Step 2 — Organic carbon removal: Once removed the carbonate carbon, sample was dried, and then put in muffle furnace with 400°C temperature heating for 3 hours to remove the organic carbon. — Step 3 — TGC content determination: After the carbonate carbon and organic carbon removal, the sample was finally determined by the high-frequency infrared carbon and sulfur analyzer.
Verification of sampling and assaying	• No material issues were found with the analysis for the QA/QC procedures for 2015–2016 and 2020 exploration programs. • SRK has been provided with some of the 2015–2016 sampling procedures and protocol documents for review, which meets the China industry standards. • The QA/QC procedures in 2020 were supervised by SRK. • The drilling, logging, sampling, and assaying methods are considered consistent with industry best practice. • To SRK's knowledge, no adjustments to the assay data were made.
Location of data points	• All drillhole and trench collars were surveyed by real-time kinematic GPS by XIAN 80 44N datum. • All the downhole surveys were measured every 50 m.
Data spacing and distribution	• The resource drilling was conducted on a 50 m grid spacing. • Most of the samples were collected at a depth of approximately 2 m. • The majority of the drillhole spacing inside the mining license is sufficient to support the declaration of Mineral Resources. • Sample compositing across the mineralized domains has been applied.

Criteria	Commentary
Orientation of data in relation to geological structure	• The vertical and inclined drillholes were drilled to intercept the mineralized intervals, hosted by a sequence of graphitic schists with moderate dip to the northwest. • Considering all the holes passed through the existing mineralized intervals, historical vertical drillholes did not introduce bias in the sampling and were designed to intersect the mineralisation.
Sample security	• Based on the information available, all remaining drill core and pulp samples are held securely at Yixiang New Energy's onsite facility.
Audits or reviews	• SRK reviewed the 2015–2016 historical works, including drillhole locations, mineralisation examination, drill core loggings validation, the sampling techniques checking and choosing pulp sample to the third laboratory validation during the process of preparing this Report. • In 2020, the additional infilled drilling program was monitored by SRK.

Section 2: Reporting of Exploration Results

Criteria	Commentary
Mineral tenement and land tenure status	• The mining license for the Yixiang Graphite Project covers an area of 0.2615 km². Yixiang New Energy was awarded the license in April 2019. • The mining license valid period is from April 2019 to April 2024. • The mining license can be renewed when it expires.
Exploration done by other parties	• There are two systematic exploration phases: — In 2015–2016, the Project was explored by Ruifa. — In 2020, the additional exploration program was also carried out by Ruifa, and supervised by SRK. • All available drilling and trench information has been incorporated in the geological database used in support of the Mineral Resource estimate.
Geology	• The Beishan graphite mineralisation is of flake type, with flake size ranging from fine to medium, hosted by a sequence of graphitic schists with moderate dip to the northwest. • The by-product material is marble units that overlie the graphite mineralized domains.
Drillhole Information	• In 2015–2016, a total of 39 diamond holes were drilled for a total length of 5,770 m. In 2020, a total of 11 infilled diamond holes were drilled for a total length of 1,647 m. • The drillhole collars were surveyed by real-time kinematic GPS. • In 2015–2016, all the holes were drilled vertically. In 2020, all additional infilled holes were inclined at 080°toward 169°(southeast). • Unless otherwise specified, all the coordinates used in this Report are XIAN 80 44N datum.
Data aggregation methods	• Not applicable; no Exploration Results are specifically reported.
Relationship between mineralisation on widths and intercept lengths	• Not applicable; no Exploration Results are specifically reported.
Diagrams	• Various maps, sections and diagrams are included in the Report, but they are not reproduced here for clarity.
Balanced reporting	• Not applicable; no Exploration Results are specifically reported.
Other substantive exploration data	• Not applicable; no Exploration Results are specifically reported.
Further work	• Not applicable; no Exploration Results are specifically reported.

Section 3: Estimation and reporting of Mineral Resources

Criteria	Commentary
Database integrity	• The database was prepared by SRK according to the geological information following Chinese industry standards, provided by Ruifa, and managed by Yixiang New Energy. • SRK validated the database. • SRK modelled the graphite mineralized domains and marble units based on the database. • SRK excluded three holes that are beyond the mining license boundary, and four very shallow holes (with no collar coordinates) drilled before 2015.
Site visits	• Jinhui Liu visited the Project on 15–19 July 2020 and 26–27 August 2020. • Gavin Chan visited the Project on 4 January 2022 • Lanliang Niu visited the Project on 15–16 July 2020 • Falong Hu visited the Project on 15–16 July 2020. • Xue Nan visited the Project on 15–16 July 2020.
Geological interpretation	• SRK recorded the graphite mineralized code based on the threshold of 2.0% TGC as well as the lithological logging code. • SRK recorded the marble units based on the CaO threshold of 45% as well as the lithological logging code. • A total of eight graphite mineralized domains were interpreted, and six marble units were modelled by SRK.
Dimensions	• SRK notes that the mining license's vertical limit is from 274 m to 150 masl. The dipping extent of the mineralized domains is below the bottom limit of 150 masl, even to ~100 masl. • The in situ rough dimensions (in meters) of graphite mineralized domains are as below: — Domain V1: 250 × 200 × 37 (strike × dip extension × average thickness) — Domain V2: 100 × 100 × 7 — Domain V3: 350 × 300 × 50 — Domain V4: 100 × 80 × 10 — Domain V5: 250 × 330 × 60 — Domain V6: 180 × 150 × 30 — Domain V7: 290 × 260 × 25 — Domain V8: 380 × 260 × 45.

Criteria	Commentary
Estimation and modelling techniques	• The by-product is marble units interleaving with the graphite domains. The marble blocks mined out during mining development were transported by local building materials companies for sale. SRK has reviewed the contracts between Yixiang New Energy and the local building materials companies. • The Mineral Resource estimate was carried out using Leapfrog Geo 5.0 software. • Graphite mineralized domains and marble units were constructed: Graphite domains were defined by threshold of 2% TGC based on the lithological code. • Marble units were defined by CaO≥45% as well as lithological logging. • Samples were composited to 2 m within the domains and units, and the residual length was added to previous intervals. • Top-capping was only used for composites in domains V1, V2 and V8. • Directional variogram modelling was performed within the plane of domain orientation. The Inverse Distance Weighted (IDW) method was used to interpolate the TGC grade on Domain V4, and CaO, MgO and SiO_2 on the marble units due to there being insufficient data to create meaningful variograms. The TGC was estimated by ordinary kriging (OK) on the remaining seven graphite domains. • Block estimation was conducted using Leapfrog Edge software. • SRK produced the one-layer block model for two seams with dimensions of 5 m × 5 m × 2 m (east × north × elevation) without a sub-block dimension. No rotation was applied to fit the seam zones. • The search distances were derived from the variogram ranges or the drilling density spacing. • Block model validation was conducted by visual comparisons between drillholes and grade estimates, comparison between block and composite grades, and by swath plots along major axes showing comparisons between mean composite and mean block grades. No detailed grade control data or production records are available for reconciliation. • No modelling of selective mining units was undertaken. • The Mineral Resource estimate was initially reported on 31 December 2020. The Mineral Resource has been updated as at 31 December 2021 by depleting the production in 2021.
Moisture	• All tonnages are reported as dry tonnages using an average dry in situ bulk density factor for each graphite domain and marble unit.
Cut-off parameters	• Based on actual production parameters and SRK's assumptions for the reasonable prospects for eventual economic extraction, a 3.5% TGC cut-off grade was applied for the Mineral Resource Statement for graphite. • No cut-off parameters were used for the marble units that are sold for building materials.

Criteria	Commentary
Mining factors or assumptions	• A 1 m minimum ore thickness to comply with inferred mining equipment capacities was used. • No other mining factors were applied to the Mineral Resource estimation process.
Metallurgical factors or assumptions	• Metallurgical factors were indirectly integrated by defining TGC cut-off grades. No other metallurgical factors were directly or indirectly applied in Mineral Resource estimation.
Environmental factors or assumptions	• No environmental factors or assumptions have been applied to the present Mineral Resources.
Bulk density	• The average density on each graphite domain was used in the Mineral Resource estimate. • The average density for all the marble units was used.
Classification	• Inferred Mineral Resources have been reported • Classification based on data quality and quantity (including drillhole spacing), geological complexity and grade continuity and grade interpolation. • Indicated Mineral Resources Classification Criteria: Drill spacing is 50 m (strike) × 50-80 m (dip extension) with high confidence regarding the domain thickness and grade continuity area, on graphite domains V1, V2, V3, V5, V6, V7 and V8, and marble units M2 and M3. • Inferred Mineral Resources Classification Criteria: Expansion area of Indicated Mineral Resources, or the drill spacing is more than 50 m × 50-80 m, and all the resources of graphite Domain V4, and marble units M1, M4, M5 and M6 were considered as Inferred. • The result appropriately reflects the competent person's view of the deposit.
Audits or reviews	• No other external reviews in relation to the latest Mineral Resource estimate have been completed to date.
Discussion of relative accuracy/confidence	• There is a high level of confidence in the underlying drillhole sample data. • There is a moderate to high level of confidence in the geological continuity of the mineralisation.

Section 4: Estimation and reporting of Ore Reserves

Criteria	Commentary
Mineral Resource estimate for conversion to Ore Reserves	• The graphite Ore Reserves estimate was based on the Mineral Resource model developed by the SRK team and excluded Inferred Mineral Resources. • The marble Ore Reserves estimate was based on the Mineral Resource model developed by the SRK team are reported and is inclusive of Mineral Resources. • The Ore Reserve estimate is derived from pit optimisation and pit design, mining dilution and loss. The referent point of Ore Reserve estimates is the primary crusher or feed ore bin located in beneficiation plant. • The following table shows the Ore Reserve for the Beishan graphite mine. Any Mineral Resources are reported as wholly inclusive of the Ore Reserves. Production in 2021 has been depleted from the Ore Reserve. Note rounding errors may occur:

Ore Reserve Category	Tonnage *(kt)*	Grade *(% TGC)*
Probable	9,549	10.15

Criteria	Commentary
Site visits	• The SRK team that includes mining, processing, geology, environment disciplines visited the site in July 2020. Gavin Chan visited the site in January 2022.
Study Status	• Two studies had been completed for Beishan graphite mine by third parties, which are named feasibility study or preliminary engineering design: 1). Feasibility Study Report on Beishan Graphite Mine as 500ktpa Ore Mining Capacity, compiled by Suzhou Sinoma Design and Research Institute of Non-metallic Minerals Industry Co., Ltd. dated December 2017 (2017 FS) and 2). Preliminary Engineering Design for Beishan Graphite Mine at 500ktpa Ore Mining Capacity, compiled by Heilongjiang Province Metallurgical Design and Planning Institute, dated January 2019 and modified slightly in December the same year (2019 FS) • The Ore Reserve estimate was completed based on the operational achievements to date and the 2019 FS. • SRK examined the historical production achievements and the 2019 FS, and the degree of correlation is sufficient for them to be used in the study. • Any material classified as an Inferred Mineral Resource was not included in the Ore Reserves calculations. • The mining schedule is technically achievable and economically viable as determined by the economic analysis. • After reviewing the feasibility study reports, SRK opines that the FS could meet the international pre-feasibility study level in general and could be basis for Ore Reserve conversion.

Criteria	Commentary
	• Considering the mine design of 2019 FS honored the mining license limit on both mining scope and mining capacity, 2019 FS is the basis of Ore Reserve conversion.
Cut-off parameters	• The marginal cut-off grade (MCOG) is applied for graphite feed ore, within the pit design, to define ore and waste. • The MCOG is estimated as 6.6% TGC. • Considering both trial production conducted by the Company in 2020 and 2019 FS forecasted, the total cost of non-mining is RMB166.7/t ore. • The processing recovery of graphite is recorded by the company in trial production is 91.5% and is within the estimated range of 2019 FS. • The product of the mine is considered as graphite concentrate with 95% TGC, which is RMB2,578/t excluding value added tax (VAT). • The by-product of marble material is credited during MCOG estimates, but the economic contribution to the mine is considered during pit optimisation progress.
Mining factors or assumptions	• The open pit mining with a conventional drill-blast, shovel and truck method is employed for the mine. • The conversion of Mineral Resources to Ore Reserves is based on pit optimisation which considers Indicated Mineral Resources only (there is no Measured Mineral Resource for this Mine). • The main input for pit optimisation is similar to MCOG estimates; the additional inputs to MCOG estimates are: — Mining cost is RMB6.3/t rock material, based on the actual achieved costs. — Non-mining cost is RMB154.7/t ore, based on the actual achieved costs. — Marble material price is RMB7.0/t, excluding VAT. — Marble material recovery rate (utilization ratio) is 97%. — Mining dilution is 10% according to the trial production. — Mining loss rate is 5%. — Overall slope angle is 43°. • The pit design are as follows: — Bench height is 15 m — Bench face angle is 65° — Catch berm is 8 m wide — Ramp is 13 m wide (dual lane) — Road gradient is 10% — Overall slope angle is approximately 43°. • The LoM plan is developed based on the parameters and mining sequence proposed by in the 2019 FS against SRK's Mineral Resource estimate and open pit design, and the project goal proposed by China Graphite, which plans to achieve the target graphite feed ore capacity of 0.5 Mtpa by 2023.

Criteria	Commentary
	• The LoM is 20 years, with an average graphite grade of 10.15% TGC. The LoM stripping ratio is 1.15 (waste divided by graphite feed ore plus by-product marble material).
Metallurgical factors or assumptions	• Graphite ore is crushed and grinded prior to being processed by flotation at the beneficiation plant, which involves a single-stage rougher, single-stage scavenger, 10-stage regrinding on primary (rougher) concentrate followed by 11-stage cleaning and collective middlings recycling. The product is a flake graphite concentrate with grades ranges between 94% and 95% TGC. The graphite recovery is above 90%. • The processing plant uses the flake graphite concentrate as raw material, upgrading the flake graphite concentrate through a flowsheet of 'pulverising-rounding-classifying-purifying-drying-iron removal', producing spherical graphite and the by-products, micro graphite powder and high-purity graphite powder. • The beneficiation and spherical graphite plants are existing operations that commenced in 2006 and 2013, respectively. The processing flowsheets applied are considered appropriate. • Additional testwork was conducted by Suzhou Sinoma Design and Research Institute of Non-metallic Minerals Industry Co., Ltd. in 2016. • The metallurgical samples taken for the testwork in 2016 are considered representative.
Environmental	• The Project has been covered by Environmental Impact Assessments and granted Environmental, Social, Health and Safety approvals.
Infrastructure	• The mining operation does not require a significant supply of fresh water. Water is only used for watering the roads and mining benches. The water is sourced from a tributary of Yadan River. • A 10 kV/0.4 kV substation is located on the mine site and is connected to the national electricity grid. • The beneficiation and spherical graphite processing plants are connected with a well- maintained road system. Access to the Project area from Luobei, the closet town, is through a series of paved roads via the village of Yanjun Farm.
Costs	• The capital cost forecast was provided by China Graphite and reviewed by SRK as being reasonable. • The operating cost forecast was based on historical operating costs and reviewed by SRK as being reasonable. • The marble ore is sold at the mine gate, whereas other products are sold at delivered price (transportation cost is borne by China Graphite). • All non-income taxes have been factored in the cost estimate.

Criteria	Commentary
Revenue factors	• Revenue forecast were based on sales of marble, flake graphite concentrate, spherical graphite and micro graphite powder and high-purity graphite by-products. • Sales contracts of previous years were reviewed, and similar terms have been negotiated. The forecast assumes similar conditions will continue. • All products are contracted for delivered prices, whereas the marble is contracted as ex-works price.
Market assessment	• Market forecast was based on a market study by Frost & Sullivan. • The products selling price forecast was based on the Frost & Sullivan Market Study, and the existing and historical sales contracts with customers provided by China Graphite. • Sales volume has been forecast to be similar tonnages to recent forecast. • Specifications based on current contracts and previous records. The major flake graphite concentrate products are -193, -194, -195 and -196, indicating the mesh size of these products is below 100 mesh and grades are between 93% and 96% TGC.
Economic	• The capital and operating cost forecasts were provided by China Graphite and reviewed by SRK as being reasonable. • The product selling prices are based on forecast made by Frost & Sullivan, substantiated by historical sales prices. • An economic viability shows that after tax (25% corporate income tax) NPV over the LoM at a discount rate of 10% returned a positive NPV as at 31 December 2021. The positive NPV suggests the Ore Reserve defined is economically viable. Every year of the forecast shows positive cashflow.
Social	• The land surrounding the Project area generally comprises forest and farmland. • The Environmental Impact Assessments for the Project provided public participation survey for the Mine site and processing plant construction. The survey results showed 100% support for the Project's construction. The EIA reports also state the local residents believe the Project will improve the development of local economy. The local residents did raise water, air and noise pollution as the key environmental concerns for the Project's development.
Other	• The Project has been operating successfully. • A risk assessment is included in this Report. No risks are classified as high risk.

Criteria	Commentary
Classification	• The Probable Ore Reserves were based on Indicated Mineral Resources. The classification is further supported by the 2019 FS, production records and data provided by China Graphite.
Audits or reviews	• No external audits of the Ore Reserves have been undertaken. SRK has completed an internal audit review as part of Ore Reserve estimation process.
Discussion of relative accuracy/confidence	• All mining estimates are based on the 2019 FS, production records and forecast made by China Graphite. • There are no unforeseen Modifying Factors at the time of this statement that will have material impact on the Ore Reserve estimates. • Where practical and possible, current industry practices have been used to quantify estimation made.