

St George Mining

Mining prospects

Mt Alexander nickel potential is growing

Metals & mining

12 December 2016

Price **A\$0.13**
Market cap **A\$33m**

Net cash (A\$m) at 23 November 2016	6.7
Shares in issue	250.4m
Free float	64%
Code	SGQ
Primary exchange	ASX
Secondary exchange	N/A

Share price performance



%	1m	3m	12m
Abs	(10.3)	(10.3)	83.1
Rel (local)	(16.4)	(13.1)	67.3
52-week high/low	A\$0.24	A\$0.07	

Business description

St George Mining (SGQ) is focused on exploration for massive sulphides in Western Australia. Its major nickel project is at Mt Alexander. Its other major project is at East Laverton, which is prospective for both nickel and gold.

Next events

Dec qtr activities	February 2017
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St George Mining (SGQ) has consolidated ownership of the Mt Alexander greenstone belt. It has confirmed nickel-copper sulphide mineralisation at three prospects over a 3.5km section of the Cathedrals belt within Mt Alexander. A regional aeromagnetic survey has indicated that the belt may continue for a further 8km strike. It has also identified structures parallel to the Cathedrals belt that may host similar mineralisation. In addition, a deep penetrating fixed loop electromagnetic (FLEM) survey has identified new electromagnetic (EM) anomalies. While the Mt Alexander project has been the main focus of activity for most of 2016, the East Laverton project continues to be a valid target for large-scale nickel and gold deposits.

Massive nickel-copper sulphides on Cathedrals belt

SGQ has strategically consolidated ownership of Mt Alexander since acquiring two former BHP Billiton (BHP) operated tenements. Within E29/638 (SGQ 75%, Western Areas 2 5%), nickel-copper sulphides have been intersected at three prospects on the Cathedrals belt namely Cathedrals, Stricklands and Investigators (east to west) comprising a c 3.5km strike. All intercepts resulted from drilling of electromagnetic (EM) anomalies. A regional aeromagnetic survey points to a possible 8km easterly extension into E29/954 (SGQ 100%) tenement and possible parallel mineralised structures to the north in E29/548 (SGQ 100%) and south of the Cathedrals belt in E29/638.

High nickel prospectivity at East Laverton

SGQ's success at Mt Alexander in consolidating the tenement areas, followed by confirmation in drilling of nickel-copper sulphide mineralisation, has led to a much reduced level of exploration activity at the former East Laverton flagship exploration project. Drilling at East Laverton has confirmed extensive strike lengths of high-magnesium oxide (MgO), olivine-rich ultramafics across three major belts. Ultramafic rocks of this composition are known to host high-grade nickel sulphides. At the Windsor project there is a powerful EM conductor where drilling is planned.

East Laverton also prospective for gold

The East Laverton project is located in the NE corner of Eastern Goldfield Province of the Archean Yilgarn Craton. Extensive greenstones have been identified in reconnaissance drilling which, in conjunction with major crustal structures, implies prospectivity for orogenic gold mineralisation. Major gold occurrences in close proximity include the Laverton gold field to the north-west, the Gruyere deposit (>6moz) to the north and the Tropicana deposit (>8moz) to the east.

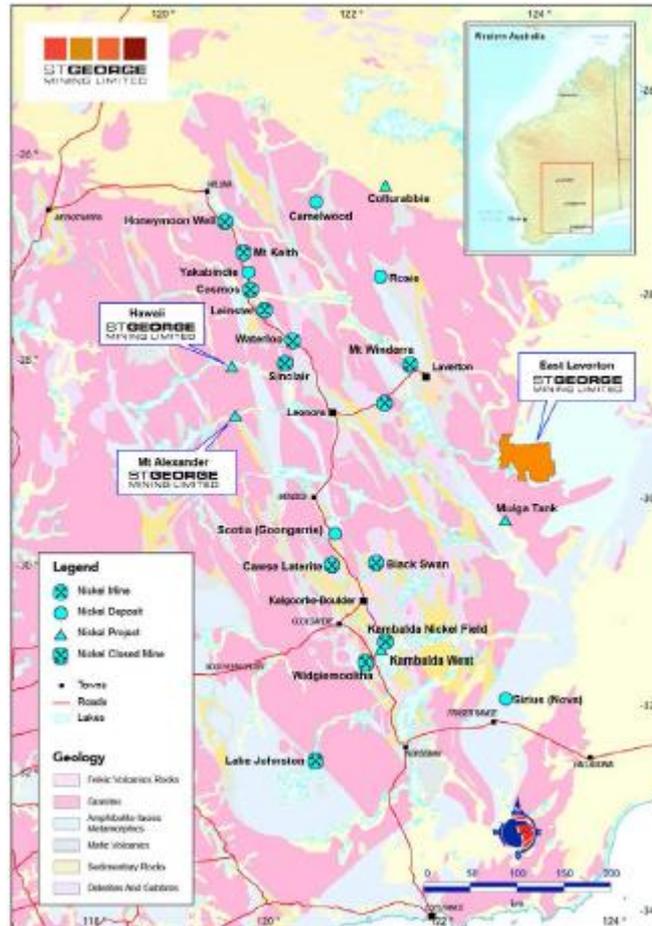
Financials

At 23 November 2016, SGQ had cash of A\$6.7m. In August 2016, a private placement raised almost A\$6.5m. In October 2016, SGQ received a cash payment of A\$2.3m from the Federal Government's R&D Tax Incentive Scheme.

St George Mining: Nickel and gold explorer

SGQ's major nickel exploration project is at Mt Alexander. Its other nickel projects are at East Laverton and Hawaii. Gold exploration is also being conducted at East Laverton. Exhibit 1 shows the location of SGQ's exploration projects and an overview of some of the major nickel mining and project sites in Western Australia.

Exhibit 1: Nickel project location plan



Source: St George Mining

Mt Alexander

The Mt Alexander project straddles the Ida Fault, a significant Craton-scale structure. The Cathedrals belt is located within the Mt Alexander project, which is east of the Ida Fault in the prospective Kalgoorlie terrane.

The Mt Goode Rift, which hosts the Cosmos nickel deposit, has been interpreted to be a splay off the Ida Fault. If this is the case, the geology at Mt Alexander and Hawaii could be contiguous with the stratigraphy that hosts Cosmos. The Cosmos mine had an original mining reserve (open pit and underground) of 949,000t at 7.3% Ni. It was discovered and developed by Jubilee Mines with first production in 2000. It was Jubilee's main asset. In 2007, Jubilee was acquired by Xstrata for A\$3.1bn. The mine closed in 2012 due to low nickel prices. Western Areas (WSA) bought Cosmos from Glencore (which had merged with Xstrata) in 2015 for A\$24.5m.

Consolidation of ownership of the Mt Alexander greenstone belt

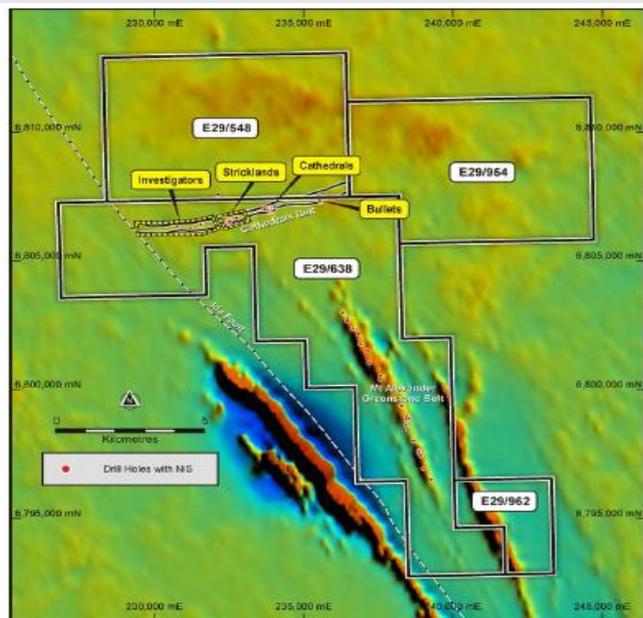
SGQ has consolidated ownership of the Mt Alexander tenements through a series of acquisitions. All the tenements are contiguous. They provide the company with 174km² of tenements, which includes the majority of the Mt Alexander greenstone belt. SGQ has extended the strike length of recurrent mineralisation discovered in the Cathedrals belt, within E29/638, from 400m to 3.5km.

- **E29/548:** the Mt Alexander North project on exploration licence E29/548 (45.12km²) was acquired from BHP in October 2015. It is located approximately 120km southwest of Leinster. Together with the Hawaii project (see page 9), it was acquired for \$40,000 plus an offtake agreement and a conditional royalty charge.
- **E29/954:** also in October 2015, SGQ lodged an application for E29/954 (41.72km²), located immediately to the east of E29/548. This was granted relatively recently in August 2016, with SGQ owning 100% of the tenement. There was no known prior exploration on this tenement.
- **E29/638:** at the time of SGQ's purchase of E29/548, a mineralised structure on E29/638 had been interpreted to extend north into SGQ's newly acquired ground. It was also considered a possibility that the mineralisation extended into E29/954. E29/638, to the south of E29/548, was held in a 75/25% JV between BHP Billiton (BHP:ASX) and Western Areas (WSA:ASX).

In December 2015, SGQ acquired BHP's 75% interest in E29/638 (78.65 km²) for A\$300,000 plus offtake rights and a conditional royalty charge. SGQ became the manager of the project, with WSA retaining its 25% interest in the project.

- **E29/962:** granted in April 2016, this new tenement (SGQ 100%) covers 4km of strike of the south-eastern extent of the Mt Alexander greenstone belt including known but underexplored ultramafics.

Exhibit 2: Cathedrals belt at the Mt Alexander project



Source: St George Mining

High-grade nickel-copper intersections in the Cathedrals belt

Exploration on E29/638 and E29/962 (at the south-east of E29/638) has been largely for komatiite-hosted nickel sulphides in the Mt Alexander Greenstone belt. However, exploration in the northern section of E29/638, which includes the Cathedrals Prospect, and also limited exploration on E29/548, has been for komatiite-hosted nickel-copper sulphides in granite terrane. To date, 19 diamond drill holes completed by SGQ in the Cathedrals belt have intersected high-grade nickel-

copper sulphides and high platinum group element (PGE) grades at depths ranging from 25-170m from surface.

To date, drilling is still largely reconnaissance exploration. Drilling at Cathedrals, Stricklands and Investigators is not yet sufficient to determine ore resources.

- **Cathedrals:** in 2008, under the BHP/WSA JV, drilling was initiated to test coincident EM and magnetic anomalies associated with nickel-PGE enriched gossans. The drilling identified high grade nickel-copper sulphide mineralisation in granite-hosted ultramafic units. The discovery was named the Cathedrals Project. High-grade nickel-copper intersections included 4m at 4.9% Ni, 1.7% Cu and 3.9g/t total PGEs from 91.4m depth (MAD012) and 3m at 3.8% Ni, 1.6% Cu and 2.7g/t total PGEs from 56.3m (MAD013).

In April 2016, SGQ drilled four previously untested EM conductors. The conductors had been previously identified by BHP. Drilling intersected four high-grade intervals of nickel-copper mineralisation. Massive nickel-copper sulphides were discovered at shallow depth 30m below surface. In June 2016, assay results confirmed nickel sulphide mineralisation for drill holes MAD15, MAD16, MAD17 and MAD19.

- **Stricklands:** in June 2016, assays for the first ever drilling at the Stricklands prospect confirmed nickel-copper mineralisation at three separate targets. Drill holes were MAD20, MAD22 and MAD23. The intersections were at shallow depths in fresh rock just below the base of weathering, which averages 35m at Stricklands.
- **Investigators:** in April 2016, a new EM survey identified three strong conductors. In August 2016, drill holes MAD31, MAD32, MAD33, MAD34, MAD37, MAD38 and MAD40 targeting separate EM conductors, intersected massive nickel-copper sulphides hosted by mineralised ultramafics.

Analysis of drill results

Drilling carried out to date is reconnaissance drilling and further infill and extensional drilling will be required to determine continuity along the part of the Cathedrals belt that has been drill tested and confirmed as mineralised. The strike length identified as mineralised so far is 3.5km but the belt is longer than this. Ultimately, the objective is to prove up resources which, after consideration of financial and technical factors, can be converted to a reserve.

The size and grades of any resource will be dependent on the nickel cut-off grade adopted. The parameters of a mining reserve will be influenced by factors such as the cut-off grade, the mining method, possible selective mining and consideration of capital costs, operating costs and revenue. Revenue should include nickel sales plus sales of coproducts such as copper, cobalt and PGEs. In the mining process, some ore dilution may have to be allowed for.

In drilling by SGQ at Cathedrals, Stricklands and Investigators, a common theme was a high grade nickel-copper sulphide intersection between 1-6m within a wider intersection of lower grade mineralisation. Not all drill results may be representative. Results to date are only a small sample. Summarising the drill results with some rounding:

- **Cathedrals** – A high grade nickel intersection range of 1-6m with nickel grades varying from around 0.5% to 9% within a broader width of 3-9m with a grade variance of 0.5% to 3%. One of the former BHP holes at Cathedrals, MARC49, combined both a broad width of 6m and a high grade of 3.33% Ni.
- **Stricklands** – A high grade nickel intersection range of 1-4m with nickel grades varying from around 0.8% to 4% within a broader width of 5-10m with a grade variance of 0.5% to 0.8%. A thicker and higher grade interval at Stricklands was MAD26 with 4.3m at 4.26% Ni.
- **Investigators** – A high grade nickel intersection range of 1-3m with nickel grades varying from around 1.6% to 8% within a broader width of 3-10m with a grade variance of 0.9% to 2.3%.

Noteworthy intersections at Investigators included MAD38 with 2.74m at 3.77% Ni, MAD40 with 1.96m at 5.09% Ni including 1.00m at 7.88% Ni, MAD 32 with 1.92m at 4.58% Ni including 0.77m at 7.82% Ni and MAD 37 with 1.27m at 5.63% Ni including 0.72m at 7.93% Ni.

Application of geophysics to nickel exploration

Reference is made in this report to a range of geophysical techniques used by SGQ's consulting scientists, Newexco, to delineate below surface anomalies prospective for nickel sulphides. Newexco has the ability to model and interpret geophysical results as a precursor to further geophysical work or the design of an exploration drilling programme. Some of the geophysical techniques used by Newexco have been designed in-house.

Newexco has participated in a number of recent nickel discoveries where it was responsible for the geophysical programmes. These successes provide confirmation of the potential of geophysical techniques in exploration. These include:

- **Nova Bollinger (2012)** – design and implementation of the geophysical programme led to the discovery hole, SRCC0024. This led to the discovery and drill out of the Nova nickel sulphide deposit east of Norseman in the Albany-Fraser belt. Acquisition and interpretation of a ground gravity survey contributed to the drilling of hole SFRDO167 and the discovery of the blind Bollinger nickel sulphide deposit down plunge of Nova. In 2015, Independence Group (IGO.ASX) made a successful A\$1.8bn takeover bid for Sirius Resources whose main asset was the Nova Bollinger deposit. Following the 2014 DFS, the reserve estimate comprises 13.1mt at 2.1% Ni, 0.9% Cu and 0.07% Co.
- **Spotted Quoll (2007)** – The interpretation of a subtle surface Moving Loop EM response led to the discovery of this high grade deposit, which had remained undetected for over 35 years despite diamond drilling testing by previous explorers. The exploration concept, survey design, data acquisition, interpretation and drill targeting were all conducted in-house by Newexco. The initial resource at Spotted Quoll was 2mt at 6% Ni. The deposit is owned and operated by WSA. Mining commenced in 2009. Based on current reserves, Spotted Quoll has a mine life >10 years. The orebody is still open at depth.
- **Flying Fox (2003)** – Innovative Downhole EM (DHEM) identified numerous anomalies with subsequent targeted drilling confirming the 'blind' T6 and T7 nickeliferous horizons which are >1,000m below surface. Production commenced in 2006. The operation is owned by WSA. Current total ore reserves are 1.15mt at 4% Ni.

Other exploration successes involving Newexco where geophysical techniques were crucial took place at Emily Ann North (2016) (Poseidon Nickel) and Savannah North massive nickel-copper-cobalt (2014) (Panoramic Resources).

Aeromagnetic survey – 8km extension and parallel structures

In October 2016, SGQ commenced a regional airborne magnetic survey over the four granted tenements at Mt Alexander. The survey, now completed, has provided an important data set for generating new exploration targets. A total of 4,472 line kilometres was flown in the survey, which was completed on a 50m spacing with a sensor height around 40m. The survey was flown in two blocks – the northern block that covered the east-northeast Cathedrals belt and the surrounding area and the southern block that covered the north-northwest trending Mt Alexander belt and surrounding area.

The objective of the survey was to provide high-resolution magnetic data to assist in the generation of new regional targets, with particular respect to:

- assist in determining if the Cathedrals belt extends to the east-northeast into SGQ's recently acquired tenement E29/954. **Result:** the new data indicates that the Cathedrals belt may

continue to the east for a further 8km strike. Magnetic features may represent ultramafics prospective for nickel-copper mineralisation; and

- identify any new structural corridors parallel (north and south) to the Cathedrals belt potentially hosting mineralised ultramafics. **Result:** the survey identified structures parallel to the Cathedrals belt that may host mineralised ultramafics.

Deep search FLEM survey has identified new EM anomalies

In November 2016, SGQ commenced a deep penetrating fixed loop electromagnetic (FLEM) survey covering a 3.5km strike length of the Cathedrals belt. The FLEM survey uses the deep penetrating SAMSON system developed by GAP Geophysics. It can deliver a depth penetration of >500m, which is twice the depth penetration typically achieved by conventional EM surveys carried out so far.

The primary objective of the FLEM survey was to detect any deep conductors in the Cathedrals belt below the depth of detection of previous surveys. It would also potentially assist in defining extensions of known mineralisation, as well as other undetected conductors.

Results and actions – following a preliminary review of data from the SAMSON EM survey:

- a number of new anomalies have been detected over the western part of the Cathedrals belt. The data is currently being modelled by SGQ's consultants Newexco; and
- the SAMSON EM survey is to be extended to cover the new eastern extension of the Cathedrals belt.

Given SGQ's 100% success rate in testing EM conductors in this belt, the company believes that the likelihood of discovering more nickel-copper sulphides at these new EM anomalies is high.

Metallurgical tests – high recoveries and concentrate grades

Preliminary metallurgical flotation test work has been carried out on an interval of Cathedrals' massive sulphide. The purpose of the test work was to confirm that the mineralisation was amenable to low-cost and effective processing. If the Mt Alexander project advances to the feasibility study stage, additional comprehensive tests will be required. Test results may vary depending on the head grades of the samples tested and location of the sample within the deposit.

Based on the test work, the potential to produce separate nickel and copper concentrates at high recoveries is indicated. The low impurities of the nickel concentrate (low MgO, talc and arsenic) may indicate potential strong demand from smelters for blending with concentrates with deleterious characteristics. Key points from the test work include:

- **Separate concentrates:** ability to produce separate nickel and copper concentrates through flotation. Separate concentrates typically generate higher revenue than mixed concentrates and are generally easier to market.
- **High recoveries:** nickel and copper recoveries of 89.4% and 85.8% respectively from the sample tested. High recoveries optimise production and revenue.
- **High concentrate grades:** concentrate grades of 18% and 32% were achieved for nickel and copper concentrates respectively. Concentrates with high grades normally deliver the highest payment terms and the lowest transport costs.
- **Smelter credits:** recovery of PGEs (includes platinum and palladium) to both the nickel and copper concentrate with a total PGE grade of 13.5g/t + Au in the nickel concentrate and 3.2g/t PGE + Au in the copper concentrate. PGEs are normally recovered at the refining stage and can provide co-product revenue, depending on the concentrate smelter/refinery sale terms.
- **Cobalt in nickel concentrate:** a cobalt grade of 0.55% was achieved in the nickel concentrate. This may provide cobalt co-product revenue. Cobalt has traditionally been used in steel and

magnetic applications. More recently, it is being keenly sought for use in battery manufacture. Approximately 60% of global cobalt production is sourced from the Democratic Republic of the Congo (DRC). There is demand for additional alternative sources of cobalt to diversify supply. In the last 12 months, cobalt prices have increased from around US\$12/lb to almost US\$14/lb.

- **Low impurities:** no deleterious compounds or elements such as high magnesium oxide (MgO), talc or arsenic. The absence of these impurities could make the concentrates highly sought after by nickel smelters. High MgO in the resultant slag during the smelting process can lead to higher temperatures and risk furnace integrity. To address the problem, smelter operators seek to adopt operational control procedures which includes the sourcing of low MgO concentrates for blending with higher MgO concentrates.

Concentrate processing

Subject to the delineation of sufficient reserves for a commercial mining project, SGQ will need to have the nickel-copper ore processed.

Under the sale conditions by BHP's Nickel West subsidiary of its interests in E29/548 and E29/638, BHP has reserved pre-emptive (not exclusive) offtake rights to SGQ's share of any nickel produced. The offtake rights allow SGQ to establish competitive pricing for the offtake – BHP must match any competitive pricing that SGQ achieves with a third party. BHP's pre-emptive rights attach to 100% of nickel from E29/548 and 75% of nickel from E29/638.

If BHP exercised the offtake rights, the ore could be trucked to one of Nickel West's nickel concentrators at Leinster (closest) or Kambalda for processing on agreed payment terms.

There are a number of other concentrators in the region which could, as an alternative, process ore from Mt Alexander. These include the Cosmos plant owned by WSA (prefeasibility study underway for a reopening) and the Sinclair plant, owned by Talisman Mining (TLM.ASX) which is currently on care and maintenance.

Mining

As exploration drilling is still largely reconnaissance, it is not yet possible to calculate a resource. Subject to technical and economic factors, this would then need to be converted to an ore reserve that could be mined.

Based on available information, any mining operation would most likely be an open pit operation, at least in its initial stages.

East Laverton – a major target for nickel and gold

East Laverton was SGQ's main nickel exploration project. However, SGQ's consolidation of the Mt Alexander greenstone belt and recent exploration success, leveraging off previous geophysical work and exploration drilling by BHP, has led to the near-term priority being shifted to Mt Alexander.

However, the strong potential of East Laverton, not only for nickel sulphide but also for gold, is undiminished. SGQ has a landholding of >2,000km² incorporating three major greenstone belts.

Nickel

East Laverton has an extensive strike length of high-MgO, olivine-rich rocks across three major ultramafic belts. Ultramafic rocks of this composition are known to host high-grade nickel sulphides. Generally, the higher the MgO level, the higher the nickel level. Structural settings are favourable, with structures and faults that control mineralisation.

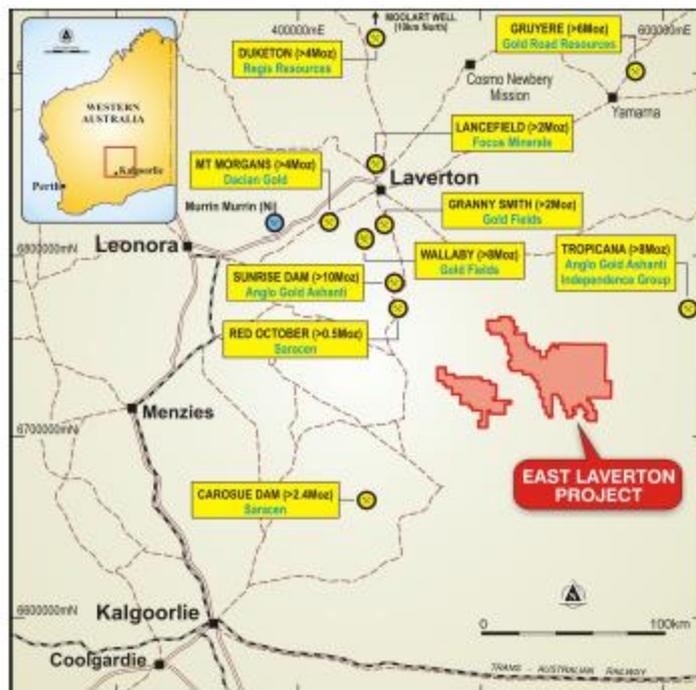
Under a previous farm-in by BHP, nickel sulphides were discovered by BHP in 2012 at two prospects. BHP later withdrew from the project, but only due to a corporate cost-cutting strategy at the time.

Current drilling is focused on a powerful EM conductor (+200,000 Siemens) at Windsor. Hole WINRC016 intersected sulphide up to 1.05% Ni, but narrowly missed the conductor.

Gold

SGQ's East Laverton project is a dominant landholding on the eastern margin of the North Eastern Goldfields. The greenstone belts of the project are considered to have the potential to host orogenic gold mineralisation. Historical exploration drilling was carried out mainly by WMC Resources in the early 1990s. The drilling was relatively shallow, with the majority of the holes being drilled to less than 100m depth. The Ascalon target was never drilled. Widespread anomalous gold has been identified in shallow drilling, confirming prospectivity. Structural controls for gold are evident. Major gold occurrences in close proximity include the Laverton gold field (>20moz) to the north-west, the Gruyere deposit (>6moz) to the north and the Tropicana deposit (>8moz) to the east.

Exhibit 3: East Laverton project showing major gold projects in the region



Source: St George Mining

A major gold campaign commenced in May 2016, with a focus on two priority gold prospects at Ascalon and Bristol.

- **Ascalon:** the main rock types at Ascalon are a dolerite intrusive, high-MgO basalts and Fe-rich sediments. The fractionated dolerite intrusive contains granophyric units. Granophyric dolerites host many gold deposits in the Yilgarn. In a first phase of drilling, results confirmed the prospect area had been a major focal point for the concentration of metal-enriched hydrothermal fluids. SGQ believes the widespread alteration is of a kind that supports the potential for gold mineralisation. Drilling results in November have extended the size of the large hydrothermal system with an anomalous gold horizon extending over 2,000m of strike and remaining open to the east, south and at depth.
- **Bristol:** the Bristol target is situated along the Central belt within the East Laverton project. In previous exploration completed in the 1990s, widespread anomalous gold (>0.5g/t) was

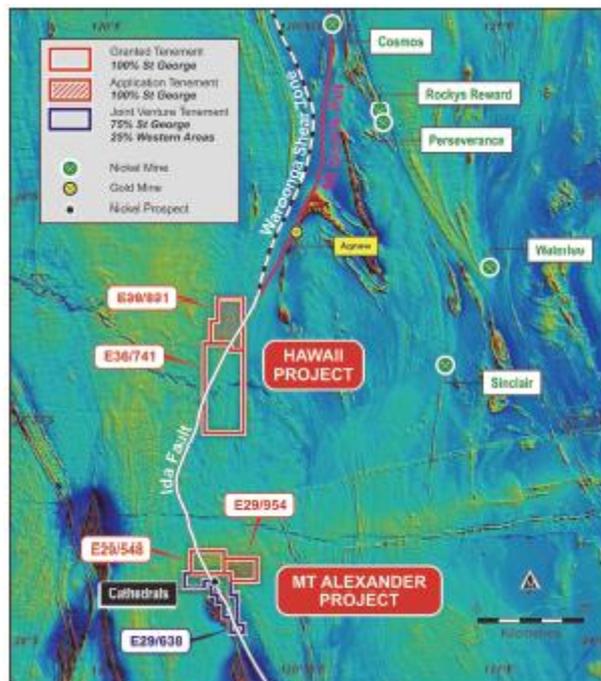
encountered over a 1km strike length from shallow drilling. SGQ has drill tested a prominent magnetic anomaly for supergene gold mineralisation and to determine the bedrock geology. Eleven of the 17 completed RC holes intercepted anomalous gold over a strike length of 1.5km. A large supergene footprint over 1,500m has been confirmed. SGQ believes the substantial supergene gold at Bristol is consistent with a significant primary gold-bearing source located in close proximity.

SGQ is to advance exploration at what it believes are highly prospective gold targets.

Hawaii

SGQ announced the acquisition of the Hawaii project on tenement E36/741 from BHP in October 2015, coincident with the acquisition of the Mt Alexander North project on E29/548. Limited on-ground exploration had been completed by BHP's subsidiary Nickel West.

Exhibit 4: Hawaii nickel project showing proximity of nickel mines in the region



Source: St George Mining

Like Mt Alexander North, Hawaii straddles the Ida Fault. BHP discovered over 5km of moderate to high MgO ultramafics adjacent to the Ida Fault. The total area of the Hawaii project, combining acquired (E36/741) and applied for (E36/851) exploration licences, is 398km².

Hawaii is prospective for komatiite-hosted nickel sulphide deposits and gold deposits such as orogenic gold that are found elsewhere in the Yilgarn Craton. No mineralisation has been discovered at the project to date.

Recent exploration activities have given priority to Mt Alexander (nickel) and East Laverton (gold). The project remains prospective.

Financials

At 23 November 2016, SGQ had cash of A\$6.7m. This incorporates a private placement in August 2016, which raised A\$6.47m.

In the placement, SGQ allotted 43.2m shares at A\$0.15/share with one free attaching option exercisable at A\$0.20 on or before 30 June 2017 for every five shares applied for. The options have the potential to raise almost A\$9.5m, subject to all the options being exercised. Currently, the shares are trading below the exercise price.

After the private placement, there were 250.4m fully paid shares and 47.5m listed options exercisable at A\$0.20 on or before 30 June 2017.

In October 2016, SGQ received a cash payment of A\$2.3m from the Federal Government's R&D Tax Incentive Scheme.

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