

## Quarterly Activities Report: September 2022

First Graphene Limited (ASX: FGR; “First Graphene” or “the Company”) is pleased to provide this update on the financial and operational performance for the quarter ending 30 September 2022.

### Highlights

- **Best performing Q1 on record for Company with 16% growth on Q1 FY2022**
- **Strengthened forward orders of circa A\$200,000 for short to medium term fulfillment**
- **Key growth areas continue in the cement/concrete, composites/plastics segments as order volumes from key clients increase, and product trials move to larger scale**
- **Products to reduce carbon emissions in cement/concrete segment launched**
- **Ongoing paid trials underway across multiple segments**
- **Company and collaboration partners secure circa A\$250,000 grant funding to progress strategic research and development programs**

### Financial Performance

The first quarter of the 2023 financial year saw First Graphene build on its growth trajectory reported in the previous financial year.

Further capitalising on the commercial strategy, the Company realised a 16.5% improvement on sales from Q1, FY22, achieving A\$160,000 in sales.

This is the strongest start to a financial year on record for First Graphene, with nearly half the sales coming from the cement and concrete segment, and the continued growth in volume orders from early adopter Clients.

Along with the strong sales, the Company continues to maintain its focus on cash management. Inventory management is one area of focus, with more than a metric tonne (16%) reduction in finished goods held in stock compared to Q1 last year. This feeds into a strategic initiative to better align safety stock levels, manufacture to order principle, whilst still maintaining the ability to cater for upside orders without negatively affecting cashflow.

The Company also strengthened its immediate forward looking orders to circa A\$200,000 predominantly across the cement/concrete and composites/plastics segments.

## Products under development or using PureGRAPH®

### Cement & Concrete

- Cement additives for reduction of carbon emissions
- Enhanced dry mixing mortar for shotcrete and pumping applications

### Composites & Plastics

- Polymer solar thermal cells
- Advanced fiberglass swimming pools
- Unique heating devices that can be retrofitted to existing gas-fired heating units for greater efficiency and reductions in nitrous oxide and carbon emissions

### Coatings, Adhesives, Sealants, Elastomers (CASE) and Foams

- Electrostatic dissipative coatings
- Sporting apparel and footwear
- Noise and vibration dampening foams

### Energy Generation and Storage

- Supercapacitors technology using metal oxide decorated products that improve on activated carbon
- Catalysts for cathode oxygen reduction in fuels cells, being cheaper alternatives to platinum
- Hydrodynamic cavitation technology for converting petroleum feedstock to synthetic graphite/graphene and clean hydrogen

## Segment Updates

First Graphene continued to strengthen relationships, progress opportunities, advance commercially focused trials, and continue investing in strategic research and development activities.

### Cement and Concrete

Reducing emissions from cement and concrete, both from improved manufacturing techniques and more sustainable use, remains a key focus among the industry. Graphene, and in particular the specialised PureGRAPH® based formulations, provide advantages across the supply chain.

The Company announced the release of PureGRAPH® CEM, a variation of the PureGRAPH® range designed specifically for use in grinding aids and admixtures. PureGRAPH® CEM is targeted to upstream construction chemical companies.

At the same time, First Graphene announced the release of an admixture developed in conjunction with South African-based Nanoproof/Glade Chemicals. The admixture, which offers

significant improvements in compressive and flexural strength if used in accordance with recommended loadings, is being marketed by the Company as PureGRAPH® AM. It is targeted to downstream concrete and construction material manufacturers to provide superior strength and durability properties.

New Zealand's GtM Action also announced the release of its HexMortar™, a graphene enhanced dry mix mortar for shotcrete and pumping applications. Formulated to quickly and permanently increase the flexural and compressive strength of dry mortars, HexMortar™ trials showed significant improvement in product performance, including a 20% improvement in flexural strength and 27% improvement in compressive strength at the 28-day mark compared to standard dry mix mortars.

Additionally, the benefits of graphene are delivering a product that is easy to work and has minimal rebound, thus reducing waste. The product is the first of a range of solutions being developed by GtM Action for the New Zealand and broader global cement and concrete markets to reduce environmental impact.

Advanced-stage trials continue with several leading construction chemical and concrete companies.

The Company is advancing its work with a consortium of partners including Breedon Cement Limited, Morgan Sindall Construction & Infrastructure Limited and the University of Manchester to develop a "green cement".

Funded partially by an Innovate UK grant, the consortium is trialing up to 1,500 tonnes of specially formulated cement, converting to circa 9,000 tonnes of concrete, with varying doses of PureGRAPH® being applied to determine optimum dosage rates and performance outcomes. This represents one of the largest commercial trials of graphene enhanced cement and concrete globally.

The Company is also progressing collaborative projects with Fosroc International to develop cement additive systems. Under the five-year collaboration agreement, both organisations are contributing to the joint development of a range of PureGRAPH® enhanced cement additives that Fosroc aims to add to its portfolio of specialty construction products.

The objective is to provide the cement industry with a global solution to reducing carbon dioxide emissions and increasing the overall performance of cement.

Advanced grinding aid trials are currently being undertaken with Fosroc in its global competence centres, following the establishment of a procedure to add graphene into the mill.

First Graphene's materials scientists are working closely with Fosroc's Group Technology and local operations teams to demonstrate synergistic performance of graphene and grinding aids through optimisation of the formulation.

In addition, a second commercial-scale trial was agreed during the quarter with a major

European specialty chemicals company. The trial builds on successful laboratory results and aims to replicate the demonstrated improvements in strength and carbon savings on an industrial scale. The trial will require 600kg of PureGRAPH® enhanced grinding aid and will produce over 160 tonnes of cement.

The appointment of Lester Lee as Commercial Manager – Cement & Concrete, was announced in September. The Singapore-based industry veteran brings to the Company nearly 30 years' experience working in the cement and concrete industries. That includes senior leadership roles in Hong Kong and Singapore with global companies such as Fosroc Construction Chemicals, K. Wah Concrete Company and W.R. Grace.

Mr Lee will focus on developing opportunities across Asia, with the region accounting for a considerable share of the global cement and concrete market.

### **Composites and Plastics**

During the quarter, First Graphene progressed several commercial and advanced trials with industry partners in the composites and plastics segment.

This includes advancing the project with Senergy Innovations to develop polymer solar thermal cells. Commercial-scale compounding continues, while moulding and extrusion tooling is being finalised with a view to developing demonstration cells in the coming quarter.

At the same time, the project with the Hubron-developed HDPE product reported in the previous quarterly report continued towards commercialisation, with injection-moulded samples demonstrating significant improvements compared to earlier prototypes.

Hubron and First Graphene continue to make final refinements to the HDPE compound to ensure it is suitable for commercial scale extrusion processing.

Foundation customer Aquatic Leisure Technologies continued to grow production volumes and expand international sales of its graphene composite pool range in the UK, Canada and the US. The company has also been granted a patent in the US for its unique technology, which in turn protects First Graphene's supply agreement and potential sales growth into the future.

One of the beneficial side effects of incorporating PureGRAPH® into plastics and composites is that for certain manufacturing processes, it reduces energy input requirements. This not only presents an opportunity for organisations to reduce carbon emissions generated from the use of high-temperature processing techniques, but also offers a path to significantly reducing energy costs.

The opportunity is generating considerable interest among bulk manufacturers, with a US-based packaging company undertaking revenue generating, large-scale trials.

First Graphene anticipates releasing further information following completion of the current trials.

## **Coatings, Adhesives, Sealants, Elastomers (CASE) and Foams**

Throughout the quarter, orders for circa A\$10,000 were realised, predominantly with customers that are completing testing and commercial trials.

The customer base continues to develop in automotive, anti-corrosion and technical textiles, with a growing pipeline of orders expected in early Q2 from partners and distributors, working in CASE and foam markets, with further extension into distribution and strategic partners expected into Q2.

A growing area of interest among clients is the advantages that graphene technology provides for electrostatic dissipative (ESD) coatings, enabling new features to be incorporated into multiple companies' product lines.

Advanced trials in graphene enhanced applications for consumer sports apparel have moved to the next stages of production validation. The Company expects to realise commercial sales in coming months.

Development is also underway in automotive coating applications across several areas including thermal management, with one product being rushed through the development stage and launched into the market. Non-disclosure conditions prevent the Company providing details on the product.

Existing customers are working to enhance elastomer polyurethane systems for use in mining and shoe sole applications, while new projects are underway to harness the benefits of PureGRAPH® for high-performance athletic and branded footwear.

First Graphene is working with a branded golf shoe partner on a range of next-generation shoe designs, with the launch of laboratory and real-life applications planned in Q2.

Rubber compounders are showing continued interest in graphene's properties to enhance thermal management, anti-oxidant and sustainability outcomes.

German machinery manufacturer DESMA has completed trials to investigate several applications for PureGRAPH® enhanced foams across the footwear, automotive, noise vibration dampening and a wide range of further applications.

## **Energy Generation and Storage**

Graphene technology is showing significant advantages in the energy segment, however much of the activity is in the advanced R&D or pre-commercialisation stage rather than market ready.

Nevertheless, First Graphene is very much a leader in this area, working in collaboration with industry, academic and government partners to rapidly progress a range of technologies and opportunities.

That includes protecting our intellectual property portfolio. During the quarter, the Company was granted an Australian patent for its hydrodynamic cavitation process, a green technology to convert petroleum feedstock to synthetic graphene and clean hydrogen.

First Graphene also secured a US patent for its novel technology used to produce metal oxide decorated products that are superior to existing activated carbon used in supercapacitors.

These metal oxide decorated products offer higher energy density and capacitance when used in supercapacitors, and have the unique advantage of also being suitable for use as electrocatalysis.

The patent was granted on 20 September 2022 and First Graphene has an exclusive, worldwide licensing agreement from the University of Manchester, where the process was initially invented by Professor Rob Dryfe, Professor Ian Kinloch and Dr Andinet Ejigu. All are renowned and highly respected experts in the graphene technology and electrochemical processing space.

The supercapacitor device market is projected to grow from US\$409 million in 2020 to US\$720 million by 2025 at an expected CAGR of 12.0 per cent. The growth of the market is driven by increasing demand in energy harvesting applications and rising use of supercapacitors in trains and aircraft. Moreover, the increasing global demand for electric vehicles is likely to fuel the growth of the market.

Supercapacitor technology is exciting because it stores more energy than a capacitor and delivers it at a higher rate than a battery. A recent [report by Azo Nano](#), a leading online publication for nanotechnology, highlights the potential for supercapacitors combined with battery technology as an optimised hybrid system. The report stated:

*“Within the next five years, graphene supercapacitors are likely to be utilized in laptops, smartphones, electronics, public transportation, and many other applications due to increased development in terms of energy storage limits.”*

In addition, work continues in collaboration with Warwick Manufacturing Group and the University of Manchester on the supercapacitor program. Partly funded through an Innovate UK grant, we have successfully proven that our coin cell technology can deliver considerably improved performance over the more commonly used activated carbon. The breakthrough has been described by Azo Nano as a “watershed moment” and will now enable the focus to shift to upscaling the technology to pouch cells.

First Graphene has also found evidence that metal oxide-coated PureGRAPH® is an effective catalyst for cathode oxygen reduction in fuel cells. The findings pave the way for a cheaper alternative to platinum, which is currently used as a catalyst. Work being undertaken on product optimisation and formulations will be a key enabler to advancing research and development in this area, which is another key growth opportunity in the energy storage segment.

The Company is actively seeking partners to advance this R&D work.

### Research and Development

First Graphene continues to seek grant funding to assist in progressing strategic technology R&D programs, both directly and in collaboration with research partners. Within the first Quarter of 2023, First Graphene and its collaboration partners secured total grant funding of approximately A\$250,000. In addition, several agreements are in place that provide the Company's R&D team with access to facilities, materials and additional resources.

As has been previously highlighted, the focus is on solutions that both present major commercial opportunities and address the global shift to addressing climate change and more sustainable outcomes.

Through the quarter, and as announced post quarter-end, First Graphene worked to secure a joint development agreement with UK company ZEBCO Heating Limited to jointly develop a unique heating device based on PureGRAPH® enhanced materials.

The device can be retrofitted to existing gas-fired domestic or commercial installations, common in the UK and Europe, and leverages the unique properties of PureGRAPH® to improve thermal performance and therefore reduce fuel consumption.

Also, the device can reduce or eliminate nitrous oxide (NOx) and carbon monoxide emissions. This is important because NOx has a Global Warming Potential Factor 300 times higher than carbon dioxide.

The UK and European Union are actively and urgently seeking improvements in efficiency in the gas heating market, especially as there is an immediate need to improve energy security in the continent.

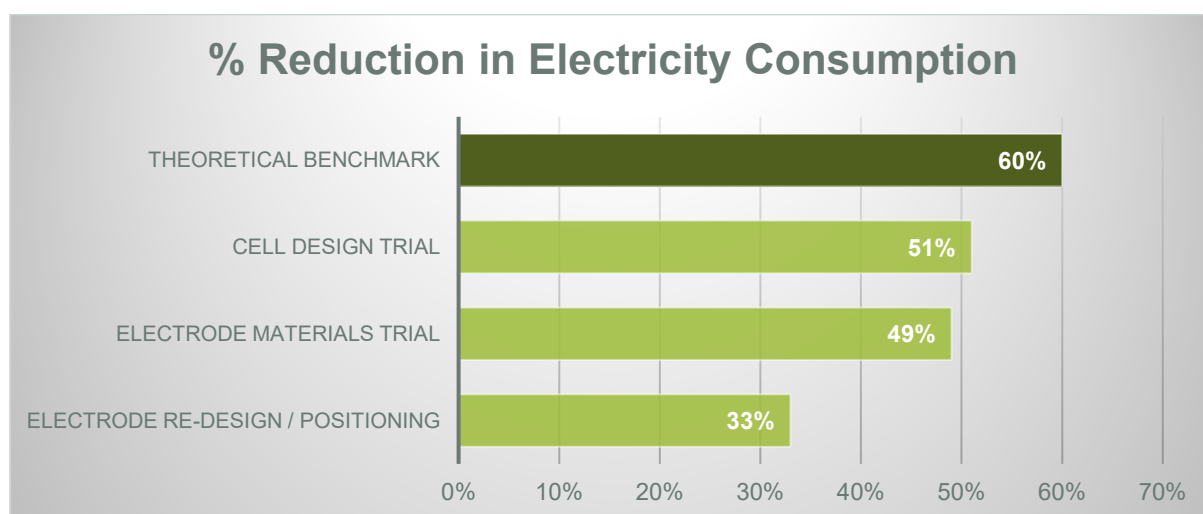


## Operations and supply chain

### Process technology update

Work has been undertaken throughout the quarter to further optimise processing technology. This includes process refinements to greatly reduce energy consumption.

The Company carried out multiple design and material changes to its electrochemical cell resulting in significant improvements in electricity usage. Each change resulted in cumulative % improvements shown below. The design now is within 10% of the benchmark energy consumption that was seen at a lab-scale.



The Company continues to look at process optimisation and is exploring opportunities to use renewable energy to ensure more holistic sustainability improvements.





For further information please contact:

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### About First Graphene Ltd (ASX: FGR)

*First Graphene Limited is focused on the development of advanced materials to help industry improve. The Company is a leading supplier of graphitic materials and product formulations with a specific commercial focus on large, high-growth global markets including cement and concrete; composites and plastics; coatings, adhesives, silicones and elastomers (CASE); and energy storage applications.*

*One of the key outcomes these advanced materials offer is the reduction of carbon dioxide emissions, whether directly through a reduction in output of these harmful greenhouse gases or lower energy usage requirements in manufacturing, or indirectly due to enhanced performance characteristics and extending the usable life of products.*

*First Graphene has a robust manufacturing platform based on captive and abundant supply of high-purity raw materials, and readily scalable technologies to meet growing market demand.*

*As well as being the world's leading supplier of its own high performance PureGRAPH® graphene product range, the Company works with multiple industry partners around the world as a supplier of graphitic materials and partner to research, develop, test and facilitate the commercial marketing of a wide range of sector-specific chemical solutions.*

*First Graphene Ltd is publicly listed in Australia (ASX:FGR) and has a primary manufacturing base in Henderson, near Perth, WA. The company is incorporated in the UK as First Graphene (UK) Ltd and is a Tier 1 partner at the Graphene Engineering and Innovation Centre (GEIC), Manchester, UK, where it has a strong marketing and R&D capability.*

With authority of the board, this announcement has been authorised for release by Aditya Asthana, Chief Financial Officer and Company Secretary.

## Appendix 4C

### Quarterly cash flow report for entities subject to Listing Rule 4.7B

**Name of entity**

First Graphene Limited

**ABN**

50 007 870 760

**Quarter ended ("current quarter")**

30 Sep 2022

<b>Consolidated statement of cash flows</b>	<b>Current quarter \$A'000</b>	<b>Year to date (3 months) \$A'000</b>
<b>1. Cash flows from operating activities</b>		
1.1 Receipts from customers	195	195
1.2 Payments for		
(a) research and development	(221)	(221)
(b) product manufacturing and operating costs	(188)	(188)
(c) advertising and marketing	(82)	(82)
(d) leased assets	-	-
(e) staff costs	(463)	(463)
(f) administration and corporate costs	(318)	(318)
1.3 Dividends received (see note 3)	-	-
1.4 Interest received	6	6
1.5 Interest and other costs of finance paid	(2)	(2)
1.6 Income taxes paid	-	-
1.7 Government grants and tax incentives	-	-
1.8 Other (provide details if material)	(16)	(16)
<b>1.9 Net cash from / (used in) operating activities</b>	<b>(1,088)</b>	<b>(1,088)</b>
<b>2. Cash flows from investing activities</b>		
2.1 Payments to acquire or for:		
(a) entities	-	-
(b) businesses	-	-
(c) property, plant and equipment	-	-

Consolidated statement of cash flows	Current quarter \$A'000	Year to date (3 months) \$A'000
(d) investments	-	-
(e) intellectual property	-	-
(f) other non-current assets	-	-
2.2 Proceeds from disposal of:		
(a) entities	-	-
(b) businesses	-	-
(c) property, plant and equipment	-	-
(d) investments	-	-
(e) intellectual property	-	-
(f) other non-current assets	-	-
2.3 Cash flows from loans to other entities	-	-
2.4 Dividends received (see note 3)	-	-
2.5 Other (provide details if material)	-	-
<b>2.6 Net cash from / (used in) investing activities</b>	<b>-</b>	<b>-</b>

<b>3. Cash flows from financing activities</b>		
3.1 Proceeds from issues of equity securities (excluding convertible debt securities)	-	-
3.2 Proceeds from issue of convertible debt securities	-	-
3.3 Proceeds from exercise of options	-	-
3.4 Transaction costs related to issues of equity securities or convertible debt securities	-	-
3.5 Proceeds from borrowings	-	-
3.6 Repayment of borrowings	-	-
3.7 Transaction costs related to loans and borrowings	-	-
3.8 Dividends paid	-	-
3.9 Other (provide details if material)	-	-
- reduction in lease liability	(49)	(49)
- Cash received from third parties	-	-
<b>3.1 Net cash from / (used in) financing activities</b>	<b>(49)</b>	<b>(49)</b>

<b>Consolidated statement of cash flows</b>	<b>Current quarter \$A'000</b>	<b>Year to date (3 months) \$A'000</b>
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<b>4.</b>	<b>Net increase / (decrease) in cash and cash equivalents for the period</b>		
4.1	Cash and cash equivalents at beginning of period	7,005	7,005
4.2	Net cash from / (used in) operating activities (item 1.9 above)	(1,088)	(1,088)
4.3	Net cash from / (used in) investing activities (item 2.6 above)	-	-
4.4	Net cash from / (used in) financing activities (item 3.10 above)	(49)	(49)
4.5	Effect of movement in exchange rates on cash held	0	0
<b>4.6</b>	<b>Cash and cash equivalents at end of period</b>	<b>5,868</b>	<b>5,868</b>

<b>5.</b>	<b>Reconciliation of cash and cash equivalents</b> at the end of the quarter (as shown in the consolidated statement of cash flows) to the related items in the accounts	<b>Current quarter \$A'000</b>	<b>Previous quarter \$A'000</b>
5.1	Bank balances	5,868	7,005
5.2	Call deposits	-	-
5.3	Bank overdrafts	-	-
5.4	Other (provide details)	-	-
<b>5.5</b>	<b>Cash and cash equivalents at end of quarter (should equal item 4.6 above)</b>	<b>5,868</b>	<b>7,005</b>

<b>6. Payments to related parties of the entity and their associates</b>	<b>Current quarter \$A'000</b>
6.1 Aggregate amount of payments to related parties and their associates included in item 1	146
6.2 Aggregate amount of payments to related parties and their associates included in item 2	-
<p><i>Note: if any amounts are shown in items 6.1 or 6.2, your quarterly activity report must include a description of, and an explanation for, such payments.</i></p> <p>The A\$146k in 6.1 (item 1) above refers to the contracted monthly salary payments and consulting fees made to the directors of the Company.</p>	

<b>7. Financing facilities</b> <i>Note: the term "facility" includes all forms of financing arrangements available to the entity. Add notes as necessary for an understanding of the sources of finance available to the entity.</i>	<b>Total facility amount at quarter end \$A'000</b>	<b>Amount drawn at quarter end \$A'000</b>
7.1 Loan facilities	-	-
7.2 Credit standby arrangements	-	-
7.3 Other (please specify)	-	-
7.4 <b>Total financing facilities</b>	-	-
7.5 <b>Unused financing facilities available at quarter end</b>		
7.6 Include in the box below a description of each facility above, including the lender, interest rate, maturity date and whether it is secured or unsecured. If any additional financing facilities have been entered into or are proposed to be entered into after quarter end, include a note providing details of those facilities as well.	-	

<b>8. Estimated cash available for future operating activities</b>	<b>\$A'000</b>
8.1 Net cash from / (used in) operating activities (item 1.9)	(1,088)
8.2 Cash and cash equivalents at quarter end (item 4.6)	5,868
8.3 Unused finance facilities available at quarter end (item 7.5)	-
8.4 Total available funding (item 8.2 + item 8.3)	5,868
8.5 <b>Estimated quarters of funding available (item 8.4 divided by item 8.1)</b>	5.392
<p><i>Note: if the entity has reported positive net operating cash flows in item 1.9, answer item 8.5 as "N/A". Otherwise, a figure for the estimated quarters of funding available must be included in item 8.5.</i></p>	

8.6 If item 8.5 is less than 2 quarters, please provide answers to the following questions:

8.6.1 Does the entity expect that it will continue to have the current level of net operating cash flows for the time being and, if not, why not?

Answer: n/a

8.6.2 Has the entity taken any steps, or does it propose to take any steps, to raise further cash to fund its operations and, if so, what are those steps and how likely does it believe that they will be successful?

Answer: n/a

8.6.3 Does the entity expect to be able to continue its operations and to meet its business objectives and, if so, on what basis?

Answer: n/a

*Note: where item 8.5 is less than 2 quarters, all of questions 8.6.1, 8.6.2 and 8.6.3 above must be answered.*

## Compliance statement

- 1 This statement has been prepared in accordance with accounting standards and policies which comply with Listing Rule 19.11A.
- 2 This statement gives a true and fair view of the matters disclosed.

Date: 31st October 2022

Authorised by: With authority of the board, this announcement has been authorised for release, by

Aditya Asthana  
Chief Financial Officer and Company Secretary

## Notes

1. This quarterly cash flow report and the accompanying activity report provide a basis for informing the market about the entity's activities for the past quarter, how they have been financed and the effect this has had on its cash position. An entity that wishes to disclose additional information over and above the minimum required under the Listing Rules is encouraged to do so.
2. If this quarterly cash flow report has been prepared in accordance with Australian Accounting Standards, the definitions in, and provisions of, *AASB 107: Statement of Cash Flows* apply to this report. If this quarterly cash flow report has been prepared in accordance with other accounting standards agreed by ASX pursuant to Listing Rule 19.11A, the corresponding equivalent standard applies to this report.
3. Dividends received may be classified either as cash flows from operating activities or cash flows from investing activities, depending on the accounting policy of the entity.
4. If this report has been authorised for release to the market by your board of directors, you can insert here: "By the board". If it has been authorised for release to the market by a committee of your board of directors, you can insert here: "By the [name of board committee – eg Audit and Risk Committee]". If it has been authorised for release to the market by a disclosure committee, you can insert here: "By the Disclosure Committee".
5. If this report has been authorised for release to the market by your board of directors and you wish to hold yourself out as complying with recommendation 4.2 of the ASX Corporate Governance Council's



*Corporate Governance Principles and Recommendations*, the board should have received a declaration from its CEO and CFO that, in their opinion, the financial records of the entity have been properly maintained, that this report complies with the appropriate accounting standards and gives a true and fair view of the cash flows of the entity, and that their opinion has been formed on the basis of a sound system of risk management and internal control which is operating effectively.