VHD Heat Sink – Computational Modelling Confirms Exceptional, Sector-Leading Heat Sink Performance

- GCM commissioned world leading expert, Professor Qing Li, to conduct Finite Element (FE) modelling on its proprietary VHD Technology graphite heat sink to compare the heat dissipation performance of the VHD heat sink against conventional heat sink materials.
- Results showed VHD heat sinks accommodate 300-400W power loads at microchip temperatures of 70-85^{o}C, significantly outperforming traditional materials (200-250W range).
- Heat mapping from the FE modelling demonstrated exceptional thermal diffusivity, rapidly dispersing heat away from the microchip base.
- The preliminary results show significant real-world implications, as data centre microchips increasingly start at a power demand of 300W and above. Findings show that a VHD heat sink can substantially lower the operating temperature of high-performance microchips.
- Customer engagement program progressing with strong interest from global thermal management providers and semiconductor manufacturers.
- GCM anticipates a strong flow of updates for the remainder of CY2025, including customer advancements and first sales agreements.

Green Critical Minerals Ltd ('GCM' or 'the Company') is pleased to announce the successful results of the computational modelling performed by the Center for Advanced Material Technology ('CAMT'), led by Professor Qing Li at the University of Sydney.

Professor Qing Li is a world leading expert in computational mechanics, with a specialisation in computational design and multidisciplinary optimisation of nonlinear, time-dependent multifunctional and lightweight structures and materials.

His work finds broad applications across aerospace, automotive, mechanical, manufacturing and biomedical engineering. As a "Highly Cited Researcher" (Clarivate Analytics), his research impact and expertise span various areas including: data science, computational mechanics, structural optimisation, additive manufacturing, biomechanics, scaffold tissue engineering and biofabrication.

Professor Li has been closely collaborating with domestic and global industry partners, including Cochlear, Stryker, Allegra, SDI, Sirona, 360 Med Care, Optimize Ortho and Corin, through a range of projects co-funded by industry and ARC, NHMRC, MRFF and other agencies.

Green Critical Minerals' Managing Director, Clinton Booth, commented: *"These modelling results led by Professor Li, demonstrate the unique and outstanding capabilities of our innovative VHD graphite technology. These findings demonstrate the significant advantages our product can offer rapidly growing sectors such as data centres, where microchip power demands are now frequently starting at 300W and above. Effective thermal management is critical for ensuring operational stability and performance continuity in such environments, in reducing data centre capital and operating costs, and in supporting sustainable data centre development. Our VHD heat sinks deliver industry-leading results, consistently outperforming traditional materials such as conventional graphite, copper, and aluminum products.*

"We will continue to move at pace as we ramp-up current customer engagement discussions and continue to receive strong interest from a growing, diverse and global customer pipeline. We have a standout and in-demand product that is needed across several large and growing markets and look forward to executing on a busy work program, executing our first sales agreements and generate first revenue in the first half of 2026.

"Encouraged by these excellent results, we also see strong potential for applying the emerging VHD technology to other thermal management products such as cold plates used in liquid cooling solutions, which the Company will pursue under its previously announced collaboration agreement."

VHD HEAT DISSIPATION

GCM commissioned Professor Qing Li's group to perform Finite Element (FE) modelling on the VHD Technology heat sink, using data from the Company's previously announced results[1]. The purpose of the FE modelling study was to compare the heat dissipation performance of the VHD heat sink against conventional heat sink materials such as aluminium, copper and isotropic graphite.

The FE simulations were conducted on heat sinks with consistent dimensions of 60mm (l) x 50mm (w) x 60mm (h), comprising a 10mm base and 50mm fins for all materials modeled. A passive environment was assumed, with a microchip (CPU/GPU) operating at defined temperatures. The modelling analysis simulated the heat transfer behavior of the heat sink and assessed how effectively each material dissipated the heat load.

The preliminary output from the FE modelling study was a comparison of the microchip's operating temperature under various power loads, measured in Watts. The results exhibited the superior thermal performance of VHD heat sinks under equivalent conditions. The key findings include:

- **At the microchip operating temperature range of 70-85^{o}C, a VHD heat sink can accommodate microchip power demands of 300W to almost 400W.**
- **In comparison, heat sinks made from the other materials modelled are only able to accommodate microchip power demands of 200-250W.**

[1] See ASX Announcements dated 17 and 20 February 2025.

These results are shown in Figure 1 Total Heat Dissipation.

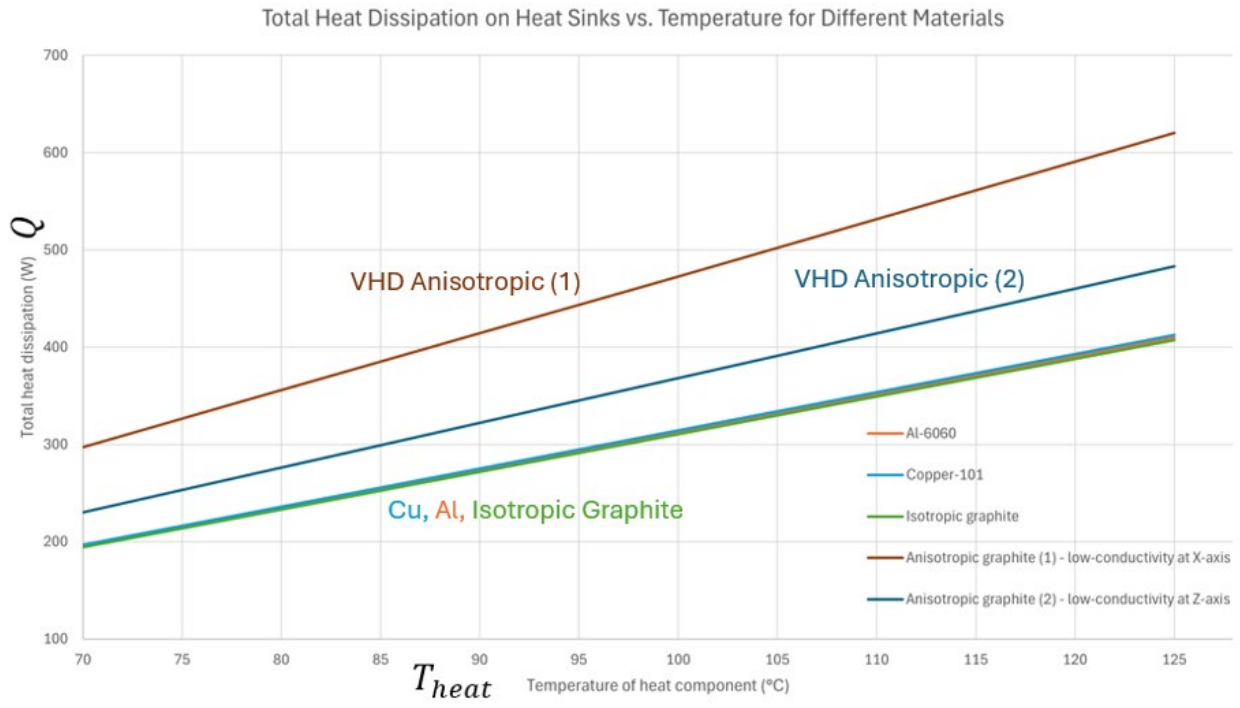

Figure 1: *Total Heat Dissipation*

The preliminary results show significant real-world implications. As data centre microchips increasingly start at a power demand of 300W and above, the findings show that a VHD heat sink can substantially lower the operating temperature of microchips. Alternatively, VHD heat sinks offer the potential to effectively cool significantly more powerful microchips, addressing one of the critical challenges facing increased performance of microchips.

With these preliminary modelling results, GCM has further validated the application and thermal performance of VHD heat sinks. The Company will now proceed with computational modelling tailored to specific microchips (GPU's and CPU's), the manufacture of prototype heat sinks from its recently commissioned production facility and subsequent performance testing to verify the modelling results.

Encouraged by these preliminary results, GCM also sees strong potential for applying the emerging VHD technology to other thermal management products such as cold plates used in direct-to-chip and liquid cooling solutions, which GCM will pursue under its previously announced collaboration agreement[2].

[2] See ASX announcement dated 23 April 2025.

HEAT SINK TEMPERATURE DISTRIBUTIONS

The FE modelling also provided GCM with valuable insights into the heat transfer profile and manufacturing guidance related to the optimal directional alignment of the VHD Technology material. The comparison of the FE modelling results can be seen in Figure 2 Heat Sink Temperature Distribution (base temperature = 70°C), and is summarised as follows:

- **The outstanding thermal diffusivity of the VHD graphite is clearly demonstrated in the heat maps in Figure 2 for optimally aligned VHD heat sinks (Anisotropic 1). In this case, the modelled 70°C base temperature is hardly visible (indicated by the red colouring in the heat maps) with a rapid transition to the coolest temperature (shown in dark blue) extending significantly along the length of the fins.**
- **These heat maps along with the heat dissipation chart confirm the relative performance rankings: VHD Anisotropic (1) heat sink exhibits the best thermal performance, followed by the VHD Anisotropic (2), then copper, then aluminium and finally isotropic graphite.**

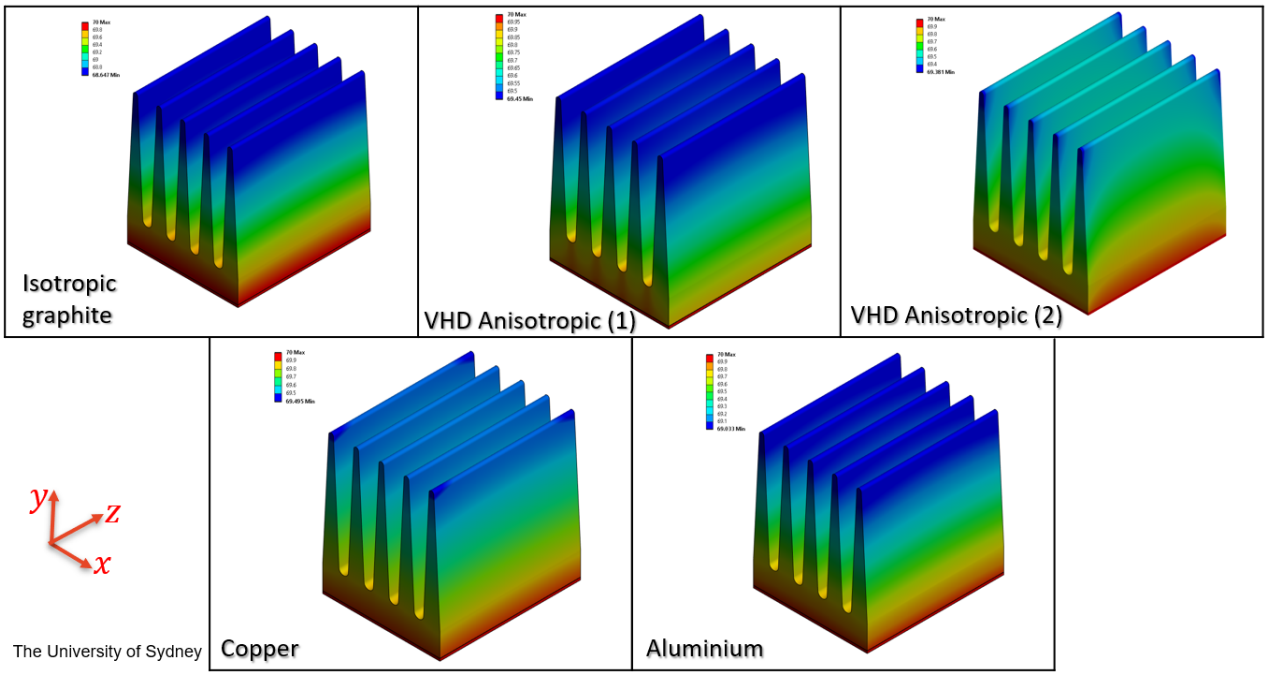

***Figure 2**: Heat Sink Temperature Distribution (Base temperature = 70°C)*

ADVANCING TOWARDS COMMERCIALISATION

GCM is continuing to experience strong and growing global interest from prospective customers and industry partners, as the Company moves towards achieving commercial-scale production. These latest modelling results provide further technical potential and have contributed to this momentum.

Notable developments include a formal request for product samples from leading thermal management solutions providers across Australia, Europe and the United Kingdom; early-stage engagement with leading thermal management solutions providers operating across North

America, Europe and Asia, a collaboration agreement with Australian data centre operator GreenSquareDC, and early-stage engagement with global semiconductor manufacturers.

Looking ahead, the Company anticipates a strong flow of updates for the remainder of CY2025, including:

- Computational modelling of heat sinks for specific microchips, particularly targeting data centre server chips and high-performance computing chips.
- Design optimisation and manufacture of prototype VHD heat sinks, based on the further modelling outcomes.
- Computational design and advanced manufacture of prototype VHD cold plates for use in direct to chip / liquid cooling applications.
- Production of commercial VHD graphite products.
- Design and manufacture of VHD heat sinks and heat spreaders.
- Expansion of production capacity.
- Receipt of customer test work feedback and further development and testing of customer prototypes.
- Continued discussions with growing customer base for VHD graphite products.
- Sale agreements; and
- Expanding GCM's footprint to include warehousing and logistics capabilities in North America, and continued planning for European logistics capabilities.

The Company will continue to keep its shareholders and the wider investment community informed as the above milestones are completed.

For further information please contact:

Clinton Booth
Managing Director
enquiry@gcminerals.com.au
(08) 9388 0051

Stephanie Richardson / Cameron Gilenko
Sodali & Co
stephanie.richardson@sodali.com / cameron.gilenko@sodali.com
(08) 6160 4903

Authorisation

The provision of this announcement to the ASX has been authorised by the Board of Directors of Green Critical Minerals Limited.

Forward Looking Statements

This announcement contains general information about GCM's activities current as at the date of the announcement. The information is provided in summary form and does not purport to be complete.

This release contains estimates and information concerning our industry and our business, including estimated market size and projected growth rates of the markets for our products. Unless otherwise expressly stated, we obtained this industry, business, market, and other information from reports, research surveys, studies and similar data prepared by third parties, industry, and general publications, government data and similar sources. This announcement also includes certain information and data that is derived from internal research. While we believe that our internal research is reliable, such research has not been verified by any third party. Estimates and information concerning our industry and our business involve a number of assumptions and limitations. Although we are responsible for all of the disclosure contained in this announcement and we believe the third-party market position, market opportunity and market size data included in this announcement are reliable, we have not independently verified the accuracy or completeness of this third-party data. Information that is based on projections, assumptions and estimates of our future performance and the future performance of the industry in which we operate is necessarily subject to a high degree of uncertainty and risk due to a variety of factors, which could cause actual results to differ materially from those expressed in these publications and reports. The Company cautions shareholders and prospective shareholders not to place undue reliance on these forward-looking statements, which reflect the view of the Company only as of the date of this release.