



Council for Geoscience

Annual Report 2021/22



mineral resources
& energy

Department:
Mineral Resources and Energy
REPUBLIC OF SOUTH AFRICA



The Council for Geoscience Annual Report 2021/22 theme
‘Geoscience is the fulcrum of human development’
is the mantra which was pronounced by the CEO, Mr Mosa Mabuza and adopted in 2019 by the organisation.



Cover Image:

Neoproterozoic shear-zone hosted pegmatite body in the Henkries Valley, Namaqualand, Northern Cape Province (Photo credit: Dr Valerie Nxumalo). Overlay displaying a regional pegmatite distribution and prospectivity map of pegmatite and associated mineralisation across the Orange River Valley, Northern Cape Province (Map produced by Doggart *et al*, 2022)

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List of Abbreviations and Acronyms

1D	One-dimensional
2D	Two-dimensional
3D	Three-dimensional
AI	Artificial intelligence
APP	Annual Performance Plan
B-BBEE	Broad-based Black Economic Empowerment
CCUS	Carbon capture utilisation and storage
CEO	Chief Executive Officer
CGS	Council for Geoscience
COVID-19	Coronavirus disease 2019
CTBTO	Comprehensive Nuclear-Test-Ban Treaty Organisation
DDM	District Development Model
DMRE	Department of Mineral Resources and Energy
EME	Exempted micro enterprise
ERP	Enterprise resource planning
ERRP	Economic Reconstruction and Recovery Plan
ECL	Environmental critical level
EXCO	Executive committee
F-REE	Fluorine rare-earth element
GEMMAP	Geological Mapping and Mineral Assessment Project of Malawi
GRAP	Generally Recognised Accounting Practice
GTP	Geoscience Technical Programme
HCM	Human Capital Management
ICT	Information and communications technology
IMMP	Integrated and multidisciplinary geoscience mapping programme
IMS	International Monitoring System
KDD	Karoo Deep Drilling
MEWMP	Mine and Environmental Water Management Programme
MPRDA	Mineral and Petroleum Resources Development Act
MT	Magnetotelluric
MTSF	Medium-Term Strategic Framework
NDP	National Development Plan
OAGS	Organisation of African Geological Surveys
PFMA	Public Finance Management Act
PPPFA	Preferential Procurement Policy Framework Act
PS	Primary station
QPZ	Quarry potential zones
QSE	Qualifying small enterprise
REE	Rare-earth element
SANSN	South African National Seismograph Network
SP	Strategic Plan
the dtic	Department of Trade, Industry and Competition
UNISA	University of South Africa
US	United States



Reverse circulation drilling in Giyani



Field discussions in the Northern Cape Province



Part A General Information

General Information on the Council for Geoscience

Registered name: Council for Geoscience

PFMA national public entity: Schedule 3A

Physical address: 280 Pretoria Street
Silverton, Pretoria
South Africa

Postal address: Private Bag X112
Pretoria, South Africa
0001

Telephone number: +27 (0)12 841 1911

Email address: info@geoscience.org.za

Website address: www.geoscience.org.za

External auditors: Auditor-General South Africa

Bankers: Nedbank and Absa in Silverton,
Pretoria

Board secretary: Ms Nomkhosi Cele

Council for Geoscience

The Geoscience Act No. 100 of 1993 as amended, established the Council for Geoscience (CGS) as, among others, the national custodian of geoscientific data, information and knowledge in South Africa.

The CGS has evolved into a modern institution with specialised facilities, assets and expertise. The scientific focus areas of the organisation give expression to a set of thematic areas which include, albeit are not limited to, geoscience for minerals and energy, geoscience for infrastructure and optimal land use (including engineering geology and geo-hazards), geoscience for environment and groundwater, geoscience for innovation and geoscience diplomacy. The CGS has six regional offices in South Africa, with a head office in Silverton, Pretoria (Figure 1).

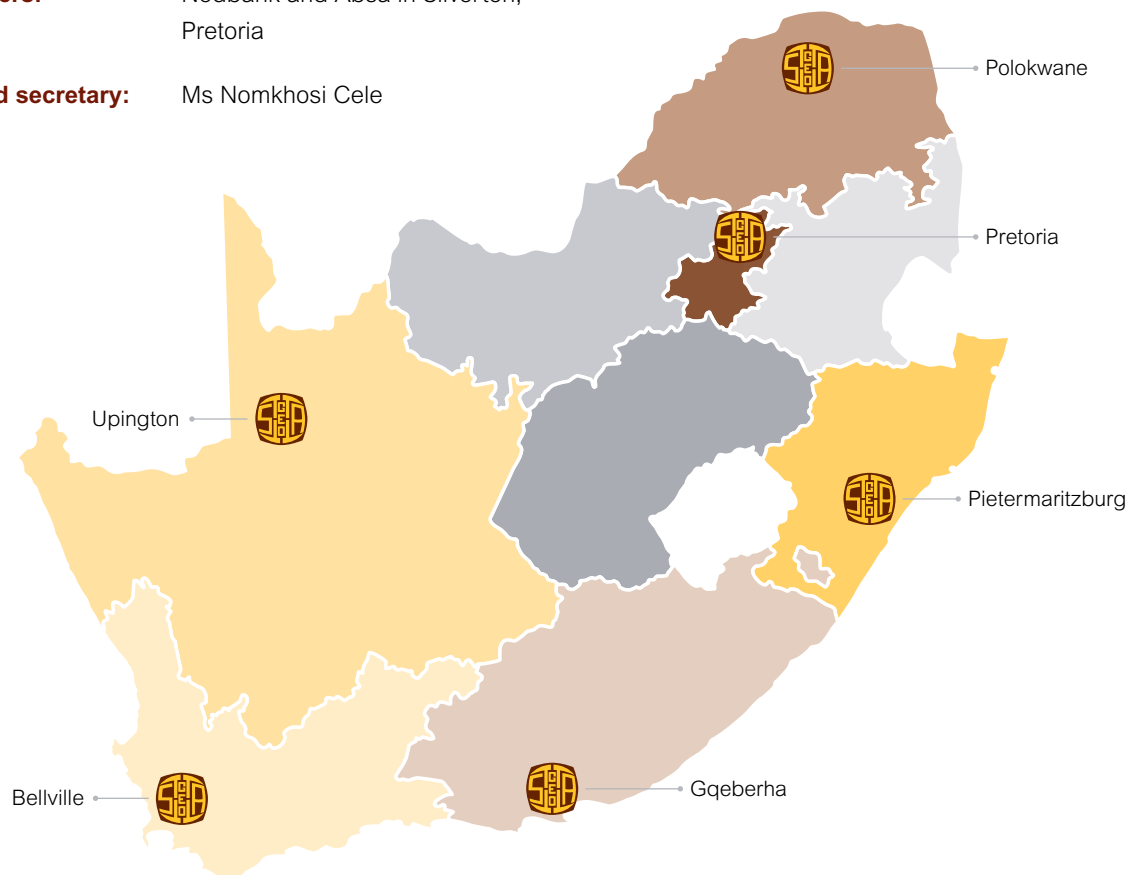


Figure 1: The six regional offices of the CGS in South Africa

1

Foreword by the Chairperson of the Board



Dr Humphrey Mathe
Chairperson of the Board

It is my humble honour and a special privilege to present the Council for Geoscience (CGS) 2021/2022 Annual Report. As the year under review marks the penultimate year of the Board's tenure, the synergism between management, its employees and stakeholders was key to the great improvements and achievements amassed by the organisation. The CGS remained resolute, dedicated and committed to the execution of all its programmes and in meaningfully contributing to realising 'A prosperous and transformed society enabled by geoscience solutions' for South Africa and her people.

Two years have passed since the onset of the global COVID-19 pandemic, which has wreaked havoc and still continues to do so in the lives of many in our country as seen in the heightened rate of infections due to the mutation of the virus. While the CGS had exercised all the necessary precautions in alleviating the rate of infection within the organisation, several employees tested positive during the 2021/22 financial year. However, we have seen a reduced infection rate and an improved recovery rate quarter on quarter. To date, 258 tests were administered to staff with a total of 72 positive cases reported in 2021/22. This reflects an overall positivity rate of 27.91% with all employees who had tested positive gaining full recovery. Therefore, the CGS is fortunate in reporting for the second consecutive year, zero loss of life owing to the virus at the end of the reporting cycle.

As the year drew nearer to its close, we were saddened by the passing-on of our fellow Board member, Mr Smunda Mokoena, on Thursday 17 March 2022. Mr Mokoena joined the CGS Board on 1 May 2020 and provided impactful guidance in both the Technical and Finance Committees of the Board. He was a true inspiration to many in the mining and mineral industry and particularly for his stern view of having principled leaders in government who would instil order in all work conducted for the State. We wish his family comfort during this difficult time and may his soul rest in eternal peace.

The final quarter of the year 2021/22 was marked by the lifting of the National State of Disaster due to the COVID-19 pandemic. This announcement has allowed the CGS to return to full operational levels. As an organisation, we have acclimatised

ourselves to operating within a new environment while pro-actively limiting the risk and impact on operations. On this premise, the CGS is pleased to announce its attainment of an unqualified audit outcome with no material findings (the clean audit) for the year under review. Moreover, through the effective implementation of the strategic programmes, an overall performance of 86.4% was realised by the organisation.

During the year under review, it was important for the CGS to conduct impactful research that finds its expression by addressing the socio-economic challenges that are faced by all who live in South Africa. Notwithstanding this commitment, the CGS has adopted a strategy that encourages the sustainability of the organisation in a changing state of ideologies, economy, and technological landscape. As the CGS, we believe that there is great potential for discovery of new minerals in South Africa. We have in abundance significant geological terranes often buried beneath thick sediments as seen in the Northern Cape Province. However, investigations into this great wealth of geology remain grossly under-explored. This is further exacerbated by meagre levels of investment in exploration that are inconsistent with the geology found in the region.

The CGS is committed to effecting the high-resolution 1:50 000 scale Integrated Geoscience Mapping Programme in South Africa. The programme continues to deliver requisite geoscientific data that may be used to produce value-added outputs in the Minerals and Energy, Water and Environment, as well as Land-Use and Infrastructure thematic areas. Some of the impactful outputs produced under the minerals and energy theme include the increased onshore mapping coverage of up to 10.70% and the offshore coverage of 0.05%. Furthermore, the CGS published a one-of-a-kind Orange River Pegmatite prospectivity map which is a known source of lithium and rare earths in the Northern Cape Province. For the Giyani mapping project, drilling activity began during the final quarter with a total of eight boreholes drilled. Numerous sulphide-bearing samples were collected and are known to be associated with gold mineralisation. Samples are currently being analysed with the assay results anticipated in Quarter 1 of the financial year 2022/23. The CGS also produced a crushed aggregate potential map for southern KwaZulu-Natal as well as the Eastern Cape Province, which indicates prospective areas for aggregate exploitation. All datasets, information and products derived from this programme will form a critical input to attracting investment in exploration and, in particular, for minerals that are earmarked for future technologies and support for new energy generation sources.

The CGS also developed the first 1:10 000-scale land-use development planning suitability map for the Giyani area which is fundamental for infrastructure development. In addition, several microzonation models have been produced which serve as a basis for evaluating site-specific risk analysis that is essential for the safety of critical infrastructure and contributory to an early warning system for disaster management associated with geo-hazards.



As the CGS, we believe that there is great potential for discovery of new minerals in South Africa. We have in abundance significant geological terranes often buried beneath thick sediments as seen in the Northern Cape Province. However, investigations into this great wealth of geology remain grossly under-explored. This is further exacerbated by meagre levels of investment in exploration that are inconsistent with the geology found in the region. The CGS published a one-of-a-kind Orange River Pegmatite prospectivity map which is a known source of lithium and rare earths in the Northern Cape Province.

To support exploration activity in South Africa, the CGS developed an interactive portal (Geoportal) which allows stakeholders to gain access to geoscience data and information records published by the CGS. Since its inception, various datasets were made available to all stakeholders and are easily downloadable over the platform.

In contributing meaningfully to the ERRP, the CGS is determined to support the national target to capture at least 5% of the global exploration expenditure through its focus on exploration activity. To achieve this, South Africa is more deliberate in gathering high-resolution geoscientific datasets which are pivotal for the identification of untapped ore deposits. In soliciting further support for CGS to fulfil this task, the Department of Mineral Resources and Energy (DMRE) have allocated additional funds to the tune of R500 million (financial years 2023/24 and 2024/25) for the sustaining of exploration activities

in South Africa. I wish to extend my appreciation to the DMRE for this expression of confidence in the work that we do as an organisation.

Noteworthy achievements were met following our participation in the drafting of the Geoscience Act Regulations, Small-Scale and Artisanal Mining Policy as well as the Exploration Strategy for the Mining Industry of South Africa. It is a great pleasure to announce that all documents were finalised by the respective drafting teams and gazetted. The strategy demonstrates that leaders in both government and the mining industry can work together in implementing solutions needed to attract further investment for exploration activities in South Africa.

Following the approved Communication and Stakeholder Relations Strategy, the CGS continues to uphold the principle of engaging stakeholders in a manner that is aligned to the government communication framework underpinned by the democratic principles of transparency, accountability, consultation and participation. Critical to the strategy is establishing cordial relations of mutual respect and benefit with stakeholders. This has proven to be a more pragmatic approach in that it is an enabler for the organisation to continue to carry out its business, allowing continuous mapping of our stakeholders and environments where we undertake research. It has further made the CGS more visible to its stakeholders, allowing for the dissemination of accurate, pertinent and up to date data and information. Stakeholder relations will remain a vital input in the appreciable advancement of all the CGS's programmes and its mandate.

In furtherance of the diplomatic relations, notable milestones were reached in the Carbon Capture, Utilisation, and Storage (CCUS) Project during the year under review. The CGS participated in high level meetings with the World Bank where progress made in the implementation of the various CCUS work packages was assessed. In a recent communication received from the World Bank, the CGS was congratulated for the outstanding progress made which also came with the initial withdrawal of funds for the project to the tune of R101 million. The funds will be used for the implementation of seismic studies and drilling activities as part of site characterisation studies in the next financial year.

The CGS also heeded the request from the DMRE to participate in several bilateral engagements between South Africa and the Republic of the Congo (Congo-Brazzaville), Côte d'Ivoire and the Federal Republic of Nigeria. The end of 2021/22 is also marked by the completion

of the airborne geophysical survey for the Kingdom of Eswatini. Data processing and interpretation activities are currently underway with the submission of the final report to the Eswatini Ministry of Mines anticipated in the 1st Quarter of the 2022/23 financial year.

As part of the Quality assurance and improvement programme, the CGS conducted the External Quality Assurance Review in line with the requirements of the International Standards for the Professional Practice of Internal Auditing. The overall opinion issued by the External Assessor is that the internal audit activity Generally Conforms to the Standards and Code of Ethics.

The CGS has concluded the bursary intake for the 2022 academic year with a total of 25 bursaries awarded. To demonstrate management's commitment to investing and growing its internal talent pool, a total of 19 part-time bursaries were awarded for this year's intake. I wish to congratulate Dr Talicia Pillay, Dr Haajierah Mosavel, and Dr Brassnavy Manzunzu for the completion of their doctoral degrees and Mr Thato Ntikang, Mr Mawande Ncume and Ms Boitumelo Mahlase for obtaining their Master's degrees.

The Board wishes to convey its deepest condolences to colleagues who have lost family members and friends during 2021/22. May you be granted strength and fortitude.

In conclusion, I wish to extend sincere appreciation to the Honourable Minister of Mineral Resources and Energy, Mr S.G. Mantashe (MP) for his continued support for the Board and the CGS as a whole. I would also like to extend my appreciation to the Honourable Chairperson of the Parliamentary Portfolio Committee on Mineral Resources and Energy (PPC MRE), Mr S. Luzipho (MP), and the honourable members of the PPC MRE for their valued input and in exercising their fiduciary duties over the CGS for the greater betterment of our country. I further applaud the CGS executive management, scientific and support staff for their sterling work and exceptional performance in executing all CGS programmes and carrying its mandate with distinction.



Dr H Mathe
Chairperson
Board of the Council for Geoscience

31 July 2022

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Overview by the Chief Executive Officer



Mr Mosa Mabuza
Chief Executive Officer

This is a significant year as it marks the end of the five year window since the introduction of a strategic re-orientation of the Council for Geoscience to focus on thematic areas that seek to aptly streamline and quantify the contribution of geosciences in its effort to find expression in addressing societal challenges. This is consistent with the profound articulation of Chief Albert Luthuli, the first African winner of the Nobel Peace Prize in 1961, that “Scientific inventions, at all conceivable levels, should enrich human life ...”. The Council for Geoscience has indeed come a long way in embracing this strategic focus and efforts of all members of the CGS family, which are beginning to yield positive and impactful results.

I am pleased to present the CGS annual report, documenting activities for the financial year 2021/22. The financial year 2021/22 marks the mid-year of the Medium-Term Strategic Framework 2019–2024 cycle. It is fitting, firstly, to applaud the individual and collective contributions of CGS management and the entire staff for the agility, commitment and professional aptitude that made it possible to navigate an extremely difficult year and deliver the obligations of the CGS. The effective management of COVID-19 by the Board augmented the governance and coordination of efforts to mitigate the risks of the pandemic. As a team, we can all be thankful to have emerged from the past year relatively unscathed.

Since the approval of the Communication and Stakeholder Relations Strategy in the prior year by the Board, the CGS continued to uphold the principle of engaging stakeholders in a manner that is aligned to government communication framework underpinned by the democratic principles of transparency, accountability, consultation and participation. In executing its mandate, the CGS has embraced the Intergovernmental Relations Framework to promote intergovernmental relations with all three spheres of government. In addition, the CGS has positioned itself to play a pivotal role in the District Development Model (DDM) – a government initiative that aims to improve the coherence and impact of government service delivery through the municipalities. It is a mechanism designed to enable all three spheres of government to work together, with communities and stakeholders, to plan, budget and implement in unison. In light of the above, the CGS continued

to engage with various stakeholders in different provinces to build and cement synergic relations for the implementation of the Geoscience Technical Programme (GTP). The CGS has also strengthened its strategic partnerships by entering into a collaborative agreement with Orion Minerals to enable a two-way flow of knowledge, information and collaborative research in geosciences. This framework will include the implementation of high resolution infill surveys in a particular area of mutual interest in the Northern Cape Province. The CGS also concluded a collaborative framework with the African Exploration Mining and Finance Corporation which will be supplemented with project specific agreements on issues of geoscience.

As the Secretariat of the Organisation of African Geological Surveys (OAGS), we facilitated a virtual Annual General Assembly/Meeting (AGM). The CGS continues to participate in a number of DMRE-led initiatives to provide necessary geoscientific/technical support. During the year in review, the CGS supported the Minister of International Relations and Cooperation's at the SOUTH AFRICA-CÔTE D'IVOIRE Joint Commission for Cooperation in Abidjan, Côte d'Ivoire and the Bi-national commission between the Republic of South Africa and Federal Republic of Nigeria met in Abuja, Nigeria.

The CGS held a two-day virtual workshop that sought to discuss risks associated with the development of dolomite land and engage in an interactive discussion with the aim of facilitating awareness, collaboration on the mandatory requirements, and enable sustainable development, service delivery and community safety. This workshop was attended by over 150 stakeholders from municipalities, government departments, academia and technocrats and the attendance was balanced in terms of stakeholders from targeted groups. During the last quarter of the financial year in review, a two-day tsunami workshop was also hosted by the CGS virtually, aimed at promoting discussions and knowledge sharing on different aspects of tsunami formations and impacts. Discussions on tsunamis both far-field and nearshore to South Africa with various targeted stakeholders to enhance the awareness of earthquake risks, hazards as well as identify any gaps and find potential solutions took place. The CGS is currently advancing collaboration prospects with the SA Weather Services, the Department of Human Settlement, National Disaster Management Centre and other institutions in order to develop an early warning based on the geo-hazard susceptibility risk matrix.

The fulfilment of the published amended regulations of the National Disaster Management Act of 2002 on 16 April 2020, Section 11K (3) which stipulates that "the monitoring and impact of seismicity through the CGS must be intensified with immediate effect" provided necessary technical basis on which mines were opened at the height of the national response to COVID-19. The CGS had subsequently been contributing to intensify monitoring of mine seismicity over the past two years, characterising the trends in mine seismicity across all major mining regions. This led to a better understanding of mine seismicity trends across various mining regions, allowing for effective interventions to be discussed between regulatory bodies and the mines, which had resulted in a decreasing trend in rockburst-related fatalities in mines.

Implementation of the integrated and multidisciplinary geoscience mapping programme (IMMP) through the GTP continued in the year under review. The GTP focused on accelerated economic recovery projects that included the on-going detailed mapping at a scale of 1:50 000 and key projects focusing on the critical minerals of the future including base and precious metals (for example, nickel, cobalt, chromium and gold), rare-earth elements (REEs) and coal. The onshore map coverage has increased to 10.7% computed from additional 32 high-quality geoscience maps produced. The onshore 1:50 000 scale map coverage has improved from below 5%, which was reported before the implementation of the IMMP.

In the year under review, the CGS officially launched its survey boat known as the R/V (Research Vessel) Nkosi. The boat was acquired to augment the CGS's marine geoscience programme which aims to map the South African continental shelf (offshore) in the highest resolution based on modern technology, at various depth scales. The marine geoscience programme in 2021/22 has mapped the outer parts of 1:50 000 sheet 3318CD between Melkbosstrand and Llandudno in the Western Cape Province. The high-resolution data collected will contribute towards the improvement of offshore geoscience map coverage which is currently at 0.05%.

The geo-environmental baseline assessment being conducted as part of the KDD Programme continued in the year under review. The programme is expected to provide a scientific basis for government to consider its options for shale gas exploration and exploitation and formulate a regulatory framework that is premised on

scientific evidence. Useful information is being extracted to improve geological understanding, economic potential assessment, ground stability, ground water profiling, modelling of regional seismicity and environmental impact assessment. Two shallow observation boreholes that proved to be particularly high yielding were donated to Beaufort West Municipality in February 2018. At the time, the Western Cape was experiencing one of the most severe droughts in recent history. The two boreholes, with a combined monthly capacity of 33 million litres, continue to bring much-needed relief to the community. To date, the municipality has extracted and distributed well over 835 million litres of water, which is equivalent to 10% of the municipality's monthly capacity. The KDD Programme has, by end of October 2021, completed the drilling of the KDD-01 ultra-deep vertical stratigraphic borehole down to the depth of 2 978 m. The borehole intersected the carbonaceous shales of the Eccca Group earmarked for shale gas potential, particularly the Whitehill Formation. A suite of gas measurements were undertaken on these shales in an effort to model the gas potential. A comprehensive report detailing the findings from the drilling and the rest of the baseline study is envisaged for publication in the first quarter of the 2022-2023 financial year.

As an implementing Agency for the CCUS project for South Africa, the CGS secured a state-owned piece of land for the proposed pilot plant in the reporting year. The site selection was supported by a Basic Assessment Report and detailed structure, seismic and subsurface geological characterisation. Samples collected from existing boreholes were also analysed for their mineralogical, petrological, geochemical, and importantly, their reservoir properties.

In the Northern Cape Province, the geological, geophysical, geochemical, remote-sensing data collected in prior year as well as historical borehole datasets from the base-metal prospective areas that surround the north and west of the Black Mountain-Aggeney's-Gamsberg complexes were scrutinised and digitised. In the previous reporting year the 1:50 000 geoscience mapping showed an estimated increase of 67% of the Orange River Pegmatite Belt, which may host significant Li and REE deposits. The CGS is proud to report on the new pegmatite distribution map that was completed in the year under review. This map will contribute significantly to the much needed intervention for the battery and renewable energy industries.



The CGS is proud to report on the new pegmatite distribution map that was completed in the year under review. This map will contribute significantly to the much needed intervention for the battery and renewable energy industries.

The Giyani Greenstone Belt project in the Limpopo Province has focused on detailed structural mapping, high-density soil survey, high-resolution ground magnetic survey, three-dimensional magnetotelluric survey and IP survey of the identified mineral targets (i.e. gold, REE and nickel-chromite-magnesite). The preliminary structural and geophysical surveys revealed the predominance of east-west and north-south to northwest-trending structures, with the latter structures appearing to be associated with gold mineralisation. Eight boreholes in the identified mineral targets were drilled using reverse circulation drilling techniques. Rock samples were collected from the drilled boreholes for analyses and assay results are expected to be processed in first quarter of the coming financial year. To support integrated district development planning and infrastructure development, the CGS has developed the first 1:10 000-scale development suitability map around Giyani. This map will be presented to the relevant authorities to aid in infrastructure development and land use. The CGS continued to engage with the Department of Human Settlements. At the beginning of the financial year 2021/22, the CGS participated in a National Department of Human Settlements' Executive Management Team's meeting where a presentation on engineering geology particularly the geotechnical aspect was the main focus. A formalised collaboration between the DHS and the CGS was recommended. The CGS implemented various Infrastructure and Land Use thematic projects in support of the MTSF priorities 5 (spatial integration, human settlements and local government) and 6 (social cohesion and safe communities). These programmes further seek to enhance the deployment of the recently adopted One Plan DDM approach. In these efforts, the CGS continued to support the Free State Department of Human Settlements in assessing the suitability and safety of various portions of land to facilitate service delivery and the provisioning of safe

affordable housing, and through our strategic partnership with the Housing Development Agency, undertook risk classification studies of unsafe dolomitic land in the greater Khutsong area to facilitate a strategic pro-active framework for human settlements and infrastructure planning. Notably, our geoscientific contributions are furthermore providing the required models for decision-making for the renewal of the long-term operating licence of the Koeberg Nuclear Power facility in support of future energy security to the Country. Through our collaborative efforts with the Department of Defence (DOD), the CGS is conducting detailed dolomite assessment and geological support to the DOD in support of its lease reduction of redevelopment programme across the military areas of Thaba Tshwane to guide development suitability and re-development decision-making. The CGS has also produced a crushed aggregate potential map of southern KwaZulu-Natal which indicate most prospective areas for aggregate exploitation. In addition, several microzonation models have been produced which serve as a basis for evaluating site-specific risk analysis that is essential for the safety of critical infrastructure.



The CGS has launched for the first time a geoscience data portal, which has been developed to ensure that access to geoscience data and information records published by the CGS in the form of maps, documents and databases are made available to stakeholders and clients. All data requests are streamlined through the registered Public Information Officer and a dedicated email address has been established to manage all data requests and dissemination.

The CGS continues implementation of its Geoscience Diplomacy Programme in Namibia, Malawi and its support of the United Nation's Comprehensive Nuclear-Test-Ban Treaty Organisation (CTBTO) for a '*Better Africa and the World*'. This year under review, the CGS has signed an agreement with the Geological Survey Department (GSD) of the Ministry of Natural Resources and Energy of the Kingdom of Eswatini to conduct regional airborne geophysical survey for geoscience mapping for economic

development. The airborne geophysical data collection has been concluded and the CGS is currently processing and interpreting the data. Final report on the survey will be submitted to the GSD Resources and Energy in the first quarter of the following year.

The CGS has adopted innovation in executing its mandate. Drone technology is currently being used to advance the mandate of the CGS and it is currently providing a novel way of capturing geoscience data to gain a perspective of the Earth that is simply not possible using instruments that are ground based. The CGS has already trained seven drone pilots who have been accredited by the Civil Aviation Authority and who are insured to undertake commercial operations.

The critical role of the CGS as a national custodian of all geoscience data and information requires a seamless and accessible geoscience information and knowledge management system, which allow effective decision-making on, among others, sustainable management of natural resources as well as mitigating the impacts of geohazards. The CGS has launched for the first time a geoscience data portal, which has been developed to ensure that access to geoscience data and information records published by the CGS in the form of maps, documents and databases are made available to stakeholders and clients. All data requests are streamlined through the registered Public Information Officer and a dedicated email address has been established to manage all data requests and dissemination. This initiative forms part of the CGS's commitment to ensure that data and information is available and easily accessed to showcase the exploration potential of the country and secure the pledge by Government of attaining 5% of the global share of exploration.

Geoscience Act Regulations 2022 were published for implementation after extensive stakeholder engagements on processing the comments that were made by different stakeholders. Implementation of these regulations will commence in the financial year 2022/23.

The Exploration Strategy for the Mining Industry of South Africa and its Implementation Plan 2022 was also published in April 2022 by the Minister of Mineral Resources and Energy. These policy documents seek to attract investment through a reinvigorated mining exploration strategy encouraging robust mineral exploration, clean technology, processing and mining supply and services sectors. In further support of the exploration activities in South Africa, the DMRE and National Treasury have allocated additional funds to the

tune of R500 million to the CGS, for the sustenance of the proposed exploration work. The funds will be transferred to the CGS in two tranches, R200 million during the financial year 2023/24 and R300 million in the financial year 2024/25.

The CGS's Statement of Financial Position reflects total assets to the amount of R727.4 million, which is comprised of non-current and current assets amounting to R365.2 million and R362.2 million, respectively. The CGS significantly enhanced good performance, particularly given the difficult economic climate, with total revenue of R583.2 million and a deficit of R12.2 million. A more comprehensive report on financials information is contained in Part E of the report.

The CGS conducted the External Quality Assurance Review in line with the International Standards for Professional Practice for Internal Auditing and it has received an overall opinion that the internal audit activity Generally Conforms to the Standards and Code of Ethics.

Sustainability is an integral part of the CGS mandate and business at the financial/economic, social, stakeholder and environmental levels. Sustainability is embedded in scientific focus and innovation within the organisation and we are privileged to have a harmonious and diversified workforce that views the CGS as its employer of choice. I extend a warm welcome to the new members of the CGS team. To those who left us, thank you for your services and may you be successful in your new endeavours.

I congratulate Dr Talicia Pillay, Dr Haajierah Mosavel and Dr Brassnavy Manzunzu for attaining their doctoral degrees; and Mr Thato Ntikang, Mr Mawande Ncume and Ms Boitumelo Mahlase on their Master's degrees.

Every year has its highlights and low moments. During the year under review, the CGS lost some of its talent, including some true stalwarts of the geosciences, through retirement. We celebrate the sterling contribution of these colleagues who served the organisation well. The following men and women are among those who have dedicated much of their lives to the organisation:

- Mr Kwena John Mokoatedi – 25 years as a Senior Technical Officer in the Economic Geology & Geochemistry Business Unit.
- Mr Dawson Moses – 39 years as a General Assistant in the Facilities Management Business Unit.
- Mr Jacob Joseph Maema – 29 years as an Administrative Officer in the Analytical Services Business Unit.
- Mr Enoch De Bruin – 17 years as a Maintenance Assistant in the Facilities Management Business Unit.

- Ms Motsoboro Andronica Mathara – four years as a Cleaner in the Facilities Management Business Unit.
- Ms Siziwe Albertina Ngamntwini – four years as a Cleaner in the Facilities Management Business Unit.
- Ms Julia Mathoto Maphutha – four years as a Cleaner in the Facilities Management Business Unit. (Mses. Mathara, Ngamntwini and Maphutha served the organisation faithfully for many years while part of an outsourced cleaning service before joining the CGS four years ago.)

As mentioned by the chairperson, we were deeply saddened during the year to lose valued team members: Mr Smunda Mokoena, a Board member, Dr Anthony David Surridge, a Technical Advisor – Carbon Capture in the Geoscience Mapping Business Unit, Ms Sonya Johanna van Eck an Editor in the Communications and Stakeholder Relations Business Unit and Mr Madimanyane Isaac Madibane an Assistant Technical Officer in the Facilities Management Business Unit. My condolences go to their loved ones. Fortunately, the CGS did not lose anyone to COVID-19 during the year.

To colleagues who are recovering from ailments at present, we wish you speedy convalescence and look forward to welcoming you back.

My special thanks go to the Board members, under the judicious leadership of the chairperson, Dr Humphrey Mathe, for their patience, meticulous evaluation of our work, support and guidance throughout the year. Gratitude also goes to the Parliament Portfolio Committee on Mineral Resources and Energy for its support, commitment, oversight and guidance as well as to the Minister and officials of the DMRE.

Again, I sign off my overview knowing that we have built a solid foundation for a CGS that is stronger and more delivery focused, and that exemplifies a capable state institution of government. It bears repeating that this has been achieved only because we are standing on the proverbial shoulders of giants in the form of all our forebears.



Mr M Mabuza
Chief Executive Officer
Council for Geoscience

31 July 2022

3

Statement of Responsibility and Confirmation of Accuracy for the Annual Report

Based on the best of our knowledge and belief, we confirm the following:

All information and amounts disclosed in the annual report are consistent with the Annual Financial Statements audited by the Auditor-General.

The annual report is complete, accurate and free from any omissions.

The annual report has been prepared in accordance with the guidelines on annual reports, as issued by National Treasury.

The Annual Financial Statements (Part E) have been prepared in accordance with the Generally Recognised Accounting Practice (GRAP) standards applicable to a public entity.

The Board of the CGS is responsible for preparing the Annual Financial Statements and for judgments made on this information.

The Board of the CGS is responsible for establishing and implementing a system of internal controls which has been designed to provide reasonable assurance on the integrity and reliability of the information on performance, human resources and the Annual Financial Statements.

External auditors have been appointed to express an independent opinion on the Annual Financial Statements.

In our opinion, the annual report fairly reflects the operations, performance information, human resources and the financial affairs of the public entity for the financial year ended 31 March 2022.

Yours faithfully



Mr M Mabuza
Chief Executive Officer
Council for Geoscience

31 July 2022



Dr H Mathe
Chairperson
Board of the Council for Geoscience

31 July 2022

4

Strategic Overview

The core mandate of the CGS is inscribed in its founding prescripts. The vision, mission and core values of the organisation aptly find their expression, as outlined in Geoscience Act No. 100 of 1993, as amended, as follows:

Vision

The vision of the CGS is:

A prosperous and transformed society enabled by geoscience solutions.

Mission

The mission of the CGS is to contribute to a prosperous South Africa by:

- Providing integrated, systematic and thematic maps and conducting research on the onshore and offshore geology of South Africa, as mandated, to:
 - Facilitate mineral, energy and agricultural development;
 - Contribute to the assessment and sustainable management of mineral, geohydrological and geoenvironmental resources; and
 - Support infrastructure development.
- Acting as a national advisory authority on geoenvironmental pollution.
- Providing an information repository and delivery platform that facilitates actionable decisions and the accessibility of relevant information by relevant stakeholders.
- Discharging the mandate in a manner that supports transformation and national developmental imperatives.

Core Values

The core values of the organisation are:

- **Innovation:** Generating and implementing novel ideas and outputs that create value.
- **Diversity:** Embracing an inclusive culture that upholds transformation and recognises contributions from all stakeholders.
- **Excellence:** Striving to excel in every aspect of our business.
- **Accountability:** Fostering reliability and commitment, taking responsibility and ownership.
- **Learning:** Advancing through knowledge creation.
- **Safety, Health, and Environment:** Prioritising the health and safety of all employees and stakeholders concomitant with environmental stewardship.
- **Transparency:** Providing services impartially, fairly, equitably and transparently.

5

Legislation and Other Mandates

The Public Finance Management Act (PFMA) No. 1 of 1999 lists the CGS as a Schedule 3A Public Entity.

The Geoscience Act No. 100 of 1993 and the subsequent Geoscience Amendment Act No. 16 of 2010 establish the CGS. The mandate of the CGS includes, albeit is not limited to:

- a) The **systematic onshore and offshore** geoscientific mapping of South Africa.
- b) **Undertake geoscientific research** and related technological development.
- c) The **collection and curation** of all geoscience data and act as a national geoscience repository.
- d) The **compilation and development of comprehensive and integrated geoscience knowledge** and information, such as geology, geophysics, geochemistry, engineering geology, economic geology, geochronology, palaeontology, geohydrological aquifer systems, geotechnical investigations, marine geology, geomagnetism, seismology, geohazards, environmental geology and other related disciplines.
- e) **Bring to the notice of the Minister any information in relation to the prospecting for and mining of mineral resources**, which is likely to be of use or benefit to the Republic.
- f) Promote the search for and the exploitation of any minerals in the Republic.
- g) Study (i) the **distribution and nature of mineral resources** and (ii) geoenvironmental aspects of past, current and future mineral exploitation.
- h) Study the use of the surface and the **subsurface of the land and the seabed**, and from a geoscientific viewpoint advise government institutions and the

general public on the judicious and safe use thereof with a view to facilitate sustainable development.

- i) Develop and maintain the **national geoscientific library**, the national geoscientific information centre, the **National Borehole Core Depository**, the **national geophysical and geochemical test sites**, the **national geoscience museum**, the national seismological network and the national geoscience analytical facility.
- j) Conduct investigations and render prescribed specialised services to public and private institutions.
- k) Render geoscience knowledge services and **advice to the State**.

In terms of the amendments made to the Geoscience Act, sections 4(c), 4(eA), 4(f), 5(b) and 8 that deal with, among others, the custodianship of geoscientific information, the review and evaluation of geotechnical reports, the maintenance of certain national geoscientific facilities and the appointment of a Geotechnical Appeal Committee were held in abeyance. Synchronously, the Mineral and Petroleum Resources Development Act (MPRDA) explicitly provides for the CGS to receive, validate and curate geological information from prospecting and mining right holders as part of their regulatory compliance requirement. These amendments constitute organic growth prospects and significantly broaden the mandate of the CGS.

The policy mandate: The Minerals and Mining Policy for South Africa (1998) affirms the CGS as a science council that supports research and development underpinning the sustainable development of the mining industry. This further enunciates the Constitutional mandate, as elaborated in the founding prescripts of the CGS.

5.1 Other Guiding Policies

Given the urgent need to address national imperatives, the CGS ensures that its business model and all its activities address the following strategic national outcomes in alignment with the National Development Plan (NDP) Vision 2030:

- **Decent employment through inclusive economic growth:** Delivering spatial geoscience information and services that attract local and international investment to develop mineral and upstream petroleum resources.
- **A skilled and capable workforce to support an inclusive growth path:** Build capacity in respect of geoscientific, administrative and managerial/leadership skills while also developing innovative outputs, systems and services.
- **An efficient, competitive and responsive economic infrastructure network:** Geoscience information and services input to infrastructure development in support of South Africa's economic development of mineral and upstream petroleum resources.
- **Vibrant, equitable and sustainable rural communities with food security for all:** The provision of geoscientific information that enables agricultural development and groundwater exploration, among others.
- **Environmental assets and natural resources which are well protected and continually enhanced:** Conducting research regarding, among others, acid mine drainage and carbon capture and storage technologies and establishing environmental baselines for possible future shale gas development.
- **An efficient, effective and development-oriented public service and an empowered fair and inclusive citizenship:** Strengthening the CGS to optimise delivery of the mandate and effect the transformative programme of the South African Government.

Further to the NDP and the MTSF, the objectives of the CGS have been formulated to support the objectives of the DMRE, whose core focus revolves around regulation, transformation and promotion of the minerals and energy sectors as well as provision of sustainable and affordable energy for growth and development to all South Africans.

Other objectives of the DMRE, supported by the CGS and with which its activities are aligned, include contributing to a just transition to a low-carbon economy; unlocking South Africa's high potential mineral and energy resources; diversification and supply of mineral resources in support of both mining and energy sectors; increasing investment in mineral and petroleum sector, onshore and offshore; increasing South Africa's share of the global minerals and energy market; increasing South Africa's share of the global exploration budget; diversification of energy sources through implementing the Integrated Resource Plan 2019; increasing infrastructure investment by both public and private sectors; inclusive, equitable and competitive exploration as well as ensuring sufficient and relevant skills in the mining and energy sector. The CGS derives its strategic foundation from the government's MTSF 2019 to 2024, the Stakeholders' Declaration on Strategy for the Sustainable Growth and Meaningful Transformation of South Africa's Mining Industry of the DMRE, and the 2019 White Paper on Science, Technology and Innovation of the Department of Science and Innovation.

6 Organisational Structure

The organogram of the CGS (Figure 2) describes the reporting structure of the organisation. The structure was developed to support the efficient, effective and robust functioning of the organisation and to streamline the composition of its Board of Directors and executive management. The executive management team of the

CGS is headed by the Chief Executive Officer (CEO) who reports to the Accounting Authority (the CGS Board – see Part C of this report). The executive management team, in turn, oversees four portfolios: Integrated Geoscience Development, Geoscientific Services, Finance, and Corporate Services (see Part A Section 7).

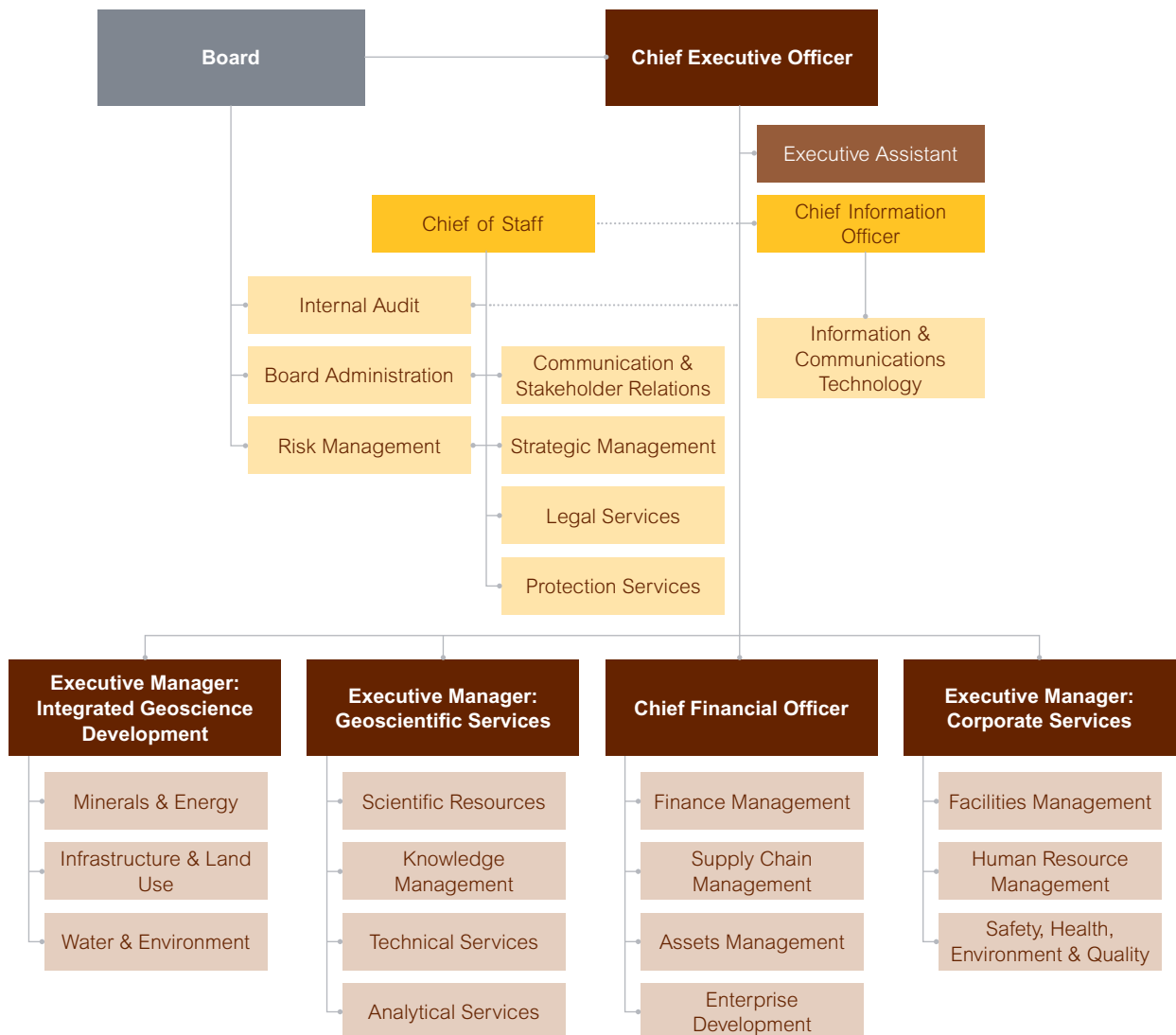


Figure 2: CGS organisational structure

7

CGS Executive Management Team



Mr Mosa Mabuza
Chief Executive Officer



Dr Jonty Tshipa
Chief of Staff



Mr Leonard Matsepe
Chief Financial Officer



Ms Refilwe Monoko
Executive Manager
Geoscientific Services



Dr David Khoza
Executive Manager
Integrated Geoscience
Development



Mr Tshepo Mokolobate
Executive Manager
Corporate Services (Acting)



Pegmatite draft Map discussions in relation to the exposed outcrops in the Northern Cape Province

Part B

Performance Information

This section of the report provides key performance information demonstrating the service delivery achievements of the CGS. The information corroborates the organisation's effective management, planning, budgeting, implementation, monitoring and evaluation of activities. The impacts and outcomes of its actions are underpinned by symbiotic planning and management inputs and activities to achieve the desired results.

The performance information affirms the alignment of the impacts and outcomes in the Strategic Plan (SP), the associated programme outputs, the output indicators and targets in the Annual Performance Plan (APP) and the various budget-related documents. This section also highlights achievements measured against the performance indicators and targets identified in the SP, the APP and the budget documents.

1

Auditor-General’s Report: Predetermined Objectives

The Auditor-General of South Africa performed the necessary audit procedures on the performance information of the CGS to provide reasonable assurance in the form of an audit conclusion. The audit conclusion on the performance against predetermined objectives is included in the report to executive management, with material findings being

reported under the Predetermined Objectives heading in the report on other legal and regulatory requirements section of the auditor’s report.

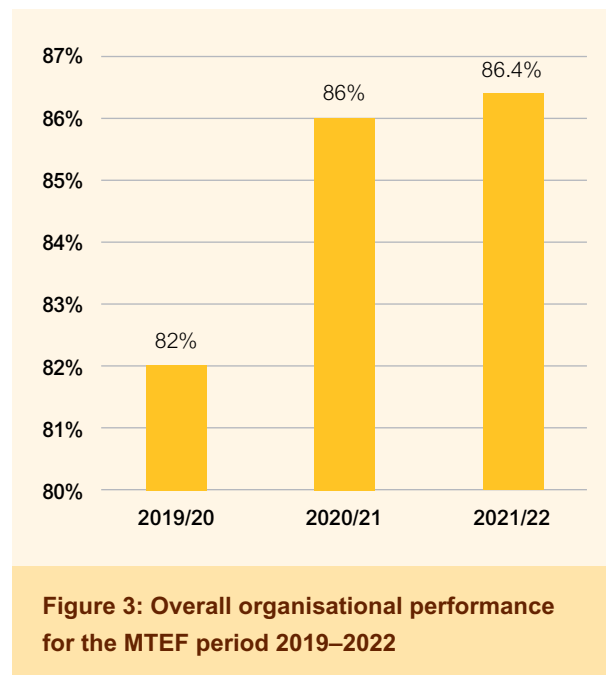
The Report of the Auditor-General, published as Part E: Financial Information, is on pages 117 to 120.

2

Overview of Performance

2.1 Service Delivery Environment

The end of the reporting period represents the fifth year of continuous implementation of the current phase of the integrated and multidisciplinary geoscience mapping programme (IMMP) as an instrument of delivery of the strategic re-orientation of the CGS, which decisively focused on implementation of its mandate, inscribed in the founding legislation, the Geoscience Act No. 100 of 1993 as amended. This includes collection, generation, compilation, interpretation and dissemination of high-quality geoscience data, information and knowledge for South Africa. The IMMP focuses on five core themes listed hereafter and in the operational highlights. Despite the challenges presented by the COVID-19 pandemic, the CGS delivered most of its APP targets for the year under review and obtained an overall performance score of 86.4%. Figure 3 summarises the overall performance of the CGS since the beginning of the MTEF cycle 2019–2022.



Theme 1: Geoscience for mineral and energy resources

The South African Government announced its bold plan to capture a minimum of 5% of the global exploration budget of approximately US\$10 billion per annum in the next three to five years. The CGS is privileged to be at the leading edge of rejuvenating and reimagining the exploration landscape, consistent with the quality of geology that suggests that the country remain a proverbial exploration frontier. Accordingly, the CGS provides necessary geoscientific/technical support in a number of DMRE-led initiatives such as South Africa's ERRP, the geo-environmental baseline studies for shale gas development in the Karoo, mine environment and water management programme as well as the Exploration Strategy.

The CGS's contribution to energy security and the **just energy transition** resides in the numerous projects that constitute its GTP. These include geothermal research potential, the early positive results of which will augment the sustainable renewable energy programme in the medium to long term. The CGS is also an implementing agency for the Carbon Capture, Utilisation and Storage Project, which is critical to test the carbon capture and utilisation in South Africa to reaffirm the commitment to clean energy.

Progress on implementation of this aspect of the CGS GTP, albeit at an early stage, gives sufficient confidence that the much-needed inclusive economic growth, coupled with the energy security needs of the country, can be re-catalysed and attained.

Theme 2: Geoscience for health, groundwater and environment

Mineral exploration and exploitation activities are shifting their focus towards an increased emphasis on environmental stewardship. The balance between mining development and environmental conservation has become one of the primary research focus for the CGS. In this regard, the notion of co-existence of the two seemingly conflicting phenomena is a subject of research that seeks to reconcile co-existence thereof on the balance of scientific research. Furthermore, understanding water resources, particularly in view of the fact that South Africa is a water-scarce country is also a priority research area under this theme. Data and information generated from this theme is intended to improve the understanding of the local and regional aquifer systems to guide the sustainable use of ground- and surface water resources.

Theme 3: Geoscience for infrastructure and land use

The CGS is legislatively mandated to provide professional and technical advice on infrastructure development in dolomitic terrains. This mandate was expanded with the Geoscience Amendment Act No. 16 of 2010 to engulf assessment and review of all infrastructure development in areas deemed susceptible to landslide. The CGS has started engagements with the National Department of Cooperative Governance and Traditional Affairs and a handful of district municipalities to explore practical modalities of applications of geoscience to inform spatial land use and optimal infrastructure development in the context of the DDM. The CGS continues to effect its mandate of maintaining the national seismic network, which detects continuously natural and mining-induced earthquakes in South Africa.

Theme 4: Geoscience innovation

The CGS is steadily strengthening its scientific innovation capacity in all geosciences. Drone technology has now been adopted to advance the mandate of the CGS and to provide a novel way of capturing geoscience data to gain a perspective of the Earth to augment instruments that are ground based. The CGS has embarked on research into the use of artificial intelligence in geoscience through the creation of instruments to address, among others, complex regional mineral and groundwater potential mapping challenges.

Theme 5: Geoscience diplomacy

The CGS recognises and implements its role as a geoscientific instrument for foreign policy predisposition of the Republic of South Africa. In this regard, the CGS has assumed a role of permanent Secretariat of the Organisation of African Geological Surveys (OAGS), which promotes close relations among African member states in geoscience research. The OAGS represents the interests of African geological surveys and collaborates closely with, *inter alia*, the European Geological Surveys to implement the PanAfGEO (Pan-African Support to the EuroGeoSurveys – Organisation of African Geological Surveys) Partnership programme on capacity building across the African continent.

The CGS has renewed its collaboration with the Namibian and Malawian geological surveys for the implementation

of high-resolution geological mapping projects. During the year under review, the CGS has signed an agreement with the Kingdom of Eswatini to conduct a regional airborne geophysical survey for geoscience mapping. Other collaborative opportunities are a subject of continuous assessment with counter parts from peer jurisdictions, while existing partnerships are sustained with partners such as the United States Geological Survey, Chinese Geological Survey, Geological Survey of Canada and Nigerian Geological Survey Agency.

Business of the CGS

The CGS not only implements its mandate, but also collaborates on:

- Agency projects sourced from other government departments/institutions and public entities.
- Private sector projects.

The CGS continued to implement mandatory projects specified in the Geoscience Act No. 100 of 1993 as amended (e.g. development and maintenance of the national core library, geophysical reference sites) and to manage:

- The national seismic network, which monitors seismic activity locally and links with regional and global networks;
- Monitoring of global infrasound activity as part of its collaboration with the Comprehensive Nuclear-Test-Ban Treaty Organisation (CTBTO);
- The National Borehole Core Depository, which provides a comprehensive collection of valuable geological materials and now boasts hyperspectral scanning capability;
- The National Geoscience Museum, which provides information and preserves rare, scientifically valuable and geological heritage samples;
- The National Geoscientific Library and bookshop, which provide geological publications and maps to the public; and
- The national geoscience analytical facility, which is available to analyse, among others, geological samples, water samples and industrial raw materials.

2.2 Organisational Environment

During the year under review, the CGS started to implement its organisational structure (Figure 2) to improve efficiency and service delivery as per the adopted strategy. The CGS elected to pilot implementation of stream leads under the Minerals and Energy Business Unit as well as the Analytical Services Business Unit, to assist with the administrative support for the Business Unit Managers.

Since the establishment of the Public Information Office in the 2020/21 financial year, the dissemination of geoscience data and information to stakeholders has improved. During the year under review, the CGS reviewed its Data and Information Policy in accordance with the POPI Act 4 of 2013 to promote the protection of personal information processed by the CGS and this includes personal information of the CGS staff, clients and stakeholders. The CGS registered an Information Officer and Deputy Information Officer, in terms of section 55 (2) of the Protection of Personal Information Act 4 of 2013 on the 16th of February 2022.

The Geoscience Data and Information Portal was launched on the 1st of June 2021 by the CEO and affirmed by the Minister of Mineral Resources and Energy on the sidelines of the Mining Indaba. The portal has been developed to ensure that geoscience data and information records published by the CGS in the form of maps, documents and databases are accessible to stakeholders and clients from the comfort of their homes.

From April 2021 to March 2022, geoscience information and data have been disseminated to a wide variety of stakeholders such as the engineering industry, the mining industry, private citizens, state-owned enterprises, higher education institutions and international companies (Figure 4). During this period, the CGS, through info@geoscience.org.za, received over 2 000 requests, for, among others, dolomite reports, geological borehole data, geological maps, geological mineral maps and other information such as geochemical, geophysical, seismic and marine data.

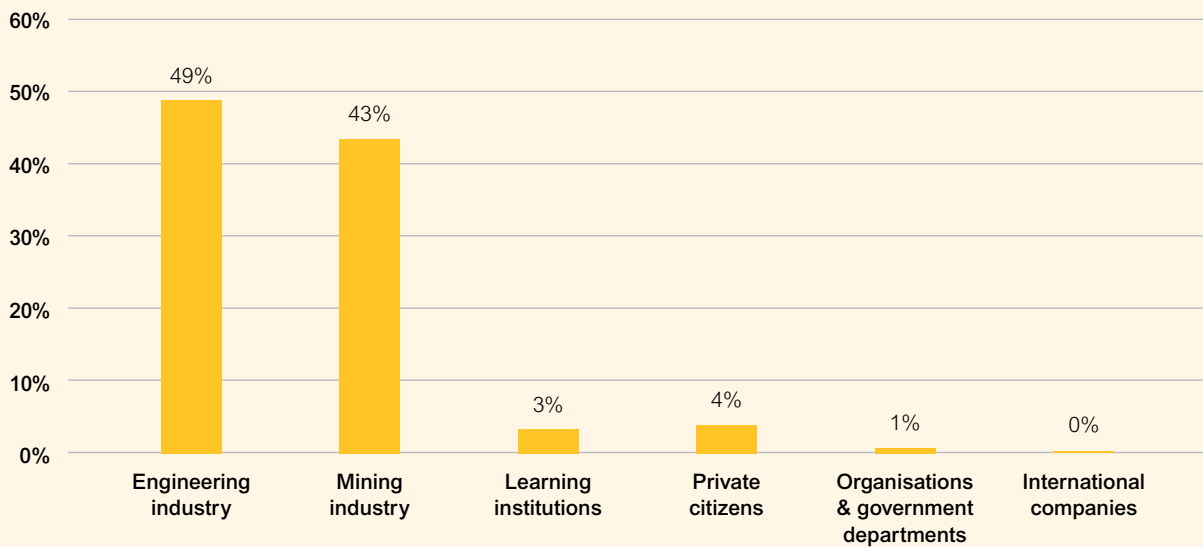


Figure 4: Percentage request through info@geoscience.org.za per industry for 2021–22

The Geoscience Data and Information Portal has registered over 1 000 users between June 2021 and March 2022. The portal users are mainly from the engineering, mining and academic institutions. Over 16 000 downloads (Figure 5) have been recorded and varied from geological maps, bibliographies and memoirs, to bulletins and geological shapefiles etc.

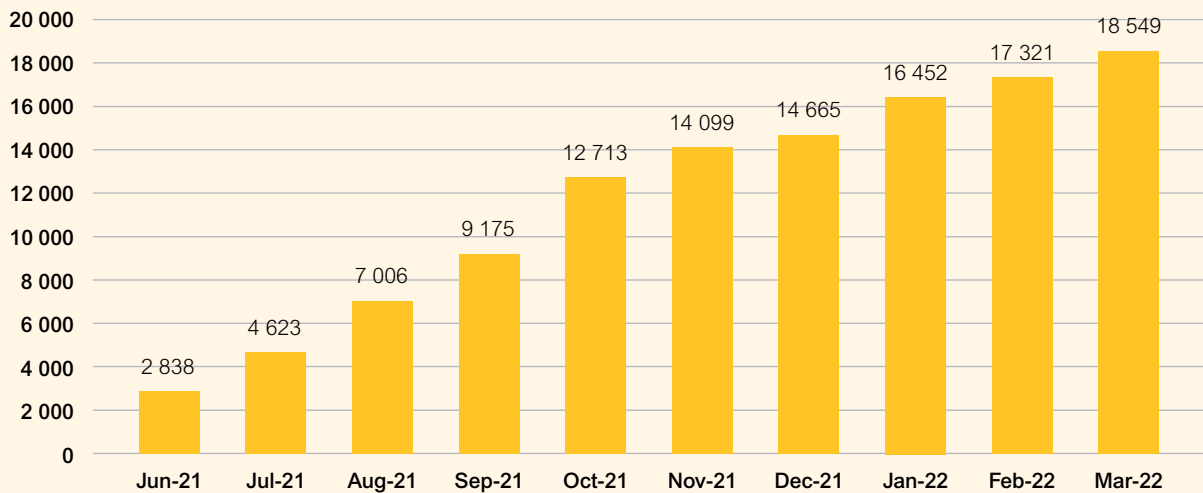


Figure 5: Data downloads through the Geosciences Data Management Portal, June 2021–March 2022

2.3 Key Policy Developments and Legislative Changes

There have been no key policy amendments to the Geoscience Amendment Act No. 16 of 2010 since it took effect on the 1st of July 2012. The Geoscience Act Regulations 2022, which elaborate the modalities of implementation of the empowering provisions in the Act were published as law in March 2022 after extensive consultations and engagements with various stakeholders. The Regulations intend to, among others, streamline the efficacy of the CGS's custodianship of the geoscience data, information and knowledge in terms of the founding legislation. In addition, a provision enabling the CGS to undertake exploration is being expanded to establish sustainable modalities for the organisation to do so while balancing implementation with its broader mandate.

The MPRDA of 2008 delineates the role of the CGS in respect of geological information generated through exploration activities in South Africa. In line with its new strategic approach, the CGS is aligning its activities with the latest developments in the MPRDA amendments, the National Environmental Management Act and the Spatial Planning and Land Use Management Act.

The District Development Model (DDM) seeks to strengthen delivery capacity and capability of municipalities. In this regard, the CGS has engaged extensively with a number of district and local municipalities in the Eastern Cape, KwaZulu-Natal, Limpopo and Mpumalanga provinces to pilot possibilities of optimal geoscientific contribution towards the stated intent of the DDM.

2.4 Progress Towards Achievement of Institutional Impacts and Outcomes

The SP 2020–2025 of the CGS was reviewed to align with the minimum requirements of the Revised Framework for Strategic Plans and APPs, 2020. The outcome indicators were amended to follow the results-based planning concept that has been adopted by the Government of South Africa. The CGS's SP 2020–2025 was therefore tabled in Parliament in March 2021 together with its Annual Performance Plan of 2021/22.

The impact statement of the CGS is drawn from its vision statement, 'A prosperous and transformed society enabled by geoscience solutions'. The CGS has adopted the IMMP as a strategy to foster the sustainability of the organisation in a constantly changing state of polity, the economy, society and the ever-shifting scientific and technological landscape. The strategy is intended to maintain an impactful delivery of the core mandate and provide innovative geoscience solutions to support the NDP 2030 and other government plans that address economic growth, poverty, inequality, job creation, education, clean water, affordable and clean energy, and safer communities. Figure 6 illustrates the impact pathway of the CGS strategy, its outcomes and areas of impact.

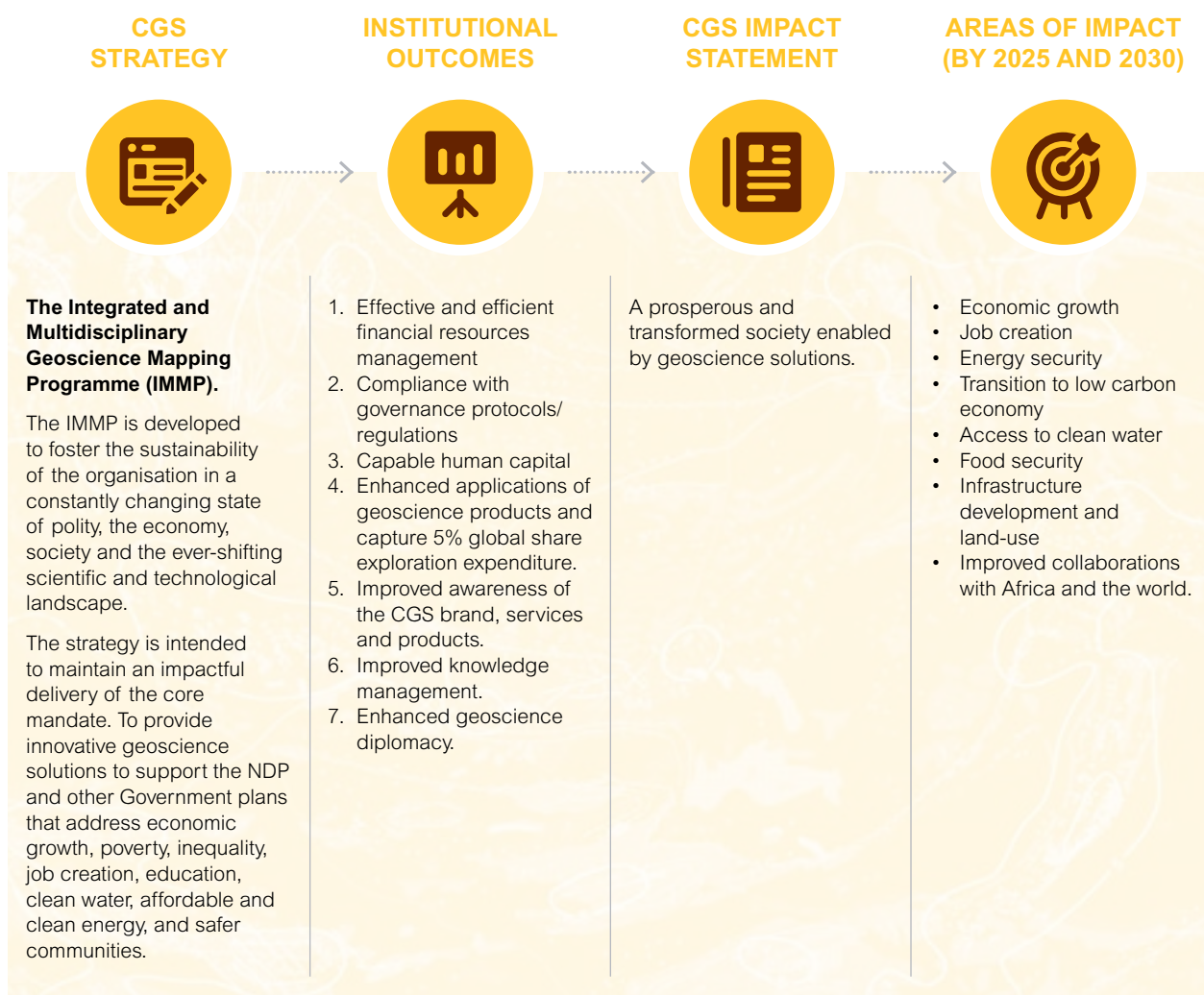


Figure 6: Strategic outlook and impact pathway of the CGS

Table 1 illustrates progress towards the achievement of the five-year targets against the outcome indicators of the CGS's SP 2020–2025.

Table 1: Progress towards the accomplishment of the CGS's SP 2020–2025

Outcomes	Outcome indicators	Baseline	Five-year target	Progress towards the achievement of the five-year target
MTSF priorities				
Priority 1: A capable, ethical and developmental state				
Effective and efficient financial resources management	Absence of material audit findings	0	Clean audit attained by 2025	The CGS attained an unqualified audit outcome with no material findings (i.e. clean audit) for the year under review. Effectiveness of internal controls is continually being strengthened to attain clean audit.
Compliance with governance protocols/regulations	An organisation complaint with relevant prescripts	New indicator	100% compliant organisation by 2025	The CGS is currently 100% compliant with the PFMA and in addition, the regulatory universe, which is a list of all prescripts that the CGS has to comply with, is still in draft form and will be concluded in the financial year 2022/23.

Outcomes	Outcome indicators	Baseline	Five-year target	Progress towards the achievement of the five-year target
MTSF priorities	Priority 3: Education, skills and health			
Capable human capital	Talent management framework to build, nurture and sustain a capable workforce implemented	New indicator	An empowered, transformed, motivated and capacitated workforce by 2025	The talent management framework is currently being developed and will be concluded in financial year 2022/23 and implemented thereafter.
MTSF priorities	Priority 2: Economic transformation and job creation Priority 5: Spatial integration, human settlements and local government Priority 6: Social cohesion and safe communities			
Enhanced applications of geoscience information and knowledge and to secure a minimum of 5% share of the global exploration expenditure	Increased onshore geoscience map coverage	New indicator	16%	In total, 205 maps have been produced out of a total of 1 916 maps resulting to the onshore map coverage of 10.7%, which marks a significant improvement from below 5% before the IMMP commenced.
	Increased offshore geoscience map coverage	New indicator	0.6%	The CGS has produced only one offshore map out of a total of 1 828 planned bringing the total percentage thus far to 0.05%.
	Implementation of the Geoscience Technical Programme for minerals, energy, groundwater, infrastructure, land-use, innovation and the environment	New indicator	Applications of geoscience knowledge towards societal development	The CGS has used geoscientific information to contribute to mineral and energy characterisation meant to attract 5% of the global exploration expenditure in South Africa over the next 3–5 years. In addition the CGS has produced critical outputs that will contribute to groundwater, infrastructure and land use.
Improved awareness of the CGS brand, services and products	Integrated Communication and Stakeholder Relations Strategy implemented	New indicator	Satisfied stakeholders with the quality of CGS services and products	The CGS has achieved stakeholder satisfaction level of 66.4% in the 2021/22 financial year, which is below its target of 70%. The communication and stakeholder relations strategy is currently being implemented to improve awareness of the CGS brand, products and services.
Improved geoscientific domain through effective knowledge management	Utilisation of the integrated geoscience information management system	New indicator	A proficiently managed geoscience data and information by 2025	The CGS has made 62.5% progress in the initial implementation of the integrated geoscience solution, which is a key component of effective data management from the capturing from the data migration and auditing programmes to creating access to the data and information through the CGS geoscience data portal. Whereas the data systems have not been integrated yet, the 5-year target is expected to be met.
MTSF priorities	Priority 7: A better Africa and world			
Enhanced geoscience diplomacy	International strategic partnerships established	New indicator	Geoscience contribution towards “a better Africa and world” strengthened by 2025	The CGS has in the year under review participated in various bilateral and multilateral in support of South Africa’s foreign policy predisposition. In the year under review, the CGS signed an agreement with the Kingdom of Eswatini to undertake geophysical surveys.

Note: Clean audit is defined as an unqualified opinion with no material findings. An unqualified opinion is when there were material findings that were corrected during the audit.

To achieve the outcome on effective and efficient financial resource management as well as attainment of a clean audit by 2025, the CGS will continue to develop and maintain transparent systems, put in place internal controls and manage risks that may arise. The CGS will continue to aspire towards achieving a clean audit by 2025. The financial statements will continue to be prepared in accordance with GRAP standards and the requirements of the PFMA. Controls have already been implemented to ensure the responsible management of assets, revenue, expenditure and liabilities. The established supply chain management function will ensure an appropriate procurement and provisioning system that is fair, equitable, transparent, competitive and cost-effective. Through its internal audit and risk management functions, the CGS monitors the effectiveness of internal controls, assesses the financial management controls and mitigates financial misconduct such as fraud, theft, irregular expenditure, and fruitless and wasteful expenditure.

Compliance with governance protocols and regulations and other prescripts is crucial for the CGS to contribute to the achievement of Priority 1 of the MTSF, namely 'a capable, ethical and developmental state'. In order to achieve an acceptable level of compliance, the CGS aims to improve and further develop compliance management maturity by putting the necessary policies and procedures in place to achieve the target of a fully compliant organisation by 2025. The CGS operates in a complex, diverse and extensive environment and regulatory universe, and has to comply with numerous prescripts. Compliance will be achieved in a structured and systematic manner integrated into operations.

Competitive advantage resides in the competence of the workforce. To attract, retain, engage and develop the right talent in the right positions, the CGS is currently developing a talent management framework that is aligned with the strategy of the CGS. This framework aims to build, nurture and sustain a capable workforce by the end of the MTSF period. The talent management framework will respond to the short-, medium- and long-term exigencies of the business informed by workforce planning.

The IMMP strategy aims to contribute towards South Africa's Economic Reconstruction and Economic Recovery Plan by securing a minimum of 5% of global exploration expenditure through applications of geoscience information and knowledge generated from the programme. Implementation of the GTP, the primary tool to realise the CGS strategy, intends to unlock South Africa's mineral and energy resource potential and contribute to the just transition to a low-carbon economy. The GTP will also provide critical data and information (through the production of onshore and offshore 1:50 000-scale

geoscience maps), including the application of AI techniques to support sustainable infrastructure development, judicious land-use and environmental stewardship. During the year under review, 32 onshore geoscience maps were produced at a scale of 1:50 000, which resulted in an increase to 10.7% of onshore map coverage, marking a significant improvement from below 5% before the IMMP commenced. In addition, applied geoscience outputs that will contribute to minerals, energy, groundwater, infrastructure and land use were produced. One of the critical outputs, in particular from the Northern Cape Province (i.e. the new pegmatite distribution map) is meant to characterise the minerals of the future and the CGS is making progress in securing 5% of the global exploration expenditure.

To improve CGS brand awareness, services and products, the Integrated Communication and Stakeholder Relations Strategy was implemented in the year under review. The CGS has started to implement the strategy and to monitor the growth of its brand through tools such as stakeholder surveys.

As the national custodian of all geoscience data and information, the CGS has started with deployment of a seamless and accessible geoscience information and knowledge management system that will allow effective decision-making for sustainable management of natural resources and mitigation of the impacts of geohazards, among others. Optimum use of the information management system will enable the organisation to implement the geoscience data and information policy as well as the Geoscience Act Regulations that were published during the year under review. In addition, the CGS has launched the Geoscience Data and Information Portal, which was developed to ensure that access to geoscience data and information records published by the CGS are made available to stakeholders and clients.

The CGS aims to enhance implementation of the geoscience diplomacy thematic area in support of the national foreign policy intention to foster economic diplomacy and to support programmes towards South Africa's contribution to building a **better Africa and the world**, which is aligned with the United Nations Sustainable Development Goals 2030 and African Union's Agenda 2063. The geoscience programmes include aspects of human capital development, institutional reform, administrative and managerial/leadership, skills development and the implementation of mutually agreed programmes. During the year under review, the CGS signed a strategic agreement with the Geological Survey Department of the Ministry of Natural Resources and Energy of Eswatini. This strategic partnership entails conducting a regional airborne geophysical survey for geoscience mapping for mineral potential and groundwater resources among other things.

3

Institutional Programme Performance Information

In accordance with the CGS strategy, a balanced scorecard (BSC) methodology is used to provide an account of the overall performance of the organisation. The BSC essentially measures the performance of the organisation at a corporate business level and at an individual level. Five strategic programmes cover the customer, the internal business

process, learning and growth and financial perspectives (Figure 7). These programmes respond to seven institutional outcomes as stipulated in the CGS's SP 2020–2025 and are aligned with government's MTSF priorities. The strategic programmes also address the cross-cutting areas of women, youth, and people with disabilities.

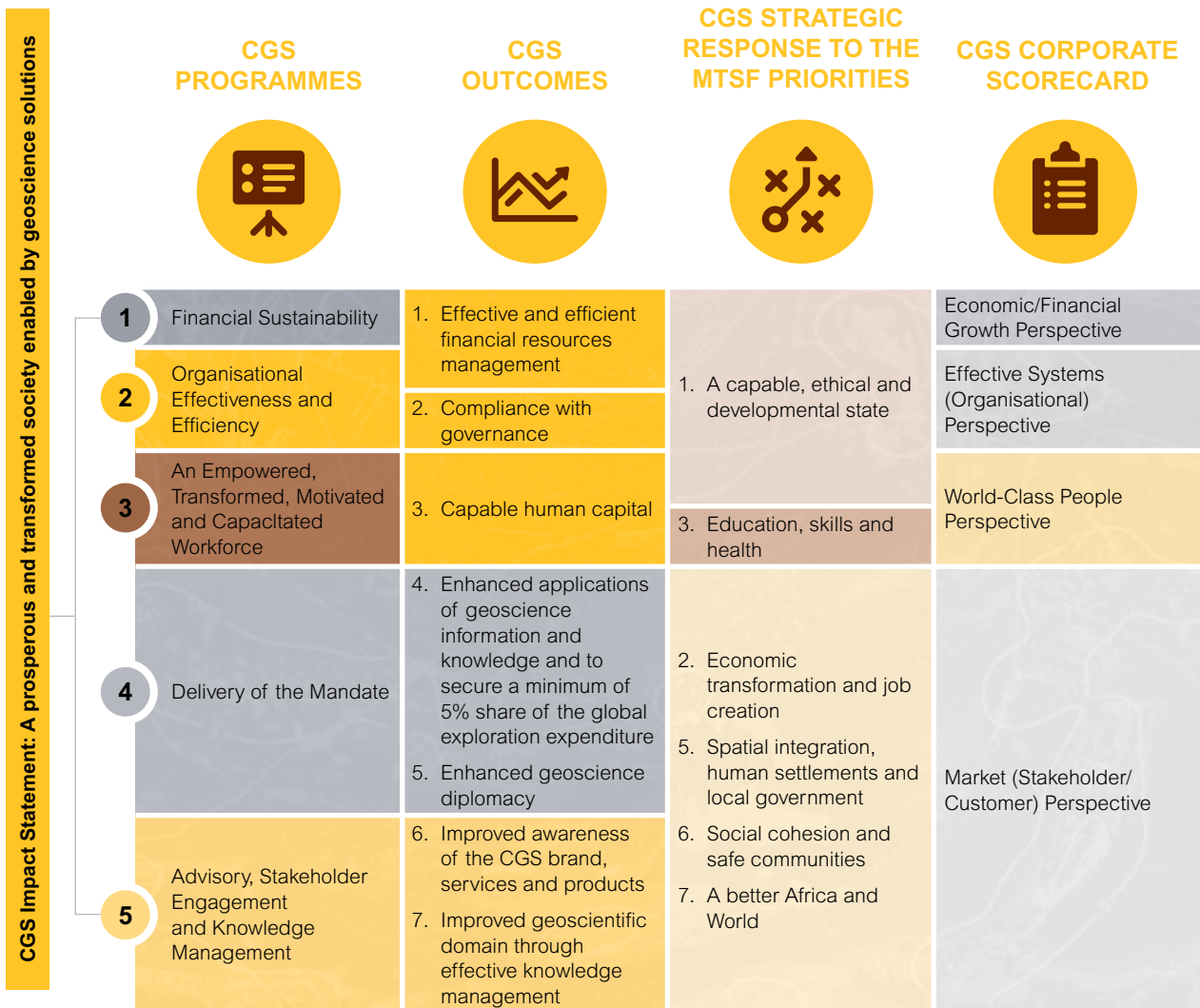


Figure 7: Summarised CGS programmes and their links to MTSF 2019–2024 priorities and the corporate scorecard

The performance information also details the service delivery environment of the organisation, broad service delivery disciplines, and clients and stakeholders served. To evaluate the corporate performance of the CGS, the organisation has developed performance indicators, which, together with the performance targets for 2021/22, are summarised in Table 2. Achievement of the targets for the output indicators for each strategic programme for the financial year under review are also detailed in Table 2.

3.1 Corporate Performance Report for 2021/22

Table 2: Corporate Performance Report against the tabled APP for 2021/22

Economic/Financial Growth perspective									
Programme 1: Financial sustainability									
Purpose: To ensure effective and efficient delivery of financial management services, to secure funding from the exploitation of collaborative activities and partnerships as well as to generate grant funding									
Institutional outcomes of programme 1: Effective and efficient financial resources management									
Outcome	Output	Output indicator	Audited actual performance 2019/20	Audited actual performance 2020/21	Planned annual target 2021/22	Actual achievement 2021/22	Deviation from planned target to actual achievement 2021/22	Reasons for deviations	
Effective and efficient financial resources management	Audited financial reports	Percentage of overhead costs to total costs	61.04%	63.00%	≤66%	54.90%	Not applicable*	Target achieved. Measures were put in place to contain and reduce overhead costs. The implementation of the GTP has improved the overall total spend.	
	Audited financial reports	Percentage of personnel costs to total costs	65.86%	64.03%	≤70%	57.18%	Not applicable*	Target achieved. This was due to containment of personnel costs in relation to project delivery spend.	
	Audited financial reports	Revenue from collaborative activities/ partnerships	R29m	R23.2m	R33m	R107.9m	+R74.9m	Target exceeded. More revenue was generated due to CGS's participation in the Eskom project of R50.1m, Free State project of R7m, Kingdom of Eswatini project of R17.2m and various other small projects.	
	Audited financial reports	Grant revenue	R422.4m	R486.2m	R373.2m	R464.3m	+R91.1m	Target exceeded. Deferred income of R86.6m was recognised over and above the current year's transfers of R373.2m. A deliberate effort has been made to reduce the deferred income.	

* Not applicable: The planned target was a range rather than an absolute figure.

Effective Systems (Organisational) perspective

Programme 2: Organisational effectiveness and efficiency

Purpose: To develop and implement effective and compliant policies, procedures and business processes in support of the CGS integrated service-delivery model, adhere to best practice to achieve sustainable governance as well as to provide and operate flexible, expandable and secure ICT solutions

Institutional outcomes of programme 2: Effective and efficient financial resources management and compliance with governance protocols/regulations

Outcome	Output	Output indicator	Audited actual performance 2019/20	Audited actual performance 2020/21	Planned annual target 2021/22	Actual achievement 2021/22	Deviation from planned target to actual achievement 2021/22	Reasons for deviations
Effective and efficient financial resources management and	Audited annual report	Percentage of total procurement spend on goods and services from small, medium and micro enterprises (QSE and EMEs) in terms of PPPFA of 2017	48.25%	40.75%	≥30%	42.48%	Not applicable*	Target achieved. Transformation in terms of procurement spent is given high priority.
	Audited annual report	Number of audit qualifications	0	0	0	0	0	Target achieved. An unqualified audit outcome with no material findings (i.e. clean audit) has been attained for the year 2021/22. Concerted effort is made for continued improvement.
Compliance with governance protocols/regulations	Availability report	Availability of key enterprise services	New measure	100%	≥99%	99.89%	Not applicable*	Target achieved. An organisational investment toward modern technologies (including cybersecurity) has resulted in the overall 99.89% uptime and availability of resources across all the CGS's sites.

* Not applicable: The planned target was a range rather than an absolute figure.

World-Class People perspective

Programme 3: An empowered, transformed, motivated and capacitated workforce

Purpose: To attract and retain highly skilled scientific personnel in the geoscience industry; To build capacity in respect of geoscientific, administrative and managerial/ leadership skills while also developing innovative products, systems and services; To promote and invest in human resources transformation and diversity

Institutional outcomes of programme 3: Capable human capital

Outcome	Output	Output indicator	Audited actual performance 2019/20	Audited actual performance 2020/21	Planned annual target 2021/22	Actual achievement 2021/22	Deviation from planned target to actual achievement 2021/22	Reasons for deviations
Capable human capital	Human resources reports	Percentage of scientific staff with Master's or Doctoral degrees	41.56%	40.47%	≥35%	41.22%	Not applicable*	Target achieved. The CGS Management continues to invest in learning and development initiatives. As a result, there is a healthy pipeline of part-time bursars currently studying towards Master's and Doctoral degrees.
	Human resources reports	Staff turnover rate	7.99%	5.48%	≤10%	4.99%	Not applicable*	Target achieved. The CGS Management continued to create inclusive and conducive working environment for all staff. There has also been retention interventions such as job rotation by placing staff at projects as well as learning and development initiatives.
Capable human capital	Human resources reports	Percentage of training expenditure to leviabile amount of payroll	3.52%	1.20%	≥1%	2.33%	Not applicable*	Target achieved. The CGS Management continued to invest in staff development to further accelerate the IMMP and other business requirements.
	Human resources reports	Percentage of staff living with disability	1.66%	2.25%	≥1.5%	1.86%	Not applicable*	Target achieved. The CGS Management implemented all-inclusive interventions specifically towards staff living with disabilities.
	Human resources reports	EE statistics, scientific cohort (Female representation)	New measure	39%**	44%	39%	-5%	Target not achieved. The organisational growth was slower than anticipated. Future recruitment will be biased towards females based on merit.
Capable human capital	Human resources reports	EE statistics, EXCO (Female representation)	New measure	20%**	20%	20%	0%	Target achieved. This was through zero turnover at Executive Management level.

* Not applicable: The planned target was a range rather than an absolute figure.

** Restated audited performance information of financial year 2020/21 expressed in percentage.

Market (Stakeholder/Customer) perspective									
Programme 4: Delivery of the mandate									
Purpose: Execute the integrated and multidisciplinary geoscience mapping programme									
Institutional outcomes of programme 4: Enhanced applications of geoscience information and knowledge and to secure a minimum of 5% share of the global exploration expenditure as well as enhanced geoscience diplomacy									
Outcome	Output	Output indicator	Audited actual performance 2019/20	Audited actual performance 2020/21	Planned annual target 2021/22	Actual achievement 2021/22	Deviation from planned target to actual achievement 2021/22	Reasons for deviations	
Enhanced applications of geoscience information and knowledge and to secure a minimum of 5% share of the global exploration expenditure and Enhanced geoscience diplomacy	Onshore geoscience maps	Onshore geoscience map coverage	New measure	9.03%	9.5%	10.7%	+1.2%	Target exceeded. Additional onshore geoscience maps were produced due to reprioritisation of internal resources to support the economic recovery projects.	
	Offshore geoscience maps	Offshore geoscience map coverage	New measure	0.05%	0.3%	0.05%	-0.25%	Target not achieved. While significant progress was made with CGS's nearshore mapping vessel (RV Nkosi), other marine mapping vessels (from key stakeholders) were not available as initially anticipated.	
	Value-added geoscience outputs such as integrated reports, 3D models, innovative solutions, mineral systems and emplacement models	Applied geoscience outputs for minerals and energy	New measure	7	4	4	0	Target achieved. The CGS produced its planned applied geoscience outputs for minerals and energy.	
	Value-added geoscience outputs such as integrated reports, 3D models and innovative solutions	Applied geoscience outputs for infrastructure, land use, health, groundwater and the environment	New measure	10	5	7	+2	Target exceeded. A number of critical geoscientific products for groundwater mapping, infrastructure development and land use were accelerated in order to support economic recovery and Carbon Capture Utilisation and Storage project.	

Market (Stakeholder/Customer) perspective									
Programme 5: Advisory, Stakeholder Engagement and Knowledge Management									
Purpose: To improve stakeholder relations through collaborations with strategically aligned institutions, the private sector and the general public									
Institutional outcomes of programme 5: Improved awareness of the CGS brand, services and products as well as improved geoscientific domain through effective knowledge management									
Outcome	Output	Output indicator	Audited actual performance 2019/20	Audited actual performance 2020/21	Planned annual target 2021/22	Actual achievement 2021/22	Deviation from planned target to actual achievement 2021/22	Reasons for deviations	
Improved awareness of the CGS brand, services and products	Media articles	Number of articles published on media platforms	17	25	24	24	0	Target achieved. As part of the implementation of the Integrated Communication and Stakeholder Relations Strategy, the CGS published its planned media articles and advertorials.	
	Stakeholder survey report	Stakeholder satisfaction level	76%	88.48%	≥70%	66.4%	-3.6%	Target not achieved. The satisfaction survey attracted a low response rate compared to the previous reporting period. This can be attributed to the publication of the Geoscience Act Regulations that was grossly misunderstood by stakeholders. Moreover, the greater brand awareness of the CGS has correspondingly increased the demand for CGS services, which has had an impact on some aspects of service delivery timeframes.	
Improved geoscientific domain through effective knowledge management	Peer-reviewed articles published in scientific journals, book chapters and edited volumes	Number of peer-reviewed articles published	41	33	30	30	0	Target achieved. The CGS has produced 30 peer-reviewed articles.	
	Examples: memoirs, bulletins, books and atlases	Number of CGS publications	12	10	8	8	0	Target achieved. The CGS has published a total of 8 publications as planned.	
	Examples: Conference abstracts, extended abstracts, papers and keynotes	Number of conference proceedings	47	66	25	32	+7	Target exceeded. Thirty-two conference abstracts have been produced this financial year – the bulk of which (19 or 59.4%) were published by the CGS from the CGS technical seminars.	

Table 3: Performance linked to budget

Programme/activity/objective	2021/2022			2020/2021		
	Budget R'000	Actual expenditure R'000	(Over)/Under expenditure R'000	Budget R'000	Actual expenditure R'000	(Over)/Under expenditure R'000
Programme 1: Financial sustainability	67 038	66 315	724	84 482	60 029	21 453
Programme 2: Organisational effectiveness and efficiency	105 260	104 124	1 136	127 939	94 255	33 684
Programme 3: An empowered, transformed, motivated and capacitated workforce	15 011	14 848	162	18 245	13 441	4 804
Programme 4: Delivery of mandate	398 456	394 155	4 302	484 305	356 795	127 510
Programme 5: Advisory, stakeholder engagement and knowledge management	16 118	15 944	181	19 591	14 433	5 158
Total	601 884	595 386	6 498	731 562	538 953	192 609

Strategy to overcome areas of underperformance

Strategies to overcome areas of underperformance include:

- 1) The CGS worked from the newly launched R/V Nkosi to map the outer parts of 1:50 000-scale sheet 3318CD between Melkbosstrand and Llandudno in the Western Cape coast. The data collected are still being processed to ensure improvement towards achievement of the offshore geoscience map coverage. Other collaborations with vessel owners are being explored to accelerate data collection in the deep-sea environment.
- 2) The pipeline of female representation in the CGS has been growing systematically and the scientific cohort is prioritised to achieve apposite gender diversification at the CGS.
- 3) The CGS will engage with the stakeholders to clear the misunderstandings with regards to the Geoscience Act Regulations of 2022. Moreover, the CGS will streamline the internal processes to improve on the turnaround times to meet the stakeholder expectations.



CGS response to the COVID-19 pandemic

Table 4: Progress on institutional response to the COVID-19 pandemic

Programme/ subprogramme	Intervention	Geographic location (Province/ district/local municipality) (where possible)	No. of beneficiaries (where possible)	Disaggregation of beneficiaries (where possible)	Total budget allocation per intervention (R'000)	Budget spend per intervention	Contribution to the outputs in the APP (where applicable)	Immediate outcomes
Programme 1: Financial sustainability								
Programme 2: Organisational effectiveness and efficiency								
Programme 3: An empowered, transformed, motivated and capacitated workforce	Continuous monitoring of implementation of the CGS COVID-19 response plan (including the COVID-19 Policy) and provision of advice by the CGS COVID-19 Committee.	All provinces of South Africa where the CGS was implementing its programmes.	CGS staff complement and its stakeholders.	Not applicable.	Included in the CGS operational budget.	Included in the CGS operational expenditure.	The interventions enabled the CGS to achieve the outputs as contained in Table 1.	The interventions gave momentum to the economic recovery projects of the CGS.
Programme 4: Delivery of the mandate								
Programme 5: Advisory, stakeholder engagement and knowledge management								
Programme 4: Delivery of the mandate	The CGS continued to contribute towards intensified monitoring of mine seismicity, characterising the trends in mine seismicity across all major mining regions, in terms of the amended regulations of the National Disaster Management Act of 2002 on 16 April 2020.	Gauteng, Northern Cape and North West provinces.	The mining industry, the DMRE and the Mine Health, Safety Council.	Not applicable.	Included in the CGS operational budget.	Included in the CGS operational expenditure.	Not applicable.	This led to a better understanding of mine seismicity trends across various mining regions, allowing for effective interventions to be discussed between regulatory bodies and the mines, which had resulted in a decreasing trend in rockburst related fatalities in mines.
Programme 5: Advisory, stakeholder engagement and knowledge management								

4

Operational Highlights

4.1 Geoscience Technical Programme

The integrated and multidisciplinary approach of the organisation forms the cornerstone of the GTP and aims to contribute to the following thematic areas: Minerals and Energy; Health, Groundwater and the Environment; Infrastructure and Land Use; Geoscience Innovation and Geoscience Diplomacy. The IMMP is currently implemented through the GTP, among others, and includes a collection of high-impact geoscientific research and mapping projects. In the year under review, the GTP was composed of statutory and commercial projects. The GTP continues to be responsive to the post-COVID-19 economic recovery programme of South Africa. The highlights on the progress of the GTP during 2021/22 are discussed in the following sections.

4.1.1 Geoscience for Minerals and Energy Resources Theme

The minerals and energy sectors are major contributors to South Africa's growth and development plan. The Geoscience for Mineral and Energy Resources Theme enables national imperatives, including the delivery of spatial and geoscience information and services. This information attracts local and international investment to develop mineral and upstream petroleum resources. The theme also aims to increase the uptake of exploration licences and expenditure, and foreign direct investment, the latter being enabled by Operation Phakisa, which is an initiative of the South African Government designed to fast track the implementation of solutions on critical development issues such as the ocean and green economies. Finally, the function aims to increase support for the exploration, development and production of shale gas and mining.

As with other themes, this theme is enabled by Section 5.1(c) of the Geoscience Amendment Act, to "serve as the

national custodian of geotechnical information, prospecting information and all other geoscientific information relating to the earth, the marine environment and geomagnetic space". Under the theme, the CGS collects, analyses and processes high-quality onshore and offshore geoscience (e.g. geological, geochemical, geophysical and mineral data), which will lower the risk of and increase confidence in exploration and mining, particularly in underexplored areas. These data are also used to identify potential economic natural energy resources such as coal, petroleum, natural gas, shale gas and geothermal energy.

To respond to the nation's post-COVID-19 Economic Reconstruction and Recovery Plan, the CGS is currently implementing key projects that focus particularly on the critical minerals of the future including base and precious metals (for example, nickel, cobalt, chromium and gold), rare-earth elements (REEs) and coal. Highlights of some of the selected projects under the Geoscience for Mineral and Energy Resources Theme follow.

4.1.1.1 Onshore Mapping

In the year under review, the CGS continued to progress in its detailed mapping programme at a scale of 1:50 000, and has increased onshore map coverage to 10.7% computed from an additional 32 high-quality geological maps produced. The onshore 1:50 000-scale map coverage has improved from below 5% before the implementation of the IMMP (Figure 8). The onshore mapping programme has focused on the Eastern, Western and Northern Cape provinces as well as Mpumalanga, Free State, KwaZulu-Natal, North West and Limpopo provinces. The production of fundamental geological maps and associated data will target various applied geoscience solutions, including mineral and energy resources, health, groundwater and the environment, infrastructure and land use, and geoscience innovation.

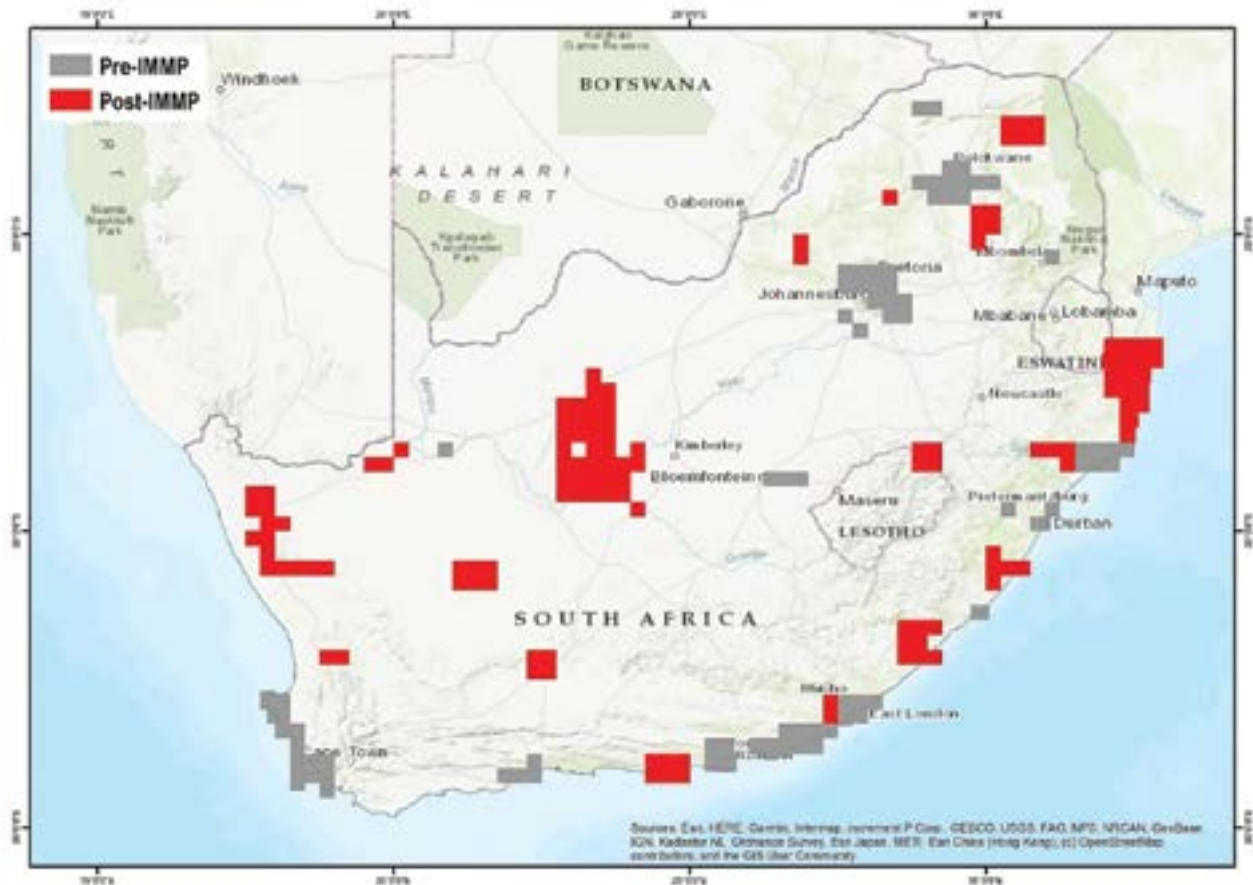


Figure 8: Comparison of onshore map coverage at the start of 2017/18, before the IMMP, to the end of 2021/22

Griqualand West Geoscience Mapping, Northern Cape Province

Background and purpose: The Griqualand West geoscience mapping delineates and characterises mineral, energy, hazard, engineering and environmental geosystems in the Griqualand West area. The detailed geological mapping programme encompasses both geoscience mapping and minerals mapping. Specifically, the project characterises potential of minerals such as diamond, iron (Fe) and manganese (Mn) and to support land-use, agricultural and groundwater understanding and environmental studies for infrastructure development and economic growth. Griqualand West Basin is a geologically complex terrain that hosts some of the world’s largest economic deposits. The study area has a complex sequence of interbedded, low-grade metamorphosed and structurally deformed Transvaal and Olifantshoek Supergroup sediments, chemical sediments representing a wide range of palaeoenvironments (from terrestrial to shallow and deep water) and volcanic rocks overlain by widespread Cenozoic cover deposits.

Achievements and highlights: During the reporting year, the extensive CGS borehole database was interrogated to source useful lithological, structural or mineralisation data, with a particular emphasis on aligning mineralisation with known structures. In doing so, a total of 49 historical boreholes from the Kalahari Manganese Field were captured, validated, and imported into ArcGIS and LeapfrogGeo™ including SRTM data for three-dimensional (3D) modelling.¹ The historical boreholes were the primary source used to create the models as the stratigraphy lies below approximately 135 m thick sedimentary Kalahari cover sequence (Figure 9).

In addition, the Griqualand West region was identified as a critical target area for machine learning development and training.

¹ **ArcGIS** is a family of client software, server software, and online geographic information system services developed and maintained by Esri.

LeapfrogGeo™ is geological modelling that integrates, communicates, and interprets geoscience data.

SRTM, NASA’s Shuttle Radar Topography Mission, is a near-global elevation dataset, with coverage from -60 to 60 degrees latitude.

Datasets collected in the preceding years were run through the innovative modelling platform, specifically to understand and characterise the potential Fe-Mn mineralisation across this region. The modelling was focused along the Maremane Dome area and correlated well with known deposits, and areas currently being explored (Figure 10).

The Griqualand West project submitted nine 1:50 000-scale geological maps for publication in the reporting year. In addition, an updated comprehensive geological memoir detailing the area’s lithostratigraphy, its land degradation patterns, groundwater potential and economic resources was being finalised.

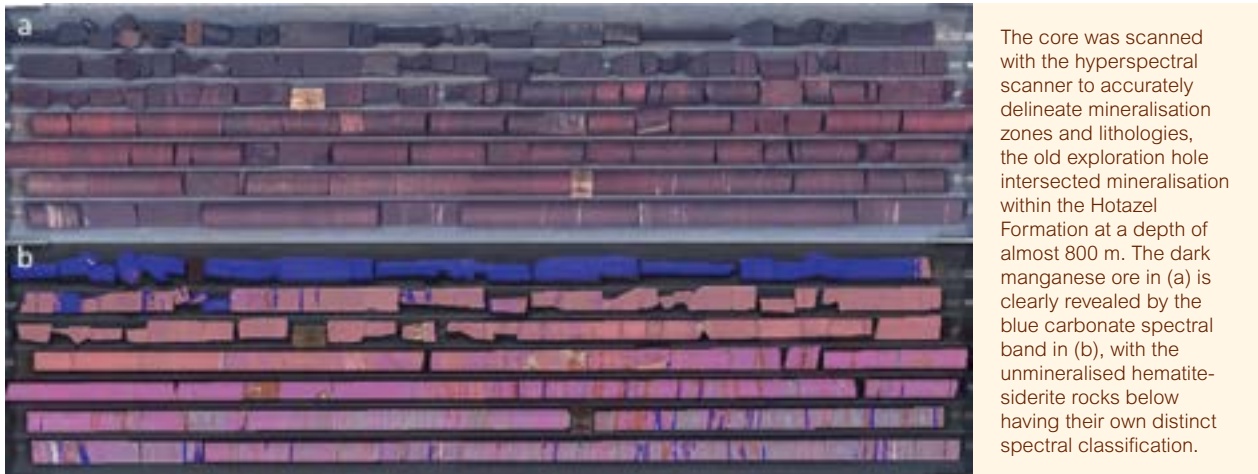


Figure 9: Borehole core from the Kalahari Manganese Field stored at Donkerhoek

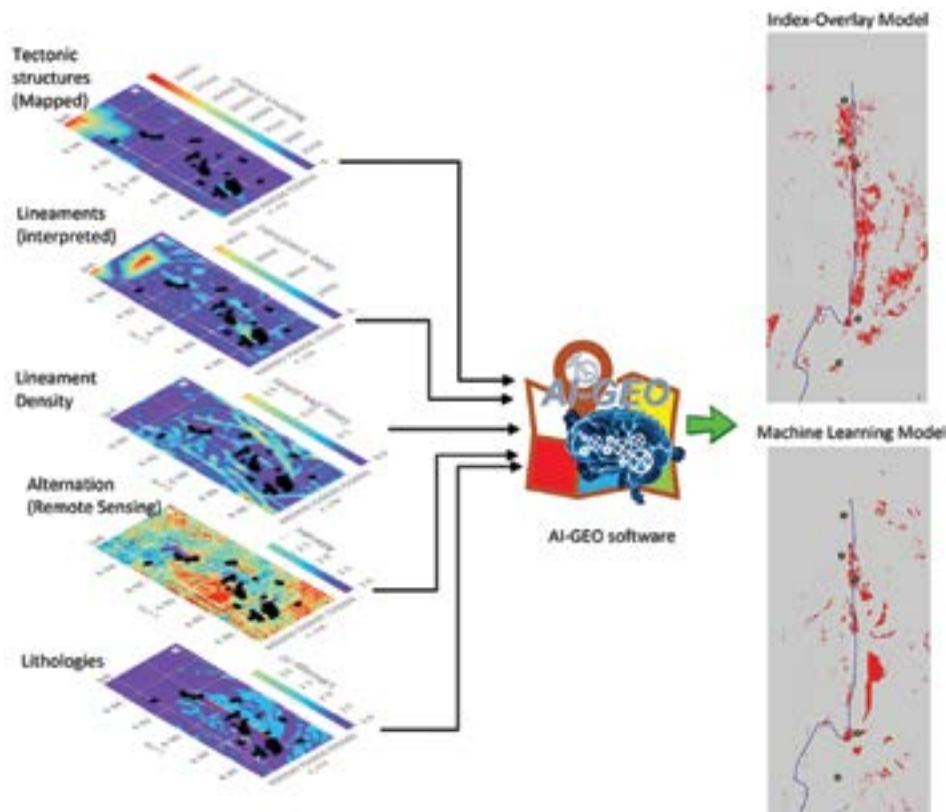


Figure 10: A graphical summary representation of the machine learning process utilised for the Griqualand West test study area

Central KwaZulu-Natal Geoscience Mapping

Background and purpose: The Central KwaZulu-Natal geoscience mapping project aims to constrain the structural and stratigraphic control as well as evolution of mineral-bearing sequences in the central KwaZulu-Natal region. In 2021/22, the project mapped the 1:50 000-scale Kranskop and Mbongolwane map sheets in the west and the Bergville and Zunckels sheets toward the east of the province. The geology of the Kranskop and Mbongolwane mapped area is defined by rocks ranging from Mesoarchaeon to recent, with multiple lithologies hosting mineral occurrences of various commodities (e.g. gold, chromite, nickel-copper) and mineralisation styles. The focus in this region centres on geological mapping to understand the structural and stratigraphic control and the evolution of mineral-bearing sequences in the region. This work is aimed at contributing towards characterisation of mineral occurrences and enabling sustainable minerals development.

Achievements and highlights: Detailed research undertaken includes the collation and regeneration of existing geoscientific information creating an extensive database comprising a total of 1 074 structural and 74 economic data points for the map areas. In addition, existing maps housed by the

CGS and those from literature were re-digitised, and all data entered into a geodatabase to define the focus areas. Interpretation of the available high-resolution aeromagnetic data and remote sensing data has assisted in revising the positions of major tectonic boundaries separating individual tectonostratigraphic packages within the Tugela Terrane.

Current interpretations have allowed for the precise definition of the Madidima and Mandleni Nappe boundaries, as well as the delineation of a previously undefined thorium-potassium rich granitoid-gneiss pluton correlated with the Dondwana Formation (Figure 11). Detailed interpretations of existing borehole data from important ultramafic complexes, which are known to host chromite and nickel-copper mineralisation, have been undertaken with 43 borehole logs digitised for three of the complexes. In addition, the information derived from these data has been instrumental in the revision of the positions of major tectonic boundaries separating individual tectonostratigraphic packages within the Tugela Terrane. The preliminary 1:50 000-scale geological maps together with the consolidated accompanying geodatabases and supporting data and information were finalised. These outputs are scheduled for publication and official release in next reporting year.

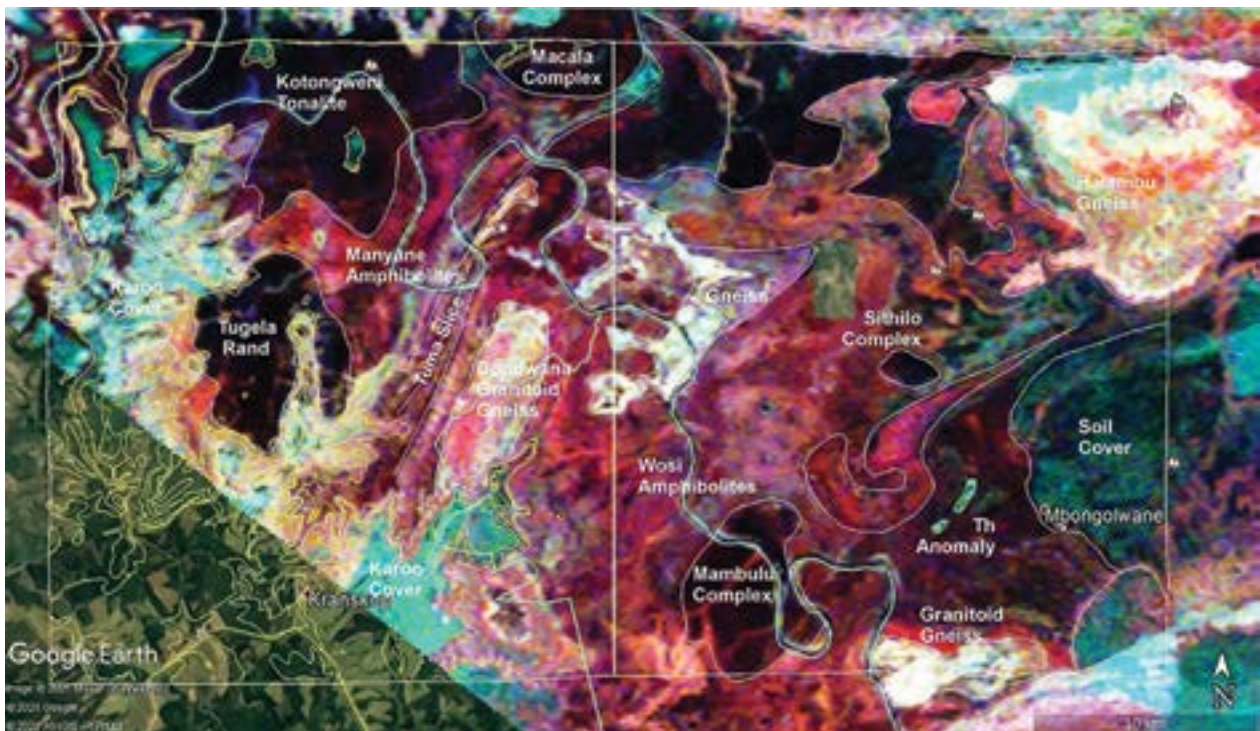


Figure 11: Interpreted Ternary diagram showing geological boundaries relating to variations in thorium-uranium-potassium data

Bushveld Geoscience Mapping, Limpopo-Northwest-Mpumalanga Provinces

Background and purpose: The Bushveld Mapping Project studies the evolution of and controls on magmatic and hydrothermal mineralising systems, particularly those linked to future energy technologies. The Bushveld granites are host to numerous small-to medium-sized polymetallic deposits made up of tin-tungsten-copper-lead-zinc-gold-silver-uranium-fluorite-iron-REEs. In addition, the mafic phase of the Bushveld Complex is also host to significant iron-titanium-vanadium deposits within magnetite layers and discordant bodies. The conceptual approach used in this study incorporates spatial analysis techniques and data integration (i.e. geophysical, geochemical, geological and remote sensing data) to perform reconnaissance-scale mineral potential mapping of critical minerals in the Bushveld Complex. The project focused on identifying geoscience data gaps in respect of key mineralising systems in the Bushveld Complex and, furthermore, similar systems in other areas of the country, such as the Northern Cape. Particular focus was given to iron oxide-copper-gold-type mineralisation, including various types of fluorspar mineralisation.

Achievements and highlights: In the year under review, research concentrated on delineating potential fluorspar targets in the area northeast of Pretoria through the integration of various geoscientific datasets including radiometric, geochemistry and aeromagnetic. Prospectivity maps were generated using fuzzy logic modelling; these maps outline prospective areas for fluorite mineralisation in the granite (endogranitic), granophyre (exogranitic) and alkaline intrusions (Figure 12). In addition, the prospectivity maps highlight areas of potential polymetallic tin-tungsten mineralisation commonly associated with fluorite mineralisation. The deposition and concentration of ore-forming fluids is considered to have been influenced by regional and local structures. This is confirmed by the occurrence of predominant dominant west-northwest–south-southeast and north-northwest (NNW) trending fractures that are related to the inferred long-lived Franspoort tectonic lineament which trends in the NNW direction. Several known fluorspar deposits in the study area also show coincidence with this tectonic lineament, suggesting a possible structural influence on the mineralisation.

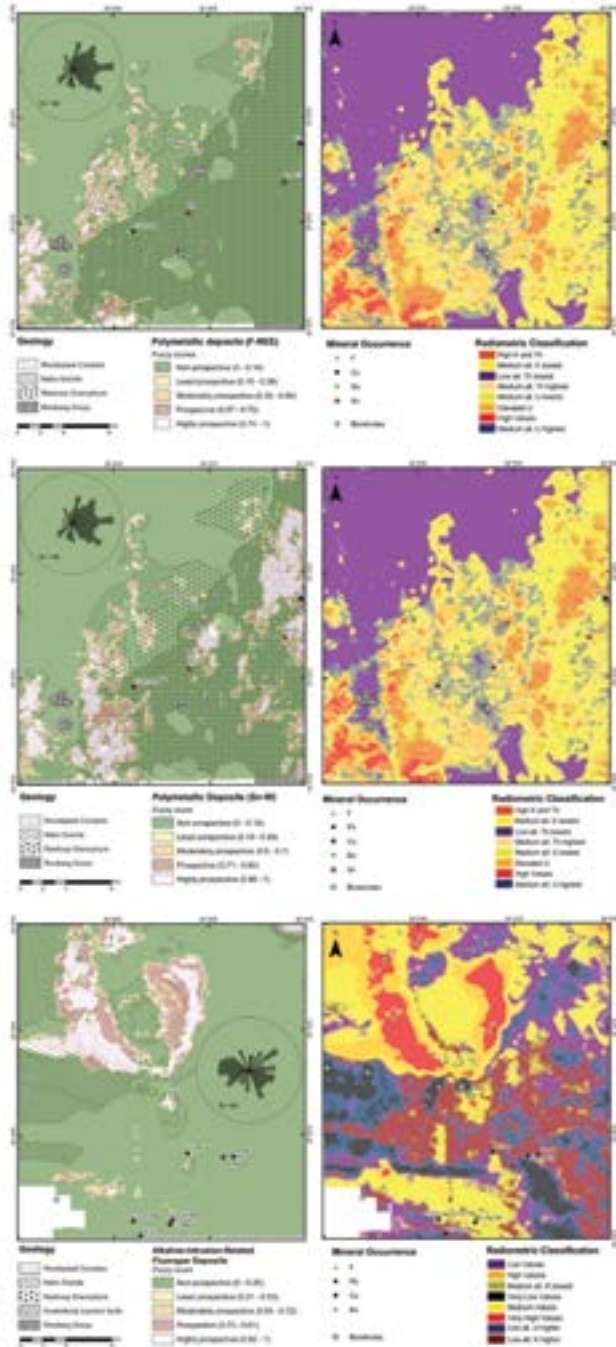


Figure 12: Top: Fluorine rare-earth element (F-REE) prospectivity map compared with the footprint map generated from the radiometric data
Note: Higher values in radio-elements (i.e. Thorium, Uranium and Potassium) represent potential areas for F-REE mineralisation.
Middle: Tin-Tungsten prospectivity map compared with the footprint map generated from the radiometric data
Note: Higher values in radio-elements represent potential areas for Tin-F-REE mineralisation.
Bottom: Alkaline-intrusion-related fluorspar prospectivity map compared with the footprint map generated from the radiometric data
Note: Very high values in radioelements represent prospective areas for fluorspar mineralisation.

Characterisation of the South African Lithosphere, Northern Cape Province

Background and purpose: The Characterisation of the Lithosphere Project aims to support the exploration for new mineral deposits in the Northern Cape Province through the delivery of fundamental geoscience data and knowledge. To achieve this aim, mineralising systems models for South Africa, starting with the Northern Cape region, will be developed and reviewed, facilitating efficient mineral potential prediction processes. These models require integration of multiple geoscientific datasets to

develop a prospectivity map at the regional and local scale. The project also provides information and knowledge using different geoscience datasets and layers on water, environmental, and geotechnical characteristics to support infrastructure development.

Achievements and highlights: In the year under review, the project systematically scrutinised an array of geological, geophysical, geochemical, remote-sensed, and digitised, historical borehole datasets from the base-metal prospective areas that surround the north and west of the Black Mountain-Aggeney's-Gamsberg complexes (Figure 13).

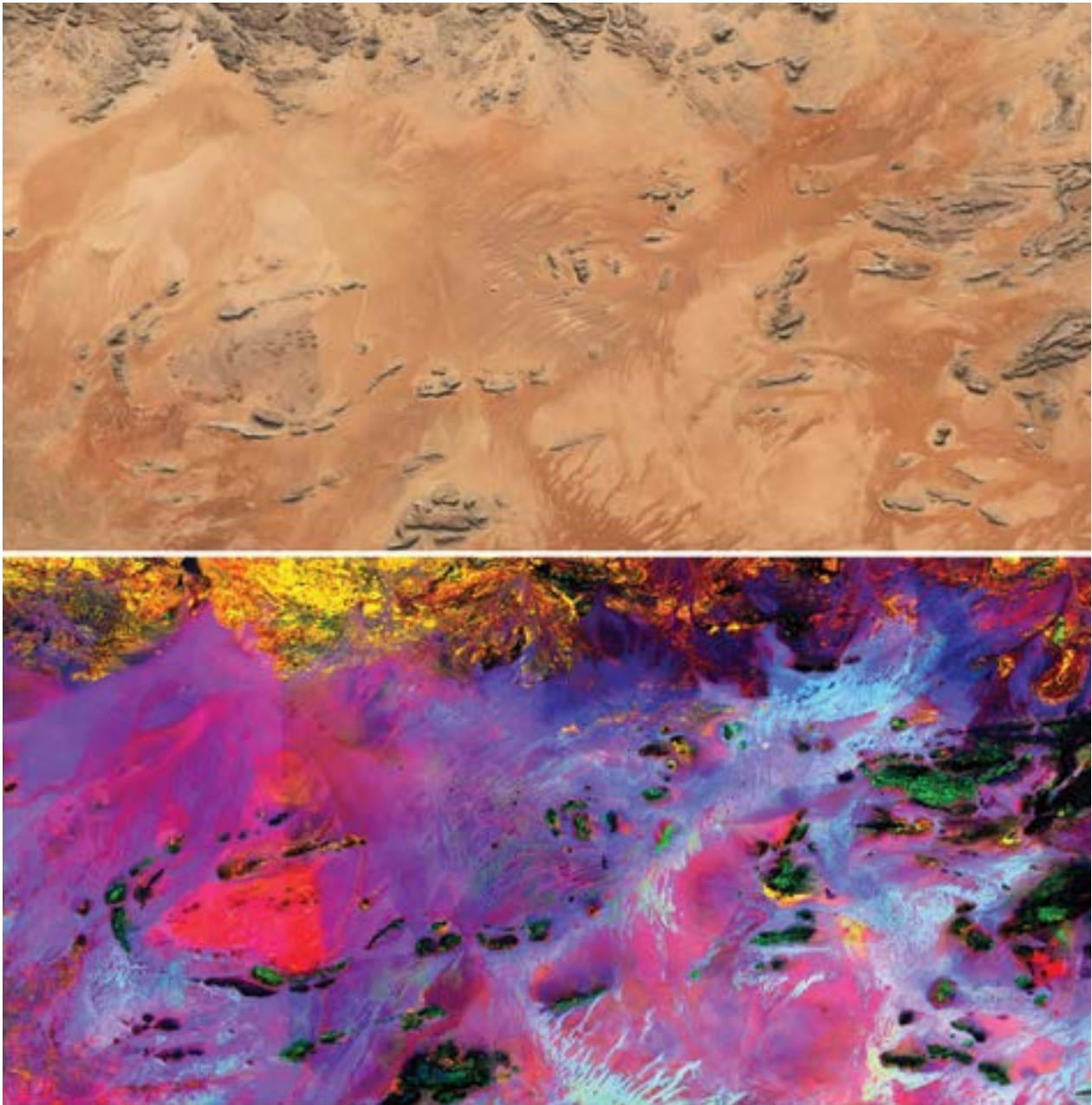


Figure 13: Multispectral satellite imagery used to define areas of varying geological characteristics and geodynamic processes

This resulted in the identification of 16 prospecting target areas. A 14-criteria ranking system was developed and will be applied across the prospective target areas. The high-ranked areas will then be the focus of an intensified data interrogation to include geophysical data inversion and Euler solutions; scrutiny of specific historical borehole datasets; baseline characterisation of remote-sensed datasets; and the generation of an exploratory drill programme to test the variety of targets across the region. These targets will be further developed and explored in the upcoming year.

In the previous reporting year the 1:50 000 geoscience mapping showed an estimated increase of 67% of the Orange River Pegmatite Belt, which may host significant lithium (Li) and REE deposits. In the year under review a **new pegmatite distribution map** was completed (Figure 14) contributing to the much-needed intervention for the battery industry.

4.1.1.2 Giyani Greenstone Belt (Limpopo Greenstone Belts)

Background and purpose: The Giyani Greenstone Belt Project aims to support economic growth, address water security and promote environmental stewardship through an integrated approach that covers multidisciplinary tasks. The project aims to achieve this by harnessing Archaean geoscientific research to understand the tectonic setting and structural controls of mineralisation and addresses societal challenges in the area. The project entails detailed geological and structural mapping of the mineral targets on 1:10 000 scale, high-density soil geochemical investigations, geophysical survey, environmental and groundwater studies targeting deep aquifer systems, mapping illegal mining sites as well as geotechnical studies.

Achievements and highlights: In the year under review, the Giyani Greenstone Belt Project involved detailed structural mapping of mineral targets, high-resolution

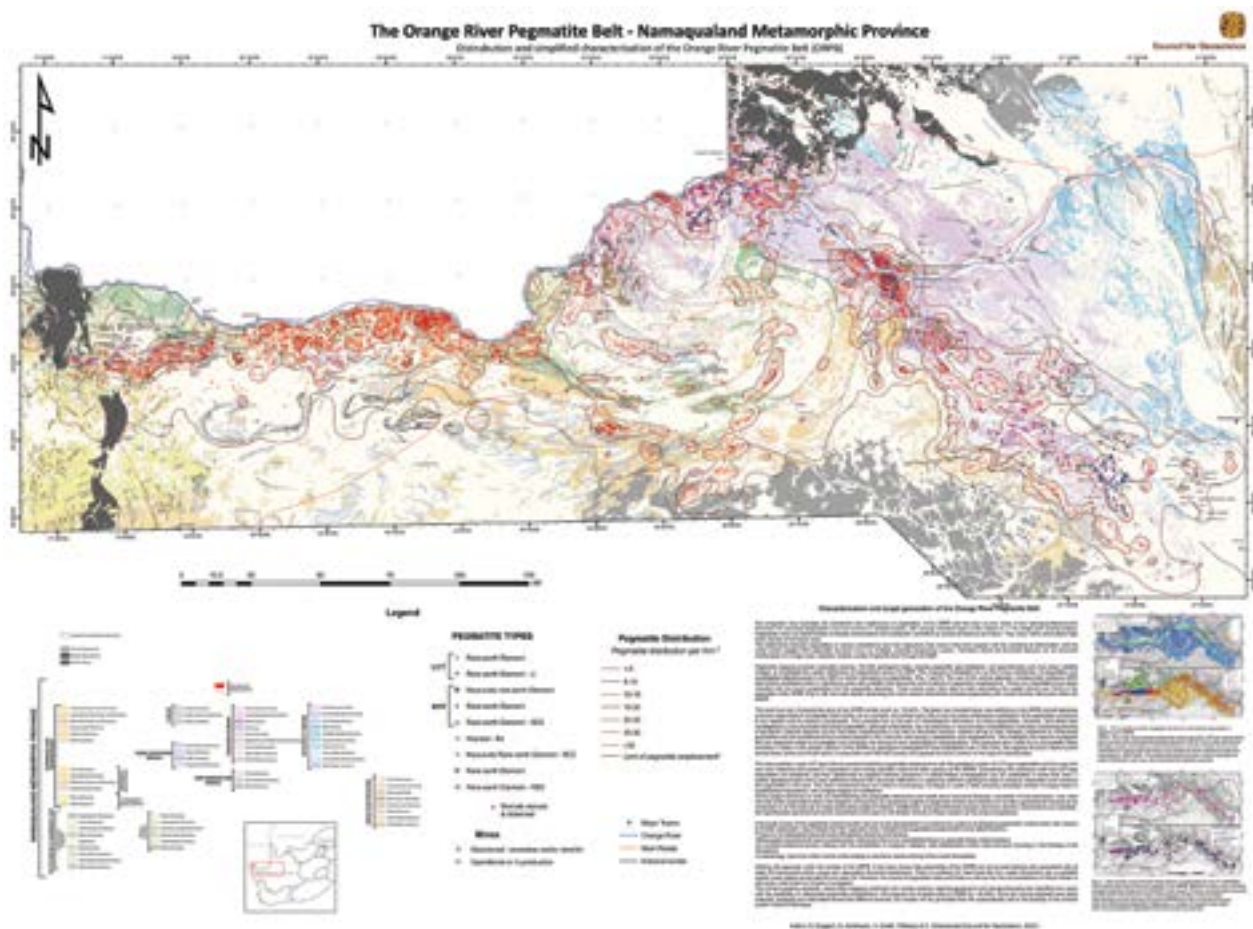


Figure 14: Map of the Orange River Pegmatite Belt in the Namaqua Metamorphic Province, showing the distribution of potential Li and REE hosting rocks

ground magnetic survey, 3D magnetotelluric (MT) survey, induced polarisation survey as well as a high-density soil survey on selected mineral targets (i.e. gold, REE and nickel-chromite-magnesite). The preliminary structural and geophysical surveys revealed the predominance of east-west and north-south to northwest-trending structures. The latter structures appear to be associated with gold mineralisation in the area. The generated mineral targets were drilled using reverse circulation drilling techniques (Figure 15), together with the targeted gold mineralisation occurring in shallow ground, i.e. from a minimum depth of 20 m to a maximum of 100 m.



Figure 15: Reverse Circulation Drilling Programme in one of the generated mineral targets, 20 km east of Giyani town

Furthermore, hydrogeological results of the previous financial year led to the identification of the groundwater potential areas in Giyani and surrounding areas. The results demarcated Mahlathi Village for groundwater drilling at a maximum depth of 150 m. Should the boreholes yield positive results; they will be donated to the Mahlathi community, since the community is beleaguered by water shortages.

4.1.1.3 Offshore Geoscience Mapping

Background and purpose: The offshore geoscience mapping project aims to map South Africa’s offshore region in high resolution towards supporting the development of the country’s **blue economy**. With increased interest in identifying new mineral resources and promoting environmental stewardship, South Africa’s offshore Exclusive Economic Zone is a significantly large and mostly unknown region. Extensive mapping is required to characterise this region and to inform critical development planning requirements. The CGS has therefore embarked on a massive campaign to map this region. Key focus areas include the near-shore region, continental shelf, and deeper marine areas. This will in turn assist in effectively planning adaptive strategies to address threats to infrastructure and the coastal communities. Furthermore, technologies to map the seafloor have vastly improved in recent years, particularly with the introduction of multibeam echosounders.

Achievements and highlights: During the year under review, seafloor mapping continued from the newly launched R/V Nkosi. The project also made improvements to the coding and algorithms used by the machine learning technique into developing seafloor substrate maps. The project mapped the outer parts of 1:50 000 sheet 3318CD between Melkbosstrand and Llandudno (Figure 16). These high-resolution data are a first for Africa and will contribute towards the offshore geoscience map coverage. The data will be correlated with the onshore data to assist in constraining the extension of key geological features that are relevant to development, such as potentially seismogenic structures.

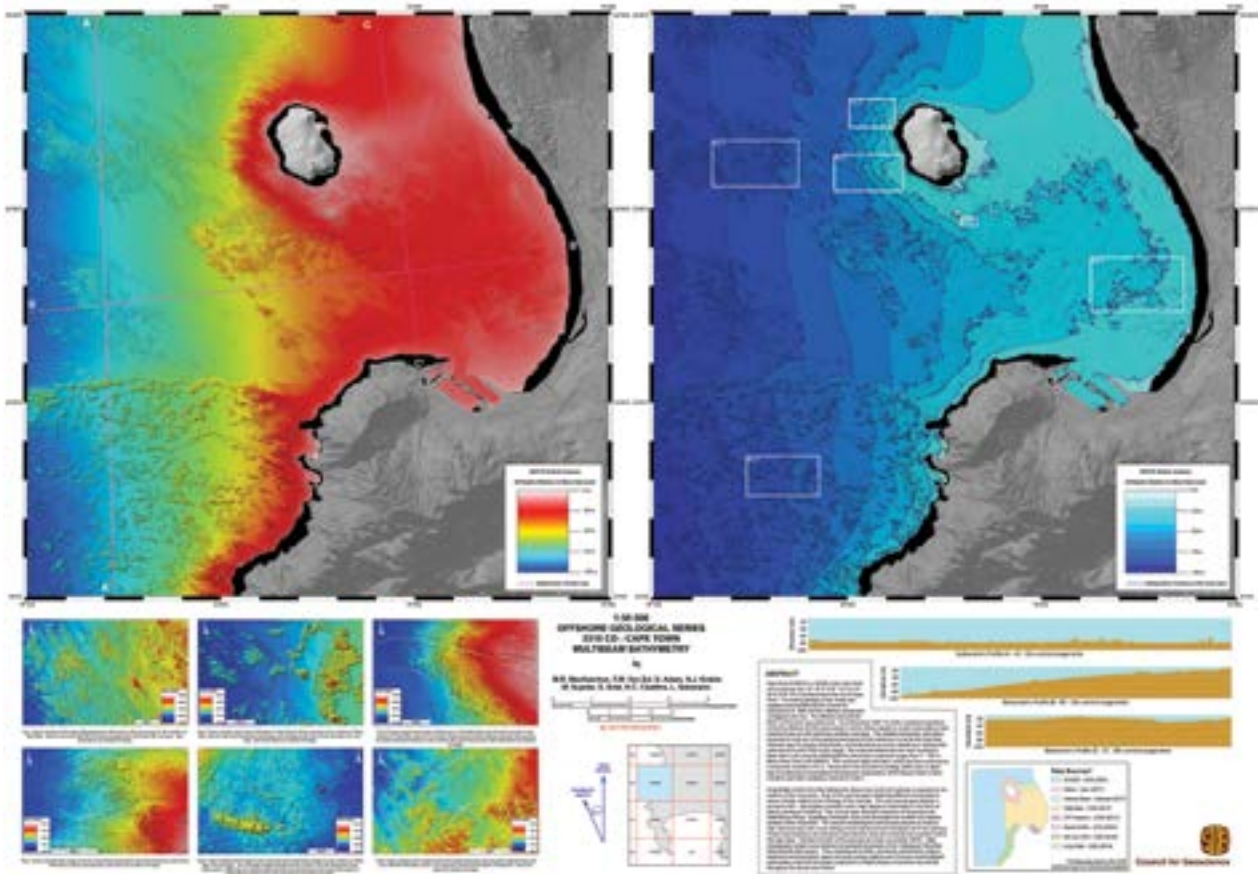


Figure 16: Map of 1:50 000 Offshore Geological series of Cape Town Multibeam Bathymetry

4.1.1.4 Karoo Deep Drilling and Geoenvironmental Baseline Programme

Background and purpose: The CGS has been undertaking a geoenvironmental baseline assessment in the southern Karoo as a prerequisite to possible shale gas exploration in the region. The environmental baseline is intended to gauge the potential impacts of shale gas exploration on the Karoo environment to assist regulators in formulating a regulatory framework that would best protect the environment. The project also entails research to understand the deep groundwater dynamics and to establish a continuous monitoring mechanism as well as assessing the shale gas potential of the carbonaceous Eccca Group.

Achievements and highlights: The drilling of the ultra-deep stratigraphic core borehole Karoo Deep Drilling (KDD)_01 (Figure 17) was successfully completed at a depth of 2 978 m. The borehole intersected the entire Beaufort and Eccca Group sedimentary rocks and advanced 306 m into the Dwyka Group. During the drilling programme, several

dolerites were encountered. As of the end of financial year 2021/22, all geological, geotechnical, and geophysical logging activities were completed to the target depth.

A suite of downhole geophysical methods was applied to study the composition and physical properties for geological and stratigraphic determinations. The logging of the core was achieved in three phases, although during the third phase only three methods could be applied due to unsafe borehole conditions at depth. The structure logs indicated that the formation was relatively competent with few natural fractures. The acoustic image showed that the observed fractures were induced by drilling, there was no evidence of faulting or folding over the zone of investigation.

The carbonaceous shales of the Eccca Group were targeted for gas measurements, the analyses of which are still ongoing at various laboratories locally and abroad. All the various datasets are being integrated in order to produce a basin-wide model.

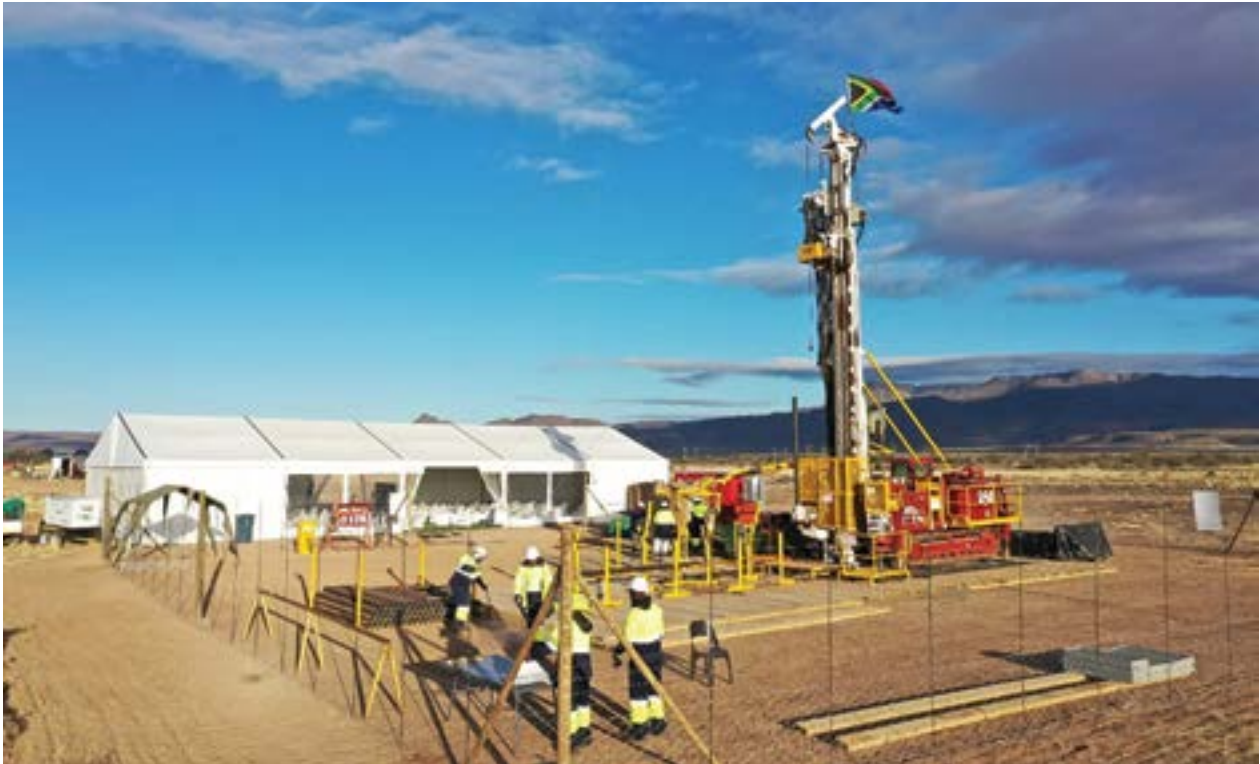


Figure 17: KDD drilling site

4.1.1.5 Geothermal Energy Potential of South Africa

Background and purpose: The CGS uses geoscientific knowledge to contribute to the diversification of the energy basket through the investigation of renewable energy sources such as geothermal energy. It is investigating the potential of geothermal energy as an affordable, reliable and renewable energy for direct heating of commercial and residential buildings. Its use has expanded to include utility-scale electricity production, distributed heating and cooling applications and the augmentation of various industrial processes. Geophysical data, primarily MT and gravity, were interpreted together with geological data to understand the relationship between geothermal fluid flow paths and the main geological structures in the vicinity, to build a unified geothermal conceptual model and describe the physical features of the geothermal system. In the year under review, the Geothermal Energy Potential of South Africa Project focused on Shu Shu in KwaZulu-Natal Province and Tshipise in the Limpopo Province.

Achievements and highlights: A 3D MT resistivity model for Shu Shu water was completed. The model detected a conductive source 1 200 m below surface from the surface manifestation of the Shu Shu geothermal waters. The acquired MT data were interpreted and indicated that the Shu Shu hot

spring is in a continuous low resistivity zone and the gravity data acquired showed that the water was located at a low density zone. Hydrogeological, seismic, social, environmental and economic aspects of the Tshipise field were also investigated to generate drilling targets for geothermal characterisation.

In considering geothermal energy for energy generation, the status of the energy in South Africa was reviewed. The review found that, when comparing the country's energy needs against the current energy generation, there is indeed scope for adding geothermal energy as a viable alternative energy source to the mix.

4.1.1.6 Carbon Capture, Utilisation and Storage

Background and purpose: South Africa's continued development hinges significantly on the country's ability to generate a sustainable supply of energy to meet national demands. The country has vast quantities of coal and is one of the world's largest coal producers. Furthermore, within the context of the post-COVID-19 economic recovery, coal has grown to one of the most significant contributors towards South Africa's mining economy. However, South Africa has committed to reducing greenhouse gas emissions. With coal being the most significant contributor to greenhouse gas emissions, the government has called on the development

of innovative solutions to help South Africa transition towards a low-carbon economy. The shift from coal cannot be absolute. There is a need for a **just energy transition**. This is critical to ensure that those communities that rely on coal for their livelihood are not negatively affected by this transition. Moreover, the energy transition will not happen overnight and therefore a sustainable solution is needed. Carbon capture utilisation and storage (CCUS) is considered globally to be this solution.

The CGS has undertaken this national imperative project to ensure that South Africa’s energy provision and national development continue, while the country still contributes effectively toward combatting climate change. The reassessment of CCUS storage sites conducted in the previous year discovered that South Africa has exponentially more CCUS potential than previously considered. Furthermore, there is significant potential underlying the

Mpumalanga and Gauteng provinces. This was an important discovery as it could fundamentally change South Africa’s energy future. The implementation of utilisation in the CCUS project revealed that several innovative solutions can support this work, including using captured carbon dioxide within the petrochemical and agricultural industries, and importantly, toward the remediation of mine water damage.

Achievements and highlights: In the year under review, research focused on targeted and high-resolution borehole logging, basin analyses and sampling of proposed reservoir and seal lithologies. Analyses focused on He-pycnometry (i.e. a technique that uses helium gas to measure volume accurately), x-ray computed tomography, in addition to a suite of geochemical, mineralogical and petrological studies. Furthermore, the study benefited from the processing of legacy two-dimensional (2D) seismic data across the proposed study region (Figure 18).

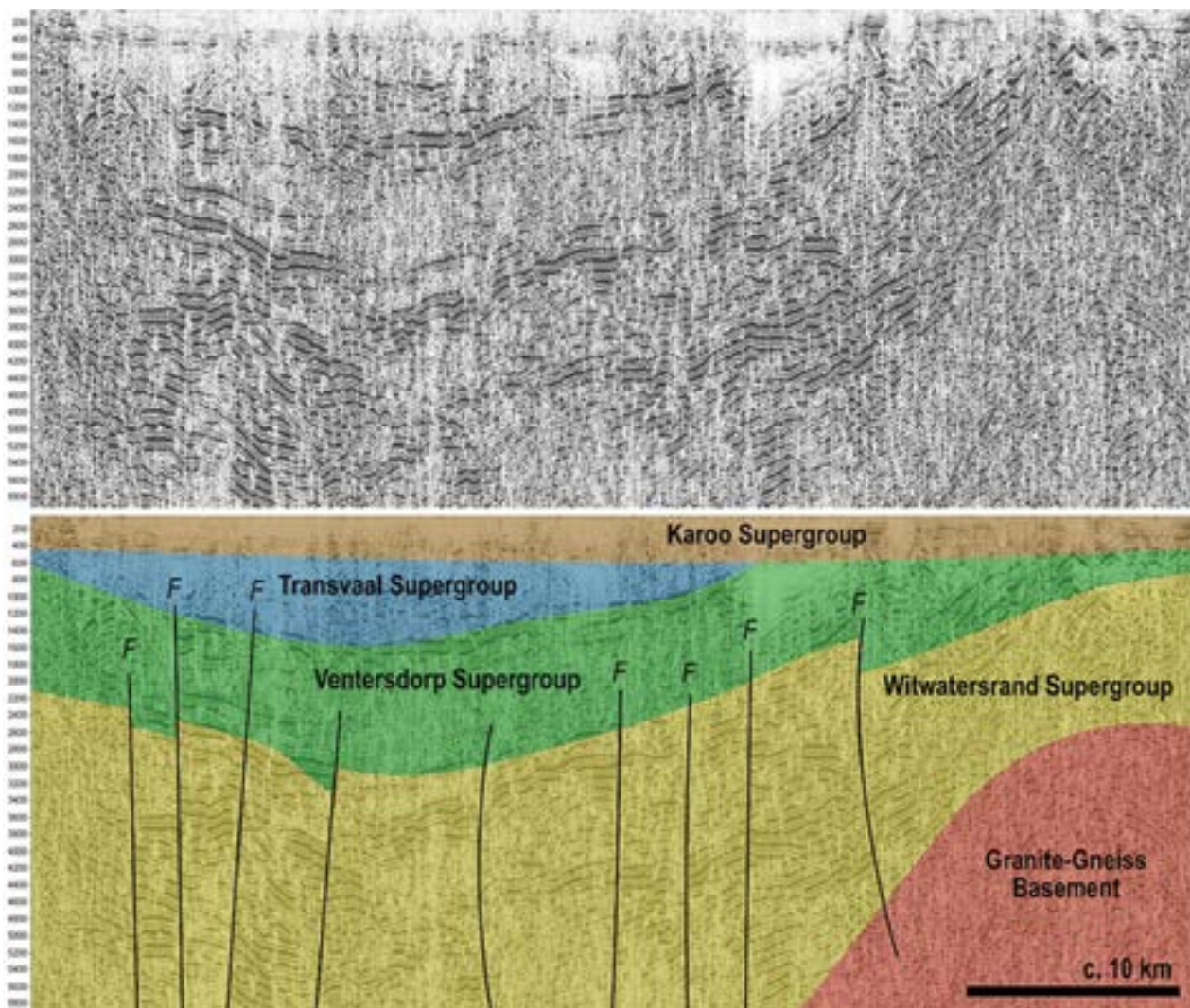


Figure 18: Example of simplified interpretation of legacy 2D seismic data across the proposed study area

This dataset is crucial to delineate basement lithologies and structures that may have a bearing on the movement and uptake of injection carbon dioxide. Hydrogeological studies were also conducted and the groundwater aquifer maps were developed to support baseline characterisation efforts. The airborne geophysical data collection is ongoing.

The CCUS programme achieved a significant milestone in that for the first time in the project an initial amount of ZAR101 million, from the US\$23 million grant, was transferred to the CGS from the World Bank. This will allow the implementation of seismic studies and drilling activities that are planned for the incoming financial year as part of site characterisation studies.

4.1.2 Geoscience for Infrastructure and Land Use Theme

The Geoscience for Infrastructure and Land Use Theme provides for systematic geoscience reconnaissance mapping. The geoscience information is analysed to identify safe and sustainable human settlement areas, sustainable land-use and infrastructure development. The Constitution of South Africa and Section 5.1(eA) of the Geoscience Amendment Act holds that the CGS must “review and evaluate all geotechnical reports in respect of geohazards that may affect all infrastructure development at prescribed tariffs”.

In line with NDP Vision 2030, the theme’s objective is facilitation of effective infrastructure and land development. A number of developmental acts and agencies, such as the Municipal Infrastructure Support Agency, Disaster Management Act, Spatial Planning and Land Use Management Act and the Critical Infrastructure Bill, also create an enabling environment for the theme to support national imperatives. This theme not only provides geoscience information and input for infrastructure development, but supports South Africa’s economic development of mineral, upstream petroleum (i.e. oil and gas) and water resources as well as the DDM. The country’s natural hazards include a high risk of subsidence in dolomitic terrains, and earthquakes and floods, all of which may have a significant impact on the economy, property and key infrastructure developments. The CGS strengthens the nation’s ability to manage the impact of natural hazards by collecting geoscience information and building early warning systems that can reduce hazard impacts. Project highlights supporting infrastructure and land-use planning are detailed next.

4.1.2.1 Seismic Monitoring and Maintenance

Background and purpose: The main aim of seismic monitoring and maintenance is providing regional parametric earthquake data, globally, locally and in mining areas. In addition, efforts were put into expanding South African National Seismograph Network (SANSN) coverage and reduction of the signal-to-noise ratio of time series data. This is achieved by providing supporting information for research projects and geohazard assessments, characterising regions prone to seismicity and facilitating international diplomacy.

Achievements and highlights: Results from routine seismic monitoring by the SANSN from January to December 2021 resulted in an updated databank of 3 768 epicentral solutions recorded by three or more seismic stations. A total of 876 earthquakes were inferred to be mining-related from the gold fields and platinum mines of South Africa. The majority of the seismic signals originated in the opencast mining areas of the country, of which 2 317 were flagged in the database as suspected explosions. Tectonic earthquakes within South African borders and off-coast totalled 463, while the remaining earthquakes were located in neighbouring countries and at teleseismic distances of more than 1 000 km outside the borders of South Africa (Figure 19). Routine operation and maintenance of the networks ensured an acceptable uptime in terms of data recording and transmission.

The mine cluster network component of the project comprised seismic analysis for the period from February 2021 to January 2022 and updating of the South African mining cluster network seismic database. A total of 6 923 events were located using the stations within the respective cluster networks. Out of the 6 923 events that were located, 137 were located within the Storm Water Management Plan (Johannesburg) area, 5 619 in the Far West Rand (Carletonville) area and 1 167 in the Klerksdorp, Orkney, Stilfontein and Hartebeesfontein area. The three cluster networks’ data were analysed on a daily basis. The Far West Rand was the most seismically active cluster of the three (accounting for 81% of all the cluster network events analysed).

The CGS continues to update the office of the Hon. Gwede Mantashe, Minister of Mineral Resources and Energy, on “the monitoring and impact of seismicity” as stipulated in the National Disaster Management Act of 2002 on 16 April 2020, Section 11K (3). The seismicity reports are prepared and submitted on a weekly basis.

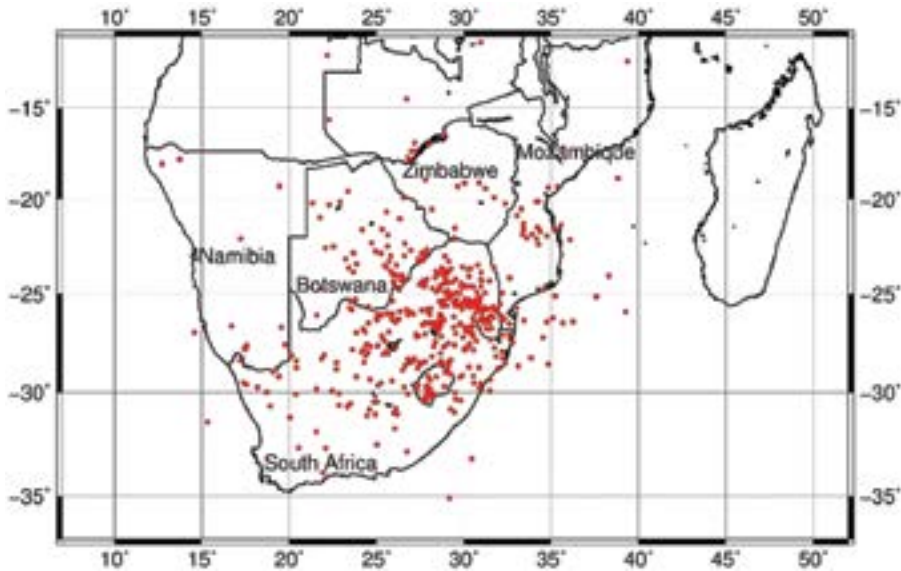


Figure 19: Map of tectonic earthquakes located in southern Africa during the period under review

4.1.2.2 National Geohazard Mapping Programme

Background and purpose: The National Geohazard Mapping Programme is a multi-year initiative aimed at integrating geoscience data to enhance our understanding of geohazards and their impact on infrastructure, land use, and community safety across South Africa. The programme consists of multidisciplinary fields of study, among others. Seismic hazard, dolomite stability, and mapping of problem soils and landslide susceptibility, undertaken as multi-year investigations utilising seismological, geological, geophysical, geotechnical, satellite airborne systems data and in situ observation. It is envisaged that these studies will be used to map natural and induced geohazards and risks across the country. The integration of these geohazard products is anticipated to be used to advise government and the public, especially with respect to sustainable infrastructure development, land-use planning, disaster management and preparedness in the country.

Achievements and highlights: During 2021/22, the project focused on the following aspects: seismic risk assessments of the City of Johannesburg; palaeoseismic studies of the Thugela fault and active fault mapping (including the Witwatersrand Basin); the microzonation studies of selected cities in KwaZulu-Natal; the dolomite-related hazard classification and research on alternative site investigation techniques to assess dolomitic land; landslide susceptibility mapping and hazard methodology formulation across the Ndwedwe Local Municipal area, KwaZulu-Natal; and the geotechnical mapping across the Greater Giyani region, Mopani District Municipality, to determine the extent of problem soils and appropriate land development.

Microzonation

Several microzonation models were produced which serve as a basis for evaluating site-specific risk analysis, essential for the safety of critical infrastructure. The models were produced for pre-selected major KwaZulu-Natal cities, including Durban, Pietermaritzburg, Port Shepstone, Richards Bay and St Lucia. Ground response analysis were performed using geophysical, seismological, geotechnical and geological data compiled in several studies. The results obtained included surface seismic hazard maps at a return period of 475 years for three target response periods, expressed as peak ground acceleration (PGA) – at periods of 0.0, 0.15 and 1.0 seconds. In addition, a map showing the amplification factors at PGA was also modelled, clearly indicating evidence of significant amplification of ground motion. The horizontal to vertical spectral ratio method using single station ambient noise recordings was used to estimate the resonance frequency of transported and residual overburden overlying bedrock. The microzonation model can serve as a basis for evaluating site-specific risk analysis, can help city planners in sensitive infrastructure developments.

Geotechnical Mapping

The geotechnical mapping applied an alternative method to 1:10 000-scale geotechnical land-use maps for infrastructure development and planning. This included conducting geotechnical investigations over a fairly extensive area of the 2330BC mapping block around the Giyani region. Geotechnical factor mapping methods were used combining various methods to produce a land-use development planning suitability map (Figure 20).

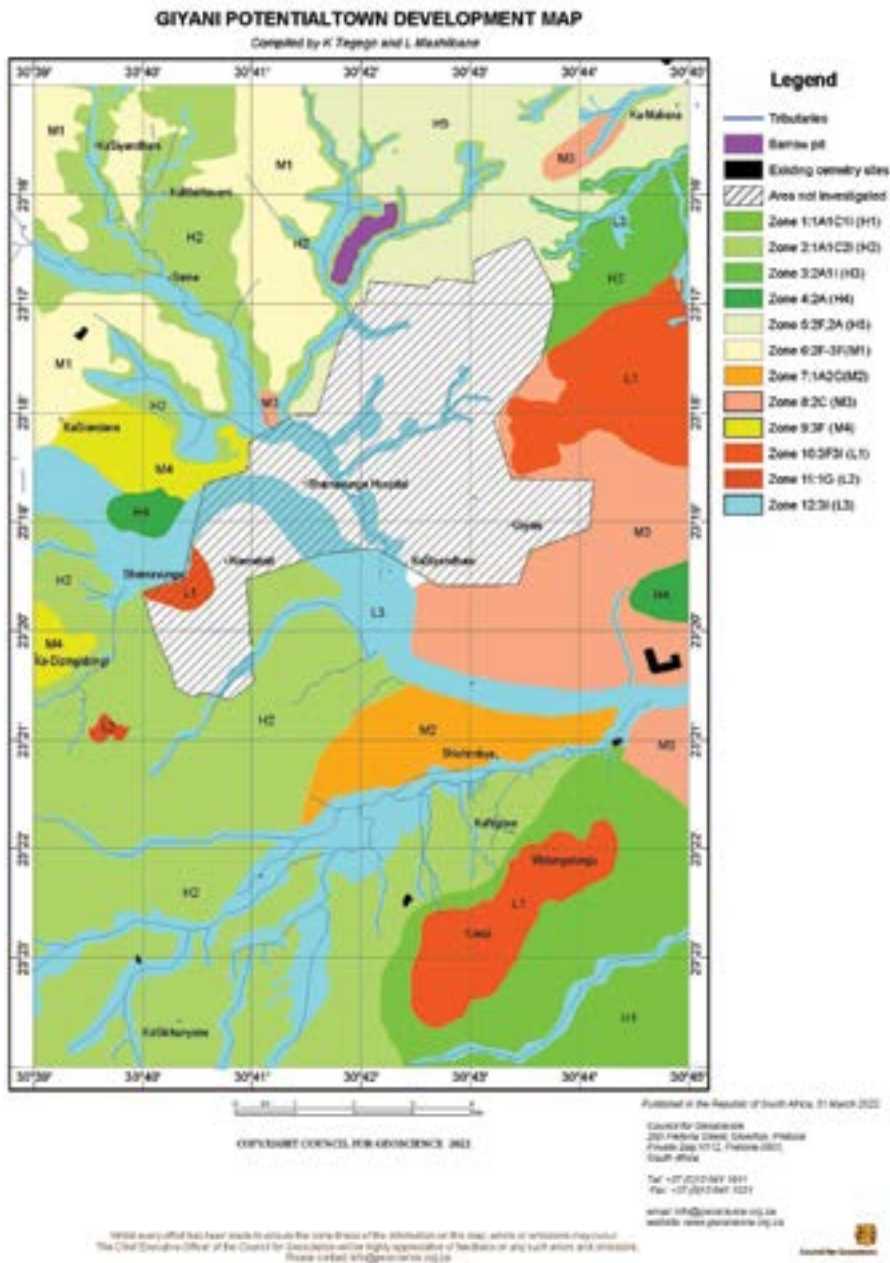


Figure 20: Giyani region, Limpopo: 1:10 000-scale development suitability based on mapped engineering geological parameters

These maps are intended to support integrated district development planning for infrastructure development. The land-use development planning suitability map is divided into a number of zones according to various geotechnical constraints to development. These areas were depicted by combining codes on the development potential maps. Development potentials were categorised as high (H1 to H5), medium (M1 to M4), low and very low (L1 to L3). It should be borne in mind that this zoning is based on regional data. It should therefore be used as a broad planning tool and not as substitute for a specific engineering site investigation.

Seismic hazard and risk related studies

The study provided a probabilistic seismic risk assessment for the City of Joburg (CoJ) which involves the estimation of the probability of damage and losses resulting from potential future earthquakes. In the year under review, the study compiled the first preliminary exposure model for the CoJ municipality. Such studies are necessary for seismic hazard assessment and earthquake risk mitigation as seismic risk is increasing sharply, due to rapid population growth, urbanisation and infrastructure development.

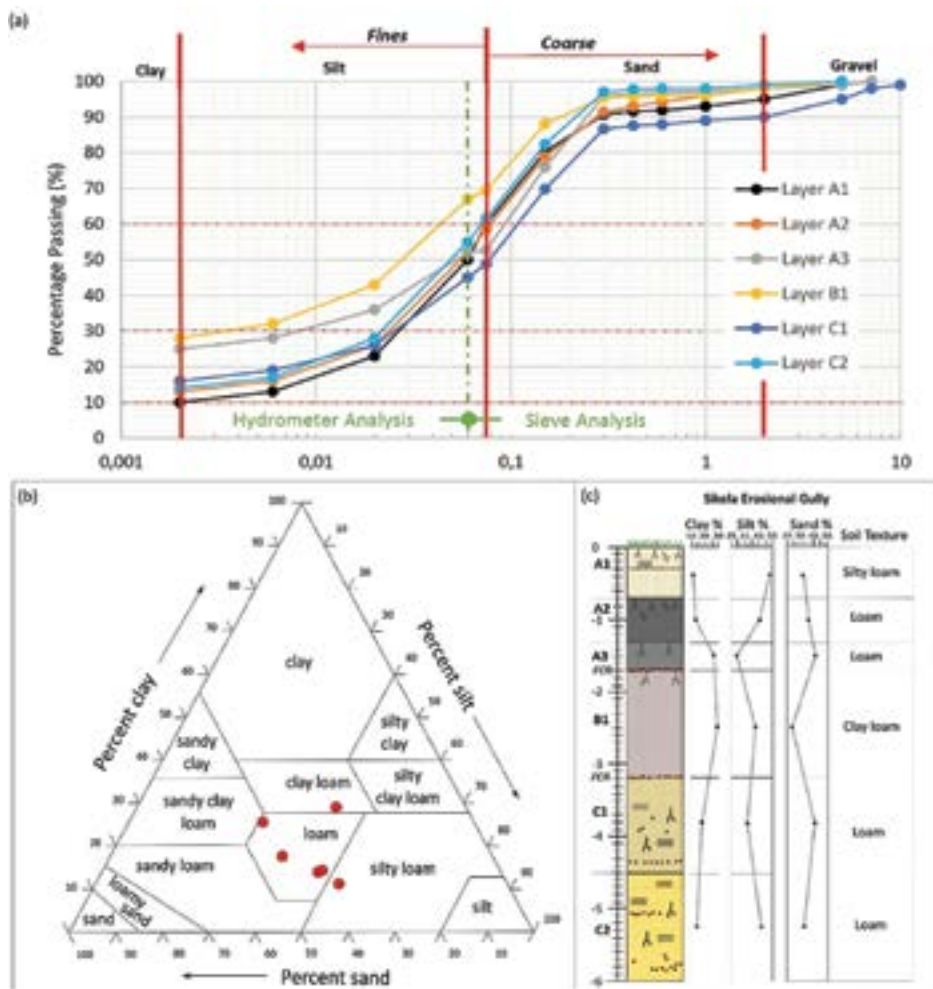
4.1.2.3 Eastern Cape Mapping

Background and purpose: The Eastern Cape Mapping Project encompasses a wide range of research fields that capture, analyse and develop fundamental geoscientific data in key development and poverty nodes in the Province. To address these challenges, area-specific studies were undertaken to assist stakeholders to make informed decisions on land-use planning, infrastructure development, conservation, environmental management and/or sustainable exploitation of valuable natural and economic resources. The key objectives are to characterise the natural and geological controls on the anomalously rapid erosion and provide fundamental stratigraphic and structural information to assist in locating potentially undefined groundwater resources.

Achievements and highlights: Eight 1:50 000-scale geological maps sheets were published for the surrounding Mthatha region. A comprehensive geological map

explanation addressing pressing geoscientific challenges in this area was reviewed and finalised for publication. The map explanation comprises a review and assessment of economic mineral potential and the creation of a coarse aggregate potential map for the area, an assessment of the groundwater potential and the development of a groundwater potential map for the area and a field investigation into the formation and expansion of hazardous erosional gullies. An assessment was also conducted on the potential risk posed by erosional features to existing roads and urban infrastructure.

Various sedimentary, chemical and geotechnical field and laboratory tests to characterise stratified erosive sediments of the Masotcheni Formation were undertaken. Tests undertaken included X-ray fluorescence, X-ray diffraction, grain size analysis, Atterberg limits, cation exchange, soil dispersion, permeability, and shear box (Figure 21).



(a) Grain size distribution curve for each pedogenic and colluvial layer of the Masotcheni Formation sampled within the Sikela gully, south of Qunu in the Eastern Cape (b) and (c). Based on the grain size analysis sediment layers are classified predominately exhibiting a loam texture.

Figure 21: Various field and laboratory tests undertaken to characterise stratified erosive sediments of the Masotcheni Formation

The tests aim to address any physio-chemical properties that may enable land degradation while trying to understand the complex interplay between phases of deposition, erosion, and non-deposition within the landscape. The results are in the initial stages of processing and interpretation.

Models that predict the susceptibility of regolith to wind erosion along the Wild Coast region of the Eastern Cape have been completed and successfully identified vulnerable areas requiring mitigating intervention along the environmentally sensitive Wild Coast.

4.1.2.4 Crushed Aggregate Resource Mapping Project

Background and purpose: This project focuses on assessing naturally occurring hard rock materials for use as aggregates in the road and rail construction and the cement manufacturing industries. Furthermore, research is undertaken to determine the feasibility of basalt fibre manufacturing in South Africa as a potential emerging industrial market. The aim is to evaluate quality aggregate

resources and expand the national database of crushed aggregate resources in support of infrastructure development. These intrusions form part of the Karoo Large Igneous Province and may be a valuable resource when used to produce basalt fibre products. Research is underway at the CGS to understand the lateral extent of naturally occurring basic rocks of basaltic/doleritic/gabbroic composition to produce an alternative product to substitute currently used expensive fibres such as carbon, fibreglass, and steel fibres.

Basalt rocks are a relatively common igneous rock type, being prized for their hardness and relative inertness compared to other igneous rocks.

Achievements and highlights: In the year under review, a preliminary basalt potential map was produced from geochemistry data. The geochemistry indicates that the Bushveld Complex and the southern Lebombo region in the Western Cape have the lowest of potential for basalt exploration, while other areas around the country, such as the Karoo, Tuli and Ventersdorp have high to intermediate basalt fibre potential, as indicated in Figure 22.

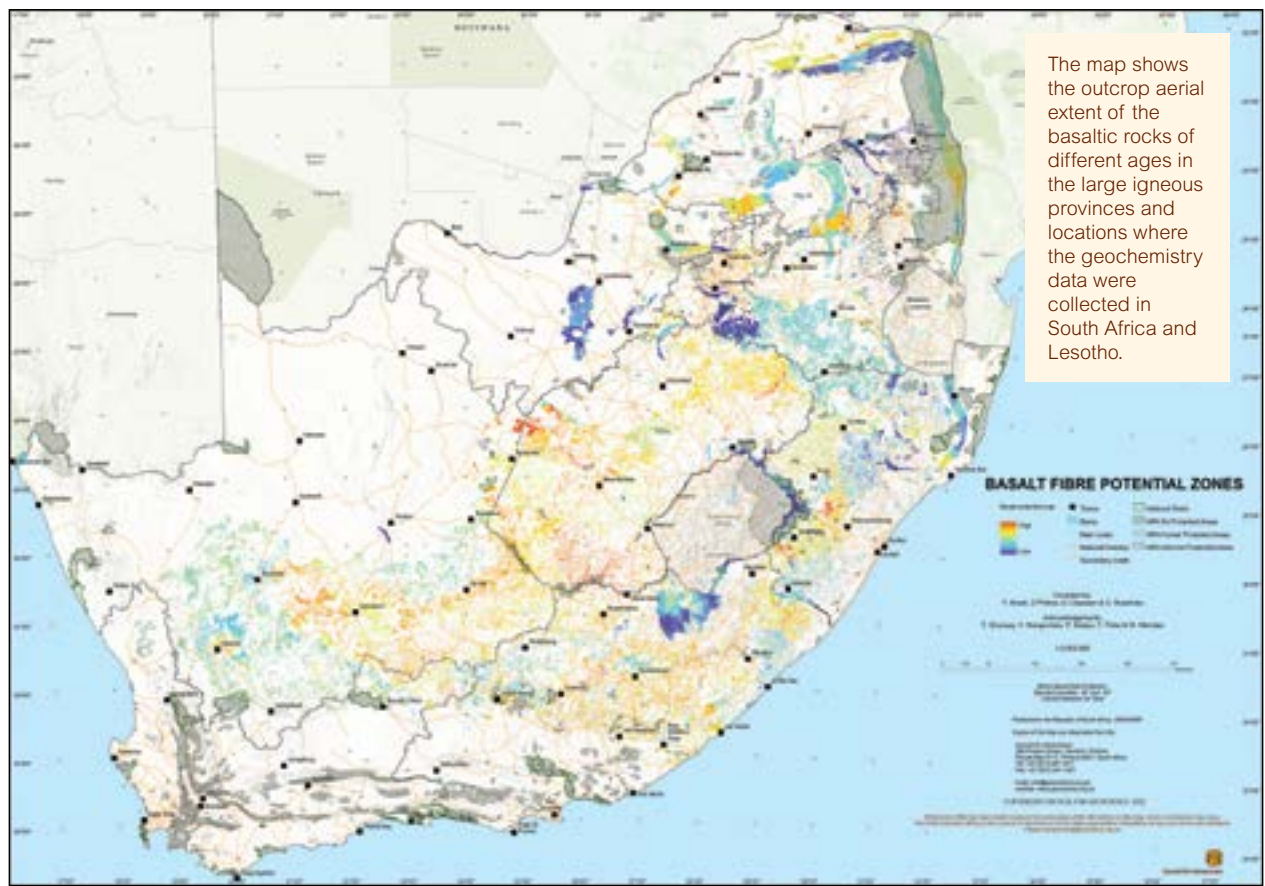
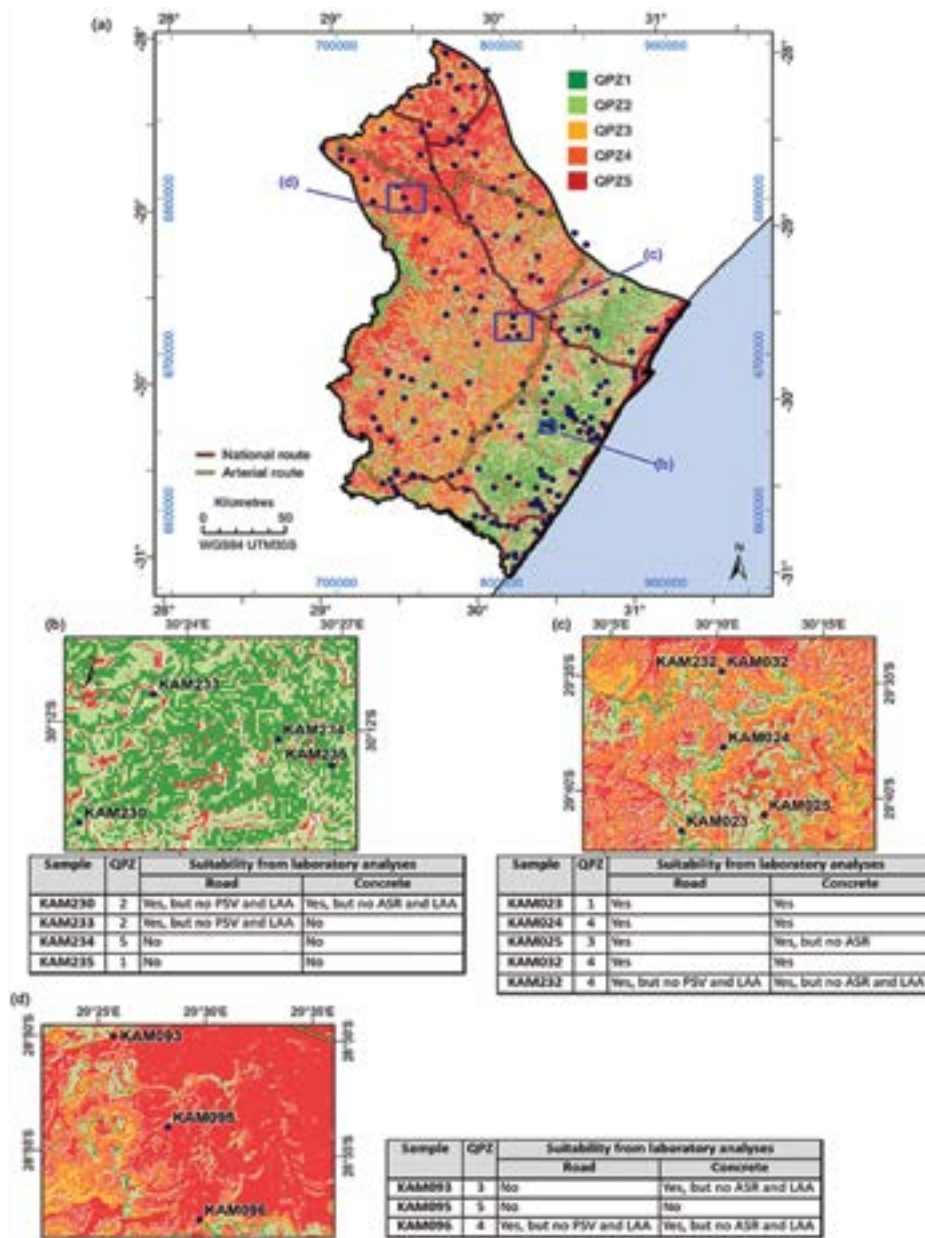


Figure 22: Preliminary basalt potential heat map of South Africa

In order to support infrastructure development, land-use and local economic development, the CGS produced a crushed aggregate potential map of southern KwaZulu-Natal which indicate most prospective areas for aggregate exploitation.

The map shows areas of interest for good-quality aggregate based on physical characteristics, such as crushing strength,

water absorption, and resistance to impact, abrasion and polishing action. It shows a very strong correlation between identified quarry potential zones (QPZs) and the measured geotechnical parameters (Figure 23). The predictive capability of this new approach can be very effective in characterising the crushed aggregate potential of an area, and enabling the identification of QPZs on a more economical and rational basis.



(a) Sample localities overlain on the QPZ map. Areas indicated by (b) to (d) were enlarged and the comparisons indicated in tables. (b) Area predominantly characterised by QPZ1 and 2 (c) area predominantly characterised by QPZ3 and 4. (d) Area characterised by QPZ3 to 5.

Figure 23: Comparison between QPZ and laboratory-based classification

4.1.3 Geoscience for Health, Groundwater and Environment Theme

Mining is a relatively mature sector that has boosted the economy but has, to some degree, left environmental legacy challenges in need of urgent attention. The social and economic wellbeing of communities is related directly to the health of the environment in which they live, produce their food and work. The focus of mining worldwide is shifting towards exploration and exploitation, with greater emphasis on environmental stewardship. As a water-scarce country, South Africa faces significant challenges in the availability and provision of water, exacerbated by a limited understanding of water resources. The development of communities, agriculture and mineral and energy resources depends on the availability of and knowledge about water resources.

The Geoscience for Health, Groundwater and Environment Theme promotes environmental stewardship, particularly in areas prone to contamination through activities such as mineral exploration and exploitation. Under this theme, sources of groundwater are identified and delineated for communities, industries and agriculture. Interventions such as artificial recharge are also considered. This theme comprises several projects, including the Mine Environment and Water Management Programme (MEWMP) and the management of state-contingent liabilities with respect to derelict and ownerless mines – now termed ‘geoscientific research for legacy mines’.

4.1.3.1 Mine Environment and Water Management Programme

Background and purpose: The MEWMP develops mitigation strategies for sustainable management of mine water in South Africa. The CGS developed a long-term action plan to improve the cost-effectiveness and sustainability of mine water management in the Witwatersrand. This action plan encompasses several issues related to mine water management, local and global environmental conditions affecting the mining sector, local challenges related to mine water management, initiatives in the sector to address these challenges, as well as gaps and strategic priorities. The MEWMP comprises various projects classified according to the following themes: active mine water management, sustainable water solutions, and proactive mine water solutions.

Achievements and highlights:

Active Mine Water Management

The active mine water management theme is composed of two main activities: ingress control and research into the relaxation of the environmental critical levels (ECLs). Ingress control aims to reduce the entry of clean water into the mine voids of the three basins (Eastern, Western and Central) of the Witwatersrand goldfields. Following a full hydrological year assessment of the mine water treatment-related pumping in the Eastern Basin, a simple model was used to estimate the value of ingress control. The average daily volume pumped across the entire project was 135.6 ML, representing an annual water management cost of R4.3 million per megalitre per day treated. A saving of 18.6 ML/d was noted since the 2020/21 hydrological year (after the completion of the Van Ryn canal and the sealing of the Modderbee crack); this translates to a saving of R79 million per annum. The evaluation of ECLs reconfirmed decanting at specific areas on the Western Basin but highlights no impacts in the Central and Eastern Basin despite failure to maintain the ECLs. As such, the CGS recommends new ECLs of 1 652 m, 1 557 m and 1 486 m above mean sea level for the Western, Central and Eastern Basins, respectively. Therefore, the pumping capacity in the Western Basin should be increased to 40 ML/d to meet the ECLs.

Sustainable Mine Water Solutions: Passive treatment

Passive treatment of acid mine water forms part of the activities under sustainable mine water solutions. The CaroRap system at the Witkranz discharge at a legacy mine site in Carolina, Mpumalanga, is a passive treatment system that incorporates the mechanisms of anoxic limestone drains and anaerobic wetlands to improve the quality of mine impacted water. Since its inception in January 2021, the system showed encouraging results in terms of metals removal and pH control. Challenges observed with the system were mostly related to the construction and physical management. The year-long performance of the system’s average removal rates of metals are calculated as 3.2%, 27.8%, 39.8% and 62.5% for manganese, zinc, aluminium and iron, respectively, while sulfate showed no removal efficiency.

4.1.4 Geoscience Innovation Theme

CGS investment in innovation will drive and enable high-impact science, leading to more accurate and robust insights and better decisions to support the CGS mission.

The Geoscience Innovation Theme fosters the conversion of ideas into actionable solutions to solve some of the country's most pressing societal challenges, such as water scarcity, poverty and geohazards. Across a wide variety of geoscience fields datasets (geology, geophysics, geochemistry etc.), data are being collected and accumulated at a dramatic pace, creating an urgent need for a new generation of computational theories and tools to allow people to extract useful information (knowledge). The Geoscience Innovation Theme also investigates the application of modern technologies such as AI in knowledge extraction. This will improve speed, efficiency and accuracy in the knowledge extraction process.

The CGS is implementing innovative AI tools in the context of modelling groundwater vulnerability and characterising subsidence from sinkholes. In addition, new open-source geoscience modelling software is being developed to allow for the integration of multiple geoscience data layers. Indeed, geoscience innovation is key to sustainably addressing modern-day social and economic challenges. Data collected over more than a century need to be reprocessed using modern techniques to extract maximum value.

This theme encompasses three projects spanning various disciplines:

- AI-predictive mineral and energy potential mapping project;
- Geoscience software development and maintenance; and
- Longer-term feasibility study of in situ iron and manganese removal by ozonation: a novel approach to protecting groundwater supply schemes.

4.1.4.1 AI-Predictive Mineral and Energy Potential Mapping Project

Background and objectives: This project seeks to create software that applies the concept of AI to geoscience data to address complex regional mineral and groundwater potential mapping challenges and to build systems capable of automating processes. The use of AI will also reduce the initial cost of search for minerals by generating maps/models for mineral exploration targeting, attracting investment and also contributing to land-use planning. The software package (AI_GEO1.0) houses all major mineral systems in South Africa and all AI algorithms for geoscience data integration, using the modified six-step knowledge discovery process.

Achievements and highlights: In the reporting year, the AI_MIN1.0 software, on which the CGS previously reported, was updated to incorporate predictive modelling for groundwater. This makes the current version a fully integrated software platform for minerals, energy and groundwater prediction (Figure 24).



Figure 24: Modified knowledge discovery process used by AI_GEO 1.0 software

Work done on the integrated software included getting user inputs to improve the usability of the software, bug fixing, quality control tests, reconfiguration of modules, updating the AI algorithms with the latest ones and general improvements to the user-friendliness of the software. Future research work will focus on linking the software to the CGS online portal, testing the downward-scalability of the software at a mine and deposit scale, and modelling potential in three dimensions.

4.1.5 Geoscience Diplomacy Theme

The nature and vagaries of the planet's surface extend it beyond the borders of any single state or entity. As the permanent Secretariat of the OAGS, the CGS primarily uses the Geoscience Diplomacy Theme to fulfil and execute several of South Africa's international relations, particularly in the geosciences. In line with one of the bold priorities of the sixth administration of '**A better Africa and the World**', the CGS has a history of collaborating with various African countries through geoscience mapping, institutional reform, map compilation and other services. Recently, the CGS has worked with the Ministries of Minerals and Mines in Malawi, Namibia and Eswatini.

The Geoscience Diplomacy Theme creates an enabling environment for national imperatives. Crucial aspects are human capital building around geoscientific, administrative and managerial/leadership skills and the development of innovative products, systems and services. The agreement on an African continental free-trade area offers invaluable opportunities to place South Africa on a path of investment-led trade and to work with other African countries to develop their own industrial capacity.

The theme supports broad international geoscientific developmental goals and requirements, particularly of African communities. Transboundary geological mapping in countries such as Namibia and Malawi generates fundamental geological data in support of economic development and the training and development of local geologists and students. The SANSN, administered by the CGS, makes an important contribution to the preparatory commission for the CTBTO, which facilitates global cooperation in monitoring nuclear weapon testing.

4.1.5.1 Comprehensive Nuclear Test Ban Treaty Organisation

Background and purpose: The CTBTO aims to prevent and prohibit all nuclear weapon tests or other nuclear explosions across the world. The role of the CGS is to operate and maintain the CTBTO waveform stations within South Africa, which is the main performance requirement mandated by the agreement between the CGS and the CTBTO. It represents South Africa at various CTBTO workshops, training courses and meetings as well as provides advice on waveform technologies to the Department of Trade, Industry and Competition (**the dtic**). In addition, the CGS uses the data from the International Monitoring System (IMS) stations for scientific and civil purposes within the country.

The CGS maintains and operates the Primary Seismic Station (PS39), the Infra-Sound Station (IS45) (Figure 25) and the Auxiliary Station Stations at Sutherland and Antarctica (AS099 & AS35) as part of South Africa's contribution to the IMS of the Comprehensive Test Ban Treaty.

Achievements and highlights: During the year under review, no major issues related to the uptime and functionality of monitoring station were recorded. The PS39 station performed well for the months of April to November 2021, all months during this reporting period returned 100% performance figures. The IS47 station underwent a second phase of upgrading to its sensors and the Wind Noise Reduction System and now meets the IMS requirements (data authentication, calibration capability and data quality). This was demonstrated when IS47 clearly recorded the volcanic explosion from Tonga.

The installation of the NDC-in-a-Box software was completed and it is streaming data from the South African IMS stations. The CGS routinely utilises the data from the CTBTO seismic stations in the daily analysis of earthquakes and for research into seismic hazards and the Earth's structure within the country. Training on infrasound analysis is planned to analyse the infrasound data and calibrate the signals from a list of suspected explosions located the eMalahleni region. This analysis is planned to become part of the daily routine of the CGS.



Figure 25: Recently upgraded international IS station (IS47) at Boshof, Free State Province, South Africa

The CGS continues to advise **the dtic** and the Department of International Relations and Cooperation through regular interactions. **the dtic** nominated a CGS delegate to participate in the Open Scholarship Initiative (OSI) Consultative Group of Experts. This group plans to leverage the expertise of a number of international experts to obtain guidance and advice on strategic, technical and substantial matters on the development and implementation of a future OSI Exercise Plan.

The auxiliary station in Sutherland (AS99) and Antarctica (AS35) are operated jointly with University of California, San Diego (Sutherland station) and the German Federal Institute for Geosciences and Natural Resources (Antarctica station). The CGS is in the process of concretising the relationship with these organisations through memoranda of understanding for the joint operation and maintenance of the auxiliary stations.

4.1.5.2 Geological Mapping and Mineral Assessment Project of Malawi

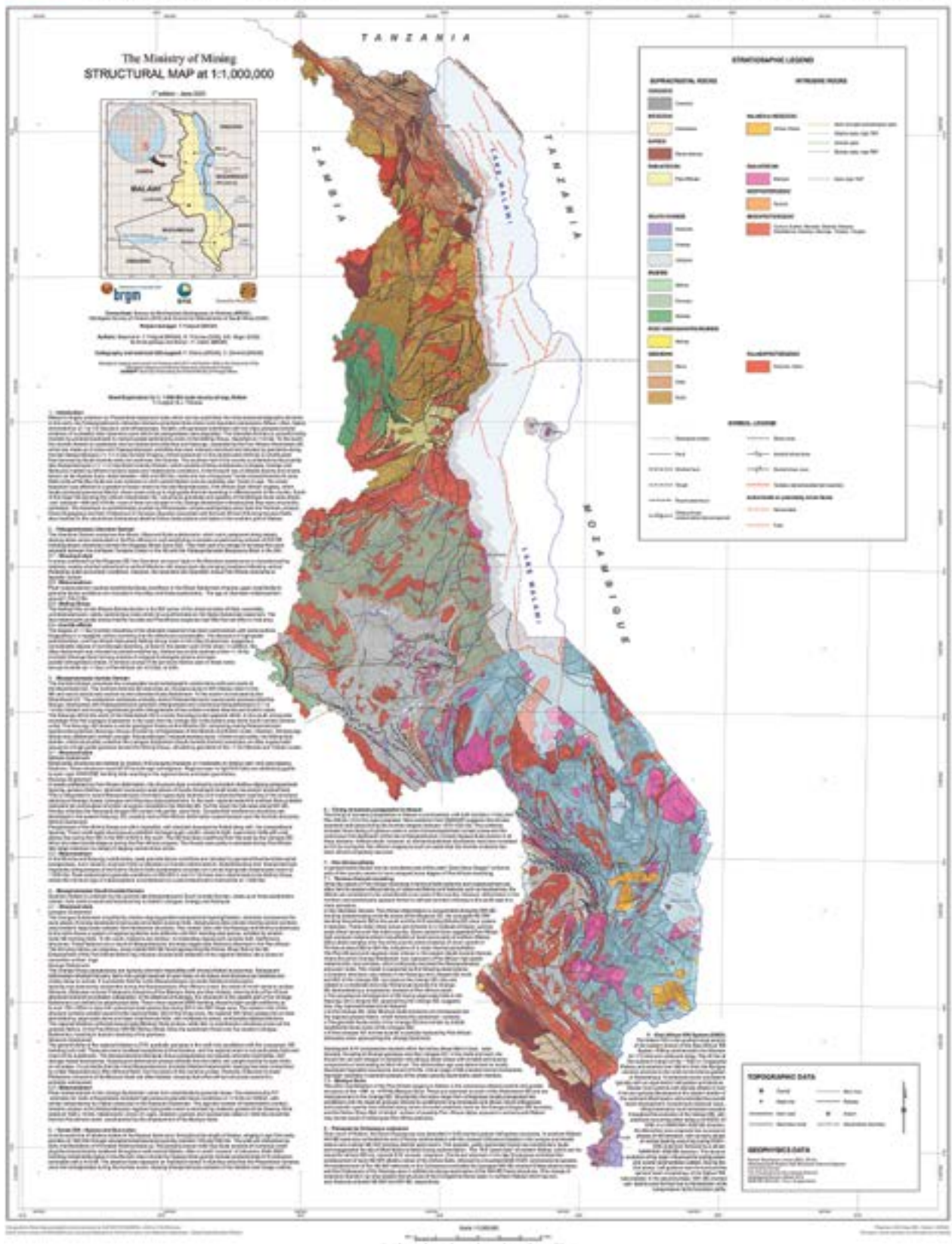
Background and purpose: The five-year (2016 to 2021), French-funded Geological Mapping and Mineral Assessment Project (GEMMAP) of Malawi is drawing to its successful conclusion. The project is kick-starting renewed mineral exploration in Malawi by, among other things, producing modern geological maps of the entire country at scales of 1:100 000, 1:250 000 and 1:1 000 000, each with sheet explanations, memoirs and final reports. In addition to the geological mapping, the project consisted of five other modules (stream sediment geochemistry, mineral potential assessment, infrastructure and equipment provision, small-scale mining, and geohazards) that were completed by the end of 2020/21. The project also included a comprehensive training programme for Malawian Geological Survey Department staff.

Achievements and highlights: The geological mapping module is by far the largest component of GEMMAP and the task to which the CGS has made the biggest contribution. In addition, the CGS is responsible for all linguistic editorial control of the technical and progress reports, being the only native English-speaking member of the consortium.

The effects of the COVID-19, political change and other factors have continued to impact the finalisation of the project. This has resulted in the finalisation of the project being informally extended until June 2022. Despite this, all other scheduled activities and deliverables have been completed to the required standards, in time and within budgets. Also running into 2022 is the planned final GEMMAP conference in Zomba, postponed to dates, yet to be decided on, between April and June 2022.

In the year under review, the project focused on producing the draft deliverables that were submitted to the client on the due date of 2 July 2021 and the preparation of the final report. Delivered items to date include:

- A complete, seamless, scale-less GIS geological map of the entire country (solid and drift layers, mineral occurrences and geohazards);
- 40 x 1:100 000-scale geological sheets with legends, cross-sections etc.;
- 40 x sheet explanations;
- 1: 250 000-scale geological and structural series maps (10 maps each);
- 1:1 000 000 geological, structural (see example in Figure 26); geohazard and mineral resource maps;
- 6 x memoirs; and
- Final reports on the geochemical survey, geohazards and mineral potential assessment (and all data annexes).



The map, with explanatory notes on the map face, was finalised during this reporting year.

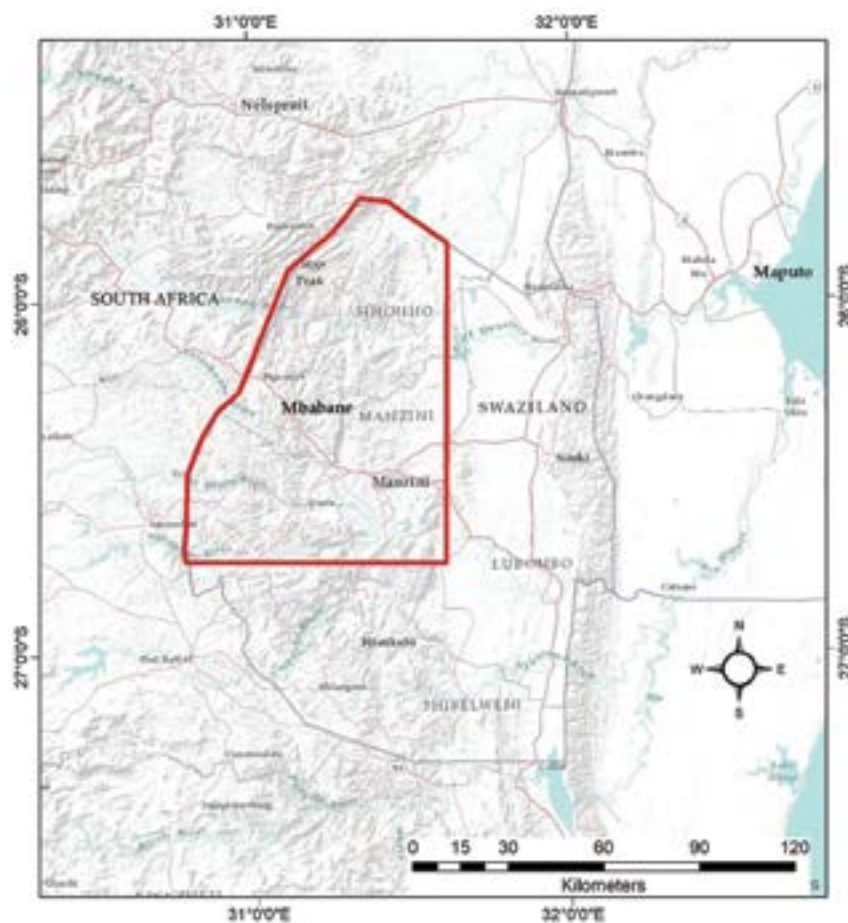
Figure 26: The new 1:1 000 000-scale structural geology map

4.1.5.3 Integrated Multi-Layer Geoscience Mapping in the Kingdom of Eswatini

Background and purpose: The CGS was appointed by the Kingdom of Eswatini Government to embark on an integrated multi-layer geoscience mapping within the Kingdom, focusing on the prospective western sector of the country. Due to the variety of geological domains developed within Eswatini, multiple mineralising systems of different ages are present, including Archaean greenstone-hosted orogenic lode gold, magmatic sulfide deposit, Archaean Kuroko-type volcanogenic massive sulfide, Archaean granite-hosted pegmatite/vein tin, and Cretaceous kimberlite-associated diamonds. The projects entails collection and interpretation of the first-ever in-country airborne geophysical data in 1D, 2D and 3D. The information will be used to gain an understanding of the subsurface characteristics that influence mineralisation and the broader evolution of the tectonic landscape, including characterising the groundwater resources. A full geoscientific understanding underpins any efforts toward socio-economic diversification, acceleration of local

infrastructural development and sustainable development of the Kingdom's potentially vast and untapped onshore mineral and groundwater resources.

Achievements and highlights: The Eswatini regional multi-geoscience data acquisition project focused on the collection and interpretation of airborne geophysical (electromagnetic, magnetic and radiometrics) data. The study area is located in the north-western section of the Kingdom of Eswatini, spanning over the Hhohho and Manzini Provinces (Figure 27). Several conductive features have been identified from the 1D inversion of the electromagnetic data collected thus far and 3D models of the magnetic data were generated over two gold deposits. These targets will be investigated further once the remaining 20% area has been flown and the final data fully processed. An in-depth investigation of the major mineral systems, remote sensing mapping of alteration and geochemical analysis will be done for target generation. This will also include an advanced geophysics training programme on the mineral systems approach, interpretation of airborne data, and ground-truthing methodologies.



It has a north-south length of 110 km and width of 70 km in the east-west direction.

Figure 27: The outline of the airborne electromagnetic survey block covering approximately 7000 km² of land

5

Knowledge and Information Management Services Palaeontological Collections

Background and purpose: As a legal custodian, the CGS continues to curate one of the largest and most extensive palaeontological collections in South Africa spanning approximately a 2.1 billion-year geological history. The collection is composed of more than 100 000 individual representative specimens from all kingdoms of life encompassing the entire stratigraphic range of South Africa and are key to the evolutionary progression of life. With the advancement in technology, digital records that were deemed unusable years back, are now crucial to leverage data mining. The CGS is also custodian of hundreds of thousands of analogue and digital records. For this, the CGS is implementing a multi-year digital migration and information auditing of legacy records to the management of various scientific collections – all to contribute to an improved geoscientific knowledge management domain. This has enabled easy access to data for the GTP, in particular for data mining exercises.

Achievements and highlights: Through the digital migration programme, which seeks to systematically scan and record all legacy maps and reports, the CGS exceeded its target of digitally migrating 100 667 analogue records by 3.39% in the year under review. The geoscientific audit plan was designed to catalogue the vast amount of raw structured and unstructured geoscience data collected over many years.

The assessment of geoscientific repositories of physical collections such as borehole core, rock samples, mineral and fossil specimens, were investigated for completeness, accuracy and scientific importance. The CGS also audited 1 816 body fossils against a target of 1 400. This achievement is key in assisting the CGS to have a decent and current inventory for its National Geoscience Museum. Numerous important types and rare specimens are present; ranging from simple multicellular organisms, to the earliest known animals and plants, to dinosaurs and the ancestors of modern day mammals. In this programme, the CGS also implements core recovery campaigns (mainly from off-site locations in Uppington and Griekwastad). The recovered borehole cores are transported to the National Borehole Core Depository and this includes the physical verification and validation of the actual drill cores in terms of integrity. The recovered core will later undergo extensive scientific reviews and use in the scientific programmes. During 2021/22, the CGS completed its core recovery campaigns. However, not all core was physically verified for shelving purposes – only 18 out of 32 borehole cores were verified. Overall, the CGS attained 95.24% of its annual target for the assessment of geoscientific repositories.

6

Information and Communications Technology

During the 2021/22 financial year, in implementing the CGS strategy, the following key information and communications technology (ICT) activities were undertaken to enhance the CGS's effectiveness and efficiency.

6.1 Availability of Key Enterprise Services

The realisation of ICT value is supported by the connected information community who needs effective and efficient access to geoscience information and services. For the period under review, various ICT solutions, maintenance, assessments and monitoring measures put in place consequently contributed to an overall average of 99.89% service availability, which is in line with a scorecard target of more than 99%.

The overall efficiency and effectiveness of the CGS was also enhanced through, among others, the provision of computers, laptops, supporting remote network infrastructure (e.g. data, voice, virtual private networks for activities such as field data collection for maritime geoscience surveys) to continue to support the hybrid working arrangements brought about by COVID-19 and its associated lockdown regulations.

The provision of ICT infrastructure and support for the geoscience web portal translates into improvement of CGS efficiency and effectiveness and contribution towards electronic government (eGovernment). The provisioning of this infrastructure is also a crucial component of the CGS's digital transformation of public service delivery and effective information dissemination between the CGS and the geoscience community.

A semi-rollout of Office 365 enabled the CGS to leverage its office suite license investment through unified communications (e.g. video-conferencing, voice over internet protocol calling, web conferencing and screen sharing). This solution also contributed towards the CGS effectiveness and efficiencies in terms of call cost savings, improved collaboration and organisational productivity, especially for field scientists.

In promoting the CGS operational efficiencies and as part of the CGS digital transformation journey, the CGS has made considerable progress on the implementation of enterprise resource planning (ERP) as of the end of the financial year under review. The ERP implementation has passed the midway-mark towards completion. The ERP is aimed at, among others, simplifying and streamlining the manual process and record keeping, and integration of the application systems across CGS business units with consolidated reporting.

Notable progress has been made on the ERP implementation which include the completion of ERP business specifications. The ERP configuration, unit tests and user acceptance testing of most modules such as Human Capital Management (HCM); Organisation Management; Safety, Health, Environment and Quality; HCM Time Management; and HCM Personnel Administration modules have been completed. The configurations for modules such as projects, finance, and supply chain management configurations are also completed and the focus will be on completion of the last miles of the last-half of the implementation which include the ERP customisation work to cater for the CGS's unique requirements (e.g. workflows, interfaces, and reports), the user acceptance testing and training.

6.2 Cybersecurity and Network Infrastructure Enhancement

6.2.1 Cybersecurity

During the year under review, various policies and procedures remained in place to protect CGS assets. The CGS continued to maintain and improve its cybersecurity during the financial year. The CGS has entrusted the State Security Agency (SSA) Cyber Centre to perform a security assessment on its ICT systems to gauge possible vulnerabilities affecting both internal- and external-facing applications. The SSA monitoring and assessments aim to assist the CGS to identify and avert any opportunistic ICT security threats.

To further strengthen the CGS's cybersecurity, additional investments were made by deploying advanced cybersecurity technologies as well as additional firewalls at Bellville and Pietermaritzburg sites to prevent unauthorised access and enable more advanced assessment, early detection and monitoring of the CGS's cyber space.

The cybersecurity user awareness-raising activities, which involved communicating possible cyber vulnerabilities, were also conducted to sensitise the CGS ICT user community to prevalent cyberattacks and to prevent the community from falling prey to these attacks.

6.2.2 Network Infrastructure Enhancement

Additional firewalls were installed at the two coastal sites (i.e. Bellville and Pietermaritzburg). The software-defined wide area network was set up to interconnect the CGS head office with the Cape Town and Pietermaritzburg sites. These act as spokes to the head office network hub through the South African National Research Network.

The network enhancement also brought about organisational effectiveness by reducing operational costs (e.g. data connectivity and virtual private network management

between multisites). This also improved ICT resource usage and deployment at multiple sites. This network enhancement was coupled with effective and efficient internet connectivity at the second disaster recovery for the benefits of the geoscience community.

6.3 Business Continuity

Over the past year, the CGS has conducted disaster recovery site risk assessment with the assistance of the Integrated Geoscience Development division which considered factors such as seismic events, distances and dependency on the source of electricity power.

The CGS established a second disaster recovery site where CGS data are replicated for critical services to ensure operational continuation in the event of a disaster. For the past year, the CGS Disaster Recovery Plan was activated and remote working was initiated successfully, for example the finance business processes continued without any interruptions. The second site investment also ensures, among others, business continuity of geoscience community and forms part of efforts to drive the CGS effectiveness and efficiency to higher levels.



Analyses of the chip samples from the drilling programme in Giyani

7

Geoscience Research Outputs

The CGS disseminates the results of its research to its stakeholders in a publication series, including memoirs, bulletins, explanations, annual reports, media articles, conference proceedings and maps, and these are presented in sections 7.1 to 7.3. The organisation's refocus on its mandate and its acquisition of new multidisciplinary data have resulted in new external collaborations and partnerships and the development of additional publications.

7.1 CGS Publications

1. Bensid, M.L., Modiba, M.G., Netshitungulwana, R., Mukosi, N.C., Mothupi, T., Zilibokwe, N. and Dube, M. 2021. Follow-up Study of the geochemical anomalies in the vicinity of Giyani. Council for Geoscience, 153pp.
2. Cawthra, H. 2022. The geological map explanation of the offshore geology of Mossel Bay (onshore-offshore sheet 3422AA, scale 1:50 000). 1:50 000 Map Explanation, Council for Geoscience, 52pp.
3. Geoclips, Volume 65, December 2021, 18pp.
4. Geoclips, Volume 66, March 2022, 14pp.
5. Makubalo, S.S. and Kenan, A.O. 2021. Investigation into the Carnotite Solubility Index of Namaqualand, Northern Cape Province, South Africa. Bulletin 160, Council for Geoscience, 46pp.
6. Mare, L.P. 2022. Density of South African rocks, Petrophysics series: Volume 1, Council for Geoscience, 112pp.
7. Mukosi, N.C., Radzuma, T., Doggart, S., Mathebula, J., Nhamussua S., Ngobeni, D., Bensid, M., Netshitungulwana, R., Madiba, M., Mohale, G., Masegala, P., Nolakana, P., Hanise, B., Madzivire, G., Lekoadu, S., Ramukumba, T., Masindi, M., Pieterse, L., Thomas, A., Ngcobo, M., Monnakgotla, A. and Sakala, E. 2021. Key findings of integrated and multidisciplinary geoscientific mapping of the Giyani Greenstone Belt and surrounds, Brochure 1 of 2021, Council for Geoscience, 16pp.
8. Pillay, T. 2021. Benthic habitat mapping using marine geophysics and machine learning on the continental shelf of South Africa, Memoir 103, Council for Geoscience, 78pp.

7.2 Peer-reviewed Articles

(CGS staff are indicated in bold)

1. Bailey, G. and **Cawthra, H.C.** The significance of sea-level change and ancient submerged landscapes in human dispersal and development: A geoarchaeological perspective, *Oceanologia*, <https://doi.org/10.1016/j.oceano.2021.10.002>.
2. Bernini, A., Bosino, A., **Botha, G. A.** and Maerker, M. 2021. Evaluation of Gully Erosion Susceptibility Using a Maximum Entropy Model in the Upper Mkhomazi River Basin in South Africa. *ISPRS International Journal of Geo-Information*, 10, 729. <https://doi.org/10.3390/ijgi10110729>.
3. **Botha, G. A.** 2021. Cenozoic stratigraphy of South Africa: Current challenges and future possibilities. *South African Journal of Geology* 2021, 124, 817-842. <https://doi.org/10.25131/sajg.124.0054>.
4. Cavosie, A.J., Spencer, C.J., Evans, N., Rankenburg, K., **Thomas, R.J.** and **Macey, P.H.** 2022. Granular titanite from the Roter Kamm crater in Namibia: Product of regional metamorphism not meteorite impact.
5. **Cawthra, H.C.**, Bergh, E., Wiles, E.A. and Compton, J.S., 2021. Late Quaternary deep marine sediment records off southern Africa. *South African Journal of Geology* 124(4), 1007-1032.
6. **Cawthra, H.C.**, Jacobs, Z. and Wadley, L. Winds of change: Climate variability in a mild glacial on the east coast of South Africa, inferred from submerged aeolianites and the archaeological record of Sibudu. *Quaternary International*. <https://doi.org/10.1016/j.quaint.2022.03.014>.
7. **Cole, J.**, Finn, CA. and Webb, S.J. 2021. Geometry of the Bushveld Complex from 3D potential field modelling. *Precambrian Research*, 359, Article 106219. <https://doi.org/10.1016/j.precamres.2021.106219>.
8. **Dhansay, T.** 2021. Shattered crust: how brittle deformation enables Critical Zone processes beneath Southern Africa, Geological Society of South Africa. *South African Journal of geology*, Vol124.2, pp519-536.

9. **Doggart, S., Macey, P.H.** and Frei, D. 2021. Lithostratigraphy of the Mesoproterozoic Twakputs Gneiss. Geological Society of South Africa. *South African Journal of geology*, Vol124.3. pp783-794. <https://doi.org/10.25131/sajg.124.0041>.
10. **Doucet, F.J., Dube, G., Mohamed, S., Gcasamba, S., Coetzee, H. and Vadapalli, V.** 2022. Application of Nanofiltration in Mine-Influenced Water Treatment: A Review with a Focus on South Africa.
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12. Gastaldo, R.A., Neveling, J., Geissman J.W., Kamo, S.L. and Looy, C.V. 2021. A tale of two Tweefonteins: What physical correlation, geochronology, magnetic polarity stratigraphy, and palynology reveal about the end-Permian terrestrial extinction paradigm in South Africa. *GSA Bulletin*, 31; <https://doi.org/10.1130/B35830.1>.
13. Grantham, G., Bumbay, A., **Moabi, N.**, Elburg, M., le Roux, P., Reinke, C. and Marschall, H. 2021. The genesis and age of the Grunehogna Granite and Rb–Sr and Sm–Nd chemistry of the Annandagstoppane Granite, Ahlmanryggen, Dronning Maud Land, Antarctica. *Polar Science*, 100717. <https://doi.org/10.1016/j.polar.2021.100717>.
14. Hahn, A., Neumann, F.H., Miller, C., Finch, J., Frankland, T., **Cawthra, H.C.**, Schefuß, E. and Zabel, M. 2021. Mid-to late Holocene climatic and anthropogenic influences in Mpondoland, South Africa. *Quaternary Science Reviews*, 261, 106983. <https://doi.org/10.1016/j.quascirev.2021.106938>.
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16. Helm, C.W., **Cawthra, H.C.**, Van Vynck, J.C., Hattingh, R. and Lockley, M.G. 2022. Possible Pleistocene hominin tracks from South Africa's west coast.
17. Helm, C.W., Lockley, M.G., Moolman, L., **Cawthra, H.C.**, De Vynck, J.C., Dixon, M.G., Stear, W. and Thesen, G.H.H. 2021. Morphology of Pleistocene elephant tracks on South Africa's Cape south coast and probable elephant trunk drag impressions. *Quaternary Research*. <https://doi.org/10.1017/qua.2021.32>.
18. **Hicks, N.** and Gold, D. 2021. A reinterpretation of the Archaean stratigraphy south of Nkandla, southern Kaapvaal Craton, South Africa: Geophysical and stratigraphic constraints on a sheared granitoid-greenstone remnant. South Africa. Geological Society of South Africa. *South African Journal of geology*, Vol124.3.pp685-698. <https://doi.org/10.25131/sajg.124.0025>.
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26. **Muedi, T.**, MacLennan, S., Szymanowski, D., Schoene, B., Ramezani, J., Oalman, J. and Linol, B. 2022. Constraining the timescales of mafic magmatism of the Central Karoo Large Igneous Province using high precision U-Pb zircon geochronology.
27. **Pillay, T.**, **Cawthra, H.C.** and **Lombard, A.T.** 2021. Integration of machine learning using hydroacoustic techniques and sediment sampling to refine substrate description in the Western Cape, South Africa. *Marine Geology* 440 (2021) 106599. doi:10.1088/1755-1315/932/1/012004.
28. **Pillay, T.**, **Cawthra, H.C.**, **Lombard, A.T.** and Sink, K. 2021. Benthic habitat mapping from a machine learning perspective on the Cape St Francis inner shelf, Eastern Cape, South Africa. Elsevier, *Marine Geology*, Volume 440, 106595. <https://doi.org/10.1016/j.margep.2021.106595>.
29. Rivers, N., Truter H.J., Strand, M., Jay, S., Portman, M., Lombard, A.T., Amir, D., Boyd, A., Brown, R.L., **Cawthra, H.C.**, Faure Beaulieu, N., Findlay, K., Gal, G., Grossmark, Y., Perschke, M.J., **Pillay, T.**, Pyrgies, O., Ramakulukusha, M., Smit, K.P., Stockdale, V., Stockill, J., Schwartz, I., Treibitz, T., Vargas-Fonseca, O.A. and Vermeulen (Miltz), E.A. 2022. Shared visions for marine spatial: Insights from Israel, South Africa, and the United Kingdom.
30. Shapi, M., Jordaan, M.A., Mbambo, A.T., Davies, T.C., **Chirenje, E.** and **Dube, M.** 2021. Determination of Potentially Harmful Element (PHE) Distribution in Water Bodies in Krugersdorp, a Mining City in the West Rand, Gauteng Province, South Africa.
4. **Coetzee, H.** and **Cole, P.** 2021. Estimation of mine water ingress volumes for the Witwatersrand goldfields. Council for Geoscience First Semester Technical Workshops, Pretoria, South Africa. 31 December 2021.
5. **Denner, G.** 2021. The application of SAR for the detection and mapping of small-scale mining in Ghana. Council for Geoscience First Semester Technical Workshops, Pretoria, South Africa. 31 December 2021.
6. Dube, G., **Malatji, M.**, **Vadapalli, V.**, **Coetzee, H.**, **Sekiba, K.**, **Mello, T.**, **Tegegn, K.**, **Motlakeng, T.**, **Lusunzi, R.**, **Masemola, K.**, **Madiba, L.**, **Radebe, J.** and **Ngobeni, R.** 2021. Metal removal from mine-impacted water using a passive treatment system – CaroRap case study. Council for Geoscience First Semester Technical Workshops, Pretoria, South Africa. 31 December 2021.
7. Dube, G.M., **Mello, T.**, **Vadapalli, V.**, **Coetzee, H.**, **Tegegn, K.**, **Lusunzi, R.**, **Moja, S.**, **Malatji, M.**, Sinthumule, M.E. and Ramatsekisa, R. 2021. Full-Scale Reducing and Alkalinity Producing System (RAPS) for the Passive Remediation of Polluted Mine Water from a Flooded Abandoned Underground Coal Mine, Carolina, South Africa. IMWA 2021 – “Mine Water Management for Future Generations.”
8. **Freemantle, G.** 2021. Discovery and development of the Husab Uranium Mine, Namibia. Council for Geoscience First Semester Technical Workshops, Pretoria, South Africa. 31 December 2021.
9. **Gcasamba, S.P.**, **Ramasenya, K.**, **Vadapalli, V.R.K.**, **Ekolu, S.** and Nyale, S.M. 2021. Shear Behaviour of Compacted Gold Mine Tailings and Gold Mine Tailings Composite for Possible Use in Mine Backfilling. IMWA 2021 – “Mine Water Management for Future Generations.”
10. **Hicks, N.** 2021. Discussion on the value of a literature review in new-age geological Mapping. Council for Geoscience First Semester Technical Workshops, Pretoria, South Africa. 31 December 2021.
11. **Hicks, N.** and **Ncume, M.** 2021. The Ilangwe Greenstone Belt: new interpretations of complex terranes based on high-resolution airborne geophysics data. Council for Geoscience First Semester Technical Workshops, Pretoria, South Africa. 31 December 2021.
12. **Jonk, L.**, **Mtshali, S.** and **Penn-Clarke, C.** 2021. Power of relationships: accessing our palaeontological heritage. Council for Geoscience First Semester Technical Workshops, Pretoria, South Africa. 31 December 2021.

7.3 Conference Proceedings

(CGS staff are indicated in bold)

1. Angelo, V. T., Spenser, J. C., Cavosie, A., **Thomas, R.** and Li, H. 2021. A new type of granite: exploring the petrogenesis of sub-moho granites from the samail ophiolite. The geological society of America, Connects 2021, 10-21 October, Portland, Oregon, USA.
2. Capar, L., Chevrel, S., and **Coetzee, H.** 2021. Hyperspectral surveying: a tool for identification identifying and mapping of asbestos mine waste in South Africa. Council for Geoscience First Semester Technical Workshops, Pretoria, South Africa. 31 December 2021.
3. **Cawthra, H.C.** 2021. Technical and juristic perspectives on deep seabed mining in South African waters and beyond. Conservation Symposium, 1-5 November 2021.

13. **Khoza, D.** 2021. Geoscience Mapping for “Just Energy Transition” in South Africa. 15th Africa Array Scientific Meeting, 1-3 December 2021, Johannesburg, South Africa.
14. **Ligavha-Mbelengwa, L., Madzivire, G., Nolakana, P., Mello, T. and Coetzee, H.** 2021. Application of Anthropogenic Organic Contaminants for the Determination of Water Ingress in the Witwatersrand Goldfields Mine Voids. IMWA 2021 – “Mine Water Management for Future Generations.”
15. **Ligavha-Mbelengwa, L., Mokitlane, L., Modzivire, G., Saeze, H., Nokalana, P. and Coetzee, H.** 2021. Assessment of ingress areas/points in the Witwatersrand Basin using Environmental Isotopes as Tracers.
16. **Lusunzi, R.,** Waanders, F. and **Netshitungulwana, R.** 2021. Seasonal Geochemical Variation of Sediments in the Sabie River, Mpumalanga, South Africa.
17. **Madzivire, G., Ntholi, T. and Coetzee, H.** 2021. Comparative Life Cycle Assessment for Acid Mine Drainage Management Options in the Central Basin of the Witwatersrand Goldfields. IMWA 2021 – Mine Water Management for Future Generations.
18. Maritinkole, J., Durrheim, R. and **Midzi, V.** 2021. Improving automatic local earthquake detection and phase picking using a deep learning algorithm. 15th Africa Array Scientific Meeting, 1-3 December 2021, Johannesburg, South Africa.
19. **Maupa, T.** 2021. Lebohang carbon capture utilisation and storage project – evaluation of an alternative geological storage site. Council for Geoscience First Semester Technical Workshops, Pretoria, South Africa. 31 December 2021.
20. **Mosavel, H.** 2021. Drilling confirms Whitehill Formation depth at 2 500 m and the absence of dolerite. Council for Geoscience First Semester Technical Workshops, Pretoria, South Africa. 31 December 2021.
21. **Mothupi, T.** 2021. SEM-based automated mineralogy and its application in the geosciences. Council for Geoscience First Semester Technical Workshops, Pretoria, South Africa. 31 December 2021.
22. **Mtyelwa, O., Moja, S.J., Kwata, M.G., Masindi, K., Malatji, M.R, Motlakeng, T., Ramukumba, T., Mahlase, B., Taole, L., Phahlane, I. and Thiba, T.** 2021. Significance of soil quality in the rehabilitation of asbestos mine dumps. Council for Geoscience First Semester Technical Workshops, Pretoria, South Africa. 31 December 2021.
23. **Muedi, T., Mudau, P., Claassen, D. and Dhansay, T.** 2021. The still-promised potential of basalt fibre composites in South Africa – KLIP case study. Council for Geoscience First Semester Technical Workshops, Pretoria, South Africa. 31 December 2021.
24. **Penn-Clarke, C.** 2021. Improved chronostratigraphic constraints and Gondwanide correlations for the Lower–Middle Palaeozoic of South Africa from brachiopod biostratigraphy. Council for Geoscience First Semester Technical Workshops, Pretoria, South Africa. 31 December 2021.
25. **Pillay, T.** 2021. Benthic habitat mapping using marine geophysics and machine learning on the continental shelf of South Africa. Council for Geoscience First Semester Technical Workshops, Pretoria, South Africa. 31 December 2021.
26. **Pillay, T., Cawthra, H.C.** and Lombard, A. T., 2021. Benthic habitat mapping from a machine learning perspective on the Cape St Francis inner shelf, Eastern Cape, South Africa. The Conservation Symposium, 1-5 November, South Africa.
27. **Ramugondo, S., Molapo, D., Tegegn, K. and Coetzee, H.** 2021. Implementation of ingress control measures in the East Rand of the Witwatersrand Basin, Gauteng Province, South Africa. Council for Geoscience First Semester Technical Workshops, Pretoria, South Africa. 31 December 2021.
28. **Safi, M.** 2021. Characterisation of the geothermal waters of South Africa, a possible energy source. Council for Geoscience First Semester Technical Workshops, Pretoria, South Africa. 31 December 2021.
29. **Sakala, E. and Dudumashe, N.** 2021. AI_GEO software platform for regional groundwater potential mapping. GWD Groundwater Conference and Exhibition. 18-20 October 2021.
30. **Sekiba, M., Chirenje, E. and Nxantisiya, Z.** 2021. Geophysical Borehole Siting at Elizabeth Conradie School in Kimberley, Northern Cape Province, South Africa. GWD Groundwater Conference and Exhibition. 18-20 October 2021.
31. **Surridge, D. and Mosia, T.** 2021. On using carbon dioxide as an energy carrier for the geothermal generation of electricity. Council for Geoscience First Semester Technical Workshops, Pretoria, South Africa. 31 December 2021.
32. **Thomas, A.** 2021. Application of remote sensing to detect and map areas burned by Wildfires. Council for Geoscience First Semester Technical Workshops, Pretoria, South Africa. 31 December 2021.

7.4 Media Articles

1. Media advertorial – Mining Weekly; Council for Geoscience goes live with digital geoscience data.
2. Media advertorial – Green Economy Journal Issue 47; Council for Geoscience – Environment focus a top priority.
3. Media article – Times Live; 'It's fake, there was no earthquake in KZN,' says Council for Geoscience.
4. Media article – Independent Online (IOL); Tremor? What tremor? Council for Geoscience has no record of KZN earthquake.
5. Media article – The Witness; Update/Geoscience reports no tremor for Durban area.
6. Media article – Fin24; Pilot site for carbon capture project due to be up and running in 2024.
7. Media advertorial – Global Africa, Mpumalanga Business 2021/22; Finding new ways of reducing and reusing carbon.
8. Media advertorial – PENT Communications, Most Inspiring & Powerful Women Magazine; Council for Geoscience (Dr V. Nxumalo, Dr H. Cawthra and Geoscientific Executive Manager Ms R. Monoko).
9. Media article – Sharenet, Europe News; South Africa aims to bring pilot carbon capture project online in 2023.
10. Media article – News24; 3.1 tremor felt in East Rand area.
11. Media article – Timeslive; Earthquake 3.1 magnitude hits Boksburg.
12. Media advertorial – South African Business; An intensive new geological mapping programme is underway.
13. Media advertorial – Western Cape Business; A study on gas potential in the Karoo has been completed.
14. Media article – African Business; Leading the march to re-imagine mineral exploration.
15. Media article – Daily Maverick; New Centurion sinkhole is one of about 200 recorded across Gauteng in past five years.
16. Media article – Eyewitness News; Parts of Joburg rattled by early morning earthquake.
17. Media advertorial – Green Economy Journal Issue 50; Integrated Geoscience – Targeting Sustainable Development in South Africa.
18. Media article – Greeneconomy.media; Council for Geoscience – An Exploration Enabler.
19. Media article – Independent Online (IOL); Confirmed:3.5 magnitude earthquake recorded in the East Rand, Gauteng.
20. Media article – Mining Elites; Council for Geoscience – An exploration enabler.
21. Media article – Mining Review Africa; Council for Geoscience: Laying the foundation for exploration.
22. Media article – News24; East Rand rocked by 3.5 magnitude tremor.
23. Media article – Sunday Times; Sinkholes will become a hole new ballgame without proper management.
24. Media article – Timeslive; Tremor recorded 50 km from Durban.



Geologists observing the Reverse Circulation Drilling in Giyani

Part C

Governance

Corporate governance at the CGS embodies systems, structures and processes by which the entity is directed, controlled and held to account. It is applied through the precepts of its enabling act, the Geoscience Act No. 100 of 1993, as amended, the PFMA Act No. 1 of 1999, as amended, National Treasury Regulations, the Protocol on Corporate Governance in the Public Sector, and policies of the organisation. This part of the report details the organisation's governance systems, structures and processes.

- **The Board and its committees** – the composition of the Board and committees, Board induction, Board remuneration and conduct, role and responsibilities of the Board.
- **Compliance with laws and regulations** – the status of CGS compliance with legislative prescripts.
- **Internal control and risk management** – the risk management framework implemented and the effectiveness of the internal controls in the organisation.
- **Fraud and corruption** – measures to detect and combat fraudulent activities.
- **Internal audit** – activities of the internal audit function.
- **Quality assurance** – status of quality assurance.
- **Health, safety and environment issues** – compliance with safety, health, environment and quality standards.

1

Executive Authority

The Minister of Mineral Resources and Energy, (The Minister), through the CGS Board, is accountable for the control, management and performance management of the CGS. Accordingly, the organisation submits reports

quarterly and annually in terms of National Treasury Regulations (26.1) to the DMRE, on 30 April, 31 July, 31 October and 31 January, unless directed otherwise by National Treasury.

2

Board of the Council for Geoscience

2.1 Board Composition and Duties

The Minister appointed the CGS Board with effect from 1 May 2020, in terms of Section 4 of the Geoscience Act No. 100 of 1993 as amended until 30 April 2023. The Board is composed of 11 non-executive members, four alternate members and one executive member, the CEO. The Chairperson of the Board is an independent, non-executive member and the roles and duties of the Chairperson and the CEO are clearly outlined.

2.2 The Current Board – 1 May 2020 to 30 April 2023

The current Board was appointed by the Minister effective 1 May 2020. The Board includes the Chairperson (independent), and 10 other non-executive members, four alternate members and the CEO (executive member).

Skills and experience



Dr Humphrey Mathe
Chairperson of the Board

Dr Mathe was appointed Board Chairperson on 1 May 2020. He is a qualified geologist with an MSc (Mineral Exploration) from Rhodes University, a PhD (Applied Geology) from the University of Natal, Durban and an Advanced Management Programme (AMP) from Insead, Fontainebleau, France. Dr Mathe is the Chief Executive Officer of Tranter Resources Pty Limited. Previously he was the Chief Executive Officer of Scinta South Africa Pty Limited, a coal resources company; and the Executive General Manager: Corporate Services at Exxaro Resources Limited. Prior to that he was the Chief Operating Officer and Executive Director of Eyesizwe Coal Pty Limited. He has worked in the mining industry all of his life and has more than 45 years' experience. He was a finalist in the Boss of the Year Award for 2008. Dr Mathe serves on the boards of Talent10 Holdings Pty Limited, Scinta South Africa Pty Limited (Non-Executive Chairman), Tranter Holdings Pty Limited, Tranter Resources Pty Limited (CEO), Council for Geoscience (Non-Executive Chairman), Handa Mining Corporation (TSX listed), Cape Copper Oxide Company (Non-Executive Chairman), Empowerment Capital Investment Partners (Non-Executive Chairman) and Wescoal Holdings Limited [(JSE listed) Non-Executive Chairman]. He also serves on the Investment Committee of Acrux Resources Pty Limited. He is a Fellow of the Geological Society of South Africa and registered with the South African Council for Natural Scientific Professions as a scientist.



Mr Mosa Mabuza
Chief Executive Officer

Skills and experience

Mr Mabuza is a Geologist with a Bachelor's Honours in Geology and a Postgraduate Diploma in Business Administration. He was appointed a Board member on 1 May 2020. He is the current CEO of the CGS and was appointed on 1 July 2017. Mr Mabuza served, among others, at De Beers as an Explorationist, Laboratory Geologist and Senior Business Analyst, at the DMRE as Chief Director of Mineral Promotion, at Anglo American Platinum as Head of Government Relations and at the DMRE as Deputy Director-General for Mineral Policy and Promotion.

Skills and experience



Mr Xolisa Mvinjelwa
Deputy Board Chairperson

Mr Mvinjelwa has a Bachelor of Science in Chemistry from the University of Cape Town, Master's in Business Administration from WITS Business School, a Certificate in Management Advanced Programme from WITS Business School and Diploma in Production Management from the Production Management Institute of South Africa. He was appointed a Board member and Deputy Chairperson of the Board on 1 May 2020 and 27 May 2021, respectively. He has over 30 years' experience of working within the mining industry where he started his career at Vereeniging Refractories (Anglo American subsidiary) as a Technical Assistant in the R&D Department while progressing through the company, holding various positions as a Process Controller, Quality Superintendent, Plant Manager, Market Analyst and Technical Sales Representative. He later joined Rhino Minerals (ANGLOVAAL subsidiary) as an Assistant Technical Marketing Manager where he was responsible for developing new markets globally. He has been working for IMERY'S South Africa (IMERY'S subsidiary) for the past 20 years occupying various positions over the years including Sales & Marketing Manager; Director: Special Projects; Head of HR, Policy & Strategy; Head of Strategy & Corporate Services; and Board Secretary. He is currently the Executive Director: Ethics & Transformation at IMERY'S South Africa and Chairman of the Social & Ethics Committee of the board. As an entrepreneur, he is also seated on various boards of companies which are mainly in the mining and associated industries. He is the Chairman of Coastal Fuels, which is a junior coal mining company with coal assets. He is also the Chairman of Ticamode, a B-BBEE company that is a partner of IMERY'S.



Mr Beeuwen Gerryts

Board member

Skills and experience

Mr Gerryts is a Mechanical Engineer with a Master's in Engineering Management (technology and innovation management) from the University of Pretoria. He was appointed a Board member on 1 May 2020. He is serving at the Department of Science and Innovation as a Chief Director for Technology Localisation, Beneficiation and Advanced Manufacturing. He has extensive experience in research and innovation management, ICT and product system specifications, policy development, and some publications in research and development and industrial development.



Ms Rosalind Mdubeki

Board member

Skills and experience

Ms Mdubeki was appointed a Board member on 1 May 2020. She has a National Diploma and a Bachelor's degree in Surveying and a Certificate in Project Management. She has worked for Eskom as a Survey Technician and Engineer in training and currently serves as a Surveyor General: Bloemfontein (responsible for the Free State and Northern Cape) in the Department of Agriculture Land Reform and Rural Development.



Ms Sibongile Malie

Board member

Skills and experience

Ms Malie was appointed a Board member on 27 May 2020. She has a Baccalaureus Legum (LLB) qualification and has extensive experience in the mining and minerals sector, gained over 17 years with the DMRE. She has a strong understanding of the legislative and regulatory framework of the mining and minerals sector. She is currently Director: Mineral Policy Development at the DMRE.

Ms Malie resigned from the Board on 2 July 2021.



Ms Deborah Mochothli

Board member

Skills and experience

Ms Mochothli was appointed a Board member on 1 May 2020 and has a Master's in Environment and Society, a B-Tech in Environmental Health, a BA Honours in Public Administration and a BA in Social Science. She has worked for the Department of Water and Sanitation as Chief Director for Regulations and Water Use, for South African National Parks as Manager: Environmental Audits and for Mafikeng District as Chief Environmental Health Officer.



Mr Smunda Mokoena
(Deceased)
Board member

Skills and experience

Mr Mokoena passed away on 17 March 2022 after a short illness. He is remembered for his dedication in serving the people of South Africa.

Mr Mokoena was appointed an independent member of the CGS Board on 1 May 2020. He had a BSc in Engineering, an MBA, and held a Government Certificate of Competence for Mines and Works. He had vast experience having served as a director on a number of boards. He served as Executive Director at Best Infrastructure and Investments, and at Service Delivery Solutions (Pty) Ltd. He had many years of experience in the mining and energy industries in both public and private sector sectors. Mr Mokoena served as a Part-time Member and Chairperson of the National Public Transport Regulator and as a Part-time Regulator Member of the National Energy Regulator.



Ms Lebogang Madiba
Board member

Skills and experience

Ms Madiba was appointed a Board member on 1 May 2020. She has a BCom Honours in Economics from the University of Pretoria, and a Master's of Finance in Economic Policy from the University of London (SOAS) and Executive Leadership Programme from UNISA School of Business Leadership. She currently serves as Chief Director: Economic Services in Public Finance at the National Treasury as well as the Economic Development Function Group Leader responsible for budget-related matters of selected national departments and their public entities. Currently, she is also serving as non-executive director of the Board of the South African Diamond and Precious Metal Regulator. Previous employment capacities include Deputy Treasurer: Front Office and Structured Finance for Transnet SOC LTD and Director: Country Risk within the Asset and Liability Division of the National Treasury. She was also a member of the Reserve Management Committee of the South African Reserve Bank until 2018.



Dr Thuli Khumalo
Board member

Skills and experience

Dr Khumalo was appointed a Board member on 1 May 2020. She has a PhD in Environmental Science, a Management Development Programme Certificate with the Gordon Institute for Business Science and is pursuing a Master of Philosophy in Corporate Strategy. She has served in a number of executive positions, including her current role as Deputy Director-General of Climate Change and Air Quality at the Department of Forestry, Fisheries and the Environment.

Dr Khumalo resigned from the Board on 31 October 2021.



Ms Adila Chowan
Board member

Skills and experience

Ms Chowan was appointed a Board member on 1 May 2020. She is a Chartered Accountant and holds an LLB qualification. Ms Chowan is also an admitted Advocate practising from Duma Nokwe Chambers. She has served on both public and private company boards as a Non-Executive Director and as an Audit Committee member.



Adv. Ntika Maake

Board member

Skills and experience

Adv. Maake was appointed a Board member on 1 May 2020. He has a B. Juris and LLB Degrees, Diploma in Corporate Governance (UNISA). Diploma in Project Management (Executive College) Post-Graduate Certificate in Climate Change and Energy Law, Post-Graduate Certificate in Water Law (Wits), Master of Laws in Extractive Industries in Africa, LLD Candidate in Property Law (Property Clause) (University of Pretoria). He has served at several public entities, including Eskom Holdings, the City of Tshwane and the Department of Justice and Constitutional Development. He is currently the Chairperson of the Water Tribunal at the Department of Human Settlement Water & Sanitation. He is also a Member of the Disciplinary Committee at the Premier Soccer League.



Dr Jennifer Mirembe

Board member

Skills and experience

Dr Mirembe was appointed a Board member on 27 May 2020. She has a Doctorate in Town Planning, Master's in City Planning and a number of management qualifications. She has served in several senior positions, including her current role of Director for Delivery Channel Management and Chief Town Planning at the National Department of Human Settlements.



Dr Patience Gwaze

Board member

Skills and experience

Dr Gwaze was appointed a Board member on 03 March 2022. She has a PhD in Physical and Chemical Properties of Aerosol Particles, a Master's in Geophysics, and a BSc Honours in Physics. She served in various institutes as a research scientist before joining the Department of Forestry, Fisheries and the Environment in 2010. She is currently the Chief Director: Air Quality Information, and the designated National Air Quality Officer.



Ms Pontso Tsotetsi

Board member

Skills and experience

Ms Tsotetsi was appointed an alternate Board member to Ms R Mdubeki on 1 May 2020. She has a Bachelor's in Land Surveying, a Diploma in Land Surveying and a Certificate in Advanced Management Development Programme. She is currently employed as the Deputy Surveyor General: Gauteng at the Department of Agriculture Land Reform and Rural Development.



Mr Paul Nel

Board member

Skills and experience

Mr Nel was appointed an alternate Board member to Ms D Mochotlhi on 1 May 2020. He has a BCompt Honours degree and is a Chartered Accountant and Information Systems Auditor. He has served as Chief Director at the Department of Water and Sanitation, Managing Director for Integrated Business Control South Africa, Senior Chief Financial Officer for several banking institutions and an Audit Manager for Deloitte.



Mr Sabelo Malaza

Board member

Skills and experience

Mr Malaza was appointed an alternate Board member to Dr Patience Gwaze on 1 May 2020. He has a Master's in Business Administration, B Phil degree in Knowledge and Information Management, Bachelor of Science degree as well as a Management Development Programme with the Gordon Institute for Business Science. He is an Environmental Management Practitioner with more than 18 years' experience in the public sector. He has served at the Department of Water and Sanitation and the Department of Environment, Forestry and Fisheries in diverse capacities. He is currently a Chief Director responsible for processing environmental impact assessment at the Department of Fisheries, Forestry and Environment.



Mr Andries Moatshe

Board member

Skills and experience

Mr Moatshe was appointed an alternate Board member to Ms Malie on 1 May 2020. He has a Master's in Environmental Management and a Higher Diploma in Public Health. He is currently working for the DMRE as a Chief Director for Mine Environmental Management and has contributed to the department's policy development.

The Board upholds and embraces the fiduciary duties outlined in Section 50 of the PFMA Act No. 1 of 1999, as amended, which require that, among others, Board members:

- a) Exercise the duty of utmost care to ensure reasonable protection of the assets and records of the organisation;
- b) Act with fidelity, honesty, integrity and in the best interest of the CGS in managing the financial affairs of the CGS;
- c) Not act in a way that is inconsistent with responsibilities assigned to Board members;
- d) Not use their position and/or privileges or confidential information they obtained as members of the Board for personal gain or to improperly benefit another person, and
- e) Disclose and declare any direct or indirect interests that the member or spouse or close family may have that could be a potential conflict of interest.

The Board implements annual declarations of interest and a declaration of interest at every committee and Board meeting to ensure that members disclose real or perceived conflicts in any matter before the Accounting Authority. Board members must withdraw from proceedings when the matter is considered unless the Board decides otherwise.

Subject to the provisions of the Geoscience Act No. 100 of 1993 as amended, read with the PFMA, the Board is accountable for the performance of the CGS. The Board shall exercise control and manage the affairs of the CGS, set the strategic direction of the organisation, and approve the vision, mission, strategic objectives and policies of the organisation.

In addition, the Board monitors compliance with policies and performance with scientific, administrative and financial objectives. The Board is solely responsible for ensuring that the CGS has and maintains effective, efficient and transparent systems of financial management, risk management and internal audit, and fair, equitable, competitive and cost-effective procurement.

The Board has the authority to lead, control and manage the business of the CGS, and has adopted a comprehensive delegation of authority framework in accordance with Section 56 of the PFMA, which delegates the day-to-day management of the affairs of the CGS to the CEO. The delegation of authority policy does not in any way divest the Board of its responsibility and accountability for the organisation.

2.3 Board Charter and Board Responsibilities

The Board Charter, which is reviewed annually, provides for the following:

- a) Leadership role of the Board, judgment and strategic direction;
- b) Board composition;
- c) Accountability, fiduciary duties and responsibilities;
- d) Code of conduct for the Board;
- e) Constitution and appointment of committees;
- f) Governance and meeting procedures;
- g) Management of conflict of interest;
- h) Responsibility for the adoption of strategic plans and the monitoring of operational performance and management;
- i) Determination and approval of policies;
- j) Risk management, and
- k) Board selection, orientation and evaluation.

2.4 Board Induction and Orientation

The CGS has a Board induction programme.

2.5 Training of New Board Members

A director development programme ensures that Board members are adequately and continually trained and have the necessary knowledge of and development on best practices and principles of corporate governance. Adequate and deliberate courses are identified with reputable institutions to strengthen the Board's skills and participation. Through quarterly reports and policies, Board members are kept abreast of CGS governance structures, strategic projects and organisational performance to enable them to fulfil their duties and responsibilities.

2.6 Board Meetings

The Board held six meetings in 2021/22. The accompanying tables detail the attendance of meetings by each Board member during the year.

Table 5: Board meetings

Board members	28 April 2021	27 May 2021	29 July 2021	28 October 2021	27 January 2022	Number of meetings attended
Dr H Mathe (Chairperson)	Present	Present	Present	Present	Present	5
Mr M Mabuza (CEO)	Present	Present	Present	Present	Present	5
Mr X Mvinjelwa (Deputy Chairperson)	Present	Present	Present	Present	Present	5
Dr T Khumalo [#]	Present	Present	Apology	-	-	2/3
Mr S Malaza	Present	Present	Present	Present	Present	5
Ms D Mochotlhi	Apology	Apology	Apology	Apology	Apology	0 (deployed for the period. Alternate member present in all meetings)
Mr P Nel [*]	Present	Present	Present	Present	Present	5
Ms R Mdubeki	Apology	Present	Present	Apology	Present	3
Ms P Tsotetsi [*]	Apology	Apology	Apology	Apology	Apology	-
Adv. N Maake	Present	Present	Present	Present	Present	5
Mr S Mokoena	Present	Present	Present	Present	Present	5
Ms A Chowan	Present	Apology	Present	Present	Present	4
Dr J Mirembe	Present	Present	Present	Present	Apology	4
Mr B Gerryts	Present	Present	Present	Present	Present	5
Mr A Moatshe [*]	Apology	Present	Apology	Apology	Present	2
Ms S Malie [#]	Present	Present	-	-	-	2
Ms L Madiba	Apology	Present	Apology	Apology	Present	2

* means the member is an alternate

means the member resigned

- means the member ceased to be a member

2.7 Board Remuneration

The remuneration of Board members is determined by the Minister of Mineral Resources and Energy in consultation with the Minister of Finance, as disclosed in note 12 of the notes to the financial statements.

Table 6: Remuneration of board members (2021/22)

Name	Remuneration	Other allowance	Other re-imbursments*	Total
Dr H Mathe	44 606	-	-	44 606
Dr J Mahachi	-	-	-	-
Mr S Mokoena	111 888	-	969	112 857
Adv. N Maake	126 468	-	-	126 468
Ms A Chowan	96 336	-	-	96 336
Mr X Mvinjelwa	129 218	-	-	129 218
Dr J Mirembe	-	-	-	-
Dr T Khumalo	-	-	-	-
Ms S Malie	-	-	-	-
Mr S Malaza	-	-	-	-
Mr P Nel	-	-	-	-
Ms R Mdubeki	-	-	-	-
Ms D Mochothli	-	-	-	-
Ms P Tsotetsi	-	-	-	-
Ms L Madiba	-	-	-	-
Mr A Moatshe	-	-	-	-
Mr B Gerryts	-	-	-	-
Dr P Gwaze	-	-	-	-

* Other re-imbursments include travel and subsistence allowance

2.8 Committees of the Board

In terms of Section 15 of the Geoscience Act No. 100 of 1993 as amended, the Board may establish a committee that shall, subject to the direction of the Board, perform such functions of the Board as determined from time to time. Furthermore, Section 56 of the PFMA Act No. 1 of 1999, as amended provides that some Board responsibilities may be delegated to Board committees and the management of the CGS without divesting the Board of its roles and responsibilities. The Board committees are, therefore, required

to make recommendations to the entire Board before strategic decisions are implemented by management. Mandated by Section 15 of the Geoscience Act No. 100 of 1993 as amended, Section 56 of the PFMA and the recommendations of the King Code, the Board has constituted and delegated some of its functions to the following four Board committees:

- Audit and Risk Committee;
- Finance Committee;
- Technical Committee; and
- Personnel, Remuneration and Transformation Committee.

2.9 Audit and Risk Committee

The Audit and Risk Committee was established in terms of Section 77 of the PFMA and National Treasury Regulation 27. The committee discharges its responsibilities in terms of the Audit and Risk Committee Charter, which sets out its committee composition, roles and responsibilities. It continually monitors the quality and reliability of CGS financial information used by the Board, financial statements issued by the CGS and various functions in the organisation. It ensures that emerging risks are timeously identified and that appropriate and effective control measures are put in place to mitigate these risks. The composition and meeting attendance of the Audit and Risk Committee from 1 April 2021 to 31 March 2022 are reflected in the following table.

Table 7: Audit and Risk Committee meetings

Committee members	2021/2022						Meetings attended
	20 April	20 May	27 July	30 July	20 October	20 January	
Ms K Maroga (Chairperson)	Present	Present	Present	Present	Present	Present	6
Ms D Morabe	Present	Present	Present	Present	Present	Apology	5
Mr O Willcox	Present	Present	Present	Present	Present	Present	6
Dr T Khumalo [#]	Present	Apology	Present	Present	Present	Present	5
Adv. N Maake	Present	Present	Present	Present	Present	Present	6
Ms A Chowan	Present	Present	Present	Present	Present	Present	6
Dr S Mngadi	Present	Present	Present	Present	Present	Present	6
Mr S Xulu	Present	Present	Present	Apology	Present	Present	5
Ms M Seane	Present	Present	Present	Present	Present	Present	6

[#] means the member resigned

2.9.1 Audit and Risk Committee Report

The Audit and Risk Committee reports that it has complied with its responsibilities arising from Section 77 of the PFMA and National Treasury Regulation 27.1. The committee also reports that it has adopted the Audit and Risk Committee Charter as its appropriate terms of reference, has regulated its affairs in compliance with this charter and has discharged all its responsibilities contained therein.

In executing its duties, the committee has performed, among others, the following functions:

2.9.2 Evaluation of Internal Controls

The committee has directed, monitored and evaluated the activities of the Internal Audit function. Through the Internal Audit function, the committee constantly monitored the effectiveness of the internal controls and assessed whether the Internal Audit function fulfilled its roles. The External Quality Assurance Review was conducted as

per the requirements of the International Standards for Professional Practice for Internal Auditing, Standards adopted by the Institute of Internal Auditors. The overall opinion issued by the External Assessor is that the internal audit activity Generally Conforms to the Standards and Code of Ethics. During 2021/22, the internal controls were reported to have significantly improved in some areas, and overall control rating was reported to require improvement. There is a room for improvement in:

- Supply Chain Management;
- Asset Management;
- Talent Management;
- Performance Information;
- Information Technology;
- Risk and Compliance Management; and
- Project Management.

The committee reports that corrective measures were implemented to resolve all findings of internal control weaknesses.

2.9.3 Evaluation of the Annual Report

The committee has:

- a) Reviewed the CGS's report on corporate performance information;
- b) Reviewed the CGS accounting policies and practices;
- c) Reviewed the adequacy and usefulness of the financial information provided to the Auditor-General;
- d) Evaluated, reviewed and discussed with the Auditor-General the audited Annual Financial Statements included in the annual report;
- e) Reviewed the Auditor-General's management report and the Auditor's report, and
- f) Based on the information provided to the committee, considered and concluded that the Annual Financial Statements comply with the requirements of the PFMA, National Treasury Regulations and the SA Standards of GRAP.

2.9.4 Risk Management

The committee reports that during the year under review it approved the Strategic Risk Register, Anti-Fraud and Corruption Policy as well as the Enterprise Risk and Compliance Management Policy, which was subsequently communicated to employees and incorporated in the culture of the CGS. The committee reviewed:

- a) The organisation's risk appetite and tolerance levels; and
- b) The significant financial risk exposures, and directed management to monitor and develop mitigation strategies for such exposures, including reputational, operational, fraud, strategic, information technology and communications systems, as well as disaster recovery and business continuity risk.

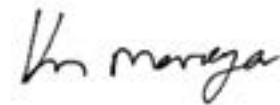
2.9.5 Evaluation of Financial Statements

The committee reviewed and discussed with the Auditor-General the financial statements of the CGS for the year ended 31 March 2022. The committee also reviewed the management letter of the Auditor-General and management responses thereto. The committee is of the opinion that the financial statements are compliant, in all material respects, with the requirements of the PFMA and SA Standards of GRAP.

2.9.6 Auditor's Report

The Audit and Risk Committee is pleased to present its report for the financial year ended 31 March 2022.

The committee reviewed the prior-year audit findings implementation plan and reports that a significant number of findings have been resolved. The committee will ensure that management resolves all audit findings that are still in progress. The committee concurs and accepts the conclusions of the Auditor-General on the financial statements and is of the opinion that the audited Annual Financial Statements should be accepted and read together with the report of the Auditor-General.



Ms KM Maroga
Chairperson
Audit and Risk Committee

31 July 2022

2.10 Finance Committee Responsibilities and Composition

The Finance Committee of the CGS is mandated to consider and recommend for the Board's approval the following matters:

- a) Significant financial activities;
- b) Liquidity and financial condition of the CGS;
- c) Write-off of bad debts;
- d) Material variances in the approved annual and/or revised budgets in accordance with the Materiality and Significance Framework Plan;

- e) Proposed capital and operating budget for capital expenditures;
- f) Financial statements for the annual report;
- g) All policies that have financial implications; and
- h) Corporate performance information management against the approved budget.

The Finance Committee consists of six non-executive members. Member details are presented in the following table, with meeting attendance from 1 April 2021 to 31 March 2022.

Table 8: Finance Committee meetings

Committee members	2021/2022					Meetings attended
	20 April	20 May	27 July	20 October	20 January	
Mr P Nel (Chairperson)	Present	Present	Present	Present	Present	5
Mr S Mokoena	Present	Present	Present	Present	Present	5
Ms A Chowan	Present	Present	Present	Present	Present	5
Ms D Morabe	Apology	Present	Present	Present	Present	4
Dr J Mahachi	Present	Present	Present	Present	Present	5
Adv. N Maake	Present	Present	Present	Present	Present	5
Mr M Mabuza	Present	Present	Present	Present	Present	5
Mr O Willcox	Present	Present	Present	Present	Present	5

2.11 Technical Committee

The Technical Committee of the CGS is mandated to consider and recommend for the Board's approval the annual scientific and strategic technical programme (i.e. GTP) of the organisation, evaluate the scientific and technical output and oversee the implementation of the ICT strategy as well as the end-term evaluations.

The composition and meeting attendance of the Technical Committee from 1 April 2021 to 31 March 2022 are reflected in the following table.

Table 9: Technical Committee meetings

Committee members	2021/22					Meetings attended
	19 April	19 May	21 July	19 October	19 January	
Mr B Gerrys (Chairperson)	Present	Present	Present	Present	Present	5
Mr X Mvinjelwa	Present	Present	Present	Present	Present	5
Dr M Mayekiso	Present	Apology	Present	Present	Present	4
Dr J Mahachi	Present	Present	Present	Present	Present	5
Mr S Malaza	Apology	Present	Present	Present	Present	4
Dr S Mngadi	Present	Present	Present	Present	Present	5
Mr S Mokoena	Present	Present	Present	Present	Present	5
Mr M Mabuza	Present	Present	Present	Present	Present	5

2.12 Personnel, Remuneration and Transformation Committee

The Personnel, Remuneration and Transformation Committee is mandated to consider and recommend for the Board's approval the human resources strategies and policies of the CGS, the organisational remuneration model, remuneration for executive management and annual salary increases. It also evaluates and makes recommendations

on the payment of performance bonuses and considers organisational performance reports on labour-related matters, employment equity, and employee training and development matters.

The composition and meeting attendance of the Personnel, Remuneration and Transformation Committee from 1 April 2021 to 31 March 2022 are reflected in the following table.

Table 10: Personnel, Remuneration and Transformation Committee meetings

Committee members	2021/22					Meetings attended
	19 April	19 May	21 July	19 October	19 January	
Ms R Mdubeki (Chairperson)	Present	Present	Present	Apology	Present	4
Dr J Mirembe	Present	Apology	Apology	Apology	Apology	1
Ms S Malie [#]	Present	Apology	-	-	-	1
Ms M Seane	Present	Present	Present	Present	Present	5
Mr X Mvinjelwa	Present	Present	Present	Present	Present	5
Dr M Mayekiso	Present	Apology	Present	Present	Present	4
Mr M Mabuza	Present	Present	Present	Present	Present	5

[#] means the member resigned

- means the member ceased to be a member

3

Risk Management

The CGS Board is responsible for entrenching risk management governance through effective leadership. Management accounts to the Board for the integration of risk management into CGS's daily operations and for the implementation and monitoring of the risk management process. The Audit and Risk Committee is an independent committee responsible for overseeing risk exposure related to governance and risk management at the CGS. The CGS develops the strategic risk register annually based on the organisational strategy, which is monitored quarterly and which provides assurance to the Board that the CGS is adequately managing identified risks. The strategic risk register is also workshopped with the Board on an annual basis. Operational risk is managed through operational risk registers and the GTP risk register.

The organisational governance risk management structure of the CGS is presented in the following figure.



Figure 28: Organisational governance risk management structure of the CGS

4

Internal Control

Management is responsible for designing, implementing and continually reviewing internal controls to provide assurance on the effectiveness and efficiency of operations and on the reliability of financial reporting, and for safeguarding and maintaining accountability for the assets of the organisation. These controls are monitored throughout

the CGS by management and employees, with the necessary segregation of duties. Internal Audit performs independent reviews on the adequacy and effectiveness of these controls as part of the approved annual internal audit plan, and the internal audit reports are presented to the Audit and Risk Committee.

5

Internal Audit

The internal audit function was established in terms of the PFMA and has adopted the risk-based audit approach aligned to the International Standards for the Professional Practice of Internal Auditing. A formal internal audit charter was reviewed and approved by the Audit and Risk Committee.

An annual internal audit plan was approved by the Audit and Risk Committee, and internal audit reports were presented to the committee quarterly. Follow-up audits were conducted on prior-year audit findings. Internal Audit also performed preliminary investigations on matters reported on the whistleblowing hotline and ad hoc assignments requested by management.

6

Compliance with Laws and Regulations

The CGS complies with National Treasury Regulations through the PFMA compliance checklist and calendar, which are continually monitored and updated. Compliance with laws and regulations is monitored through the activities of the Audit and Risk Committee and by the Risk and

Compliance unit at an operational level, based on the regulatory universe for the CGS. Compliance checklists are also developed for all applicable laws and regulations listed in the regulatory universe and monitored in a systematic way.

7

Fraud and Corruption

The CGS has a legal responsibility in terms of the PFMA to take steps to prevent unauthorised, irregular, fruitless and wasteful expenditure and losses resulting from criminal conduct. The Anti-Fraud and Corruption Policy was reviewed and approved in January 2021, and an anonymous whistleblowing tip-off is in place. This function is administered externally by Deloitte. Reports are issued monthly, and fraudulent conduct is investigated by the internal auditors and reported to the Audit and Risk Committee. Fraud risks are identified during the risk assessment process and monitored on the various risk registers at the CGS.



Research Vessel Nkosi used for the Offshore Geoscience Mapping

8

Minimising Conflict of Interest

All suppliers of goods and services to the CGS are required to complete standardised National Treasury documentation (SBD4 Declaration of Interest). In view of possible allegations of favouritism and conflict of interest, should the resulting bid, or part thereof, be awarded to persons employed by the CGS, or to persons connected with or related to them, it is required that the bidder or his

or her authorised representative declare his or her position to the evaluation/adjudication authority. In addition, staff members of the CGS involved in the Bid Specification, Bid Evaluation and Adjudication Committee members are required to complete declaration and non-disclosure forms at each meeting.

9

Code of Conduct

All CGS staff members abide by the Code of Ethics and Conduct. The CGS is committed to ethical and fair business dealings and promotes a corporate culture that is non-sectarian, and is socially and environmentally responsible. It does so by subscribing to the following values and principles:

- Fairness and integrity in all business dealings, including the ethical handling of actual or apparent conflicts of interest between personal and professional relationships;
- Respect for the human rights and dignity of all employees;
- Acceptance of diverse cultural, religious, race, gender and sexual orientations;

- Honesty, transparency and accountability; and
- Adherence to sound standards of corporate governance and to laws.

In terms of the Code of Ethics and Conduct, all persons representing the CGS must uphold the highest standard of business ethics and integrity. Furthermore, all staff, contractors, consultants and others acting on behalf of the organisation must accurately and honestly represent the organisation and not engage in any activity or scheme intended to defraud anyone of money, property or services. The reputation and integrity of the CGS are central to its ability to operate as an effective state-owned organisation.

10

Board Secretary

The Board Secretary provides advisory services to the Board and notifies Board members of regulatory changes and new developments in corporate governance. Furthermore, the Board Secretary guides the Board and Board committees on

how to discharge their responsibilities in the best interests of the organisation. The Board Secretary facilitates and attends Board and Board committee meetings, and takes custody of all policy documents.

11

Quality Assurance

To produce accurate and reliable analytical test results and to be recognised as a facility with an effective quality management system, the CGS is continuing with ISO 17025 accreditation preparations for its analytical laboratories. This is an important project because an accredited analytical laboratory gives it a competitive edge commercially, and compliance with health and safety regulations. Accredited laboratories ultimately lead to improved customer satisfaction and augment brand equity. The validation of analytical test methods is one of the key requirements for ISO 17025 accreditation process. Controlled accommodation and environmental conditions such as humidity and temperature is a key requirement

for proper validating of analytical test methods. Currently, these accommodation and environmental conditions are not controlled. The CGS is in the process to implement a heating, ventilation and air conditioning system to meet these requirements. This system is at 92% completion and it is expected to be commissioned by the end of August 2022, after which the validation of test methods will resume in earnest. Progress on planned activities towards ISO 17025 accreditation is at 35% as of end of financial year 2021/22. The ISO 9001 certification process is underway and the implementation of organisation-wide planned activities is at 19% and progress is expected to increase significantly during 2022/23.

12

Health, Safety and Environment

The CGS continues to improve towards provision and maintenance of a safe and healthy work environment to all. To achieve that, management continues to enhance compliance to the Occupational Health and Safety Act, No. 85 of 1993 and the Regulations, and the National Environmental Management: Waste Act, 2008 (No. 59 of 2008): Waste Classification and Management Regulations. A comprehensive occupational, health and safety checklist, which is a standing agenda item at meetings of the Audit and Risk Committee of the Board is a compliance monitoring tool and it is also used for documenting improvements that are being implemented. The compliance checklist also contributes towards the organisation risk combined assurance framework.

Management also implemented measures to prevent the spread of COVID-19 in the workplace and exposure to persons who interact with the organisation in line with

Government Regulations and provision of suitable and required personal protective equipment.

CGS operations produce various types of waste that requires proper management in line with applicable legislation such as National Environmental Management: Waste Act, 2008 (No. 59 of 2008). This is crucial to protect the environment and to ensure the health and safety of employees and the citizens at large. Certain waste can be hazardous and pollute the environment. Bad waste management practices can also cause environmental degradation, which may cause serious medical conditions in both humans and animals. The waste management project is underway and full implementation is envisaged during 2022/23. The CGS also ensures that when undertaking operations with potential environmental impact, this impact is avoided or minimised as far as reasonably practicable.



Drones owned by the CGS

13

Communication and Stakeholder Engagement Programme

13.1 Building the CGS Brand

During 2021/22, the CGS coordinated brand awareness activities to illuminate its work among stakeholders. This involved events, campaigns, stakeholder engagements, participation in conferences, media relations, and establishing and maintaining strategic collaborations and partnerships.

Brand-building highlights included:

- A media article was published in the Mining Weekly publication on the Council for Geoscience going live with its digital data portal.
- A media advertorial was published in the Green Economy Journal which focused on prioritising environmental issues.
- A media article was published on News24 on the pilot site for the CCUS project.
- A media advertorial was published in the Mining Elites publication centered on environmental sustainability.
- CGS women were profiled in the Most Inspiring & Powerful Women Magazine.
- The CGS was featured in the Sunday Times in an article focusing on the pervasive sinkhole challenge.
- A number of articles were published in digital media platforms such as Eyewitness News, My Broadband, News24, IOL, and Times Live on the various tremors that occurred across the country.
- A media advertorial was published in the Mining Review Africa on CGS's role as a precursor to mining exploration in South Africa.
- An article was featured in an international publication focusing on hydrography and the marine environment in South Africa.
- A media advertorial was published in the African Business magazine focusing on reimagining mineral exploration.
- There were a total of 24 advertorials that were published in various trade and mainstream media.

- Real-time newsfeeds about organisational developments, stakeholder engagement initiatives, campaigns, events and geoscience information have contributed to the steady growth of followers on CGS social media platforms such as Facebook, Twitter and LinkedIn.

Media interviews included:

- Dr Taufeeq Dhansay was interviewed on Radio 786 regarding a volcano that erupted in the Democratic Republic of Congo.
- The CEO of the CGS, Mr Mosa Mabuza, was interviewed by Power FM's Thabiso Tema on the Kwa-Hlathi diamond rush.
- The eNCA's Sally Burdett interviewed Dr David Khoza regarding the Haiti earthquake that occurred.
- The CEO was interviewed on Power FM on the assessment of potential mineralisation in Limpopo.
- Eswatini TV interviewed Mr Mosa Mabuza after the launch of CGS's airborne geophysics survey in Eswatini.
- Mr Willem Meintjes was interviewed on Radio 702 regarding the sinkholes.

In addition, the CGS responded to a plethora of ad hoc print and online media enquiries on earthquakes as and when these occurred.

Campaigns and events included:

Key campaigns and events during the year:

- The CGS profiled its youth during the month of June on social media platforms.
- During Women's Month, a social media campaign, themed 'Women in Geoscience', was conducted on various platforms to showcase some of the CGS's inspiring female employees.
- The year under review saw the official launch of the airborne geophysics survey by the CGS in partnership with the Eswatini government.

- September saw the celebration of Heritage Month in various CGS offices and social media platforms, which profiled South Africa's palaeoheritage.
- As part of creating awareness of the 16 days of Activism for No Violence against Women and Children campaign, a fence wrap was installed at the CGS head office to encourage employees to report abuse or violence to law enforcement authorities.
- A year-end video message from the CEO, Mr Mosa Mabuza, was sent to employees. The season's greetings message was shared with followers on various social media platforms.
- The CGS participated in the DMRE-coordinated mining investment conferences in Limpopo, North West and Northern Cape. The CEO presented on the mineral potential in these provinces that could stimulate new investment opportunities.
- The CGS corporate videos were profiled on the Green Economy Journal's YouTube channel, the aim being to showcase its products and services.
- Radio promos were aired on Leandra FM, Rise FM, Mix FM and VOC FM in Mpumalanga to create awareness about the CCUS project.
- The CGS participated in the Petroleum Agency South Africa Upstream Training Trust's career expos in Limpopo, KwaZulu-Natal and Western Cape provinces to expose learners to and educate them on careers in geosciences.

13.2 Stakeholder Engagement

The CGS understands that, for it to deliver on its mandate, it must engage and communicate with a broad spectrum of stakeholders, including employees, international, national and provincial departments, municipalities, traditional authorities, state-owned entities, farmers, environmental non-government organisations, academia and professional bodies, private companies and the public.

During the year under review, the CGS adopted an integrated approach to stakeholder engagement that includes understanding, aligning and managing stakeholder expectations, all of which are fundamental to corporate responsibility, good governance and transparency. This approach focuses on building strong constructive and interpersonal relationships with key stakeholders, particularly in areas conducive to the successful implementation of important CGS projects. The management, scientific, technical and support staff of the organisation alike have embraced this approach, which is now beginning to bear fruit for project implementation.

Numerous engagements were held with key stakeholders to enable seamless implementation of the GTP, and corporate-wide projects and events. Given the unprecedented socio-economic impact associated with COVID-19, the CGS was directed by the DMRE to lead the country's Economic Reconstruction and Recovery Programme in terms of geoscience solutions for a prosperous society and to develop an exploration implementation plan. Several projects were prioritised to address the country's economic challenges.

Limpopo: Giyani Greenstone Belt project

The CGS delegation, led by the CEO, presented the Giyani Greenstone Belt progress report to the stakeholders that were consulted prior and during the implementation of the geoscientific research in Giyani. These stakeholders included but were not limited to municipalities, traditional leaders and communities. During the progress report phase, stakeholders were informed of the planned drilling programme focusing on the mineral targets.

The CGS continued with its commitment to build capacity in communities where it operates and as such a cumulative total of 44 casual workers were employed on a rotational basis to assist the geophysics, geochemistry and engineering and geohazards teams. To broaden the body of knowledge, the CGS entered into a collaborative framework with the University of Venda.

KwaZulu-Natal and Free State: IMMP

The CGS held a series of stakeholder meetings with the King Cetshwayo District, iLembe District, uMzinyathi District, Nkandla Local Municipalities and Traditional Councils in preparation of the Geothermal Energy Potential of South Africa undertaken in Shu Shu Hot Springs, KwaZulu-Natal.

Insofar as the groundwater studies and mineral potential assessment is concerned, the CGS, led by the CEO, held a series of stakeholder meetings in KwaZulu-Natal and the Free State to provide feedback on the status of geoscientific research undertaken. Following the changes in local government, the CGS held introductory meetings with various stakeholders where new leadership assumed office after the elections. Among others, the uThukela District, Alfred Duma Local Municipalities in KwaZulu-Natal and the Maluti-a-Phofung Local Municipality in the Free State have new leadership within the study area.

Eastern Cape and KwaZulu-Natal: Insizwa Complex

The CEO led introductory meetings with stakeholders such as the Ugu District Municipality in KwaZulu-Natal and the Alfred Nzo District Municipality in the Eastern Cape as well as traditional councils in relation to the Insizwa Complex project. Generally, the stakeholders were receptive of the planned research and the scientists commenced with fieldwork in September 2021, focusing on collecting geochemical and soil samples.

Western Cape: Karoo Deep Drilling Programme

The KDD Programme presented an opportunity to cement synergic relations with the municipality, the farming community, communities and leadership. As such, concerted efforts were dedicated to iterative engagements throughout the lifespan of a drilling programme in Beaufort West to ensure seamless implementation of the project. Drilling reached its technical capacity at a depth of 2 978 m.

Mpumalanga: Carbon Capture Utilisation and Storage

As any novel technology, the CCUS project sought iterative engagement meetings with key stakeholders in Mpumalanga ranging from provincial government, district and local municipalities, the farming community, community members and environmental non-governmental organisations. The CEO led a series of meetings with the provincial and municipal leadership wherein unequivocal support was granted for the programme. This has culminated in a collaborative framework between the CGS and the Govan Mbeki Local Municipality which has leased 20 hectares of land (farm Goedhoop 308/02) for the implementation of CCUS.

In addition, the project has received considerable support internationally with the first disbursement of the World Bank Carbon Capture and Storage Capacity Building Trust Fund since the approval of the change of implementing agent from the South African National Energy Development Institute to the CGS.

Several agreements were reached between the CGS and stakeholders in response to the Intergovernmental Relations Framework and the DDM championed by the Presidency as well as diplomacy. The agreements involved but not limited to the:

- SA Navy;
- African Exploration Mining and Finance Corporation;
- Govan Mbeki Local Municipality;
- National Home Builders Registration Council;
- Orion Minerals Limited;
- University of Johannesburg;
- Cape Peninsula University of Technology; and
- Science and Technology Research Partnership for Sustainable Development.

13.3 Corporate Social Responsibility

CGS-branded face masks were donated to stakeholders such as traditional councils in Giyani, the Nhlanguano Traditional Council, the KwaZulu-Natal Department of Economic Development and Traditional Affairs, Mpumalanga AgriSA, the Secunda Farming Association, and the Alfred Nzo Local House of Traditional Leaders.

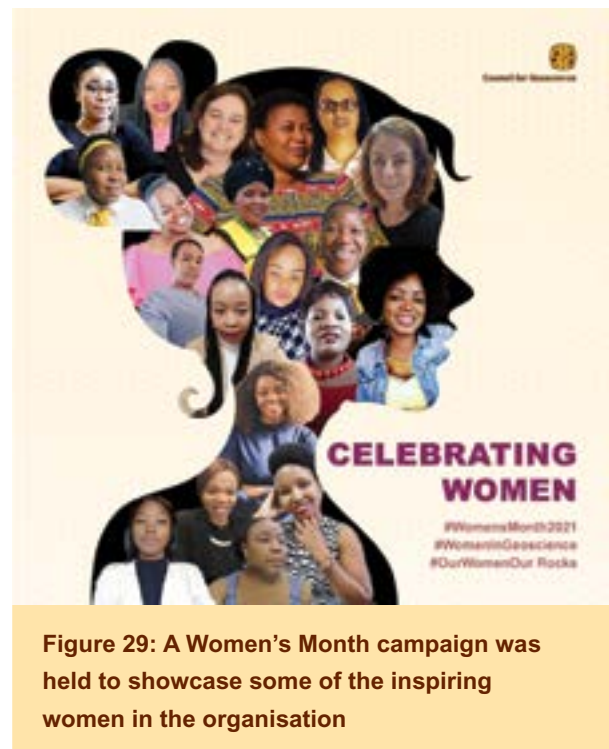


Figure 29: A Women's Month campaign was held to showcase some of the inspiring women in the organisation



Figure 30: Dr Souleymane Diop asking questions during the UTT Career Expo in the Limpopo Province



Figure 31: Dr Taufeeq Dhansay explaining geology to learners at the Western Cape UTT Career Expo



Figure 32: Ms Ndivhuwo Mukosi explaining a geological map to Hosi Tshabalala in Siyandhani Traditional Council



Figure 33: Swaziland Airborne Geophysics Survey Launch at the Kingdom of Eswatini



Figure 34: CGS participation at the DMRE Mining Investment Conference in the North West Province

14

B-BBEE Compliance Performance Information

The following table has been completed in accordance with the compliance to the Broad-based Black Economic Empowerment (B-BBEE) requirements of the B-BBEE Act of 2013 and as determined by the Department of Trade, Industry and Competition.

Table 11: B-BBEE compliance performance information

Has the Department / Public Entity applied any relevant Code of Good Practice (B-BBEE Certificate Levels 1–8) with regards to the following:		
Criteria	Response Yes/No	Discussion <i>(include a discussion on your response and indicate what measures have been taken to comply)</i>
Determining qualification criteria for the issuing of licences, concessions or other authorisations in respect of economic activity in terms of any law?	No	The CGS does not issue licences, it is not within its mandate. The issuing of mining licences is done by the DMRE.
Developing and implementing a preferential procurement policy?	Yes	Preferential procurement is incorporated in the Supply Chain Management Policy and implementation is on-going depending on new National Treasury statutes.
Determining qualification criteria for the sale of state-owned enterprises?	No	It is not within the mandate of the CGS to sell state-owned enterprises.
Developing criteria for entering into partnerships with the private sector?	Yes	The CGS partners with the public sector and each partnership has its own unique requirements depending on the collaborative expertise and agreements.
Determining criteria for the awarding of incentives, grants and investment schemes in support of Broad-based Black Economic Empowerment?	No	The CGS does not issue grants and investments schemes; however, bursaries are issued based on the CGS bursary policy.



Grotesque weathering of Silurian-aged sandstones of the Silurian-aged Skurweberg Formation at Stadsaal, Cederberg with the Klipbokberg in the background

Part D

Human Resources Management

This section presents key focus areas of the Human Resources department for the year under review, including training and transformation initiatives.

It also includes:

- Performance measurement systems to assess performance;
- Management of employee wellness to ensure the health and wellbeing of staff;
- Key human resources activities for the year;
- Human capital challenges;
- Human resources goals; and
- Human resources statistics.

The CGS regards its staff members as a resource pivotal to the delivery of its strategic objectives. To this end, the Human Resources department is a strategic partner in the organisation whose role is to ensure that the CGS attracts and retains the required resources and expertise to carry out its legislative mandate and strategic objectives.

1

Overview of Human Resources Matters

1.1 Staff Complement

The CGS boasts a staff complement of 431 across six regions, namely Pretoria (Head Office), Gqeberha, Limpopo, Bellville, Pietermaritzburg and Upington. Of these, 57% are in core (scientific) functions and 43% in support functions. The organisation invests significantly in its staff with major focus on youth and women employment, with 26% of the workforce falling in the youth cohort and females constituting 49% of staff, as depicted in Figure 35.

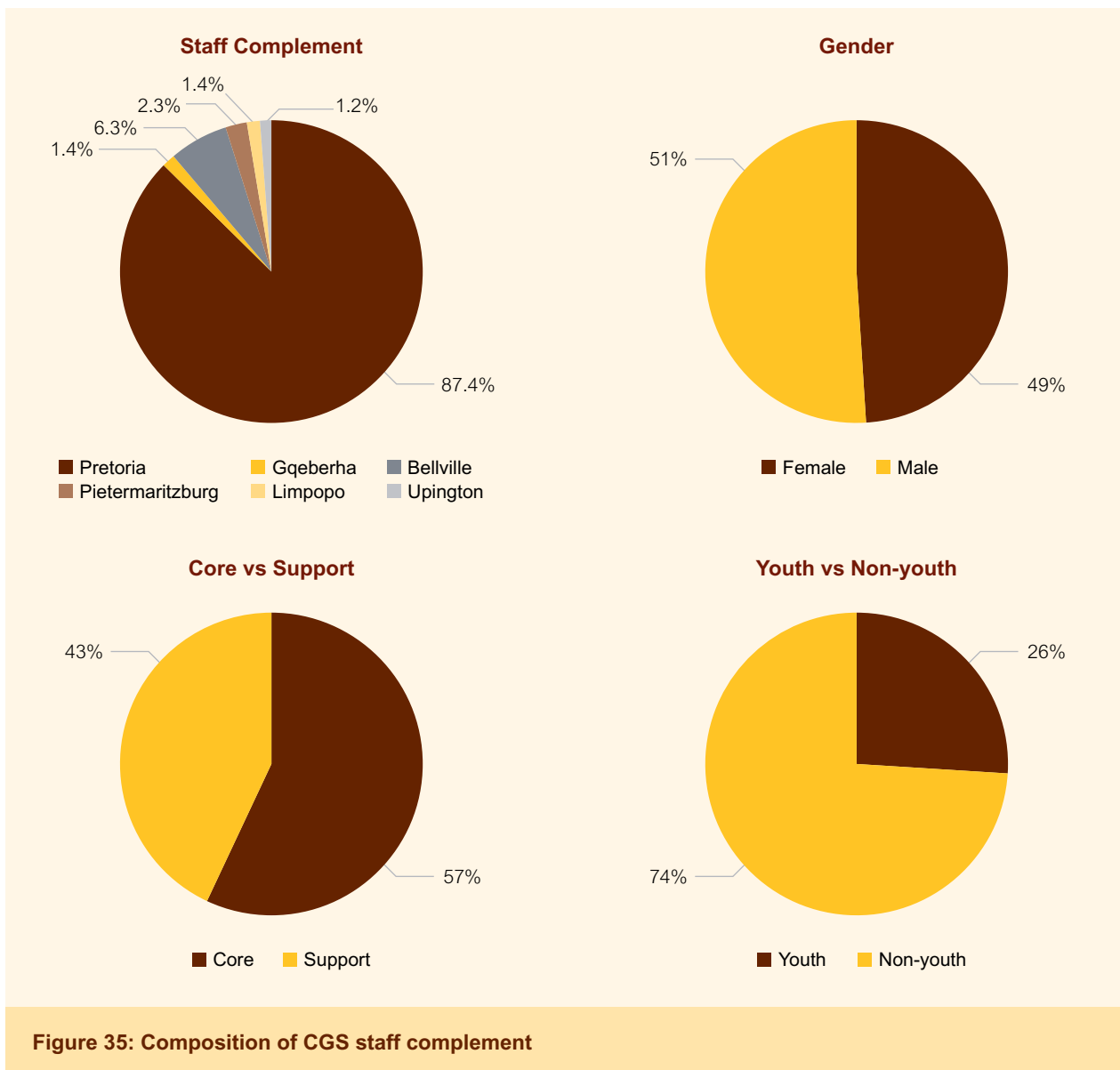


Figure 35: Composition of CGS staff complement

COVID-19

A total number of 258 staff tested for COVID-19 in the year under review with the 70 testing positive. The CGS did not have any fatalities and all the staff members who tested positive recovered. The CGS continues to put measures in place in line with the government regulations to curb the spread of the pandemic.

1.2 Key Human Resources Activities and Achievements During the Year

- A workshop in managing discipline in the workplace was held in the year under review. The workshop capacitated supervisors and managers in managing discipline in the workplace.
- The structure implementation has been rolled out in the Integrated Geoscience Development and Geoscientific Services Division. The process is still ongoing and is anticipated to be finalised in the 2022/23 financial year.
- During the year under review, the CGS participated in career fairs in the provinces of the Western Cape, Kwazulu-Natal and Limpopo. This intervention is part of an ongoing endeavour to encourage the youth to consider geoscience as a preferred career.
- Another key achievement in the year under review relates to an inclusive workforce for people living with disabilities. The organisation attained 1.86% for the target of people living with disabilities. This is a relatively significant achievement, as recent data show that the representation of persons living with disabilities has

been hovering around 1.3% over the past three years for the economically active population (Commission for Employment Equity, 2020/21 Annual Report). The organisation will continue to encourage employees to disclose and support those that have disclosed.

- A key achievement for the year under review includes the successful salary negotiations and agreement with organised labour as approved by the Board.
- The CGS hosted a successful Mental Wellness Health Workshop to support staff members during the trying times of a debilitating Covid-19 pandemic. In addition, wellness materials were shared with staff.
- As a science institution, the CGS advertised and offered deserving bursars with bursaries for both staff (part-time bursary) and non-staff (full-time bursary) students to contribute to government initiatives of skills development and creating employment opportunities.

1.3 Staff Turnover Analysis

Employee turnover measures the percentage of employees who left the CGS during the year under review, as well as the rate of filling the vacancies. The year ended with a turnover of 4.99%, lower than the 10% target. This rate is attributed to retention initiatives such as learning and development and other important employee support initiatives. The resignations were 45%, with 32% of terminations being retirement. As reflected in Figure 37, there is a balance of 50% for all terminations between core and support respectively, and 60% of the resignations were from the core group.

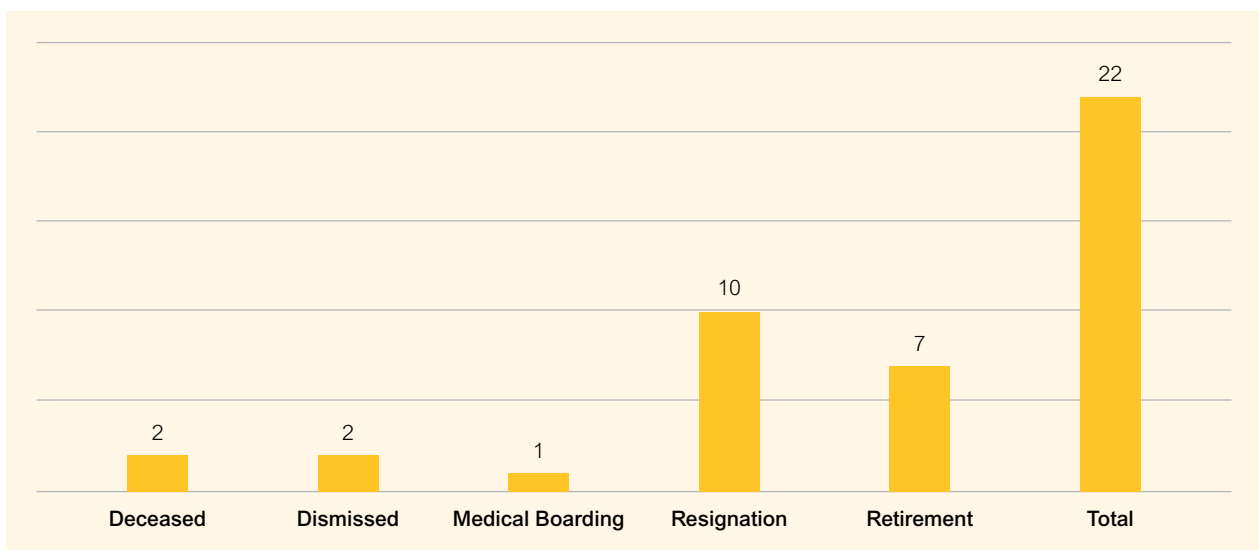


Figure 36: Staff turnover

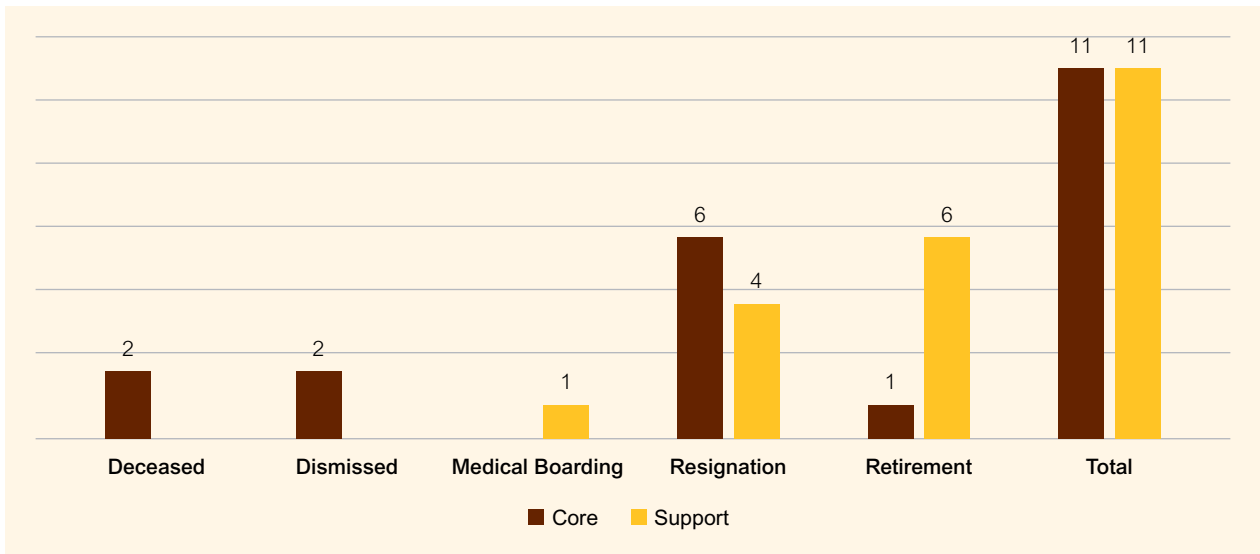


Figure 37: Turnover for support and core staff

1.4 Overall Employee Tenure

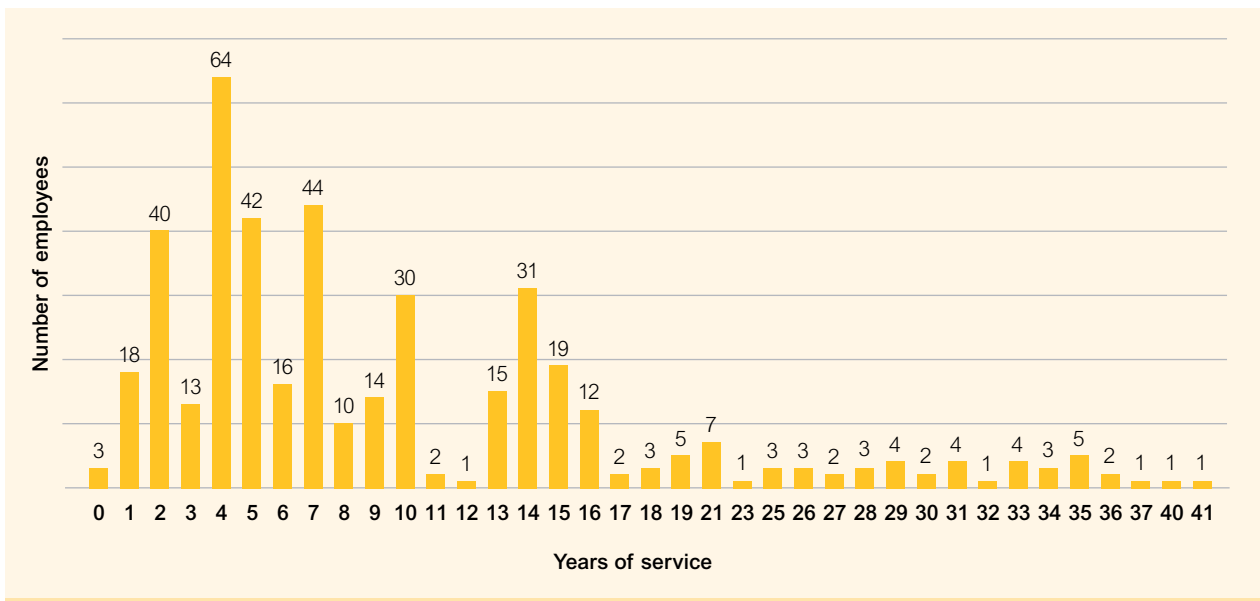
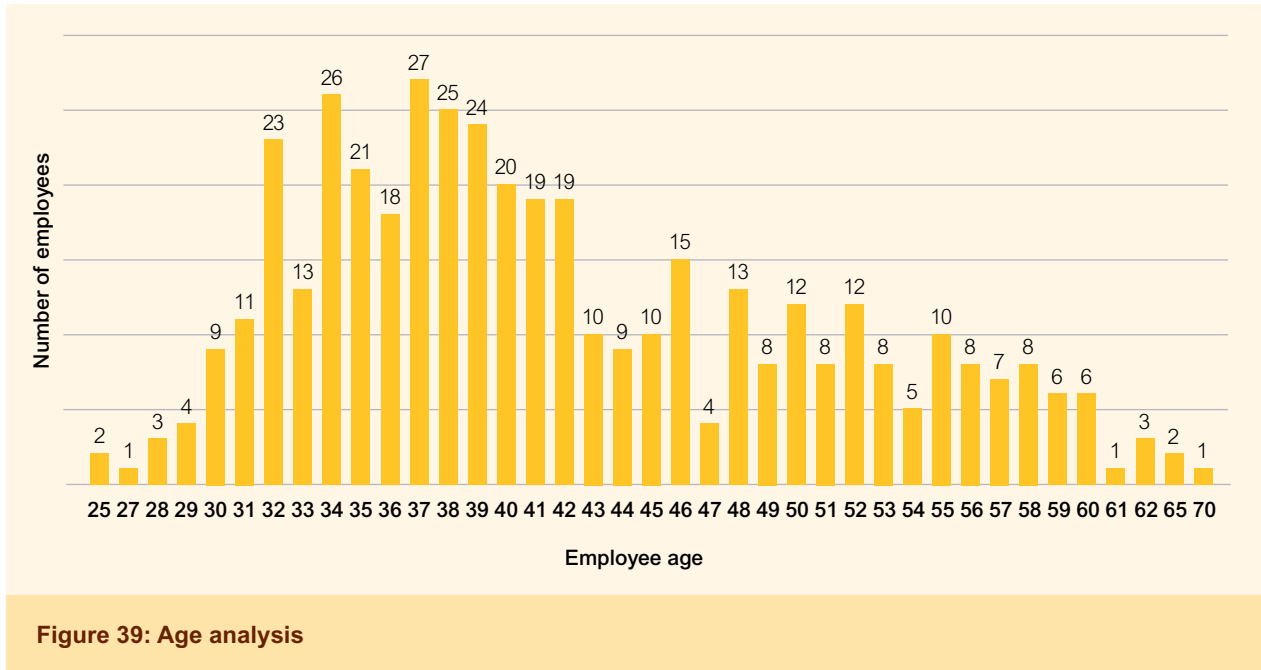


Figure 38: Overall employee tenure

Sixty-eight percent of the workforce have a tenure of five years or more at the CGS. While longer-tenured employees have knowledge of the organisation’s culture, services and mandate, a precarious balance of new hires is equally important as they bring new and fresh ideas. The CGS has to its advantage a blend of the two cohorts.

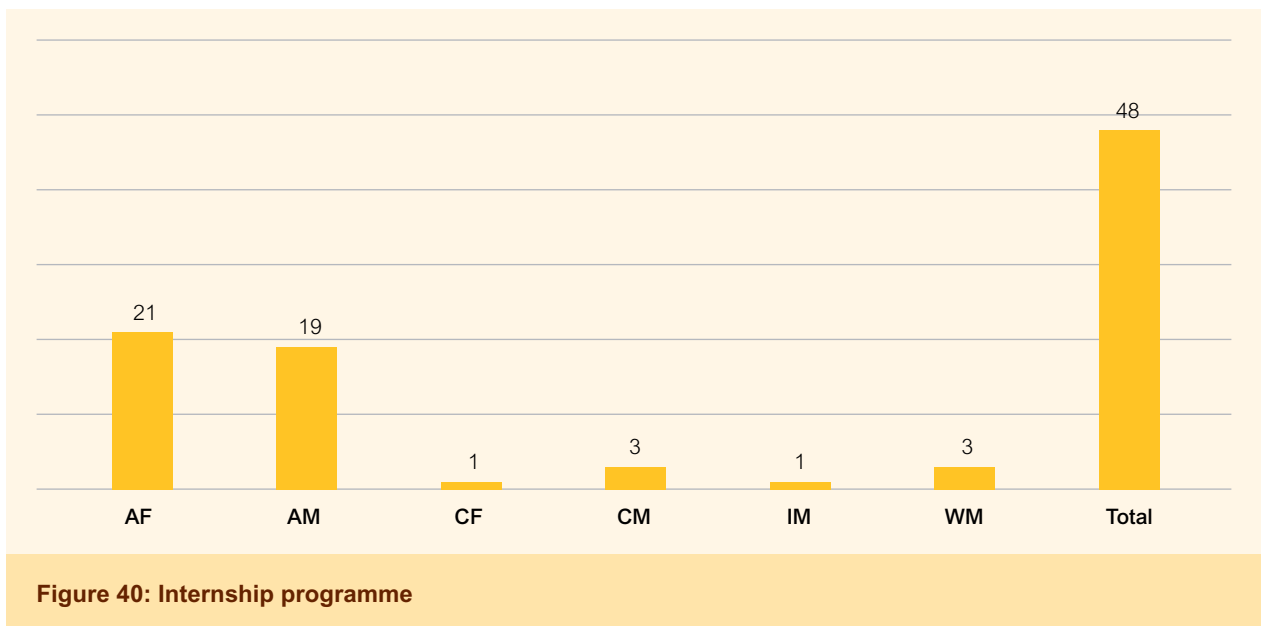
1.5 Workforce Age Analysis



Twenty-six percent of the workforce are youth, down from 30% in the last financial year. While the youth number has declined, the CGS has been able to retain the staff. The CGS continues to give the youth opportunities as and when they avail. Programmes in place include bursaries, internships, mentorships and coaching to capacitate the youth.

1.6 Internship Programme

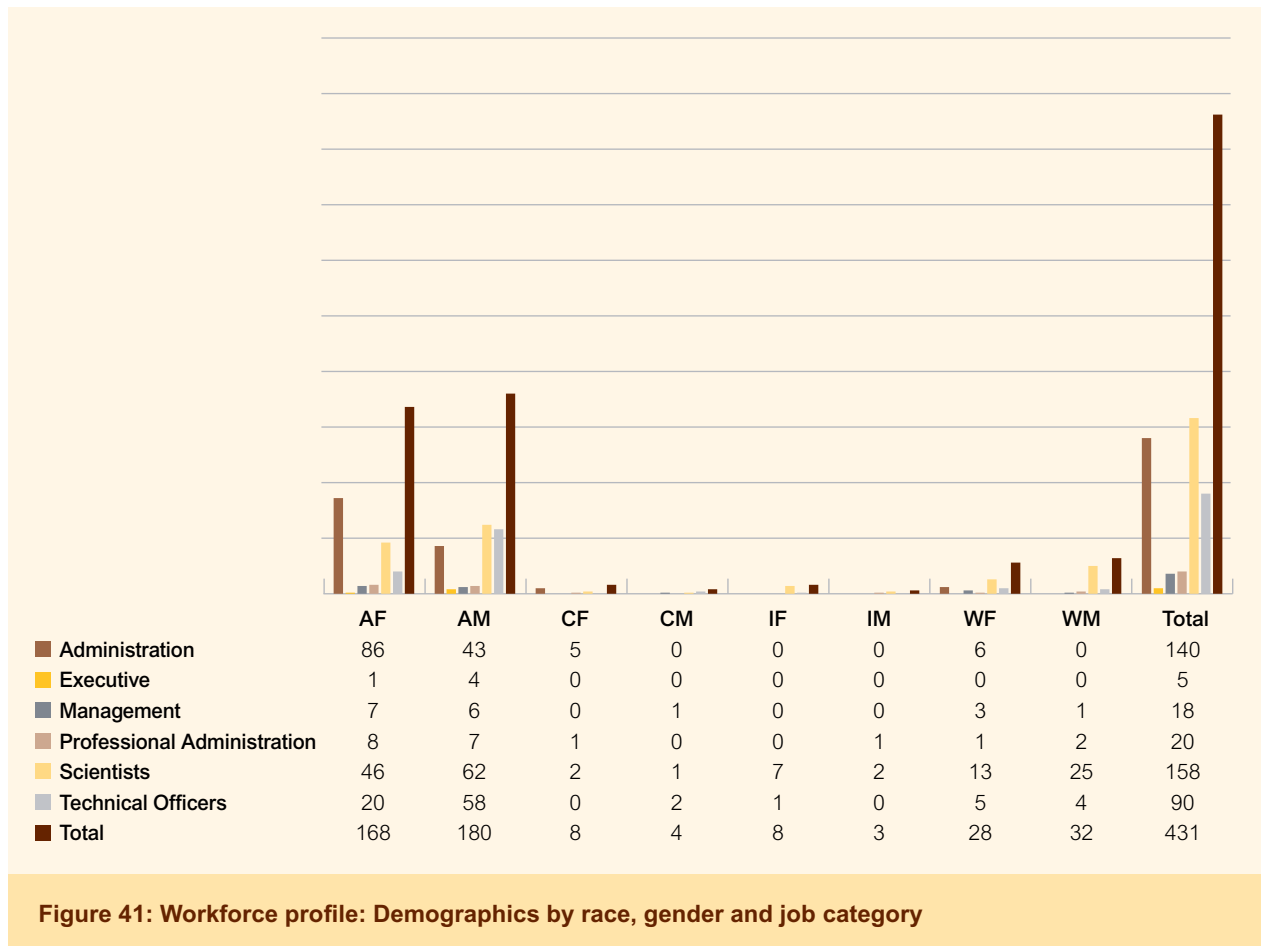
The following figure gives an overview of the internship programme for the year under review.



Note: AF – African female; AM – African male; CF – Coloured female; CM – Coloured male; IM – Indian male; WM – White male

The CGS currently has 48 interns on a programme that runs for a period of two years. Fifty-eight percent of the interns are placed at core, while 42% are in support functions. The programme gives graduates much-needed practical exposure to increase their prospects of employment. Some of the interns are afforded permanent opportunities while others are offered fixed-term contracts during or after their internship contracts, following a rigorous recruitment process.

1.7 Workforce Analysis



Note: AF – African female; AM – African male; CF – Coloured female; CM – Coloured male; IF – Indian female; IM – Indian male; WF – White female; WM – White male

While gender representation has been achieved at organisational level, there is an opportunity to improve representation in some key and strategic roles. Noticeably, 51% of African females occupy administrative roles, while 4.2% are in management positions. Management is considering affirmative action measures to ensure that more African females are appointed in critical positions.

1.8 Bursaries

1.8.1 Full-time Bursars

The external full-time bursary programme supports talented students from previously disadvantaged backgrounds who cannot afford tertiary education. In the 2021 academic year, 22 students were supported. Figure 42 profiles the full-time bursars for the year under review.

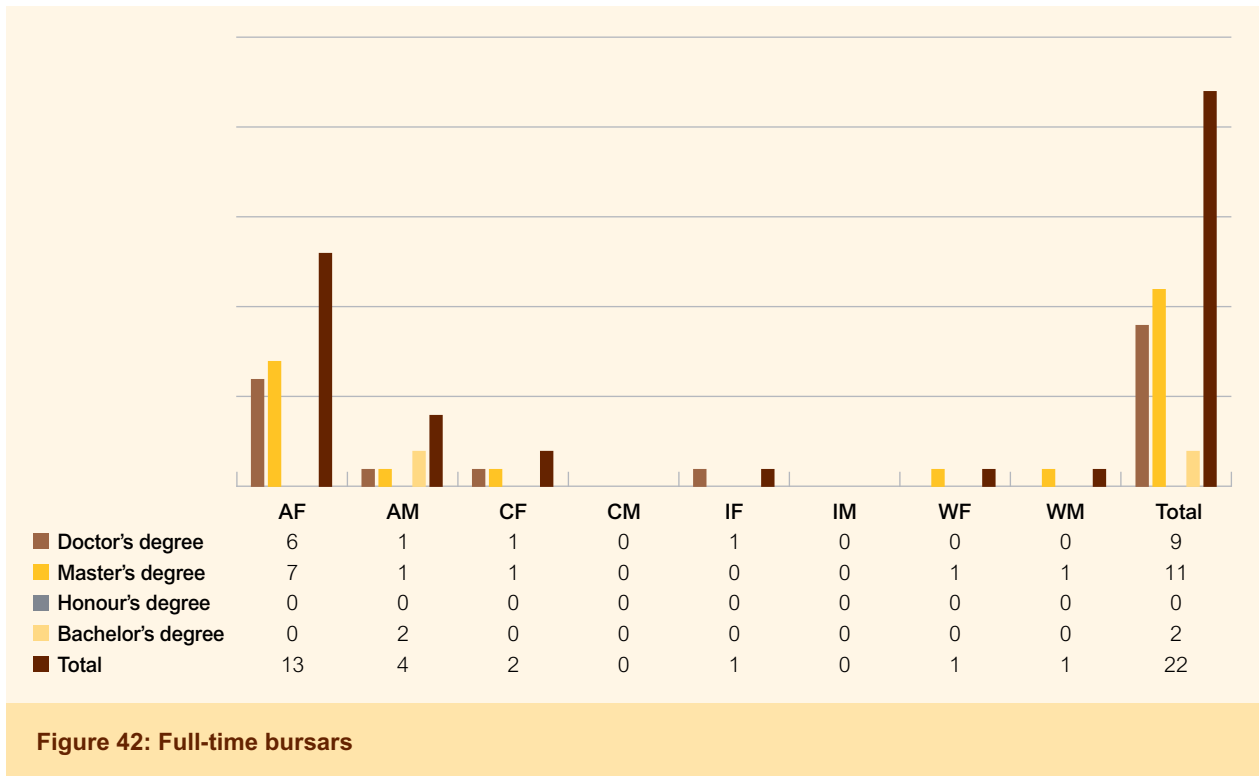


Figure 42: Full-time bursars

Note: AF – African female; AM – African male; CF – Coloured female; CM – Coloured male; IF – Indian female; IM – Indian male; WF – White female; WM – White male

Of 22 full-time bursars, 59% are African females and 18% are African males. The 67% of the nine full-time PhD bursars are African females. This demonstrates CGS's commitment in empowering the females in the geoscience environment.

1.8.2 Part-time Bursars

Part-time bursaries are offered to the CGS staff for scientific and non-scientific studies. The part-time bursary programme is integral to CGS's career development and retention strategies. There were 19 new part-time bursars in the year under review. Eight core bursars and 11 support bursars – 63% of the total are females, and 37% males. This is another demonstration of the CGS's commitment to capacitate staff. Figure 43 shows the part-time bursars for the year under review.

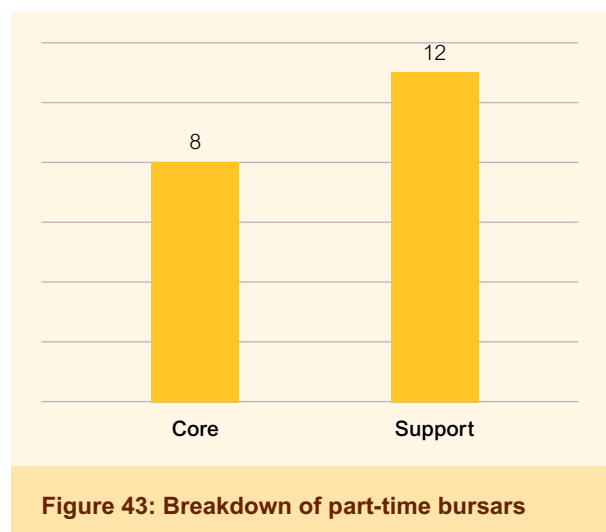
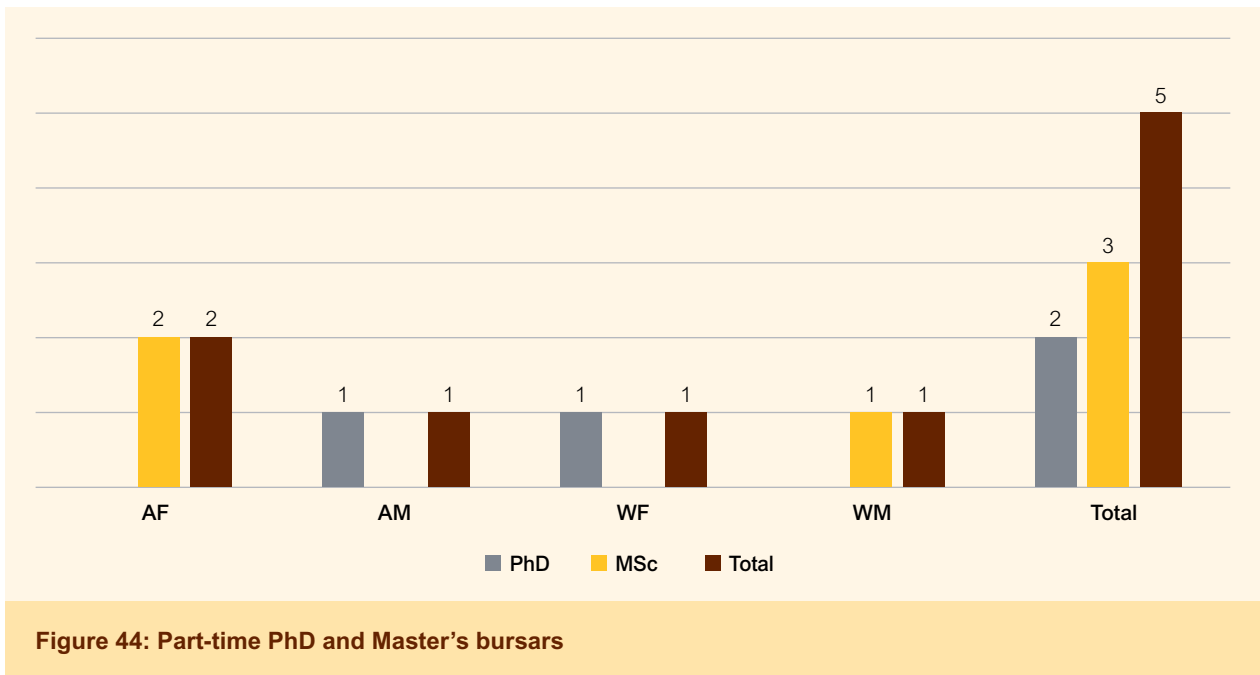


Figure 43: Breakdown of part-time bursars

Figure 44 shows the five part-time bursars for PhD and Master's degrees for the year. Notably, 60% of the bursars are female and 40% are males. Furthermore, Africans constitute 60%.



Spodumene crystals within the pegmatites in the Northern Cape Province

1.9 Training Interventions Completed During the Year

Table 12: List of training interventions and number of attendees

Training	Number of attendees
First Aider	46
Basic Fire Fighting Techniques (1 st and 2 nd Groups)	41
Forklift (1 st and 2 nd Groups)	19
Managing Discipline	28
Leapfrog Software	13
Fraud Risk Management	1
SHEQ Integrated Management System & Risk and Audit	1
Effective Stakeholder Management	5
ACG Mine Seismicity Course	3
QGIS Groundwater Modelling	1
POPIA: Protection of Personal Information Act Workshop	1
SCM Workshop- The National Public Sector Clean Audit Turnaround Indaba 2021	6
Introduction to Geographic Information System (GIS)	1
FSSC 22000 V5.1 Understanding and implementation of Food Safety Systems Certification Based on ISO 22000:2018 and FSSC Scheme Requirements	2
Scenario and Strategic Planning	1
Controls training	4
Electric reach truck	10
Performing an Effective Quality Assessment (PEQA)	1
IT Auditing for Non-I.T. Auditors (Basics of I.T. Auditing) (BITA)	1
Fraud Investigations (FRIN)	1
Strategic HR & BP	2
Nebosh training	2
Management Executive Development Programme (MEDP)	6
POPI Act (Employee Relations)	2
Chairining Disciplinary Hearings (Employee Relations)	2
Workplace Disciplinary and Dismissal (Employee Relations)	2
Health and Safety Representative	4
Managing Poor Performance/Incapacity (Employee Relations)	2
International Mine Water Association Conference	10
3 rd Australasian Exploration Geoscience Conference (AEGC)	1
Introduction to air pollution	4
	223

1.10 Investing In Women

In line with the employment equity priorities of the country, the CGS takes seriously its responsibility to empower women, especially from historically disadvantaged communities, and grows a scientific and support services human resources base that is gender representative. Our people love what they do, as the following three profiles of some of our star performers attest.



Dr Maphuti Kwata

When did you join the CGS?

I joined the CGS as an intern in 2005 and have about 17 years' working and research experience. I was subsequently promoted to a Technical Officer position in 2007, a Junior Scientist position in 2009 and a Scientist position in 2018 within the Water and Environment Business Unit.

What is your research interests?

My research interests may be broadly defined under the geoenvironmental investigations, specifically, ambient air quality monitoring (i.e. criteria for air pollutants, short-lived climate influencing pollutants, other inhalable hazardous pollutants); airborne dust monitoring; water quality monitoring and soil/sediment sampling; flow measurement of streams; assessing the gas pollutant levels from secondary sources like the South African Weather Services and the Sentinel 5-P Satellite, etc. I currently co-lead the newly established task team that aims to determine the airborne mercury levels from different receptor areas in Gauteng, Limpopo and Mpumalanga provinces.

What did you want to do when you were in matric?

I wanted to be a medical doctor, but God had different plans for me. I take comfort in the message from Jeremiah 29:11 where the Lord declared that "For I know the plans I have for you". I'm happy that I ended up being an environmental scientist, which allows me to still serve. I also remember as a young girl telling my father that I wanted to be just like him and little did I know I will end up in a field which is in line with what he had studied.

How did the CGS assist you in fulfilling your dreams?

My recollection is as clear as if it was yesterday. I started as an intern working in the Environmental Laboratory, where I got to work with the environmental monitoring team (water quality monitoring, wetland samples etc.), when the section was called Environmental Unit. I was encouraged to continue with my post-graduate studies by many colleagues, which I did. I simultaneously studied while working hard in different project under the Environmental Unit. The CGS has also empowered me to take leadership positions within the tasks I work on and I have been delegated to contribute in different roles such as mentoring and coaching new and younger scientists. I interact with many colleagues and we continuously learn from each other. I owe my success to many colleagues who have encouraged me, some have mentored me, and others have given me critical feedback which has helped in my development as a scientist. Presenting at the CGS quarterly workshops has helped me to grow as a contributor and I'm now a regular contributor at local and international conferences, especially in air quality themes. I have also increased my publication record and completed my PhD in the Environmental Science discipline at the University of South Africa while at the CGS.

What is your current role?

I'm an Assistant Mine Water Project Manager. I assist the team with general queries related to support functions such as procurement or finance, and I submit/manage motivations and other requests related to the project and report/escalate matters that cannot be addressed at project level. I also assist with follow-up for the monthly and quarterly reports submissions, submissions of hard copies of quarterly reports and progress feedback to the client, follow-up on motivations, requests for quotations and invoices, and I proof read reports and write draft board and technical summaries.

I also serve as a co-leader of two air quality tasks under two separate projects within the Water and Environment Unit.

The air quality task under the Integrated Research in Mine Closure project focuses on different particulate matter that are inhalable. We monitor airborne asbestos fibre levels and other hazardous pollutant levels that are inhalable around the human settlements that are in close proximity to the mining sources of air pollutants. We also monitor the asbestos mine dump tailings that have been rehabilitated and seek proactive solutions. Specifically, we are focusing on environmental toxicity of these inhalable pollutants, their environmental degradation, movement and vulnerable receptors.

The air quality task within the co-existence of Mining and Environment task under the Mine Water project focuses on the common air pollutants and short-lived climate forcing pollutants. Specifically, we study the composition, formation, chemistry and effects of air pollutants within the lower part of the atmosphere that contains the air we breathe. We study the effects of air pollutants on human health, acid deposition, warming of the lower part of the atmosphere, etc. We assess secondary data from reputable sources such as the South African Weather Services and the European 5-P Sentinel Satellite Company and use the data to develop air pollutant risk charts and maps. I'm also co-leading the airborne CO₂ measurement component under the carbon capture utilisation and storage.

I have a wide research experience that involve investigations in geoenvironmental field, specifically, air quality monitoring and characterisation, soil/sediment sampling and analysis, water quality monitoring and stream flow measurements, spatial and temporal profiling of environmental pollutants, etc. I have a wide network of collaborators within the CGS and at organisations like the South African Weather Services, universities, municipalities and other government departments. I continue to refine and expand my knowledge and skills within the environmental and geoscience science fields, and contribute to the reduction of the effects of air pollution and climate change challenges in South Africa and the region.

I'm a registered member of the South African Council for Natural Scientific Professions and the National Association of Clean Air scientific communities. I'm indebted to the support of my supervisor Prof. SJ Moja, who continues to serve as my mentor.

What does the role entail and what about it is rewarding?

My role entails environmental research (water quality monitoring, air quality and dust monitoring) and proposing mitigation and control measures on how to reduce and control exposure to dust. Leading three task projects under Integrated Research into Mine Closure, Mine Water and Environment Management Programme and Carbon capture utilisation and storage is rewarding.

How is your role linked to the CGS's strategic objectives?

Our work in monitoring and measuring gas pollutants that are radiation absorbing will contribute baseline data that are necessary in climate change mitigation measures. Specifically, we are focusing on the chemistry, movement and levels of heat absorbers like ozone (O₃), methane (CH₄), carbon dioxide (CO₂) and black carbon. Secondly, our work in asbestos will yield data that will provide clear site and area specific recommendations.

What challenges you?

My desire is to develop the air pollution modeling skills, which I believe will add value to the task. I have delayed, but I'm working on it.

With hindsight, would you have chosen a different career?

No, I love being an environmental scientist because it has broaden my skills and knowledge as it overlaps with various other fields such as Earth science, engineering, geophysics, remote sensing, seismology mineralogy and energy.

How would you encourage:

Youngsters wanting to follow your career?

I will encourage the youngsters to believe in themselves and have passion in everything they do. The road may be long, but it will be worth it in the long run.

Ambitious CGS employees below your level?

Everything is possible only if they believe in themselves and mostly through motivation, faith, and willingness to work hard and learn as much as they can.



Dr Haajierah Mosavel

When did you join the CGS?

I joined the CGS family on the 1st of September 2014.

What did you want to do when you were in matric?

Initially, I wanted to become a computer programmer but then I met a geologist half way through my matric year and he convinced me that Earth science was an exciting and fun career.

How did the CGS assist you in fulfilling your dreams?

The CGS has exposed me to various facets of geology in the working environment, travelling across South Africa and allowing me to further my studies. I've obtained my PhD in Geology at the University of the Western Cape with the support and mentorship of the CGS and senior staff. The CGS has world-class projects, for example the Karoo Deep Drilling Programme, Carbon Capture and Utilisation project and Onshore-Offshore mapping, producing highly skilled scientific staff unravelling fundamental geological information.

What is your current role?

Geological scientist within the Minerals and Energy Business Unit.

What does the role entail and what about it is rewarding?

My job involves various field and/or laboratory investigations in a variety of geo-scientific fields. I conduct research that involves mapping, core logging, and gathering of data, compilation of maps and reports which resolve complex problems in a variety of geo-scientific fields. My role also entails giving input to the development of project proposals, contract proposals and giving scientific advice to the public and government sector.

It is rewarding to know that I contribute to the goals and vision of the CGS as well as broader society by assisting South Africa's sustainable development goals. Being able to share my knowledge with others and constantly learning from them.

How is your role linked to the CGS's strategic objectives?

CGS projects contribute towards the National Development Plan of South Africa focusing on environmental sustainability, economic growth, employment, poverty, education and training which supports the UN Sustainable Development Goals.

What challenges you?

Expecting quick results. Things take time and you need to have patience. Through strategic planning and collaborative working with others, this challenge can be broken down to smaller goals that make it achievable in order to reach bigger goals.

With hindsight, would you have chosen a different career?

No, my passion for Earth science started at university. Science is a wonderful career that can fulfil you. As scientists we seek out knowledge, discover, innovate and embrace experiences. With all types of success, success in a science career comes from those who can hold on the longest.

How would you encourage:

Youngsters wanting to follow your career?

I would love to have the opportunity to do a career day at schools where I introduce the career subject to them. So many students, like my younger self, have no idea what it entails to be a geologist, especially students within the lower income communities. They always associate it with an archaeologist! I would love to do a career road show on behalf of the CGS going to grass-root level (grade 1 to grade 12) to introduce the subject to them through videos, experiments and live presentations. This could even be extended to inviting a few to a field trip where they get to see and experience the practical side of work: "A day or two in the life of a geologist!"

Another way would be to be a part of events that host career exhibitions where we basically have question and answer sessions to initiate interest in the career. To work hand in hand with schools to offer bursaries and recruit from a young age so that they can have a vision or goal to work towards.

Ambitious CGS employees below your level?

Ambitious employees should be encouraged and motivated to progress all the time. They should be given opportunities to take on leadership roles in different activities of projects. They should be given opportunities to work beyond their work scope and opportunities to excel. The workplace should be a domain of development and professionalism. Life changes all the time and so does science. If opportunities

are not being created for individuals in the work place, the level of work produced will stagnate. There will be no new challenges or excitement to produce their best. I would definitely create opportunities where individuals can show eagerness to develop and progress within the workplace. I am a product of an individual who gave me the chance to prove my capabilities, to rise to challenges and through that, I have gained the necessary experiences to push myself to higher possibilities and achievements. A workplace that creates opportunities for individuals is a place that grows with success. Leadership is not owned by one individual but it is rather a position that ensures that the qualities of leadership are developed in each member of its workforce. A good leader will facilitate the development of individuals all the time and in this way ambitious workers will strive to do better all the time.



Ms Gracy Lekwara

When did you join the CGS?

I joined the CGS on the 1st of October 2006 as a Payroll Administrator.

What did you want to do when you were in matric?

I loved accounting and I wanted to be a chartered accountant.

How did the CGS assist you in fulfilling your dreams?

After I joined the CGS in the Payroll Office, I was given an opportunity to attend various trainings that were related to my work. The trainings enhanced my working abilities and knowledge of payroll which added value to how I carried out my work in the Payroll Office. Through the support of the Management team and my progression and growth in payroll, I was offered a promotion in the Payroll Office.

What is your current role?

Payroll Supervisor in the Payroll Office.

What does the role entail and what about it is rewarding?

My role entails managing the Payroll Office and ensuring that employees of the CGS are paid on time along with all other third-party payments that we are responsible for. My role also includes ensuring that the CGS complies with all applicable tax and labour laws, rules and regulations to ensure that both employees and the CGS are protected. The role is very rewarding as it creates an environment where I build and manage relationships with employees of the CGS at all levels. My role allows me to enforce one of the employees' rights in the workplace: the right to compensation that is fair and paid on time.

How is your role linked to the CGS's strategic objectives?

The CGS is working toward creating a financial sustainable organisation that is effective and efficient. The Payroll Office helps the CGS to attain those goals by making sure that the organisation complies with the legislative and policy environment. From the processing of employee's remuneration and payments to those of third parties, the

Payroll Office ensures that payments are made accurately and on time, avoiding any audit queries or overpayments that can be detrimental to the CGS and may lead to an audit qualification.

What challenges you?

Time management is crucial in the Payroll Office as the role is demanding. I would at times put in more hours to ensure that the payroll is processed accurately on the 15th or 30th of each month without any delays.

With hindsight, would you have chosen a different career?

No. I love and appreciate the work that I do.

How would you encourage:

Youngsters wanting to follow your career?

Be passionate about your work as payroll is a very sensitive office where confidentiality is a requirement. You need to love what you do and be driven and satisfied with the impact that you will be making in any organisation.

Ambitious CGS employees below your level?

Work hard and well with your team members. The work that we do requires team efforts, and we have to support one another to be able to achieve the CGS goals and objectives. Have a learning spirit and acquire the necessary knowledge to help you succeed.

1.11 Employee Relations

During the year under review, various misconduct cases and grievances were lodged. The most prevalent transgression was conflicts of interest, followed by misuse of CGS property, substance abuse and harassment. Misrepresentation, negligence, desertion and financial misconduct had one transgression each. The CGS continues to encourage employees to comply with policies and procedures through the various interventions to avoid non-compliance of the policies. The corrective measures are put in place as consequence management to enforce compliance.

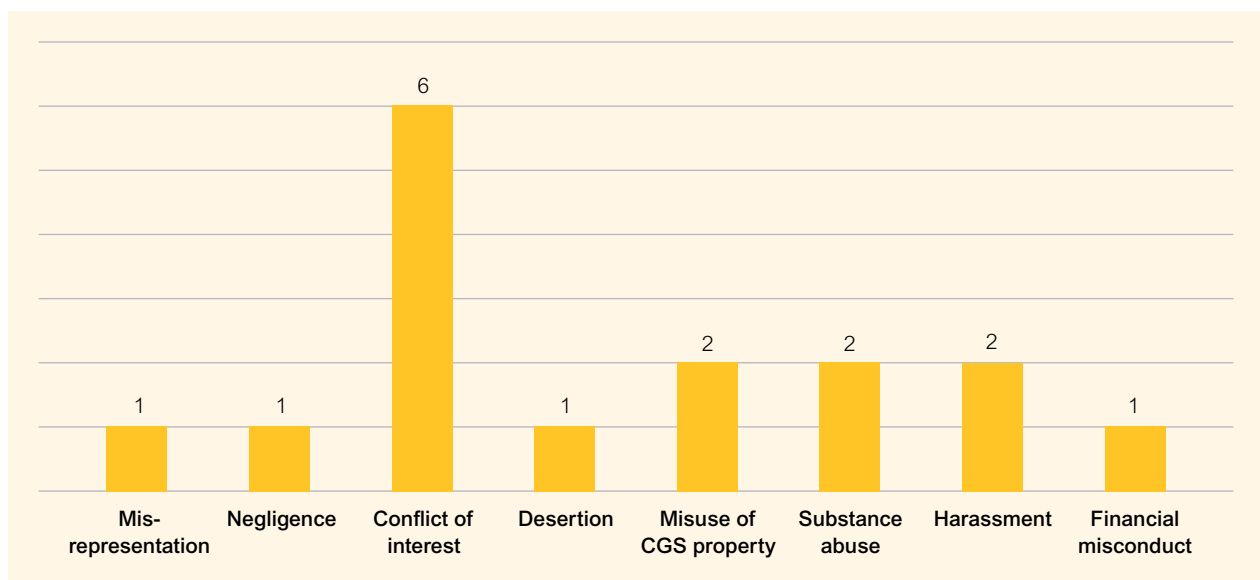


Figure 45: Breakdown of cases of misconduct during 2021/22

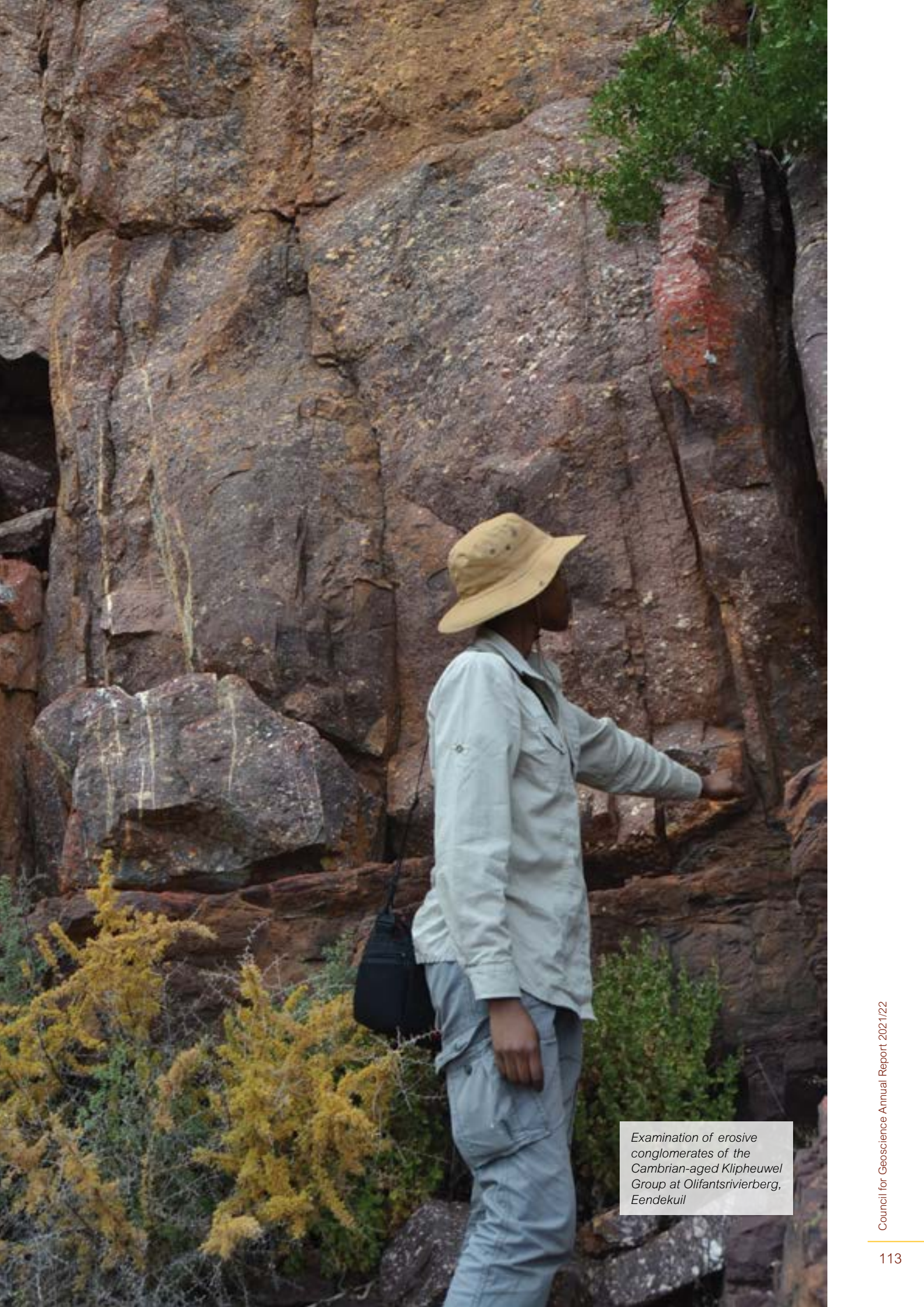
1.12 Safety and Lost Time Injury

Seven injury-on-duty cases were reported during the year under review and measures are being taken to prevent recurrence.

1.13 Planned Activities for 2022/23

- a) Generic performance contracts for all levels of scientific positions;
- b) Performance management – contracting, mid-year review and final assessment;
- c) Submission of Workplace Skills Plan to Mining Qualification Authority;
- d) Development and implementation of Talent Management Framework;
- e) Development and implementation of training plan;
- f) On-going review of policies; and
- g) Staff Satisfaction Survey.





Examination of erosive conglomerates of the Cambrian-aged Klipheuwel Group at Olifantsrivierberg, Eendekuil



Handheld XRF analyses during the drilling programme in Giyani

Part E

Financial Information

This part of the report provides insight into the financial wellness of the organisation and covers the following aspects:

- The report of the CFO, which includes the general financial review and matters related to the proposed activities, retention of surplus, supply chain management, audit report and plans for the future.
- Report of the Auditor-General to Parliament on the CGS. This report gives an opinion regarding the fairness of the Annual Financial Statements in presenting the organisation's financial position, financial performance, cash flow in accordance with SA Standards of GRAP and requirements of the PFMA in all material aspects. It reports on performance on legal and regulatory compliance, internal control and related matters.
- The Annual Financial Statements, comprising the Statement of Financial Position, Statement of Financial Performance, Statement of Changes in Net Assets, Cash Flow Statement and Notes to the Financial Statements.

1

Chief Financial Officer's Report



Mr Leonard Matsepe
Chief Financial Officer

“In order to generate excitement in the exploration industry, the CGS continues to invest in de-risking of exploration investment, through the provision of both raw and beneficiated geoscience information. In the main, the CGS will increase its participation in the latter stages of the pre-competitive mining value chain. Various robust strategies are being explored including collaboration with funding institutions and other stakeholders of course, with caution not to compromise the research mandate. This will require substantial financial investment that will potentially yield enormous returns.”

Background

The Council for Geoscience is listed as a Schedule 3A Public Entity in terms of the Public Finance Management Act, Act No. 1 of 1999. The objectives underlying the establishment of the CGS are to develop and publish world-class geoscience knowledge products and to render geoscience-related services to the South African public and industry.

Financial position

A steady balance sheet position with an average growth rate of 7% has been maintained over the last 12 years. The CGS boasts total assets to the value of R727.4 million and a liquidity ratio of 1.2:1 in the reported financial year.

Property and equipment

An investment to the amount of R44.7 million was made in property, equipment and intangible assets during the year. Continued investment in scientific infrastructure and equipment remains a priority to ensure that world-class facilities and equipment are acquired and maintained.

Cash flow management

The cash and cash equivalents decreased from R358 million in 2021 to R293 million in 2022, resulting in a net cash outflow of R65.1 million. This investment was made to support the acceleration of economic recovery through the implementation of the geoscience programme.

Going concern

The CGS's Annual Financial Statements have been prepared on the going-concern basis. Executive management has performed a formal review of the CGS's ability to continue as a going concern in the foreseeable future and based on this review, considers that the presentation of the financial statements on this basis is appropriate.

Events after the reporting date

The Exploration Strategy for the Mining Industry of South Africa and its Implementation Plan 2022, which seeks to attract investment through a reinvigorated mining exploration strategy encouraging robust mineral exploration, clean technology, processing and mining supply and services sectors, was published. This requires the CGS to implement some of the barriers identified in South Africa's Exploration Implementation Plan.

Request for the retention of surplus

In terms of Section 53(3) of the PFMA of 1999, the CGS has to obtain approval from National Treasury to retain surpluses. Approval was obtained for the use of accumulated surpluses for the maintenance of and investment in scientific equipment and infrastructure, and the implementation of the repositioning strategy. A new request will be made for the year under review.

Supply chain management

The Supply Chain Management Unit is operational under the division of the Chief Financial Officer. This business unit provides an appropriate procurement and provisioning system, which is fair, equitable, transparent, competitive and cost-effective, and is established in accordance with Section 54 of the PFMA of 1999 (as amended by Act No. 29 of 1999). In terms of the BBBEE, Section 13G (1) of the B-BBEE Act, the CGS complied with Management Control and Enterprise Supplier Development.

Audit report matters

Matters raised in the audit report of the Auditor-General are given due attention to ensure attainment of unqualified audit opinions. The CGS obtained an unqualified audit opinion from the Auditor-General for the year ended 31 March 2022 and will continue to enhance the internal control environment.

Financial sustainability

In order to ensure financial sustainability, the CGS is deliberate in exploiting its vast geoscience information, knowledge and scientific prowess to develop apposite value propositions worthy of both fiscal and commercial investment.

2

Report of the Auditor-General to Parliament on the Council for Geoscience

Report on the audit of the financial statements

Opinion

1. I have audited the financial statements of the Council for Geoscience (CGS) set out on pages 121 to 158, which comprise the statement of financial position as at 31 March 2022, statement of financial performance, statement of changes in net assets, cash flow statement and statement of comparison of budget and actual amounts for the year then ended, as well as notes to the financial statements, including a summary of significant accounting policies.
2. In my opinion, the financial statements present fairly, in all material respects, the financial position of the Council for Geoscience as at 31 March 2022, and its financial performance and cash flows for the year then ended in accordance with Standards of Generally Recognised Accounting Practice (Standards of GRAP) and the requirements of the Public Finance Management Act 1 of 1999 (PFMA).

Basis for opinion

3. I conducted my audit in accordance with the International Standards on Auditing (ISAs). My responsibilities under those standards are further described in the Auditor-General's responsibilities for the audit of the financial statements section of my report.
4. I am independent of the public entity in accordance with the International Ethics Standards Board for Accountants' *International code of ethics for professional accountants (including International Independence Standards)* (IESBA code) as well as other ethical requirements that are relevant to my

audit in South Africa. I have fulfilled my other ethical responsibilities in accordance with these requirements and the IESBA code.

5. I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my opinion.

Emphasis of matters

6. I draw attention to the matter below. My opinion is not modified in respect of this matter.

Fruitless and wasteful expenditure

7. As disclosed in note 23 to the financial statements, fruitless and wasteful expenditure of R18 496 000 that was incurred in the previous years was still under investigation.

Responsibilities of the accounting authority for the financial statements

8. The accounting authority is responsible for the preparation and fair presentation of the financial statements in accordance with the Standards of GRAP and the requirements of the PFMA, and for such internal control as the accounting authority determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.
9. In preparing the financial statements, the accounting authority is responsible for assessing the public entity's ability to continue as a going concern, disclosing, as applicable, matters relating to going concern and using the going concern basis of accounting unless the appropriate governance structure either intends to liquidate the public entity or to cease operations, or has no realistic alternative but to do so.

Auditor-General's responsibilities for the audit of the financial statements

10. My objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes my opinion. Reasonable assurance is a high level of assurance but is not a guarantee that an audit conducted in accordance with the ISAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.
11. A further description of my responsibilities for the audit of the financial statements is included in the annexure to this auditor's report.

Report on the audit of the annual performance report

Introduction and scope

12. In accordance with the Public Audit Act 25 of 2004 (PAA) and the general notice issued in terms thereof, I have a responsibility to report on the usefulness and reliability of the reported performance information against predetermined objectives for selected programme presented in the annual performance report. I performed procedures to identify material findings but not to gather evidence to express assurance.
13. My procedures address the usefulness and reliability of the reported performance information, which must be based on the public entity's approved performance planning documents. I have not evaluated the completeness and appropriateness of the performance indicators included in the planning documents. My procedures do not examine whether the actions taken by the public entity enabled service delivery. My procedures do not extend to any disclosures or

assertions relating to the extent of achievements in the current year or planned performance strategies and information in respect of future periods that may be included as part of the reported performance information. Accordingly, my findings do not extend to these matters.

14. I evaluated the usefulness and reliability of the reported performance information in accordance with the criteria developed from the performance management and reporting framework, as defined in the general notice, for the following selected programme presented in the public entity's annual performance report for the year ended 31 March 2022:

Programme	Pages in the annual performance report
Programme 4 – Delivery of the mandate	37

15. I performed procedures to determine whether the reported performance information was properly presented and whether performance was consistent with the approved performance planning documents. I performed further procedures to determine whether the indicators and related targets were measurable and relevant, and assessed the reliability of the reported performance information to determine whether it was valid, accurate and complete.
16. I did not identify any material findings on the usefulness and reliability of the reported performance information for this programme:
- Programme 4 – Delivery of the mandate

Other matter

17. I draw attention to the matter below.

Achievement of planned targets

18. Refer to the annual performance report on pages 34 to 38 for information on the achievement of planned targets for the year and management's explanations provided for the under/over achievement of targets.

Report on the audit of compliance with legislation

Introduction and scope

19. In accordance with the PAA and the general notice issued in terms thereof, I have a responsibility to report material findings on the public entity's compliance with specific matters in key legislation. I performed procedures to identify findings but not to gather evidence to express assurance.
20. I did not identify any material findings on compliance with the specific matters in key legislation set out in the general notice issued in terms of the PAA.

Other information

21. The accounting authority is responsible for the other information. The other information comprises the information included in the annual report, which includes the audit committee's report. The other information does not include the financial statements, the auditor's report and those selected programmes presented in the annual performance report that have been specifically reported in this auditor's report.
22. My opinion on the financial statements and findings on the reported performance information and compliance with legislation do not cover the other information and I do not express an audit opinion or any form of assurance conclusion on it.
23. In connection with my audit, my responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the

financial statements and the selected programmes presented in the annual performance report, or my knowledge obtained in the audit, or otherwise appears to be materially misstated.

24. If based on the work I have performed, I conclude that there is a material misstatement in the other information, I am required to report that fact. I have nothing to report in this regard.

Internal control deficiencies

25. I considered internal control relevant to my audit of the financial statements, reported performance information and compliance with applicable legislation; however, my objective was not to express any form of assurance on it. I did not identify any significant deficiencies in internal control.

Auditor-General

Pretoria

30 July 2022



AUDITOR - GENERAL
SOUTH AFRICA

Auditing to build public confidence

Annexure – Auditor-General’s responsibility for the audit

1. As part of an audit in accordance with the ISAs, I exercise professional judgement and maintain professional scepticism throughout my audit of the financial statements and the procedures performed on reported performance information for selected programme and on the public entity’s compliance with respect to the selected subject matters.

Financial statements

2. In addition to my responsibility for the audit of the financial statements as described in this auditor’s report, I also:
 - identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error; design and perform audit procedures responsive to those risks; and obtain audit evidence that is sufficient and appropriate to provide a basis for my opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations or the override of internal control
 - obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the public entity’s internal control
 - evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the board of directors, which constitutes the accounting authority
 - conclude on the appropriateness of the accounting authority’s use of the going concern basis of accounting in the preparation of the financial statements. I also conclude, based on the audit evidence obtained, whether a material uncertainty exists relating to events or conditions that may cast significant doubt on the ability of the Council

for Geoscience to continue as a going concern. If I conclude that a material uncertainty exists, I am required to draw attention in my auditor’s report to the related disclosures in the financial statements about the material uncertainty or, if such disclosures are inadequate, to modify my opinion on the financial statements. My conclusions are based on the information available to me at the date of this auditor’s report. However, future events or conditions may cause a public entity to cease operating as a going concern

- evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and determine whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation
- obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the group to express an opinion on the consolidated financial statements. I am responsible for the direction, supervision and performance of the group audit. I remain solely responsible for my audit opinion.

Communication with those charged with governance

3. I communicate with the accounting authority regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that I identify during my audit.
4. I also provide the accounting authority with a statement that I have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to bear on my independence and, where applicable, actions taken to eliminate threats or safeguards applied.

3

Annual Financial Statements for the Year Ended 31 March 2022

Statement of Financial Position

as at 31 March 2022

	Notes	2022 R'000	2021 (Restated) R'000
Assets			
Non-current assets			
		365 186	359 423
Property and equipment	3	341 983	334 694
Intangible assets	4	5 641	7 167
Heritage assets	27	17 562	17 562
Current assets			
		362 183	380 895
Inventories	5	5	5
Trade and other receivables from exchange transactions	7	69 181	22 528
Cash and cash equivalents	8	292 997	358 362
Total assets		727 369	740 318
Net assets and liabilities			
Accumulated surplus		423 940	436 115
Non-current liabilities			
Post-employment benefit liabilities	6	11 530	11 260
Current liabilities			
		291 899	292 943
Trade and other payables	9	52 157	68 134
Deferred income	10	205 183	191 337
Accruals	11	34 559	33 472
Total net assets and liabilities		727 369	740 318

Statement of Financial Performance

for the Period Ended 31 March 2022

	Notes	2022 R'000	2021 (Restated) R'000
Total revenue		583 211	525 886
Revenue from exchange transactions	12	256 968	272 193
Revenue from non-exchange transactions	12	326 243	253 693
Total cost of projects		(268 543)	(194 862)
Cost of commercial projects	12	(83 215)	(14 932)
Cost of statutory projects	12	(185 328)	(179 930)
Gross surplus		314 668	331 024
Administrative expenses		(325 918)	(324 497)
Other operating expenses	12	(905)	(19 580)
Surplus from operations		(12 155)	(13 052)
Finance cost	13	(20)	(14)
Net (deficit)/surplus for the year		(12 175)	(13 066)

Statement of Changes in Net Assets

for the Period Ended 31 March 2022

	Notes	Accumulated surplus R'000	Total R'000
Opening balance at 31 March 2020		384 134	384 134
Net surplus for the period		65 047	65 047
Restated balance at 31 March 2020		449 181	449 181
Net loss for the period		(773)	(773)
Correction of prior period error	25	(12 293)	(12 293)
Restated net loss for the period		(13 066)	(13 066)
Restated balance at 31 March 2021		436 115	436 115
Net loss for the period		(12 175)	(12 175)
Balance at 31 March 2022		423 940	423 940

Cash Flow Statement

for the Period Ended 31 March 2022

	Notes	2022 R'000	2021 (Restated) R'000
Cash inflow from operating activities		(21 244)	173 827
Cash receipts from customers		525 052	525 901
Cash paid to suppliers and employees		(556 123)	(364 629)
Cash generated from operations	14	(31 070)	161 272
Interest received	12	9 846	12 569
Finance cost	13	(20)	(14)
Cash outflow from investing activities		(44 121)	(47 479)
Acquisition of:			
Property and equipment	15.1	(44 554)	(40 779)
Intangible assets	15.2	(187)	(7 333)
Proceeds from sale of asset	12	-	29
Insurance proceeds for property and equipment	3.1	620	604
Net increase/(loss) in cash and cash equivalents		(65 365)	126 349
Cash and cash equivalents at beginning of period	8	358 362	232 013
Cash and cash equivalents at end of period	8	292 997	358 362

1 Accounting Policies

for the Year Ended 31 March 2022

1.1 Basis of preparation

Statement of compliance

1. The financial statements have been prepared in accordance with the Standards of Generally Recognised Accounting Practices (GRAP) including any interpretations, guidelines and directives issued by the Accounting Standards Board.

The financial statements have been prepared on the historic cost basis and accounting policies are consistent with prior years.

These Annual Financial Statements have been prepared on a going concern basis, i.e. the assumption that the Council for Geoscience will continue to operate as a going concern for at least the next twelve months.

2. The Cash Flow Statement has been prepared in accordance with the direct method.
3. Specific information is presented separately on the Statement of Financial Position such as:
 - a) receivables from non-exchange transactions, including taxes and transfers;
 - b) taxes and transfers payable;
 - c) trade and other payables from non-exchange transactions.

The budget reporting standard does not apply to the Council for Geoscience as our budget is tabled as part of the Department of Mineral Resources and Energy's budget.

1.2 Revenue recognition

Revenue comprises the revenue from non-exchange transactions recognised as income in the current year, contract income and sales of publications.

The Council for Geoscience measures revenue at the fair value of the consideration received or receivable. Revenue is recognised only when it is probable that the

economic benefits associated with a transaction will flow to the Council for Geoscience, and the amount of revenue and associated costs incurred or to be incurred, can be measured reliably.

1.2.1 Revenue from non-exchange transactions

The Council for Geoscience receives grants in the form of a baseline allocation from the Department of Mineral Resources and Energy.

Revenue from non-exchange transactions that are conditional grants is recorded as deferred income when it is received. It is then recognised as income proportionate to the costs incurred.

Other baseline allocation funds are recognised as revenue upon receipt.

1.2.2 Revenue from exchange transactions

Revenue from exchange transactions comprises sales and contract revenue as follows:

Sales revenue

Sales revenue represents the invoiced value of goods and services supplied by the Council for Geoscience. This revenue is recognised when the revenue recognition criteria are met.

Contract revenue

Revenue from contracts is recognised by means of progress payments over the duration of the contracts. Revenue from contracts in progress is recognised when the revenue criteria are met. When the outcome of a contract can be estimated reliably, revenue is recognised by referring to the stage of completion of the contract outcome.

1.3 Interest received

Interest is recognised on a time proportionate basis with reference to the principal amount receivable and the effective interest rate applicable.

1 Accounting Policies

(continued)

1.4 Property and equipment

Property and equipment are tangible non-current assets that are held for use in the production or supply of goods or services, or for administrative purposes, and are expected to be used during more than one period.

The cost of an item of property and equipment is recognised as an asset when:

- it is probable that future economic benefits associated with the item will flow to the Council for Geoscience; and
- the cost of the item can be measured reliably.

Land and buildings were valued at initial recognition and subsequently only the building is depreciated on a straight-line method.

Costs include costs incurred initially to acquire or construct an item of property and equipment and costs incurred subsequently to add to, replace part of, or service it. If the cost of a replacement part is recognised in the carrying amount of an item of property and equipment, the carrying amount of the replaced part is derecognised.

Property and equipment are carried at cost less accumulated depreciation and any impairment losses.

Day-to-day expenses incurred on property and equipment are expensed directly to surplus or deficit for the period.

Where an asset is acquired at no cost, or at a nominal cost, its cost is its fair value as at date of acquisition.

A major refurbishment that meets the recognition criteria of an asset is capitalised.

Depreciation is provided on all property and equipment other than freehold land, to write down the cost, less residual value, on a straight line basis over its average useful lives, as follows:

Land	Not depreciable
Buildings	30 years
Motor vehicles	5 to 12 years
Equipment	5 to 12 years
Aircraft and Helicopter – Body	15 to 17 years
Aircraft and Helicopter – Components	Useful hours as per South African Civil Aviation Authority
Boat	10 years
Office furniture	20 to 25 years
Computer equipment	6 to 13 years
Specialised equipment	15 years

The depreciation charges for each period are recognised in the Statement of Financial Performance, unless it is included in the carrying amount of another asset.

The average useful lives and residual values are reviewed on an annual basis and changes are reflected as changes in accounting estimates on a prospective basis.

1.5 Intangible assets

An intangible asset is recognised when:

- it is probable that the expected future economic benefits that are attributable to the asset will flow to the entity; and
- the cost of the asset can be measured reliably.

Capitalised computer software is carried at cost less accumulated amortisation and less accumulated impairment losses. Computer software is tested annually for impairment or changes in estimated future benefits. Amortisation is provided to write down the intangible assets to their residual value, on a straight-line basis, being two to ten years.

Research and development

Expenditure on research activities is recognised as an expense in the period in which it is incurred.

1 Accounting Policies

(continued)

An internally generated intangible asset arising from research and development is recognised as part of intangible assets only if all of the following conditions are met:

- an asset is created that can be identified;
- it is probable that the asset created will generate future economic benefits;
- the development cost of the asset can be measured reliably.

Where no internally generated intangible asset can be recognised, development expenditure is recognised as an expense in the period in which it is incurred. Internally generated assets are amortised on a straight-line basis over their useful lives.

1.6 Heritage assets

Heritage assets are assets held for their cultural, environmental or historical significance. Heritage assets are initially recognised at deemed cost which has been determined, due to the nature of heritage assets, by specialist valuers. Heritage assets are reflected at deemed cost and are not depreciated. At each reporting date heritage assets are assessed for indications of impairment. If any such indication exists, an estimate of the recoverable amount or the recoverable service amount of the heritage assets will be determined and tested against the carrying amount.

1.7 Inventories

The Council for Geoscience is a custodian of scientific information that produces publications in the form of books, maps and map explanations etc. These publications are distributed to the public for free or at a nominal charge.

Inventories are initially measured at deemed cost (fair value).

1.8 Translation of foreign currencies

Foreign currency transactions

A foreign currency transaction is recorded, on initial recognition in Rand, by applying to the foreign currency amount the spot exchange rate between the Rand and the foreign currency at the date of the transaction.

At each balance sheet date:

- foreign currency monetary items are translated using the closing rate.

Exchange differences arising on the settlement of monetary items or on translating monetary items at rates different from those at which they were translated on initial recognition during the period or in previous Annual Financial Statements are recognised in the Statement of Financial Performance in the period in which they arise.

Cash flows arising from transactions in a foreign currency are recorded in Rand by applying to the foreign currency amount the exchange rate between the Rand and the foreign currency at the date of the cash flow.

1.9 Deferred income

Deferred Income is accounted for in the Statement of Financial Position. The related revenue is recognised on an accrual basis in the Statement of Financial Performance in the period in which it satisfies the revenue recognition criteria.

1.10 Retirement benefit costs

Short-term employee benefits

The cost of short-term employee benefits (those payable within twelve months after the service is rendered, such as bonuses, paid vacation leave and sick leave) is recognised in the period in which the service is rendered and is not discounted.

1 Accounting Policies

(continued)

The expected cost of compensated absences is recognised as an expense as the employees render services that increase their entitlement or, in the case of non-accumulating absences, when the absence occurs.

Defined contribution and defined benefit plans

The Council for Geoscience operates both a defined contribution pension and provident fund and a defined benefit plan in respect of post-retirement medical aid contributions. For the defined benefit plan, the defined benefit obligation and the related current service cost, is determined by using the projected unit credit method. The defined benefit plan is subject to an annual actuarial valuation. The qualifying plan asset of this scheme is held and administered by Momentum Group Limited.

The actuarial gains or losses are further limited to the extent that the net cumulative unrecognised actuarial gains or losses (before recognition of that actuarial gain or loss) exceed the unrecognised part of the transactional liability. Payments to defined contribution retirement benefit plans are charged to the Statement of Financial Performance in the year to which they relate.

1.11 Provisions and contingent liabilities

Provisions are recognised when:

- the entity has a present obligation as a result of a past event;
- it is probable that an outflow of resources embodying economic benefits will be required to settle the obligation; and
- a reliable estimate can be made of the obligation.

The amount of a provision is the present value of the expenditure expected to be required to settle the obligation.

Commitments

The Council for Geoscience classifies commitments as contracted future transactions that are non-cancellable or only cancellable at significant cost, and that will normally result in the outflow of cash.

This excludes steady routine transactions such as salary commitments relating to employment contracts or social security benefits.

A distinction is made between operational and capital commitments.

Disclosure is made of the aggregate amount of operational and capital expenditure contracted for at the reporting date, to the extent that the amount has not been recorded in the financial statements.

If a commitment is for a period longer than a year, it is stated in the note to the commitments.

Disclosure of expenditure that has been approved, but that has not yet been contracted for, is made.

1.12 Financial instruments

Initial recognition

The entity classifies financial instruments, or their component parts, on initial recognition as a financial asset, a financial liability or an equity instrument in accordance with the substance of the contractual arrangement.

Financial assets and liabilities are recognised on the entity's Statement of Financial Position when the Council for Geoscience becomes party to the contractual provisions of the instrument.

Financial assets and liabilities are initially recognised at fair value.

Derecognition of financial instruments

The entity derecognises a financial asset only when the contractual rights to the cash flows from the asset expire, or it transfers the financial asset and substantially all the risks and rewards of ownership of the asset to another entity.

The entity derecognises financial liabilities when the entity's obligations are discharged, cancelled or they expire.

1 Accounting Policies

(continued)

Impairment of loans and receivables

Financial assets are assessed for indicators of impairment at each balance sheet date. Financial assets are impaired where there is objective evidence that, as a result of one or more events that occurred after the initial recognition of the financial asset, the estimated future cash flows of the investment have been impacted.

The carrying amount of trade receivables is reduced through the use of an allowance account (bad debt provision). When a trade receivable is considered uncollectible, it is written off against the allowance account. Subsequent recoveries of amounts previously written off are credited against the allowance account. Changes in the carrying amount of the allowance account are recognised in surplus or deficit.

Fair values of trade and other payables are determined at a price charged at transaction date and impaired when indicators of impairment are present. At period end there were no differences between the book value and the fair values of trade and other payables.

Fair value of trade and other receivables

Fair values of trade and other receivables are determined at a price charged at transaction date and impaired when indicators of impairment are present. At period end there were no differences between the book value and the fair values of trade and other receivables because of the short-term maturity.

Financial assets carried at amortised cost

Loans and receivables are measured at amortised cost less any impairment losses recognised to reflect irrecoverable amounts. Impairment is determined on a specific basis, whereby each asset is individually evaluated for impairment indicators. Write-offs of these assets are expensed in surplus or deficit.

Cash and cash equivalents

Cash and cash equivalents are short-term, highly liquid investments that are readily convertible to known amounts of cash. Cash and cash equivalents are measured at fair value.

Financial liabilities carried at amortised cost

Trade and other payables are initially measured at fair value and are subsequently measured at amortised cost.

1.13 Operating leases

Leases of assets under which all the risks and rewards of ownership are effectively retained by the lessor are classified as operating leases. Lease payments under an operating lease are recognised as an expense on a straight-line basis over the lease term.

Any contingent rents are expensed in the period they are incurred.

1.14 Impairment

The Council for Geoscience identifies cash-generating assets as assets that are managed with the objective of generating a commercial return, and non-cash-generating assets as assets that do not generate market related cash flows from that asset.

The entity assesses at each balance sheet date whether there is any indication that an asset may be impaired. If there is any indication that an asset may be impaired, the recoverable amount is estimated for the individual asset. The recoverable amount of an asset is the higher of fair value less assumed costs to sell and its value-in-use.

If the recoverable amount of an asset is less than its carrying amount, the carrying amount of the asset is reduced to its recoverable amount. That reduction is an impairment loss recognised immediately in surplus or deficit.

At each reporting date the entity assesses impairment losses recognised in prior years for continued existence or decreases. If such indication exists, the recoverable amounts of those assets are estimated. The increase in the carrying amount of an asset attributable to a reversal of an impairment loss does not exceed the carrying amount that would have been determined had no impairment loss been recognised for the asset in prior periods. A reversal of an impairment loss of assets carried at cost less accumulated depreciation or amortisation is recognised immediately in surplus or deficit.

1 Accounting Policies

(continued)

1.15 Critical accounting estimates and judgements

Provision for bad debts

Past experience indicates a reduced prospect of collecting debtors over the age of four months. Debtor balances are regularly assessed by management and provided for in line with the policy.

Provisions

Provisions were raised and management determined an estimate based on the information available and in line with the policy.

Property and equipment

Management has made certain estimations with regard to the determination of estimated useful lives and residual values of items of property and equipment.

Leases

Management has applied its judgement to classify all lease agreements that the entity is party to as operating leases, as they do not transfer substantially all risks and ownership to the entity. Furthermore, as the operating lease in respect of premises is only for a relatively short period of time, management has made a judgement that it would not be meaningful to classify the lease into separate components for the land and for the buildings for the Polokwane office current lease, and the agreement will be classified in its entirety as an operating lease.

1.16 Sources of estimation uncertainty

There are no key assumptions concerning the future and other key sources of estimation uncertainty at the balance sheet date that could have a significant risk of causing material adjustment to the carrying amounts of assets and liabilities within the next financial year.

1.17 Irregular expenditure

Irregular expenditure is recorded in the notes to the financial statements when confirmed. The amount recorded is equal to the value of the irregular expenditure incurred, unless it is impractical to determine, in which case reasons therefore must be provided in the notes. Irregular expenditure receivables are measured at the amount that is expected to be recovered and are de-recognised when settled or written off as irrecoverable.

Irregular expenditure must be removed from the balance of the irregular expenditure notes when it is either:

- condoned by the relevant authority if no official was found to be liable in law;
- recovered from an official liable in law;
- written-off if it's irrecoverable from an official liable in law; or
- written-off if it's not condoned and not recoverable.

1.18 Fruitless and wasteful expenditure

Fruitless and Wasteful Expenditure is expenditure that was made in vain and would have been avoided had reasonable care been exercised. Fruitless and wasteful expenditure where identified is accounted for in the related year. The expenditure is accordingly classified with its nature, and where subsequently recovered or written off, it is accounted for accordingly in surplus or deficit.

1.19 Post-reporting date events

Events after the reporting date are those events, both favourable and unfavourable, that occur between the reporting date and the date when the financial statements are authorised for issue. Two types of events can be identified:

- Those that provide evidence of conditions that existed at the reporting date (adjusting events after the reporting date)
- Those that are indicative of conditions that arose after the reporting date (non-adjusting events after the reporting date).

1 Accounting Policies

(continued)

The Council for Geoscience will adjust the amounts recognised in the financial statements to reflect adjusting events after the reporting date once the event has occurred.

The Council for Geoscience will disclose the nature of the event and estimate its financial effect or a statement that such estimate cannot be made in respect of all material non-adjusting events, where non-disclosure could influence the economic decisions of users taken on the basis of the financial statements.

1.20 Related party transactions

Individuals as well as their close family members, and/or entities are related parties if one party has the ability, directly or indirectly, to control or jointly control the other party or exercise significant influence over the other party in making financial and/or operating decisions. Management is regarded as a related party and comprises the Board members and senior management. Related party transfers/payments of appropriated funds, specific-purpose allocations, etc. would generally fall under the disclosure exemption in GRAP 20, and such transfers and allocations are therefore part of the normal supplier and/or client/recipient relationships and are therefore not disclosed.

Notes to the Annual Financial Statements

for the Year Ended 31 March 2022

2 New standards and interpretations

2.1 Standards and interpretations issued, but not yet effective

The Council for Geoscience has not applied the following standards and interpretations, which have been approved but are not yet effective for accounting periods 2021/22:

GRAP statement	Description	Impact	Effective date
GRAP 25	Employee Benefits	None	To be determined
GRAP 104	Financial Instruments (revised)	None	To be determined

3 Property and equipment

2022	Land R'000	Buildings and Fixtures R'000	Equipment* R'000	Office furniture R'000	Aircraft and boat R'000	Motor vehicles R'000	Computer equipment R'000	Total R'000
Gross carrying amount	18 231	233 716	202 459	14 265	24 859	26 899	62 934	583 363
Accumulated depreciation at the beginning of the period	(1 600)	(74 644)	(121 646)	(9 331)	(9 760)	(15 624)	(16 064)	(248 669)
Opening net carrying amount at 31 March 2022	16 631	159 072	80 813	4 934	15 099	11 275	46 870	334 694
Movements during the period:								
Work in progress (refer to note 3.2)	-	21 369	(195)	-	-	-	(2 988)	18 186
Acquisitions	-	-	11 726	721	-	4 133	9 789	26 369
Disposals	-	-	(72)	(134)	(3)	(32)	(108)	(349)
Disposals – Cost	-	-	(4 438)	(852)	(67)	(319)	(1 238)	(6 914)
Disposals – Depreciation	-	-	4 366	718	63	287	1 130	6 565
Depreciation	-	(6 378)	(21 329)	(485)	(742)	(2 571)	(5 411)	(36 917)
Closing net carrying amount at 31 March 2022	16 631	174 062	70 942	5 037	14 354	12 805	48 152	341 983
Gross carrying amount	18 231	255 085	209 552	14 134	24 792	30 713	68 497	621 001
Accumulated depreciation/impairment	(1 600)	(81 022)	(138 609)	(9 098)	(10 439)	(17 908)	(20 345)	(279 018)

Notes to the Annual Financial Statements

(continued)

3 Property and equipment (continued)

2021	Land R'000	Buildings and Fixtures R'000	Equipment* R'000	Office furniture R'000	Aircraft and boat R'000	Motor vehicles R'000	Computer equipment R'000	Total R'000
Gross carrying amount	18 231	210 421	196 458	13 325	23 555	26 900	54 176	543 066
Accumulated depreciation at the beginning of the period	(1 600)	(68 618)	(99 302)	(8 744)	(9 284)	(13 058)	(12 445)	(213 051)
Opening net carrying amount at 31 March 2021	16 631	141 803	97 156	4 581	14 271	13 842	41 731	330 015
Movements during the period:								-
Work in progress (refer to note 3.2)	-	23 295	(27 167)	-	(1 282)	-	(6 032)	(11 186)
Reversal of impairment	-	315	-	-	-	-	-	315
Acquisitions	-	-	33 269	1 121	2 585	-	14 990	51 965
Disposals	-	-	(10)	(40)	-	(1)	(119)	(170)
Disposals – Cost	-	-	(102)	(181)	-	(1)	(199)	(483)
Disposals – Depreciation	-	-	92	141	-	-	80	313
Depreciation	-	(6 341)	(22 436)	(728)	(475)	(2 566)	(3 699)	(36 245)
Closing net carrying amount at 31 March 2021	16 631	159 072	80 813	4 934	15 099	11 275	46 870	334 694
Gross carrying amount	18 231	233 716	202 459	14 265	24 859	26 899	62 934	583 362
Accumulated depreciation/impairment	(1 600)	(74 644)	(121 646)	(9 331)	(9 760)	(15 624)	(16 064)	(248 669)

* Equipment includes the following categories of equipment: Specialised Equipment, Audio and Visual, Technical Equipment, Office Equipment, and Scientific Equipment

Notes to the Annual Financial Statements

(continued)

3 Property and equipment (continued)

The transfer of the following land and buildings as stipulated under Section 26 of the Geoscience Act (Act No. 100 of 1993) has not yet been completed.

Location	Fair value at date of transfer R'000
474 Carl Street, Town Lands 351JR, Pretoria West	2 800
280 Pretoria Street, Silverton, Pretoria	94 000

Details regarding land and buildings are kept at the Council for Geoscience head office and will be supplied upon written request.

3.1 Compensation from third parties for property and equipment lost

	2022 R'000	2021 R'000
Proceeds from insurance	620	604

3.2 Property and equipment in the process of being constructed

Cumulative expenditure recognised in the carrying value of property and equipment being developed/constructed

	Buildings and fixtures R'000	Equipment* R'000	Aircraft and boat R'000	Total R'000
Gross carrying amount	70 211	23 933	1 040	95 184
Opening net carrying amount at 31 March 2021	70 211	23 933	1 040	95 184
Movement	21 369	(3 183)	-	18 186
Closing net carrying amount at 31 March 2022	91 580	20 751	1 040	113 371

Notes to the Annual Financial Statements

(continued)

3 Property and equipment (continued)

Property and equipment in the process of being constructed with delays

Included in the work in progress for buildings and fixtures is a carrying amount of R81.090 million in respect of a ventilation system in the Silverton building that has been delayed.

	Buildings and fixtures R'000
Gross carrying amount	59 593
Opening net carrying amount at 31 March 2021	59 593
Movement	21 497
Closing net carrying amount at 31 March 2022	81 090

Repairs and maintenance expenditure incurred for the year to repair and maintain property and equipment.

	2022 R'000	2021 R'000
Repairs and maintenance		
Land and buildings	8 413	4 751
Office equipment and furniture	77	4
Technical and scientific equipment	1 910	2 482
Computer equipment	55	163
Aircraft	210	127
	10 665	7 527

Notes to the Annual Financial Statements

(continued)

4 Intangible assets

	2022 R'000	2021 R'000
Computer software		
Gross carrying amount	16 833	9 501
Accumulated amortisation	(9 666)	(8 166)
Opening net carrying amount at 31 March 2021	7 168	1 335
Movements during the period:		
Acquisitions	187	7 333
Disposals	(9)	-
Disposals – Cost	(269)	-
Disposals – Amortisation	259	-
Amortisation	(1 704)	(1 501)
Closing net carrying amount at 31 March 2022	5 641	7 167
Gross carrying amount	16 752	16 833
Accumulated amortisation	(11 111)	(9 666)

5 Inventories

	2022 R'000	2021 R'000
Publication inventories	5	5

6 Retirement benefit

6.1 Post-retirement medical aid fund (PRM)

The Council for Geoscience has made provision for the medical aid fund covering all its qualifying employees. All eligible employees are members of the defined benefit scheme. To improve management of this defined benefit scheme the Council for Geoscience established a qualifying plan asset in October 2010 which is held and administered by Momentum Group Limited and evaluated annually as at 31 March.

Notes to the Annual Financial Statements

(continued)

6 Retirement benefit (continued)

The amount recognised in the Statement of Financial Performance is determined as follows:

	2022 R'000	2021 R'000
Current service costs	52	48
Interest charge	2 350	2 074
Expected return on planned assets	(1 306)	(1 517)
Actuarial (gain)/loss recognised	(434)	3 947
Recognition of loss on asset realisation	(392)	(2 959)
	270	(1 593)

The amount included in the Statement of Financial Position arising from the Council for Geoscience obligation in respect of PRM is as follows:

	2022 R'000	2021 R'000	2020 R'000	2019 R'000	2018 R'000
Present value of fund obligations	25 894	26 070	24 348	(15 094)	25 565
Fair value of planned assets	(14 364)	(14 810)	(15 094)	8 035	(17 530)
Liability recognised in Statement of Financial Position	11 530	11 260	9 254	(7 059)	8 035

Movement in net liability during the period is as follows:

	2022			2021		
	Liability	Planned asset	Net	Liability	Planned asset	Net
Liability at beginning of period	26 070	-	26 070	24 348	-	24 348
Value of planned assets at beginning of period	-	(14 810)	(14 810)	-	(15 094)	(15 094)
	26 070	(14 810)	11 260	24 348	(15 094)	9 254
Interest charge/expected return of planned asset	2 350	(1 306)	1 044	2 562	(1 541)	1 021
Contributions received	-	(392)	(392)	-	(1)	(1)
Current service costs	52	-	52	37	-	37
Benefits paid	(2 373)	2 373	-	(2 311)	2 311	-
Actuarial (gain)/loss	(205)	(229)	(434)	1 434	(485)	949
Closing balance	25 894	(14 364)	11 530	26 070	(14 810)	11 260

Notes to the Annual Financial Statements

(continued)

6 Retirement benefit (continued)

Contributions expected to be paid

Top up payments are expected to be made during the 2022/23 financial year.

Expected rate of return on assets 9.98%

Assumptions

Discount rates 9.98%

Basis of discount rates: JSE zero coupon bond yield after the market closed on 31 March 2022

Return on assets 9.98%

Expected salary increases 4.23%

Healthcare cost inflation rate 7.78%

Sensitivity analysis-on accrued liability (R Millions) for the year ended 31 March 2022

Assumption	Change	In service	Continuation	Total	Change
Central assumptions	-	2.248	23.646	25.894	-
Healthcare inflation	1%	2.590	25.435	28.025	8%
	-1%	1.964	22.047	24.011	-7%
Discount rate	1%	1.972	22.090	24.062	-7%
	-1%	2.586	25.414	28.000	8%
Post-retirement mortality	-1 year	2.322	24.692	27.014	4%
Average retirement date	-1 year	2.322	23.646	25.968	0%
Continuation of membership at retirement	-10%	2.024	23.646	25.670	-1%

The preceding table above indicates, for example that if medical inflation is 1% greater than the long-term assumptions made, the liability will be 8% higher than that shown.

Sensitivity analysis for current service and interest cost (R Millions) for the year ended 31 March 2022

Assumption	Change	Current service	Interest cost	Total	Change
Central assumptions	-	51 647	2 353 673	2 405 320	-
Healthcare inflation	1%	61 841	2 560 042	2 621 883	9%
	-1%	43 416	2 171 606	2 215 022	-8%
Discount rate	1%	43 623	2 407 098	2 450 721	2%
	-1%	61 728	2 286 708	2 348 436	-2%
Post-retirement mortality	-1 year	53 302	2 460 072	2 513 374	4%
Average retirement date	-1 year	56 581	2 367 250	2 423 831	1%
Continuation of membership at retirement	-10%	46 509	2 333 705	2 380 214	-1%

The preceding table above indicates, for example, that if medical inflation is 1% greater than the long-term assumptions made, the liability will be 9% higher than that shown.

Notes to the Annual Financial Statements

(continued)

6 Retirement benefit (continued)

6.2 Pension and provident fund benefits

The Council for Geoscience and its employees contribute to a defined contribution plan. The assets of the scheme are held separately from the Council for Geoscience in funds under the control of trustees. The total cost charged to income of R16.072 million (2021: R15.591 million) represents equal contributions of 7.5% by the employer and employee.

7 Trade and other receivables from exchange transactions

	2022 R'000	2021 R'000
Trade receivables	31 493	5 503
Contract customers	28 182	9 006
Other receivables	11 758	10 044
	71 433	24 554
Less – Provision for bad debts	(2 252)	(2 026)
	69 181	22 528
Provision for bad debts		
Opening balance	2 026	2 047
Movement	226	(21)
Closing balance	2 252	2 026
Analysis of impairment		
Long overdue debtors considered impaired	2 252	2 026
	2 252	2 026

There is no difference between the fair value of trade and other receivables and their book value.

8 Cash and cash equivalents

Cash and cash equivalents at the end of the period are represented by the following balances:

	2022 R'000	2021 R'000
Cash at bank	116 907	26 800
Call accounts	176 091	331 562
	292 997	358 362

There is no difference between the fair value of cash and cash equivalents and their book value.

Notes to the Annual Financial Statements

(continued)

9 Trade and other payables

	2022 R'000	2021 R'000
Trade payables	21 430	21 673
Other payables	30 728	46 461
	52 157	68 134

There is no difference between the fair value of trade payables and their book value.

10 Deferred income

Exchange revenue

	2022 R'000	2021 R'000
10.1 Deferred income arising as a result of an agreement entered into with the Department of Science and Innovation to develop an intellectual property management office (Geoscience Act par 5(1)(g))		
Carrying amount at the beginning of period	2 607	2 609
Amounts used during the period	-	(2)
Carrying amount at the end of period	2 607	2 607
10.2 Deferred income arising as a result of an agreement with the Organisation of African Geological Surveys		
Carrying amount at the beginning of period	293	248
Amounts received	42	45
Carrying amount at the end of period	335	293
10.3 Deferred income arising as a result of an agreement with the Department of Science and Innovation for the environmentally friendly and efficient methods for the extraction of Rare Earth Elements		
Carrying amount at the beginning of period	-	182
Amounts used during the period	-	(182)
Carrying amount at the end of period	-	-

Notes to the Annual Financial Statements

(continued)

10 Deferred income (continued)

	2022 R'000	2021 R'000
10.4 Deferred income arising as a result of an agreement entered into with the National Research Foundation		
Carrying amount at the beginning of period	110	110
Carrying amount at the end of period	110	110
10.5 Deferred income arising as a result of Carbon Capture, Utilisation and Storage (CCUS) project		
Carrying amount at the beginning of period	81 810	-
Amounts received	-	90 000
Amounts used during the period	(24 369)	(8 190)
Carrying amount at the end of period	57 441	81 810
10.6 Deferred income arising as a result of CCUS project funded by the World Bank		
Amounts received	101 000	-
Carrying amount at the end of period	101 000	-
10.7 Deferred income arising as a result of an agreement entered into with the Department of Mineral Resources and Energy to develop and implement various measures to mitigate the effect of mining-induced contamination		
Carrying amount at the beginning of period	106 518	105 002
Amounts received	50 819	248 537
Amounts used during the period	(113 647)	(247 021)
Carrying amount at the end of period	43 690	106 518
Total deferred income	205 183	191 337

Notes to the Annual Financial Statements

(continued)

11 Accruals

	2022 R'000	2021 R'000
Accruals for leave pay		
Carrying amount at the beginning of period	27 216	19 804
Provision current period	3 770	9 133
Amounts used during the current period	(2 521)	(1 721)
Carrying amount at the end of period	28 465	27 216
<p>The leave pay provision relates to the estimated liabilities as a result of leave days due to employees.</p>		
Accruals for 13th cheque		
Carrying amount at the beginning of period	6 256	5 395
Provision current period	(162)	861
Carrying amount at the end of period	6 094	6 256
<p>The 13th cheque accrual relates to the structuring of employee costs to company and is paid out on employees' birthdays.</p>		
Total accruals	34 559	33 472

Notes to the Annual Financial Statements

(continued)

12 Surplus/Deficit from operations

	2022 R'000	2021 R'000
Operating surplus/deficit is arrived at after taking the following items into account:		
Revenue	583 953	525 886
Non-exchange revenue		
Total grant received	377 062	502 230
Project related revenue	(50 819)	(248 537)
Total non-exchange revenue	326 243	253 693
Exchange revenue		
Department of Mineral Resources and Energy project related revenue	113 647	224 351
Contracting revenue	104 726	19 872
Publication revenue	3 198	3 337
Carbon Capture, Utilisation and Storage	24 369	8 190
	245 939	255 750
Other exchange revenue		
Foreign currency gains	44	627
Proceeds from sale of asset	-	29
Recovery of asset losses	620	604
Sundry income	912	2 908
	1 576	4 168
Interest received		
- Interest income on call accounts	7 006	8 345
- Interest* income on current accounts	2 447	3 930
	9 453	12 275
Total exchange revenue	256 968	272 193

* includes interest accrued to the amount of R441 912

Notes to the Annual Financial Statements

(continued)

12 Surplus/Deficit from operations (continued)

	2022 R'000	2021 R'000
Total cost of contracts	268 543	194 862
Cost of commercial projects		
Direct cost	64 621	5 710
Personnel expenditure	18 594	9 222
	83 215	14 932
Cost of statutory projects		
Direct cost	55 618	51 789
Personnel expenditure	129 710	128 141
	185 328	179 930
Administrative expenses include:		
Audit fees	3 671	2 873
- Current period	2 895	1 786
- Internal audit	219	955
- Fee for other services	558	131
Provision for bad debts	226	(21)
Depreciation – on owned assets	36 916	36 245
- Buildings	6 378	6 341
- Equipment	21 329	22 436
- Office furniture	484	728
- Motor vehicles	2 571	2 566
- Aircraft	443	282
- Boat	299	193
- Computer equipment	5 411	3 699
Reversal of impairment	-	315
Amortisation – intangible assets		
- Computer software	1 704	1 501
Rentals in respect of operating leases		
- Land and buildings	6 614	843
- Multifunctional printers	887	855

Notes to the Annual Financial Statements

(continued)

12 Surplus/Deficit from operations (continued)

	2022 R'000	2021 R'000
Other operating expenses		
Net loss on disposal of equipment	72	10
Net loss on disposal of vehicles	32	-
Net loss on disposal of intangible assets	9	-
Net loss on disposal of computer equipment	108	120
Net loss on disposal of office furniture	134	40
Net loss on disposal of boat	3	-
Write-off work in progress – HVAC	-	18 496
Foreign currency losses	548	914
	905	19 580
Staff costs	340 464	337 293
Included in staff costs are:		
Defined benefit plan expense for the post-retirement medical aid fund	270	2 036
- Current service cost	52	37
- Interest cost	2 350	2 562
- Expected return on plan assets	(1 306)	(1 541)
- Recognised actuarial (gain)/loss	(434)	979
- Recognition of loss on asset realisation	(392)	(1)
Defined contribution plan expenses for the pension and provident fund	16 072	15 591

Emoluments

	2021/22				Total R'000
	Pensionable salary R'000	Performance bonus R'000	Provident/ Pension fund contributions R'000	Other contributions* R'000	
Senior management					
Mr Mabuza M	3 656	404	222	921	5 203
Mr Matsepe LD	2 577	304	157	130	3 168
Ms Shelembe PR	1 941	220	127	550	2 839
Dr Tshipa J	2 057	195	123	279	2 655
Dr Khoza TD	1 949	213	119	108	2 389

Notes to the Annual Financial Statements

(continued)

12 Surplus/Deficit from operations (continued)

	2020/21				Total R'000
	Pensionable salary R'000	Performance bonus R'000	Provident/ Pension fund contributions R'000	Other contributions* R'000	
Senior management					
Mr Mabuza M	3 114	334	188	678	4 314
Mr Matsepe LD	2 577	298	157	552	3 584
Ms Shelembe PR	1 941	236	127	437	2 741
Dr Tshipa J	2 057	238	123	457	2 875
Dr Khoza TD	1 949	233	119	427	2 728

* Other contributions relate to employer contributions towards statutory deductions and leave.

Board emoluments

Non-executive Board members	2022 R'000	2021 R'000
Dr Mathe H	45	176
Dr Mahachi J	-	107
Mr Koloji K	-	-
Mr Mvinjelwa X	129	129
Mr Mokoena S	113	131
Adv. Maake N	126	113
Ms Chowan A	96	150
Dr Mirembe J	-	-
Dr Khumalo T – Resigned 31 October 2021	-	-
Mr Malaza S	-	-
Mr Nel P	-	-
Ms Mdubeki R	-	-
Ms Mochothli D	-	-
Ms Tsotetsi P	-	-
Ms Madiba L	-	-
Mr Moatshe A	-	-
Mr Gerrys B	-	-
	509	806

Notes to the Annual Financial Statements

(continued)

13 Finance cost

	2022 R'000	2021 R'000
Finance cost on motor vehicle fleet cards	20	14

14 Reconciliation of net surplus/(loss) for the period to cash-generated from operations

	2022 R'000	2021 R'000
Net surplus for the period	(12 175)	(13 066)
Interest	20	14
Depreciation on property and equipment	36 916	36 245
Amortisation – Intangible assets	1 704	1 501
Reversal of impairment of assets	-	(315)
Proceeds from sale of assets	-	(29)
Compensation from third parties for property and equipment lost	(620)	(604)
Net loss on disposal of fixed assets	358	170
Interest earned	(9 846)	(12 569)
Provision for post-retirement medical aid benefits	270	2 006
Operating cash flows before working capital changes	16 627	13 353
Working capital changes:		
Increase in provision for accumulated leave pay and 13 th cheque	1 088	8 273
(Increase)/Decrease in trade and other receivables	(46 653)	16 762
Increase/(Decrease) in trade and other payables	(15 977)	39 690
Increase/(Decrease) in deferred income	13 845	83 194
Cash generated from operations (including finance costs)	(31 070)	161 272

Notes to the Annual Financial Statements

(continued)

15 Acquisition of:

	2022 R'000	2021 R'000
15.1 Property and equipment		
Land and buildings	-	-
Equipment	11 726	33 269
Office furniture	721	1 121
Aircraft and boat	-	2 585
Motor vehicles	4 133	-
Computer equipment	9 789	14 990
	<u>26 369</u>	<u>51 965</u>
Work in progress – Acquisitions		
Land and buildings	21 369	23 295
Computer equipment	(2 988)	(6 032)
Equipment	(195)	(27 167)
Aircraft and boat	-	(1 282)
	<u>18 186</u>	<u>(11 186)</u>
Total acquisitions	<u>44 554</u>	<u>40 779</u>
15.2 Intangible assets		
Computer software	187	7 333
	<u>187</u>	<u>7 333</u>

16 Contingent liability

	2022 R'000	2021 R'000
16.1 Pending legal action		
The Council for Geoscience has an estimated legal liability due to pending labour cases	476	-
	<u>476</u>	<u>-</u>

17 Taxation

No provision for income tax was made as the Council for Geoscience is exempted in terms of Section 10(1)(Ca)(i) of the Income Tax Act.

Notes to the Annual Financial Statements

(continued)

18 Operating lease commitments

	2022 R'000	2021 R'000
18.1 Lease of office space		
The operating lease between a supplier and the Council for Geoscience was entered into from 1 December 2017 to 30 November 2023.		
At reporting date, the outstanding commitments under non-cancellable operating leases, which fall due are as follows:		
Up to 1 year	562	674
2 to 5 years	495	1 209
Total lease commitments	1 057	1 883
18.2 Lease of office printing equipment		
The operating lease contracts with suppliers are from 1 May 2021 to 30 January 2025.		
At the reporting date, the outstanding commitments under non-cancellable operating leases, which fall due are as follows:		
Up to 1 year	2 847	792
2 to 5 years	3 480	-
Total lease commitments	6 327	792
18.3 Commitments		
Operating expenditure		
Approved and contracted	130 916	41 024
Approved but not yet contracted	28 201	13 170
Capital expenditure		
Approved and contracted: Property and equipment	71 858	55 234
Approved but not yet contracted: Property and equipment	-	10 281
Total commitments	230 974	119 709
Commitments		
Up to 1 year	35 405	50 098
2 to 5 years	195 570	69 611
Total commitments	230 974	119 709

The Council for Geoscience has usage-based contracts for the provision of the following services:

- Sampling Services Geophysics
- Accommodation and travel
- Courier services

Notes to the Annual Financial Statements

(continued)

19 Financial instruments

Financial instruments consist of cash and cash equivalents, investments with financial institutions, trade and other receivables and trade and other payables.

19.1 Credit risk

Financial assets, which potentially subject the Council for Geoscience to concentrations of credit risk, consist principally of cash, short-term deposits and trade receivables. The Council for Geoscience's cash equivalents and short-term deposits are placed with high credit quality financial institutions. Trade receivables are presented net of the allowance for doubtful debts. Credit risk with respect to trade receivables is limited due to the large number of customers being dispersed across different industries and geographical areas. Accordingly the Council for Geoscience has no significant concentration of credit risk.

The carrying amounts of financial assets included in the Statement of Financial Position represent the Council for Geoscience's exposure to credit risk in relation to those assets.

Trade and other receivables are controlled by well-established policies and procedures which are reviewed and updated on an ongoing basis. The Council for Geoscience does not have any significant exposure to any individual customer or counterparty.

Trade receivables and other payables are carried at amortised costs. Refer to notes 7 and 9.

19.2 Interest rate risk

The organisation's exposure to interest rate risk and the effective interest rates on the financial instruments at reporting date are: 31 March 2022.

	Weighted average effective interest rate 2022 %	Weighted average effective interest rate 2021 %
Assets		
Cash	1.00%	1.00%
Call accounts	3.94%	3.64%

Short-term deposits

The risk is perceived to be low due to the following factors:

- Funds are only invested with approved financial institutions according to the policy of the Council for Geoscience.
- Short-term deposits are only reinvested or invested with management approval.

Notes to the Annual Financial Statements

(continued)

19 Financial instruments (continued)

19.3 Foreign currency risk

The Council for Geoscience undertakes certain transactions denominated in foreign currencies, hence exposures to exchange rate fluctuations arise. It is not policy for the Council for Geoscience to take out cover on these outstanding foreign currency transactions due to the fact that these transactions take place on an ad hoc basis. The Council for Geoscience exposure at 31 March 2022 is disclosed in note 20.

19.4 Airborne operations risk

It is the policy of the Council for Geoscience to transfer risk in respect of airborne operations to third parties, namely insurance and an external operator.

20 Foreign currency exposure

	2022			2021		
	Exchange rate	Foreign amount '000	R-value R'000	Exchange rate	Foreign amount '000	R-value R'000
20.1 Trade receivables						
Foreign currency						
US\$	R14.39330	\$28	399	R14.56250	\$28	404
20.2 Banks						
Foreign funds						
Euro	R15.86860	€240	3 808	R17.06900	€240	4 097

21 Related-party transactions

During the period, the following related-party transactions took place between the Council for Geoscience and the Department of Mineral Resources and Energy:

	2022 R'000	2021 R'000
Total grant received	377 062	502 230

Refer to note 10 for further details regarding transactions with the Department of Mineral Resources and Energy. All other related-party transactions were concluded at arm's length.

Notes to the Annual Financial Statements

(continued)

21 Related-party transactions (continued)

	2022 R'000	2021 R'000
Relationships:		
Parent National Department: Department of Mineral Resources and Energy		
Other Government Departments and Entities: South African National Energy Development Institute	-	90 000

The Council for Geoscience has been appointed as the implementing agency of the Carbon Capture, Utilisation and Storage (CCUS) project. The Director-General of Mineral Resources and Energy requested South African National Energy Development Institute (SANEDI) to transfer the MTEF funding allocations that were made available for the CCUS project to the CGS.

Refer to note 10 for further details regarding transactions with South African Energy Development Institute.

22 Irregular expenditure

	2022 R'000	2021 R'000
Opening balance	1 695	-
Irregular expenses identified in the current year	-	1 695
Expenditure condoned	(1 695)	-
	-	1 695

Details of irregular expenditure identified in the current year

Non-compliance with National Treasury's instruction note 5 of 2020/21 'Emergency Procurement in Response to National State of Disaster'. National Treasury Practice note number 5 was repealed by National Treasury Practice note number 11 with effect from 1 September 2020. The contract variation of 25% for internet services was concluded after the instruction note 5 of 2020/21 was repealed on 26 August 2020. No loss has been incurred as services were rendered. National Treasury condoned the irregular expenditure on 30 April 2021.

Disciplinary steps were taken against the employee that caused the irregular expenditure and they have since resigned

-	1 695
-	1 695

Notes to the Annual Financial Statements

(continued)

23 Fruitless and wasteful expenditure

	2022 R'000	2021 R'000
Opening balance	18 496	-
Fruitless and wasteful expenditure identified in the current year	-	18 496
	18 496	18 496

Determination

Fruitless and wasteful expenditure was identified in regards to the implementation of the humidity, ventilation and airconditioning (HVAC) system up to 2017. The work was found to be technically not acceptable and needed remediation. Management remains committed to eliminating and avoiding any fruitless and wasteful expenditure.

Investigation

The Council for Geoscience has commenced with investigative procedures and has engaged legal services to recover the costs and damages.

24 Events after reporting date

Non-adjusting events

Eminent acquisition of assets

Acquisition of equipment in support of the geoscience programme. The estimated cost for this acquisition is at R6 million.

Notes to the Annual Financial Statements

(continued)

25 Correction of prior year error

		2022 R'000	2021 R'000
Nature	Period		
A correction was made to the financial statements on VAT expenditure that was not recognised in the period to which it relates.	31 March 2020	-	5 149
A correction was made to payables in the prior period relating to the allocation of payments.	31 March 2020	-	(3 100)
A correction was made to the financial statements on other income that was not recognised in the period to which it relates.	31 March 2020	-	(2 882)
A correction was made to the financial statements to depreciation/amortisation for the prior period.	31 March 2020	(121)	(2 383)
A allocation correction was made from expenditure and capitalised.	31 March 2020	-	(65)
A correction was made to expenditure that was not recognised in the correct period.	31 March 2021	11 191	12
An adjustment was made to payables in the prior period relating to a construction project retention.	31 March 2020	-	(637)
An adjustment was made to deferred income in the prior period relating to a construction project retention.	31 March 2020	-	(197)
A correction was made to the financial statement to revenue for the prior period.	31 March 2021	(8)	-
A correction was made to expenditure that was previously capitalised.	31 March 2021	1 231	-
		12 293	(4 101)
Effect			
Statement of Financial Performance as at 31 March 2020			
Revenue recorded in the incorrect period – CCUS		(8)	(3 079)
Expenditure recorded in the incorrect period		11 191	5 161
Payment incorrectly allocated		-	(3 100)
Retention on projects recorded in the incorrect period		-	(637)
Depreciation/amortisation recorded in the incorrect period		(121)	(2 383)
Work in progress/assets captured as an expense		-	(65)
Reallocation of expenditure erroneously capitalised		1 231	-
		12 293	(4 101)

Notes to the Annual Financial Statements

(continued)

25 Correction of prior year error (continued)

	2022 R'000	2021 R'000
Effect		
Statement of Financial Position as at 31 March 2020		
Government Grant Project Related Revenue Recognised – Deferred income	-	976
Retention on projects not provided for – Payables	-	637
Capitalisation of VAT on asset	-	1 319
Payment incorrectly allocated	-	3 100
Expenditure recorded in the incorrect period not provided for	(11 191)	(6 480)
Revenue recorded in the incorrect period – Debtors	8	2 103
Accumulated depreciation/amortisation recorded in the incorrect period	121	2 383
Reallocation of expenditure erroneously capitalised	(1 231)	
Work in progress/assets captured as an expense	-	65
Statement of Net Assets for the period ended 31 March 2019		
Accumulated surpluses	(12 293)	4 101
Correction of prior year disclosure		
Nature		
Disclosure as at 31 March 2021		
Restatement of closing balances of cumulative expenditure recognised in the carrying value of property and equipment being developed/constructed and cost:		
Buildings and fixtures	(139)	-
Office furniture	139	-
Restatement of accumulated depreciation		
Vehicles other	(39)	-
Boat	39	-
Restatement of closing balances of commitments		
Approved and contracted	(1 695)	-
Effect		
None (only disclosure item)		

Notes to the Annual Financial Statements

(continued)

26 Change in accounting estimate

The useful lives of property and equipment were reassessed. This resulted in a change of estimated remaining lives of certain assets in the categories listed below:

Useful lives

	Old	New
Equipment	5–7 years	5–12 years
Office furniture	20 years	20–25 years
Motor vehicles	5–8 years	5–12 years
Computer equipment	6 years	6–13 years
Computer software	2–5 years	2–10 years

The effect of the change in accounting estimate has resulted in depreciation amounting to R2 087 864 in 2021/22.

The change of R4 175 729 will be reflected in future periods.

The residual values of property and equipment was reassessed. This resulted in a change of estimated residual values of assets in the categories listed below:

Residual values

	Old	New
Equipment	5% of cost	0% of cost
Office furniture	5% of cost	0% of cost
Computer equipment	5% of cost	0% of cost
Vehicles other	10% of cost	0% of cost

The effect of the change in accounting estimate has resulted in depreciation amounting to R3 425 263 (2020/21).

	2022 R'000	2021 R'000
Due to the change in accounting estimate regarding the useful life and residual values of assets, the depreciation expense is reported at:	31 500	27 593
Equipment	21 329	19 914
Office furniture	484	299
Motor vehicles	2 571	2 580
Computer equipment	5 411	3 299
Computer software	1 704	1 501

Notes to the Annual Financial Statements

(continued)

26 Change in accounting estimate (continued)

	2022 R'000	2021 R'000
Depreciation expense using the previous rates would have been reported at:	33 587	24 311
Equipment	22 909	17 405
Office furniture	595	(129)
Motor vehicles	2 658	2 540
Computer equipment	5 640	2 921
Computer software	1 784	1 574
Difference – useful lives	2 087	(144)
Equipment	1 580	(71)
Office furniture	111	8
Motor vehicles	87	14
Computer equipment	229	(22)
Computer software	80	(73)
Difference – residual values	-	3 425
Equipment	-	2 580
Office furniture	-	420
Computer equipment	-	400
Vehicles other	-	25

Notes to the Annual Financial Statements

(continued)

27 Heritage assets disclosure

GRAP 103 defines heritage assets as assets which have a cultural, environmental, historical, natural, scientific technological or artistic significance and are held indefinitely for the benefit of present and future generations.

Certain heritage assets are described as inalienable items thus assets which are retained indefinitely and cannot be disposed of without consent as required by law or otherwise.

	2022 R'000	2021 R'000
Nature		
The Council for Geoscience has the following different classes of heritage assets:		
- Gemstone collections	1 445	1 445
- Meteorite collections	2 804	2 804
- Mineral collections	13 313	13 313
	<u>17 562</u>	<u>17 562</u>

The heritage assets were at initial recognition valued at fair value using evaluators with the following credentials:

- Fossils – Professor for Paleontological Research, University of the Witwatersrand
- Mineral collections – MSc Geology and Professor and Chairman of the Department of Geology, University of the Witwatersrand
- Meteorite collections – Author of “Meteorites”, private collector of meteorites
- Gemstones – MSc Geology

Various valuation methods were used taking into account the different types of heritage assets held by the Council for Geoscience.

The valuations reports are held at the Council for Geoscience offices and are available for inspection.

The Palaeontological (fossil) assets have no monetary value as legislation does not permit the purchase or sale of fossils. (National Heritage Resources Act 1999 par 35(4)(c)).

The Council for Geoscience is in possession of old scientific equipment only for display purposes. This equipment does not carry any value.

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Council for Geoscience

RP140/2022

ISBN 978-0-621-50343-2

www.geoscience.org.za