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**Council for Geoscience Briefing  
of the PC on Mineral  
Resources:  
Annual Report for 2012/13**




**Presentation Structure**


- Corporate Performance
  - Historic Performance
  - Balanced Scorecard
- Audited Financial Statements & Multi Year Budgets
- Transformation Trends
- National Geoscience Mapping Programs
- Key Geoscience Projects



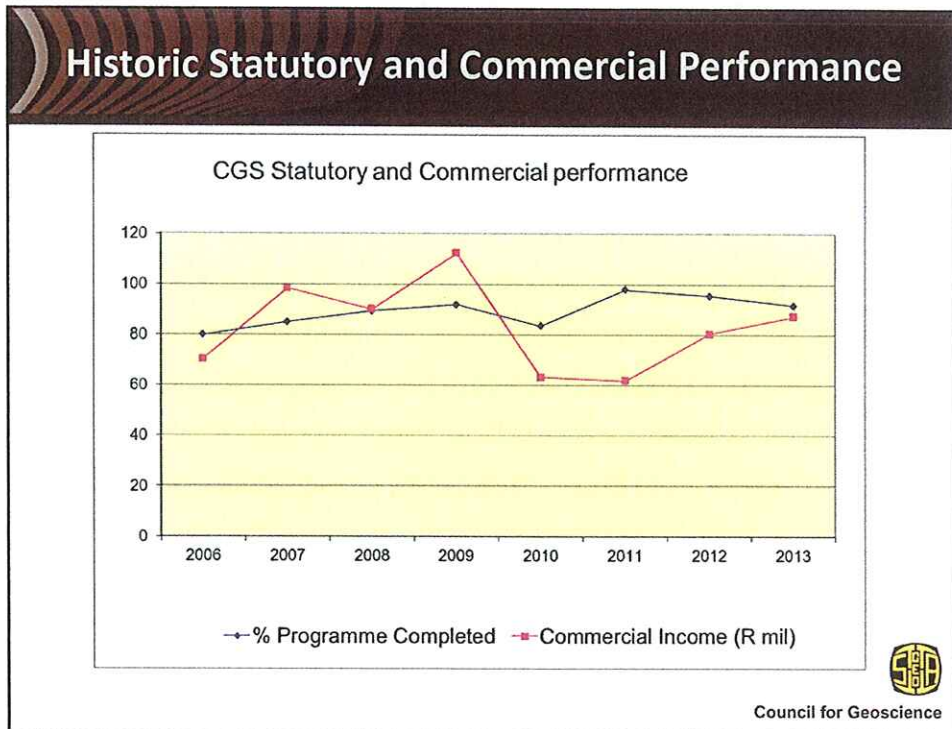
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## Corporate Performance



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## Balanced Scorecard (2012/2013)

### BSC Perspective: Market (Stakeholder/Customer) Focus

Measure	Baseline 2011/12	Target 2012/13	Performance 2012/13
ATP Performance Index	95,4%	85%	91,58%
Customer Satisfaction Level	88,87%	85%	88,4%
# of Geoscience Maps and Publications Published In-house	16	46	34
# of Rural Development Project Reports Completed	27	10	29



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## Balanced Scorecard (2012/2013)

### BSC Perspective: Market (Stakeholder/Customer) Focus

Measure	Baseline 2011/12	Target 2012/13	Performance 2012/13
# of Regional and African Development Projects in Progress	23	22	20
# of Environment-related Projects in Progress	6	6	21
Number of Seismic Stations Installed (MHSP)	New indicator	10	2



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## Balanced Scorecard (2012/2013)

### BSC Perspective: **Effective Systems (Organizational)**

Measure	Baseline 2011/12	Target 2012/13	Performance 2012/13
% ISO Implementation in Accordance with Reference Report	90%	100%	0%
Implement Geoscience Amendment Act	0%	40%	0%
Preferential (BEE/HDI) procurement as % of total procurement	31,54%	40%	34%
# of Audit Qualifications	0	0	0



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## Balanced Scorecard (2012/2013)

### BSC Perspective: **Economic (Financial) Growth**

Measure	Baseline 2011/12	Target 2012/13	Performance 2012/13
Total Revenue	R241,4m	R223m (R296,5m)	R289,9m
Contract Revenue	R79,3m	R72,6m	R86,5m
Sundry Income	R17,3m	R2,8m	R18,2m
Ratio of External Revenue to Total Revenue	40%	32%	36,11%



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## Balanced Scorecard (2012/2013)

### BSC Perspective: **Economic (Financial) Growth**

Measure	Baseline 2011/12	Target 2012/13	Performance 2012/13
Number of Large Tenders and Proposals Submitted (>R1m)	21	30	15
Tender Success Rate	New Indicator	10%	40%
Ratio of Overheads to total cost (%)	67,2%	55%	56,79%
Ratio of Personnel Costs to Total Costs	59,7%	59%	58,91%



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## Balanced Scorecard (2012/2013)

### BSC Perspective: **World Class People (Learning and Growth)**

Measure	Baseline 2011/12	Target 2012/13	Performance 2012/13
Staff Turnover	-2%	0%	12,29%
# of Staff Sponsored for MSc and PhD Degrees	41	35	46
Proportion of Scientists to Total Staff	38,87%	44%	41,12%
% of Scientific Staff with PhD and MSc Degrees	53,85%	56%	48,92%



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## Balanced Scorecard (2012/2013)

### BSC Perspective: World Class People (Learning and Growth)

Measure	Baseline 2011/12	Target 2012/13	Performance 2012/13
% Satisfied Protégées	91,3%	60%	62%
# of Papers and Articles Published	81	70	115
# of Projects with Intellectual Property Value	0	1	0
# of Projects with External Collaborators	45	58	45



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## Balanced Scorecard (2012/2013)

### BSC Perspective: World Class People (Learning and Growth)

Measure	Baseline 2011/12	Target 2012/13	Performance 2012/13
# of Strategic Science Partnerships	27	16	33
% Satisfied Staff	71%	65%	71,9%
EE Statistics (Consolidated) (W:B)	36:64	36:64	31:69
EE Statistics (Gender) (M:F)	60:40	54:46	59:41



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## Audited Financial Statements & Multi Year budgets



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### Audited Financials 2012/13 & Multi-year Budget for the Period 2013/14 to 2015/16


<b>ACTUALS AND BUDGETS FOR THE PERIOD 2012/13 TO 2015/16</b>					
<b>INCOME (RANDS)</b>	<b>2012/13 Budget x 1000</b>	<b>2012/13 Audited Actual x 1000</b>	<b>2013/14 Budget x 1000</b>	<b>2014/15 Budget x 1000</b>	<b>2015/16 Budget x 1000</b>
Government grant	223 006	187 907	265 268	297 908	319 027
Sales and contracts	72 600	86 467	79 860	87 846	96 631
Sundry income	2 756	15 565	2 894	3 039	3 191
<b>TOTAL INCOME - A</b>	<b>298 362</b>	<b>289 939</b>	<b>348 022</b>	<b>388 793</b>	<b>418 848</b>
<b>EXPENDITURE</b>					
Personnel costs	147 360	159 618	160 289	172 787	186 148
Bursaries	1 900	353	2 090	2 300	2 530
Commercial project costs	32 670	34 744	35 937	39 531	43 484
Overheads and operating costs	105 432	76 857	128 206	147 175	147 536
<b>SUBTOTAL - B</b>	<b>287 362</b>	<b>271 572</b>	<b>326 522</b>	<b>361 793</b>	<b>379 698</b>
<b>CAPITAL EXPENDITURE</b>					
Equipment - Acquisitions	1 000	*21 037	1 500	2 000	10 000
Land and buildings	10 000		20 000	25 000	29 150
<b>SUBTOTAL</b>	<b>11 000</b>	<b>21 037</b>	<b>21 500</b>	<b>27 000</b>	<b>39 150</b>
<b>TOTAL EXPENDITURE = B</b>	<b>298 362</b>	<b>271 572</b>	<b>348 022</b>	<b>388 793</b>	<b>418 848</b>
Surplus (Loss)	---	18 367	--	--	--

\* Balance Sheet

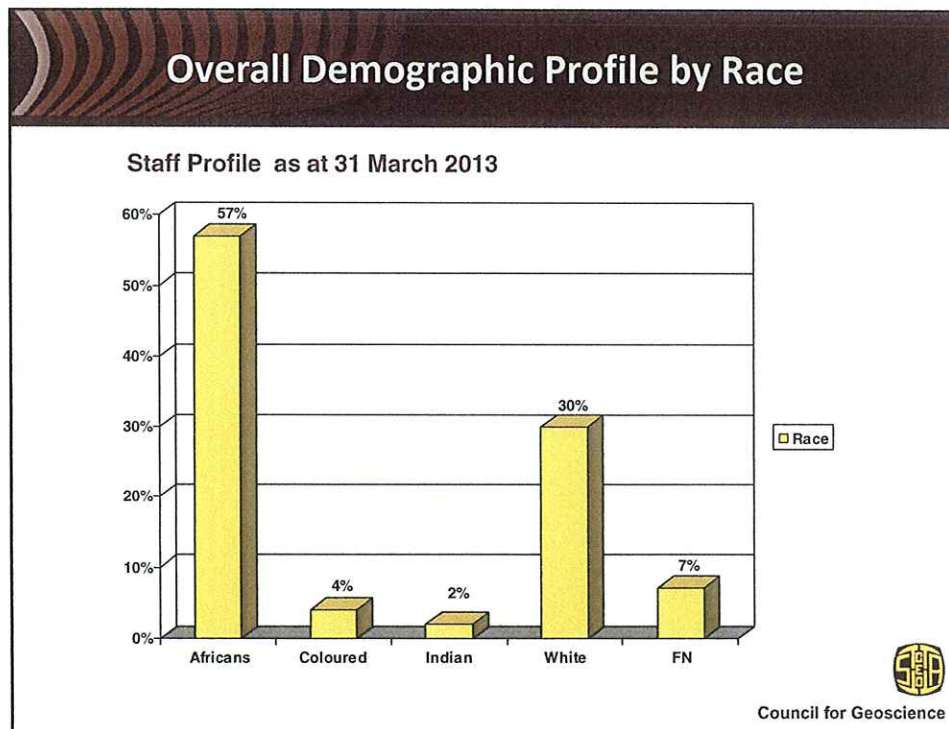


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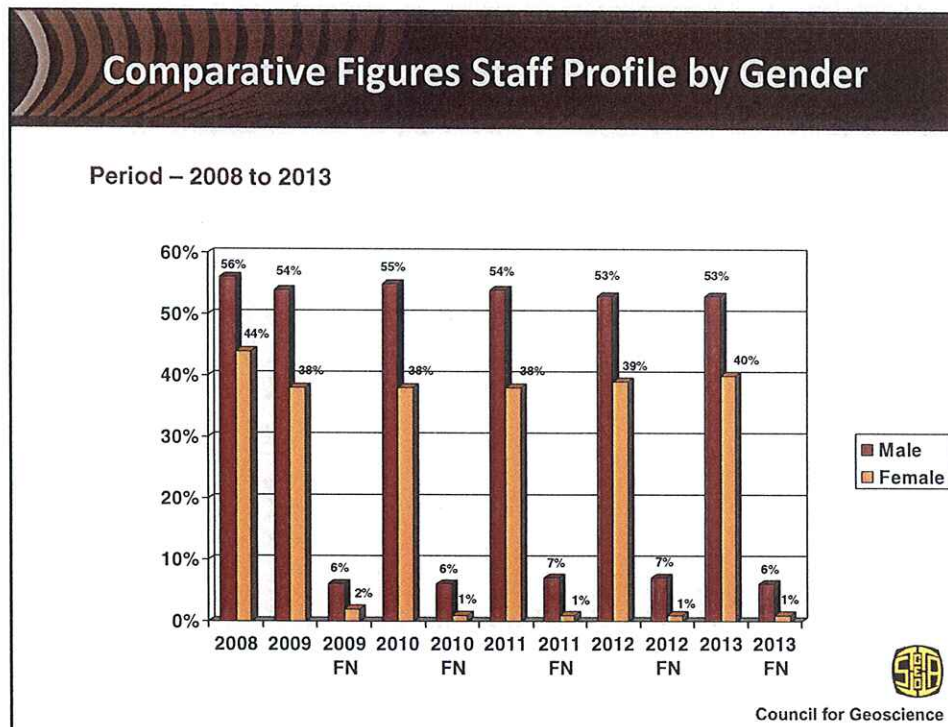
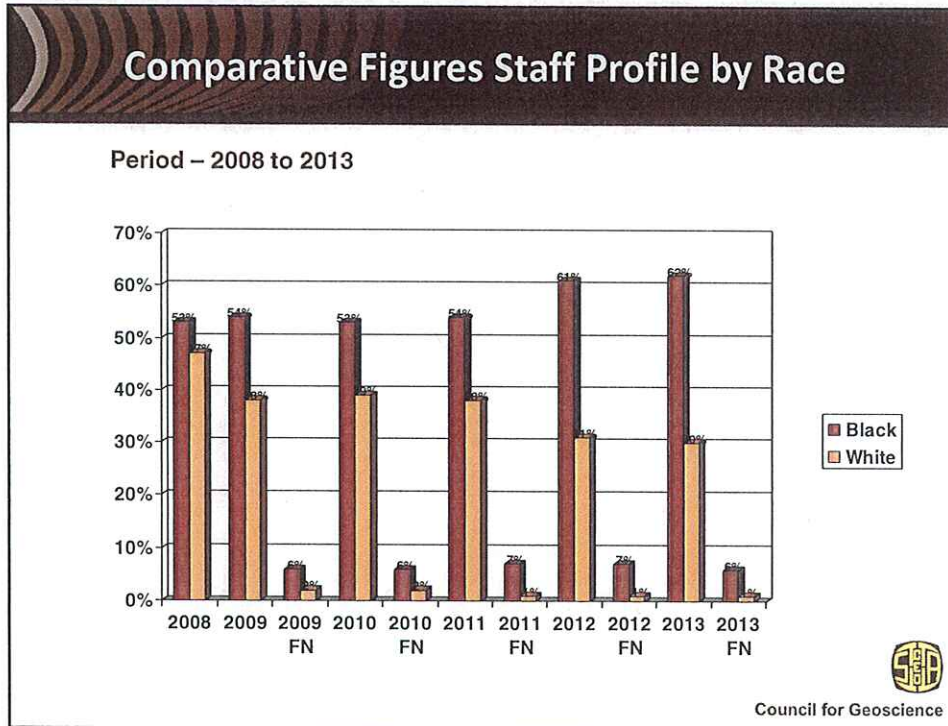
## Transformation Trends

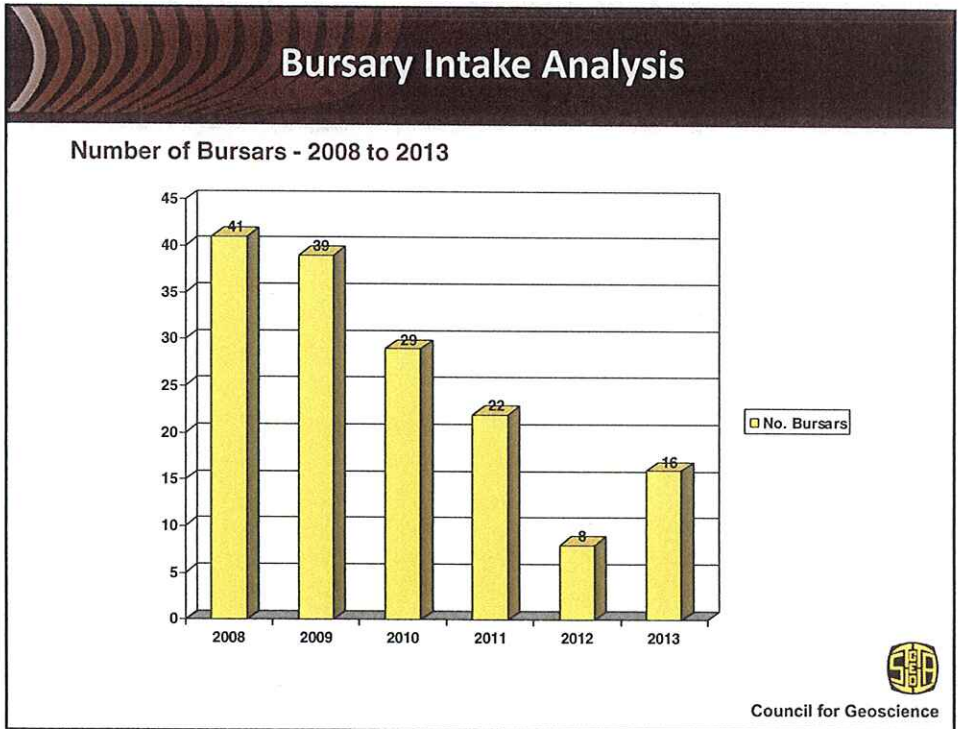
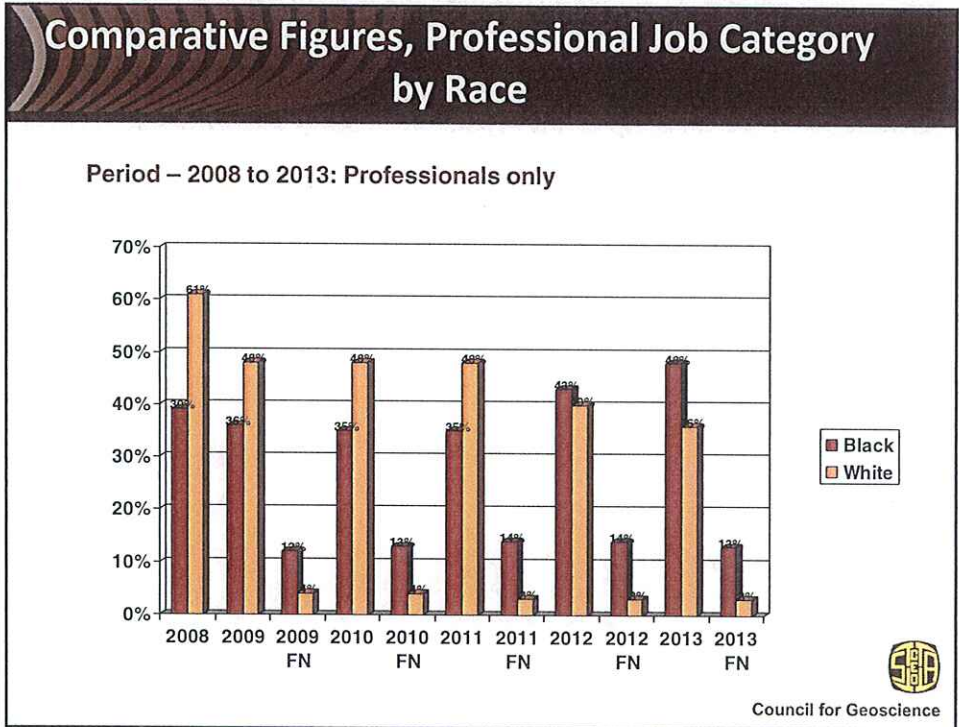


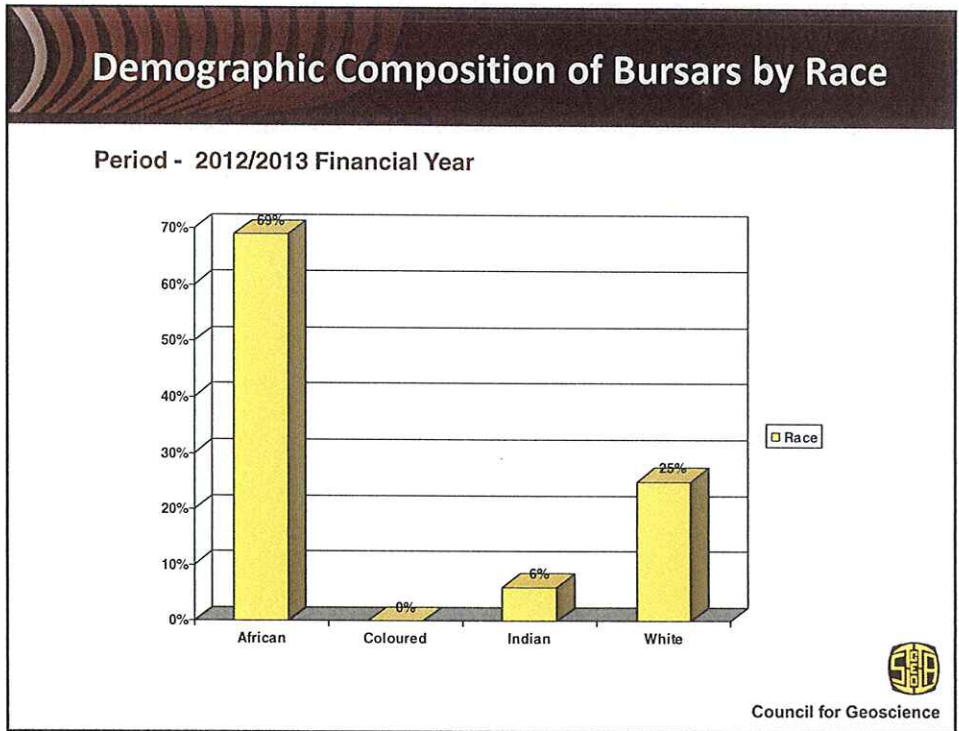
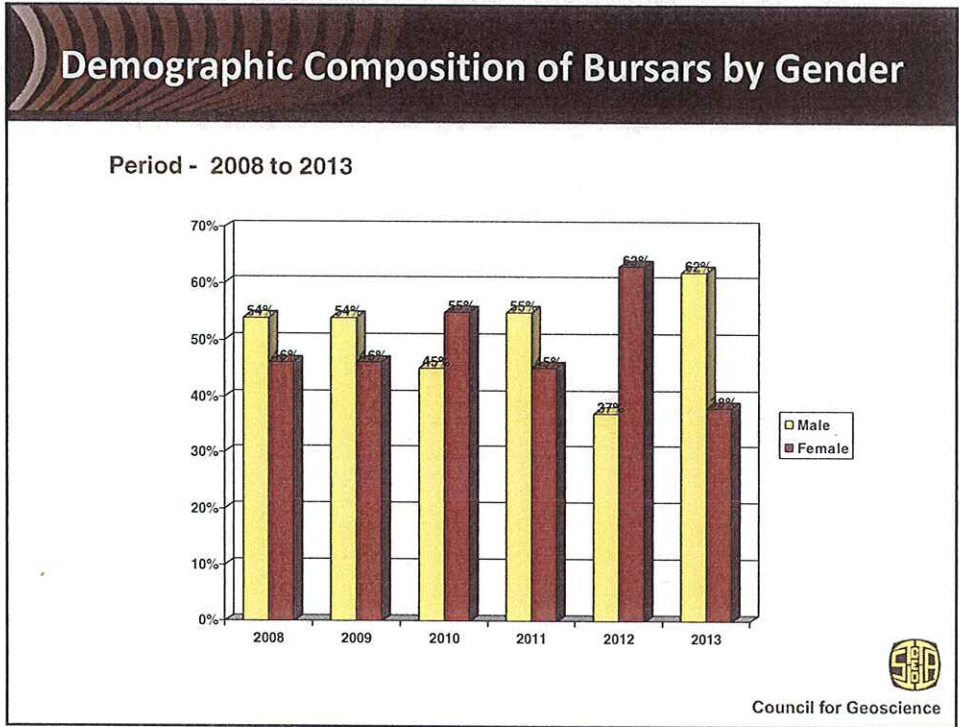
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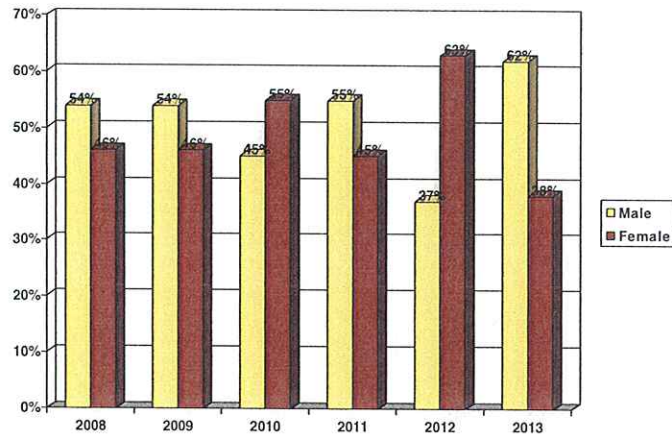






## Demographic Composition of Bursars by Gender

Period - 2008 to 2013



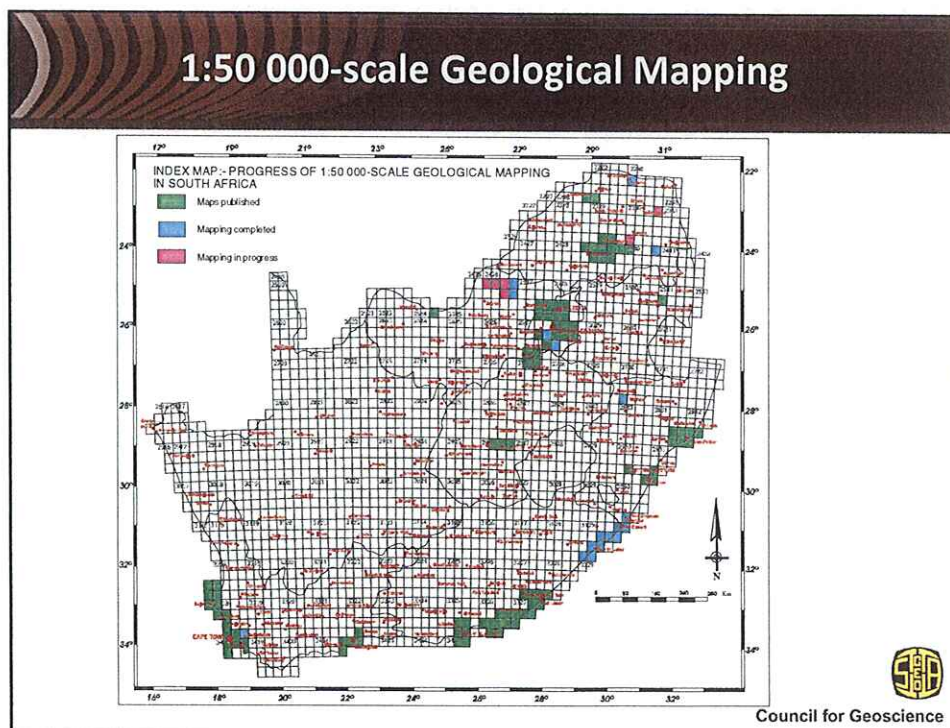
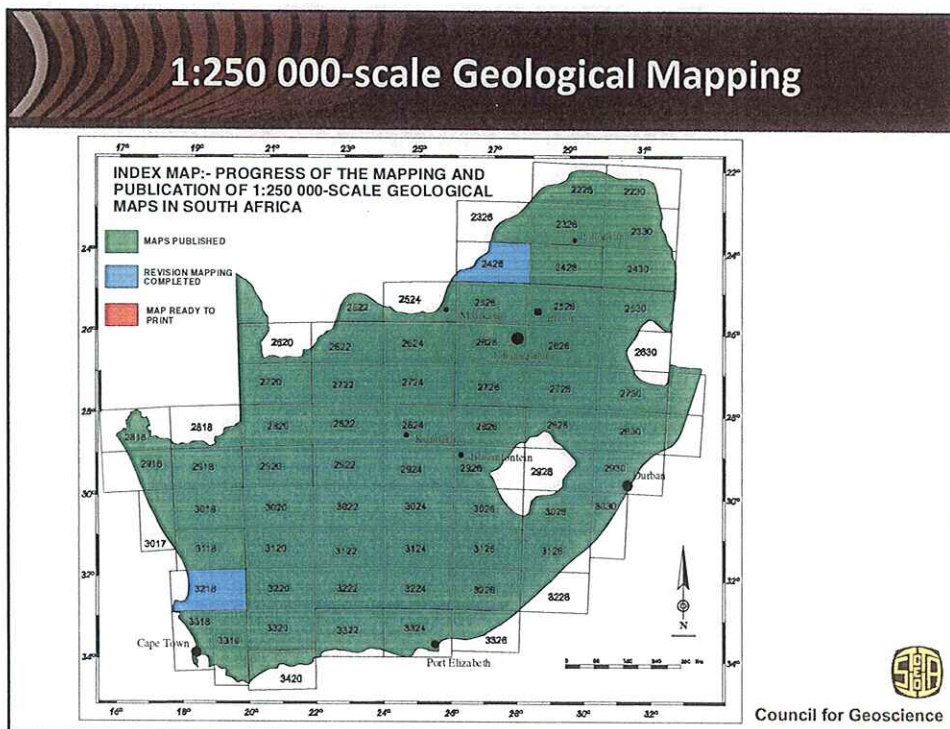
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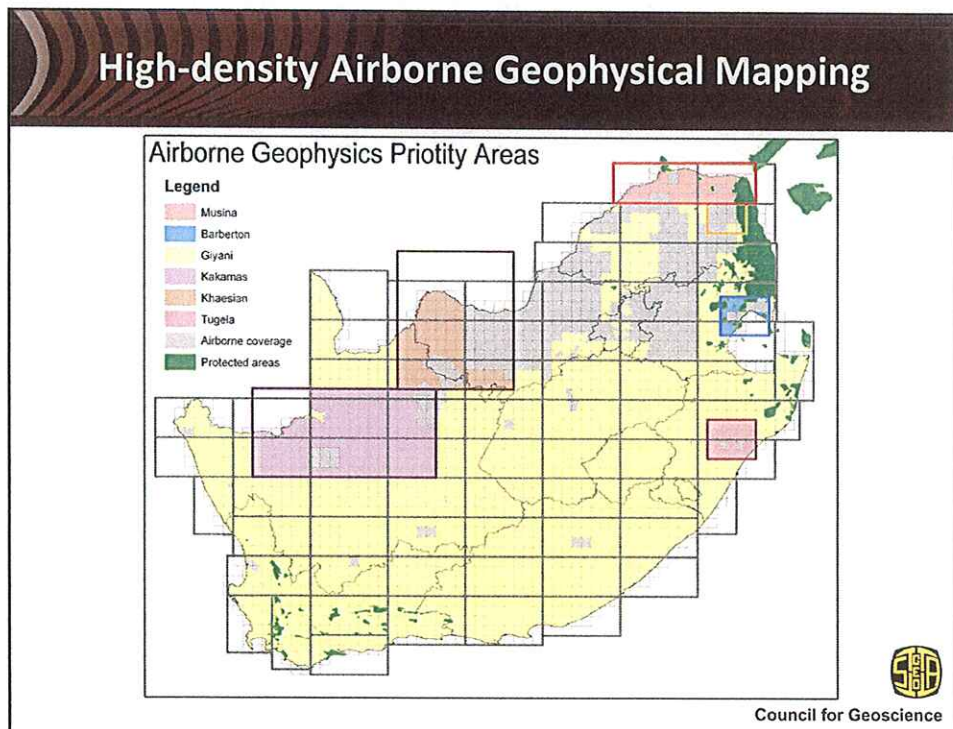
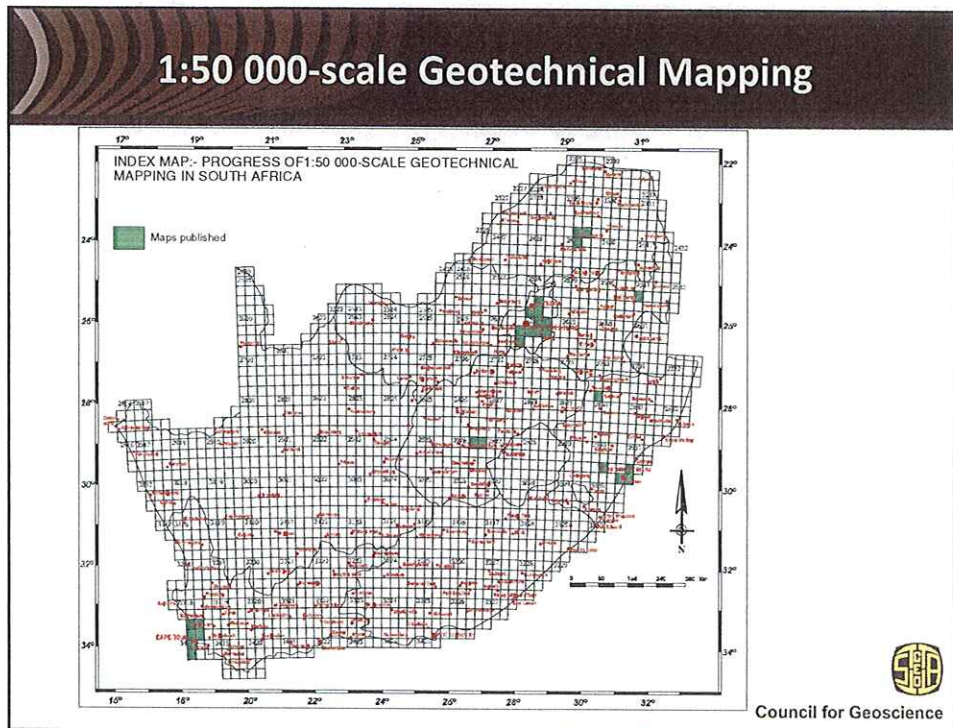
## National Geoscience Mapping Programs

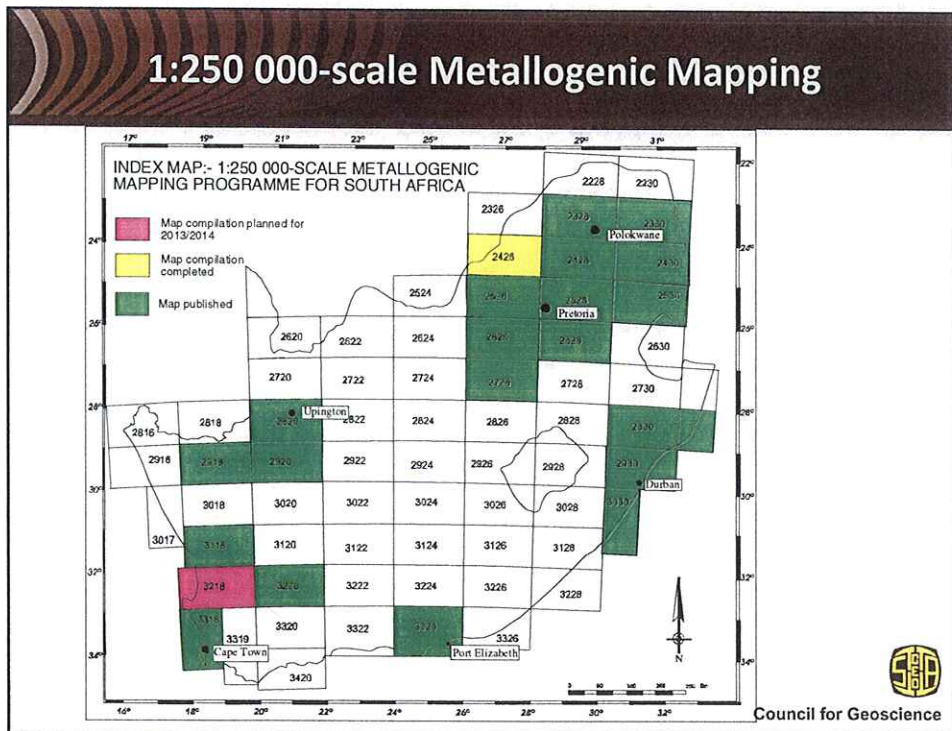
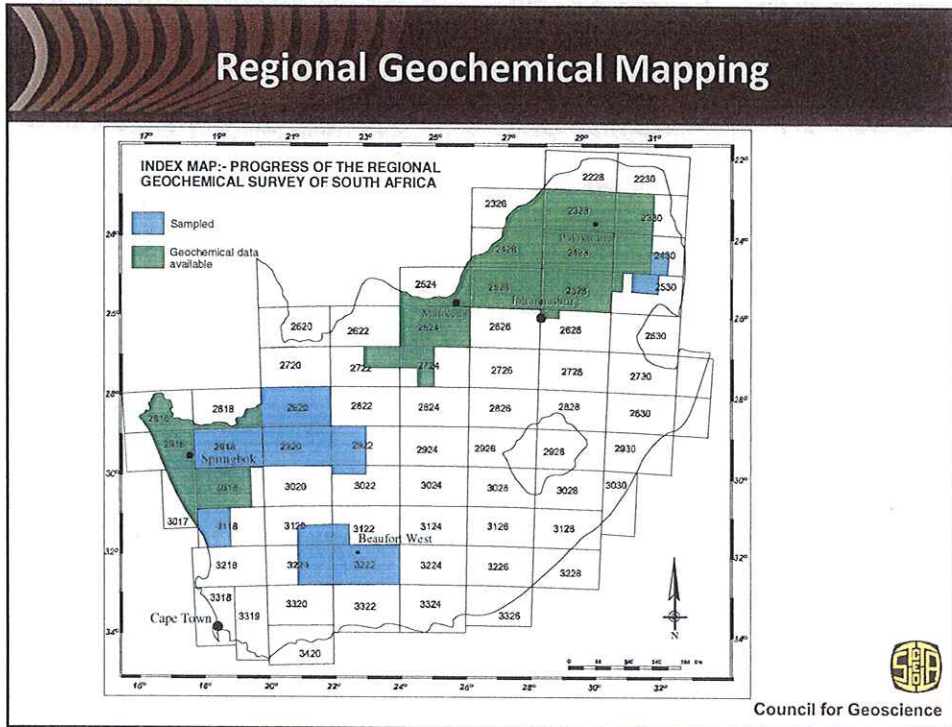
- Geological Mapping
- Geotechnical Mapping
- Geophysical Mapping
- Geochemical Mapping
- Metallogenic Mapping




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## Key Geoscience Projects




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## Management of State Liabilities with respect to Derelict and Ownerless Mines

Progress to date



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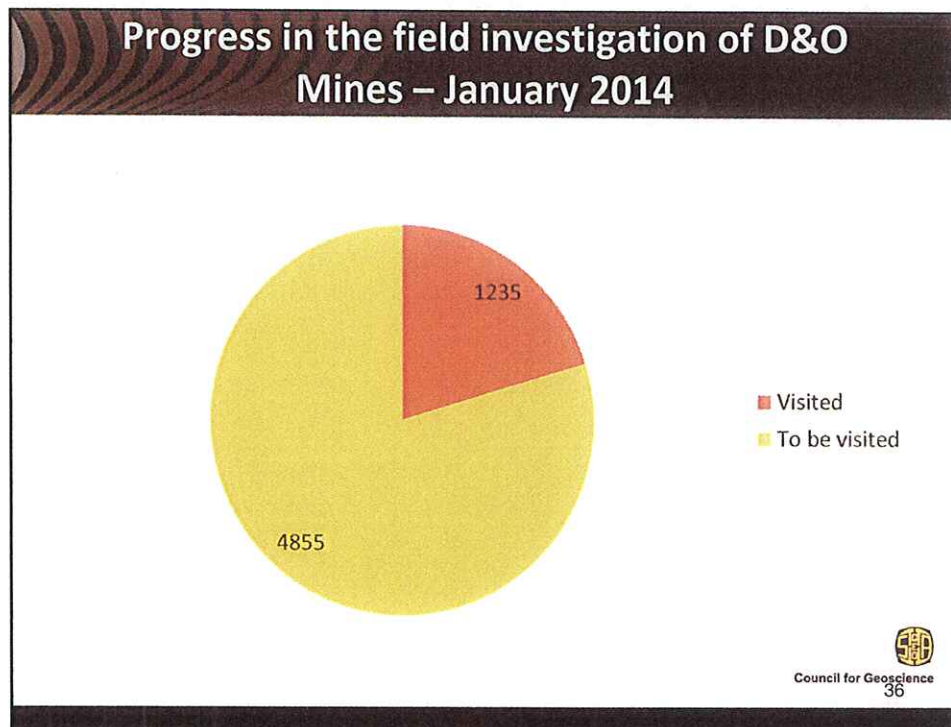
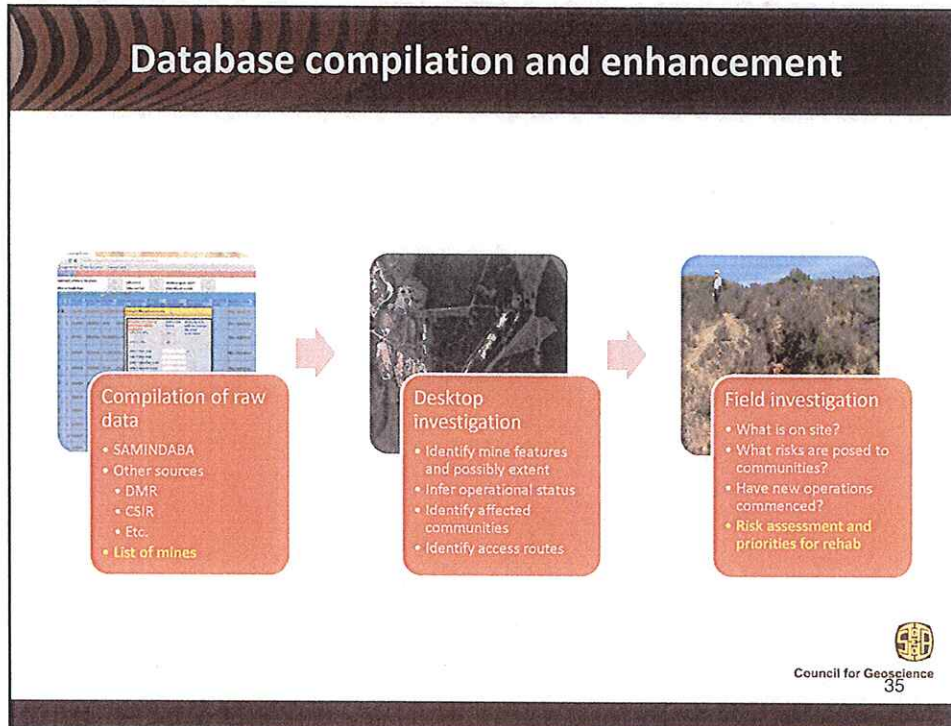


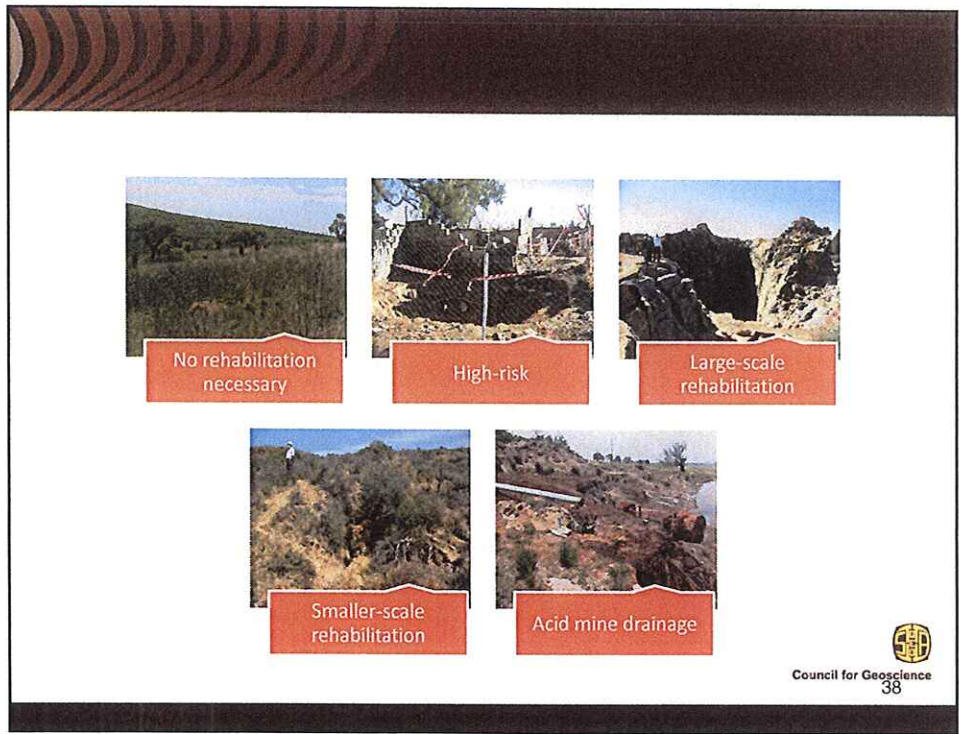
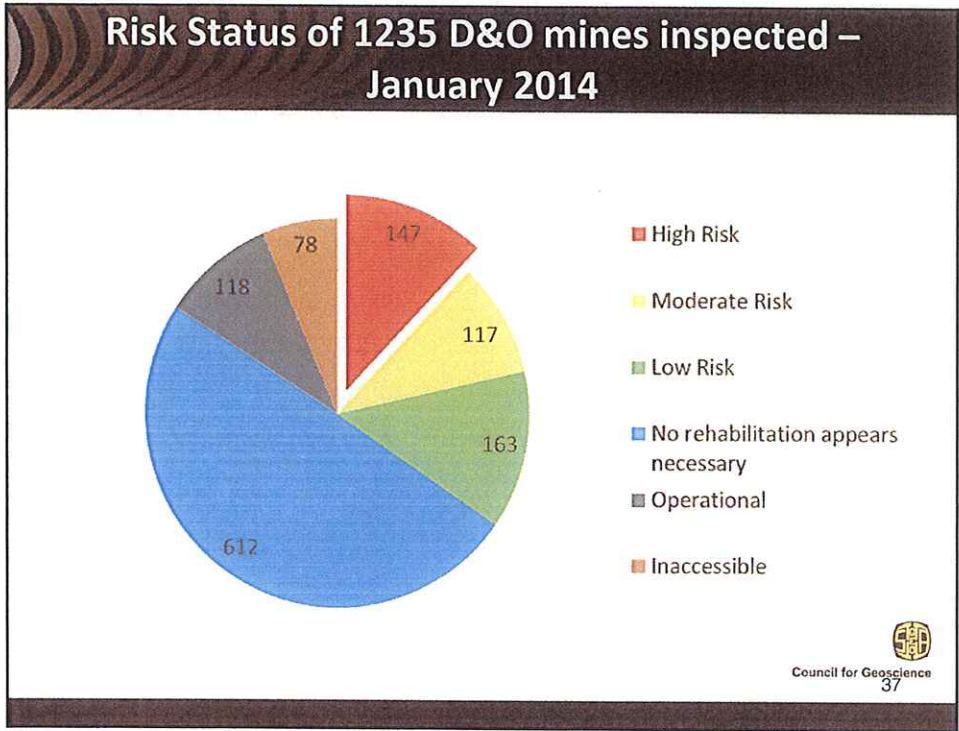
## Project scope

- Compile and manage a database at national scale
- Develop rehabilitation plans and bills of quantities for identified asbestos mines
- Develop rehabilitation plans and bills of quantities for identified coal mines
- Close dangerous mine openings

## Database

- Maintain and verify existing database
- All listed sites have been mined
- Desktop and field investigations
- Risk assessment and prioritisation for rehabilitation (field assessment)
- Use database to estimate State contingent liability and provision





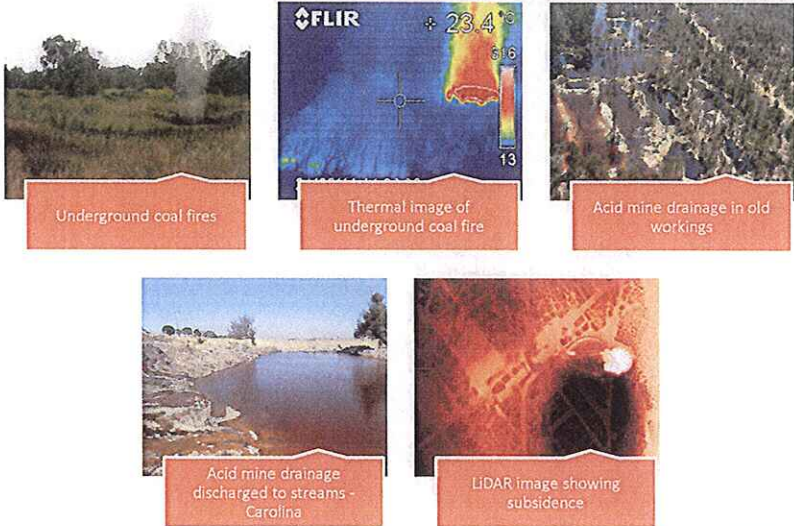
## Focus area: Koegas

- Asbestos was discovered in Koegas in 1893
- The original community lost ownership of the land under the 1913 Land Act. This was restored in 2008
- Much of the area is affected and/or contaminated by asbestos mining
- Airborne survey technologies have been employed to quantify contamination and assist in rehabilitation



## Coal in Mpumalanga

- Current focus is on eMalaheni area, where underground coal mines operated between the late 19<sup>th</sup> Century and mid 20<sup>th</sup> Century
- Ownership of these mines is uncertain, but is being investigated
  - Impacts include:
    - Subsidence – hazardous land
    - Spontaneous combustion – hazards and air pollution
    - Acid mine drainage



Underground coal fires

FLIR + 23.4°C  
Thermal image of underground coal fire


Acid mine drainage in old workings

Acid mine drainage discharged to streams - Carolina

LIDAR image showing subsidence

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### Focus area: Old Coronation Settlement



- High risk area with informal settlement located over a collapsed bord and pillar coal mine
- Shacks located above old mine workings
- Sinkholes and underground fires pose an immediate threat to community
- CGS working with eMalahleni Local Municipality to look for solutions

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## Rehabilitation approach

Holistic approach to rehabilitation under development


**Restore productive capacity of land** where possible

**Prevent** acid mine drainage generation and treat acid mine drainage in the interim

Extinguish fires and suppress spontaneous combustion

Avoid negative environmental impacts  
Flowable fill material produced with coal fly ash (waste), AMD (waste) and a small amount of cement

Laboratory tests acceptably low environmental impact



  
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## Dangerous mine holings

Field investigations are still finding open holes


Database field studies


Revisiting Gauteng mining belt

Closure programme aiming at 30 holes in the current financial year

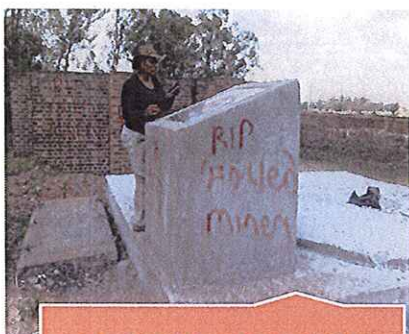
New engineering service providers supplying innovative designs

Illegal mining poses challenges for safety of field staff and contractors and sustainability of closures.

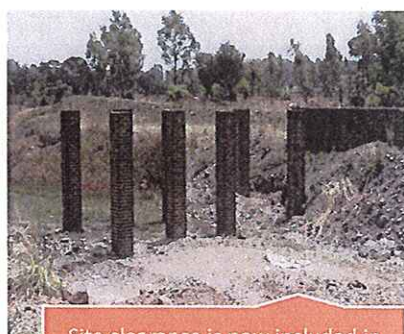


  
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## Shaft closures



Closed shaft, with marker and warning signs



Site clearance is now included in the scope of shaft closures, making land safer for affected communities

## Project status

- Operational database
- Risk assessment and rehabilitation plans for asbestos and coal mines
- Piloted a technology for sustainable closure of old underground coal mines in Mpumalanga
- Closure of shafts in Gauteng, Mpumalanga and Limpopo Integrating work with multiple stakeholders
- Local government in Mpumalanga
- Illegal mining forum in Gauteng

## Quantification of the State's liability w.r.t. D&O Mines

- The State's liability w.r.t. D&O Mines was assessed in 2007 at around R30 billion.
- This has been reassessed using actuarial calculations:
  - Increased to R41 billion due to inflation and additional sites identified in the database



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## Aim of the MTEF Project- Exploration/Mining Investment Stimulation in Minerals and Energy Sectors

- Stimulate exploration and mining investment in South Africa
  - By conducting semi-regional airborne and geochemical surveys and obtaining higher quality data in mineral belts and districts
  - By developing conceptual mineral deposits models and integrating multi-disciplinary data in GIS




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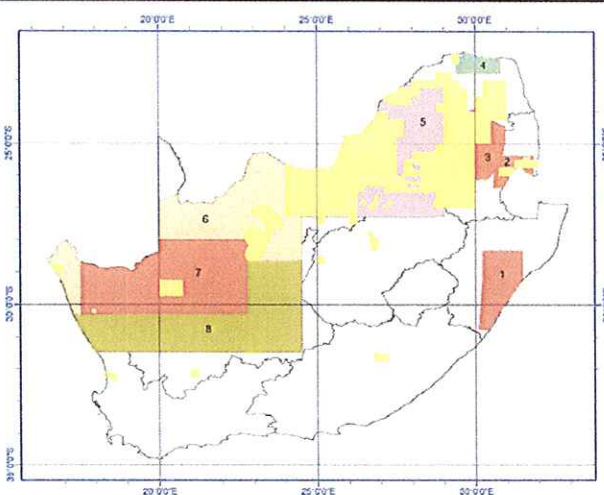
## Products of MTEF – Exploration Mining Investment Stimulation in Minerals and Energy Sectors

- ☐ Mineral prospectivity maps
  - Showing mineral prospective areas (targets)
  - Report explaining the targets potentiality



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## MTEF Project Areas




**Legend**

- High priority areas
- Current high resolution Airborne geophysics coverage

All colored areas are potential regions

- 1 = Tugela (KZN)
- 2 = Barbeton greenstone belt (Mpumalanga)
- 3 = Sabi-Pilgrim's Rest Goldfield (Mpumalanga)
- 4 = Musina Copper District (Limpopo)
- 5 = Thabazimbi (Northwest Province)
- 6 = Kheis Terrane (Northern Cape)
- 7 = Namaqualand Terrane (Northern Cape)
- 8 = Karoo Basin



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## MTEF Project Areas – Mineral Commodities

1= Natal metamorphic Province and Pongola Supergroup (mainly for gold and base such as nickel-copper, lead-zinc-copper, iron-titanium-chromium, but also rare earth elements (REE), Sn, W and others)

2= Barbeton (for gold)

3 = Sabi Pilgrim's Rest Goldfield (for gold)

4 = Musina Copper District (mainly for copper)

5 = Transvaal Supergroup (for manganese, iron, and polymetallic minerals in carbonates)

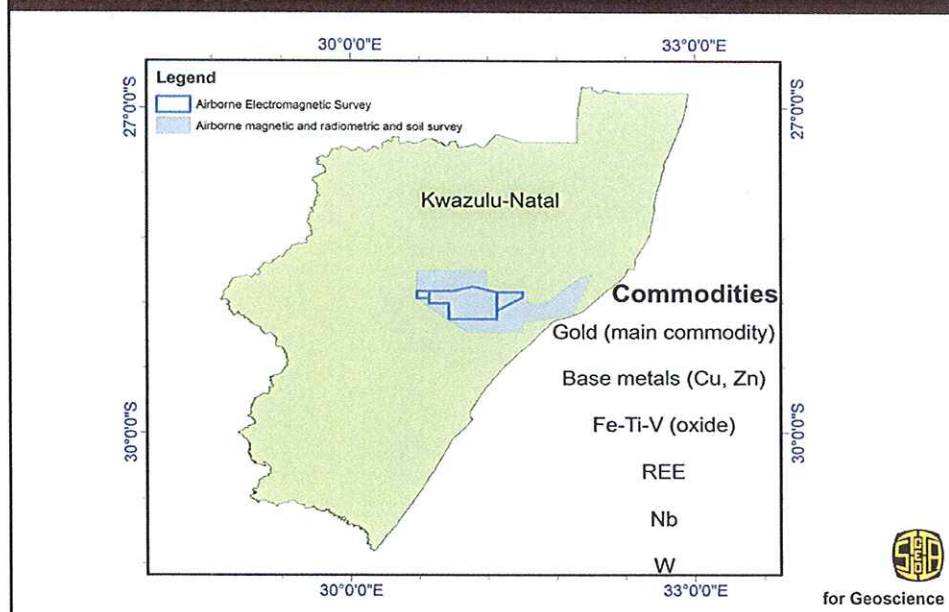
6 and 7 = Namaqua Metamorphic Complex and Kheis Terrane (For many commodities including base metals, monazite (REE), tin, tungsten, alluvial-lacustrine uranium deposits etc.)

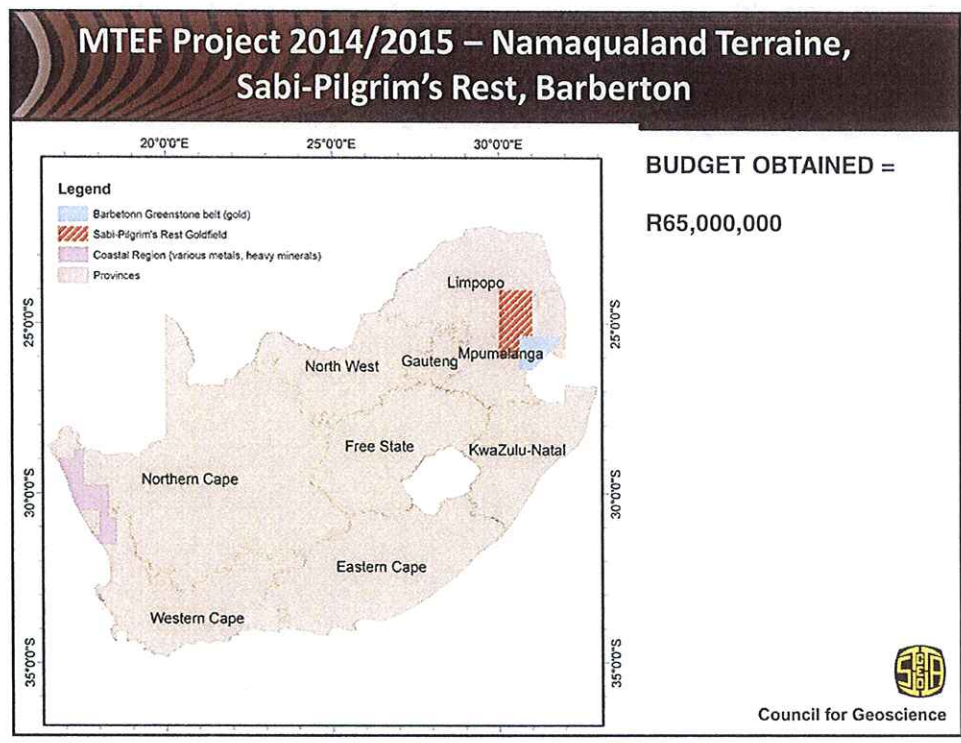
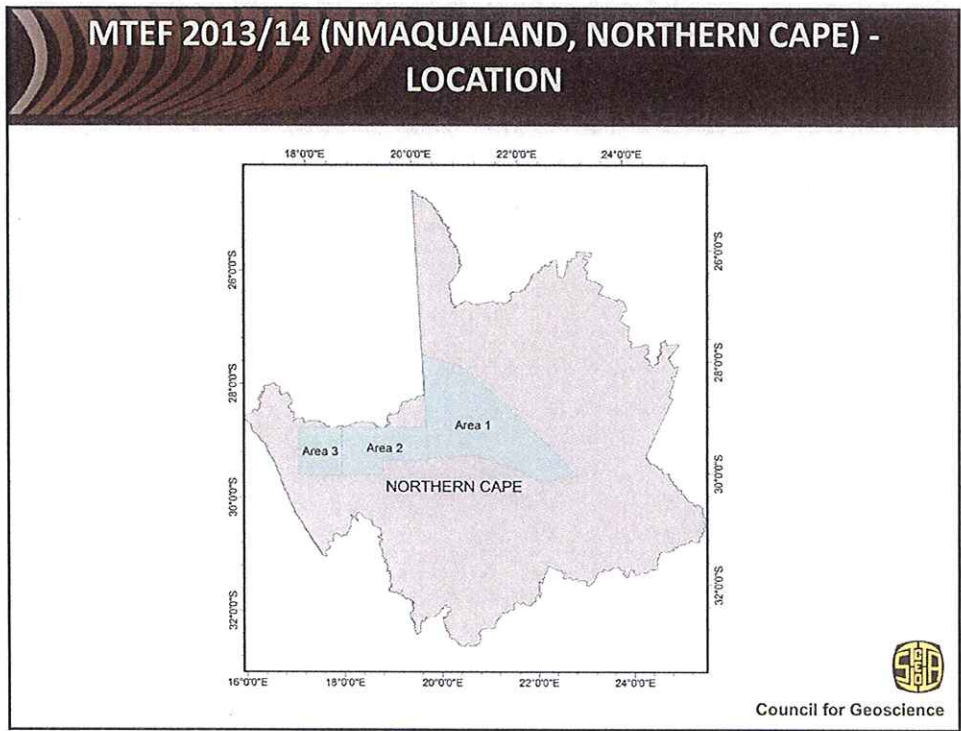
8 = Karoo basin (for energy fossil fuels and uranium)

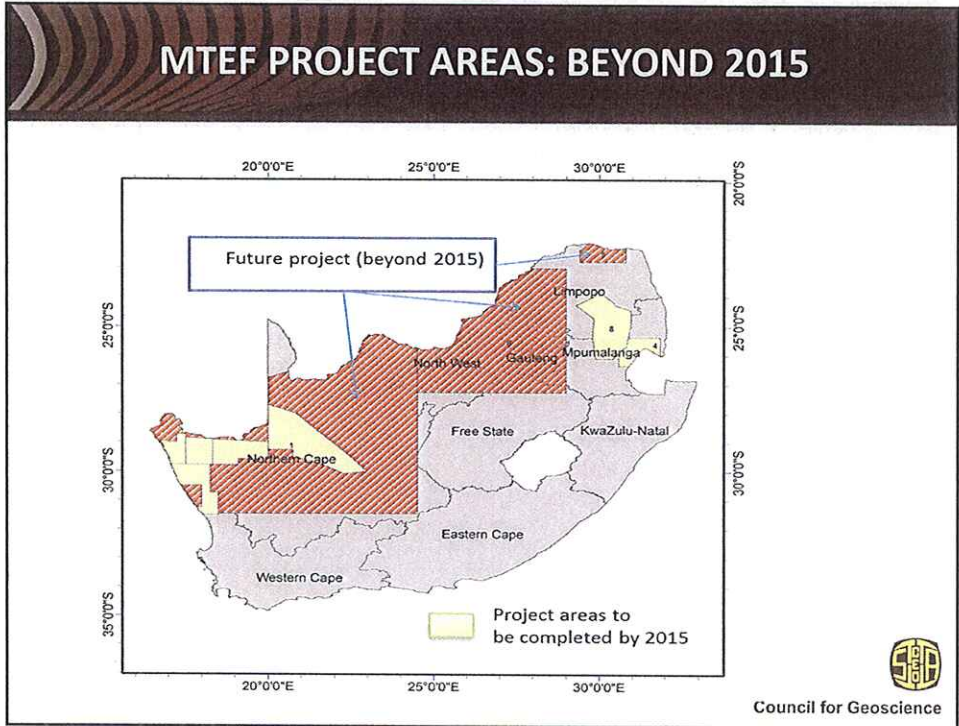


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## MTEF PROJECT 2012/2013 (Tugela, KZN) - LOCATION

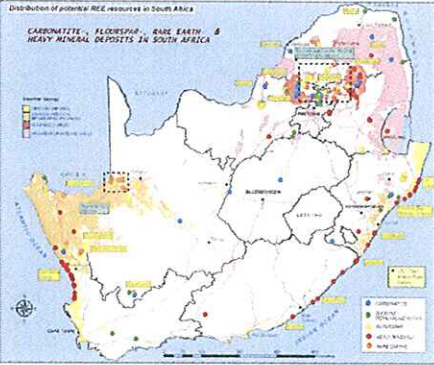







### Exploration and Beneficiation of Rare Earth Elements

- Scoping Test Work for Rare Earth Elements Resources
- Objective to contribute toward the advanced metals initiative (AMI) to facilitate research, development and innovation across the advanced metals value chain
- Goal is to develop technological competencies and achieve optimal sustainable local manufacturing of value-added products, generating significant export income and new industries for South Africa by the 2020s, while reducing environmental impact



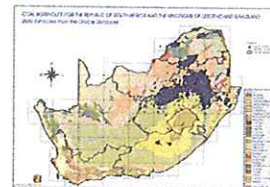
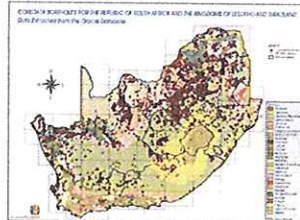
  
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## South African Mineral Databases

The South African Databases are geared towards generating and improving the geoscientific minerals database by acquiring and updating existing data and information, as well as publishing and disseminating such information. The acquired and upgraded geoscientific data and information is pivotal in promoting mineral development and stimulation of mining investment by offering technical geological data and information and advice to small scale miners and junior and mid-tier mining and exploration companies.

### Mineral information to date

- > 19 000 mineral records
  - Industrial Minerals
  - Metallogenic Minerals
- Geological reports
- > 11 000 borehole information



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## Strategic Mine Water Management Project

### Objectives:

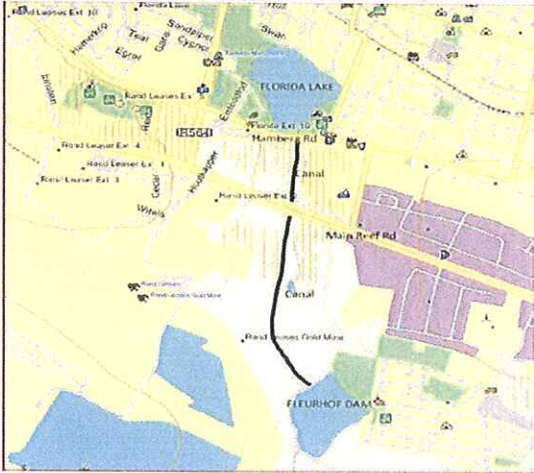

- Prevent ingress of surface and groundwater into the underground workings;
- Manage decanting of mine-polluted water;
- Predict and prevent harm to the environment;
- Apportion pollution sources and liabilities;
- Develop a mine water management strategy.



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## Strategic Mine Water Management Project

- **Prevention of Ingress:**
  - Canalisation of the natural watercourse between Florida Lake and Flueurhof Dam. The aim is to prevent ingress of 1 MI/d

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## Strategic Mine Water Management Project

- **Prevention of Ingress**
- Canal construction, this included Pedestrian bridge

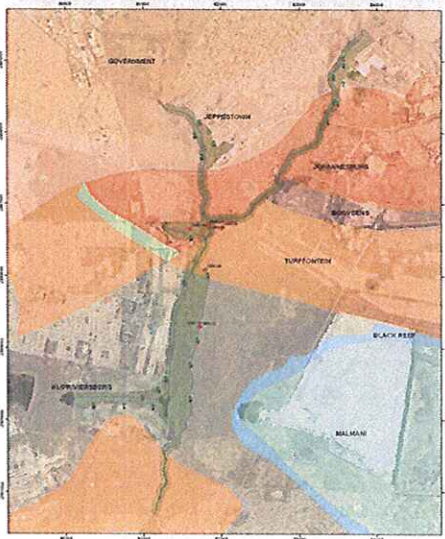



- DMR-CGS is now in process of handing over the canal to Johannesburg Road Authority.



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## Strategic Mine Water Management Project



**DRD CANAL**

Legend:  
 • SPONGHOLE  
 • BORDERS  
 ■ DRD CANAL  
 ■ ROAD

Scale: 0 500 1000 1500 2000


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### Prevention of Ingress:

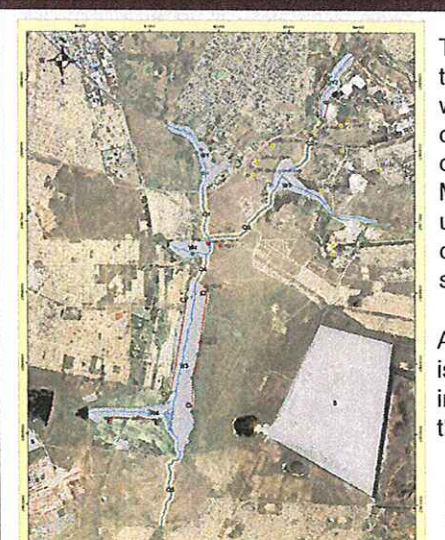
Feasibility studies for the implementation of ingress control measures in Central Basin. This include three proposed canals: Elsburgspruit, DRD and New Canada.

The area under Elsburgspruit canal is the river reach that traverses Knights Gold Mine located approximately four (4) km north-east of Germiston Central Business district. The river reach runs from the Knight Mine in a southern direction over the main reef before it crosses below the Main Reef Road.

In Elsburgspruit catchment proposed canal 11ML/d is assumed to be the ingress volume.

  
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## Strategic Mine Water Management Project



**Fig 2 TESTPOINT LOCATIONS**

Legend:  
 • Canal 20m x 1.5m  
 • Residual Services  
 • SHP75  
 ■ Road


Scale: 0 500 1000 1500 2000

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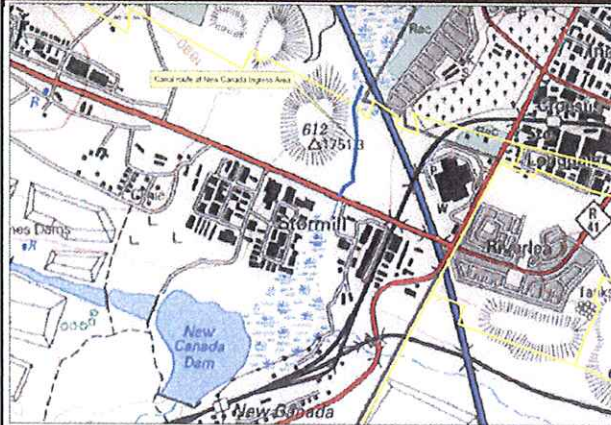
The DRD canal is located immediately to the west of Roodepoort. The section of the water course to be canalised, the tributary of the Klipspruit, is situated on the property of the former Durban Roodepoort Deep Mine. The area was extensively mined using both incline and vertical shafts. Most of these shafts have been sealed over for safety reasons.

Approximately 2.6 km of this water course is proposed to be lined. This section runs in a south westerly direction and ends at the confluence with the Klipspruit River.

It is estimated that 5.6ML/d is the water ingress volume in the DRD proposed canal area.

  
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## Strategic Mine Water Management Project



The ingress estimation for the New Canada Catchment proposed canal is about 4ML/d. The New Canada Canal is located south of Johannesburg on the old Consolidated Modderfontein Rand Gold Mine (CMR). A significant portion of the river reach under consideration runs adjacent to an existing tailings before it crosses the Main Reef Road (R41).

The lining of the stream will begin in the northern side of this bridge (near the N1) to end south of the Main Reef Road.

The Basic Assessment Report for the 3 canals was completed and submitted to DEA for approval

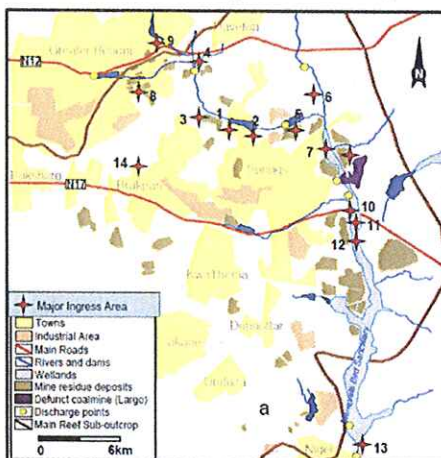


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## Strategic Mine Water Management Project

### Prevention of Ingress in East Rand Basin

- 14 major Ingress areas have been identified in East Rand. 5 of these areas have started with feasibility studies for implementation of ingress prevention measures.



No	Major Water Ingress Area	Volume (ML/d)
1	Geduld Dam	New area
2	Alexander Dam	New area
3	West Pit	5 (3.5 before Intervention)
4	Gravelotte	0.2
5	Cowles Dam	5.6
6	Northern Blesbokspruit (northern area)	1.4
7	Northern Blesbokspruit (southern area)	0.7
8	Van Ryn run-off	New area
9	Van Ryn (Rynfield) Dam	1.4
10	Largo (northern area)	0.6
11	Largo (southern area)	
12	Central Blesbokspruit	3.9
13	Southern Blesbokspruit (Marievale)	5.7
14	Leeupan	4.1

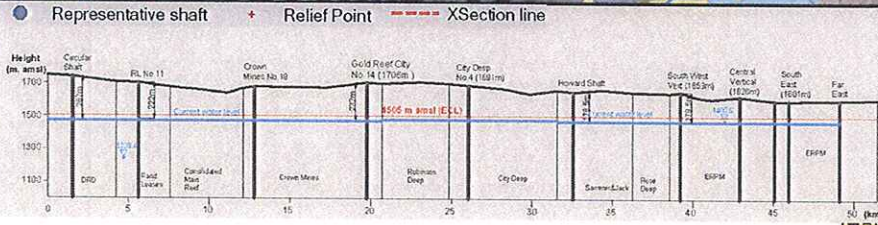


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## Strategic Mine Water Management Project

### Mine Water Monitoring in Central Rand Basin



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## Strategic Mine Water Management Project

### Seismicity Monitoring in Central Rand Basin



Seismic network of 12 stations in the Central Basin

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## South African National Seismograph Network

The project entitled: "Integration of the South African National Seismograph Network and Database" was successfully completed.

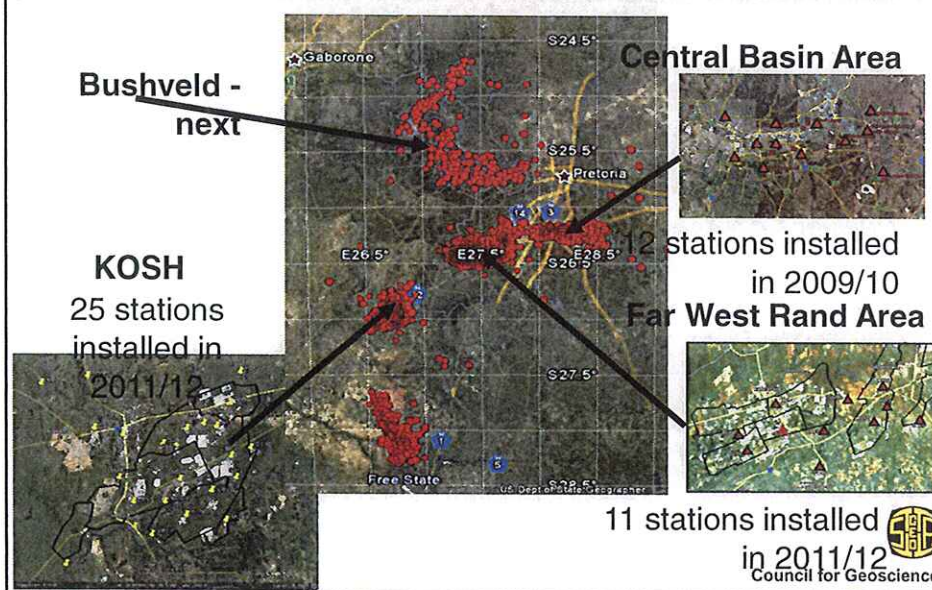
This project compliments other similar projects in the Carletonville region, sponsored by JICA, and in the Johannesburg region.

These networks in the mining regions are a first for the CGS.

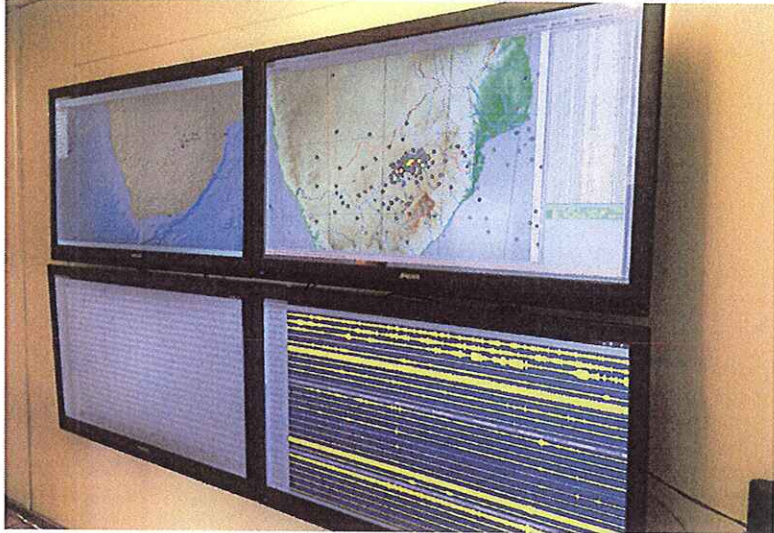


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## Record of Local Seismicity



### Remotely Monitoring of Seismicity at Data Centre

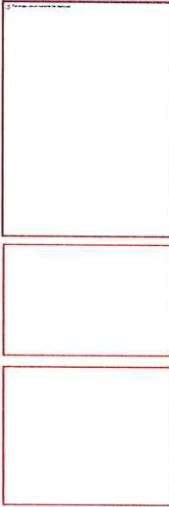


The image shows a wall-mounted display of four computer monitors. The top-left monitor shows a map of a region with a blue coastline. The top-right monitor shows a map of South Africa with numerous black dots representing seismic activity. The bottom-left monitor displays a list of text, likely seismic event details. The bottom-right monitor shows a series of horizontal waveforms, characteristic of seismic data. In the bottom right corner of the slide, there is a logo for the Council for Geoscience.

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### The South African Geological Hazard Observation System

- Funded by the Department of Science and Technology – 3 Year research programme
- Monitoring system to understand where geological hazards are occurring and to assess trends and possible impacts
- Aims to create a Geological Hazard decision support system
- Strong capacity building component with 4 Msc projects and 2 PhD projects



The image shows three empty rectangular boxes stacked vertically on the right side of the slide. In the bottom right corner of the slide, there is a logo for the Council for Geoscience.

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## Geological Mapping School - Limpopo



## International Geological Congress (IGC) 2016

- The bid to host the 35th IGC (IGC35) in 2016 was awarded to South Africa at IGC33 in Oslo, Norway in 2008
- At the closing function of IGC34 in Brisbane, Australia, the "President's Cup" and therewith the responsibility for the next IGC was handed to South Africa
- The CGS Board approved R5 million as refundable seed money towards the organization and management of the IGC and a similar amount was awarded by the NRF
- A not-for-profit Company (the 35<sup>th</sup> IGC Foundation) was established to take the responsibility for the organization and management of IGC35 in South Africa
- A PCO was appointed to assist with the organization and management of the IGC35



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THANK YOU



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