Geotechnical Consultants

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Name:	John Jeremy Christensen
Profession:	Geotechnical Consultant
Date of Birth:	7 December 1954
Years with Firm:	14
Nationality:	UK/South African

Membership in Professional Societies:

- Registered Professional Scientist 1983 Pr.No. 1346/83
- Member SAIMM (Southern African Institute of Mining & Metallurgy)
- Member SAIEG (South African Institute of Engineering Geologists)
- Member SACNASP (South African Council of Natural Scientific Professions)

Qualifications:

1986/87	MBA. - Univ. of Witwatersrand.
1981	MSc.(Eng. Geology) - University of London
1980	DIC.(Eng. Geol) Royal School of Mines, Imperial College London.
1977	BSc.Hons.(Eng. Geol) University of Natal.
1976	BSc.(Geology) - University of Natal - Durban

Key Credentials:

Jeremy has over 30 years of experience in geotechnical and engineering geological practice for a wide range of civil and mining projects.

Jeremy is a registered geotechnical practitioner (Pr No. 401346/83) that has spent most of his professional career in geotechnical consulting. He obtained a BSC (Honours) in 1978 in engineering geology and an MSc degree including rock & soil mechanics from Imperial College, London in 1981. He obtained an MBA from the University of Witwatersrand, South Africa in 1987 and started his own geotechnical consulting practice – GEO3 in 1994. He joined the family business Elro J Braak (Pty) Ltd in 1996 on the death of his father-in-law where he acted as managing director of Braaks Environmental Products until October 2004. In 2004 he returned to geotechnical consulting and started his present consulting practice Geologica cc.

Geologica consults primarily in the mining industry providing a range of services from site investigations, pit slope design, development of slope monitoring systems, tailings dam stability studies and training and mentoring in mining geotechnics. Geologica researches innovative technologies to assist with logging and mapping and has successfully implemented portable Leeb hardness testers and hand-held mobile mappers.

Geologica co-owns a cone penetrometer (CPTu) and a Marchetti Dilatometer (DMT) used for determining the in-situ properties of soils and weak rocks. A seismic module allows the determination of shear modulus and other parameters used extensively in determining settlement and liquefaction potential of soils and tailings dams.

EMPLOYMENT RECORD

October 2004 – Present

Name of Firm Geologica cc

Position Principal

Specialization Geotechnical consulting in mining and civil projects.

Recent significant projects include:

2018

- Completed PEA phase geotechnical studies including reporting for:
  - Proposed copper mine in Sudan;
  - Proposed gold mine in Bulgaria.
- Co-worked on PFS phase geotechnical investigations in 2018 for:
  - Proposed lithium mine in Mali;
  - Proposed gold mine in Ghana.
- On-going and current PFS phase geotechnical investigations in 2018/2019 for:
  - Proposed gold mine in Ethiopia;
  - Proposed graphite mine in Malawi – shallow mine with groundwater and soft, saprolite slopes. Special sampling and soft materials testing required.
  - Redesign of open pit on an existing silver mine in Myanmar. Very poor rock conditions requiring special laboratory test-work and targeted drilling in a steep slope environment.
- Lead geotechnical consultant for a composite concrete rockfill gravity dam in Gaboshe river, South Africa including analysis and reporting. Geotechnical analysis for pre-feasibility studies for Mpuluzi off-channel storage dam near Swaziland.
- One-month on-site GroundProbe radar monitoring project at Nkomati Nickel mine in South Africa with daily progress reports and recommendations on safe mining through the unstable zone.
- Geotechnical consultant for the impact studies and relocation of civil structures at Jwaneng diamond mine in Botswana as a result of a proposed large cut-back and new underground workings.

2017

- Foundation and slope stability investigations for an ash tailings dam using CPTu and DMT equipment, together with laboratory test work. Determination of the functional phreatic surface using dissipation tests where open tube piezometers were yielding incorrect values.
- Slope stability review of the upper saprolite benches of a nickel mine in Mpumalanga, South Africa with a review of proposed stone column stabilization as well as possible Terramesh and gabion stabilization. Recent geotechnical advice for safe monitoring using GroundProbe SSR and prisms of a failing slope in saprolite.
- Data compilation, analysis and geotechnical review of resource drilling using a core photograph analysis procedure to extract geotechnical data for PEA studies and future PFS investigation.
- Geotechnical studies for relocating heavy plant on a large diamond mine in Botswana and investigation of the impact of potential leakage from the tailings dams. Pile foundations are located in hard calcrete but potentially underlain by a weathered and weak 5m layer of Dorbank.

PRE-2017

- Established a Geotechnical Department and implemented Geotech-systems development on a mine in Turkey, up-skilling staff in geotechnical mapping (using an Ashtech Mobile Mapper with ArcPad/ArcGIS) and geotechnical logging. Implemented slope stability assessment and a slope monitoring programme (prism and SAR radar based), Demonstrated how to undertake bench/crest Inspections for disturbance and the installation of crack extensometers. Development of Flash reports, safety procedures and seepage/drainage plans (HDH). Also developed a Blastability Model using GSI from resource & Geotech logs. Compiling available geotechnical drill-hole data for developing a 3D Geotechnical Model of the pits in Leapfrog.
- Supervision and control of a full pre-feasibility geotechnical investigation for a new mine in Turkey including the compilation of a geotechnical report for inclusion in the NI43-101 document.
- Geotechnical drilling and logging for mine planning and slope stability for a bankable feasibility study (BFS) – Boynton and Rooderand Platinum Mines. Also carried out ground investigations for Rooderand and Boynton processing plants including heavily loaded silos, crushing and screening plants, as well as all ancillary buildings and tailings dams. Investigations included test pitting, geotechnical drilling and refraction seismic tests, together with plate load tests and CSW (continuous surface wave) tests. Determinations of bearing capacity, deformation and dynamic moduli as well as predictions of settlement in poor quality rock mass.
- N Mara geotechnical staff training, core logging with Acquire digital capture and log design, pit mapping, implementation of Trimble Geotechnical Mapping system using ArcMap/ArcGIS and assistance with stability issues and Reutech radar implementation.
- Investigation for a new crusher plant site at African Barrick Gold (ABG) in Tanzania and TSF inspections and recommendations. Investigation for TSF expansion and location of materials for the upstream raising.
- Three large tailings dams and return-water recycling dams for platinum mines near Brits in the Northwest province, focusing on shear strength, compressibility and permeability of the basin and paddock wall substrates, as well as permeabilities, shear strength and suitability of site construction materials.
- Kapulo Mine DRC - scoping study for new mine, geotechnical logging for pit wall design, together with a total geotechnical site investigation including drilling, trenching and soil testing for the Plant site and TSF.
- Site investigations for a uranium processing plant in Zambia and a shallow open pit uranium prospect in Botswana. Co-worked on a geotechnical study for a proposed lithium mine in Mahenge, Tanzania.
- Slope stability assessment and recommendations for an open pit mine in the DRC and underground support inspections for the same mine, including safe mining above a collapsing crown pillar.
- Geotechnical drilling on numerous mine sites for pit wall stability, core orientation and stereographic presentation and evaluation of kinematic feasibility of potential slope failures. Codes of Practice for open pit mines and quarries with reference to safe working procedures, analysis of pit-wall stability and mine hazard-risk assessment plans.
- Established Geotechnical Departments on mines in Eritrea & Turkey, developed computerized logging, pit mapping, slope inspection & blast evaluation methodologies.

- Recent focus has been on Geotech-systems development, training and mentoring of geotechnical staff in Mali, Ghana, Ethiopia, Turkey, Eritrea, Zambia, Tanzania, DRC, Sudan and Saudi Arabia – with particular emphasis on geotechnical logging & mapping techniques, as well as bench/highwall stability analysis and pit wall designs.
- Compilation of the geotechnical section of NI43-101 on deposits in Eritrea and DRC.

1996 – October 2004

Name of Firm	Braaks Environmental Products
Position	Managing Director
Specialization	Strategic planning / Cost accounting.
Function	Manager of environmental products including the following:

- Organic composting and horticulture growing media production facility.
- Green Stuff Absorbents (industrial & hazardous spill clean-up materials using Oasis® floral foam by-products)
- Fibregro Products – research & development and marketing of a peat substitute manufactured from wattle bark fibres.
- Research and development of new products and methods related to bioremediation using bacteria and fungi.
- Private consulting and mentoring on geotechnical projects.

1994 – October 1996

Name of Firm	GEO3cc Consulting Engineering, Hydro & Environmental Geologists
Business Activity	Consulting Eng. Geology / Geohydrology & Environmental Geology
Position	Owner Principal
Projects	Dam site investigations including a large concrete arch dam – Maguga Dam in Swaziland, several small to medium earth dams and several concrete gravity dams/weirs in the Lomati river.

1992 - July 1994

Name of Firm	Braaks Group
Business Activity	Horticulture / Plant Growing Media
Position	Financial Manager
Function	Accounting/Finance/Costing/Personnel Private Geotechnical Consulting

1989 - 1992

Name of Firm	George, Orr & Associates
Business Activity	Consulting Engineering Geology
Position	Associate
Projects	Dams – Omdel Embankment Dam on the Omaruru River in Namibia – very loose porous substrate with no cut-off. Solution to use upstream blanket and drains and filters. Geotechnical investigation for a 35km canal near Omaruru in Namibia and foundation, geohydrology and environmental investigations in Usakos – Namibia.

1987 - 1989

Name of Firm	Braaks Indoor Plants
Business Activity	Horticulture
Position	Information Systems Manager
Function	Accounting/Financial & Personnel Systems

1986 - 1987

Name of Firm	University of the Witwatersrand
Activity	MBA Student

1984 - 1986

Name of Firm	John M Weaver
Business Activity	Consulting Engineering Geology
Position	Associate
Function	Senior Engineering Geologist
Specialization	Stability of natural slopes/embankments and excavations. Thabina Gorge Arch dam – Tzaneen. Townships & geophysics

1982 - 1984

Name of Firm	George, Orr & Associates
Business Activity	Consulting Engineering Geology
Position	Associate
Function	Engineering Geologist
Specialization	Dams, Tunnels and slope stability.

1981 - 1982

Name of Firm	John M Weaver
Business Activity	Consulting Engineering Geology
Position	Engineering Geologist
Function	Site Investigations
Specialization	Townships & roads, earth dams, geophysics and stability over dolomite.

JEREMY CHRISTENSEN
2019-01-01

Summary – Current Work Experience by Sector

Mining – Geotech studies, training, pit design	70%
Civil/Mining – Dams (TSF's) /Major structures	20%
Civil – Buildings/Utilities	10%