

BIODIVERSITY IMPACT ASSESSMENT

ENVIROAFRICA

CURRICULUM VITAE

PEET JJ BOTES

Nationality	South African
Profession	Environmental Scientist
Specialization	Environmental Management Systems Botanical Assessments Environmental Compliance Auditing Environmental Impact Assessments
Position in Firm	Member
Language	Afrikaans (home) English (fluent)
Years Experience: With Organisation:	Since March 2011
In field of Speciality:	Since 1997 (14 years)

KEY QUALIFICATIONS

- Botanical Assessments
- Wastewater Management
- Environmental Management Systems (Planning, Development, Implementation and Review)
- Environmental Management plans (EMP)
- Environmental Control (ECO) during construction phase
- Environmental Compliance Auditing
- Environmental Impact Assessment and Review
- Environmental Advisory Services

EDUCATION AND PROFESSIONAL STATUS

- BSc (Botany & Zoology), Dept. of Natural Sciences, Stellenbosch University 1989
Additional Subjects: Nature Conservation III & IV & Biochemistry II
- Hons. BSc (Plant Ecology), Stellenbosch University, 1989
Additional Subjects: Soil Science & Statistical Methods

REGISTERED MEMBER: Registered Professional Environmental and Ecological Scientist at SACNASP (South African Council for Natural Scientific Professions) as required in terms of Section 18(1)(a) of the Natural Scientific Professions Act, 2003.

EMPLOYMENT RECORD

1 March 2011 till present	EnviroAfrica, Western Cape
July 2010 – February 2011	PB Consult, Western Cape
March 2005 – June 2010	Enviroscientific, Western Cape
November 1997 – February 2005	Denel OTB (Overberg Test Range), Western Cape

BRIEF RESUME OF RELEVANT EXPERIENCE:

- Act as environmental scientist, managing the environmental department of OTB (a division of Denel): developing and implementing an ISO14001 environmental management system, ensuring environmental legal compliance, performing environmental risk assessments with regards to missile tests performed on terrain, developed policy and management plans for natural veld- (26 000ha), alien plant-, game-, fire- and coastal management according to CapeNature principles;
- Evaluate Development proposals from an environmental perspective.
- Act as independent environmental consultant guiding and advising development proposals within legal constraints;
- Assess the potential impacts of proposed activities to allow for effective management and/or mitigation of negative impacts;
- Develop ISO 14001 environmental management systems for proposed developments;
- Ensure the implementation of good management principles by developing environmental management plans (EMP), both for the construction and operational phases of developments and offering environmental control officer (ECO) services;
- Facilitate DWA license application, especially with regards to winery wastewater and sewerage treatment systems;
- Facilitate and coordinate the Environmental Impact Assessment (EIA) process;
- Perform botanical assessments with regards to development proposals;
- Developing the biodiversity and legal insets for and environmental audit system with regards to the Woolworths Farming for the Future project.
- Performed more than 400 environmental audits with regards to biodiversity management and legal compliance within the agricultural sector;
- Ensure compliance to ROD by performing independent environmental compliance audits on completed development projects.

PROJECT EXPERIENCE:

- Environmental Control Officer for numerous projects e.g.: Frandevco Estate in Franschhoek; Crystal Creek in Somerset West; Various Ervin in Gordon's Bay; Mount Royal Estate, Malmesbury; Old Mill Estate, Worcester; Alleé Blue winery in Franschhoek; Arabella winery in Ashton; De Aria winery in Durbanville; Worcester WWTW; Sunny Side Reservoir and Low cost housing in De Doorns; Arniston WWTW; etc.;
- ISO 14001 Environmental Management Systems e.g.: Frandevco Estate, Franschhoek; Mount Royal Estate, Malmesburg; Lourensford, Somerset West, etc.;
- Environmental Management Plans e.g.: Calamatha Estate in Somerset West; Paternoster WWTW; GrainCo Silo Bag Depots; Cathbert development, Paarl; Stuisbaai WWTW;
- Full Biodiversity Management Plans e.g.: Loevenstein & Morelig Farms in Paarl; Bosman Farming in Wellington, Graymead Melsetter Farms in Grabouw; Graaf Fruit in Prince Alfred Hamlet; Kroonpoort Farm in Napier; UVA Farms in Wellington, etc.;
- Botanical assessments e.g.: Betty's Bay urban development; Gansbaai Municipality; Seven Falls Heidelberg; Crystal Creek; Somerset West; Schaapkraal Erf in Cape Town; Kleindrif River Lodges, Wemmershoek Voortrekker Camp Site Upgrade, etc.;
- DWA Wastewater General Authorization or License applications (more than 80 wineries as well as Sewerage Treatment Systems)
- Environmental compliance audits e.g.: Vioolsdrif Border Post Development; Bitterfontein Pipeline; Kennard Pipeline, etc.;
- Development planning and EIA process e.g.: Zuiderkruis Farm in the Hemel and Aarde Valley; Struisbaai WWTW; Groenrivier development in Worcester; etc.;
- Biodiversity & environmental legislation audits (performed more than 400 Woolworths Farming for the Future audits in the agricultural sector)

WETLAND IMPACT ASSESSMENT


Curriculum Vitae (CV) for Piet-Louis Grundling

1	Name of Expert:	Piet-Louis Grundling			
2	Proposed Position:	Peatland specialist/wetland rehabilitation specialist			
3	Company/ Consortium	Ikhaphozi Enviro Services			
4	Nationality:	RSA			
5	Date of Birth:	1966/05/30			
6	Education:	Name of Institution	Degree Obtained	Dates	
		Univ of Waterloo	PhD	2014	
		Rand Afrikaans Univ	MSc	2001	
		Univ Pretoria	BSc Honours	1993	
		Univ Pretoria	BSc	1991	
7	Membership in Professional Associations	Name of Association	Membership Category	Dates	
		International Mire Conservation Group	Chair	2010 - present	
		SA Council for Natural Scientific Professions	Earth Scientist	2006	
		South African Wetland Society	Chair	2013-present	
		Centre for Environmental management, University of the Free State	Research Associate	2011 to present	
8	Other Training:	Name of Institution	Training Details	Dates	
9	Countries of Work Experience	Country	Dates (from – to)		
		South Africa	1985 till present		
		Lesotho	Periods in 1999, 2000, 2003		
		Mozambique	Period in 1996		
		Canada (teaching assistant part of Doctoral)	2006 - 2009		
10	Languages:	Language	Speaking	Reading	Writing
		Afrikaans	Good	Good	Good
		English	Good	Good	Good
11	Employment Record				
	<ul style="list-style-type: none"> Dates (from – to): 2010 - present Employer: Ikhaphozi Enviro Services Position held: Director/wetland specialist Responsibilities: Coordinate project, Specialist researcher: peatlands and wetland studies, wetland rehabilitation; Wetland training through the Univ of the Free State 				

Curriculum Vitae (CV) for Piet-Louis Grundling

	<ul style="list-style-type: none"> • Dates (from – to): 2006 - 2009 • Employer: Univ Waterloo • Position held: Teaching and Research assistant (during doctoral studies) • Responsibilities: Wetland hydrology research, student support, evaluate assignments and exams 	
	<ul style="list-style-type: none"> • Dates (from – to): 2006 – 2006 • Employer: Self employed • Position held: Consultant • Responsibilities: Technical advice to Maccaferri and South African Biodiversity Institute 	
	<ul style="list-style-type: none"> • Dates (from – to): 2000 - 2005 • Employer: Working for Wetlands /South African Biodiversity Institute (SANBI) • Position held: National coordinator/Technical Advisor/ Provincial Coordinator • Responsibilities: Wetland rehabilitation: Coordinate programme/Create jobs/advise project planning and implementation 	
	<ul style="list-style-type: none"> • Dates (from – to): 1999 - 2000 • Employer: Wetland Consulting Services • Position held: Researcher • Responsibilities: Research: wetland and peatland projects in South Africa and lesotho 	
	<ul style="list-style-type: none"> • Dates (from – to): 1989 - 1999 • Employer: Council for Geoscience • Position held: Researcher • Responsibilities: Research: peatland projects in South Africa, Mozambique and Lesotho 	
12	<p>Detailed Tasks Assigned <i>(all tasks to be performed under this assignment)</i></p>	13. Work Undertaken <i>(that best illustrates capability to handle the tasks assigned)</i>
	<ul style="list-style-type: none"> • Wetland inventory • Wetland delineation and description • Wetland characterization and assessment • Wetland flow assessment • Wetland mitigation measures, and • Rehabilitation. 	<p>Project 1</p> <ul style="list-style-type: none"> • Dates (from – to): 2011 • Location: South Africa • Client: The Minister – Department of Environmental Affairs • Main project features: Advice minister on impacts of planned Maphophoma dam on peatland • Positions held: Revie Panel – Peatland specialist • Activities performed: Assessment of impacts and provide advice to the Minister
		<p>Project 2</p> <ul style="list-style-type: none"> • Dates (from – to):2011 to 2015 • Location: South Africa • Client: Vunene Mining/State Prosecutor • Main project features: Wetland impact assessment and rehabilitation • Positions held: Wetland specialist • Activities performed: Monitor progress; advise Mine and report to State Prosecutor
		<p>Project 3</p> <ul style="list-style-type: none"> • Dates (from – to): 2000 to 2006 and 2010 to 2015 • Location: South Africa • Client: Working for Wetlands

Curriculum Vitae (CV) for Piet-Louis Grundling

		<ul style="list-style-type: none"> • Main project features: Wetland rehabilitation; advising DEA; GDARD and DoA on peat mining activities and policies • Positions held: Technical advisor, Manager • Activities performed: Advising, assessment, planning, implementation, management, and mentorship.
		<p>Project 4</p> <ul style="list-style-type: none"> • Dates (from – to): 2014 to 2015 • Location: South Africa • Client: Water Research Commission • Main project features: Peatland Research • Positions held: Project manager and peatland specialist • Activities performed: Research, planning, implementation, management, and mentorship.
14	<p>Certification</p> <p>I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience. Furthermore, I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if engaged. Finally, I hereby confirm my availability to commence work on this project for a period of 18 months</p> <p>Name of Expert: Piet-Louis Grundling</p> <div style="text-align: center;">  </div> <p>Signature of Expert:</p> <p>Date: 19 August 2015.</p>	

TRAFFIC IMPACT ASSESSMENT

CORNELIA HUTCHINSON, Traffic and Transportation Engineer

TRANSPORT AND INFRASTRUCTURE



CAREER SUMMARY

Mrs Hutchinson is a traffic and transportation engineer with over 10 years' experience in the civil engineering sector. She has extensive knowledge of traffic impact studies and access management plans, including traffic studies for new and existing mines, large industrial developments (as part of Environmental Impact Assessments) and ports (landside).

Countries of work experience include South-Africa, Uganda and Lesotho.

She plays a key role as senior traffic engineer in WSP's Bedfordview office, where she is primarily responsible for traffic and transportation-related projects in Ekurhuleni.

EDUCATION

BEng (Hons) Transportation Engineering, University of Pretoria	2011
BEng Civil Engineering, University of Pretoria	2003

PROFESSIONAL MEMBERSHIPS

Professional Engineer, Engineering Council of South Africa (20130451)	2013
Graduate Member, South African Institute of Civil Engineers (201236)	2003

PROFESSIONAL EXPERIENCE

- Re-application for the security access restrictions in Freeway Park, Boksburg, South Africa (Current): Traffic Engineer - Traffic Impact Study. Client: Freeway Park Residents Association. Fee Value: ZAR 27,000.
- Multi-Disciplinary Engineering Services for a Private Vehicle Proving Ground Development Northern Cape, South Africa (Current): Traffic Engineer - Traffic Impact Study. Client: Ingen | Aix GmbH. Fee Value: ZAR8.6 m.
- Jeanette Project Environmental Impact Assessment, Free State, South Africa (Current): Traffic Engineer - Traffic Impact Study for the underground gold mine near Welkom. Client: Jones & Wagener/ Taung Gold. Fee Value: ZAR 130,000.
- Brentwood Park Ext. 39 development, Benoni, South Africa (Current): Senior Traffic Engineer - Overseeing the Traffic Impact Study for the proposed residential development. Client: PTY Props 56. Fee Value: ZAR 40,000.
- Environmental Authorisation for the Middelburg Colliery Expansions Project, Middelburg, South Africa (2015): Traffic Engineer - Traffic Impact Study. Client: Jones & Wagener. Fee Value: ZAR 80,000.
- Eveleigh Ext. 55 Access, Boksburg, South Africa (2015): Traffic Engineer - Amendments to the Ekurhuleni Roads Masterplan. Client: Edgarvale 8. Fee Value: ZAR 12,000.
- Rezoning of Portion 22 and the remainder of Portion 23 of Erf 252 Edenburg, Johannesburg, South Africa (2015): Traffic Engineer - Traffic Impact Study for

YEARS WITH THE FIRM

7 years

YEARS TOTAL

11 years

PROFESSIONAL QUALIFICATIONS

Professional Engineer

AREAS OF PRACTICE

Traffic impact studies

Traffic/ access management plans

Traffic studies for environmental authorisations

Traffic signal design

Parking studies

LANGUAGES

English

Afrikaans

HUTCHINSON CORNELIA, Traffic and Transportation Engineer

the proposed high-density residential development. Client: Expectio Properties. Fee Value: ZAR 48,000.

- Comaro Crossing Shopping Centre Upgrades, Johannesburg, South Africa (2015): Traffic Engineer - Providing access design advice and obtaining JRA approval for upgrades to the shopping centre access. Client: SA Retail Properties (Broll Property Group). Fee Value: ZAR 17,500.
- Traffic Signal Investigations and Design, Ekurhuleni, South Africa (2015): Project Manager - Traffic signal warrant investigations, design and optimisation on an as-and-when required basis. Client: Ekurhuleni Metropolitan Municipality. Fee Value: ZAR 175,400.
- Ekurhuleni West College (EWC) Parking Relaxation Studies, Ekurhuleni, South Africa (2015): Traffic Engineer - Parking relaxation studies for two EWC campuses (Tembisa and Boksburg). Client: VMR Architects. Fee Value: ZAR 109,000.
- Ekurhuleni Unified Command Centre, Boksburg, South Africa (2015): Senior Traffic Engineer - Traffic Impact Study for a unified control/command centre for various EMM Services. Client: Ekurhuleni Metropolitan Municipality. Fee Value: ZAR 84,400.
- Parkdene Ext. 3 Portion 2 Erf 654, Boksburg, South Africa (2015): Traffic Engineer - Section 7 report, parking relaxation and traffic impact assessment for the rezoning. Client: Simplegrow Properties 9. Fee Value: ZAR 80,000.
- Comet Future Development, Boksburg, South Africa (Current): Managing the traffic impact assessment and SATURN model development for the proposed mixed-use development on Comet Ext. 18. Client: Living Africa. Fee Value: ZAR 131,000.
- Sunward Park Shopping Centre Upgrades, Boksburg, South Africa (Current): Traffic Engineer - Parking relaxation and traffic impact assessment. Client: Acucap Investments. Fee Value: ZAR 118,000.
- Matholesville Ext. 3 to 5 (Spitzland), Roodepoort, South Africa (Current): Traffic Engineer - Parking relaxation and traffic impact assessment. Client: Living Africa Development. Fee Value: ZAR 82,000.
- Bardene Erven 100 and 101 Office/Car Showroom Development, South Africa (2015): Traffic Engineer - Traffic Impact Assessment. Client: WJH Properties. Fee Value: ZAR 48,900.
- Monte Cristo Estate Traffic Signals, Beyers Park, South Africa (2015): Traffic Engineer - Traffic Signal warrant investigation and design. Client: Monte Cristo Homeowners Association. Fee Value: ZAR 45,000.
- Scoping and Environmental Impact Reporting and Environmental Management Programme for Klipfontein Environmental Approvals, South Africa (2015): Traffic Engineer - Traffic Impact Assessment. Client: Sub-consultant to Jones & Wagener for BECSA. Fee Value: ZAR 112,500.
- Collins Road Closure Traffic Impact Study, Bedfordview, South Africa (2015): Senior Traffic Engineer - Traffic Impact Study for new security access restrictions. Client: Collins Road Home Owners. Fee Value: ZAR 19,600.
- Morehill Glen Traffic Impact Study, Benoni, South Africa (2015): Senior Traffic Engineer - Traffic Impact Study for the re-application for security access

HUTCHINSON CORNELIA, Traffic and Transportation Engineer

restrictions. Client: Morehill Glen Community Security.
Fee Value: ZAR 22,700.

- Bonaero Park Erf 765 Section 7, Bonaero Park, South Africa (2014): Traffic Engineer - Report in terms of Section 7 of the Gauteng Transport Infrastructure Act for the impact of the subdivision of Erf 174. Client: Nine Nine Ninety Nine Projects. Fee Value: ZAR 19,000.
- Plantation Road, Bedfordview, South Africa (2014): Senior Traffic Engineer - Traffic impact assessment for the implementation of security access restrictions. Client: Jurgens Bekker Attorneys. Fee Value: ZAR 20,000.
- The Stewards Ext. 20 Access Road, Boksburg/Benoni, South Africa (2014): Traffic Engineer - traffic signal warrant, designs and revision of existing traffic signals associated with the development. Client: Investec Property. Fee Value: ZAR 69,000.
- Commercia Ext. 9 Parking Relaxation Study, Tembisa, South Africa (2014): Traffic Engineer - parking relaxation study for the proposed wholesale development in Commercia Ext. 9. Client: Jazz Spirit. Fee Value: ZAR 39,000.
- Environmental Impact Assessment for the Kraft Paper Mill, Frankfort, Free State, South Africa (2014): Traffic Engineer - Traffic Impact Assessment. Client: Industrial Development Corporation. Fee Value: ZAR 72,000.
- Proposed Supplier Park Development, Kathu, Northern Cape, South Africa (2014): Traffic Engineer - Traffic Impact Assessment. Client: Synergistics for Anglo American, Kumba Iron Ore. Fee Value: ZAR 124,500.
- Rehabilitation of the Main Road Maqhaka to Hleoheng Road and Mt Moorosi to Qhoali Road, Lesotho (2014): Traffic Engineer - Intersection and route capacity analysis, Climbing lane determination, E80 loading, Traffic Calming Measures. Client: Ministry of Public Works and Transport Lesotho. Fee Value: ZAR 11.1 m.
- Butsanani Environmental Impact Assessment/Environmental Management Programme for the proposed Rietvlei Opencast Coal Mine, Mpumalanga, South Africa (2014): Traffic Engineer - Traffic Impact Assessment. Client: WSP Environment & Energy. Fee Value: ZAR 98,900.
- Access Management Plan and Traffic Impact Study for Balmoral Ext. 1, Germiston, South Africa (2014): Traffic Engineer - Access Management Plan and Traffic Impact Assessment. Client: Actom. Fee Value: ZAR 54,000.
- Township Establishment of Ravenswood Ext. 79, Boksburg, South Africa (2014): Traffic Engineer - Traffic Impact Study and Access. Client: Klaptops 243. Fee Value: ZAR 71,900.
- Access Management Plan and Section 7 Report for Portions A & D of Driefontein 85 IR, Boksburg, South Africa (2014): Traffic Engineer - Access Management Plan and Section 7 Report. Client: North Rand Property Investments cc. Fee Value: ZAR 40,800.
- Township Establishment of Vulcania Ext. 13, Brakpan, South Africa (2014): Traffic Engineer - Traffic Impact Study and Access Plan. Client: Euro Body Builders cc. Fee Value: ZAR 55,900.
- Transnet Ports Terminal Traffic Management Study for the Richards Bay Terminal, KwaZulu-Natal, South Africa (2014): Traffic Engineer - Traffic Management Study. Client: Transnet Port Terminals. Fee Value: ZAR 350,000.

HUTCHINSON CORNELIA, Traffic and Transportation Engineer

- Anglo Alexander Environmental Impact Assessment Project in Kriel, Mpumalanga, South Africa (2014): Traffic Engineer - Traffic Impact Study for the proposed new coal mine. Client: Synergistics (SLR Group). Fee Value: ZAR 72,000.
- Mackenzie Park Muslim School, Benoni, South Africa (2013): Traffic Engineer - Traffic Impact Study. Client: Everite Building Products. Fee Value: ZAR 25,500.
- Goedeburg Ext. 50 Church Development, Benoni, South Africa (2013): Traffic Engineer - Traffic Impact Study. Client: Emseni Christian Centre. Fee Value: ZAR 45,500.
- Lifehouse Church, Johannesburg, South Africa (2013): Traffic Engineer - Traffic Impact Study. Client: Lifehouse Church. Fee Value: ZAR 26,800.
- Re-application for Security Access Restrictions at Angus road, Bedfordview, South Africa (2013): Traffic Engineer - Traffic Impact Study. Client: Angus Close Residents Association. Fee Value: ZAR 7,980.
- N3 Rehabilitation Warden to Keeversfontein, South Africa (2013): Traffic Engineer - Capacity analysis using High Capacity Manual Software and the Highway Traffic Model. Client: N3 Toll Concession. Fee Value: ZAR 50,000.
- Indigo Place Residential Development, Kew, South Africa (2013): Traffic Engineer - Traffic Impact Study. Client: H. Weinberg. Fee Value: ZAR 22,200.
- National Ports Plan, South Africa (2013): Traffic Engineer - Traffic and transportation status quo report and planning for Richards Bay and Durban Ports. Client: Transnet National Ports Authority. Fee Value: ZAR 100,000.
- The Stewards Ext. 13 Residential Development, South Africa (2013): Traffic Engineer - Revised Traffic Impact study (land use changes since 2011 study). Client: President Towers. Fee Value: ZAR 30,000.
- Parking Relaxation Study for Erf 1012, Bedfordview Ext. 189, South Africa (2013): Traffic Engineer - Parking reduction study. Client: Maxidor SA. Fee Value: ZAR 29 800.
- Freeway Park Security Closure, Ekurhuleni, South Africa (2013): Traffic Engineer - Site development plans at the access restriction locations. Client: Freeway Park Residents Association. Fee Value: ZAR 24,260.
- As-and-when Roads Rehabilitation Project, South Africa (2013): Traffic Engineer - Traffic Accommodation Plans for during construction. Client: Ekurhuleni Metropolitan Municipality. Fee Value: ZAR 50,000.
- Division of Land on Farm Driefontein 85-IR, Boksburg, South Africa (2013): Traffic Engineer - Access Management Plan. Client: Lumina Export and Import cc. Fee Value: ZAR 20,000.
- Future Industrial Development in Comet, Boksburg, South Africa (2013): Traffic Engineer - Access Management Plan. Client: Copper Moon Trading 631. Fee Value: ZAR 57,000.
- Conference Centre on Bardene Ext. 92 and 98, South Africa (2013): Traffic Engineer - Traffic Impact Study. Client: Cloversgreen Investments. Fee Value: ZAR 42,400.
- Security Access Restrictions in Oriel North, Bedfordview, South Africa (2013): Traffic Engineer - Traffic Impact Study. Client: Oriel North Residents Association. Fee Value: ZAR 28,300.

HUTCHINSON CORNELIA, Traffic and Transportation Engineer

- Industrial Development on Lilianton Ext. 12, Ptn. 10 Driefontein 85 IR, South Africa (2013): Traffic Engineer - Traffic Impact Study. Client: Able Wise Trading 47. Fee Value: ZAR 38 600.
- Township Regeneration Strategy, South Africa (2013): Traffic Engineer - Traffic and transportation status quo report and planning in Vosloorus, Kathlehong, Daveyton and Wattville. Client: Ekurhuleni Metropolitan Municipality. Fee Value: ZAR 100,000.
- Newmarket Shopping Centre, Alberton, South Africa (2012): Traffic Engineer - Traffic Signal Design. Client: Internal. Fee Value: ZAR 45,000.
- Crux-Capella Security Access Restrictions, Solheim, South Africa (2012): Traffic Engineer - Traffic Impact Study. Client: Crux-Capella Residents Association. Fee Value: ZAR 28,000.
- Industrial Development on Germiston Ext. 41, South Africa (2012): Traffic Engineer - Traffic Impact Study. Client: Garsin Properties. Fee Value: ZAR 44,000.
- Proposed New Yzermyn Coal Mine, Mpumalanga, South Africa (2012): Traffic Engineer - Traffic Impact Study. Client: WSP Environmental. Fee Value: ZAR 150,000.
- Phuthaditchaba Taxi Rank, South Africa (2012): Engineer - Feasibility Study. Client: Ekurhuleni Metropolitan Municipality. Fee Value: ZAR 497,040.
- Driefontein 87 IR Farm, Germiston, South Africa (2012): Engineer - Access Management Plan for various portions of farm. Client: Copper Moon Trading 631. Fee Value: ZAR 62,300.
- New Access Control Measures in Hillcrest Ave, Bedfordview, South Africa (2012): Engineer - Traffic Impact Study. Client: Cresthill Homeowners Association. Fee Value: ZAR 19,000.
- Laying Eskom Cables in Edenvale, South Africa (2012): Engineer - Traffic Management Plans. Client: CBI Electric - African Cables. Fee Value: ZAR 46,000
- Laying of Eskom Cables in Isando, South Africa (2012): Engineer - Traffic Management Plan. Client: CBI Electric - African Cables. Fee Value: ZAR 12,000.
- North Villa Close Re-application of Security Access Restrictions, South Africa (2012): Project manager - Traffic Impact Study. Client: Benoni North Community Precinct. Fee Value: ZAR 22,760.
- Re-application of Libradene Security Village Access Restrictions, South Africa (2012): Project manager - Traffic Impact Evaluation. Client: Libradene Security Village. Fee Value: ZAR 11,600.
- Mixed-use Development on Bassonia Ext. 1, South Africa (2012): Engineer - Traffic Impact Study. Client: Home Talk Developments. Fee Value: ZAR 45,000.
- Proposed Beyers Park Ext 112 and 120 over Westwood Small Holdings 41 and 40, South Africa (2012): Project manager - Traffic Impact Study. Client: Planet Waves 140 and STM Mining Equipment. Fee Value: ZAR 56,040.
- Extension and Upgrading of Dunswart Taxi Rank to a Full Scale Public Transport Modal Transfer Facility, South Africa (2011): Engineer - Feasibility Study. Client: Ekurhuleni Metropolitan Municipality. Fee Value: ZAR 168,000.

HUTCHINSON CORNELIA, Traffic and Transportation Engineer

- Proposed Development of Holding 46, Bartlett Ext. 1, South Africa (2011): Engineer - Traffic Impact Study. Client: Ronnie Matthews Investment Holdings. Fee Value: ZAR 24,700.
- Re-application for Security Access Restrictions at East Village, Sunward Park, Boksburg, South Africa (2011): Engineer - Traffic Impact Study. Client: East Village Residents Association. Fee Value: ZAR 5,450.
- Proposed Sintel Char Plant Expansion Grootegeluk Mine, Lephalale, South Africa (2011): Engineer - Traffic Impact Study. Client: Synergistics Environmental Services. Fee Value: ZAR 131,000.
- Proposed New Largo Mine, Mpumalanga, South Africa (2011): Engineer - Traffic Impact Study. Client: Synergistics Environmental Services. Fee Value: ZAR 206,602.
- Proposed Bedfordview Ext. 526, Farm Bedford 68 IR, South Africa (2011): Engineer - Traffic Impact Study. Client: Speyside Properties. Fee Value: ZAR 35,000.
- Proposed LED Advertising Sign on Oxford/ Corletta Dr. Illovo, South Africa (2011): Engineer - Traffic Impact Assessment. Client: Wideopen Platform. Fee Value: ZAR 10,700.
- Robor Main Entrance on Barbara Road, Elandsfontein, South Africa (2011): Engineer - Traffic signal/access investigation. Client: Robor. Fee Value: ZAR 31,000.
- Rezoning of Erf 759 Dalview on the K118, South Africa (2011): Engineer - Report in terms of Section 7 of the Gauteng Transport Infrastructure Act for the impact of the proposed rezoning. Client: Futureplan Urban Design and Planning Consultants. Fee Value: ZAR 11,800.
- Proposed New Eerstelingsfontein Opencast Coal Mine in Belfast, Mpumalanga, South Africa (2011): Engineer - Traffic Impact Study. Client: WSP Environment and Energy. Fee Value: ZAR 126,800.
- New Access Control Measures in Lavin Road, Bedfordview, South Africa (2011): Engineer - Traffic Impact Study. Client: Tag Security. Fee Value: ZAR 11,246.
- Supplementary Access to the Stewards Ext. 13 and 14, Benoni, South Africa (2011): Engineer - Traffic Impact Study. Client: H Weinberg. Fee Value: ZAR 25,000.
- Intersections (Signalised and Unsignalised) in Ekurhuleni, South Africa (2010): Engineer - Investigation, SIDRA analysis and optimisation of various intersections. Client: Ekurhuleni Metropolitan Municipality.
- Renewal of Access Control Measures, Disa Road, Bedfordview, South Africa (2010): Engineer - Traffic Impact Study. Client: Disa Road Closure Association. Fee Value: ZAR 17,625.
- Renewal of Access Control Measures, Leicester Road, Bedford Gardens, South Africa (2010): Engineer - Traffic Impact Study. Client: Safetyzone. Fee Value: ZAR 14,285.
- Determine if South-to-east Loop is required at Northern Terminal of N12/Kingsway Interchange after Implementation of Alliance Road Off-ramp, Daveyton, South Africa (2010): Engineer - Traffic Study. Client: Ekurhuleni Metropolitan Municipality. Fee Value: ZAR 30,000.

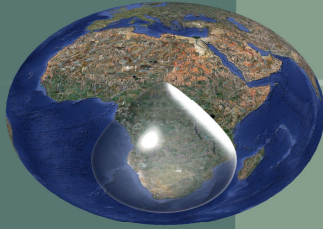
HUTCHINSON CORNELIA, Traffic and Transportation Engineer

- Portion 1 of the Farm Driefontein 87 IR, on Future Routes K110 and 127, Germiston, South Africa (2010): Engineer - Report in terms of Section 7 of the Gauteng Transport Infrastructure Act for the impact of the proposed division of land. Client: Business Venture Investments 752. Fee Value: ZAR 15,000.
- Rezoning of the Remainder of Erf 477 and Portion 2 of Erf 478 Eastleigh Township, South Africa (2010): Engineer - Traffic Impact Study. Client: Futureplan Urban Design and Planning. Fee Value: ZAR 30,000.
- Rezoning of the Remainder of Erf 477 and Portion 2 of Erf 478 Eastleigh Township on the future K68, South Africa (2010): Engineer - Report in terms of Section 7 of the Gauteng Transport Infrastructure Act for the impact of the proposed rezoning. Client: Futureplan Urban Design and Planning Consultants. Fee Value: ZAR 15,000.
- Portion 205, 227 and the Remainder of Portion 1 of the Farm Driefontein 87 IR and the Remainder of Portion 2 of Elandsfontein 90 IR, South Africa (2010): Engineer - Access Management Plan. Client: Ekurhuleni Metropolitan Municipality. Fee Value: ZAR 45,000.
- Proposed Township Comet Ext. 14 on Portion 403 of the Farm Driefontein 85-IR, Boksburg, South Africa (2010): Engineer - Traffic Impact Study. Client: Copper Moon Trading 631. Fee Value: ZAR 40,000.
- Impact of the Proposed Comet Ext.14 on the K90, South Africa (2010): Engineer - Report in terms of Section 7 of the Gauteng Transport Infrastructure Act. Client: Copper Moon Trading 631. Fee Value: ZAR 15,000.
- Proposed Comet Ext. 11 and 14 and Portion 498 of the Farm Driefontein 85-IR, Boksburg, South Africa (2010): Engineer - Access Management Plan and Internal Road Network. Client: Ekurhuleni Metropolitan Municipality. Fee Value: ZAR 30,000.
- Comet Extensions 6, 9 and 13, Boksburg, South Africa (2010): Engineer - Access Management Study. Client: Abbeydale Civils & Building. Fee Value: ZAR 30,000.
- Riley Road in Bedfordview, South Africa (2010): Engineer - Traffic study to investigate the undesirable operational conditions. Client: Ekurhuleni Metropolitan Municipality. Part of as-and-when contract.
- Rondebult Road in Boksburg, South Africa (2010): Engineer - Traffic study to investigate the undesirable operational conditions. Client: Ekurhuleni Metropolitan Municipality. Part of as-and-when contract
- Jeppe Quondam Club in Bedfordview, South Africa (2010): Engineer - Traffic Impact Assessment. Client: Penguin Airtime. Fee Value: ZAR 30,000.
- New Eastgate Roof Parking Layout, South Africa (2010): Engineer - Design, tender and project management. Client: Liberty Properties. Fee Value: ZAR 200,000.
- Pomona Eastern Outfall Sewer Line, Kempton Park, South Africa (2009): Engineer - Preliminary design. Client: Ekurhuleni Metropolitan Municipality. Fee Value: ZAR 100,000.
- Proposed Interchange between the N12 and Alliance road to serve the Daveyton CBD, South Africa (2009): Project Engineer - managing the design of a half-diamond interchange on the N12. Client: Ekurhuleni Metropolitan Municipality. Fee Value: ZAR 2.5 m.

HUTCHINSON CORNELIA, Traffic and Transportation Engineer

- Preparation and Evaluation of Various Water-Related Tenders (2008): Civil Engineer at Ekurhuleni Metropolitan Municipality's Revenue Unit. Managing Various Leak Fixing and Water Demand Management Projects and Water Meter Installations. (2007): Water Demand Management Engineer at Ekurhuleni Metropolitan Municipality's Kempton Park depot.

HYDROGEOLOGICAL IMPACT ASSESSMENT



GEO-LOGIC

Hydro Geological Consultants CC

327 25th Avenue
Villieria
Pretoria
0186

Henk Kruidenier 082 872 5705

Tel / Fax: +27 12 329 1352
e-mail: henk@geo-logic.co.za

CURRICULUM VITAE

Jan Hendrik Basson Kruidenier
(B. Tech Geotecnology, N Dip Geology)
Pr. Sci. Nat Registration Number 400106/15

PERSONAL DETAILS

Nationality:	South African
Date of birth:	30 March 1962
Residential and work address:	25 th Avenue 327, Villieria, Pretoria, 0186
Postal address:	25 th Avenue 327, Villieria, Pretoria, 0186
Telephone numbers:	Work: +27 12 329 1352 Cell: 082 872 5705
Identity number:	620330 500 3083
Languages:	Afrikaans, English and Dutch

QUALIFICATIONS

Matric, (1979) Hoërskool Silverton.
N. Dip Geology, (1981-1983) Technicon Pretoria
B.Tech Geotecnology (1996) Technicon Pretoria

EMPLOYMENT HISTORY

Geo-Logic Hydrogeological Consultants CC:	Director, Geohydrological Consultant
(2013 to Present)	
Exigo Sustainability (Pty) Ltd: (2011 to 2013)	Geohydrologist
Geo-Logic Hydrogeological Consultants CC:	Director, Geohydrological Consultant
(2001 to 2010)	
VSA Geoconsultants (PTY) Ltd: 1991 – 2001	Geohydrological Consultant
Council for Scientific and Industrial Research (CSIR): (1982 to 1990)	Junior and Senior Geotechnician
African Geo Survey: (1981 to 1981)	Learner Geotechnician
Geological Survey: (1980 to 1981)	Learner Geotechnician

KEY QUALIFICATIONS AND EXPERIENCE

Mr Kruidenier has 33 years' experience in geohydrological assessments and geophysical studies relating to groundwater exploration and management. He is experienced in different levels of groundwater studies focusing on water use license applications, contamination risks assessments, groundwater monitoring, well field planning,

establishment and management. The study of groundwater in the mining sector, landfill sites, tailings dams, sewerage treatment plants, graveyards and filling stations were done on a routine basis.

Regional aquifer assessments were done on a number of occasions for governmental and non-governmental departments for agricultural purposes, mining sector, land developments and roads.

Water provision programs for rural development were done on a large scale from 1991 to 2001. Large villages and towns were serviced with bulk water supply schemes fed by well field of boreholes on a regional scale. Planning, establishing, monitoring and expanding existing well fields formed part of the water provision programs.

Have done the Orange River basin study which includes countries such as Namibia, Botswana, Lesotho and South Africa. Water provision to the mining sector in remote and arid regions and development of regional water resources management strategies.

INTERNATIONAL EXPERIENCE

- Participated in the assessment of the upper and lower soil conditions for the gas pipeline from Temane in Mozambique to the Highveld in South. The Temane gas field plant site formed part of this investigation.
- Establishment and extension of existing and newly developed well fields for towns such as Nampula, Pemba, Montepuez and Quilemane in Mozambique.
- A large groundwater study to supply in the water demand for Gaberones and large irrigation farms located in Botswana.
- Geophysical exploration study for a copper mine at Springfontein South West Africa (Namibia). The Electromagnetic method was used to compile a 3D image of the ore body.

SPECIALITY FIELDS

- Geophysical study program planning, execution and data assessment. The Gravity, DC CVES, EM-37, DC Slumberger and Magnetic methods were used on a day to day basis throughout his 33 year career.
- Geophysical studies relating to finding contamination plums and preferred pathways for contamination travel.
- Regional groundwater aquifer studies which includes hydro-census studies on a large scale, aquifer sustainability assessments for more than 80 villages located in the Limpopo and North West Provinces.
- Local and regional water resources development, monitoring and management.
- Evaluation of groundwater specialist studies in the groundwater source development industry, which includes water supply to mines and large towns. Experience in pre-feasibility studies (PFS) and Definitive Feasibility Studies.
- Characterization of aquifers with a focus on management of regional groundwater systems.
- Groundwater well field planning and sustainability assessment.
- Drilling and borehole yield testing contractor management of large groundwater source development programs.
- Geohydrological impact and contamination risk assessment studies for landfill sites, filling stations, abattoirs, cemetery sites, chicken, pig farms, water treatment plants and feedlots. The studies include groundwater resource development, establishing of groundwater monitoring facilities, groundwater monitoring plans for the purpose of water use license applications.
- Groundwater management for water supply and environmental management programmes (EMP's).

SOILS AND LAND CAPABILITY IMPACT ASSESSMENT

CURRICULUM VITAE: DR. JOHAN H. VAN DER WAALS
(4 February, 2016)

1. Personal Particulars

Full names: Johan Hilgard van der Waals **Title:** Dr.
Date of birth: 1969 – 05 – 22 **Place of Birth:** Pretoria
Race: White **RSA Id no:** 690522 5224 082
Marital status: Married
Language Proficiency:
 Afrikaans: Excellent all round
 English: Excellent all round
 Spanish: Read and speak very good, writing fair
 Portuguese: Understand fair
 French: Understand fair (having completed two years of classes with the Alliance Francaise in Pretoria)
Computer Literacy/Proficiency: Highly proficient in a range of software packages including MS Word, MS Excel, MS Outlook, MapSource, Fugawi, ACDSee as well as varying experience in a range of GIS/GPS software applications.

2. Contact Detail

Work physical address: 624 Whippet Street Garsfontein 0060 Pretoria	Work postal address: PO Box 40568 Garsfontein 0060 South Africa
Work telephone number: +27 (0)12 993 0969	
Work fax number: +27 (0)86 274 6653	
Cell phone number: +27 (0)82 570 1297	
Email address: johan@terrasoil.co.za	

3. Academic Qualifications

- 3.1 BSc Soil Science and Botany Cum Laude, 1995, Potchefstroom University for CHE
- 3.2 BSc Honours Soil Science and Plant Nutrition, 1999, University of Pretoria
- 3.3 MSc Soil Science and Plant Nutrition, 2001, University of Pretoria
- 3.4 PhD Soil Science, 2006, University of Pretoria

4. Academic Output

4.1 Peer Reviewed Journal Publications

- 4.1.1 Van der Waals, J.H., & Claassens, A.S. 2002. Accurate lime recommendations under South African conditions. *Commun. Soil Sci. Plant Anal.*, 33(15-18), p 3059-3074.
- 4.1.2 Van der Waals, J.H., Snyman, H.G. & Claassens A.S. 2005. Increase in metal extractability after liming of sacrificial sewage sludge disposal soils. *Water SA* 31(2) p. 271-273.
- 4.1.3 Jackson, C.R., Lubbe, N.R., Robertson, M.P., Setsaas, T.H., Van der Waals, J. & Bennett, N.C. 2008. Soil properties and the distribution of the endangered Juliana's Golden Mole. *Journal of Zoology* **274**(2008) 13-17.
- 4.1.4 Van der Waals, J.H. 2013. Soil colour variation between topsoil and subsoil horizons in a plinthic catena on the Mpumalanga Highveld, South Africa. *South African Journal of Plant and Soil* **30**(1): 47–51

4.2 Peer Reviewed Book Chapters

- 4.2.1 Van der Waals, J.H. & Laker, M.C. 2008. Micronutrient deficiencies in crops in Africa with emphasis on Southern Africa. In Alloway, B.J. (Ed.) *Micronutrient deficiencies in global crop production*. Springer Science, pp 201-224

4.3 Conference Proceedings Publications

- 4.3.1 Van der Waals, J.H., Kaiser, C., & Stronkhorst, L.D. 2003. Challenges concerning fertilizer use and management practices in the banana industry in South Africa. In Schnug, E., Nagy, J., Németh, T., Kovács, Z., & Dövényi-Nagy, T. (Eds.), Proceedings of the 14th International Symposium of Fertilizers (CIEC), June 22-25, 2003, Debrecen, Hungary, pp 386. ISBN 963 9274 44 5
- 4.3.2 Van der Waals, J.H. & Claassens, A.S. 2003. Long-term heavy metal pollution risk due to the use of slags as agricultural limes on the South African Highveld. In Spiers, G., Beckett, P., & Conroy, H. (Eds.), Sudbury 2003 Mining and the Environment Conference Proceedings, May 25-28, 2003, Sudbury, Ontario, Canada. ISBN 0-88667-051-9.
- 4.3.3 Van der Waals, J.H., Van der Merwe, C. & Erdmann, R. 2007. Detail assessment of metal distribution in polluted soil – a South African case study. In Fourie, A., Tibbett, M. & Wiertz, J. (Eds.), Proceedings of the Second International Seminar on Mine Closure, Santiago, Chile, 16-19 October, 2007. pp 815-820.

4.4 Technical Research Reports

- 4.4.1 Snyman, H.G. & van der Waals, J.H. 2004. Laboratory and field scale evaluation of agricultural use of sewage sludge. WRC Report No. 1210/1/04. ISBN: 1-77005-230-5, Water Research Commission, Pretoria.

4.5 National Conference Presentations

- 4.5.1 Van der Waals, J.H., & Claassens, A.S. 2001. Successful use of the RH-value in determining lime requirements. Joint Congress (Soil Science Society of South Africa, South African Society of Crop Production, Southern African Weed Science Society), Pretoria, 16-18 January 2001. (Oral Paper)
- 4.5.2 Van der Waals, J.H., & Claassens, A.S. 2001. The plant availability of selected heavy metals and phosphorus from applied slags. Joint Congress (Soil Science Society of South Africa, South African Society of Crop Production, Southern African Weed Science Society), Pretoria, 16-18 January 2001. (Oral Paper)

- 4.5.3 Viljoen, A., Van der Waals, J.H., Nel, B., and Wiese, L. D. 2002. The potential application of disease suppressive soils in the management of *Fusarium* wilt of banana. 13th Annual Soil-borne Disease Symposium, Stellenbosch. (Oral Paper)
- 4.5.4 Van der Waals, J.H., & Claassens, A.S. 2003. Long-term heavy metal pollution risk due to the use of slags as agricultural limes on the South African Highveld. Golden Jubilee Congress (Soil Science Society of South Africa, South African Society of Crop Production, Southern African Society for Horticultural Sciences), Stellenbosch, 20-23 January 2003. (Oral Paper)
- 4.5.5 Stronkhorst, L.D., Viljoen, A., Claassens, A.S., Nel, B., & Van der Waals, J.H. 2003. The effect of N-fertilization and pH on the incidence of *Fusarium* Wilt (Panama disease) of banana in greenhouse trials. Golden Jubilee Congress (Soil Science Society of South Africa, South African Society of Crop Production, Southern African Society for Horticultural Sciences), Stellenbosch, 20-23 January 2003. (Oral Paper)
- 4.5.6 Kaiser, C., & Van der Waals, J.H. 2003. Effects of different mineral element foliar sprays and soil application on Panama disease (*Fusarium oxysporum* f.sp *cubense*) of bananas. Golden Jubilee Congress (Soil Science Society of South Africa, South African Society of Crop Production, Southern African Society for Horticultural Sciences), Stellenbosch, 20-23 January 2003. (Oral Paper)
- 4.5.7 Van der Waals, J.H., & Snyman, H.G. 2004. Selected chemical and physical soil properties of three sacrificial sewage sludge disposal sites. Water Institute of South Africa (WISA) Conference, Cape Town, 2-6 May 2004. (Oral Paper)
- 4.5.8 Van der Waals, J.H. & Claassens, A.S. 2005. Influence of increasing lime rates on ammonium EDTA (NH₄-EDTA) extractable metals and organic matter from two acid long-term biosolids disposal soils. Combined Congress (Soil Science Society of South Africa, South African Society of Crop Production, South African Weed Science Society, Southern African Society for Horticultural Sciences), Potchefstroom, 11-14 January 2005. (Oral Paper)
- 4.5.9 Van der Waals, J.H. & Claassens, A.S. 2006. Heavy Metal Uptake by Wheat from Two Sacrificial Biosolids Disposal Soils at Differential Liming Rates. Combined Congress (Soil Science Society of South Africa, South African Society of Crop Production, Southern African Society for Horticultural Sciences), Durban, 24-26 January 2006. (Oral Paper)
- 4.5.10 J.H. van der Waals, L.D. Stronkhorst, A.S. Claassens, A. Viljoen. 2006. Chemical Analysis of Soils Suppressive and Conducive to *Fusarium* Wilt of Banana in South Africa. Combined Congress (Soil Science Society of South Africa, South African Society of Crop Production, Southern African Society for Horticultural Sciences), Durban, 24-26 January 2006. (Oral Paper)
- 4.5.11 Van der Waals, J.H., Rossouw, P.S., Potgieter, J.J.C. & de Jager, P.C. 2007. Uranium mobility in soils – a South African case study. Combined Congress (Soil Science Society of South Africa, South African Society of Crop Production, Southern African Society for Horticultural Sciences), Badplaas, 22-25 January 2007. (Oral Paper)
- 4.5.12 Van der Waals, J.H., de Jager, P.C., Rossouw, P.S. & Claassens, A.S. 2008. Mobility of Cr, Ni and V in long-term slag applied soils of Mpumalanga. Combined Congress (Soil Science Society of South Africa, South African Society of Crop Production, Southern African Society for Horticultural Sciences, South African Weed Science Society), Stellenbosch, 19-22 January 2009. (Oral Paper)
- 4.5.13 Van der Waals, J.H., de Jager, P.C., Rossouw, P.S. & Claassens, A.S. 2009. Mobility of Cr, Ni and V in long-term slag applied soils of Mpumalanga. Combined Congress (Soil Science Society of South Africa, South African Society of Crop

- Production, Southern African Society for Horticultural Sciences, South African Weed Science Society), Stellenbosch, 19-22 January 2009. (Oral Paper)
- 4.5.14 Van der Waals, J.H. 2009. Generalised soil characteristics of the wetland zones of the Halfway House granites, Gauteng Province. Wetlands Indaba, Langebaan, 27 – 30 October 2009. (Oral Paper)
- 4.5.15 Van der Waals, J.H., & Rossouw, P.S. 2010. Refining area specific wetland delineation criteria through the use of land type data. Wetlands Indaba, Kimberley, 26 – 29 October 2010. (Oral Paper)
- 4.5.16 Rossouw, P.S., Van der Waals, J.H., & De Jager, P.C. 2011. The extractability of chromium(III) and nickel as influenced by soil water potential levels. Combined Congress (Soil Science Society of South Africa, South African Society of Crop Production, Southern African Weed Science Society, Southern African Society for Horticultural Sciences), Durban, 17-20 January 2011. (Oral Paper)
- 4.5.17 Van der Waals, J.H. Rossouw, P.S. & Van Zyl, L.G. 2011. Long-term land use induced soil chemical variation on the Mpumalanga Highveld. Combined Congress (Soil Science Society of South Africa, South African Society of Crop Production, Southern African Weed Science Society, Southern African Society for Horticultural Sciences), Durban, 17-20 January 2011. (Oral Paper)
- 4.5.18 Van Zyl, L.G., & Van der Waals, J.H. 2011. Geomorphometry as indicator for slope position. Combined Congress (Soil Science Society of South Africa, South African Society of Crop Production, Southern African Weed Science Society, Southern African Society for Horticultural Sciences), Durban, 17-20 January 2011. (Oral Paper)
- 4.5.19 Pretorius, M.L., Van Huyssteen, C., Van der Waals, J.H., & Grundling, A.T. 2011. Soil colour as indicator of wetland boundaries on the Maputaland Coastal Plain. Combined Congress (Soil Science Society of South Africa, South African Society of Crop Production, Southern African Weed Science Society, Southern African Society for Horticultural Sciences), Durban, 17-20 January 2011. (Oral Paper)
- 4.5.20 Van der Waals, J.H., & Fairall, E. P. 2011. Pan African Parliament Development – The case for a wetland. National Wetlands Indaba, Didima, KwaZulu-Natal, 18-21 October 2011 (Oral Paper)
- 4.5.21 Rossouw, P.S., & Van der Waals, J.H. 2011. Blue-green colouration in soil as a tool in understanding wetland hydrology. National Wetlands Indaba, Didima, KwaZulu-Natal, 18-21 October 2011 (Oral Paper)
- 4.5.22 Van der Waals, J.H., Rossouw, P.S., & Fairall, E.P. 2012. Proposed hydric soil indicators for the soils of the Halfway House Granite Dome. Combined Congress (Soil Science Society of South Africa, South African Society of Crop Production, Southern African Weed Science Society), Potchefstroom, 16-19 January 2012. (Oral Paper)
- 4.5.23 Van der Waals, J.H., & Rossouw, P.S. 2012. Occurrence and implications of topsoil/subsoil colour variation along a hillslope on the plinthic catena. Combined Congress (Soil Science Society of South Africa, South African Society of Crop Production, Southern African Weed Science Society), Potchefstroom, 16-19 January 2012. (Oral Paper)
- 4.5.24 Rossouw, P.S., & Van der Waals, J.H. 2012. Blue-green colouration in soil: indicator of modal gleyed/wetland conditions. Combined Congress (Soil Science Society of South Africa, South African Society of Crop Production, Southern African Weed Science Society), Potchefstroom, 16-19 January 2012. (Oral Paper)

- 4.5.25 Van der Waals, J.H. 2012. Proposed Classification of Organic Matter Enriched Topsoil Horizons in the South African Taxonomic System. National Wetlands Indaba, Klein Kariba, Limpopo Province, 23-26 October 2012 (Oral Paper)
- 4.5.26 Van der Waals, J.H. 2013. Wetland delineation in mining environments: quo vadis? LaRRSA Conference, Pretoria (Oral Paper)
- 4.5.27 Van der Waals, J.H. 2014. The development of a detailed wetland management guideline for the Halfway House Granite Dome. International Association for Impact Assessment, Gallagher Convention Centre, Gauteng Province, Midrand, 27-29 August, 2014.
- 4.5.28 Van der Waals, J.H. 2014. Implications if the erosion susceptibility of soils and wetlands on the Halfway House Granite Dome. National Wetlands Indaba, Lanseria, North West Province, 20-24 October, 2014 (Oral Paper)
- 4.5.29 Van der Waals, J.H. 2014. The impact of mining on agriculture and wetlands. National Wetlands Indaba Workshop, Lanseria, North West Province, 20-24 October, 2014 (Oral Paper)

4.6 International Conference Oral and Poster Presentations

- 4.6.1 Van der Waals, J.H., & Claassens, A.S. 2001. Accurate lime recommendations under South African conditions. 5th International Symposium Plant-Soil Interactions at Low pH, Alpine Heath, 12-16 March 2001. (Poster Paper)
- 4.6.2 Van der Waals, J.H., Snyman, H.G., & Claassens, A.S. 2003. Extractable heavy metal fractions of three soils from sewage sludge disposal sites in South Africa. 8th International Symposium on Soil and Plant Analysis, Somerset West, 13-17 January 2003. (Poster Paper)
- 4.6.3 Van der Waals, J.H., Snyman, H.G., & Claassens, A.S. 2003. The effect of liming on pH and extractable heavy metals from soils at two sewage sludge disposal sites. 8th International Symposium on Soil and Plant Analysis, Somerset West, 13-17 January 2003. (Poster Paper)
- 4.6.4 Stronkhorst, L.D., Viljoen, A., Claassens, A.S., Nel, B., & Van der Waals, J.H. 2003. The effect of N-fertilization and pH on the incidence of *Fusarium* Wilt (Panama disease) of banana in greenhouse trials. 8th International Symposium on Soil and Plant Analysis, Somerset West, 13-17 January 2003. (Poster Paper)
- 4.6.5 Van der Waals, J.H. & Claassens, A.S. 2003. Long-term heavy metal pollution risk due to the use of slags as agricultural limes on the South African Highveld. Sudbury Mining and the Environment Conference, May 25-28, 2003, Sudbury, Canada. (Oral Paper)
- 4.6.6 Van der Waals, J.H., Kaiser, C., & Stronkhorst, L.D. 2003. Challenges concerning fertilizer use and management practices in the banana industry in South Africa. 14th International Symposium of Fertilizers (CIEC), June 22-25, 2003, Debrecen, Hungary. (Oral Paper)
- 4.6.7 Snyman, H.G., Van der Waals, J.H. & Van Niekerk, C. 2003. Aspects of the beneficial agricultural use of sewage sludge in South African soils. IWA Conference on Environmental Biotechnology: Advancement on Water and Wastewater Applications in the Tropics Kuala Lumpur, Malaysia, 9-10 December 2003. (Oral Paper)
- 4.6.8 J.H. van der Waals, A.S. Claassens & W.F.A. Kirsten. 2004. Reactivity and metal content of slags used on the Mpumalanga Highveld: How applicable are current guidelines? 15th International Scientific Center for Fertilizers Symposium, September 27-30, 2004, Pretoria, South Africa. (Oral Paper)
- 4.6.9 J.H. Van der Waals, P.C. de Jager & A.S. Claassens. 2004. Factors affecting the mobility of trace elements added to agricultural soils through the use of slags as

- liming materials. 15th International Scientific Center for Fertilizers Symposium, September 27-30, 2004, Pretoria, South Africa. (Oral Paper)
- 4.6.10 Van der Waals J.H. & Claassens, A.S. 2005. Influence of increasing lime rates on ammonium EDTA (NH₄-EDTA) extractable metals and organic matter from two acid long-term biosolids disposal soils. 9th International Symposium on Soil and Plant Analysis, Cancun, Mexico, January 30th to February 4th, 2005. (Poster Paper)
- 4.6.11 Rossouw, P.S., Van der Waals, J.H., Claassens, A.S. & De Jager, P.C. 2007. Chromium and nickel transformation in South African Highveld catena soils. 10th International Symposium on Soil and Plant Analysis, Budapest, Hungary, 11-15 June 2007. (Poster Paper)
- 4.6.12 Van der Waals, J.H., Van der Merwe, C. & Erdmann, R. 2007. Detail assessment of metal distribution in polluted soil – a South African case study. Second International Seminar on Mine Closure, Santiago, Chile, 16-19 October, 2007. (Oral Paper)

4.7 Awards

- 4.7.1 Best student (PhD) presentation: “Van der Waals, J.H. & Claassens, A.S. 2003. Long-term heavy metal pollution risk due to the use of slags as agricultural limes on the South African Highveld.” At the Sudbury Mining and the Environment Conference, May 25-28, 2003, Sudbury, Canada.
- 4.7.2 Best Paper: “Van der Waals, J.H. & Claassens, A.S. 2005. Influence of increasing lime rates on ammonium EDTA (NH₄-EDTA) extractable metals and organic matter from two acid long-term biosolids disposal soils.” Combined Congress (Soil Science Society of South Africa, South African Society of Crop Production, South African Weed Science Society, Southern African Society for Horticultural Sciences), Potchefstroom, 11-14 January 2005.
- 4.7.3 Best Paper: “Van der Waals, J.H., Rossouw, P.S., Potgieter, J.J.C. & de Jager, P.C. 2007. Uranium mobility in soils – a South African case study.” Combined Congress (Soil Science Society of South Africa, South African Society of Crop Production, Southern African Society for Horticultural Sciences), Badplaas, 22-25 January 2007.

4.8 Completed Student Supervision: Masters students (University of Pretoria)

- 4.8.1 Berhe, M.A. (Main Supervisor). 2003. The use of ethnopedology as a tool for participatory land use planning in the Eritrean Highlands.
- 4.8.2 Stronkhorst, L.D. (Main Supervisor). 2006. Selected soil properties affecting the incidence of Panama disease in banana.
- 4.8.3 McLea, J. (Co-supervisor). 2007. Assessment of the cultivation of *Jatropha curcas* L. for the production of bio diesel in the Mafikeng area of the North West Province of South Africa.
- 4.8.4 Stones, R. (Main Supervisor). 2007. Land suitability studies for the growing of deciduous berries in the Limpopo Province of South Africa
- 4.8.5 Rossouw, P.S. (Partial Supervisor). 2008. Environmental extractability of Cr(III) and Ni from soils of South Africa’s Eastern Highveld.
- 4.8.6 Lubbe, N.R. (Co-supervisor). 2010. Characterization of the soils of Marion Island.

4.9 Membership of National and International Bodies

- 4.9.1 Soil Science Society of South Africa (SSSSA) – Member
- 4.9.2 South African Soil Surveyors Organisation (SASSO) – Accredited Member
- 4.9.3 South African Council for Natural Scientific Professions – Reg. no. 400160/08

4.10 International Dedicated Soil Classification Workshops / Field Excursions

- 4.10.1 World Reference Base (WRB) field excursion and soil classification workshop, Wroclaw, Poland, September 2011.
- 4.10.2. World Reference Base (WRB) field excursion and soil classification workshop, Yakutsk (Siberia), Russian Federation, August 2013.
- 4.10.3 World Reference Base (WRB) field excursion and soil classification workshop, Ireland, September 2014.
- 4.10.4 Team Coach, International Field Course and Soil Judging Contest (WRB and USDA Soil Taxonomy), 1-5 September 2015, Gödöllő, Hungary.

5. Professional/Consulting Output

(Note: Specialist reports are the property of the client and Terra Soil Science. For a complete list of projects and clients please contact Terra Soil Science. A list will be supplied upon signing of a non-disclosure agreement.)

- 5.1 Agriculture potential reports:** 350+ throughout South Africa
- 5.2 EMP/EIA soil surveys:** 200+ throughout South Africa
- 5.3 Specialist Soil Surveys:** 50+ throughout Southern Africa
- 5.4 Wetland delineation and general soil surveys (Land-use planning):** 150+ throughout Southern Africa
- 5.5 Fertilizer recommendations (various applications):** 40+
- 5.6 Short courses presented:** 13 (Soil Classification and Wetland Delineation)
- 5.7 Presentation at specialist workshops:** Advanced Environmental Crimes Workshop presented by the Department of Environmental Affairs (DEA) and Directorate Public Prosecutions (DPP) (2011)
- 5.8 Specialist Witness:**
 - 5.8.1 Specialised witness in the Regional Division of North Gauteng for the State in the matter between The State versus 1. Stefan Frylinck and 2. Mpofu Environmental Solutions CC (Case Number 14/1740/2010). Judgement delivered on the 6th April 2011 in favour of the State.
- 5.9 Soil Classification Working Group (SCWG) of the Soil Science Society of South Africa (SSSSA):** Active member of the SCWG since 2004 and currently involved with the upgrading and amendment of the South Africa Taxonomic System towards an open ended system that caters for agricultural, hydrological and pollution related soil classification categories.

6. Previous Work Experience

6.1 1988 – 1997: South African National Defence Force. Last position held: Squadron Commander Terrain Evaluation (4 Survey and Mapping Regiment, South African Engineer Corps)

6.2 1997 – 1998: Rehabilitation officer in the gold mining industry with ENVIROGREEN (now Fraser Alexander)

6.3 1999 – 2007: University of Pretoria: Last position held: Senior Lecturer in Soil Science and Land-use Planning

6.3.1 Courses Presented/Developed:

Course	Level (e.g. <i>second year, Masters</i>)	Self developed (Yes or No)
ARD 482 Physical- Biological Resources and Development	Fourth year	Yes (50%)
ARD 782 Physical- Biological Resources and Development	Honours	Yes (50%)
GDK 250 Introductory Soil Science Practical	Second year	No
GKD 350 Soil Classification	Third year	Yes
GKD 460 Environmental Management	Fourth year	Yes (50%)
GKD 461 Soil Mineralogy and Genesis	Fourth year	Yes (50%)
GKD 480 Resource Surveying	Fourth year	Yes
LBU 410 Land-use Planning	Fourth year	Yes
LBU 420 Project in Land-use Planning	Fourth year	Yes
GDK 780 Soil Classification	Honours	Yes
GDK 781 Land-use Planning	Honours	Yes (50%)
GDK 782 Resource Surveying	Honours	Yes (50%)
GDK 783 Project in Land-use Planning	Honours	Yes (50%)

6.3.2 Other Academic/Industry Collaboration

6.3.2.1 Chairman of the organizing committee of the 15th International Scientific Center for Fertilizers (CIEC) Symposium held in Pretoria from 27 to 30 September 2004. The symposium was held at the request of the President (Prof. Christian Hera – Romania) and Deputy President (Prof. Ewald Schnug – Germany) of the CIEC.

6.3.2.2 Collaboration with the personnel from the Department of Zoology on the soil characteristics that influence the distribution of the Juliana's Golden Mole in the Bronberg area.

6.3.2.3 Collaboration with the personnel from the Department of Geography on the soils of Marion Island.

6.3.2.4 Collaboration with the Forestry and Agriculture Biotechnology Institute (FABI) on Panama disease of banana. Dr. van der Waals' contribution concerns plant nutrition and soil fertility influences on the incidence of the disease.

6.3.2.5 Collaboration with the South African Iron and Steel Institute and Pistorius & Co. on the mobility of heavy metals derived from slag applied soils.

6.4 2007 – present: Managing Director of Terra Soil Science cc. Terra Soil Science was established in August 2007 and has grown to such a point that it has, apart

- from Johan van der Waals, eight full-time employees (GIS and project management) as well as an association with two part time soil surveyors for a range of soil survey and GIS applications.
- 6.5 2011 – 2013:** Research fellow with the Department of Soil, Crop and Climate Sciences, University of the Free State, Bloemfontein.
- 6.6 2013 – present:** Part-time lecturer (Soil Classification), Department of Plant Production and Soil Science, University of Pretoria.

Resumé

Johan van der Waals completed his undergraduate studies in Soil Science and Botany at the Potchefstroom University for CHE (cum laude) in 1995. He completed his honours degree in Soil Science and Plant Nutrition (University of Pretoria) in 1999 (part-time), Masters in Soil Science and Plant Nutrition (University of Pretoria) in 2001 and PhD in Soil Science (University of Pretoria) in 2006. Both his Masters and PhD degrees focussed on heavy metal mobility in soils as a result of the use of metal containing waste products. He was a staff member in the department of Plant Production and Soil Science of the University of Pretoria from 1999 to 2007 and presented 13 courses of which many were self developed. His favourite and strongest course was Soil Classification in which the students were intensively exposed to the **South African Taxonomic System** as well as to the **World Reference Base for Soil Resources (WRB)** of the Food and Agriculture Organisation (FAO) of the United Nations (UN) and the United States Department of Agriculture's (USDA) **Soil Taxonomy**.

Since the establishment of Terra Soil Science CC, Johan has been involved in a range of soil consulting services. The bulk of the contribution to the industry entails soil surveys for EIAs as well as soil management plans and soil based wetland surveys and delineations. The recent focus on wetland conservation in SA led to a range of surveys to determine the status and extent wetlands that have had some form of human impact. The culmination has been the successful defence of the Wetland Delineation Guidelines and wetland description criteria in the recent court case on the destruction of Pan African Parliament Complex Site in Midrand, Gauteng.

Johan van der Waals has an active interest in the understanding of soils and their properties and their influence on a range of natural and anthropogenic processes and as such is actively involved in research. Key to this understanding is a proper grounding in the Soil Classification, Soil Chemistry, Plant Nutrition and Soil Biology disciplines and therefore these form the core of his academic interests.



DR. J.H. VAN DER WAALS

SOCIO-ECONOMIC IMPACT ASSESSMENT

Curriculum Vitae

Tony Barbour

ENVIRONMENTAL CONSULTING AND RESEARCH

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(Tel) 27-21-6837085, (Fax) 27-21-6837085, (Cell) +27-82 600 8266
(E-Mail) tbarbour@telkomsa.net

Tony Barbour has 23 years' experience in the environmental sector. His experience includes ten years as an environmental consultant in the private sector in South Africa followed by four and a half years at the University of Cape Town's Environmental Evaluation Unit. In 2004 he established his own environmental consulting company, Tony Barbour Environmental Consulting and Research, with a focus on Social Impact Assessment (SIA), Strategic Environmental Assessment (SEA), Independent Review Work, Training and Capacity Building and Environmental Project Management.

PERSONAL DETAILS

Tony Barbour, born on 8 June 1961
Nationality: South African and Irish
Marital Status: Married

EDUCATION

- BSc (Geology and Economics) Rhodes, 1984;
- BEcon (Honours) Rhodes, 1985;
- MSc (Environmental Science) University of Cape Town, 1992

ADDITIONAL QUALIFICATIONS

- Advanced and basic mediation/facilitation skills training course, Centre for Conflict Resolution, University of Cape Town (1999);
- Multi-party negotiation and facilitation skills for natural resource management, MEPC/CIDA (1999).

ACADEMIC AWARDS

- Schwartz Award, Top Student, Geology III, Rhodes University;
- Shell Medal of Excellence, Top student, Masters Course Work, MSc Environmental Science, UCT.

AREAS OF EXPERIENCE AND EXPERTISE

Project management, proposal writing, preparation, review and editing of reports and documents, environmental planning and management, Social Impact Assessment (SIA); Environmental Impact Assessment (EIA); Strategic Environmental Assessment (SEA); waste management, environmental economics, facilitation, public participation, training and teaching. Countries with work experience include South Africa, Namibia, Botswana, Zambia, Lesotho, Swaziland, Ghana, Mozambique, Mauritius, Kenya, Ethiopia, Oman, South Sudan and Sudan.

EMPLOYMENT RECORD

- **Private Consultant:** November 2004-current.
- **University of Cape Town:** August 2000-October 2004, Environmental Evaluation Unit (EEU), University of Cape Town. Senior Environmental Consultant and Researcher;
- **Private sector:** 1991-August 2000
1991-1996: Ninham Shand Consulting (Cape Town). Senior Environmental Scientist;
1996-August 2000: Steffen, Robertson and Kirsten (SRK Consulting) – Associate Director, Manager Environmental Section, SRK Consulting, Cape Town.

RELEVANT AREAS OF EXPERIENCE AND EXPERTISE

SOCIAL IMPACT ASSESSMENT

Mining and Industrial projects

- Social Labour Plan for coal mine in Mpumalanga, South Africa (2014);
- SIA for heavy mineral separation plant, Vredendal, Western Cape Province (2012);
- SIA Otjizondo Manganese Mine, Namibia (2011);
- SIA for upgrade of PPC Riebeeck cement plant, Western Cape, South Africa (2009);
- SIA for Elitheni Coal Mine, Eastern Cape (2008);
- SIA and Resettlement Action Plan (RAP) for Southern Ashanti Gold Mining Project, Ghana (2007);
- SIA for Valencia Uranium Mine, Swakopmund, Namibia (2007);
- SIA for expansion of PPC cement factory, Riebeck West, Western Cape (2007);
- SIA and Social Labour Plan for Xolobeni Heavy Mineral Sands Project, Eastern Cape, South Africa (2007);
- SIA and Social Labour Plan for Tormin Heavy Mineral Sands Project, Western Cape, South Africa (2007);

Infrastructure and development projects

- SIA for 150 MW coal power station, Mpumalanga, South Africa (current);
- SIA for waste to energy plant, Pretoria, South Africa (2014);
- SIA for mixed use development in Khayelitsha, Western Cape (2014);
- SIA for small scale hydro scheme on the Orange River, South Africa (2014);
- SIA for Eskom sub-station and power lines, George, South Africa (2014);
- SIA for Ongegund mixed use development, Western Cape Province (2012);
- SIA for Trawal Dam, Clanwilliam, Western Cape Province (2013);
- SIA for Eskom transmission lines from proposed Bantamsklip Nuclear Power Station, Western Cape (2010). Project put on hold after initial scoping phase;
- SIA for Eskom transmission lines from proposed Koeberg Nuclear Power Station, Western Cape (2010);
- SIA Bloubos Road, Somerset West, Western Cape (2010);
- SIA for Boschendal Farm Mixed Use Development, Stellenbosch, Western Cape (2008-current);
- SIA Driftsands Nature Reserve, Cape Town, Western Cape (2009);
- SIA Kidds Beach Golf Estate, East London (2009);
- SIA Swartland Regional Mall, Malmesbury, Western Cape (2009);
- SIA Klipfontein Mixed Use Residential Development, Malmesbury, Western Cape (2009);
- SIA Struisbaai Harbour Development, Struisbaai, Western Cape (2009);
- SIA De Plaat Mixed Use Residential Development, Velddrift, Western Cape (2009);
- SIA Woodlands Golf Estate, East London, Eastern Cape (2009);
- SIA Duttons Cove Residential Development, Herolds Bay, Western Cape (2008);
- SIA Ashton Mixed Use Development, Ashton, Western Cape (2009);
- SIA for Mandela Bay Mixed Development Precinct, Mandela Bay, Eastern Cape (2008);
- SIA for Annandale Mixed Development Precinct, Cape Town, Western Cape (2008);
- SIA for Garden Route Dam development, George, Western Cape (2008);
- SIA for Moropule Coal Power Station, Botswana (2007);
- SIA for proposed residential development near Stillbaai, Western Cape (2007);

- SIA for proposed residential development near Gansbaai, Western Cape (2007);
- SIA Bulk Water Scheme, City of Cape Town, Western Cape (2007);
- SIA Montague Golf Estate, Western Cape (2006);
- SIA for Schalkenbosch Golf Estate, Tulbagh, Western Cape (2006);
- SIA for 2010 World Cup Stadium on Green Point Common, Cape Town (2006);
- SIA for raising of the Clanwilliam Dam, Western Cape (2005-06);
- SIA Kransvlei Golf Estate, Clanwilliam, Western Cape (2005);
- SIA for road up-grade between Gansbaai and Bredadorp, Southern Cape (2005);
- SIA Zeekoevlei Golf Estate, Somerset West, Western Cape (2005)
- SIA Silwersand Golf and Resort Estate, Robertson, Western Cape (2003)
- SIA Assessment for Valkenberg East Site, Cape Town (2003).
- N2 – Outeniqua Pass by-pass, George, SA. Socio-economic assessment for proposed by-pass options between the N2 and the Outeniqua Pass (1997).
- Social Assessment for Sparrebosch Golf Course, Knysna, SA (1996).
- Social Assessment for Riversonderend Road By-pass (1991).

Renewable energy projects

- SIAs for wind energy facilities: SIAs for over 20 wind energy projects in Western Cape and Eastern Cape Province of South Africa (2009-current);
- SIAs for solar energy facilities: SIAs for over 30 solar energy projects in Western Cape, Northern Cape, Free State, North West, Mpumalanga and Limpopo Provinces of South Africa (2010-current).

Strategic social input into projects

- Social Specialist for identification of multi-sector investment opportunities in the Eastern Nile Basin, World Bank and Eastern Nile Technical Office (current);
- SIA as part of SEA undertaken for industrial area located near Wellington, Western Cape Province (2014);
- Social specialist for assessment of large dam developments on the Eastern Nile Basin, specifically the Blue Nile (Abbay River) in Ethiopia and the consequences for the downstream countries of Sudan and Egypt, World Bank and Eastern Nile Technical Office (2012-2013);
- Social specialist for development and design of Decision Support System for the Nile Basin. Input included development of social indicators used to assess water related projects and development scenarios (dams and irrigation schemes) in the Nile Basin (2012);
- Social specialist for the water resource classification of the Olifants/Doorn Catchment Area (Western and Northern Cape Province) (2011-2012).

Social Impact Assessment and Resettlement Guidelines

- Development of Guidelines for Social Impact Assessment for Department of Environmental Affairs and Development Planning, Western Cape, (2007);
- Development of a Social Assessment and Development Framework for Department of Water Affairs and Forestry, South Africa, including development of guidelines for Social Impact Assessment, Conflict Management, Relocation and Resettlement and Monitoring and Evaluation (2005). The aim of these guidelines was to assist DWAF to identify, assess and manage social impacts (positive and negative) during the design, development, operation and closure of projects.

Resettlement Action Plans (RAPs)

- RAP for farming community located near Paarl in the Western Cape (current);
- SIA and RAP for Southern Ashanti Gold Mining Project, Ghana (2007);
- RAP for Mare Chicose Landfill Site, Mauritius (2005);
- Maguga Dam, Swaziland. Development of socio-economic monitoring and evaluation programme, including indicators, for the resettlement programme, Swaziland (2001).

Waste management projects

- SIA for Vissershok landfill expansion, Cape Town (current);
- SIA for Stellenbosch Landfill Site (2011);
- SIA for Barka Landfill Site, Barka, Oman (2011);

- SIA Helderberg Waste Transfer Station, Western Cape, (2009);
- SIA for Mare Chicose Landfill Site, Mauritius (2005);
- SIA for Coastal Park Landfill Site (1998).

STRATEGIC ENVIRONMENTAL ASSESSMENT

- Project Manager SEA for assessment of option to develop biofuels in Northern Namibia (2010-2011);
- Project Manager SEA City of Windhoek, Namibia (2010-2011);
- Project manager for SEA for Phase 2 of the National Roads Strategy for Mozambique (2007).
- Joint project manager for SEA of Cape Town 2004 Olympic Bid, Cape Town, SA (1999).
- Baralink SEA, Johannesburg, SA. Specialist input on socio-economic aspects for Baralink SEA (1998).
- Series of 4 Strategic Environmental Assessment training courses for officials of the Government of Botswana, 2000 & 2001.
- Guest lecturer in SEA for MPhil course in Environmental Management at University of Cape Town, 2000-2004.
- Paper presented at IAIA 98, Christchurch, New Zealand (1998). Strategic Environmental Assessment of the Cape Town 2004 Olympic Bid,

ENVIRONMENTAL IMPACT ASSESSMENT

Experience includes developing proposals (technical and financial), liaising with clients, authorities and the public, developing terms of reference for specialist sub-consultants, project management and reviewing reports. Projects include:

- Barka Landfill Site, Barka, Oman (2011);
- Darling Wind Farm, Western Cape, South Africa. Environmental assessment of proposed Wind Farm near the town of Darling (2002).
- Walvis Bay Naval Facility, Walvis Bay, Namibia. Environmental assessment of the proposed naval facilities in Walvis Bay (2001).
- Portnet Saldanha, Western Cape, SA. EIA for the expansion of a bulk iron ore export facility at the Port of Saldanha (2000).
- Coastal Park Waste General Waste Site, Cape Town, SA. EIA, including public participation for a large, general waste site (1998).
- Sanderlings Development Plettenberg Bay, SA. EA, including public participation, for proposed residential development adjacent to the coast (1999).
- Stellenbosch Mountain Golf Course Development, Stellenbosch, SA. EIA, including public participation, for golf course, hotel and residential development (1998).
- Sparrebosch EIA, Knysna, South Africa (SA). EIA, including public participation, for golf course, hotel and residential development (1996).
- Stones Hill by-pass, Grahamstown, SA. EIA, including public participation, of a proposed by-pass near Stones-Hill, Grahamstown (1992).
- Riversonderend N2 by-pass, Riversonderend, SA. EIA, including public participation, of a proposed by pass of the N2 around the town of Riversonderend (1991).

REVIEW

- Review of social implications associated with proposed SANRAL N1-N2 Winelands Toll Road Project as part of the City of Cape Town's legal challenge of SANRALs proposal to develop toll roads (2014);
- Internal Review of Gamsberg Zinc Mine SIA for ERM (Northern Cape Province, South Africa), March, 2013;
- Internal Review of Waterval Tailings Dam SIA for WSP (North West Province, South Africa), March, 2013,
- Review of SIA for the proposed N1-N2 Winelands Toll Road Project as part of the City of Cape Town's legal challenge to the proposed project (2011-2012);

- Review of SIA for Nuclear 1 for Arcus Gibb (3 conventional nuclear power plants) located along the western and south eastern coasts of South Africa (2009);
- Review of SIA for proposed PMBR Plant at Koeberg, Western Cape (2008);
- Review of specialist reports for the Groot Letaba Dam EIA, Mpumalanga, South Africa (2008).
- External Review Consultant for SIA component of N2 Wild Coast Toll Road EIA (2008).
- Internal Review Consultant for Golder Associates on Namakwa Sands Heavy Mineral Mining EIA, Western Cape (2006);
- Review of EIA for Palm Valley Golf Course Estate, Durbanville, Western Cape (2005);
- Review of EIA for Zeekoevlei Golf Course Estate, Somerset West, Western Cape (2005);
- Review of EIA for Oostenberg Waste Transfer Station, Brackenfell, Western Cape (2004);
- Review of Socio-Economic Study undertaken for the R300 Toll Road EIA, Cape Town, Western Cape (2004);
- Review of EIA for proposed establishment of Toll booths on Chapman's Peak Drive, Cape Town, Western Cape (2003);
- Review of EIA for Cell Phone Mast, Cedeberg, Western Cape (2003);
- Review of EIA for Hotel and Conference Center, Durbanville, Western Cape (2003);
- Review of EIA for N7 Road Up-grade, Clanwilliam, Western Cape (2002);
- Review of EIA for Up-grade of Sewage Works, Western Cape (2002).

ENVIRONMENTAL RESEARCH

Experience and projects include:

- Environmental and social specialist for the development of Mozambique Biofuels Strategy (2007).
- Development of strategy for the development of the Environmental Goods and Service Industry in the Western Cape for the Department of Environmental Affairs and Development Planning in the Western Cape (2006).
- Review of the Environmental Goods and Service Industry in South African and development of a strategy for the Department of Trade and Industry, South Africa (2006).
- Chapter on the South African Environmental Goods and Services Industry for study commissioned by the Department of Environmental Affairs and Tourism (2006).
- Integrating Sustainable Development into the Integrated Development Planning Process in South Africa. Review of 4 case studies in SA for the World Summit on Sustainable Development, Johannesburg (2002).
- Development of Integrated Sustainable Transportation Assessment Framework for Transportation Planning in South Africa. Project Manager for joint project between EEU and Urban Transportation Research Group at UCT (2003).
- Project Manager for South African Cleaner Development Mechanism (CDM) initiative being undertaken by South South North Trust. Project involves the recovery of methane gas from the Bellville South Landfill Site in Cape Town (2004)
- Development of Toolkit for incorporating Sustainable Development in to the Integrated Development Planning Process in South Africa (2004).
- Integrating Sustainable Development into the Eastern Cape Province Provincial Growth and Development Plan, 2004-2020 (2003-2004).
- Department of Housing, South Africa. Assessment of options for the development of energy and water efficient low cost housing in South Africa and an assessment of potential financing mechanisms, South Africa (2000).

ENVIRONMENTAL PLANNING

- Development of a Rehabilitation and Land Use Plan for the Alexkor Mining Area in the Richtersveld in the Northern Cape Province (2003-2007). This formed part of a land claim for the Richtersveld Community and included acting as the lead expert witness for the community in the associated court case.
- Southern Cape Spatial Development Framework (SCSDF), Southern Cape Region, SA. Environmental opportunities and constraints assessment for SCSDF study (2000).
- Stellenbosch Rivers Management Plan, Stellenbosch, SA. Integrated management plan for the

urban river systems in Stellenbosch (1998).

- Wetton-Lansdowne corridor project, Cape Town, SA. Habitat conservation and biodiversity study to inform planning proposals for the Wetton-Lansdowne corridor (1998).
- Tygerberg Spatial Development Framework, City of Tygerberg, Cape Town, SA. Environmental baseline study for the spatial development framework study for the City of Tygerberg (1999).
- Protea Valley development options, City of Tygerberg, Cape Town, SA. Assessment and identification of suitable land use development options for Protea Valley (2000).

WASTE MANAGEMENT

- Project Manager, Al Wusta Regional Waste Site Investigation, Oman (2011).
- Project Manager, Al Batinah Regional Waste Site Investigation, Oman (2011);
- Project Manager, Barka Landfill Site EIA, Muscat, Oman (2010);
- Mare Chicose Landfill, Mauritius. SIA and Compensation and Relocation Plan for proposed expansion of the current landfill site (2005).
- Robertson Waste Site, Robertson, SA. EA, including public participation, for the identification of a new waste site (2000).
- Project Manager, Coastal Park General Waste Site, Cape Town, SA. EIA for proposed expansion of a large, general waste site (1998).
- Project Manager, Windhoek general and hazardous waste site, Windhoek, Namibia. Investigation to identify new general and hazardous waste disposal site for Windhoek (1997).
- Project Manager, Walvis Bay general and hazardous waste site, Walvis Bay, Namibia. Investigation to identify new general and hazardous waste disposal site for Walvis Bay (1998).
- Project Manager, Port Elizabeth Waste Site, Port Elizabeth, SA. Environmental Assessment for permit application (1998).
- Project Manager, Brackenfell general waste site, Cape Town, SA. Permit application report ad environmental assessment for Brackenfell waste site (1995).
- Project Manager, Ceres general waste site, Ceres, SA. Permit application report ad environmental assessment for Ceres waste site (1995)
- Project Manager, Caledon general waste site, Caledon, SA. Permit application report ad environmental assessment for Caledon waste site (1996).
- Project Manager, Wellington general waste site, Wellington, SA. Permit application report ad environmental assessment for Wellington waste site (1996).
- Project Manager, Greyton general waste site, Greyton, SA. Permit application report ad environmental assessment for Greyton waste site (1999);

ENVIRONMENTAL TRAINING AND CAPACITY BUILDING

Experience includes design of training courses, development of training manuals and running courses for both the private and public sector. Courses include:

- 2 X 5 day course on Resource Economics for Coastal Managers and Government Officials, Namibian Government (2009).
- 5 day course on EIA and Environmental Management course for Swaziland Local Authorities, 2004.
- Integrated Coastal Management course for Department of Marine and Coastal Management, 2004.
- 5 regional Social Assessment Training Workshops for officials from the South African Department of Water Affairs and Forestry, 2004.
- EIA training course for officials of the South African National Parks, Kruger National Park, 2003.
- Environmental Management course for Shell South Africa, 2003.
- 10 Local Agenda (LA) 21 training courses for provincial and local government departments in South Africa during period 2000-2002.
- Resource Economics Workshop for South African Department of Water Affairs and Forestry, 2002.
- Conflict Resolution Workshop for subsistence fishermen, Kwa-Zulu Natal, 2002.
- Integrating the principles of LA 21 into Integrated Development Planning. Course presented at World Summit on Sustainable Development, Johannesburg, 2002.
- Environmental facilitation, mediation and conflict management. Training course for Independent

- Mediation Services in South Africa (IMSSA) facilitators, 1998, 1999 and 2000.
- Series of 4 Strategic Environmental Assessment training courses for officials of the Government of Botswana, 2000 & 2001.
- EIA training course for officials of the Government of Lesotho, 2000 and 2001.
- EIA training courses for local government officials in Cape Town, 2000.

LECTURING AND TEACHING

Experience includes lecturing and teaching at an under and post-graduate level since 1990. The areas of interest include Environmental Economics, EIA, SEA, SIA and Waste Management.

- Guest Lecturer in SIA, Department of Environmental and Geographical Science and Department of Planning, University of Cape Town (current);
- Lecturer in Environmental Economics for the MPhil course in Environmental Management at University of Cape Town from 1990 –2006.
- Guest lecturer in SIA, EIA and SEA for MPhil course in Environmental Management at UCT, 2000-2004.
- Coordinator and lecturer in Environmental Economics at Cape Technikon, 1999.
- Coordinator and lecturer of waste management course, Peninsula Technikon in 1998.
- Guest lecturer at Peninsula Technikon for waste management, 1994 – 1998.
- Moderator for Peninsula Technikon waste management course, 1994-2002.
- Environmental Management for senior managers, module on a business management course for AngloVaal Management run by Prof John Simpson of UCT, 2000 and 2001.
- Guest lecturer on SIA and EIA for Geography and Environmental Science Honours, UCT. 2000-2004.
- Presenter and coordinator on annual Integrated Environmental Management Short Course run by the Environmental Evaluation Unit at UCT (2000-2006).
- Presenter on Integrated Coastal Management course run by Environmental Evaluation Unit at UCT 2005-2006.

PUBLIC PARTICIPATION

Experience includes designing public participation processes and facilitating public meetings and workshops. Projects include:

- SEA for Wellington Industrial Area, managed and facilitated public meetings and workshops (2014).
- Green Point Common, Cape Town. Public participation and facilitation processes for development of new market area for informal traders (2005);
- Chapman's Peak Drive. Managed and facilitated the public participation processes for looking at the technical and funding options for re-opening Chapman's Peak Drive on the Cape Peninsula as a toll road (2001).
- Visserhok Hazardous waste disposal sites, Cape Town City Council and Wastetech, Cape Town, SA. Managed and facilitated the public participation processes for the permit application for two hazardous waste sites located at Visserhok (1994).
- Grand West Casino, Cape Town. Public participation processes for proposed establishment of the Grand West Casino at the Cape Show Grounds, Cape Town (1997).
- Coastal Park waste site, Cape Town, SA. Managed and facilitated public participation processes for the permit application for the Coastal Park general waste site (1998).
- Managed and facilitated public participation processes associated with EIA's listed above.

ENVIRONMENTAL MANAGEMENT PLANS AND REHABILITATION REPORTS

- Development of rehabilitation programme and cost estimate for damage caused by 80 years of alluvial diamond mining between Alexander Bay and Port Nolloth, West Coast, South Africa (current). This project is linked to the Richtersveld Land Claim and involved acting as an expert witness in the associated court case.
- Corridor Sands Heavy Mineral Project, Mozambique. Development of an Environmental

- Management Plan (EMP) for the construction phase of the project (2001).
- Walvis Bay Naval facilities, Walvis Bay, Namibia. EMP for the construction phase of the project (2001).
- APC cement factory, Otjiwarongo, Namibia. Operational management plan for up-grade to meet the legislative requirements (2000).
- Sparrebosch golf course, hotel and residential development, Knysna, SA. Environmental Management Plan (EMP) for the construction phase (1997).
- M3 highway up-grade, Johannesburg, SA. EMP for the design and construction phase of the M3 (1995).
- Trunk Road 46, Grahamstown-Port Alfred, Eastern Cape, SA. EMP for the construction phase (1994).
- Trunk Road 46, Grahamstown to Port Alfred, Eastern Cape, SA. Rehabilitation proposals for borrow pits, quarries, cuts, fills and road surfaces (1993).
- Trunk Road 19, Maclear to Halcyon Drift, Eastern Cape, SA. Rehabilitation proposals for borrow pits and quarries (1992).
- Namakwa Sands, Heavy Mineral Mining Operation, West Coast SA. Conceptual Rehabilitation Plan (1991).

ENVIRONMENTAL MANAGEMENT SYSTEMS AND AUDITS

- APC Cement Factory, Otjiwarongo, Namibia. Operational audit of APC cement factory to assess compliance with Namibian legislation (2000).
- Vodacom, SA. Conceptual Development of an Environmental Policy and outline for an Environmental Management System for Vodacom, SA (1998).
- Marine Oil, SA, initial site audit (1999).
- Rose Foundation, SA. Audit of 15 waste oil-recycling facilities in SA (1997).
- Zambian Copper Belt, Zambia. Pre-acquisition audit of 20 electrical transformer stations (1997).

SUPERVISION OF STUDENTS

- 1994-2006: Supervision of the thesis component of MPhil in Environmental Management for a number of students. Usually requested to act as supervisor for at least one or two students per year.
- Internal and external examiner for a number of theses submitted in fulfillment of the MPhil Environmental Management at UCT.

PUBLICATIONS AND PAPERS

Environmental publications and guidelines

- Principal Author of Health, Safety and Environmental Guidelines for Bitumen and Coal Tar Products, prepared for the SA Bitumen Association (Sabita), in 1994 and revised in 1998.
- Co-author of document outlining an integrated Waste Management Strategy for the Western Cape, SA, produced in 1995;
- Principal Author of Guidelines for Waste Management in South Africa, a handbook for local authorities, produced by Ninham Shand in 1993.

Papers and articles

The majority of the articles aimed at the layperson as opposed to journal articles.

1. SOWMAN, M R, GLAZEWSKI, J I, FUGGLE, R F, BARBOUR, A (1990) " Planning and legal responses to sea-level rise in South Africa", South African Journal of Science, v 86, 1990.
2. BARBOUR, T (1992) 'Addressing the social impacts of waste disposal by incorporating permit applications into the latest Integrated Environmental Management (IEM) procedures", Paper

- presented at Wastecon '92, 3 – 5 November 1992.
3. BARBOUR, T (1992) "Internalising externalities: An attempt to address social costs", paper presented at a workshop on the Economy and Environment, 25 November 1992.
 4. BARBOUR, T (1993) "The importance of taking waste disposal seriously", IMIESA, v 18 no 7 July 1993.
 5. BARBOUR, T (1993) "Community based waste collection", Earthyear 5th edition, winter 1993.
 6. BARBOUR, T (1993) "Guidelines for waste management in South Africa", Ninham Shand, 1993.
 7. BARBOUR, T (1994) "Quarry Rehabilitation Reports: Are they effective working documents or merely legal requirements?", EPM, v 5, no 2, February 1994.
 8. BARBOUR, T (1994) "Environmental factors relating to site selection for dams", Paper presented at SAICE one-day seminar on earth dam design, 3 June 1994.
 9. BARBOUR, T (1994) "Environmental Economics", Earthyear 7th edition, Summer 1994.
 10. BARBOUR, T (1996) "Lessons learnt from Vissershok for public participation and landuse planning", Paper presented at Wastecon 96, Durban, South Africa.
 11. BARBOUR, T and COLEMAN, A (1996) "Towards an integrated waste management strategy for the Western Cape", Paper presented at Wastecon 96, Durban, South Africa.
 12. BARBOUR, T (1998) Strategic Environmental Assessment of the Cape Town 2004 Olympic Bid", paper presented at IAIA 98, Christchurch, New Zealand.
 13. BARBOUR, T (2000) Robertson Waste Site: A Case Study, paper presented at Wastecon 2000, Somerset West, SA.
 14. BARBOUR, T (2000) National Environmental Management Act: Implications for Waste Management and the Minimum Requirements, paper presented at Wastecon 2000, Somerset West, SA.
 15. BARBOUR, T (2001). The role of economic incentives in promoting and/or improving environmental rights. Paper presented a Conference on Environmental Rights, Cape Town, 30 July 2001.
 16. BARBOUR, T (2002). The role of environmental assessments in land-use planning. Paper presented at Southern African Town Planning Conference, Somerset West, 18-19 March 2002.
 17. BARBOUR, T (2002). Incorporating principles of environmental sustainability into policy making. Conference on Environmental Practices for the 21st Century, Somerset West, 24-25 May, 2002.
 18. BARBOUR, T and Brownlie, S (2002). Have mandatory environmental impact assessments improved decision-making in South Africa, and are they making a significant contribution to sustainable development? International Association for Impact Assessment (SA), National Conference, 7-9 October 2002.
 19. Barbour, T (2003). Developing and evaluating effective strategies for managing hazardous materials and wastes. Paper prepared for Chemical and Toxic Waste Management Conference Park Hyatt, Rosebank, Johannesburg, February 2003.
 20. Barbour T (2004). Incorporating Sustainable Development considerations in to the IDP process. Paper prepared for conference on Environmental Management for Local Government, Johannesburg, June 2004.
 21. THESIS TOPIC "Quarry Rehabilitation: The need to adopt a pre-planning approach towards rehabilitation (MSc Environmental Science)." An important component of the study was the development of a Rehabilitation Programme and Rehabilitation checklist to assist those involved in carrying out rehabilitation work.

HERITAGE IMPACT ASSESSMENT

CURRICULUM VITAE

Name: Jonathan Michael Kaplan

Profession: Archaeologist/Heritage Practitioner

Date of Birth: 23-09-1961

Name of Company: Agency for Cultural Resource Management (ACRM)

Position: Director

Nationality: South African

ID Number: 6109235177089

Marital status: Married with two children

Languages:
First language: English
Other: Afrikaans

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7700
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Mobile 082 321 0172
E-mail acrm@waccess.co.za

Qualifications:

- MA (Archaeology) University of Cape Town, 1989.

Professional registration:

- Association of Southern African Professional Archaeologists (ASAPA) Membership No. 253
- Registered with the South African Heritage Resources Agency (SAHRA)
- Association of Professional Heritage Practitioners (APHP)

Publications:

- Kaplan, J. & Mitchell, P. 2012. The archaeology of the Lesotho Highlands Water Project Phases 1A and 1 B. South African Humanities 24:1-32. KwaZulu Natal Museum.
- Sealy, J., Maggs, T., Jerardino, A. & Kaplan, J. 2004. Excavations at three shell middens at Melkbosstrand: variability among herder sites on Table Bay. South African Archaeological Bulletin 59:17-28.
- Kaplan, J. 1993. The state of archaeological information in the coastal zone from the Orange River to Ponta do Ouro. Report prepared for the Department of Environmental Affairs and Tourism. Agency for Cultural Resource Management.
- Kaplan, J. 1990. The Umhlatuzana Rock Shelter sequence: 100 000 years of Stone Age history. Natal Museum Journal of Humanities 2:1-94.
- Kaplan, J. 1989. 45 000 years of hunter-gatherer history at Umhlatuzana Rock Shelter: South African Archaeological Society Goodwin Series 6:7-16

- Kaplan, J. 1987. Settlement and Subsistence at Renbaan Cave. In Parkington, J. & Hall, M (Eds). Papers in the Prehistory of the Western Cape, South Africa. British Archaeological Reports International Series 332:237-261

Countries of work experience:

South Africa, Lesotho, Swaziland, Namibia, Botswana, Mozambique

Services offered:

- Archaeological Impact Assessments
- Heritage Impact Assessments
- Heritage Management Plans
- Heritage tourism
- Rock art recording
- Excavation and data analysis
- Monitoring of construction activities

Company profile:

ACRM was founded by Jonathan Kaplan in 1992 and is one of the oldest heritage consultancies in the country. Jonathan has completed more than 1500 Archaeological and Heritage Impact Assessments (HIA & AIAs), specialising in Stone Age, rock art and herder studies. He has undertaken baseline studies on large infrastructure projects, including the Lesotho Highlands Water Project, Maguga Dam (Swaziland), Namibia/Botswana Water Transfer Project, Sasol/ACO Gas Pipeline (South Africa & Mozambique), Corridor Sands (Mozambique) and numerous utility projects for Eskom, the Department of Transport and Public Works, local and provincial authorities, as well as private developers. Since 2010, ACRM has conducted baseline studies (Scoping and full EIA) on a large number of alternative energy (wind and photo-voltaic) projects in the Western and Northern Cape Provinces.

Jonathan has a MA degree in Archaeology (UCT 1989) and is an Association of Southern African Professional Archaeologists (ASAPA) accredited Cultural Resources Management (CRM) practitioner (Membership No 253).

ACRM has been registered since 1992.

Declaration:

I confirm that the above CV is an accurate description of my experience and qualifications.



Signature

Date: 24 June, 2015

GEOTECHNICAL IMPACT ASSESSMENT

CV – AL PARROCK

<u>Proposed position:</u>	SPECIALIST GEOTECHNICAL ENGINEER		
<u>Name of firm:</u>	ARQ Consulting Engineers (PTY) LTD		
Name of key person:	Alan Leslie PARROCK		
Profession:	Civil Engineer		
<u>Date of Birth:</u>	02.06.1950		
<u>Years with firm:</u>	21		
<u>Nationality:</u>	South African		
<u>Qualifications/ Education:</u>	BSc (Eng) Civil- University of Natal, RSA 1973.		
<u>Membership of Professional Institutions:</u>	Honorary Life Member of GIGSA, the Geosynthetics Interest Group of South Africa, 2013. SAICE, Geotechnical Division Gold Medal recipient in 2010. Fellow of the South African Institution of Civil Engineers, 2007. Registered Professional Engineer with ECSA: No 760359, 1976. Member of the International Society of Soil Mechanics and Geotechnical Engineers. Member of the South African Association of Consulting Engineers, (SAACE 456). Member of GIGSA, the Geosynthetics Interest Group of South Africa. Member of the Concrete Society of South Africa (No. P162). Member of the Society for Asphalt Technology.		
<u>Countries of Work Experience:</u>	Angola, India, Lesotho, Mauritius, Madagascar, Mozambique , Namibia, Panama, , South Africa, Swaziland & Zimbabwe.		
<u>Languages:</u>	English first language		
<u>Total years of experience:</u>	41		
<u>Employment Record:</u>	1993 to present	ARQ (PTY) Ltd	Geotechnical principal and managing director
	<u>1988 - 1993</u>	BKS Inc	Geotechnical division head
	<u>1987 - 1988</u>	Mossgas Offshore Design Services	Geotechnical foundation designer
	<u>1982 - 1987</u>	BKS Inc	Geotechnical Associate
	<u>1978 - 1982</u>	BKS on projects in Namibia and Pretoria	Resident engineer
	<u>1976 - 1978</u>	The National Institute for Road Research of the CSIR	Researcher
	<u>1975 - 1976</u>	Natal Roads Department- freeway contracts	Assistant resident-engineer
	<u>1973 - 1975</u>	Natal Roads Department	Design and construction engineer

Key experience: During Alan Parrock's over 40 years of post-graduate experience, he has specialised in the geotechnics and geostochastics of soil and rock masses with particular reference to roads/pavements, foundations, tunnels, slopes, dams, offshore structures and commercial/industrial buildings.

This training and experience was complemented by the development of (project) management, contractual, legal and financial and computer proficiency. Coupled with the above, Alan developed analytical computer

skills by using commercially available word processing, spreadsheet, graphics, statistical analysis and finite element packages.
He is co-partner with PROKON Software Consultants (Pty) in a geotechnical analysis and design suite of programs.

Selected experience related to Geotechnical Engineering:

- Name of Project :** MUKURUMUDZI DAM, KENYA
Project Duration : 2011 - 2013
Location : Msabweni division, Kwale District Kenya
Client : Base Titanium Ltd (ARQ sub-consultants to Wave Solutions)
Project Description: Geotechnical investigation and design. 23 m Earthfill dam with by-wash spillway
Value of Project : US\$ 15 million
Duties: Earth embankment dam design.
- Name of Project :** BRAKPAN TAILINGS EXTENSIONS.
Project Duration: December 2011
Location : Brakpan, South Africa
Client : Fraser Alexander
Project Description : Brakpan tailings extensions from 40m to 70m high. Geotechnical investigation, laboratory testing and finite element design
Value of Project : R150,000.00 (ARQ Fees)
Duties Professional Engineering Services.
- Name of Project :** ARNAUD DAM AND CANAL, MAURITIUS
Project Duration : March 2009 to date
Location : Mauritius
Client : Water Resources Unit, Ministry of Energy and Public Utilities, Mauritius (ARQ sub-consultants to Lux-Consult and PDNA International)
Project Description : 20m high, Foundation evaluation and embankment dam
Value of Project : US\$ 8.5 million
Duties Professional Engineering Services.
- Name of Project :** SEMONKONG DAM, LESOTHO
Project Duration : Feb 2011 to present
Location : Lesotho
Client : Lesotho Water and Sewage Authority (ARQ sub-consultants to PDNA)
Project Description : 30 m High Massive Arch Buttress dam, Preliminary foundation investigation
Value of Project : Maloti 98 million
Duties Preliminary foundation evaluations.
- Name of Project :** AYVALI DAM, TURKEY
Project Duration : 2008 – 2013
Location : North eastern Turkey
Client : Özdoğan Enerji AS
Project Description : 178 m RCC gravity dam, 1 520 000m³ for 150 MW hydropower scheme.
Value of Project : US\$ 300 million
Duties : Preliminary foundation evaluation.
- Name of Project :** De HOOP DAM, SOUTH AFRICA
Project Duration : 2006 to 2012
Location : Mpumalanga, South Africa
Client : Department of Water Affairs & Forestry
Project Description : 88 m high, 0.90 million m³ RCC gravity dam for water supply to new platinum mining development, etc.
Value of Project : US\$ 300 million

- Duties :** Lateral Support.
- Name of Project :** **CHANGUINOLA 1 DAM, PANAMA**
- Project Duration :** 2006 – 2010
- Location :** Bocas del Torro, Panama
- Client :** Changuinola Civil Works Joint Venture (contractor)
- Project Description :** 102 m RCC arch/gravity dam, 875 000 m³ for 230 MW hydropower scheme
- Value of Project :** US\$ 420 million
- Duties :** Protocol & mapping of foundations.
- Name of Project :** **BOSPOORT DAM, RSA**
- Project Description :** Rehabilitation of 28m high concrete gravity dam and embankment saddle dams. New labyrinth spillway, new side channel spillway, raising and general rehabilitation
- Duration & Value :** 2006 – present. R 110 million
- Duties :** Geotechnical and Materials Inputs.
- Name of Project :** **BRAAMHOEK PUMPED STORAGE SCHEME (1330MW)**
- Project Description :** Hydropower pumped storage scheme
- Project Duration :** 2004 – 2006
- Value of Project :** R 5 billion (R 850 million for dams)
- Duties :** Management of geotechnical & material investigation for roads.
- Name of Project :** **BERG RIVER DAM, FRANCHOEK, SOUTH AFRICA**
- Project Description :** 65m high CFRD for Cape Town water supply
- Project Duration :** 2002 – 2007
- Value of Project :** R 550 million
- Duties :** Foundation stiffness evaluation and review.
- Name of Project :** **STERKFRONTEIN DAM, SAFETY INVESTIGATION**
- Project Description :** 93m high earthfill dam
- Duration & Value :** 2002
- Duties :** Dam safety inspection and evaluation of hydro-fracture potential.
- Name of Project :** **WELGEDACHT WATERCARE PROJECT IN SPRINGS**
- Project Description :** Design and construction of 35Ml/d watercare works
- Project Duration :** 1999 – 2003
- Value of Project :** R 80 million
- Duties :** Geotechnical design.
- Name of Project :** **KARACASU DAM, AYDIN, TURKEY**
- Project Description :** Asphaltic concrete faced rockfill dam 60m, or 75m in height
- Project Duration :** 1999 – 2001
- Value of Project :** US\$ 60 million
- Duties :** Geotechnical and seismic analysis studies at feasibility level.
- Name of Project :** **DD5A REGIONAL OUTFALL SEWER**
- Project Description :** 1,8m diameter in outfall sewer in bad ground conditions
- Project Duration :** 1996 – 2001
- Value of Project :** R 95 million
- Duties :** Geotechnical design.
- Name of Project :** **WOLWEDANS DAM SAFETY EVALUATION**
- Project Description :** 70m high RCC arch/gravity dam
- Project Duration :** 1997
- Value of Project :** R 55 million
- Duties :** Geotechnical evaluation of rock slope and post tensioned retaining system stability on left bank.

Name of Project : ALOE COVE DAM
Project Description : 23m multiple arch buttress dam in (RMC) masonry
Project Duration : 2000 – 2003
Value of Project : R 8 million
Duties : Foundation investigation, analysis and design as part of APP's team.

Name of Project : KAMUZU DAM II
Project Description : 26m high raising using Hydroplus fusegates
Project Duration : 1998 – 1999
Value of Project : US\$ 8 million
Duties : Expert involvement during the evaluation of the embankment.

Name of Project : GENADENDAL DAM
Project Description : 8m earthfill embankment
Project Duration : 1996
Value of Project : R 0,8 million
Duties : Geotechnical aspects of design.

Name of Project : THUKELA WATER PROJECT, KZN, SOUTH AFRICA
Project Description : 185m Jana dam (RCC, or CFRD)
Project Duration : 1997 – 2000
Value of Project : R 6 billion
Duties : Foundation stiffness characterization.

Name of Project : BAKUBUNG DAM
Project Description : 14m masonry (RMC) multiple arch buttress
Project Duration : 1995 – 1996
Value of Project : R 0,7 million
Duties : Foundation analysis, design and approval during construction.

Name of Project : STERKSPRUIT DAM
Project Description : 27m massive arch buttress concrete dam
Project Duration : 1991 – 1995
Value of Project : R 6 million
Duties : Foundation evaluation and design.

Name of Project : ARABIE DAM, MARBLE HALL
Project Description : 30m high embankment alternative
Duration & Value : 1985
Duties : Investigation and analysis.

Name of Project : BON ACCORD DAM
Project Description : Betterments of 12m embankment dam
Project Duration : 1991
Value of Project : R 2 million
Duties : Stability and erosion evaluation.

Major assignments: Tunnelling projects:

Name of Project : GAURAIL RAPID RAIL LINK PROJECT
Project Description : Tender design of tunnel linking an overland section with Johannesburg International Airport and a tunnel through a topographic high close to Pretoria as well as lateral support at tunnel portals, cut and cover sections and at the stations along the route. Finite element analyses where the tunnel reaches close to surface.
Project Duration : 2010

Name of Project : MOOI KRAAL COAL MINE, ACCESS TUNNEL/ADIT
Project Description : Investigation & derivation of design parameters for 90m deep inclined twin

- audit system
- Project Duration :** 2003
- Value of Project :** R 5 million
- Duties :** Investigation & derivation of design.
- Name of Project :** **VIERFONTEIN COAL MINE**
- Project Description :** Closure of disused coal mine
- Project Duration :** 2001
- Name of Project :** **SWARTKOP CHROME MINE**
- Project Description :** Closure of old inclined shafts using dynamic compaction
- Project Duration :** 1997
- Name of Project :** **PHALABORWA PRODUCTION SHAFT**
- Project Description :** Finite element analysis of block forces on lining
- Project Duration :** 1996
- Name of Project :** **DROSTE PARK**
- Project Description :** Mine shaft stability of near-surface underground workings for retail development
- Project Duration :** 1995
- Name of Project :** **PILGRIMS REST – TPA ROADS**
- Project Description :** Investigation, analysis (including finite element study) and new lining design of 100 year old mining tunnels
- Project Duration :** 1993
- Name of Project :** **PWVIA WONDERBOOMPOORT – TPA ROADS**
- Project Description :** Basic planning and preliminary design of an 85m² road tunnel through the Wonderboompoort.
- Project Duration :** 1989
- Name of Project :** **KEYBLOCK THEORY**
- Project Description :** Development of a probabilistic evaluation of keyblock failure in rock tunnels in conjunction with CSIR and UNISA
- Project Duration :** 1987/89
- Name of Project :** **MOSSGAS PROJECT**
- Project Description :** Directional drilling through surf zone
- Project Duration :** 1987

Major assignments: Geotechnical projects:

- Name of Project :** **NELSON MANDELA BRIDGE, JOHANNESBURG**
- Project Description :** 280m high RCC gravity dam on the Indus River at final feasibility design stage
- Project Duration :** 2001 – 2003
- Value of Project :** R 55 million
- Duties :** Foundation design.
- Name of Project :** **DOMTEX TERMINAL, JOHANNESBURG INTERNATIONAL AIRPORT**
- Project Description :** Piled foundations and lateral support
- Project Duration :** 2001 -2003
- Value of Project :** R 230 million
- Duties :** Foundation design.
- Name of Project :** **NEW MALL WALL MBABANE, SWAZILAND**
- Project Description :** Construction of new mall wall with concrete retaining blocks in single, double and triple combination
- Duration & Value :** 1994
- Duties :** Geotechnical analysis and design.

Name of Project : SONANGOL HEADQUATERS, ANGOLA
Project Description : Foundation and lateral support for multi-storey building in sand
Project Duration : 2002
Value of Project : R 100 million
Duties : Design and construction supervision assistance.

Name of Project : MOSSGAS OFFSHORE RIG IN MOSSELBAY
Project Description : Offshore gas rig
Project Duration : 1987 – 1988
Value of Project : R 8 million
Duties : Member of the foundation design team.

Name of Project : PALABORA COPPER MINE, SOUTH AFRICA
Project Description : Lateral support of 20m high walls for production and service shafts
Duration & Value : 1997
Value of Project : R 4 million
Duties : Design and construction supervision.

Name of Project : LESOTHO HIGHLANDS WATER PROJECT
Project Description : Northern access roads
Project Duration : 1985 – 1987
Value of Project : R 150 million
Duties : Geotechnical design.

Certification

I, the undersigned, certify that, to the best of my knowledge and belief, this CV describes me, my qualifications and my experience.

Signature:



Date of signing: 01 November 2015

CV – JS TALJAARD

Proposed position:	GEOTECHNICAL ENGINEER IN TRAINING		
Name of firm:	ARQ Consulting Engineers (Pty) Ltd		
Name of key person:	Johannes Schalk Taljaard		
Profession:	Civil Engineer		
Date of Birth:	06.04.1990		
Years with firm:	1		
Nationality:	South African		
Qualification/ Education:	B.Eng. (Civil) – University of Pretoria, RSA 2013.		
Membership of professional institutions:	Associate member of SAICE		
Countries of Work Experience:	South Africa, Namibia (Windhoek), Angola (Luanda)		
Languages:	Afrikaans first language; English		
Total years of experience:	1.6		
Employment Record:	May 2014 to present	ARQ (PTY) Ltd	Engineer-in-training
	Nov 2013 to April 2014	BEAL Consulting Engineers and Project Management	Junior Civil Engineer

Key Experience: Hannes is a young graduate civil engineer with interest in the field of geotechnical engineering. Hannes obtained work experience on the Kusile Power Station project and gained exposure to the large scale of construction activities offered by the project. He has also gained experience in performing geotechnical investigations in various countries and giving founding recommendations for various developments looking at aspects such as bearing capacity, foundation type (strip footings, pad footings, piled foundations etc.) and settlement.

Relevant Experience:

<u>Name of Project :</u>	AQPSA DMS dump slope stability analysis
Project Duration:	October 2014 – December 2014
Location:	Kroondal, South Africa
Client:	DRA (Pty) Ltd
Project Description:	Slope stability analysis in Phase ² (finite element analysis) of 50 m high platinum waste material dump
Value of Project:	R 40 000.00
Position & Duties:	Conducting slope stability analysis and providing recommendations
<u>Name of Project :</u>	NAMIBIA TRADE HOUSE IN LUANDA SUL
Project Duration:	May 2014 – October 2014
Location:	Luanda Sul, Angola
Client:	Bührmann and Partners (Pty) Ltd
Project Description:	Geotechnical investigation for 10 storey building
Value of Project:	R 600 000.00

Position & Duties:	Conducting geotechnical investigation and writing report
<u>Name of Project :</u>	GMRH BUILDING - WINDHOEK
Project Duration:	August 2014 – October 2014
Location:	Windhoek, Namibia
Client:	Bührmann and Partners (Pty) Ltd
Project Description:	Geotechnical investigation for 14 storey building
Value of Project:	R 85 000.00
Position & Duties:	Conducting geotechnical investigation (boreholes, continuous surface wave testing and test pits) and report writing
<u>Name of Project :</u>	NATIONAL COUNCIL BUILDING - WINDHOEK
Project Duration:	August 2014 – October 2014
Location:	Windhoek, Namibia
Client:	Bührmann and Partners (Pty) Ltd
Project Description:	Geotechnical investigation for 7 storey building
Value of Project:	R 80 000.00
Position & Duties:	Conducting geotechnical investigation (boreholes, continuous surface wave testing) and report writing
<u>Name of Project :</u>	FULENI ANTHRACITE
Project Duration:	March 2014 to October 2014
Location:	KwaZulu-Natal, South Africa
Client:	GJP International
Project Description:	Geotechnical investigation for roads, plant area and dams for the proposed anthracite mine.
Value of Project:	R 1 Million
Position & Duties:	Team member conducting test pit investigations and report writing.
<u>Name of Project :</u>	BEEFCOR – BAYVIEW FEEDLOT
Project Duration:	May 2014 to September 2014
Location:	Bronkhorstspuit, Gauteng, South Africa
Client:	Beefcor (Pty) Ltd
Project Description:	Geotechnical investigation for feed kraal surface (basic layerworks)
Value of Project:	R 82 000.00
Position & Duties:	Team member conducting DCP investigations and report writing.
<u>Name of Project :</u>	ESKOM - KUSILE POWER STATION
Project Duration:	November 2013 to present (Ongoing)
Location:	Witbank, Mpumalanga
Client:	Black and Veatch
Project Description:	Site supervision (6 months involvement)
Value of Project:	R 650 000.00
Position & Duties:	Site supervision. Junior engineer doing inspections (pre- and post-concrete) of cable trenches, tunnels and bases and revision of data packs for civil structures.

Name of Project : BOOYSENDAL TAILINGS STORAGE FACILITY
Project Duration: January 2012 to June 2013
Location: Near Lydenburg (Mpumalanga)
Client: Northam Platinum Limited
Project Description: Construction of tailings storage facility (3 weeks involvement)
Value of Project: -
Position & Duties: Student doing vacation work with surveyors, setting out points and batter boards.

Certification

I, the undersigned, certify that, to the best of my knowledge and belief, this CV describes me, my qualifications and my experience.

Signature:



Date of signing: 01 August 2015

CV – C VAN DYK

Proposed position:	GEOTECHNICAL ENGINEER IN TRAINING		
Name of firm:	ARQ Consulting Engineers (Pty) Ltd		
Name of key person:	Coert van Dyk		
Profession:	Civil Engineer		
Date of birth:	13.04.1992		
Years with firm:	7 months		
Nationality:	South African		
Qualifications/ Education:	B.Eng. (Civil) – University of Pretoria, RSA 2014.		
Membership of professional institutions:	SAICE – Associate member, ECSA – Candidate Engineer		
Countries of work experience:	South Africa		
Languages:	Afrikaans first language, English		
Total years of experience:	0.6		
Employment record:	Jan 2015 to present	ARQ (PTY) Ltd	Engineer in training

Key experience: Coert is a young graduate civil engineer with interest in the field of geotechnical engineering. He has spent one and a half years with the firm as a bursary student and has gained experience in performing geotechnical investigations during that period. During his first seven months as a permanent employee of ARQ he has done a few geotechnical investigations and various finite element analyses.

Relevant experience:

<u>Name of Project :</u>	SAMRAND BUSINESS PARK
Project duration:	<i>June 2013 to July 2013</i>
Location:	Midrand, Gauteng
Client:	Pinnacle Technology Holdings
Project description:	Geotechnical investigation for a warehouse and an office block.
Value of project:	R 240 000.00
Position & duties:	Team member
<u>Name of Project :</u>	KLIPDRIFT PIPELINE
Project duration:	<i>June 2013</i>
Location:	Hammanskraal, Gauteng
Client:	LTE Consulting
Project description:	Geotechnical investigation for a pipeline.
Value of project:	R 57 000.00
Position & duties:	Team member
<u>Name of Project :</u>	GROOTVLEI SEWAGE TREATMENT PLANT
Project duration:	<i>June 2013</i>
Location:	Balfour, Mpumalanga
Client:	PDNA Consulting Engineers
Project description:	Geotechnical investigation for a sewage treatment plant.
Value of project:	R 60 000.00
Position & duties:	Team member

<u>Name of Project :</u>	REHABILITATION OF ROAD D201
Project duration:	<i>December 2013 to January 2014</i>
Location:	Pampierstad, Northern Cape
Client:	Thebe Ya Africa Consulting Engineers and Project Managers
Project description:	Geotechnical investigation for proposed rehabilitation of road D201.
Value of project:	R 200 000.00
Position & duties:	Team member
<u>Name of Project :</u>	JET PARK WAREHOUSES
Project duration:	<i>January 2014</i>
Location:	Jet Park, Gauteng
Client:	AVENG Properties
Project description:	Geotechnical investigation for warehouses.
Value of project:	R 270 000.00
Position & duties:	Team member
<u>Name of Project :</u>	MOUNT EDGECOMBE INTERCHANGE ABUTMENT FOOTING
Project duration:	January 2015
Location:	Mount Edgecombe, Durban
Client:	CMC di Ravenna
Project description:	Design verification of changes made to the footing of one of the abutments at the Mount Edgecombe Interchange
Value of project:	R 11 000.00
Position & duties:	Project manager, Finite Element Analyses, Report writing
<u>Name of Project :</u>	DELMAS MINE DAMS
Project duration:	February 2015 – April 2015
Location:	Delmas, Mpumalanga
Client:	Obsideo Consulting
Project description:	Geotechnical investigation for earth dams at a mine
Value of project:	R 65 000.00
Position & duties:	Project manager, Field work, Report writing
<u>Name of Project :</u>	MOUNT EDGECOMBE INTERCHANGE MSEW AND PILES
Project duration:	April 2015
Location:	Mount Edgecombe, Durban
Client:	CMC di Ravenna
Project description:	Design verification of changes made to the piles of two abutments as well as the analysis of a temporary piling platform at the Mount Edgecombe Interchange
Value of project:	R 70 000.00
Position & duties:	Project manager, Finite Element Analyses, Report writing
<u>Name of Project :</u>	KLIPDRIFT PIPELINE 2
Project duration:	May 2015
Location:	Hammanskraal, Gauteng
Client:	LTE Consulting
Project description:	Finite Element Analyses for a pipe jack beneath the N1.
Value of project:	R 32 000.00
Position & duties:	Project manager, Finite Element Analyses, Report writing
<u>Name of Project :</u>	DELMAS MINE DAMS 2
Project duration:	July 2015 – August 2015
Location:	Delmas, Mpumalanga
Client:	Silica Quartz
Project description:	Geotechnical investigation for a process water dam at a mine

Value of project: R 48 000.00
Position & duties: Project manager, Field work, Report writing

Certification

I, the undersigned, certify that, to the best of my knowledge and belief, this CV correctly describes me, my qualifications and my experience.

Signature: 

Date of signing: 01 November 2015

CV – LLL Du Plessis

Proposed position:	GEOTECHNICAL ENGINEER		
Name of firm:	ARQ (Pty) Ltd		
Name of key person:	Louis Louw Lötter DU PLESSIS		
Profession:	Civil Engineer		
Date of birth:	30.07.1985		
Years with firm:	7		
Nationality:	South African		
Qualifications/ Education:	BEng (Hons) Geotechnical Engineering - University of Pretoria, RSA 2010 BEng (Civil) - University of Pretoria, RSA 2008		
Membership of professional institutions:	ECSA Candidate Engineer (201150982) Associate member of SAICE Committee member of SAICE Pretoria Branch – 2009 to 2013		
Countries of work experience:	Botswana, Democratic Republic of Congo, Kenya, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Philippines, Republic of Congo, Somalia, South Africa, Zambia		
Languages:	Afrikaans, English		
Total years of experience:	6		
Employment record:	Jan 2009 to present	ARQ (Pty) Ltd	Engineer in Training

Key experience: During Louis du Plessis' 7 years of post-graduate engineering experience at ARQ, he has specialised in the field of geotechnical engineering.

Louis has worked on all aspects of geotechnical investigations including logging of test pits, auger and core holes as well as analysing and reporting of foundation recommendations. Investigations conducted includes for compact, large and linear developments as well as dolomitic stability assessments.

He has also been responsible for numerous analyses design and inspection of lateral support, foundations (shallow and deep), embankments, impact compaction as well as geosynthetically reinforced fills and pavements.

Louis is proficient in the use of several commercially available computer packages, such as word processing (MS Word), spreadsheets (MS Excel), draughting (AutoCAD) as well as several other engineering software packages (Phase2, Settle3D, Plaxis2D, Repute, Prokon and Geostudio).

Relevant experience:

<u>Name of Project :</u>	RUSTENBURG RAPID TRANSPORT – NORTH EAST CORRIDOR
Project duration:	2014 - present
Location:	North West Province, South Africa
Client:	Rustenburg Local Municipality
Project description:	Construction of the North East Corridor of the Rustenburg Rapid Transport.
Value of project:	R1.2 billion
Position & duties:	Assistant Resident Engineer - Structures. Full-time site supervision of the construction of 5 bridges, 8 bus stations and other ancillary structures.

<u>Name of Project :</u>	NORTHERN CAPE ZINC PROJECT
Project duration:	2014
Location:	Northern Cape, South Africa
Client:	AMEC
Project description:	PFS study for open pit mine, with pit 2km long, 1km wide and 500m deep.
Value of project:	R200 000 (ARQ fees)
Position & duties:	Design of open pit slopes.
<u>Name of Project :</u>	GOUDA WIND FARM (138MW)
Project duration:	2013-2014 (4 months involvement)
Location:	Western Cape, South Africa
Client:	Aveng Ground Engineering Ltd (GEL)
Project description:	Design and construction of 46No wind turbine generators.
Value of project:	R400 000 (ARQ fees)
Position & duties:	Full-time site supervision and quality assurance of pile foundation installation and testing.
<u>Name of Project :</u>	FULENI ANTHRACITE PROJECT
Project duration:	2013-2014 (6 months involvement)
Location:	Kwazulu-Natal, South Africa
Client:	Prodelko
Project description:	Detailed design stage for new anthracite open cast mine.
Value of project:	R900 000 (ARQ fees)
Position & duties:	Site investigation and foundation recommendations for roads and dams.
<u>Name of Project :</u>	ARNAUD DAM AND CANAL, MAURITIUS
Project duration:	2011 – 2014
Location:	Mauritius
Client:	Water Resources Unit, Ministry of Energy and Public Utilities, Mauritius (ARQ sub-consultants to Luxconsult and PDNA Mott McDonald)
Project description:	20m high embankment dam and diversion canal.
Value of project:	US\$ 8.5 million
Position & duties:	Full-time site supervision as designer's representative.
<u>Name of Project :</u>	PADCAL MINE PROJECT
Project duration:	2013-2014 (12 months involvement)
Location:	Philippines
Client:	Golder & Associates
Project description:	Design of spillway for tailings storage facility.
Value of project:	R600 000 (ARQ fees)
Position & duties:	Design of lateral support for deep box cut for spillway.
<u>Name of Project :</u>	IMPROVEMENT OF NATIONAL ROUTE 2 SECTION 14 - RETAINING WALL
Project duration:	2010-2013 (2 months involvement)
Location:	Eastern Cape, South Africa
Client:	Development & Engineering Consulting / Kubu Consulting JV
Project description:	Improvement of National Route 2 Section 14, 20km long road section.
Value of project:	R200 million
Position & duties:	Design of lateral support for existing 6m high ancillary structure.
<u>Name of Project :</u>	BELFAST COLLIERY
Project duration:	2013 (1 month involvement)
Location:	Mpumalanga, South Africa

Client:	Kaytech / Exxaro
Project description:	Design of unpaved haul road using geosynthetic reinforcement for heavy coal trucks.
Value of project:	R50 million
Position & duties:	Design of unpaved road.
<u>Name of Project :</u>	EVEREST EXPANSION PROJECT
Project duration:	2011-2013 (6 months involvement)
Location:	Limpopo Province, South Africa
Client:	DRA Mining
Project description:	Construction of two box cuts for new decline shafts.
Value of project:	R200 million
Position & duties:	Design of lateral support for one 37m high decline box cut.
<u>Name of Project :</u>	RIC AFRICA CONSULTATIONS
Project duration:	2010-present (2 months involvement)
Location:	Southern Africa
Client:	RIC Africa
Project description:	Impact compaction and construction of stone columns.
Value of project:	R500 000 (ARQ fees)
Position & duties:	Design of impact compaction and stone columns with site and tender assistance.
<u>Name of Project :</u>	AUAS HILLS RETIREMENT VILLAGE
Project duration:	2012-2013 (2 months involvement)
Location:	Windhoek, Namibia
Client:	Namibia Technical Services / Tulipamwe Consulting Engineers
Project description:	Development of retirement village, 50 000m ² .
Value of project:	R45 000
Position & duties:	Geotechnical site investigation, analysis and reporting.
<u>Name of Project :</u>	KCM COP F&D OPEN PIT MINE
Project duration:	2012-2013 (3 months involvement)
Location:	Copperbelt Province, Zambia
Client:	A&B Global Mining
Project description:	Deepening of open cast pit to a size of 2km long, 1km wide and 600m deep.
Value of project:	US\$100 million
Position & duties:	Prefeasibility design of open pit slopes.
<u>Name of Project :</u>	MAYOKO IRON PROJECT
Project duration:	2012-2013 (6 months involvement)
Location:	Mayoko, Republic of Congo
Client:	Bigen Africa
Project description:	Upgrading of 290km unpaved road section.
Value of project:	US\$20 million
Position & duties:	Geotechnical site investigation for road, borrow pit and quarry investigations.
<u>Name of Project :</u>	MOATIZE NACALA RAILWAY PROJECT
Project duration:	2011-2012 (10 months involvement)
Location:	Mozambique, Malawi
Client:	Aurecon
Project description:	Construction of 920km railway line.
Value of Project:	US\$1 billion

Position & Duties: Design of high fill embankments, bridge foundations, mechanically stabilised earth walls and lateral support for railway line.

Name of Project : **KCC COPER AND COBALT**

Project duration: 2010-present (12 months involvement)

Location: Kolwezi, Democratic Republic of Congo

Client: SNC-Lavalin / Katanga Mining

Project description: Construction and upgrading of various areas of mine plant and infrastructure.

Value of project: US\$300 million (ARQ fees)

Position & duties: Site investigations, foundation recommendations and geotechnical design of various foundations.

Name of Project : **MACCAFERRI CONSULTATIONS**

Project duration: 2011-present (2 years involvement)

Location: Southern Africa

Client: Maccaferri

Project description: Design checks for various types of earth retaining structures.

Value of project: R420 000

Position & duties: Design and peer review of earth retaining structures.

Name of Project : **KEMPINSKI STRAND HOTEL**

Project duration: 2010-2011 (4 months involvement)

Location: Swakopmund, Namibia

Client: Seelenbinder Consulting Engineers

Project description: Development of 5-storey luxury hotel on waterfront.

Value of project: R300 000

Position & duties: Geotechnical site investigation, analysis and reporting.

Name of Project : **BUSHBUCK RIDGE RING ROAD (R40)**

Project duration: 2010-2012 (12 months involvement)

Location: Limpopo Province, South Africa

Client: Mošomo Consulting Engineers

Project description: Construction of ring road around town of Bushbuck Ridge.

Value of project: R250 000

Position & duties: Geotechnical site investigations, design of earth retaining structures.

Name of Project : **RIVERSIDE MALL RETAINING WALL**

Project duration: 2011 (4 months involvement)

Location: Nelspruit, Mpumalanga, South Africa

Client: Coffey Projects

Project description: Adjudication of failed retaining wall.

Value of project: R40 000 (ARQ fees)

Position & duties: Peer review of retaining wall design and adjudicator.

Name of Project : **MINISTRY OF JUSTICE BUILDING**

Project duration: 2011 (2 months involvement)

Location: Windhoek, Namibia

Client: Namibia Technical Services / Seelenbinder Consulting Engineers

Project description: Development of 10-storey office building in CBD.

Value of project: R30 million

Position & duties: Geotechnical site investigation, analysis and reporting.

Name of Project : **FIBRE CO – FIBRE OPTIC ROUTES**

Project duration: 2011-2012 (6 months involvement)

Location:	South Africa
Client:	UWP Consulting
Project description:	Installation of 2 500km of fibre optic cables next to national routes across SA.
Value of project:	R100 million
Position & duties:	Geotechnical site investigation, analysis and reporting.
<u>Name of Project :</u>	RAND WATER C6 PIPELINE
Project duration:	2010-2011 (4 months involvement)
Location:	Gauteng, South Africa
Client:	Bigen Africa
Project description:	Replacement of 22km long old pipeline with new 900mm ø steel pipe.
Value of project:	R50 million
Position & duties:	Geotechnical site investigation, analysis and reporting.
<u>Name of Project :</u>	KUSILE POWER STATION
Project duration:	2010-2011 (6 months involvement)
Location:	Mpumalanga, South Africa
Client:	Nyeleti Consulting Engineers
Project description:	Construction of 4 800MW coal-fired power station.
Value of project:	R100 million
Position & duties:	Foundation designs for auxiliary structures.
<u>Name of Project :</u>	DIEPSLOOT PEDESTRIAN AND VEHICLE BRIDGES
Project duration:	2010-2013 (6 months involvement)
Location:	Diepsloot Township, Gauteng, South Africa
Client:	Hlanganani Engineers & Project Managers
Project description:	Construction of three bridges in Diepsloot, two for pedestrians and one for vehicle traffic.
Value of project:	R50 million
Position & duties:	Geotechnical site investigations, analysis and reporting.
<u>Name of Project :</u>	RAND WATER LABORATORIES
Project duration:	2010-2011 (6 months involvement)
Location:	Gauteng, south Africa
Client:	PDNA Consulting Engineers
Project description:	Construction of single storey laboratories across several sites.
Value of project:	R5 million
Position & duties:	Geotechnical site investigations, analyses and reporting.
<u>Name of Project :</u>	LEISURE BAY DEVELOPMENT
Project duration:	2010 (3 months involvement)
Location:	Pretoria, South Africa
Client:	BestCiv Engineering
Project description:	Development of residential estate.
Value of project:	R50 million
Position & duties:	Lateral support design for 4m deep excavation.
<u>Name of Project :</u>	50MW NAMPOWER DIESEL GENERATION STATION
Project duration:	2010-2011 (6 months involvement)
Location:	Walvis Bay, Namibia
Client:	NamPower
Project description:	Construction of 50MW diesel generation power station.
Value of project:	R40 million

Position & duties: Geotechnical site investigation comprising core drilling, test pits, CSW and piezocone tests, electrical resistivity surveys etc. Analysis, reporting and assistance in foundation design.

Name of Project : **EKANGALA PIPELINE**

Project duration: 2009-2010 (5 months involvement)

Location: Mpumalanga, South Africa

Client: SSI Consulting Engineers

Project description: Installation of 7km sewer pipeline.

Value of project: R10 million

Position & duties: Geotechnical site investigation, analysis and reporting.

Certification

I, the undersigned, certify that, to the best of my knowledge and belief, this CV correctly describes me, my qualifications and my experience.

Signature:



Date of signing: 25 January 2016

AIR QUALITY IMPACT ASSESSMENT



Kirsten Collett

Air Quality Consultant
WSP Environment & Energy South Africa

Career Summary

Kirsten completed her BSc in Geography and Environmental Studies at the University of Witwatersrand in 2005. She then went on to complete her BSc honours and MSc degree in the field of atmospheric science. Kirsten worked at the Climatology Research Group at the University of Witwatersrand for 4 years and was involved in various air quality projects with both local and international associations. These projects involved the real time monitoring of atmospheric parameters, data analysis and reporting. She was also responsible for lecturing a variety of courses to undergraduate students and has presented much of her work at various local conferences. Kirsten is currently employed at the Johannesburg branch of WSP Environmental as an air quality and acoustic consultant and has worked on various air quality and acoustic impact assessments; air quality management plans; air quality and acoustic monitoring; and air quality and acoustic modelling for a variety of clients. She has provided consulting support to various client industries including petrochemical, mining, metallurgical, manufacturing and local government bodies.

Professional Qualifications

Education and Training

- MSc Atmospheric Sciences, University of the Witwatersrand, Johannesburg
- BSc (Hons) Geography and Environmental Studies, University of the Witwatersrand, Johannesburg
- BSc Geography and Environmental Studies, University of the Witwatersrand, Johannesburg

Selected relevant experience

Project experience

AIR QUALITY IMPACT ASSESSMENTS

11/2011 – 01/2015, First In Spec Biofuels Ltd, Air Quality Impact Assessment, Coega IDZ, Eastern Cape, South Africa.

As part of a larger Environmental Impact Assessment for a proposed biodiesel production plant in Coega, WSP Environmental was commissioned to conduct a specialist air quality impact assessment for the facility. Kirsten was responsible for compiling the air quality impact assessment which was initially a screening-level assessment and later upgraded to a Tier 2 full air quality impact assessment. The project involved a baseline

review of the area; baseline meteorological and pollutant data analysis; emission inventory compilation; dispersion modelling; reporting; and atmospheric licence (AEL) compilation.

03/2012 – 01/2014, Atha Africa Ventures (Pty) Ltd, Air Quality Impact Assessment, Wakkerstroom, Mpumalanga, South Africa.

WSP Environmental was commissioned to undertake an air quality impact assessment for a proposed underground coal mine near Wakkerstroom, Mpumalanga as part of a comprehensive environmental and social impact assessment for the mine. Kirsten was responsible for conducting the air quality assessment. The assessment comprised onsite ambient air quality monitoring in order to assess the existing air quality in the region as well as dispersion modelling (using the ADMS (v5) software) to determine the predicted impacts that the proposed mine will have on the existing air quality. Kirsten developed a comprehensive emissions inventory to account for all emission sources at the proposed mine during both construction and operational phases. Results from both the on-site monitoring and modelling were presented in an AQIA report, with concentrations assessed against the national ambient air quality standards to evaluate compliance.

08/2012 – 01/2013, Apollo Tyres South Africa (Pty) Ltd, Air Quality Impact Assessment, Durban, KwaZulu Natal, South Africa.

WSP Environmental was commissioned to perform an air quality impact assessment for a tyre manufacturer to determine the changes in emissions should they replace their existing heavy fuel oil fired boiler with two coal fired boiler equipped with bag filters. Kirsten was responsible for conducting this screening-level air quality assessment through a baseline review of the site; collation of boiler and emission specifications from boiler manufacturers; determination of the impact of the boiler emissions on the surrounding communities using the SCREEN3 screening-level dispersion modelling software; interpretation of modelled results; compliance assessment; and reporting.

04/2012 – 07/2012, Ferrochrome Furnaces (Pty) Ltd, Air Quality Impact Assessment, Rustenburg, North West, South Africa.

WSP Environmental was commissioned to perform an air quality impact assessment of a proposed ferrochrome production facility in Zinniaville, Rustenburg as part of a larger environmental impact assessment. Kirsten was responsible for conducting the air quality assessment through a baseline review of the site; compilation of a detailed site specific emissions inventory; determination of the impact of the proposed facility on the surrounding communities using the ADMS dispersion modelling software; interpretation of modelled results; compliance assessment; reporting; and compilation of the atmospheric emission licence (AEL) application.

04/2012 – 07/2012, SIVEST SA (Pty) Ltd, Air Quality Impact Assessment – Total Paarden Island Depot Recommissioning, Western Cape, South Africa.

WSP Environmental was commissioned as part of a broader environmental impact assessment, to conduct an air quality impact assessment of the recommissioning of the Total Paarden Island fuel storage and distribution terminal near Cape Town. The air quality impact assessment investigated emissions generated as a result of both the construction phase and operational phase of the facility. Kirsten was responsible for the baseline review of the site; compilation of a detailed site specific emissions inventory; estimation of emissions generated from each of the onsite storage tanks through the use of the TANKS 4.0.9 model; determination of the impact of the proposed facility on the surrounding communities using the SCREEN3 dispersion modelling software; interpretation of modelled results; compliance assessment; and reporting.

10/2011 – 12/2012, Noble Resources Ltd, Air Quality Assessment for a Proposed Oilseeds Processing Plant, Standerton, Mpumalanga, South Africa.

Noble Resources proposed to construct an oilseeds processing plant in Standerton and required an air quality assessment to determine what impacts the activity would have in the region. Kirsten performed this assessment through researching the background to the study in terms of site location, site specific pollutant sources and receptors and existing meteorological conditions, as well as developing an emissions inventory for the proposed plant. From this information, Kirsten then performed dispersion modelling using the ADMS dispersion modelling software to assess the impact of such emission on surrounding receptors.

10/2007 – 07/2008, City of Johannesburg, Ambient Air Quality Assessment during Car Free Day, Johannesburg, South Africa.

This project monitored vehicular emissions from a mobile monitoring station placed alongside the M1 highway in Johannesburg. This was done to evaluate the effectiveness of car free day and to assess whether there was a reduction in emissions on the day. Kirsten was involved in the assessment, analysis and reporting in this specific project.

AIR QUALITY MANAGEMENT**09/2011 – 12/2015, Sonae Novobord (Pty) Ltd, Air Quality Management Reports, White River, Mpumalanga, South Africa.**

WSP Environmental has been continuously monitoring formaldehyde, suspended particulate matter (PM₁₀) and dust deposition (fallout) concentrations in and around the Sonae Novobord White River plant since 2008. Kirsten was responsible for analysing and assessing the ambient monitoring data and drafting the air quality management reports.

01/2013 – 07/2014, Anglo American Thermal Coal, Combined Integrated Air Quality Management Plan, Mpumalanga, South Africa.

Anglo American Thermal Coal requested the compilation of a combined integrated Air Quality Management Plan (AQMP) for the Greenside, Kleinkopje and Landau Collieries in the Mpumalanga province. The AQMP was aimed at becoming a management tool for the collieries going forward and was a continuation of the original AQMPs conducted by WSP Environmental during previous years. Kirsten was responsible for the compilation of the combined AQMP which was performed through a baseline assessment of activities at each colliery; identification of key emission sources; compilation of a detailed site specific emissions inventory for each colliery; determination of the impact of emissions from each colliery (as well as the combined impact) on surrounding communities using the CALPUFF dispersion modelling software; review of current management and mitigation techniques at each colliery; and development of strategies to minimise any impacts of emissions going forward.

02/2013 – 10/2013, Columbus Steel (Pty) Ltd, Fugitive Dust Suppression Plan, Middelburg, Mpumalanga, South Africa.

WSP Environmental was commissioned to compile a fugitive dust suppression plan in order to assess the fugitive dust emanating from the steel plant and slag pot tipping area of a stainless steel plant in Middelburg. Kirsten was responsible for compiling the fugitive dust suppression plan through onsite dust fallout monitoring; analysis of all historical particulate matter, dust fallout and meteorological data for the site; identification of key emission sources; reporting; and provision of mitigation and management measures in order to limit the impact of fugitive dust going forward.

11/2012 – 04/2013, Anglo American Thermal Coal, Greenside Colliery Integrated Air Quality Management Plan, Mpumalanga, South Africa.

Anglo American Thermal Coal requested the compilation of an integrated Air Quality Management Plan (AQMP) for the Greenside Colliery in the Mpumalanga province. The AQMP was aimed at improving air quality at the colliery through the identification of main sources of emissions and recommendations to reduce emissions from these sources. Kirsten was responsible for the compilation of the AQMP which was performed through a baseline assessment of activities at the colliery; identification of key emission sources; compilation of a detailed site specific emissions inventory; determination of the impact of emissions from the colliery on surrounding communities using the ADMS dispersion modelling software; review of current management and mitigation techniques at the colliery; and development of strategies to minimise any impacts of emissions from the colliery going forward.

04/2012 – 12/2012, Anglo American Thermal Coal, Landau Colliery Integrated Air Quality Management Plan, Mpumalanga, South Africa.

Anglo American Thermal Coal requested the compilation of an integrated Air Quality Management Plan (AQMP) for the Landau Colliery in the Mpumalanga province. The AQMP was aimed at improving air quality at the colliery through the identification of main sources of emissions and recommendations to reduce emissions from these sources. Kirsten was responsible for the compilation of the AQMP which was performed through a baseline assessment of activities at the colliery; identification of key emission sources; compilation of a detailed site specific emissions inventory; determination of the impact of emissions from the colliery on surrounding communities using the ADMS dispersion modelling software; review of current management and mitigation techniques at the colliery; and development of strategies to minimise any impacts of emissions from the colliery going forward.

10/2011, Sonae Novobord (Pty) Ltd, A Strategic Overview of Air Quality Conditions at the Sonae Novobord Plant, White River (June 2008 - June 2011).

WSP Environmental has been monitoring various air quality aspects in and around the Sonae Novobord White River plant since 2008. Concentrations of formaldehyde, suspended particulate matter (PM₁₀) and dust deposition (fallout) have been continually monitored in terms of the requirements of the NEMA Section 24G Environmental Management Plan. Kirsten was involved in performing a strategic assessment of conditions at the plant, to ascertain whether the air quality has improved over time and whether the conditions set out in the Record of Decision and the Air Quality Management Plan are being met.

AMBIENT MONITORING**01/2012 – 01/2015, Evraz Highveld Steel and Vanadium, Dust Fallout Monitoring, Mpumalanga, South Africa.**

As part of Evraz Highveld Steel's on-going monitoring program for the assessment of dust generated by the steelworks and associated activities, WSP Environmental was commissioned to conduct dust fallout monitoring both on and off site. Monitoring has been performed over time at the site on a monthly basis in accordance with the ASTM D1739 reference method. Kirsten was responsible for data analysis, interpretation and reporting during the 2012 monitoring period. Most recently, Kirsten was responsible for project management during the 2014 campaign.

01/2014 – 01/2015, Evraz Highveld Steel and Vanadium, Particulate Matter Monitoring, Mpumalanga, South Africa.

WSP Environmental was commissioned to monitor particulate matter concentrations at three locations in and around the Evraz Highveld Steel facility using E-sampler monitoring equipment. Kirsten was responsible for project management and reporting for the project.

09/2013 – 09/2015, Eskom Holdings (Pty) Ltd, Dust Fallout Monitoring, Majuba Power Station, Mpumalanga, South Africa.

WSP Environmental was commissioned to monitor dust fallout at the Majuba Power Station in Mpumalanga for a two year period. Kirsten was responsible for project management, data analysis and reporting for the project.

05/2013 – 01/2014, Tubular Holdings (Pty) Ltd, Dust Fallout Monitoring, Kendal, Mpumalanga, South Africa.

WSP Environmental was commissioned to monitor dust fallout and meteorological conditions at the Tubular Holdings workers' living quarters near Kendal, Mpumalanga. The project was initiated to determine the source of dust at this location. Kirsten was responsible for project management; data analysis; and reporting for the project.

10/2011 – 12/2011, Atlantis Foundries (Pty) Ltd, Dust Monitoring Program, Atlantis, Western Cape, South Africa.

WSP Environmental has been commissioned to provide specialist air quality support and monitoring services to Atlantis Foundries (Pty) Ltd, situated within Atlantis near Cape Town. The project included: dust deposition monitoring, the compilation of an Atmospheric Emission Licence (AEL) for the facility and the development of site-specific dust mitigation and management strategies. Kirsten has been involved in assisting with data analysis and interpretation of the results obtained from the monthly monitoring campaigns at the site.

2011, Sasol New Energy Holding (Pty) Ltd, Mozambique Gas Engine Power Plant Project, Ressano Garcia, Mozambique.

WSP Environmental was commissioned by Sasol New Energy Holding (Pty) Ltd to undertake an integrated environmental and social impact assessment (ESIA) and bankable environmental, social and health impact assessment (ESHIA) for the proposed gas engine power plant that is to be constructed in Ressano Garcia, Mozambique. As part of this assessment, a specialist air quality study was conducted to assess what impacts the proposed plant may have on air quality in the region. Kirsten was responsible in assisting with the set-up of passive monitoring equipment, dust buckets and a meteorological station at the site.

02/2007 – 12/2010, EUCAARI (European Integrated Project on Aerosol, Cloud, Climate and Air Quality Interactions), Mpumalanga, South Africa.

This was an international aerosol project focusing on four developing countries, namely South Africa, India, Brazil and China. It was initiated to provide a comparative set of aerosol emission data between the four countries. Kirsten was involved in the setup and maintenance of the monitoring instrumentation at the South African site. For this, Kirsten was also involved in an aerosol training course in Hyytiälä, Finland as well as technical training in Leipzig, Germany for the SMPS (Scanning Mobility Particle Sizer) instrument.

02/2009 – 08/2009, Eskom, Ambient Air Monitoring at the Point of Highest Impact Resulting from Kriel and Matla Power Stations, Mpumalanga, South Africa.

This study was conducted on the Mpumalanga Highveld in order to increase our understanding of the sources and diurnal variations of various atmospheric species as well as the effects of local meteorology on the concentration of these species. The study included ambient monitoring using a mobile monitoring station. Kirsten was involved in the data analysis, statistical manipulation and reporting.

ACOUSTICS

11/2014 – 02/2015, Sasol New Energy Holding (Pty) Ltd, Central Termica De Ressano Garcia, Ressano Garcia, Mozambique.

WSP Environmental was commissioned by Sasol New Energy Holding (Pty) Ltd to undertake acoustic monitoring at the Central Termica De Ressano Garcia gas engine power plant site in order to assess the noise associated with the construction phase of the plant. Kirsten was responsible for the acoustic data analysis and reporting for this project.

07/2012 – 12/2015, Sonae Novobord (Pty) Ltd, Environmental Noise Survey, White River, Mpumalanga, South Africa.

WSP Environmental has been conducting environmental noise monitoring at the Sonae Novobord White River plant since 2009. The project includes day and night time monitoring in accordance with the SANS 10103:2008 methodology, data analysis, compliance assessment and reporting. Kirsten was involved in the data analysis, interpretation and reporting for the project.

03/2012 – 01/2014, Atha Africa Ventures (Pty) Ltd, Environmental Acoustic Impact Assessment, Wakkerstroom, Mpumalanga, South Africa.

WSP Environmental was commissioned to undertake an environmental acoustic impact assessment for a proposed underground coal mine near Wakkerstroom, Mpumalanga as part of a comprehensive environmental and social impact assessment for the mine. Kirsten was responsible for conducting the environmental acoustic assessment. The assessment comprised onsite environmental noise monitoring in order to obtain a baseline noise climate for the region as well as acoustic modelling to determine the predicted impacts that the proposed mine will have on the existing noise climate. An inventory of all noise sources during the construction and operational phases was compiled with associated sound power levels for each source. These sources were then input into the Computer Aided Noise Abatement (CadnaA) acoustic model. Results were compared with the monitored (existing) noise levels as well as the SANS day and night-time guidelines to assess compliance.

07/2013 – 09/2013, Sonae Novobord (Pty) Ltd, Environmental Noise Survey, Panbult, Mpumalanga, South Africa.

WSP Environmental was commissioned to do a once of environmental acoustic compliance monitoring survey at the Sonae Novobord Panbult site in Mpumalanga. Kirsten was responsible for project management and reporting for the project.

03/2013 – 05/2013, Rustenburg Platinum Mines Limited, Environmental Noise Impact Assessment, Amandelbult Mine, Limpopo, South Africa.

As part of an environmental impact assessment, WSP Environmental was commissioned to conduct an environmental noise assessment for the sinking of a new shaft at the Tumela mine in the Limpopo Province. Kirsten conducted this environmental noise impact assessment through a baseline review of the site; compilation of a detailed site specific noise inventory; determination of the impact of the proposed project on the surrounding communities using the CadnaA acoustic model; interpretation of modelled results; compliance assessment; and reporting.

02/2013 – 05/2013, Shell and BP South Africa Petroleum Refineries (SAPREF), Environmental Noise Impact Assessment, Durban, KwaZulu Natal, South Africa.

WSP Environmental was contracted to perform the environmental noise impact assessment of the Cleaner Fuels Phase Two Project for the SAPREF Refinery in South Durban. The project investigated the noise

associated with undertaking the required modifications to the refinery in order to meet the pending fuel specifications published by the South African Department of Energy. Kirsten was responsible for analysis and interpretation of onsite acoustic monitoring; compilation of a detailed site specific noise inventory; determination of the impact of the proposed project on the surrounding communities through the use of the CadnaA acoustic model; interpretation of modelled results; compliance assessment; and reporting.

11/2012 – 01/2013, Assmang Black Rock Mine Operations, Environmental Monitoring Assessment 2012, Northern Cape, South Africa.

WSP Environmental was commissioned to conduct environmental monitoring for their underground manganese mining venture at Black Rock in the Northern Cape Province. The environmental monitoring consisted of both environmental noise monitoring and particulate monitoring. Vehicle noise and emissions testing was also performed on various Assmang owned vehicles onsite. Kirsten was responsible for analysis of all monitored data, interpretation, compliance assessment and reporting.

06/2012 – 12/2012, Anglo Gold Ashanti, Environmental Noise Surveys, Vaal River and West Wits Operations, North West, South Africa.

WSP Environmental was commissioned by Anglo Gold Ashanti to perform environmental noise surveys of their Vaal River and West Wits mining operations in the North West Province, as part of their commitment to minimise negative impacts on the environment. The project included day and night time monitoring in accordance with the SANS 10103:2008 methodology, data analysis, compliance assessment and reporting. Kirsten was responsible for assisting with data analysis, interpretation and reporting.

2011, Sasol New Energy Holding (Pty) Ltd, Mozambique Gas Engine Power Plant Project, Ressano Garcia, Mozambique.

WSP Environmental was commissioned by Sasol New Energy Holding (Pty) Ltd to undertake an integrated environmental and social impact assessment (ESIA) and bankable environmental, social and health impact assessment (ESHIA) for the proposed gas engine power plant that is to be constructed in Ressano Garcia, Mozambique. As part of this assessment, a specialist environmental acoustic study was conducted to assess what impacts the proposed plant may have on the noise climate of the region. Kirsten was responsible in assisting with on-site acoustic monitoring for the project.

MSC THESIS

01/2007 – 09/2009, Eskom, The Atmospheric Nitrogen Budget over the South African Highveld, Mpumalanga, South Africa.

This project was Kirsten's MSc thesis and was performed in collaboration with Eskom. The project aimed to assess the atmospheric nitrogen cycle in the industrialised Highveld region. The project investigated the various atmospheric nitrogen compounds on the South African Highveld and looked at the dominant sources, the transport and conversion of the species in the atmosphere and in what form they are deposited to the ground. From this it was confirmed that the majority of emitted nitrogen remains in the atmosphere, confirming the trends depicted by satellite technology.

HONOURS PROJECT

01/2006 – 11/2006, Eskom, NO_x or Not: Nitrogen Oxide Levels over the South African Highveld, Mpumalanga, South Africa.

This was Kirsten's honours project and was performed in collaboration with Eskom. This project aimed to validate the nitrogen dioxide hotspot over the South African Highveld as identified by satellite technology. The prevalent sources of nitrogen dioxide were investigated as well as the diurnal and seasonal distributions.

THIRD YEAR PROJECT

01/2005 – 11/2005, The Monitoring Of Aerosol Concentrations over the South African East Coast, Natal, South Africa.

This project formed part of Kirsten's BSc degree and investigated aerosol concentrations along the east coast of South Africa using a research aircraft equipped with various aerosol and condensation nuclei instruments. It aimed to investigate whether the high aerosol concentrations were a direct result of industries in the south Durban area and also investigated transport of aerosols in the region.

Publications

- Collett, K.S., Piketh, S.J. and Ross, K.E., 2010: An assessment of the atmospheric nitrogen budget on the South African Highveld, South African Journal of Science, 106, 5/6, Article# 220.
- Laakso, L., Vakkari, V., Laakso, H., Virkkula, A., Kulmala, M., Beukes, J.P., van Zyl, P.G., Pienaar, J.J., Chiloane, K., Gilardoni, S., Vignati, E., Wiedensohler, A., Tuch, T., Birmili, W., Piketh, S., Collett, K., Fourie, G.D., Komppula, M., Lihavainen, H., de Leeuw, G. and Kerminen, V.-M., 2010: South African EUCAARI – measurements: a site with high atmospheric variability, Atmospheric Chemistry and Physics Discussion, 10, 30691 – 30729.
- Ross, K., Broccardo, S., Heue, K-P., Collett (nee Ferguson), K. and Piketh, S., 2007: Nitrogen oxides on the South African Highveld, Clean Air Journal, 16, 2, 6 – 15.

Awards

- National Association for Clean Air (NACA) conference 2008 – Awarded best presentation for paper entitled “The Atmospheric Nitrogen Budget over the South African Highveld”.

VLADIMIR JOVIC, B.Sc.Hons

PRINCIPAL CONSULTANT (AIR QUALITY), ENVIRONMENT & ENERGY



YEARS WITH THE FIRM

<1

YEARS TOTAL

12

PROFESSIONAL QUALIFICATIONS

Pri.Sci.Nat (pending)

AREAS OF PRACTICE

Air Quality Impact Assessments

Atmospheric Impact Reports

Atmospheric Emission Licencing

Air Quality Management Plans

LANGUAGES

English

Serbian

French

CAREER SUMMARY

Vladimir Jovic has more than 12 years' working experience in the Air Quality industry. His key interest falls with atmospheric dispersion modelling within air quality field.

He has developed technical and specialist skills in various modelling packages including the industrial source complex models (ISCST3 and SCREEN3), AMS/EPA Regulatory Models (AERMOD and AERSCREEN), UK Gaussian plume model (ADMS), and EPA Regulatory puff based model (CALPUFF and CALMET).

Mr. Jovic also has experience in conducting air quality impact assessments for a range of industries including: platinum, gold and coal mining, foundries, asphalt plants, landfills, road construction, sugar mills, power stations, and iron and steel industries.

He is also proficient in compilation of emission inventories, air quality management plans and setting up and managing air quality monitoring networks.

He has a good understanding of the laws and regulations associated with ambient air quality and emission limits in South Africa and various other African countries, as well as the World Bank/IFC Guidelines, European Community Standards and Objectives and World Health Organisation guidelines.

Mr. Jovic also has valuable practical experience with air pollution monitoring equipment, including dust fallout monitoring, passive sampling and monitoring PM₁₀ and other criteria pollutants.

EDUCATION

Bachelor of Science (Honours), Urban and Regional Planning, University of Belgrade, Serbia	1998
Bachelor of Science, Urban and Regional Planning, University of Belgrade, Serbia	1998

ADDITIONAL TRAINING

AERMOD Air Dispersion Modelling - Course, CALPUFF Advanced Techniques in Dispersion Modelling - Course, NACA, Lakes Environmental	2014
Air Dispersion Modelling (short course), NACA	2014
Introduction to Atmospheric Dispersion Modelling, NACA	2010
AERMOD Air Dispersion Modelling, University of Johannesburg, Lakes Environmental	2010
CALPUFF - Advanced Techniques in Dispersion Modelling, University of Johannesburg, Lakes Environmental	2010
CALPUFF Modelling - Course, NACA & University of Johannesburg, ASG at TRC Solutions	2008

VLADIMIR JOVIC, B.Sc.Hons.

PROFESSIONAL MEMBERSHIPS

National Association for Clean Air	NACA
South African Society for Atmospheric Science	SANAS
The Geo-Information Society of South Africa	GISSA
South African Council for Scientific Professions – Professional Natural Scientist in the field of Environmental Science [pending]	SACNASP

PROFESSIONAL EXPERIENCE

Atmospheric Impact Reports

- Atmospheric Impact Report for Dekro Paints Pty Ltd, Kuils River, Cape Town, Western Cape, South Africa (2015-2016): Project Manager and Lead Consultant. WSP Environmental was appointed by Dekro Paints to undertake an Atmospheric Impact Report of current emissions from their plant in the Kuils River, Cape Town. Development of the Atmospheric Impact Report, including a baseline assessment, emissions inventory compilation, dispersion modelling applying AERSCREEN, Atmospheric Emissions License compilation, Dust fallout and passive samples monitoring. Client: Dekro Paints.

Air Quality Impact Assessments

- Air Quality Impact Assessment for Silicon Smelters, eMalahleni, Mpumalanga, South Africa (2015): Lead Consultant. WSP Environmental was appointed by Silicon Smelters to undertake an Air Quality Impact Assessment for the proposed briquetting plant at their plant in the Mpumalanga Province. Development of the Air Quality Impact Assessment Report, including a baseline assessment, emissions inventory compilation, dispersion modelling and reporting. Client: Silicon Smelters.
- Air Quality Impact Assessment for the Proposed Anaerobic Digestion Plant at Winelands Pork Abattoir, Cape Town, Western Cape, South Africa (2015): Lead Consultant. Air Quality Impact Assessment for the proposed development of an Anaerobic Digestion Treatment Plant in Stickland, Cape Town the Western Cape Province. The primary focus of the project is the proposed establishment of a waste treatment and beneficiation facility in order to add value to the waste streams currently being produced on site. This includes the baseline assessment, compilation of the emissions inventory, dispersion modelling simulations using AERMOD, data analysis and report compilation. Client: Resource Management Services (RMS).
- Air Quality Impact Assessment for the existing Pembani Coal Carolina Pty Ltd Coal Mine, Mpumalanga Province, South Africa (2016): Project Manager and Lead Consultant. Air Quality Impact Assessment for the existing underground and opencast coal mine. Vladimir is responsible for the development of the Air Quality Impact Assessment for the air quality impact assessment, including the baseline assessment, emissions inventory compilation, dispersion modelling and reporting. Client: Pembani Coal Carolina Pty Ltd.

NOISE IMPACT ASSESSMENT



Kirsten Collett

Air Quality Consultant
WSP Environment & Energy South Africa

Career Summary

Kirsten completed her BSc in Geography and Environmental Studies at the University of Witwatersrand in 2005. She then went on to complete her BSc honours and MSc degree in the field of atmospheric science. Kirsten worked at the Climatology Research Group at the University of Witwatersrand for 4 years and was involved in various air quality projects with both local and international associations. These projects involved the real time monitoring of atmospheric parameters, data analysis and reporting. She was also responsible for lecturing a variety of courses to undergraduate students and has presented much of her work at various local conferences. Kirsten is currently employed at the Johannesburg branch of WSP Environmental as an air quality and acoustic consultant and has worked on various air quality and acoustic impact assessments; air quality management plans; air quality and acoustic monitoring; and air quality and acoustic modelling for a variety of clients. She has provided consulting support to various client industries including petrochemical, mining, metallurgical, manufacturing and local government bodies.

Professional Qualifications

Education and Training

- MSc Atmospheric Sciences, University of the Witwatersrand, Johannesburg
- BSc (Hons) Geography and Environmental Studies, University of the Witwatersrand, Johannesburg
- BSc Geography and Environmental Studies, University of the Witwatersrand, Johannesburg

Selected relevant experience

Project experience

AIR QUALITY IMPACT ASSESSMENTS

11/2011 – 01/2015, First In Spec Biofuels Ltd, Air Quality Impact Assessment, Coega IDZ, Eastern Cape, South Africa.

As part of a larger Environmental Impact Assessment for a proposed biodiesel production plant in Coega, WSP Environmental was commissioned to conduct a specialist air quality impact assessment for the facility. Kirsten was responsible for compiling the air quality impact assessment which was initially a screening-level assessment and later upgraded to a Tier 2 full air quality impact assessment. The project involved a baseline

review of the area; baseline meteorological and pollutant data analysis; emission inventory compilation; dispersion modelling; reporting; and atmospheric licence (AEL) compilation.

03/2012 – 01/2014, Atha Africa Ventures (Pty) Ltd, Air Quality Impact Assessment, Wakkerstroom, Mpumalanga, South Africa.

WSP Environmental was commissioned to undertake an air quality impact assessment for a proposed underground coal mine near Wakkerstroom, Mpumalanga as part of a comprehensive environmental and social impact assessment for the mine. Kirsten was responsible for conducting the air quality assessment. The assessment comprised onsite ambient air quality monitoring in order to assess the existing air quality in the region as well as dispersion modelling (using the ADMS (v5) software) to determine the predicted impacts that the proposed mine will have on the existing air quality. Kirsten developed a comprehensive emissions inventory to account for all emission sources at the proposed mine during both construction and operational phases. Results from both the on-site monitoring and modelling were presented in an AQIA report, with concentrations assessed against the national ambient air quality standards to evaluate compliance.

08/2012 – 01/2013, Apollo Tyres South Africa (Pty) Ltd, Air Quality Impact Assessment, Durban, KwaZulu Natal, South Africa.

WSP Environmental was commissioned to perform an air quality impact assessment for a tyre manufacturer to determine the changes in emissions should they replace their existing heavy fuel oil fired boiler with two coal fired boiler equipped with bag filters. Kirsten was responsible for conducting this screening-level air quality assessment through a baseline review of the site; collation of boiler and emission specifications from boiler manufacturers; determination of the impact of the boiler emissions on the surrounding communities using the SCREEN3 screening-level dispersion modelling software; interpretation of modelled results; compliance assessment; and reporting.

04/2012 – 07/2012, Ferrochrome Furnaces (Pty) Ltd, Air Quality Impact Assessment, Rustenburg, North West, South Africa.

WSP Environmental was commissioned to perform an air quality impact assessment of a proposed ferrochrome production facility in Zinniaville, Rustenburg as part of a larger environmental impact assessment. Kirsten was responsible for conducting the air quality assessment through a baseline review of the site; compilation of a detailed site specific emissions inventory; determination of the impact of the proposed facility on the surrounding communities using the ADMS dispersion modelling software; interpretation of modelled results; compliance assessment; reporting; and compilation of the atmospheric emission licence (AEL) application.

04/2012 – 07/2012, SIVEST SA (Pty) Ltd, Air Quality Impact Assessment – Total Paarden Island Depot Recommissioning, Western Cape, South Africa.

WSP Environmental was commissioned as part of a broader environmental impact assessment, to conduct an air quality impact assessment of the recommissioning of the Total Paarden Island fuel storage and distribution terminal near Cape Town. The air quality impact assessment investigated emissions generated as a result of both the construction phase and operational phase of the facility. Kirsten was responsible for the baseline review of the site; compilation of a detailed site specific emissions inventory; estimation of emissions generated from each of the onsite storage tanks through the use of the TANKS 4.0.9 model; determination of the impact of the proposed facility on the surrounding communities using the SCREEN3 dispersion modelling software; interpretation of modelled results; compliance assessment; and reporting.

10/2011 – 12/2012, Noble Resources Ltd, Air Quality Assessment for a Proposed Oilseeds Processing Plant, Standerton, Mpumalanga, South Africa.

Noble Resources proposed to construct an oilseeds processing plant in Standerton and required an air quality assessment to determine what impacts the activity would have in the region. Kirsten performed this assessment through researching the background to the study in terms of site location, site specific pollutant sources and receptors and existing meteorological conditions, as well as developing an emissions inventory for the proposed plant. From this information, Kirsten then performed dispersion modelling using the ADMS dispersion modelling software to assess the impact of such emission on surrounding receptors.

10/2007 – 07/2008, City of Johannesburg, Ambient Air Quality Assessment during Car Free Day, Johannesburg, South Africa.

This project monitored vehicular emissions from a mobile monitoring station placed alongside the M1 highway in Johannesburg. This was done to evaluate the effectiveness of car free day and to assess whether there was a reduction in emissions on the day. Kirsten was involved in the assessment, analysis and reporting in this specific project.

AIR QUALITY MANAGEMENT**09/2011 – 12/2015, Sonae Novobord (Pty) Ltd, Air Quality Management Reports, White River, Mpumalanga, South Africa.**

WSP Environmental has been continuously monitoring formaldehyde, suspended particulate matter (PM₁₀) and dust deposition (fallout) concentrations in and around the Sonae Novobord White River plant since 2008. Kirsten was responsible for analysing and assessing the ambient monitoring data and drafting the air quality management reports.

01/2013 – 07/2014, Anglo American Thermal Coal, Combined Integrated Air Quality Management Plan, Mpumalanga, South Africa.

Anglo American Thermal Coal requested the compilation of a combined integrated Air Quality Management Plan (AQMP) for the Greenside, Kleinkopje and Landau Collieries in the Mpumalanga province. The AQMP was aimed at becoming a management tool for the collieries going forward and was a continuation of the original AQMPs conducted by WSP Environmental during previous years. Kirsten was responsible for the compilation of the combined AQMP which was performed through a baseline assessment of activities at each colliery; identification of key emission sources; compilation of a detailed site specific emissions inventory for each colliery; determination of the impact of emissions from each colliery (as well as the combined impact) on surrounding communities using the CALPUFF dispersion modelling software; review of current management and mitigation techniques at each colliery; and development of strategies to minimise any impacts of emissions going forward.

02/2013 – 10/2013, Columbus Steel (Pty) Ltd, Fugitive Dust Suppression Plan, Middelburg, Mpumalanga, South Africa.

WSP Environmental was commissioned to compile a fugitive dust suppression plan in order to assess the fugitive dust emanating from the steel plant and slag pot tipping area of a stainless steel plant in Middelburg. Kirsten was responsible for compiling the fugitive dust suppression plan through onsite dust fallout monitoring; analysis of all historical particulate matter, dust fallout and meteorological data for the site; identification of key emission sources; reporting; and provision of mitigation and management measures in order to limit the impact of fugitive dust going forward.

11/2012 – 04/2013, Anglo American Thermal Coal, Greenside Colliery Integrated Air Quality Management Plan, Mpumalanga, South Africa.

Anglo American Thermal Coal requested the compilation of an integrated Air Quality Management Plan (AQMP) for the Greenside Colliery in the Mpumalanga province. The AQMP was aimed at improving air quality at the colliery through the identification of main sources of emissions and recommendations to reduce emissions from these sources. Kirsten was responsible for the compilation of the AQMP which was performed through a baseline assessment of activities at the colliery; identification of key emission sources; compilation of a detailed site specific emissions inventory; determination of the impact of emissions from the colliery on surrounding communities using the ADMS dispersion modelling software; review of current management and mitigation techniques at the colliery; and development of strategies to minimise any impacts of emissions from the colliery going forward.

04/2012 – 12/2012, Anglo American Thermal Coal, Landau Colliery Integrated Air Quality Management Plan, Mpumalanga, South Africa.

Anglo American Thermal Coal requested the compilation of an integrated Air Quality Management Plan (AQMP) for the Landau Colliery in the Mpumalanga province. The AQMP was aimed at improving air quality at the colliery through the identification of main sources of emissions and recommendations to reduce emissions from these sources. Kirsten was responsible for the compilation of the AQMP which was performed through a baseline assessment of activities at the colliery; identification of key emission sources; compilation of a detailed site specific emissions inventory; determination of the impact of emissions from the colliery on surrounding communities using the ADMS dispersion modelling software; review of current management and mitigation techniques at the colliery; and development of strategies to minimise any impacts of emissions from the colliery going forward.

10/2011, Sonae Novobord (Pty) Ltd, A Strategic Overview of Air Quality Conditions at the Sonae Novobord Plant, White River (June 2008 - June 2011).

WSP Environmental has been monitoring various air quality aspects in and around the Sonae Novobord White River plant since 2008. Concentrations of formaldehyde, suspended particulate matter (PM₁₀) and dust deposition (fallout) have been continually monitored in terms of the requirements of the NEMA Section 24G Environmental Management Plan. Kirsten was involved in performing a strategic assessment of conditions at the plant, to ascertain whether the air quality has improved over time and whether the conditions set out in the Record of Decision and the Air Quality Management Plan are being met.

AMBIENT MONITORING**01/2012 – 01/2015, Evraz Highveld Steel and Vanadium, Dust Fallout Monitoring, Mpumalanga, South Africa.**

As part of Evraz Highveld Steel's on-going monitoring program for the assessment of dust generated by the steelworks and associated activities, WSP Environmental was commissioned to conduct dust fallout monitoring both on and off site. Monitoring has been performed over time at the site on a monthly basis in accordance with the ASTM D1739 reference method. Kirsten was responsible for data analysis, interpretation and reporting during the 2012 monitoring period. Most recently, Kirsten was responsible for project management during the 2014 campaign.

01/2014 – 01/2015, Evraz Highveld Steel and Vanadium, Particulate Matter Monitoring, Mpumalanga, South Africa.

WSP Environmental was commissioned to monitor particulate matter concentrations at three locations in and around the Evraz Highveld Steel facility using E-sampler monitoring equipment. Kirsten was responsible for project management and reporting for the project.

09/2013 – 09/2015, Eskom Holdings (Pty) Ltd, Dust Fallout Monitoring, Majuba Power Station, Mpumalanga, South Africa.

WSP Environmental was commissioned to monitor dust fallout at the Majuba Power Station in Mpumalanga for a two year period. Kirsten was responsible for project management, data analysis and reporting for the project.

05/2013 – 01/2014, Tubular Holdings (Pty) Ltd, Dust Fallout Monitoring, Kendal, Mpumalanga, South Africa.

WSP Environmental was commissioned to monitor dust fallout and meteorological conditions at the Tubular Holdings workers' living quarters near Kendal, Mpumalanga. The project was initiated to determine the source of dust at this location. Kirsten was responsible for project management; data analysis; and reporting for the project.

10/2011 – 12/2011, Atlantis Foundries (Pty) Ltd, Dust Monitoring Program, Atlantis, Western Cape, South Africa.

WSP Environmental has been commissioned to provide specialist air quality support and monitoring services to Atlantis Foundries (Pty) Ltd, situated within Atlantis near Cape Town. The project included: dust deposition monitoring, the compilation of an Atmospheric Emission Licence (AEL) for the facility and the development of site-specific dust mitigation and management strategies. Kirsten has been involved in assisting with data analysis and interpretation of the results obtained from the monthly monitoring campaigns at the site.

2011, Sasol New Energy Holding (Pty) Ltd, Mozambique Gas Engine Power Plant Project, Ressano Garcia, Mozambique.

WSP Environmental was commissioned by Sasol New Energy Holding (Pty) Ltd to undertake an integrated environmental and social impact assessment (ESIA) and bankable environmental, social and health impact assessment (ESHIA) for the proposed gas engine power plant that is to be constructed in Ressano Garcia, Mozambique. As part of this assessment, a specialist air quality study was conducted to assess what impacts the proposed plant may have on air quality in the region. Kirsten was responsible in assisting with the set-up of passive monitoring equipment, dust buckets and a meteorological station at the site.

02/2007 – 12/2010, EUCAARI (European Integrated Project on Aerosol, Cloud, Climate and Air Quality Interactions), Mpumalanga, South Africa.

This was an international aerosol project focusing on four developing countries, namely South Africa, India, Brazil and China. It was initiated to provide a comparative set of aerosol emission data between the four countries. Kirsten was involved in the setup and maintenance of the monitoring instrumentation at the South African site. For this, Kirsten was also involved in an aerosol training course in Hyytiälä, Finland as well as technical training in Leipzig, Germany for the SMPS (Scanning Mobility Particle Sizer) instrument.

02/2009 – 08/2009, Eskom, Ambient Air Monitoring at the Point of Highest Impact Resulting from Kriel and Matla Power Stations, Mpumalanga, South Africa.

This study was conducted on the Mpumalanga Highveld in order to increase our understanding of the sources and diurnal variations of various atmospheric species as well as the effects of local meteorology on the concentration of these species. The study included ambient monitoring using a mobile monitoring station. Kirsten was involved in the data analysis, statistical manipulation and reporting.

ACOUSTICS

11/2014 – 02/2015, Sasol New Energy Holding (Pty) Ltd, Central Termica De Ressano Garcia, Ressano Garcia, Mozambique.

WSP Environmental was commissioned by Sasol New Energy Holding (Pty) Ltd to undertake acoustic monitoring at the Central Termica De Ressano Garcia gas engine power plant site in order to assess the noise associated with the construction phase of the plant. Kirsten was responsible for the acoustic data analysis and reporting for this project.

07/2012 – 12/2015, Sonae Novobord (Pty) Ltd, Environmental Noise Survey, White River, Mpumalanga, South Africa.

WSP Environmental has been conducting environmental noise monitoring at the Sonae Novobord White River plant since 2009. The project includes day and night time monitoring in accordance with the SANS 10103:2008 methodology, data analysis, compliance assessment and reporting. Kirsten was involved in the data analysis, interpretation and reporting for the project.

03/2012 – 01/2014, Atha Africa Ventures (Pty) Ltd, Environmental Acoustic Impact Assessment, Wakkerstroom, Mpumalanga, South Africa.

WSP Environmental was commissioned to undertake an environmental acoustic impact assessment for a proposed underground coal mine near Wakkerstroom, Mpumalanga as part of a comprehensive environmental and social impact assessment for the mine. Kirsten was responsible for conducting the environmental acoustic assessment. The assessment comprised onsite environmental noise monitoring in order to obtain a baseline noise climate for the region as well as acoustic modelling to determine the predicted impacts that the proposed mine will have on the existing noise climate. An inventory of all noise sources during the construction and operational phases was compiled with associated sound power levels for each source. These sources were then input into the Computer Aided Noise Abatement (CadnaA) acoustic model. Results were compared with the monitored (existing) noise levels as well as the SANS day and night-time guidelines to assess compliance.

07/2013 – 09/2013, Sonae Novobord (Pty) Ltd, Environmental Noise Survey, Panbult, Mpumalanga, South Africa.

WSP Environmental was commissioned to do a once of environmental acoustic compliance monitoring survey at the Sonae Novobord Panbult site in Mpumalanga. Kirsten was responsible for project management and reporting for the project.

03/2013 – 05/2013, Rustenburg Platinum Mines Limited, Environmental Noise Impact Assessment, Amandelbult Mine, Limpopo, South Africa.

As part of an environmental impact assessment, WSP Environmental was commissioned to conduct an environmental noise assessment for the sinking of a new shaft at the Tumela mine in the Limpopo Province. Kirsten conducted this environmental noise impact assessment through a baseline review of the site; compilation of a detailed site specific noise inventory; determination of the impact of the proposed project on the surrounding communities using the CadnaA acoustic model; interpretation of modelled results; compliance assessment; and reporting.

02/2013 – 05/2013, Shell and BP South Africa Petroleum Refineries (SAPREF), Environmental Noise Impact Assessment, Durban, KwaZulu Natal, South Africa.

WSP Environmental was contracted to perform the environmental noise impact assessment of the Cleaner Fuels Phase Two Project for the SAPREF Refinery in South Durban. The project investigated the noise

associated with undertaking the required modifications to the refinery in order to meet the pending fuel specifications published by the South African Department of Energy. Kirsten was responsible for analysis and interpretation of onsite acoustic monitoring; compilation of a detailed site specific noise inventory; determination of the impact of the proposed project on the surrounding communities through the use of the CadnaA acoustic model; interpretation of modelled results; compliance assessment; and reporting.

11/2012 – 01/2013, Assmang Black Rock Mine Operations, Environmental Monitoring Assessment 2012, Northern Cape, South Africa.

WSP Environmental was commissioned to conduct environmental monitoring for their underground manganese mining venture at Black Rock in the Northern Cape Province. The environmental monitoring consisted of both environmental noise monitoring and particulate monitoring. Vehicle noise and emissions testing was also performed on various Assmang owned vehicles onsite. Kirsten was responsible for analysis of all monitored data, interpretation, compliance assessment and reporting.

06/2012 – 12/2012, Anglo Gold Ashanti, Environmental Noise Surveys, Vaal River and West Wits Operations, North West, South Africa.

WSP Environmental was commissioned by Anglo Gold Ashanti to perform environmental noise surveys of their Vaal River and West Wits mining operations in the North West Province, as part of their commitment to minimise negative impacts on the environment. The project included day and night time monitoring in accordance with the SANS 10103:2008 methodology, data analysis, compliance assessment and reporting. Kirsten was responsible for assisting with data analysis, interpretation and reporting.

2011, Sasol New Energy Holding (Pty) Ltd, Mozambique Gas Engine Power Plant Project, Ressano Garcia, Mozambique.

WSP Environmental was commissioned by Sasol New Energy Holding (Pty) Ltd to undertake an integrated environmental and social impact assessment (ESIA) and bankable environmental, social and health impact assessment (ESHIA) for the proposed gas engine power plant that is to be constructed in Ressano Garcia, Mozambique. As part of this assessment, a specialist environmental acoustic study was conducted to assess what impacts the proposed plant may have on the noise climate of the region. Kirsten was responsible in assisting with on-site acoustic monitoring for the project.

MSC THESIS

01/2007 – 09/2009, Eskom, The Atmospheric Nitrogen Budget over the South African Highveld, Mpumalanga, South Africa.

This project was Kirsten's MSc thesis and was performed in collaboration with Eskom. The project aimed to assess the atmospheric nitrogen cycle in the industrialised Highveld region. The project investigated the various atmospheric nitrogen compounds on the South African Highveld and looked at the dominant sources, the transport and conversion of the species in the atmosphere and in what form they are deposited to the ground. From this it was confirmed that the majority of emitted nitrogen remains in the atmosphere, confirming the trends depicted by satellite technology.

HONOURS PROJECT

01/2006 – 11/2006, Eskom, NO_x or Not: Nitrogen Oxide Levels over the South African Highveld, Mpumalanga, South Africa.

This was Kirsten's honours project and was performed in collaboration with Eskom. This project aimed to validate the nitrogen dioxide hotspot over the South African Highveld as identified by satellite technology. The prevalent sources of nitrogen dioxide were investigated as well as the diurnal and seasonal distributions.

THIRD YEAR PROJECT

01/2005 – 11/2005, The Monitoring Of Aerosol Concentrations over the South African East Coast, Natal, South Africa.

This project formed part of Kirsten's BSc degree and investigated aerosol concentrations along the east coast of South Africa using a research aircraft equipped with various aerosol and condensation nuclei instruments. It aimed to investigate whether the high aerosol concentrations were a direct result of industries in the south Durban area and also investigated transport of aerosols in the region.

Publications

- Collett, K.S., Piketh, S.J. and Ross, K.E., 2010: An assessment of the atmospheric nitrogen budget on the South African Highveld, South African Journal of Science, 106, 5/6, Article# 220.
- Laakso, L., Vakkari, V., Laakso, H., Virkkula, A., Kulmala, M., Beukes, J.P., van Zyl, P.G., Pienaar, J.J., Chiloane, K., Gilardoni, S., Vignati, E., Wiedensohler, A., Tuch, T., Birmili, W., Piketh, S., Collett, K., Fourie, G.D., Komppula, M., Lihavainen, H., de Leeuw, G. and Kerminen, V.-M., 2010: South African EUCAARI – measurements: a site with high atmospheric variability, Atmospheric Chemistry and Physics Discussion, 10, 30691 – 30729.
- Ross, K., Broccardo, S., Heue, K-P., Collett (nee Ferguson), K. and Piketh, S., 2007: Nitrogen oxides on the South African Highveld, Clean Air Journal, 16, 2, 6 – 15.

Awards

- National Association for Clean Air (NACA) conference 2008 – Awarded best presentation for paper entitled “The Atmospheric Nitrogen Budget over the South African Highveld”.



Bradley Keiser

Senior Air Quality Consultant
WSP Environment & Energy South Africa

Career Summary

Bradley Keiser completed his BSc Honours degree at the University of Kwa-Zulu Natal in Geography and Environmental Management.

Prior to working at WSP, Bradley was employed fulltime by Gondwana Environmental Solutions as a senior air quality consultant. During his employment at Gondwana, Bradley was involved in numerous air quality related projects, with a specific focus on ambient air quality monitoring, including the management of large scale public and private ambient air quality monitoring networks.

Bradley has seven years' experience in the field of air quality, and is currently employed at WSP Environment & Energy, South Africa. Bradley is involved in numerous air quality monitoring projects, both short-term and continuous ambient air quality monitoring. Additionally, Bradley has become involved in numerous dispersion modelling projects (air quality impact assessments), making use of modelling software packages such as ADMS, AERMOD and Calpuff, while he is also involved in air quality management plan developments and Atmospheric Emission License compilations and submissions.

Professional Qualifications

Education and Training

- BSc (Honours) Environmental Management, University of KwaZulu-Natal, Pietermaritzburg
- BSc Geography, University of KwaZulu-Natal, Pietermaritzburg

Selected Relevant Experience

AMBIENT AIR QUALITY MONITORING

2014 - Ongoing, Continuous PM and DFO Monitoring, Project Manager, Anglo American Thermal Coal, South Africa

The monthly maintenance and management of the Anglo Thermal Coal continuous particulates and dust fallout monitoring networks located at ten collieries. The project includes the maintenance of the networks, monthly analysis and reporting for compliance purposes.

2013 - Ongoing, Dust Fallout Monitoring, Project Manager, Eskom Majuba Power Station, Mpumalanga, South Africa

Management of the dust fallout monitoring network at the Eskom Majuba Power Station. The project includes the collection and exchange of fallout units on a monthly basis, gravimetric analysis of samples and monthly reporting of fallout rates.

2013 - Ongoing, Dust Fallout Monitoring, Project Manager, Sasol New Energy Holdings, Mozambique

Management of the CTRG dust fallout monitoring network in the Ressano Garcia area, Mozambique. The project included the collection and exchange of fallout units on a monthly basis, meteorological monitoring, gravimetric analysis of samples and monthly reporting of fallout rates.

2013, Continuous PM Monitoring, Project Manager, Anglo American Thermal Coal Kriel Colliery, Mpumalanga, South Africa

One TOPAS monitor (Turnkey Instruments) was supplied on a custom designed solar system trailer, capable of simultaneously monitoring TSP, PM₁₀, PM_{2.5} and PM₁, as well as wind speed and direction. The project includes the maintenance of the station, data management and verification and reporting on a monthly basis.

2013 - Ongoing, Continuous PM Monitoring, Project Manager, Afrisam South Africa Ulco Plant, Northern Cape, South Africa

One TOPAS monitor (Turnkey Instruments) was supplied on a custom designed solar system trailer, capable of simultaneously monitoring TSP, PM₁₀, PM_{2.5} and PM₁, as well as wind speed and direction. The project includes the maintenance of the station, data management and verification and reporting on a quarterly basis.

2013, Dust Fallout Monitoring, Project Manager, Sappi Southern Africa Lomati Sawmill, Mpumalanga, South Africa

Management of the Lomati Sawmill dust fallout monitoring network in the Barberton area. The project included the collection and exchange of fallout units on a quarterly basis, gravimetric analysis of samples and quarterly reporting of fallout rates.

2013 - Ongoing, Continuous PM Monitoring, Project Manager, Anglo American Thermal Coal Landau Colliery, Mpumalanga, South Africa

Two TOPAS (Turnkey Instruments) and ETL monitors were supplied on custom designed solar system trailers, capable of simultaneously monitoring TSP, PM₁₀, PM_{2.5} and PM₁, benzene and nitrogen dioxide, as well as wind speed and direction. The project includes the maintenance of the stations, data management and verification and reporting on a monthly basis.

2013, Dust Fallout Monitoring, Project Manager, York Timbers (Pty) Ltd, Mpumalanga, South Africa.

Management of the York Timbers dust fallout monitoring network in the Sabie area. The project included the collection and exchange of fallout units on a monthly basis, meteorological monitoring, gravimetric analysis of samples and monthly reporting of fallout rates.

2012, Assmang Black Rock Mine Operations, Environmental Monitoring Assessment 2012, Northern Cape, South Africa.

WSP Environmental was commissioned to conduct environmental monitoring for their underground manganese mining venture at Black Rock in the Northern Cape Province. The environmental monitoring consisted of both environmental noise monitoring and continuous particulate monitoring. Vehicle noise and emissions testing was also performed on various Assmang owned vehicles onsite.

2012, Ambient Monitoring, Project Manager, Sappi Southern Africa Ngodwana Sawmill, Mpumalanga, South Africa

A short-term monitoring campaign was undertaken at Sappi Ngodwana with continuous monitoring being conducted for particulates (PM₁₀ and PM_{2.5}), sulphur dioxide (SO₂), nitrogen dioxide (NO₂) and meteorological conditions. Additional to this, monitoring was conducted for dust fallout at 12 locations and passive diffusive sampling for NO₂ and SO₂ at 12 locations. The purpose of the monitoring was to determine the impact on the receiving environment as well as verification of the dispersion model.

2012, Continuous PM Monitoring, Project Manager, Anglo American Thermal Coal Kleinkopje Colliery, Mpumalanga, South Africa

One TOPAS monitor (Turnkey Instruments) was supplied on a solar system trailer. This system monitors TSP, PM₁₀, PM_{2.5} and PM₁, as well as wind speed and direction. The project includes the maintenance of the station, data management and verification and reporting on a quarterly basis.

2012, Passive Diffusive Monitoring, Project Manager, Anglo American Thermal Coal Kleinkopje Colliery, Mpumalanga, South Africa

Radiello passive diffusive samplers were deployed for a once-off monitoring campaign. Monitoring was conducted for sulphur dioxide, nitrogen dioxide and volatile organic compounds (specifically the BTEX range), with a detailed monitoring report being submitted to the client.

2011 - Current, Management of Monitoring Network, Project Manager, Sonae Novobord, Mpumalanga, South Africa

The monitoring network consists of a dust fallout network, including fenceline and community samplers, three continuous particulate matter monitors (Osiris Units), one meteorological station and the quarterly deployment of formaldehyde passive samplers. All data is managed and verified, with monthly summary reports and detailed quarterly reports being submitted to the client.

2011 - 2012, Passive Diffusive Monitoring, Project Manager, Evraz Highveld Steel and Vanadium, Mpumalanga, South Africa

Radiello passive diffusive samplers were deployed for two weekly monitoring campaigns, lasting a total of six months. Monitoring was conducted for sulphur dioxide, nitrogen dioxide and volatile organic compounds (specifically the BTEX range), with monitoring reports being submitted to the client on a monthly basis.

2011 - 2012, Management of Dust Fallout Monitoring Network, Project Manager, Group Five Construction, Northern Cape, South Africa

Management of the Group Five dust fallout monitoring network at the proposed solar power plant in the Kathu area. The project included the collection and exchange of fallout units on a monthly basis, gravimetric analysis of samples and monthly reporting of fallout rates.

2011 - 2012, Management of Dust Fallout Monitoring Network, Project Manager, Evraz Highveld Steel and Vanadium, Mpumalanga, South Africa

Management of the Highveld dust fallout monitoring network, consisting of 13 dust fallout samplers. The project included the collection and exchange of fallout units on a monthly basis, gravimetric and elemental analysis of samples and monthly reporting of fallout rates.

2011, Passive Diffusive and Fugitive Emissions Monitoring, Project Manager, Orica Mining Services, Tanzania

Radiello passive diffusive samplers were deployed for a once-off monitoring campaign, to assess fugitive emissions associated with the manufacturing of explosives. Monitoring was conducted for sulphur dioxide, nitrogen dioxide and volatile organic compounds (specifically the BTEX range). Additionally, samples were extracted directly from the emissions from the process to determine the levels of SO₂, NO₂, VOC's and formaldehyde.

2011, Passive Diffusive Monitoring, Project Manager, Afrisam South Africa Dudfield Plant, North-West, South Africa

Radiello passive diffusive samplers were deployed for two monitoring campaigns. Monitoring was conducted for sulphur dioxide, nitrogen dioxide and volatile organic compounds (specifically the BTEX range), with a detailed monitoring report being submitted to the client.

2011, Management of Continuous PM₁₀ and Meteorological Monitoring Network, Project Manager, Kumba Iron Ore Sishen Mine, Northern Cape, South Africa

Siting, supply, installation and management of six PM₁₀ E-Samplers, three PM₁₀ BAM 1020 monitors and three meteorological stations. The E-Samplers were installed on solar system trailers for ease of re-location, while

the BAM monitors were permanent installations within temperature controlled shelters. The project included the real-time reporting of data as well as quarterly maintenance visits.

2011, Management of Continuous Monitoring Network, Project Manager, Evraz Highveld Steel and Vanadium, Mpumalanga, South Africa

Siting, supply, installation and management of six PM₁₀ and PM_{2.5} monitors (MetOne E-Samplers), one meteorological station and one continuous multi-gas monitor (Aeroqual).

2011, Once-off Stack Monitoring, Project Manager, Sappi Southern Africa Ngodwana Mill, Mpumalanga, South Africa

Once-off stack monitoring was conducted for SO₂, NO₂, CO, O₂ and CO₂ using a portable gas analyser, with the monitoring data being compared to isokinetic data.

2010 – 2011, Continuous PM₁₀ Monitoring, Project Manager, AngloAmerican Thermal Coal, Kleinkopje Colliery, Witbank, Mpumalanga, South Africa

One PM₁₀ monitor (MetOne E-BAM) was supplied and installed at the Kleinkopje Colliery. The project involved the monthly maintenance of the unit and compilation of monthly data analysis reports. The reports included a meteorological overview for the reporting period, as well as the comparison of the PM₁₀ concentrations to the National Ambient Air Quality Standards.

2010 – 2011, Quarterly Stack Monitoring, Project Manager, Exxaro Grootegeluk Mine, Limpopo, South Africa

Quarterly stack monitoring was conducted at the Exxaro Char Plant. Monitoring was conducted for SO₂, NO₂, CO, O₂, CO₂, PM and PAH's, with the monitoring being conducted on four stacks. Detailed stack monitoring reports were submitted to Exxaro, detailing compliance as well as operational inefficiencies in the plant.

2010 - 2011, Management of Continuous Ambient Air Quality Monitoring Network, Project Manager, Lonmin Platinum, North-West, South Africa

Management of the technical team tasked with the calibration and onsite maintenance of five full ambient air quality monitoring stations. The project included data management and verification of data and submission of detailed monthly monitoring reports.

2010 - 2011, Management of Dust Fallout Monitoring Network, Project Manager, Lonmin Platinum, North-West, South Africa

Management of the Lonmin dust fallout monitoring network, consisting of approximately 120 dust fallout samplers. The project included the collection and exchange of fallout units on a monthly basis, gravimetric analysis of samples, monthly reporting of fallout rates as well as an audit of the network. Furthermore, detailed analysis of certain samples was conducted identifying the significant sources within Lonmin contributing to dust fallout.

2010, Continuous PM₁₀ Monitoring, Project Manager, Kumba Iron Ore Sishen Mine, Northern Cape, South Africa

Two PM₁₀ monitors (MetOne E-Sampler and E-BAM) were installed at the Sishen Mine on a rental basis to investigate PM₁₀ concentrations in and around the mine to inform the siting of a permanent PM₁₀ monitoring network. The project involved the monthly maintenance of the units and compilation of monthly data analysis reports.

2010, Management of Continuous Ambient Air Quality Monitoring Network, Project Manager, City of Tshwane Metropolitan Municipality, Gauteng, South Africa

Management of the technical team tasked with the calibration and onsite maintenance of six full ambient air quality monitoring stations. The project included data management and verification of data and submission of detailed monthly monitoring reports.

2010, Management of Continuous Ambient Air Quality Monitoring Network, Project Manager, KwaZulu-Natal Department of Agriculture and Environmental Affairs, KwaZulu-Natal, South Africa

A six month contract managing the technical team tasked with the calibration and onsite maintenance of five full ambient air quality monitoring stations, as well as the repair of sensors and analysers within the network. The project included data management and verification of data and submission of detailed monitoring reports.

2009 – 2011, Management of Continuous Ambient Air Quality Monitoring Network, Project Manager, Mpumalanga Department of Land Affairs and Agriculture, Mpumalanga, South Africa

Management of the technical team tasked with the calibration and onsite maintenance of four full ambient air quality monitoring stations located within the Highveld Priority Area. The project included data management and verification of data, submission of detailed monthly reports, including meteorological overviews for the reporting periods as well as the comparisons of ambient concentrations to relevant South African Air Quality Standards.

2009 – 2010, Management of Continuous Ambient Air Quality Monitoring Network, Project Manager, Anglo Gold Ashanti Vaal River Operations, Orkney, South Africa

Management of the technical team tasked with the calibration and onsite maintenance of continuous, real-time monitoring equipment which included one real-time monitoring station, two meteorological stations, one continuous stack monitoring station and four continuous PM₁₀ monitors. The management included data management and verification of data, submission of detailed monthly reports, including meteorological overviews for the reporting periods as well as the comparisons of ambient concentrations to relevant South African Air Quality Standards.

2009, Continuous PM₁₀ Monitoring, Project Manager, Exxaro Grootegeluk Mine, Limpopo, South Africa

Two PM₁₀ monitors (MetOne E-Samplers) were managed and maintained at the Grootegeluk Mine. The project involved the quarterly maintenance of the units and compilation of quarterly data analysis reports. The reports included a meteorological overview for the reporting period, as well as the comparison of the PM₁₀ concentrations to the National Ambient Air Quality Standards.

2009, Passive Diffusive Monitoring, Project Manager, Exxaro Grootegeluk Mine, Limpopo, South Africa

Radiello passive diffusive samplers were deployed at the Grootegeluk Mine for two weekly monitoring campaigns, lasting a total of six months. Monitoring was conducted for sulphur dioxide, nitrogen dioxide and volatile organic compounds (specifically the BTEX range), with monitoring reports being submitted to the client on a monthly basis.

2008 – 2010, Management of Continuous Ambient Air Quality Monitoring Network, Project Manager, Department of Environmental Affairs, Gauteng, South Africa

Management of the technical team tasked with the calibration and onsite maintenance of six full ambient air quality monitoring stations located within the Vaal Triangle Priority Area. The management included data management and verification of data, submission of detailed monthly reports, including meteorological overviews for the reporting periods as well as the comparisons of ambient concentrations to relevant South African Air Quality Standards.

2008 – 2009, Continuous PM₁₀ Monitoring, Project Manager, Calgro M3 Holdings, Florida Ext 13, Gauteng, South Africa

One PM₁₀ monitor (MetOne E-Sampler) was installed at a proposed development site on a rental basis. The project involved the monthly maintenance of the unit and compilation of monthly data analysis reports. The reports included a meteorological overview for the reporting period, as well as the comparison of the PM₁₀ concentrations to the National Ambient Air Quality Standards.

2008 – 2009, Rain Enhancement Research, Flight Scientist, Data Operator and Science Team Manager, Climatology Research Group (CRG Wits), Riyadh and Abha, Saudi Arabia

The research involved the use of aircraft penetrating storms to determine the impact of cloud seeding on individual weather systems. Furthermore, upper air monitoring of criteria pollutants using the aircraft was conducted to determine the location and concentrations within the plume associated with Riyadh.

2008, Management of One Ambient Air Quality Monitoring Station, Project Manager, Airports Company South Africa (ACSA), OR Tambo International Airport, Johannesburg, South Africa

Management of the technical team tasked with the calibration and onsite maintenance of continuous, real-time monitoring equipment. The management included data management and verification of data, submission of detailed monthly reports, including meteorological overviews for the reporting periods as well as the comparisons of ambient concentrations to relevant South African Air Quality Standards.

2008, Passive Diffusive Monitoring, Project Manager, City of Tshwane Metropolitan Municipality, Bon Accord, Pretoria, South Africa

Radiello passive diffusive samplers were deployed at the Bon Accord quarry for two weekly monitoring campaigns, lasting a total of six months. Monitoring was conducted for sulphur dioxide, nitrogen dioxide and volatile organic compounds (specifically the BTEX range). Results from this monitoring campaign were used as input into a dispersion model to account for the background concentrations of the area.

2007 – 2011, Management of One Meteorological Station, Project Manager, Kumba Iron Ore Sishen Mine, Northern Cape, South Africa

Management of one meteorological station, including data management and verification of data, as well as the quarterly maintenance of the station.

2007, Passive Diffusive Monitoring, Project Manager, City of Johannesburg Metropolitan Municipality, Gauteng, South Africa

Radiello passive diffusive samplers were deployed throughout the City of Johannesburg, at 350 locations. Monitoring was conducted for sulphur dioxide, nitrogen dioxide and volatile organic compounds (specifically the BTEX range). A regular grid file was generated in ArcGIS 9.2 which informed the passive deployment team of the exact locations for the samplers. The outcome of the project was the identification of pollution hotspots within the municipality, where further, more sophisticated methods of monitoring is required.

AIR QUALITY IMPACT ASSESSMENTS

2013, Air Quality Impact Assessment for the Upgrade of an Emissions Extraction System, Project Manager, BHP Billiton Samancor Meyerton Works, Vereeniging, Gauteng

An Air Quality Impact Assessment and associated AEL amendment was undertaken for the proposed upgrade of the fugitive emissions extraction system at the Samancor Meyerton Works. The assessment included a baseline review of the site; compilation of a detailed site specific emissions inventory; and determination of the impact of the proposed project on the surrounding environment and nearby communities using the internationally approved modelling software, AERMOD.

2013, Air Quality Impact Assessment for a Biomass Boiler, Project Manager, Gledhow Sugar Company, KwaDukuza, KwaZulu-Natal

An Air Quality Impact Assessment and associated AEL amendment was undertaken for a proposed biomass boiler at the Gledhow Mill. The assessment included a baseline review of the site; compilation of a detailed site specific emissions inventory; and determination of the impact of the proposed project on the surrounding environment and nearby communities using the internationally approved modelling software, ADMS version 4.2.

2013, Air Quality Impact Assessment for a Tank Farm, Project Manager, Anglo American Thermal Coal Isibonelo Colliery, Mpumalanga, South Africa

An Air Quality Impact Assessment was undertaken for a proposed Tanks Farm at the Isibonelo Colliery. The assessment included a baseline review of the site; compilation of a detailed site specific emissions inventory; and determination of the impact of the proposed project on the surrounding environment and nearby communities using the internationally approved modelling software, ADMS version 4.2.

2013, Air Quality Impact Assessment for a Re-Mining Project, Project Manager, Anglo American Platinum Rustenburg Operations, North West, South Africa

As part of a larger environmental impact assessment, WSP was contracted to compile an air quality impact assessment for the Waterval Tailings Re-mining Project. The assessment included a baseline review of the site; compilation of a detailed site specific emissions inventory; and determination of the impact of the proposed project on the surrounding environment and nearby communities using the internationally approved modelling software, ADMS version 4.2. Specific models were created for each scenario of the project.

2013, Air Quality Impact Assessment for a Mine Shaft, Project Manager, Rustenburg Platinum Mines Limited Tumela Mine, Limpopo, South Africa

As part of a larger environmental impact assessment, WSP was commissioned to conduct an air quality impact assessment of the proposed Tumela Five Shaft and associated infrastructure at the existing Tumela mine in the Limpopo Province. The assessment included a baseline review of the site; compilation of a detailed site specific emissions inventory; and determination of the impact of the proposed project on the surrounding environment using the internationally approved modelling software, ADMS version 5.

2012, Air Quality Impact Assessment for a Ferrochrome Plant, Project Manager, Abalengani, North-West, South Africa

An air quality impact assessment was undertaken to determine the impact of emissions associated with a proposed ferrochrome plant, to be located in Rustenburg. The dispersion model (ADMS v4.2) included complex terrain to determine the dispersion of pollutants within the steep terrain associated with the Rustenburg area.

2012, Air Quality Impact Assessment for a Biomass Boiler, Project Manager, Sappi Southern Africa Ngodwana Sawmill, Mpumalanga, South Africa

An air quality impact assessment was undertaken to determine the impact of emissions associated with a proposed biomass boiler. The dispersion model (ADMS v4.2) included complex terrain to determine the dispersion of pollutants within the steep terrain associated with the Ngodwana area.

2012 - Current, Air Quality Management Plan at a Colliery, Project Manager, Anglo American Thermal Coal Landau Colliery, Mpumalanga, South Africa

An air quality management plan was developed for the Landau Colliery, accounting for all sources of emissions at the colliery. The main sources of pollution were identified, with detailed recommendations being provided to reduce emissions from these sources. This AQMP is an ongoing document, with the project being renewed annually, with the AQMP being amended to account for the changes in the Life of Mine Plan, specifically relating to mining locations.

2012 - Current, Air Quality Management Plan at a Colliery, Project Manager, Anglo American Thermal Coal Kleinkopje Colliery, Mpumalanga, South Africa

An air quality management plan was developed for the Kleinkopje Colliery, accounting for all sources of emissions at the colliery. The main sources of pollution were identified, with detailed recommendations being provided to reduce emissions from these sources. This AQMP is an ongoing document, with the project being renewed on an annual basis, with the AQMP being amended to account for the changes in the Life of Mine Plan, specifically relating to mining locations.

2012, Air Quality Management Plan at a Cement Plant, Project Manager, Afrisam South Africa Dudfield Plant, North-West, South Africa

An air quality management plan was developed for the Dudfield Plant, accounting for all sources of emissions at the plant. The main sources of pollution were identified, with detailed recommendations being provided to reduce emissions from these sources.

2012, Air Quality Impact Assessment for a Gas Engine Power Plant, Project Manager, Sasol New Energy Holdings, Mozambique

This assessment included the identification of baseline conditions, which was achieved through passive monitoring (NO₂, SO₂ and BTEX), dust fallout monitoring and meteorological monitoring. The emissions associated with the power plant were calculated using the US-EPA AP42 emission factors, which were used in the dispersion model (ADMS v4.2). Due to the site being located within steep terrain, the complex terrain option was included in the model.

2011, Air Quality Impact Assessment for a Biomass Boiler, Project Manager, Sappi Southern Africa Lomati Sawmill, Mpumalanga, South Africa

An air quality impact assessment was undertaken to determine the impact of emissions associated with a proposed power generation plant located adjacent to the Lomati Sawmill, specifically consisting of a biomass boiler with a heat input below 50MW, therefore not requiring an AEL. The dispersion model (ADMS v4.2) included complex terrain to determine the dispersion of pollutants within the steep terrain associated with the Lomati area.

2011, Air Quality Impact Assessment for a Sawmill, Project Manager, Sappi Southern Africa Lomati Sawmill, Mpumalanga, South Africa

An air quality impact assessment was undertaken to determine the impact of emissions associated with the replacement of the wood drying kilns at the Lomati Sawmill. As the drying of wood is a Listed Activity, an Atmospheric Emission License application was required. Monitoring of fugitive emissions from the kilns was conducted for inclusion into the dispersion model (ADMS v4.2), while monitoring was also conducted to determine the dust fallout associated with onsite activities. The dispersion model included complex terrain to account for the effect of terrain on dispersion of pollutants. Once the AQIA was completed, the AEL was submitted to the authorities, who have provided the Provisional AEL.

2010, Fugitive Dust Emissions Assessment, Project Manager, Exxaro Grootegeluk Mine Char Plant, Limpopo, South Africa

An assessment was undertaken to determine fugitive dust emissions associated with activities at the Char Plant. The assessment identified major contributing sources of fugitive emissions and mitigation strategies that should be implemented to reduce these emissions, as well as ambient air quality monitoring recommendations, including monitoring techniques and siting of the network.

2009, Air Quality Impact Assessment for Chromium Processing Plant, Project Manager, Mittal Steel Newcastle, KwaZulu-Natal, South Africa

An air quality impact assessment was undertaken to determine the impact of emissions associated with a plant expansion at the Chromium Processing Plant. The AQIA was conducted using an emissions inventory provided by the client, while emission rates for the expansion were calculated using US-EPA AP42 emission factors. The dispersion model used was ADMS v4.1, where long-term scenarios were run to predict the annual average concentrations of criteria pollutants. Isoleth outputs from the model were generated in Surfer.

2007, Air Quality Baseline Assessment for a Proposed Development, Project Manager, Calgro M3 Holdings, Gauteng, South Africa

An air quality baseline assessment was undertaken to determine the impact associated with the construction of a low cost housing development in Florida, Gauteng. The assessment included the short-term monitoring data obtained for the meteorology, dust fallout and PM₁₀.

ENVIRONMENTAL NOISE MONITORING**2013, Noise Monitoring, Project Manager, Sonae Novobord Panbult Plant, Mpumalanga, South Africa**

Noise monitoring was conducted during the daytime and night-time at Sonae Panbult Plant. A compliance assessment report was submitted detailing areas of concern in terms of noise propagating from the plants.

2012, Noise Monitoring, Project Manager, Anglo Gold Ashanti Vaal River and West Wits Operations, Free State, South Africa

Noise monitoring was conducted during the daytime and night-time at various plants at the Anglo Gold Vaal River and West Wits Operations. A compliance assessment report was submitted detailing areas of concern in terms of noise propagating from the plants.

PALEONTOLOGICAL IMPACT ASSESSMENT

Resumé: Professor Barry Dean Millstead

Qualifications

B.Sc Geology (Hons), University of Wollongong, Australia, 1982 -1985
Ph.D Geology, University of Queensland, Australia, 1986 - 1997

Professional Institutes

South African Council for Natural Scientific Professions (Reg No 400332/07)
Geological Society of South Africa
Paleontological Society of South Africa

Relevant Career Experience

University of Limpopo: 2014-present **Position:** Associate Professor
Role: Conducting research in geological and palaeontology. Present diverse courses to students at all study levels. To assist with academic administration of the department and to provide academic leadership to students and junior staff members.

Various: 2006 –Present **Position:** Consulting Geologist/ Principle of BM Geological Services

- **2014 Palaeontological Impact Assessment Report, Limpopo**
Preparation of a Palaeontological Impact Assessment Report on the site of proposed solar power generation facility near Pongola, Mpumalanga Province.
- **2014 Palaeontological Impact Assessment Report, Limpopo**
Preparation of a Palaeontological Impact Assessment Report on the site of proposed solar power generation facility near Newcastle, Mpumalanga Province.
- **2014 Palaeontological Impact Assessment Report, KwaZulu-Natal**
Preparation of a Palaeontological Impact Assessment Reports on the sites of two proposed solar power generation facility near Senekal, KwaZulu-Natal Province.
- **2014 Palaeontological Impact Assessment Report, Northern Cape**
Preparation of a Palaeontological Impact Assessment Report on the site of the proposed expansion of a gypsum mine near Loerisfontein, Northern Cape Province.
- **2014 Palaeontological Impact Assessment Report, Northern Cape**
Preparation of a Palaeontological Impact Assessment Report on the site of the proposed expansion of coal mining operations at Vele coal mine, Limpopo Province.
- **2014 Palaeontological Impact Assessment Report, Free State**
Preparation of a Palaeontological Impact Assessment Report on the site of the proposed expansion of a school site in Clarens, Free State Province.
- **2014 Palaeontological Impact Assessment Report, Mpumalanga**
Preparation of a Palaeontological Impact Assessment Report on the site of the proposed ring road construction around Ermelo, Mpumalanga Province.
- **2014 Palaeontological Impact Assessment Report, Mpumalanga**
Preparation of a Palaeontological Impact Assessment Report on the site of the proposed sand and clay mine, near Cullinen, Mpumalanga Province.
- **2014 Palaeontological Impact Assessment Report, Limpopo**
Preparation of a Palaeontological Impact Assessment Report on the site of proposed coal-fired power station near Lephelale in Limpopo Province.
- **2013 Palaeontological Impact Assessment Report, Northern Cape**
Preparation of a Palaeontological Impact Assessment Report on the site of proposed civil construction project near Sutherland in Northern Cape Province.

- **2013 Palaeontological Impact Assessment Report, Eastern Cape**
Preparation of a Palaeontological Impact Assessment Report on the site of proposed civil construction project near Sterkstroom in Eastern Cape Province.
- **2013 Palaeontological Impact Assessment Report, Free State**
Preparation of a Palaeontological Impact Assessment Report on the site of proposed civil construction project near Virginia in Free State Province.
- **2013 Palaeontological Impact Assessment Report, Free State**
Preparation of a Palaeontological Impact Assessment Report on the site of proposed civil construction project near Odendaalsrust in Free State Province.
- **2013 Palaeontological Impact Assessment Report, Free State**
Preparation of a Palaeontological Impact Assessment Report on the site of proposed civil construction project near Henneman in Free State Province.
- **2013 Palaeontological Impact Assessment Report, North West**
Preparation of a Palaeontological Impact Assessment Report on the site of proposed civil construction project near Lichtenburg in North West Province.
- **2013 Palaeontological Impact Assessment Report, Limpopo**
Preparation of a Palaeontological Impact Assessment Report on the site of proposed civil construction project near Lephalale in Limpopo Province.
- **2013 Palaeontological Impact Assessment Report, Eastern Cape**
Preparation of a Palaeontological Impact Assessment Report on the site of proposed civil construction project Near Aberdeen in Eastern Cape Province.
- **2012 Manganese, Zimbabwe**
Appraisal of geological setting and mineralisation style of vein-hosted manganese deposits.
- **2012 Palaeontological Impact Assessment Report, Gauteng**
Preparation of a Palaeontological Impact Assessment Report on the site of proposed civil construction project in southern Gauteng Province.
- **2012 Palaeontological Impact Assessment Report, Mpumalanga**
Preparation of a Palaeontological Impact Assessment Report on the site of proposed civil construction project near Waterval Boven, Mpumalanga Province.
- **2012 Gold, Sudan**
Field verification program of remote sensing characterisation of structurally deformed Precambrian age igneous and sedimentary strata. A significant component of the study involved the collection of geological data and lithological samples for assay. Compilation of exploration program.
- **2012 Gold, Eastern Democratic Republic of Congo**
Planning and implementation of a detailed soil and stream sediment sampling programs as well as structural and lithological mapping program covering approximately 300km² in the structurally deformed, gold-bearing strata of the Kibaran Orogeny. Lithological and structural mapping formed a significant component of the study. The project resulted in a detailed assessment of the economic potential of a number of prospecting concession areas.
- **2012 Building Sand and Brick Clay, Western Cape**
Planning and implementation of a detailed pitting and sampling program within Cainozoic age sediments to determine the economic potential of sand and clay deposits.
- **2011 Mine Works Program, Mpumalanga**
Preparation of a Mine Works Program for a proposed gravel quarry in the Mpumalanga
- **2011 Copper, Democratic Republic of Congo**
Lithological and structural mapping of an area of approximately 320 km² in the structurally deformed Katangan Copper Belt sequence resulting in the production of geological maps and a structural synthesis. Interpretation of mineralization style and genesis as well as generation of exploration targets were significant outputs of the fieldwork program.
- **2011 Palaeontological Impact Assessment Report, Northern Cape**
Preparation of a Palaeontological Impact Assessment Report on the site of proposed manganese mine northwest of Hotazel, Northern Cape.
- **2010 Palaeontological Impact Assessment Report, Northern Cape**
Preparation of a Palaeontological Impact Assessment Report on the site of a mineral exploration permit north-west of Fraseburg, Northern Cape.

- **2010 Palaeontological Impact Assessment Report, Northern Cape**

Preparation of a Palaeontological Impact Assessment Report on the site of a mineral exploration permit west of Victoria West, Northern Cape.

- **2010 Palaeontological Impact Assessment Report, Northern Cape**

Preparation of a Palaeontological Impact Assessment Report on the site of a mineral exploration permit east of Victoria West, Northern Cape.

- **2010 Palaeontological Impact Assessment Report, Western Cape**

Preparation of a Palaeontological Impact Assessment Report on the site of a mineral exploration permit near Beaufort West, Western Cape.

- **2010 Palaeontological Impact Assessment Report, Western Cape**

Preparation of a Palaeontological Impact Assessment Report on the site of a mineral exploration permit south of Fraseburg, Western Cape.

- **2010 Palaeontological Impact Assessment Report, Eastern Cape**

Preparation of a Palaeontological Impact Assessment Report on the site of a mineral exploration permit near Craddock, Western Cape.

- **2009 Alluvial Diamonds, Mozambique**

Desktop appraisal of the geological potential for alluvial diamonds in a selected area of eastern Mozambique.

- **2009 Mine Works Program**

Preparation of a Mine Works Program for a proposed brick clay quarry, eastern Western Cape Province.

- **2007 Lead/Zinc , Nigeria**

Desktop low level due diligence report on a predominantly lead/zinc hosting vein deposit Located in Nigeria.

- **2007 Building Sand/ Ceramic Clay, Western Cape**

Planning and implementation of a detailed pitting and sampling program within Cainozoic age sediments to determine the economic potential of sand and clay deposits.

- **2007 Brick Clay, Western Cape**

Planning and implementation of a due diligence study of an operating clay quarry to ascertain the quantity and quality remaining clay resources as well as identification of possible negative environmental issues that may constitute a barrier to utilisation of remaining resources. The study resulted in a calculation of potential life of mine and a valuation for the deposit.

- **2007 Gold, Northern Free State**

Desktop study to identify the location of historical exploration boreholes and field-based follow-up and location validation survey. These activities formed part of a larger due diligence study.

- **2007-2011 Uranium, Karoo**

The majority of this time has been involved in the management of an extensive exploration programme for sediment hosted uranium in the Karoo of South Africa. This project was taken through all exploration phases from the point of initiation through satellite and air photo interpretation, managing of air-borne geophysical surveys and interpretation of the results, extensive field mapping, target generation through to (and including) the drilling and initial resource calculations.

Universities of KZN and Durban-Westville : 2003 - 2006

Position: Lecturer, Geology

Role: During the tenure of this position a number of courses were produced and presented including stratigraphic principles, sedimentary basin analysis, Precambrian geology of South Africa, palaeontology, a half-year first year level course on Earth's surface processes which contained a one semester set of practical exercises based on understanding and interpretation of geological maps.

Council for Geoscience: 1990 - 2000

Position: Research Scientist

Role: Conducting research programs, including responsibility for identification of research needs, planning and conduct of research. Production of research reports and papers. Research was predominantly centred the stratigraphy of southern African Karoo-age sedimentary basins. Research programs were a combination of biostratigraphic, and purely stratigraphic research, combining sedimentological, biostratigraphic, and climatological data. The scale of investigation varied between local and broad scale international correlations. As a result a broad knowledge of world wide, late Palaeozoic and Mesozoic continental sedimentary systems was developed.