

THE INCLUSION OF A CONTRACT OF

Specialist Assessments and Additional Impacts



2019 STRATEGIC ENVIRONMENTAL ASSESSMENT FOR THE IDENTIFICATION OF ENERGY CORRIDORS AS WELL AS ASSESSMENT AND MANAGEMENT MEASURES FOR THE DEVELOPMENT OF A PHASED GAS PIPELINE NETWORK IN SOUTH AFRICA











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Sir South African National Biodiversity Institute



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public enterprises

PART 3, SPECIALIST ASSESSMENTS AND ADDITIONAL IMPACTS, Page 1 STRATEGIC ENVIRONMENTAL ASSESSMENT FOR A PHASED GAS PIPELINE NETWORK IN SOUTH AFRICA





3 3.1 Introduction

4 This section of the report describes the process undertaken for the 5 assessment of the Draft Refined Corridors. This includes assessment 6 undertaken by Specialists and the Project Team. The latter is informed by 7 previous Strategic Environmental Assessments (SEAs) undertaken by the 8 CSIR (such as the Electricity Grid Infrastructure (EGI) SEA in 2016), as 9 well as discussions with various specialists and authorities. 10

11 3.2 Scope of Work and Approach

12 3.2.1 Scope of Work

13 The geographic scope of the assessment was focused on the Draft 14 Refined Corridors (as described in Part 2 of the SEA Report). The scope 15 of the Specialist Assessments considers the construction and operation 16 of onshore gas transmission pipeline infrastructure and associated 17 infrastructure, such as pigging stations, block valves and access roads, 18 and includes an assessment of social, economic and biophysical 19 opportunities and risks associated with the proposed development. The 20 scope of issues addressed in the SEA was informed by an in-depth review 21 of similar assessments undertaken locally and globally, as well as by 22 engagement with stakeholders and governance groups.

23

24 In order to advance the principles of balance and comprehensiveness, 25 the main specialist topics in the assessment have been addressed by 26 multi-author teams. Each of the Specialist Assessments therefore has 27 multiple authors, which were selected on the basis of their acknowledged 28 expertise, inclusive of appropriate formal qualifications and experience, 29 peer-group recommendations and track record of outputs.

30

31 Each team includes one Integrating Author, several Contributing Authors 32 and in some cases Corresponding Authors. The Integrating Authors were 33 responsible for ensuring that all the components written by Contributing 34 and Corresponding Authors were delivered on time, and were 35 incorporated in a logical manner in each Chapter; and that the scope of 36 the Chapter was addressed. Integrating Authors also reviewed the input 37 from Contributing and Corresponding Authors, and compiled sections of 38 the assessment chapters. They were also responsible for ensuring that 39 comments from experts, project partners, project team members, 40 stakeholders and peer reviewers have been adequately addressed 41 and/or incorporated and documented. 42 Contributing Authors were responsible for compiling text, references, 43 tables and graphics for sections of the assessment chapters. These were 44 submitted to their Integrating Authors, based on agreed formats and 45 templates. They also assisted in addressing reviewer comments relating 46 to text they have contributed.

47

48 The Corresponding Authors were also responsible for delivering text, 49 references, tables and graphics to their Integrating Authors. They were 50 also selected to conduct review and provide expert feedback on relevant 51 sections of the assessment reports.

52

53 During the SEA Process, two Multi-Author Workshops were held with the 54 Specialist Teams. The Integrating and Contributing Authors were 55 expected to attend all writing workshops and actively participate in the 56 discussions and decisions taken. The first Multi-Author Workshop took 57 place on 7 December 2017 to inform the Specialist Team of the scope of 58 the project, as well as to discuss and confirm the scope of the specialist 59 assessments and the report structure, and potential alignment between 60 studies, data requirements, gaps, and any concerns raised. The second 61 Multi-Author Workshop was held on 20 April 2018 in order to discuss the 62 first draft reports compiled by the Specialists, as well as to discuss 63 information requirements, gaps and tasks for completion. 64

65 3.2.2 Specialist and Author Team Expertise

66 Table 1 illustrates the Specialist Assessments that have been 67 undertaken as part of this SEA, as well as the associated authors. Table 68 2 includes a description of the Specialist and Author Team expertise. 69 Signed specialist declarations of interest are also included in Appendix A 70 of this chapter.

71

72 3.2.3 Review Process

73 In the Gas Pipeline SEA, review of reports, tools and outputs during 74 various stages of the SEA is considered a significant element of the 75 process. These include review by key stakeholders and experts that have 76 in-depth knowledge and insights into the subject of the SEA, as well as 77 review by academic peers and members of the public. These types of 78 reviews promote transparency and enables concerns raised by affected 79 parties to be considered, where applicable. It also ensures that the SEA 80 is relevant and scientifically comprehensive. Academic peer review of 81 specialist chapters compiled for the SEA promotes overall robustness of 82 the process and ensures that scientific credibility is upheld. The overall 83 review processes undertaken for this SEA are described in this section. 84

85 The first draft of each Specialist Assessment chapter was reviewed 86 internally by the SEA Project Team consisting of the Council for Scientific 87 Industrial Research (CSIR) and South African National Biodiversity 88 Institute (SANBI). The chapters were then revised by the specialists 89 based on the initial review comments and the second draft was compiled 90 and sent to the Peer Reviewers and Project Partners for review (i.e. the 91 National Departments of Environmental Affairs, Energy and Public 92 Enterprises, as well as Eskom, iGas and Transnet). Following this, the 93 chapters were revised by the specialists based on the partner and peer 94 review comments, and finalised in a third version for wider public and 95 stakeholder review. The SEA Process is currently at this stage, whereby 96 the Specialist Chapters, as well as Chapters on the background to the 97 SEA have been uploaded on the project website 98 (https://gasnetwork.csir.co.za/). 99

100 The expert peer reviewers were identified from existing scientific 101 publications collected throughout the process and through nominations 102 from the SEA Project Team, general stakeholders, Expert Reference 103 Group and the Specialists. A total of 13 peer reviewers, from NGOs, 104 academia and research institutions; and the private sector provided peer 105 review comment. Table 1 indicates the peer reviewers that have been 106 appointed for the SEA Process. 107

108 The Peer Reviewers were requested to provide their comments in a 109 standardised document making reference to the specific page number 110 and line number when documenting their comments. When the 111 Specialists were re-drafting their third version of the report for public and 112 stakeholder review, they were requested to detail, in the Peer Review 113 Sheets, how the comments have been addressed and incorporated into 114 the Specialist Assessment Chapters. The completed Peer Review Sheets 115 and Specialists Responses are included in Appendix B, and are therefore 116 available in the public domain via the project website 117 (https://gasnetwork.csir.co.za/). 118





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Table 1: Details of the Specialist Assessment Chapters, Specialist Team and Peer Reviewer Team

Specialist Chapter	Integrating Author	Specialist Section	Contributing Author	Corresponding Author	Peer Reviewer
		Fynbos Biome	 Dr. David Le Maitre; CSIR 		 Professor Brian W. van Wilgen; Academic/Researcher (associated with the University of Stellenbosch)
		Savannah and Grassland Biomes	 Dr. Graham von Maltitz; CSIR Bonolo Mokoatsi; CSIR 		 Professor Bob Scholes; University of the Witwatersrand Johannesburg
		Indian Ocean Coastal Belt Biome	 Simon Bundy and Alex Whitehead; SDP Ecological and Environmental Services 		 Duncan Hay, Catherine Pringle, and Leo Quayle, Institute of Natural Resources
		Succulent and Nama Karoo Biomes	 Lizande Kellerman; CSIR Simon Todd; 3 Foxes Biodiversity Solutions 		 Professor Sue J. Milton-Dean; Renu-Karoo Veld Restoration
Integrated Biodiversity and Ecology Assessment (Terrestrial and Aquatic Ecosystems, and Species)	Luanita Snyman-Van der Walt, CSIR	Albany Thicket Biome	 Dr. Derek Berliner; Eco-Logic Consulting 	 Dr. Werner Marais; Independent Consultant, affiliated with University of Pretoria Jon Smallie; Birdlife South Africa Dr. John Midgely; Academic/Researcher Dr. William Branch; Academic/Researcher Werner Conradie; Academic/Researcher Dr. Dean Pienke/WWF, ECPTA 	 Professor Sue J. Milton-Dean; Renu-Karoo Veld Restoration
		Estuaries	 Dr. Lara Van Niekerk, Carla-Louise Ramjukadh and Steven Weerts,; CSIR 		 Professor Janine Adams; Nelson Mandela University
		Wetlands and Rivers	 Gary de Winnaar and Dr. Vere Ross- Gillespie; GroundTruth 		 Duncan Hay, Catherine Pringle, and Leo Quayle, Institute of Natural Resources Nancy Job; SANBI
		Avifauna	 Albert Froneman and Chris van Rooyen; Chris Van Rooyen Consulting 		 Jonathan Booth and Robin Colyn, Birdlife South Africa
		Bats	Kate MacEwan; Inkululeko Wildlife Services		 Refer to Note 1 below
		Fauna	• All of the above (Refer to Note 2 below)	 Kate MacEwan; Inkululeko Wildlife Services 	
Seismicity Assessment	Prof Raymond Durrheim; University of the Witwatersrand	Impacts of Earthquakes, Seismicity and Faults	 Brassnavy Manzunzu; Council for Geoscience 		 Professor Andrzej Kijko; University of Pretoria Dr Alistair Sloan; University of Cape Town
Settlement Planning, Disaster Management and related Social	Surina Laurie, CSIR Annick Walsdorff, CSIR	Settlement and Development Planning	 Elsona van Huyssteen; CSIR Cheri Green; CSIR Dave McKelly; CSIR Zukisa Sogoni; CSIR 	 Tony Barbour; Tony Barbour Environmental Consulting and Research Dr Hugo van Zyl; Independent Economic Researchers 	 Peter Magni; Independent Consultant
Impacts		Disaster Management	 Professor Doreen Atkinson; Nelson Mandela University 		
Additional Issues		Agriculture	 Johann Lanz; Independent Consultant 		
(Agriculture, Defence,	Annick Walsdorff, CSIR Rohaida Abed, CSIR	Defence and Civil Aviation			
Civil Aviation, and Heritage) - Refer to Note 3 below		Heritage	 Fahiema Daniels, SANBI Tsamaelo Malebu, SANBI 		
Gas Opportunities Analysis	Rae Wolpe; Impact Economix	A Gas Opportunities Analysis Report was review of the gas sector opportunities for	s commissioned to mainly provide a brief overviev cusing on potential gas bulk users in South Africa.	w of the potential future opportunities and benefi This study is included as Appendix 1 of Part 1 of th	ts of gas within the region and included a rapid le SEA Report.
3 Note 1: A detailed assessment of i	mpact on bats as a result of the ga	s pipeline development was not required as it is not	expected to be of extreme significance. However the report do	pes discuss potential impacts relating to habitat destruction or	disturbance during the construction of a gas pipeline and does

4 provide guidance on the requirements that should be followed in each of the four sensitivity tiers. This high level assessment is deemed suitable for an SEA study of this nature and where necessary the site specific studies will provide more detail.

5 Note that faunal input was provided by the Specialist Contributing Authors for each Biome and Ecosystem Report included in the Integrated Biodiversity and Ecology Assessment (Terrestrial and Aquatic Ecosystems, and Species). This input was reviewed and augmented by Kate MacEwan of Inkululeko 6 Wildlife Services.

7 Note 3: The impact of gas pipeline development on Agriculture, Defence, Civil Aviation and Heritage features is anticipated to be of limited significance. This section is largely based on the 2016 EGI SEA Assessment due to impact similarities and where required additional specialist input was obtained. In 8 addition, in terms of the National Heritage Resources Act (Act 25 of 1999), a Heritage Impact Assessment will need to be done for the gas pipeline during the project specific phase.







Table 2: Specialist and Author Team Expertise

Specialist and Affiliation	Proiect Role	Biosketch
Integrated Biodiversity and Ecology	Assessment (Terrestrial	and Aquatic Ecosystems, and Species)
		Luanita Snyman-Van der Walt commenced work at CSIR in January 2014, after completing a BSc Botany-Zoology-Tourism, a BSc. Honor
Luanita Snyman-Van der Walt,	Integrating Author	Environmental Science at the North West University, Potchefstroom Campus. She is currently pursuing an MSc. in Geographical Informatis registered as a Professional Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP) (Registration System (GIS) analyses for environmental assessment and management, with a focus on Geographic Information System (GIS) analyses for environmental
CSIR	Integrating Aution	has conducted numerous ecological specialist studies and served as project manager for several Environmental Impact Assessments assisted in managing the shale gas development scientific assessment. She also fulfilled the role of Integrating Author for the Biod
		Expansion SEA. She also provided technical GIS and manning support on the Strategic Environmental Assessment Aquaculture Development
Dr. David Le Maitre; CSIR	Contributing Author	Dr. David Le Maitre has more than 30 years of research experience in the ecology of Cape fynbos vegetation, as well as fire ecology and hydrological and ecological impacts of invading alien plants and in the dynamics of invasion processes. His area of interests lies in the in and the ecosystems services they generate, including river assimilatory capacity; and developing diagnostic tools to assess the impact water quality regulation based on the landscape features and water flows. David Le Maitre is a research associate at the Centre for associate professor extraordinary at the School of Public Management and Planning, at the same university. Le Maitre holds a PhD in public defense the University of Cape Term
Dr. Graham von Maltitz; CSIR	Contributing Author	Dr. Graham von Maltitz is a CSIR research group leader for global change and ecosystems dynamics department of the CSIR. He special involving the interface between humans and natural resource management in the terrestrial environment. He holds a PhD in ecology and has over 30 years of experience in environmental and global change, focused on unique problems associated with resource ecosystems dynamics on areas of communal land management. He has worked extensively in the savanna, forest and grassland biomes of resource use within the communal areas. More recently he has focused on the causes and consequences of global change. This include use and land-use change as well as biomass-based energy. He has been involved in a number of global science/policy forums and p Convention to Combat Desertification and the Intergovernmental science-policy Platform on Biodiversity and Ecosystem Services.
Bonolo Mokoatsi; CSIR	Contributing Author	2018 while pursuing a MSc in Environmental Management. With her MSc research, she aims to support precision agriculture through seasonal responses to variable-rate fertilizers and irrigation. Her work at CSIR involved GIS support and satellite image processing for me environmental assessments and technical reports. She fulfilled the role of GIS specialist for the Biodiversity Assessment of the Gas Pij GIS support for assessing canopy cover versus above-ground biomass in an effort to map the distribution of bush encroachment in the Bonolo also serves as an external marker for the University of South Africa in the subject of GIS and remote sensing.
Simon Bundy; SDP Ecological and Environmental Services	Contributing Author	Simon Bundy has been involved in environmental and development projects and programmes since 1991 at provincial, national municipal, NGO and private sectors, providing a broad overview and understanding of the function of these sectors. Simon Bundy has coastal management and botanical issues including the undertaking of EIAs and Specialist Assessments. He has local and internation involved in a number of large scale power projects as well as the development of residential estates, infrastructure and linear development Cape, where he has provided both technical support, as well as the undertaking of rehabilitation programmes. From a technical secological systems in the near shore environment and is competent in a large number of ecological methodologies and analytical meth analysis. He is competent in wetland delineation and has formulated ecological coastal set back methodologies for EKZN Wildlife ar Tourism and Environmental Affairs in conjunction with the Oceanographic Research Institute. He has also worked on coastal marine po companies and has undertaken projects for the Global Environment Fund of the United Nations. He acts as botanical and environment provides technical support to the IEM division of the CSIR, Stellenbosch. He is a registered Professional Natural Scientist (Ecology – Regi
Alex Whitehead; SDP Ecological and Environmental Services	Contributing Author	Alex Whitehead is an Ecologist registered with SACNASP (400176/10). He holds a BSc Honours specializing in Ichthyology and Fisherie lead specialist in a number of terrestrial, aquatic and wetland studies. His specialist involvement has been linked with a diverse range treatment works, housing estates, industrial estates, bulk infrastructure such as water and power lines, harbours, piers, renewable energy and agri-industrial facilities. His specialist fields of interest include aquatic ecology (both freshwater and estuarine, ichthyofauna and inv assessments; and terrestrial ecology (fauna and flora). Alex has 13 years of experience, which includes projects undertaken throughout \$
Lizande Kellerman; CSIR	Contributing Author	Lizande Kellerman holds a Bachelor's degree in Zoology and Entomology, with an Honours and Masters in Botany both at the University Conservation Ecology from Stellenbosch University. She is a registered Professional Natural Scientist (Botanical Sciences – Registration more than 10 years' experience in environmental assessment and management studies, primarily in planning, preparing, managing an (BA, EIA and SEA), environmental management plans (EMPs), environmental screening studies, fatal flaw assessments, cultivation rights use, waste management, mining, bioprospecting and biodiversity permitting for numerous projects in the agricultural (including aquad renewable energy sectors.
Simon Todd; 3 Foxes Biodiversity Solutions	Contributing Author	Simon Todd has 18 years' experience as a terrestrial ecologist in arid systems and biodiversity assessments. His primary focus includes with the arid ecosystems of South Africa. He is also familiar with the SEA process and has contributed amongst others, to the REDZ SEA SEA. Apart from the above studies, he has also worked extensively across the Nama and Succulent Karoo and has provided specialist economic developments. He is the Nama and Succulent Karoo representative on the National Vegetation Map Committee. Simon Todd is a record chairman of the Arid-Zone Ecology Forum and has 20 years' experience working throughout the country. Simon Todd is registered with the
Dr. Derek Berliner; Eco-Logic Consulting	Contributing Author	Dr. Derek Berliner is an independent environmental consultant, with over 25 years of experience. He obtained a BSc in Agriculture, ar University of Pretoria. He also holds a MSc in Botany from the University of Witwatersrand and a PhD in Botany from the University of C





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ours in Environmental Science, as well as a MSc in ation Science at Vrije Universiteit Amsterdam, and ation Number 400128/16). Her work at the CSIR vironmental assessment and decision-making. She and Basic Assessments across South Africa. She liversity Assessment of the Gas Pipeline and EGI ment in South Africa.

management. His work focuses on assessing the impacts of invasions on river and wetland systems ts of land-use and land management practices on Invasion Biology, Stellenbosch University, and an plant ecology, specialising in invasion ecology and

lises in large, integrated multidisciplinary projects from the Nelson Mandela Metropolitan University plogy and management in southern Africa, with a southern Africa, focusing particularly on natural ed terrestrial feedbacks to climate processes, land processes, including links with the United Nations

annesburg. She commenced work at CSIR in April a non-destructive approach for monitoring crops' ulti-disciplinary studies, NEXUS trade-off analyses, ipeline and EGI Expansion SEA. She also provided Savannah and Grassland biomes of South Africa.

and international level, with employment in the a core competency in coastal ecological systems, onal experience, and in South Africa, he has been nents in KwaZulu-Natal, Eastern Cape and Western specialist perspective, Simon focuses on coastal nods including multivariate analysis and canonical nd for the Department of Economic Development ollution projects for various insurance and salvage mental specialist for Eskom Eastern Region and istration Number: 400093/06) with SACNASP.

es Science from Rhodes University. He serves as a of development scenarios, including waste water rgy (solar and wind power), dams, and aquaculture vertebrates); wetland delineation and functionality South Africa, as well as in Ghana.

of Pretoria. She is currently completing her PhD in on Number: 400076/10) with SACNASP. She has nd conducting environmental impact assessments ts and license applications for air emissions, water culture), construction, environmental, mining and

examining the impacts of land use on biodiversity A, Shale Gas SEA, SKA, as well as the ESKOM EGI cological assessments for more than 150 different ognised arid-areas ecological expert and is a past ne SACNASP (Registration Number: 400425/11). nd BSc Honours in Wildlife Management from the Cape Town. Some of his key areas of expertise are

Specialist and Affiliation	Project Role	Biosketch
		forest ecology and conservation planning; biophysical baseline studies for community conservation planning and impact evaluation; bio
		hierarchy in SEIAs; training for application of IFC performance standard 6: biodiversity safeguards; and developing environmental manage
Dr. Lara Van Niekerk; CSIR	Contributing Author	br. Lara van Niekerk joined the CSIR in 1994, where she fulfils a role of Senior Scientist. Lara is part of a core team that deve strategic/operational policies and legislation required for the effective management of South Africa's estuaries. She has been involved studies. Lara is the architect of the SA National Estuarine Management Protocol and related planning guidelines. She led the team of s of all South Africa's estuaries as part of the SA National Biodiversity Assessment in 2011 and in the process of refining this for 2018.
Carla-Louise Ramjukadh; CSIR	Contributing Author	Carla-Louise Ramjukadh served as a Candidate Researcher in the Coastal Systems Research Group of the Natural Resources and the 2018. She is currently working for the South African Weather Services – Marine Research Institute as a Scientific Researcher. She how Water Science from the University of Western Cape, as well as a MSc in Biological Science from the University of Cape Town. She has be but not limited to, Estuarine Management Plans in the Western Cape Province, effect of climate change in coastal systems, and character
Steven Weerts; CSIR	Contributing Author	Steven Weerts joined the CSIR in 2004 as a Senior Scientist, and currently fulfils the role of Research Group Leader for the Coastal Res MSc from the University of Natal, and the latter from the University of Zululand. He has extensive experience in Marine Ecology and has specialist consultancy reports to private and public sectors clients, stakeholders and users. He has also published many scientific Management Plans, Outfall Monitoring Programmes, and Port Planning projects, and also served as the Integrating Author for the Marin Assessment Aquaculture Development in South Africa.
Gary de Winnaar; GroundTruth	Contributing Author	Gary de Winnaar has over ten years of experience in professional consulting services while conducting assessments of aquatic and the flora. He has provided specialist input for a range of studies requiring solutions regarding practical and applied terrestrial and aquatic enterrestrial elements, survey fauna and flora, characterise and map biodiversity features (including sensitive habitats), conduct specialist and assessing impacts to biodiversity and the environment. He is particularly interested in the assessment of environmental flows to er supported by sustained water flow. He managed and integrated specialist teams and inputs covering specialist fields such as services/resource economics, etc. He is a registered Professional Natural Scientist (Ecological Science – Registration Number: 400454).
Dr. Vere Ross-Gillespie; GroundTruth	Contributing Author	Dr.Vere Ross-Gillespie currently manages the Rivers Division of GroundTruth, where work consists of conducting environmental flow a and water quality monitoring, impact assessments, river ecological surveys, rehabilitation and also research. Vere has eight years of a freshwater ecology. He is also involved in a wide range of active research projects, both local and internationally. Vere's research Limnology, Climate Change and Biology. Current/recent research projects include Adaptability and Vulnerability of Riverine Biota to Clim Periphyton as Indicators of flow and nutrient alterations for the management of water resources. He is a registered Professional Natural
Albert Froneman; Chris Van Rooyen Consulting	Contributing Author	Albert Froneman has more than 15 years' experience in the management of avifaunal interactions with industrial infrastructure. He hold University of Cape Town. He managed the Airports Company South Africa (ACSA) – Endangered Wildlife Trust Strategic Partnership fro recognized for its achievements in addressing airport wildlife hazards in an environmentally sensitive manner at ACSA's airports across expert in the field of bird hazard management on airports and has worked in South Africa, Swaziland, Botswana, Namibia, Kenya, Israel, of the International Bird Strike Committee. At present he is consulting to ACSA with wildlife hazard management on all their airports. He consultant outside the aviation industry and has completed a wide range of bird impact assessment studies and pre-construction mor Avifauna Assessment of the 2016 EGI SEA. Since 2009 Albert has been a registered Professional Natural Scientist (Registration Nu Zoological Science.
Chris van Rooyen; Chris Van Rooyen Consulting	Contributing Author	Chris van Rooyen has nineteen years' experience in the assessment of avifaunal interactions with industrial infrastructure. He was emptive the Eskom-EWT Strategic Partnership from 1996 to 2007, which has received international acclaim as a model of co-operative mar conservation. He is an acknowledged global expert in this field and has consulted in South Africa, Namibia, Botswana, Lesotho, New Zea extensive project management experience and he has received several management awards from Eskom for his work in the Eskom-EV co-author of 17 conference papers, co-author of two book chapters, several research reports and the current best practice guidelines for completed more than 100 power line assessments; and has to date been employed as specialist avifaunal consultant on more than also conducted numerous risk assessments on existing power lines infrastructure. He also works outside the electricity industry and he studies associated with various residential and industrial developments. He was also a specialist author on the Avifauna Assessment of
Kate MacEwan; Inkululeko Wildlife Services	Contributing Author	Kate MacEwan is a SACNASP registered zoologist and environmental scientist and holds a BSc (Honours) in Zoology from Wits Uni practical bat conservation experience and wide diversity of contacts with various African bat academics and biologists. Kate is cur Assessment Advisory Panel (SABAAP), and a co-author of both the South African Good Practise Guidelines for Surveying Bats in Wind Fa and the South African Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy Facilities: 1 st Edition (Aronson et al. species accounts (including some from Mozambique) in the latest southern African Red Data mammal listings (Child et al. (2016)). S Phase 1 Renewable Energy Development Zones SEA, and is also part of the Phase 2 assessment.
Seismicity Assessment		
Professor Raymond J Durrheim; University of the Witwatersrand Johannesburg	Integrating Author	Protessor Raymond Durrheim is the South African Research Chair of Exploration, Earthquake and Mining Seismology and holds appoin University of the Witwatersrand School of Geosciences. He is co-director of the AfricaArray research and capacity-building programme collaborative project "Observational studies in South African mines to mitigate seismic risks" (2010-2015). He holds a BSc in Geology a BSc Honours in Geophysics from the University of Witwatersrand; a MSc in Geophysics from the University of Pretoria, and a PhD in Research conducted by Professor Raymond Durrheim may be divided into three categories: (i) investigations of the structure and seismology); (ii) earthquake physics and seismic hazard assessment; and (iii) engineering seismology (particularly related to deep mining







diversity and EIA and application of the mitigation gement, and biodiversity offset plans.

eloped the ecological flow requirement methods, in over 50 estuarine freshwater flow requirement specialists that assessed the ecosystem condition

he Environment (NRE) group in CSIR from 2016 lds a BSc and BSc Honours in Environmental and een involved in various research projects, including terisation of pH in estuarine systems.

sources Group. He holds a BSc., BSc Honours and as authored more than 150 contract research and publications. He has worked on several Estuary ne Ecology chapter of the Strategic Environmental

terrestrial ecosystems, and associated fauna and ecology, including abilities to integrate aquatic and GIS modelling and mapping, as well as identifying nsure that biodiversity patterns and processes are terrestrial invertebrates, botany, and ecosystem (13) with SACNASP.

Ind Instream Flow Requirement studies, biological experience in the field of aquatic entomology and ch interests include Aquatic Ecology, Entomology, mate Change, the development and application of Scientist (Ecological Science) with SACNASP.

ds a M.Sc. degree in Conservation Biology from the rom 1999 to 2008 which has been internationally South Africa. Albert is recognized worldwide as an and the USA. He has served as the vice chairman le is also an accomplished specialist ornithological nitoring reports. He was a specialist author on the mber 400177/09) with SACNASP, specialising in

ployed by the Endangered Wildlife Trust as head of nagement between industry and natural resource aland, Texas, New Mexico and Florida. He also has WT Strategic Partnership. He is the author and/or for avifaunal monitoring at wind farm sites. He has 30 renewable energy generation projects. He has has done a wide range of bird impact assessment the 2016 EGI SEA.

iversity. She has over 20 years of zoological and irrently the chairperson for the South African Bat arm Developments: 4th Edition (Sowler et al 2016) ., 2014). Kate is also the co-author on several bat She has also served as a specialist author in the

intment as a research chair and supervisor at the and was co-leader of the Japanese-South African and Physics from the University of Stellenbosch; a Geophysics from the University of Witwatersrand. d evolution of the crust and mantle (exploration g).

Specialist and Affiliation	Project Role	Biosketch		
	T TOJECE NOIC	Broscow Manzunzu is a solemologist with the Council for Geoscience. He completed a MSc in Geophysics in 2013 and is currently up		
Broospour Monsunsus Council for		biassnavy manzunzu is a seismologist with the council for deoscience. He completed a most in deophysics in 2013 and is currently in		
Brassnavy Manzunzu; Council for	Contributing Author	He joined the zimbabwe Meteorological Services as a trainee Meteorologist in 2007. In April 2008 he moved to the seismology		
Geoscience		seismologist and eventually fulfilled the position of Seismology Manager. In 2012, ne joined the Council for Geoscience as a seismic n		
		on seismic hazard in Africa. He has published a number of peer reviewed international journal articles. He has been part of the GEM- sul		
Settlement Planning, Disaster Mana	agement and related Sc	cial Impacts Report		
		Surina has more than 7 years of experience in environmental assessment and management and is a Senior EAP in the Environmental N		
		a Masters degree in Environmental Management from the University of Stellenbosch and a Certificate in Environmental Economics fr		
		Professional Natural Scientist (Registration Number: 400033/15) with the SACNASP. Surina has experience in the management a		
Surina Laurie, CSIR	Integrating Author	assessments in South Africa for various sectors, including renewable energy, industry and tourism. She has also been part of advisory to		
,		construction, environmental and regulatory aspects for various sponsors, developers and lenders during the DOE's first and second		
		undertaken several Solar Photovoltaic (PV) and Wind Energy Environmental Assessments (i.e. FIAs, BAs, and Amendment and Anneal Pr		
		Free State. She also served as the Integrating Author for the Socio-Economics chapter of the Strategic Environmental Assessment Aquad		
		Analy Waledorff is a Principal Environmental Assessment Practitioner in the Environmental Margon Environment Analysis (Control of the Control		
		was obtained with Great Distingtion from the Université Libre de Bruvelles in Belgium, and a Masters Degree in Chemical Engineering		
Appials Maladarff CCID	Integrating Author	was obtained with Great Distinction from the Universite Libre de Bruxenes in Deigium, and a Masters Degree in Chemical Engineering		
Annick Walsdom, CSIR	Integrating Author	She has more than 16 years' experience in environmental assessment and management and has been involved in several environ		
		Preliminary Environmental Assessments, EIAs and Environmental Management Plans (EMPS). She played a key role in the Integrated Er		
		currently in the gazetting phase.		
		Elsona van Huyssteen is a Principle Urban and Regional Planner at the CSIR and has over 20 years' experience in research, and police		
Elsona van Huyssteen; CSIR	Contributing Author	disciplinary initiatives in the urban and regional development planning field. Her interest focuses on innovative ways to engage collective		
		impacting cities, settlements and regions; transdisciplinary and multi-stakeholder initiatives, and action-orientated leadership.		
		Cheri Green has over 30 years' research experience in fields of accessibility, transportation planning, land use development, facility la		
Cheri Green: CSIR	Contributing Author	social facility provision norms. She is a Registered Town & Regional Planner and Senior Researcher at the CSIR. She has been involved		
,		including the development of Integrated Transport Plans.		
		David McKelly currently works in the Western Cape Office of the Built Environment research group of the CSIR where he practices a		
		degree in Geographical Information Science and Systems obtained from the University of Salzburg in Austria through distance learning		
		Description of QCD 1289) with the South African Council, Be Angenetic Council, Be Angenetic and South African Council and		
Dave McKelly; CSIR	Contributing Author	detenance dete graatien and dete mining. He regularly demonstrates his skille in relational detenance. Structure guary language (SOI		
		databases, data creation and data mining. He regularly demonstrates his skins in relational databases, Structure query language (Squ		
		He is a critical trinker who is continuously looking at ways to solve difficult geo-spatial problems in a research environment. He excels		
		Since joining the CSIR at the beginning of 2014, Zukisa Sogoni has been involved in project application work in the fields of accessi		
		specific focus on GIS based-advanced spatial analysis. Zukisa has worked on accessibility analysis and facility allocation for eThekwini		
Zukisa Sogoni; CSIR	Contributing Author	planning for the City of Cape Town. He has also been involved in advanced GIS spatial analysis and social facilities provision standard		
		Development and Land Reform, Geographical Spatial Decision Support for SEDA, and spatial analysis for the a project involving the Pro-		
		(PICC) and Department of Higher Education and Training. Zukisa is currently part of the technical team compiling the draft of the first Na		
		Tony Barbour holds a master's degree in environmental science and has 23 years' experience in the environmental sector. His ex		
Tony Barbour; Tony Barbour	O a man a markin at	consultant in the private sector in South Africa followed by four and a half years at the University of Cape Town's Environmental		
Environmental Consulting and	d Author	environmental consulting company. Tony Barbour Environmental Consulting and Research, with a focus on Social Impact Assessment		
Research		Independent Review Work, Training and Capacity Building and Environmental Project Management, Tony has conducted over 40 Social		
		Western Cape Provincial Government guidelines on social specialist inputs into FIAs		
		Dr. Hugo van Zyl holds a PhD in economics from the University of Cane Town and has more than 18 years' experience focusing on the		
		any representation of the second seco		
		environmental and development implications. Hugo vari zyr is the director of independent Economic Researchers, rocusing of econ		
		developments, mining, operaty projects, concernation projects and oper tourism initiatives throughout couthern Africe. The majority of the		
Dr Hugo van Zyl; Independent	Corresponding	developments, mining, energy projects, conservation projects and eco-courism initiatives throughout southermain and as evolution in a set of a		
Economic Researchers	Author	impact assessment tools and cost-benefit analysis in order to inform decision-making. He has lead, participated in and co-ordinate		
		(including environmental valuation, payments for ecosystem services, policy reform), socio-economic impact assessment, strategic as		
		From a policy perspective he has provided economic inputs and guidance to national water tariff, air pollution, biodiversity conservation		
		change policy. Dr Van Zyl is also the lead author of the Western Cape Provincial Government guidelines on economic specialist inputs in		
		national level and are applied throughout the country.		
		Doreen Atkinson is a Research Associate at the Nelson Mandela University. She is also a trustee of the Karoo Development Foundation		
Drofoppor Daroon Athing	Contributing Author	in Political Studies from the Rhodes University, a MA in Political Science from University of California, Berkeley; and a PhD in Political		
Protessor Doreen Atkinson;		research expertise include local government, community development, intergovernmental relations, policy analysis, governance, local		
iveison Mandela University		development, land reform, sustainable livelihoods, project and programme evaluation, and regional development. Doreen has extensi		
		five Karoo conferences since 2009.		
Additional Issues (Agriculture, Defence, Civil Aviation, and Heritage)				
Annick Waledorff is a Dringinal Environmental Associational in the Environmental Management Convises group of the CSID. S				
Annick Walsdorff CSIR	Integrating Author	was obtained with Great Distinction from the Université Libre de Bruvelles in Baldium, and a Masters Degree in Chemical Engineering		
		She has more than 16 years' experience in environmental assessment and management and has been involved in several environmental		
1	1	Tone has more than to yours experience in environmental assessment and management and has been involved in several environmental assessment and management and has been involved in several environmental assessment and management and has been involved in several environmental assessment and management and has been involved in several environmental assessment and management and has been involved in several environmental assessment and management and has been involved in several environmental assessment and management and has been involved in several environmental assessment and management and has been involved in several environmental assessment and management and has been involved in several environmental environm		







ndertaking his PhD at University of Witwatersrand. section where he began his career as a trainee azard scientist. He has worked on several projects Ib-Sahara Africa since its inception.

Management Services (EMS) group of the CSIR with rom the University of London. She is a Registered and integration of various types of environmental eams advising on financing, real estate, corporate, bidding windows in 2012 and 2013. Surina has rocesses) in the Northern Cape, Western Cape and culture Development in South Africa.

She holds a Degree in Chemical Engineering which (Cum Laude) from the University of Stellenbosch. nmental studies of national importance including nvironmental Management Plan for the SKA, which

icy development. She has lead collaborative multie futures through profiling spatial growth dynamics

location planning (in urban and rural context), and in several studies in the Karoo region since 2002,

as a GIS Specialist. He holds a Master of Science g (UNIGIS). He is registered as a Professional GISc ArcGIS and Arc/Info) software for developing GIS L), project management and customer interaction. in geo-spatial analysis, map production and data

ibility analysis and facility location planning with a i Municipality, City of Tshwane and social facilities rds for a project involving the Department of Rural residential Infrastructure Coordinating Commission ational Spatial Development Framework.

perience includes ten years as an environmental Evaluation Unit. In 2004 he established his own : (SIA), Strategic Environmental Assessment (SEA), Impact Assessments and is the lead author of the

ne analysis of projects and policies with significant nomics impact assessment, project appraisal and ture projects, industrial developments, mixed use nese appraisals have involved the use of economic ed research in environmental resource economics ssessment and protected area business planning. ation, biofuels, mine closure funding and climate to EIAs. These guidelines have been accepted at a

(non-profit Trust). She holds a BA and BA Honours Science from the University of Natal. Her areas of al economic development, small towns and rural ive research on Karoo tourism, and has organised

She holds a Degree in Chemical Engineering which (Cum Laude) from the University of Stellenbosch. nmental studies of national importance including

Specialist and Affiliation	Project Role	Biosketch
		Preliminary Environmental Assessments, EIAs and Environmental Management Plans (EMPs). She played a key role in the Integrated En
		currently in the gazetting phase.
Rohaida Abed, CSIR	Integrating Author	Rohaida Abed is an Environmental Assessment Practitioner in the EMS group of the CSIR, based in Durban. She holds a MSc Degree KwaZulu-Natal. She has eight years of experience in the Environmental Management field, and has been involved in various transport in Control Officer. She has also been involved in Basic Assessments (BAs) and EIAs relating to Port infrastructure, Bulk Liquid Storage f Project Manager. She is a registered Professional Natural Scientist (400247/14) with the SACNASP.
Fahiema Daniels, SANBI	Contributing Author	Fahiema Daniels is a Deputy Director of the Biodiversity Planning Directorate at SANBI. She obtained a BSc (Ecology and Environmenta Plant Ecology); and MSc (Conservation Biology) from the University of Cape Town. Fahiema Daniels plays a key role in supporting biodi analyses for National-scale projects, such as the Electricity Grid Infrastructure SEA, Shale Gas SEA and REDZ SEA. Additional projects in the spatial prioritization for identifying Biodiversity Economy Nodes in South Africa, and developing the spatial layers that feed into Resource Management Land User Incentive tool.
Tsamaelo Malebu, SANBI	Contributing Author	Tsamaelo Malebu is a GIS Specialist in the Biodiversity Information and Planning Directorate of SANBI. He holds a BSc Degree (Envi Environment and Conservation from the University of the Witwatersrand. He has supported the 2016 EGI SEA, the development of the provided technical support to the GEF funded Grasslands Programme and the identification of Marine Protected Areas as part of the Ope
Johann Lanz; Independent Consultant	Contributing Author	Johann Lanz is registered as a Professional Natural Scientist in the field of Soil Science with SACNASP (Registration Number 40026 Geographical Science) from the University of Cape Town, a BSc. Agriculture (Soil Science, Chemistry) from the University of Stellenbosch the University of Cape Town. He provides soil specialist study inputs to EIAs, SEAs and EMPRs. These focus on impact assessments an and re-vegetation of mining and industrially disturbed and contaminated soils, as well as more general aspects of soil resource man Agricultural Assessment of the 2016 EGI SEA. He also undertakes soil resource evaluations and mapping for agricultural land use plann recent research projects focused on conservation farming, soil health and carbon sequestration.
Gas Opportunities Analysis		
Rae Wolpe; Impact Economix	Contributing Author	Rae Wolpe has twenty years' experience working as a development economist and economic development professional in both the managed over 50 projects at national, provincial, and local level in South Africa. Rae has a Masters in City and Regional Planning (with an MPhil in Monitoring and Evaluation from the University of Stellenbosch. Rae recently authored an input to the SKA Socio-economic Impacts of the SKA".
1 2 3		







vironmental Management Plan for the SKA, which

e in Environmental Science from the University of nfrastructure related projects as an Environmental facilities and Renewable Energy in the capacity of

al & Geographical Science); BSc Honours (Botany: iversity planning in South Africa by leading spatial clude listing of threatened ecosystems; supporting the Department of Environmental Affairs Natural

ronmental Science) and BSc Honours in Ecology, e South African Mining and Biodiversity Guideline, eration Phakisa Oceans Economy lab.

58/12). He holds a BA (English, Environmental & n, and a M.Sc. (Environmental Geochemistry) from id rehabilitation on agricultural land, rehabilitation agement. He was also a specialist author on the ning and management, and has conducted several

e public and private sectors, and he has project Distinction) from the University of Cape Town and ic Impact Assessment on the "National Economic

1 3.2.4 Terms of Reference and Methodology

2 The Terms of Reference of each Specialist Assessment are detailed in 3 the corresponding chapters, however the overall general study 4 requirements are noted below:

- 5
- 6• Undertake a review of existing literature (including the latest
- 7 research undertaken both locally and internationally); maps and
- 8 aerial photographs; and relevant data (if available) to compile a
- 9 baseline description applicable to each corridor; including a list of
- 10 species or features that are sensitive to gas pipeline infrastructure
- 11 that have been observed and/or are likely to occur in each corridor;
- 12 Identification of any additional features of interest or any gaps in
- 13 information within the corridors not identified in the existing
- 14 sensitivity analysis, making use of datasets made available through
- 15 the draft environmental constraints map and additional information
- 16 sourced by the specialist;
- 17• Review and update, where required, the environmental sensitivity for
- 18 the proposed gas pipeline corridors provided by the CSIR and SANBI
- 19 and develop/verify the approach for classing each sensitivity feature
- 20 according to a four-tiered sensitivity rating system i.e. Very High,
- 21 High, Medium or Low;
- 22 Assess the proposed corridors in terms of the potential impacts
- 23 associated with the construction and operation of gas pipelines on
- 24 the various environmental features, ecosystems and habitats, and
- 25 outline proposed management actions to enhance benefits and
- 26 avoid/reduce/offset negative impacts;
- 27• Conduct a risk assessment based on a function of probability and 28 consequence; and
- 29• Provide input to the pre-construction site specific environmental
- 30 assessment protocol (e.g. additional information and level of
- 31 assessment is required in each sensitivity category before an
- 32 authorisation should be considered), Standards and Environmental
- 33 Management Programme (EMPr).
- 34

35 3.2.4.1 Risk Assessment Methodology

36 As noted above, each Specialist Assessment Chapter includes a rigorous 37 and systematic risk assessment of the impacts relating to gas pipeline 38 development. The risk assessment is an approach for considering all 39 impacts of an issue in a common way. Risk¹ is represented as probability 40 or likelihood of a positive or negative impact occurring as a result of gas 41 pipeline development, considered in relation to the consequence of that 42 impact, without and with mitigation. Risk and opportunity is therefore 43 calculated as likelihood multiplied by consequence (on a qualitative

44 basis), as illustrated in Figure 1. The probability terms range from 45 extremely unlikely to very likely. The consequence terms ranging from 46 slight to extreme for risk, and minor to outstanding for opportunity, are 47 calibrated per Specialist Assessment Chapter topic so that there is 48 consistency with regards to the manner in which risk is determined. This 49 allows for suitable integration across different Specialist Assessment 50 Chapters and disciplines.

52 Risk and opportunity is assessed for each key impact, within each study 53 area and for different types of receiving entities or environments – e.g. a 54 sensitive wetland or estuary. The assessment is qualitative and uses the 55 following categories: undiscernible/none, very low, low, moderate, high 56 and very high. The risk categories are predefined as a set of criteria 57 which explain the nature and implications of the attributed risks (Table 58 3).



Effect/Consequence

61 Figure 1: Risk Assessment Diagram for Risk and Opportunity Calculation

62

60

51

59

63 Table 3: Example of a predefined set of criteria applied across the Specialist 64 Assessment Chapters

Risk category	Definition			
No	Any changes that may occur as a result of the impact either			
discernible	reduce the risk or do not change it in a way that can be			
risk	differentiated from the mean risk experienced in the			
	absence of the impact.			
Very low risk	Extremely unlikely (<1 chance in 10 000 of having a consequence of any discernible magnitude); or if more likely than this, then the negative impact is noticeable but slight, i.e. although discernibly beyond the mean experienced in the absence of the impact, it is well within the tolerance or adaptive capacity of the receiving environment (for instance, within the range experienced naturally, or less than 10%); or is transient (< 1 year for near-full recovery).			

	Low risk	moderati impact is of the fo (<1% of in durati attribute or attribu
	Moderate risk	Not unlik consequ because impacted change, affected and un-in
	High risk	Greater consequ that pers there ma which is
	Very high risk	Greater negative than 30 for an in acceptat
65 66		

67 3.3 Way forward

68 Stakeholders are encouraged to submit review comments using the

69 Template Spreadsheet provided on the project website 70 (https://gasnetwork.csir.co.za/), which requires a specification of the 71 specific page number and line number of the section that needs to be 72 queried or raised for feedback.

73

74 Following this 30 days public review period, the specialist assessments 75 will be updated where relevant and where required, and the proposed 76 energy corridors will be finalised based on inputs from stakeholders.









Risk category Definition

likely (<1 chance in 100 of having a more than e consequence); or if more likely than this, then the of moderate consequence because of one or more llowing considerations: it is highly limited in extent the area exposed to the hazard is affected); or short ion (<3 years), or with low effect on resources or s (<25% reduction in species population, resource ute utility).

ely (1:100 to 1:20 of having a moderate or greater ence); or if more likely than this, then the ences are substantial but less than severe, although an important resource or attribute is , the effect is well below the limit of acceptable or lasts for a duration of less than 3 years, or the resource or attribute has an equally acceptable npacted substitute.

han 1 in 20 chance of having a severe ence (approaching the limit of acceptable change) ists for >3 years, for a resource or attribute where be an affordable and accessible substitute, but ess acceptable.

than even (1:1) chance of having an extremely and very persistent consequence (lasting more years); greater than the limit of acceptable change, nportant resource or attribute for which there is no le alternative.

¹ IPCC, 2014: Annex II: Glossary [Mach, K.J., S. Planton and C. von Stechow (eds.)]. In: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, pp. 117-130.