

STRATEGIC ENVIRONMENTAL ASSESSMENT FOR
GAS PIPELINE DEVELOPMENT IN SOUTH AFRICA

APPENDIX B

Peer Review Sheets and
Specialists Responses

Appendix B: Peer Review Sheets and Specialist Responses

Table of Contents

Appendix B: Peer Review Sheets and Specialist Responses	1
1. Integrated Biodiversity and Ecology Assessment (Terrestrial and Aquatic Ecosystems, and Species) – Fynbos Biome	2
2. Integrated Biodiversity and Ecology Assessment (Terrestrial and Aquatic Ecosystems, and Species) – Savannah and Grassland Biomes	8
3. Integrated Biodiversity and Ecology Assessment (Terrestrial and Aquatic Ecosystems, and Species) – Indian Ocean Coastal Belt Biome	12
4. Integrated Biodiversity and Ecology Assessment (Terrestrial and Aquatic Ecosystems, and Species) – Succulent and Nama Karoo Biomes	19
5. Integrated Biodiversity and Ecology Assessment (Terrestrial and Aquatic Ecosystems, and Species) – Albany Thicket Biome	22
6. Integrated Biodiversity and Ecology Assessment (Terrestrial and Aquatic Ecosystems, and Species) – Estuaries	25
7. Integrated Biodiversity and Ecology Assessment (Terrestrial and Aquatic Ecosystems, and Species) – Wetlands and Rivers	27
8. Integrated Biodiversity and Ecology Assessment (Terrestrial and Aquatic Ecosystems, and Species) – Avifauna	32
9. Seismicity Assessment	34
10. Settlement Planning, Disaster Management and related Social Impacts Report	46

1. Integrated Biodiversity and Ecology Assessment (Terrestrial and Aquatic Ecosystems, and Species) – Fynbos Biome

Peer Reviewer: Professor Brian W. van Wilgen; Academic/Researcher (associated with the University of Stellenbosch)

EXPERT REVIEW AND SPECIALIST RESPONSES: Fynbos Biome – Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/Figure	Expert Reviewer Comments	Responses from Specialist
Brian van Wilgen	2 and throughout		General comment	There are many acronyms used throughout the text without definition. I realise there is a list of acronyms on page 2 with definitions, but this document would be a whole lot more readable if the acronyms were to be defined at first use in each section of the report, as well as in the headings of tables and captions of figures where they are also used. The list on page 2 is also incomplete - missing acronyms include CBA1, CBA2, iGAS, SANBI, IDP, SDF, NEMA, NPAES	Acronyms have been added; All acronyms have been explained on first use in the text. iGas
Brian van Wilgen	5	4 to 5		A little more background at the start would be useful. The gas pipeline phases should be described, and the terms of reference of the report should be listed	Further background will be supplied by the integrative writer
Brian van Wilgen	5	13		Replace "fynbos can be divided" with "The vegetation in the fynbos biome can be divided"	Done
Brian van Wilgen	5	27		Replace "and do regenerate Renosterveld" with "and do stimulate regeneration in Renosterveld"	Done
Brian van Wilgen	6		Unnumbered table	The table heading could be more descriptive. The derivation of the corridor names in column 1 should be explained in the table heading. Overall suitability should also be explained. If something has moderate or low suitability for gas pipeline development, what does that mean? Does it mean that gas pipeline development would cause impacts of a moderate or low significance?	Will this heading be standardised across the assessments as a numbered table? The suitability refers to the potential for gap pipeline development based on the density, spatial distribution and nature of the sensitive conservation features within the biome in the corridor. Thus low suitability implies many features and this, in turn, means it will be difficult to minimise some impacts no matter what route is chosen so the impacts could be of a high significance. Response from CSIR Project Team: The headings will not be standardised across the assessments however additional detail will be provided in the Integrated Biodiversity

EXPERT REVIEW AND SPECIALIST RESPONSES: Fynbos Biome – Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/Figure	Expert Reviewer Comments	Responses from Specialist
					Assessment chapter.
Brian van Wilgen	7	2 to 25		Sections 2 and 3 are too brief, especially if this report is read in isolation. A brief account of the terms of reference, and the criteria that will apply to classifying impacts would be useful. If this is contained elsewhere in the SEA report, cross-references should be given.	Further background will be supplied by the integrative writer; see pg. 7 lines 12-15 for the specific terms of reference; the criteria used in classifying impacts were drawn primarily from the WCBSP.
Brian van Wilgen	13		Table 2	Should include the Mountain Catchment Areas Act?	Added
Brian van Wilgen	17	28 - 31		Add Leptospermum?	Added
Brian van Wilgen	19	28		Reference (here and elsewhere) to faunal migration routes. I am not aware of any animals (other than birds, which are covered elsewhere) that rely on migration in the fynbos. The issue is rather disruption of movement?	There may be some local butterfly species migrations but I have removed the term migration or replaced it with movement where appropriate
Brian van Wilgen	28		Table 5	It would be useful if the terms "feature class sensitivity" and "buffer distance sensitivity" could be explained in the table heading. In the first row, 4th column, replace "High (10 km4)" with "High (10 km)4"	Will a standardised set of definitions be developed on these lines? (see Table 4): (a) Very high - the feature is a CBA 1 or a PA so the objective for the feature is to protect biodiversity so any loss will be very highly significant; Very high - the feature is a CBA 2 of threatened species occurrence so the objective for the feature is to protect biodiversity so losses will be highly significant; (c) etc.; error corrected. Response from CSIR Project Team: Additional detail will be provided in the Integrated Biodiversity Assessment chapter.
Brian van Wilgen	56	26		What is a side slope? Do you mean steep slope?	A side slope refers to the slope at right angles to the orientation of the road i.e. where cut and fill could be needed; text reworded
Brian van Wilgen	57	17		"loss or decline" Do you mean "decline in numbers, or local or even global extinction"? Good to be clear about this.	Changed to "local extinction or decline in the populations"
Brian van Wilgen	57	35		See earlier comment on migration.	See above i.e. There may be some local butterfly species migrations but I have removed the term migration or replaced it with movement where appropriate
Brian van Wilgen	58	4		It may be helpful to indicate what kinds of burrows	Added "of porcupines, aardvarks and carnivores"

EXPERT REVIEW AND SPECIALIST RESPONSES: Fynbos Biome – Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/Figure	Expert Reviewer Comments	Responses from Specialist
				should be avoided. For example, larger mammals like armadillo and badger burrows may be easier to detect and avoid. Mole burrows will be almost impossible to avoid?	
Brian van Wilgen	58	53		Putting in fences may be a double-edged sword. They could trap animals and increase the risk of falling into the trenches. In these areas, rather increase the number of ramps or ladders. Also, be clear what you mean by ladders - few animals can climb ladders, but may benefit from steps rather than ramps.	Agree that fences could be problematic which is why they were listed last and they need to be put right round the open section of trench and secured to prevent entry; wording amended; ladders changed to steps
Brian van Wilgen	58	16		How is it proposed to control dust? Will it be possible to use water in such a water-stressed region? If not, what other methods are feasible?	Dust from vehicles can be reduced by making them travel slowly as recommended. Dust can be controlled by covering dumps with geotextiles; text amended
Brian van Wilgen	59	Whole page		It would be useful to differentiate between sites that are invaded prior to the start of construction, and sites that are free of invasive species. For already-invaded sites, the aim would be to reduce invasions to manageable levels, and how sustainable that will be will depend on the degree to which surrounding areas are invaded, and will provide an ongoing source of propagules for re-invasion. More importantly, sites that are not yet invaded should be managed to prevent any invasion. Furthermore, if potentially invasive species are introduced to these areas, management should be designed to (1) detect such species as early as possible, and (2) to eradicate them locally before they become established.	Identification of alien species prior to construction was listed as a step under mitigation; this would take care of species already present; regular surveys are specified with the objective of achieving control of any new occurrences. The following text was added to the opening paragraph: "Studies of invasive species control measures have shown that eradication of a species cannot be achieved except in the initial stage of establishment. Therefore, effective control in this context should be that alien plant species cover within the pipeline servitude is reduced to, and maintained at, less than 5% canopy cover."
Brian van Wilgen	59	38		"Ensure that any invasions are controlled". Please define what is meant by "controlled". Reduced to a level where they can be maintained at that level with available resources in perpetuity?	See responses above and: "As part of the hand-over process, ensure that the land-owner's responsibility to maintain the cleared areas is acknowledged in writing."
Brian van Wilgen	60	10 to 14		Limited knowledge of re-establishment requirements is not a reason for failing to achieve	Text reworded: "The primary reason for this is the factors that determine success rates of re-establishment of most of the

EXPERT REVIEW AND SPECIALIST RESPONSES: Fynbos Biome – Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/Figure	Expert Reviewer Comments	Responses from Specialist
				full rehabilitation. It is a factor that restricts our ability to predict whether or not rehab attempts will be successful.	very diverse Fynbos plant species and specialised faunal groups (e.g. many of the invertebrates) are poorly known, in other words rehabilitation success is highly unpredictable."
Brian van Wilgen	60	29		Genetic stock for rehabilitation will have to be collected off-site. That will be an additional impact at the collection site; in critically rare vegetation types, it will be an important impact.	The reviewer is not necessarily correct, there may not be any need to collect material off-site. Mitigation measure changed to read: "Use material from that section of the route in its rehabilitation or from a source community matched as closely as possible, excluding Very High sensitivity features"
Brian van Wilgen	60	32		Replace "complete loss" with "local or global extinction"	Done
Brian van Wilgen	62		Table 6	Please explain the mitigation potential categories (L, M, H) in the table heading.	Rather than expand the table heading the following section has been added to the text: "There are no hard standards for defining the degree of mitigation but the following descriptions will give some background. Low mitigation implies that a basic community of plant and animal species would become established but species diversity, vegetation cover and ecosystem structure and function would be significantly altered compared to the original community. For example, only annual plant species may establish with no perennial species to provide habitat or at as foci for the recruitment of other species into the community; or the vegetation cover may be too sparse or ephemeral to prevent soil erosion. Given what is observed on old lands in these low rainfall environments, it is possible that the highly simplified vegetation community that will establish will remain little changed for decades. High mitigation implies that, over time, ecosystem structure and function will be reinstated, vegetation cover will reach levels comparable to the pre-development community, and that most species will re-establish themselves albeit with altered abundances. Some species may still not re-establish themselves, at least for some years. Moderate mitigation would result in a community somewhere between these two extremes on one or more measures."
Brian van Wilgen	64	29		The concept of a self-sustaining ecosystem. You can remove a few species (especially rare species) from an ecosystem and it will still be self-	I agree that you can remove a few or even several species and still have a functioning ecosystem. The studies to date have found that while annual species can be re-established

EXPERT REVIEW AND SPECIALIST RESPONSES: Fynbos Biome – Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/Figure	Expert Reviewer Comments	Responses from Specialist
				sustaining. If that is the case, there is no loss of ecosystem function, or no loss of critical functionality - the only loss is of the rare (or other) species that have been eliminated. So the risk is loss of species, not of loss of ecosystem sustainability, unless it can be shown what that loss of sustainability will mean in the longer term?	relatively easily, perennial species have not become established. This is important because the perennial species form nuclei for the establishment of other species. They are probably key habitat providers for the fauna. The ability of the annual plant dominated systems to maintain, for example, sufficient cover to control wind erosion is probably poor. This is why there is concern about the ability to even recreate a self-sustaining system and, thus, the medium to long-term sustainability.
Brian van Wilgen	67		Table 7	First impact in column 1. The disturbance is not an impact; it is something that will lead to an impact. The impact brought about by disturbance is that animals are either killed, forced to move to new areas, or fail to reproduce. Oil spills and other pollution will also kill or injure plants.	Text reworded
Brian van Wilgen	68	6 and 21		In line 6, it says that adverse effects are not acceptable. On line 26, it says that adverse effects must be avoided if at all possible, indicating that there may be circumstances where they are in fact acceptable. It would be useful to explore what circumstances would lead to an acceptable action.	The first instance is dealing with the prescriptions threatened species or ecosystems; the second is dealing with areas classified as CBAs and the specific prescriptions for them in terms of acceptable activities. If these areas has threatened features then the former rules would apply. No changes made to the text.
Brian van Wilgen	68	27		The statement is made that "crossing of formal protected areas will only be considered if the pipeline route is aligned with other linear features already in the protected area". On page 13 it says that "no development" is permissible in protected areas. Again, this seems contradictory. What development, exactly, is permissible in protected areas, and under what circumstances?	I was not able to find the reference on page 13 that is referred to, only this: "No development, construction or farming may be permitted in a nature reserve without the prior written approval of the management authority" which does not totally prohibit development. The WCBSP which is being summarised in this section is attempting to set criteria for what is acceptable and unacceptable which is simply placing some bounds on what can be permitted. No changes made to the text
Brian van Wilgen	68	47		"different stages of phases of the development" - what are stages of phases? Delete "of phases"?	of should be or
Brian van Wilgen	70	9		replace "conducts" with "conduct"	Completed
Brian van Wilgen	70	28		Full stop needed.	Completed
Brian van Wilgen	70	46 to 53		"There should be regular inspections by people	My opinion is that it is essential that the rehabilitation is

EXPERT REVIEW AND SPECIALIST RESPONSES: Fynbos Biome – Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/Figure	Expert Reviewer Comments	Responses from Specialist
				trained to understand the local vegetation These surveys should be done at least once a year". The practicality of this recommendation has to be questioned. First, is it really necessary to send people out to cover hundreds of kilometres of pipeline, every year or even more often? Would the cost be justified? And if adverse trends are detected, what could be done?	monitored intensively in the early stages to ensure that it is effective and, if it isn't, to take measures to correct any adverse outcomes at an early stage. The words "at least" have been removed, the following change has been made: "These surveys should be done once a year in the early stages (1-3 years) and bi-annually after that. The surveys should be in the same season.." and the words: "Expert advice should be sought if deemed necessary."
Brian van Wilgen	71	32 to 54		There is a proposal to develop appropriate sampling designs and frequencies. Again, the practicality of this proposed monitoring system should be considered. I would recommend the following manageable set of indicators: (1) the selection of a set of representative indicator species to monitor; (2) the inclusion of an indicator on vegetation cover as monitoring sites; (3) the inclusion of an indicator of erosion (e.g. permanent pegs); and (4) the implementation of a set of "thresholds of potential concern" around the fire regime, in fire-prone ecosystems only (see van Wilgen, B.W., Govender, N, Forsyth, G.G. and Kraaij, T. (2011). Towards adaptive fire management for biodiversity conservation: Experience in South African national parks. Koedoe: 53, 102 – 110).	Thanks for the input. My opinion is that it is necessary to customise the measurements. For example: A 20% canopy cover of annual species and 20% cover of a mixture and annual and perennial species represent different states of community structure and function. Fire regimes are an important indicator of ecosystem function and dynamics in the moister fynbos but are not necessarily useful in arid fynbos where fires are rare as noted in the text. However, the corridor represents only a small portion of the landscape so it may not be practical to monitor its fire regime independent of the landscape it is embedded in. Nevertheless, monitoring of fire occurrence and extent has been recommended.
Brian van Wilgen	72	7 to 11		Many of the ecosystems in the area are either not fire-prone, or not fire-dependent. Maybe list the vegetation types that need to be monitored in this regard, and those that do not.	Essentially all the systems in the Fynbos Biome are fire prone although fires may be rare in some such as the arid fynbos and some dune thicket and strandveld types. There are small forest patches that do not burn but these are very unlikely to be encountered in the corridor and so were not included. No changes made to the text

2. Integrated Biodiversity and Ecology Assessment (Terrestrial and Aquatic Ecosystems, and Species) – Savannah and Grassland Biomes

Peer Reviewer: Professor Bob Scholes; University of the Witwatersrand Johannesburg

EXPERT REVIEW AND SPECIALIST RESPONSES: Savanna and Grassland Biomes - Gas Pipeline Development						Change has been effected in the report
						No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Name	Reviewer	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Response from Specialist
RJ Scholes		4	3		See my comments on the electricity grid assessment report with respect to this rather bald statement. It needs a bit more explanation, detail and action to be useful. Comment on EGI Report: Endemism is a well-defined technical term, but in a summary statement it is better to spell it out 'South African grasslands have a large number of species which occur nowhere else in the world.'	Modified as suggested
RJ Scholes		4	19		Not 'likely'. It is an inevitable consequence of the operating rules that no tree will be permitted within 10 m either side.	Reworded to make it explicit that tree establishment of large trees will not be allowed within the registered servitude.
RJ Scholes		4	27		Remaining', not 'Reaming'	An autocorrect error, now corrected
RJ Scholes		5	4		And substantial disruption of soil and drainage to a depth of approximately 2 m and width of 1.5 m, some effects of which, despite restoration, persist for centuries.	Added
RJ Scholes		6	6		You use preserved here, conserved a line later. They are not synonyms.	Changed
RJ Scholes		7	2		Mucina, not Musina	Changed
RJ Scholes		8	5		ISII? Do you mean small?	Thanks - a type error
RJ Scholes		9	52		See my comments or the Grid assessment. Which much less critical for a pipeline, you cannot simply dismiss the visual/sense of place issue so lightly here, by saying they are dealt with elsewhere. Their importance is precisely because of the biodiversity connection, so you need to flag that here quite explicitly.	Agreed and strengthened
RJ Scholes		10	5		Similar issue: You cannot meaningfully separate the wetlands from their landscape. Doing so plays directly into the problem of a reductionist, fragmented, discipline based assessment, instead of a systemic one. You need to point out the CONNECTIONS. These are much more important here even than in the electricity pylon	Agreed and strengthened. Note from CSIR Project Team Integrating Author: The integrated chapter highlights connections between the various terrestrial and aquatic ecosystems and features assessed, and

EXPERT REVIEW AND SPECIALIST RESPONSES: Savanna and Grassland Biomes - Gas Pipeline Development						Change has been effected in the report
						No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Name	Reviewer	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Response from Specialist
					case, because blasting a deep trench, even if later filled in, will alter the subsoil hydrology in a way which can affect the relationship of the wetland to the savanna or grassland which supplies it.	the importance of these connections.
RJ Scholes		10	9		There is an implicit buffering in the operating rule that no 'deep-rooted' plant (i.e. tree, I think they mean, quite without evidence) is allowed within 10 m. Does this rule make any sense? If so, given what we know about savanna tree rooting, is 10 m enough? If there is no evidence supporting it, why have it at all - allowing trees to regrow would greatly reduce both the functional and visual impact. And you DO use a buffer in figure 10. On what basis did you decide it? Does it make sense, given what we know about the species distributions?	This was given to us under their specifications Note from CSIR Project Team: The pipeline will be about 1-2 m below ground. iGas has mentioned that deep rooted vegetation would impact the structure of the pipeline, hence they will be removed from the 10 m servitude as per the recommendations provided in the EMPr.
RJ Scholes		12		1	Phase 7. This corridor would be a barrier to any migration??? I don't think you meant that. It is actually quite hard to see how a buried pipeline constitutes a barrier at all	Removed
RJ Scholes		15	5		What a miss is a statement about how these sensitivity surfaces overlaid. Such a procedure needed to have a shared logic with other studies. Is it a summation rule, a multiplicative rule, or a max rule? In other words, if there are two or more constrains, do they simply accumulate, or do they interact, or does a given level of one (e.g. very high) set the overall score?	Added - these maps do not attempt to order sensitivity
RJ Scholes		33	3		This discussion misses the critical difference between a powerline and a pipeline, which is that the latter is buried. This means that there is disruption not only of the surface, but right through the soil profile. Since many of these soils are only 0.5 m thick, and the majority of cases, it will require blasting into the underlying rock. Even if you carefully repack the soil, the shattered channel will persist, essentially for ever. What impact will this have on hillside subsurface flow? How can this be mitigated?	This has been added
RJ Scholes		35	5		In practice this is not operational. Would you in fact change the alignment to avoid a burrow or roost? How far would you need to avoid it by? Really the only way to do this would be to realign at a much higher scale, to avoid whole colonies.	Modified to give additional mitigation options
RJ Scholes		35	11		...and within a month of excavation. This not only limits changes in the soil, but ensures that the exposed area of trench, a potential	Added

EXPERT REVIEW AND SPECIALIST RESPONSES: Savanna and Grassland Biomes - Gas Pipeline Development						Change has been effected in the report
						No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Name	Reviewer	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Response from Specialist
					trap for animals, is minimised.	
RJ Scholes		35	12		...avoiding burying rare and endangered species under the temporary soil dumps	Added
RJ Scholes		35	22		Need to add a point relating to slope drainage: where there is a potential to create an erosion feature, or to channel subsurface water in an undesirable way drainage points need to be engineered into the design (rather like mitre drains are engineered into roads) to harmlessly redirect flow. On this point, many of these routes (especially through KZN and the EC) cut across unstable, erosion prone sodic soils. A preferential channel will quickly lead to a deep donga, endangering the stability of the pipeline and causing sedimentation problems. This will need specialised engineering. Others will cut across vertic soils. What is needed there?	Added both descriptive text on the impact as well as mitigation measures.
RJ Scholes		35	32		The biggest impact will come from having up to 500 construction workers milling around, setting snares, providing poaching intelligence, collecting plants for traditional medicine, lighting fires...so training and key performance indicators are critical.	Strengthened to include more on this impact
RJ Scholes		36	31		There seems to be no evaluation of what would happen in the event of an unplanned disaster: a landslide/earthquake/flood; or a pipe rupture, or a deliberate act of sabotage. What would the biodiversity impacts be? How could they be mitigated, during the event and in the emergency clean-up?	Added
RJ Scholes		37	24		Is the same criterion used in other specialist studies? Why 50%? Surely any reduction which would result in less than viable population would meet the criterion? The threatened species algorithm often assumes a 10% reduction.	Changed to 10%
RJ Scholes		40	15		Align and design the route such that hillslope hydrology and soil erosion impacts are minimised	Added
RJ Scholes		40	28		Train the construction workers and inspectors with regards to their responsibilities regarding biodiversity and ecological impacts, and monitor, reward or punish their actions.	Added
RJ Scholes		40	35		Identify unintended subsurface drainage outcomes (such as the desiccation of former wetlands, or the creation of new ones, or the appearance of piping erosion around the former trench, and take remedial action by excavating drains or putting in plugs.	Added to monitoring and operational phase

EXPERT REVIEW AND SPECIALIST RESPONSES: Savanna and Grassland Biomes - Gas Pipeline Development						Change has been effected in the report
						No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Name	Reviewer	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Response from Specialist
RJ Scholes		40	50		There should be spatial and temporal monitoring of poaching/livestock theft/illegal plant collection along the line of the pipeline, especially where it passes through private or public protected areas, especially during construction, but also during operation.	Added as suggested

3. Integrated Biodiversity and Ecology Assessment (Terrestrial and Aquatic Ecosystems, and Species) – Indian Ocean Coastal Belt Biome

Peer Reviewer: Duncan Hay, Catherine Pringle, and Leo Quayle, Institute of Natural Resources

EXPERT REVIEW AND SPECIALIST RESPONSES: Indian Ocean Coastal Belt Biome - Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Response from Specialist
Catherine (Kate) Pringle	3	7-35		The following acronyms are missing from the "List of Acronyms": IOCB; PCE	These acronyms were present
Catherine (Kate) Pringle	6	1-18		The following information is missing from the summary: where is the IOCB, what methods were used in the assessment of potential impacts, what were the key findings, and what are the recommendations?	I have made a minor addition
Catherine (Kate) Pringle	6	25		There are two spaces between "perspectives." and "The establishment of...". This should be changed to a single space	Done
Catherine (Kate) Pringle	6	27		There should be a space between "IOCB" and "As such..."	Done
Catherine (Kate) Pringle	6	31		"Evaluate and recommend" may read better as "evaluate and provide recommendations on.."	Done
Catherine (Kate) Pringle	7	4		"The IOCB is one of the approximately" should read "The IOCB is one of approximately" Remove the "the"	Done
Catherine (Kate) Pringle	7	12		"This strategic <i>environmental</i> assessment"?	Done
Catherine (Kate) Pringle	8-11	1-1		Section 3.1. Study Methodology is not clear on the process that was followed. It may be useful to be more specific on the steps that were followed and to cross reference these with the relevant section where a more detailed methodology is provided. For example: Identified key attributes and sensitivities in the IOCB, including vegetation types (Section 5.1.1) and Fauna (Section 5.1.1); Undertook feature sensitivity mapping (Section 5.3), Applied four tier sensitivity rating to identify potential impacts (Section 5.4) etc.	The template which we were asked to follow did not have a detailed methodology section. The methods followed are fairly standard throughout all the specialist studies and I think details thereof will be highlighted in the main report. I have made some minor adjustments.
Catherine (Kate) Pringle	9-11	17-1	Table 1	Check formatting of this table. Should it not be single line spacing?	We used the table formatting that was provided in the template. I assume appropriate formatting will be applied by CSIR? Note from the CSIR: The reports will be formatted.
Catherine (Kate) Pringle	11		Table 1	Re Ecoregion data. The data source is given as SANBI, but no date is provided. Please include the date.	The dataset we were given is undated. The ecoregions are based on Burgess (2004) as described in Mucina and

EXPERT REVIEW AND SPECIALIST RESPONSES: Indian Ocean Coastal Belt Biome - Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Response from Specialist
					Rutherford (2006).
Catherine (Kate) Pringle	11-12	1-31		Section 3.2. Assumptions and limitations. This section should align with the section on "Gaps in knowledge" (Section 9). A couple of limitations have been omitted from this section. For example: the difference in available data between the Eastern Cape and KZN.	Additions have been made to Section 3.2
Catherine (Kate) Pringle	11	20-22		The text states that "the assumption is the forest biomes will largely not be considered for the development of the gas pipeline". Has this assumption been agreed? And is the agreement documented somewhere? If so, the relevant reference needs to be provided.	I think this has come up in discussions during team workshops. There is no forest biome specialist and it is a general understanding that forest habitat will be treated as highly sensitive and be avoided so far as possible. I don't think anything has been specifically put in writing. I have reworded slightly.
Catherine (Kate) Pringle	12	4		Replace "around" with "on"	Done
Catherine (Kate) Pringle	12	1-12		Section 3.2.3 is a bit misleading as it implies that data on fauna was not considered, when in fact it was. I would suggest that you start this section by saying that fauna were considered using xxxx data. However, other data on fauna, such as direct observations were excluded from the assessment as this data is based on observation records which are skewed to particular places such as protected areas etc.	Faunal point data provided was not considered in the sensitivity assessment, only as supporting evidence when considering specific areas - i.e. the importance of protected areas, certain CBA areas, forest reserves etc. The faunal data was supplementary and not a focal point of this study.
Catherine (Kate) Pringle	12	15		The first sentence in this paragraph is very long and confusing. I suggest shortening and re-wording.	Addressed
Catherine (Kate) Pringle	12	18		I presume the second sentence relates to the impact of rapid land transformation on the accuracy of the data? I suggest that you re-word this sentence to make this more explicit.	I have given these two sections an overhaul. There was overlap. The revised version should make more sense. 3.2.4. refers only to the limited extent of the IOCB and potential issues with neighbouring biomes, while 3.2.5 now refers only to data deficiencies, transformation and spatial contradictions.
Catherine (Kate) Pringle	12	24		It is not clear how section 3.2.4 and section 3.2.5 differ from one another. Do they both relate to the impact of rapid land transformation on the accuracy of the data?	
Catherine (Kate) Pringle	12	26		This sentence requires a reference. I suggest Jewitt D, Goodman PS, Erasmus BFN, O'Connor TG, Witkowski ETF. Systematic land-cover change in KwaZulu-Natal, South Africa: Implications for biodiversity. S Afr J Sci. 2015;111(9/10), Art. #2015-0019, 9 pages. http://dx.doi.org/10.17159/sajs.2015/20150019	Added, thank you!

EXPERT REVIEW AND SPECIALIST RESPONSES: Indian Ocean Coastal Belt Biome - Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Response from Specialist
Catherine (Kate) Pringle	13		Table 2	All Acts in this table should have the Act No and date included e.g. National Environmental Management: Protected Areas Act 57 of 2003.	Added for NEMPA
Catherine (Kate) Pringle	13		Table 2	There are several instruments which are relevant but have been omitted from this table. For example, the Convention on Biodiversity should be included under international instruments. At a National level, the Constitution should be listed, with specific reference to Section 24. NEMA should then be listed first as it gives effect to the Constitution. Following NEMA should be all the specific environmental management acts (SEMA's). These include the ones that you have listed plus the Integrated Coastal Management Act 26 of 2008. I think you also need to list some other key national laws which have relevance e.g. National Forests Act, Sea Shore Act(?), National Heritage Resources Act.	National Forest Act was included. The coastal zone is not considered in this report. The estuarine specialist with deal with the ICMA. Any references to seashore vegetation, estuaries or coastal dynamics are purely descriptive. Not sure I follow the inclusion of the constitution? I am also not entirely sure of the applicability of the NHRA to this study - cultural and heritage resources are being covered in another study. Note from the CSIR: Relevant legislation will be detailed in the Integrated Biodiversity Assessment Report and SEA Report (including the chapter on Additional Impacts, which deal with Heritage Impacts (amongst other issues)).
Catherine (Kate) Pringle	14		Table 2	The KwaZulu-Natal Nature Conservation Management Act 29 of 1992 has been replaced by the KwaZulu-Natal Nature Conservation Management Act 9 of 1997.	Corrected
Catherine (Kate) Pringle	14		Table 2	The nature conservation laws for the Eastern Cape are not included. I think that the Cape Ordinance 19 of 1974 and the Nature Conservation Act 10 of 1987 still apply, but this should be checked.	Added
Catherine (Kate) Pringle	15	1		"As a consequence of the excavation of the pipeline, deep excavations below..." may read better as "As a consequence of the excavation for the pipeline, the upper soils horizons will be disturbed"	Done
Catherine (Kate) Pringle	15	3		The sentence starting "Such disturbance..." should be split in two. "...habitat form. However, in other habitats..."	Done
Catherine (Kate) Pringle	15	6-7		I would suggest putting the following brackets to improve the readability of the sentence (in addition to factors such as fire and grazing)	Done
Catherine (Kate) Pringle	15	17		This sentence doesn't make sense.	I think I have cleaned it up.
Catherine (Kate) Pringle	16	16		I am not sure what you mean by "species ethos"?	Behaviour - I have changed this for clarity
Catherine (Kate) Pringle	16	28		Diceros bicornis should be in italics	This section has been removed and replaced

EXPERT REVIEW AND SPECIALIST RESPONSES: Indian Ocean Coastal Belt Biome - Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Response from Specialist
Catherine (Kate) Pringle	16	30		"we" should be "are"	Done
Catherine (Kate) Pringle	18	8		Will cessation of the fire regime really occur? Surely with an increase in grass rather than shrub species, fire could increase?	I have proposed removing this entire sentence as it does not make sense in hind sight.
Catherine (Kate) Pringle	18	22		5 and 6 should be written in full	Done
Catherine (Kate) Pringle	18	27		I am not sure what the (5) is there for?	Neither am I. Removed.
Catherine (Kate) Pringle	19		Table 4	Is Table 4 adapted from Mucina and Rutherford 2006. If so, the citation should be included in the table heading	Done
Catherine (Kate) Pringle	19		Table 4	For consistency, all sentences in the "distribution" column should end with a full stop.	Noted
Catherine (Kate) Pringle	22		Table 5	All species names should be italicised	Noted
Catherine (Kate) Pringle	25		Figure 3	I presume this data is based on Mucina and Rutherford 2006. The citation should be included in the figure heading.	SANBI (2012) vegetation map. Citation added.
Catherine (Kate) Pringle	25		Figure 4	I presume this data is based on Mucina and Rutherford 2006. The citation should be included in the figure heading.	
Catherine (Kate) Pringle	31	1		I presume that section 5.1.1.6 summarises data from Mucina and Rutherford 2006. This should be referenced accordingly.	Done
Catherine (Kate) Pringle	31		Table 6	All descriptions in the table should end with a full stop. The relevant citation should also be included in the table heading.	Noted
Catherine (Kate) Pringle	36	21		Figure 144 should be Figure 14	Fixed
Catherine (Kate) Pringle	37	18		Figure 166 should be Figure 16	
Catherine (Kate) Pringle	45	11		NPAES should be in full followed by the acronym in brackets	Done
Catherine (Kate) Pringle	45	32-36		This section only discusses private nature reserves. What about game farms? These may fall outside of the IOCB but if not should be included. They are very important, particularly in northern KZN where they form part of corridors and part of the black rhino expansion project.	Game farms are included. I have made this clear.
Catherine (Kate) Pringle	46	4		Programmes should be agreements. As I understand it, there is only one overarching Stewardship Programme in KZN.	Noted
Catherine (Kate) Pringle	47	8		The date of the National Land Cover should be included.	Provided by SANBI 2017
Catherine (Kate) Pringle	47	7-15		This section 5.3.1.10 does not discuss the field crop boundaries which are listed under land cover in Table 8. A description of this layer should be provided.	Noted. Practically the FCB data was included in the National Landcover, so although used was not significant data.

EXPERT REVIEW AND SPECIALIST RESPONSES: Indian Ocean Coastal Belt Biome - Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Response from Specialist
Catherine (Kate) Pringle	48	8		"A 5km buffer layer.." should be bulleted.	Done
Catherine (Kate) Pringle	49		Table 8	Ecoregion feature class. A date should be provided for the SANBI layer.	Noted
Catherine (Kate) Pringle	51		Table 9	KZN CBA Irreplaceable have only been scored as "High". I would suggest that these should be "Very high" as they are areas that are required to meet biodiversity targets.	In other areas of KZN, I agree, but, within the IOCB much of these "irreplaceable" areas have been transformed or are isolated. This particular point is being investigated further through more detailed scrutiny of the transformed and CBA data layers.
Catherine (Kate) Pringle	51		Table 9	Private nature reserves and game farms. Game farms are listed as being considered but this is not expressed in the text.	Addressed
Catherine (Kate) Pringle	62	22-23		There should be a space between the sections.	The word version I have shows a gap (?)
Catherine (Kate) Pringle	64	28		Double space after "environments"	Corrected
Catherine (Kate) Pringle	65	16		"While such approach...." may read better as "While such an approach may be a rational one..."	Corrected
Catherine (Kate) Pringle	66	1		How did you arrive at the thresholds for your consequence levels?	These were based on the methodology for the risk assessment provided in the report template. Apart from specialist knowledge these were derived fairly arbitrarily.
Catherine (Kate) Pringle	67	3		Areas should be area	Corrected
Catherine (Kate) Pringle	69		Table 10	It is not clear how you integrated sensitivity, consequence and likelihood to arrive at the risk category. For example, why does a high sensitivity coupled with a moderate consequence and a likely likelihood have a low risk category? This integration approach needs to be made explicit.	This was completed based on methodology provided in the template. See below table taken from methodology - the scenario appears acceptable based on the method. The particular comment you raised is for disturbance of fauna - larger fauna will simple move from the track of the impending disturbance, thus although the area might be rated as sensitive, the actual risk to fauna will be low. It is likely that the fauna will be disturbed, but it is unlikely that they will be killed, or their behaviour altered (apart from avoiding the area).
Catherine (Kate) Pringle	73	5		This sentence should be bulleted.	Done
Catherine (Kate) Pringle	74	27		This space should be deleted.	Done
Catherine (Kate) Pringle	75-76			There are inconsistencies in the referencing styles. For example, some references include the dates in brackets others don't, the publisher name is missing from all book references. These require a thorough check.	Hopefully corrected

EXPERT REVIEW AND SPECIALIST RESPONSES: Indian Ocean Coastal Belt Biome - Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Response from Specialist
Catherine (Kate) Pringle	75-76	1-36		The following references are included in the reference list but not cited in the text: Little & Jansen 1995, van Aard et al 1998, van Aarde 2009, Zonneveld et al 1990.	Removed
Catherine (Kate) Pringle	General query			Has Mucina and Rutherford 2006 been used synonymously with the SANBI vegetation Map 2012 throughout the report? If so, this should be made explicit.	No, separately
Catherine (Kate) Pringle	General query			The TOR requires that ground-truthing of specific areas within the corridors be undertaken. Has this been done? If so, how have the datasets been updated to include this information? This is not included in the text.	Yes. The transformed land use layer is being reviewed in detail. Due to the nature of the IOCB, there has been a lot of interest in it and there is a lot of available data, more so KZN than the EC. One of the issues was overlap of data, more so than gaps. From early on it was clear that the IOCB is highly transformed and prioritising the transformed layer will guide and naturally refine the sensitivity layers – what is not transformed, must then be sensitive. Ground-truthing – through review of recent aerial photography and driving up and down the IOCB (not all dedicated field trips specifically for this purpose) the extent of transformation became clear as did areas where the transformation layer needed to be adjusted – basically expanded. These adjustments were minor relative to the total area i.e. closing up a small gap, or changing the shape of a polygon slightly to improve the accuracy. When viewed at the biome scale these changes are barely noticeable – an area that had small specs of red showing through small gaps, now shows fewer small specs, or no specs. As a result, the ground truthing did not add any significant data, it purely resulted in minor adjustments (and in most cases no adjustments) to existing data. Most of the results of ground-truthing have not been directly mentioned in the report as they have not resulted in anything new being presented, only confirming what is already represented or inadvertently clarifying queries or concerns raised through the review process.
Catherine (Kate) Pringle	General query			The ToR requires the "Identification of additional features". Are there any relevant planning tools, such as Environmental Management Frameworks (EMFs) which may provide additional insights?	None that we are aware of for the IOCB

EXPERT REVIEW AND SPECIALIST RESPONSES: Indian Ocean Coastal Belt Biome - Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Response from Specialist
Catherine (Kate) Pringle	General query			The TOR requires that the National Biodiversity Assessment 2011 is considered. How has this been done?	Specific consideration was taken of the gazetted Threatened Ecosystems 2011
Catherine (Kate) Pringle	General query			It is assumed that soil and agriculture are considered elsewhere. If not, this is a major oversight.	This is considered by other relevant specialists.

Impact	Study area	Location	Without mitigation			With mitigation		
			Consequence	Likelihood	Risk	Consequence	Likelihood	Risk
Impact 1: Ecological and biodiversity impacts	1	Very high sensitivity area	Slight	Likely	Very low	Slight	Likely	Very low
		High sensitivity area	Moderate	Likely	Low	Slight	Not likely	Very low
							(mitigation = avoid)	
		Medium sensitivity area	Severe	Likely	High	Severe	Not likely	Moderate
							(mitigation = avoid)	
		Low sensitivity area	Extreme	Very Likely	Very high	Extreme	Not likely	Moderate
							(mitigation = avoid)	
	2	Very high sensitivity area	Slight	Likely	Very low	Slight	Likely	Very low
		High sensitivity area	Moderate	Likely	Low	Slight	Likely	Very low
		Medium sensitivity area	Substantial	Likely	Moderate	Substantial	Not likely	Low
							(mitigation = avoid or offset)	
		Low sensitivity area	Severe	Very likely	High	Severe	Not likely	Moderate
							(mitigation = avoid or offset)	

4. Integrated Biodiversity and Ecology Assessment (Terrestrial and Aquatic Ecosystems, and Species) – Succulent and Nama Karoo Biomes

Peer Reviewer: Professor Sue J. Milton-Dean; Renu-Karoo Veld Restoration

EXPERT REVIEW AND SPECIALIST RESPONSES: Karoo and Desert Biomes - Gas Pipeline Development						Change has been effected in the report
						No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Name	Reviewer	Page Range	Line/s	Table/Figure	Expert Reviewer Comments	Response from Specialist
Sue Milton		1-82			The report, including methods, mapping, coverages used, conclusions and recommendations are all clear, logical and easy to follow. I have made a few suggestions for corrections to grammar and additions to the text and references. These are listed by page and line number below.	Noted
Sue Milton		1-82		Additional Refs	Cherryl Walker, Suzanne J Milton, Tim G O'Connor, Judy M Maguire & W Richard J Dean (2018) Drivers and trajectories of social and ecological change in the Karoo, South Africa, African Journal of Range & Forage Science, 35:3-4, 157-177	Reference added
Sue Milton		1-82		Additional Refs	M Timm Hoffman, Andrew Skowno, Wesley Bell & Samukele Mashele (2018) Long-term changes in land use, land cover and vegetation in the Karoo drylands of South Africa: implications for degradation monitoring, African Journal of Range & Forage Science, 35:3-4, 209-221	Reference added
Sue Milton		1-82		Additional Refs	W Richard J Dean, Colleen L Seymour & Grant S Joseph (2018) Linear structures in the Karoo, South Africa, and their impacts on biota, African Journal of Range & Forage Science, 35:3-4, 223-232	Reference added
Sue Milton		19	4		"Although mostly still intact, heavy grazing has left certain parts" add a noun such as "Although the habitat is mostly intact"	Noted and updated
Sue Milton		19	6		"increased stocking rates that in turn exacerbates" should read "exacerbate"	Noted and updated
Sue Milton		19	13		"well as the construction of dams also threaten the Nama Karoo's" could add "construction and failure of dams"	Noted and updated
Sue Milton		19	17		"invasive plants currently common to the Nama Karoo region" should read "common in"	Noted and updated
Sue Milton		19	18		Suggest adding Opuntia spp and various other Cactaceae - (bearing in mind the widespread distribution of Tephrocactus and Echinopsis in the Nama Karoo)	Noted and updated
Sue Milton		19	19		Suggest adding Pennisetum setaceum - especially as this is very successful on disturbed rocky ground such as cutting on the	Noted and updated

EXPERT REVIEW AND SPECIALIST RESPONSES: Karoo and Desert Biomes - Gas Pipeline Development						Change has been effected in the report
						No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Name	Reviewer	Page Range	Line/s	Table/Figure	Expert Reviewer Comments	Response from Specialist
					escarpment, borrow pits etc.	
Sue Milton		19	31		"with the highest concentrations particularly within the avifauna, specifically raptors " Suggest inserting "highest concentration of pesticides..."	Noted and updated
Sue Milton		20	17		"Euphorbiaceae adds to the species diversity of Nama Karoo" "richness" may be a more appropriate adjective	Noted and updated
Sue Milton		21	33		Should probably also mention scorpions	Noted and updated
Sue Milton		22			4.2.4.2 Socio-economic value. This paragraph could also cite Walker et al 2018	Noted and reference added
Sue Milton		22	12		"commercial exploitation of medicinal bioprospecting (such as Hoodia gordonii)" Suggest changing "medicinal bioprospecting" to "medicinal plants"	Noted and updated
Sue Milton		22	26		"extreme summer aridity with daily temperatures in excess of 40°C the norm" Suggest changing to read " daily temperature maxima in summer in excess of 40°C the norm"	Noted and updated
Sue Milton		23	3		See also see Joseph R. McAuliffe,*, M. Timm Hoffman, Leslie D. McFadden, Wesley Bell, Sam Jack, Matthew P. King, Veronica Nixon, 2018 ,Landscape patterning created by the southern harvester termite, Microhodotermes viator: Spatial dispersion of colonies and alteration of soils. Journal of Arid Environments, 157: 97–102 OR Joseph R. McAuliffe,*, M. Timm Hoffman, Leslie D. McFadden, Sam Jack, Wesley Bell, Matthew P. King 2019 Whether or not heuweltjies: Context-dependent ecosystem engineering by the southern harvester termite, Microhodotermes viator. Journal of Arid Environments. in press	Noted and references added
Sue Milton		25 or 26	4.3.3		To match the other sections you need a statement about invasive alien plants in the Succulent Karoo. I would think that Arundo, Nerium, Tamarix ramossissima, Atriplex lindleyi, Cactaceae, Pennisetum setaceum and Prosopis should be mentioned especially as alien problems are exacerbated by cropping, mining and eutrophication of water	Noted and updated
Sue Milton		29	15-19		Perhaps add hippo. Also this section needs a citation to support the statement.	Noted, updated and references added

EXPERT REVIEW AND SPECIALIST RESPONSES: Karoo and Desert Biomes - Gas Pipeline Development						Change has been effected in the report
						No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Name	Reviewer	Page Range	Line/s	Table/Figure	Expert Reviewer Comments	Response from Specialist
Sue Milton		30	7		"the Karoo chat (<i>Cercomela schlegelii</i>)" Why single out this widespread species probably more common in the Nama than Succulent Karoo?	Noted. Species removed.
Sue Milton		30	17-18		Scorpions: Move this sentence to the paragraph dealing with invertebrates	Noted and updated
Sue Milton		31	16-20		Should probably also cite Walker et al 2018	Noted and reference added
Sue Milton		32	7		Brownanthus now Mesembryanthemum	Noted and updated
Sue Milton		32	12		"and <i>Pachypodium namaquanum</i> ('halfmens'), is typical of non-succulent 11 woody perennials such as <i>Boscia albitrunca</i> (Shepherds tree)," Perhaps write "is typified by non-succulent woody perennials.."	Noted and updated
Sue Milton		66			"Avoid impact to restricted and specialised habitats such as..." Suggest adding quartz or pebble patches	Noted and updated
Sue Milton		67			Do explosions and leaks pose any particular risk to terrestrial or aquatic systems or to soil-dwelling animals?	Yes, noted and section updated
Sue Milton		73	27		Should not this section also cover best practice guidelines for fuel storage and vehicle and machine repair on site	Yes, noted and section updated
Sue Milton		74	8.5		Possibly add to the guidelines "No fertilizers or irrigation should be applied during rehabilitation as this is likely to lead to a green flush after rain and failure of perennial species to establish in competition with annuals and ephemerals"	Yes, noted and section updated
Sue Milton		74	25-31		"A key gap in knowledge for the Karoo study area is that baseline information is generally poorly sampled" would read better as "there is a paucity of baseline information as the area is generally poorly sampled etc."	Noted and updated
Sue Milton		75	4		Allsopp with 2 ps	Noted and updated

5. Integrated Biodiversity and Ecology Assessment (Terrestrial and Aquatic Ecosystems, and Species) – Albany Thicket Biome

Peer Reviewer: Professor Sue J. Milton-Dean; Renu-Karoo Veld Restoration

EXPERT REVIEW AND SPECIALIST RESPONSES: Albany Thicket Biome - Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/Figure	Expert Reviewer Comments	Response from Derek Berliner
SJ Milton	General			The Albany Thicket assessment report adequately covers the requirements of the SEA. The sensitivity classification is based on adequate evidence at a broad scale, and the recommendations are sound if somewhat limited and non-specific because of the coarse scale of the project. The comments that follow include suggestions for additional impacts that could be evaluated, lack of clarity in certain areas, and minor grammatical corrections.	Noted
SJ Milton	9	16	Text	shrublands (one word)	Done
SJ Milton	10	10	Text	Albany Thicket (both words with caps)	Done
SJ Milton	11	14	Text	"degradation between 31-88%" difficult to relate these figures to tables 6 and 7	This refers to total degradation for both 'moderate' and 'severe classes' (i.e. sum of both), I have removed this in the text.
SJ Milton	12	2	Table 7	I have problems understanding how total pristine thicket is 406,316 sq km whereas the caption says the total thicket area is 20,730 sq km. Are the areas of thicket types in the table in hectares?	Well spotted, I have taken out the misleading tables and replaced with a single table in % 's of each class
SJ Milton	12	9	Text	"the short space of a decade, heavy browsing, especially by mohair-producing angora 9 goats, can convert dense shrub land into a desert-like state" Citation needed	I have included a reference
SJ Milton	14	38	Text	"pastorists" should be pastoralism	Done
SJ Milton	16	13	Table 8	What is "SCP" in the table column heading?	(Systematic) Conservation Planning Category
SJ Milton	24	8	Table 13	Not clear how the scaling out of 10 for suitability was calculated	See appendix
SJ Milton	24	14-16	Text & Table 13	According to the suitability score in Table 13, phase 1 is the most suitable (4.8) and Phase 2 least suitable at 3.7	The higher the score the higher the overall suitability of the gas phase
SJ Milton	25	3	Text	Should this read "gas phase 2" give the scoring in table 13?	Yes, thanks made the correction

EXPERT REVIEW AND SPECIALIST RESPONSES: Albany Thicket Biome - Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/Figure	Expert Reviewer Comments	Response from Derek Berliner
SJ Milton	26	2	Figure 13	Do the pink parts of these maps represent "other biomes" or less-sensitive areas?	The Pink are other areas, i.e. lowest sensitivity, but applies only within the gas phase study area
SJ Milton	28		Table 15	Under Invasive alien plant spread: mitigation, you could add "do not use sand sources contaminated with invasive alien plant seed for bedding of the pipe or for construction work"	Yes thanks
SJ Milton	28		Table 15	Invasive alien plants: mitigation perhaps alter to read "where invasive alien plants occur on or in the vicinity of the construction site"	Added
SJ Milton	28		Table 15	Other impacts probably include	See note below
SJ Milton	28		Table 15	1. development of access roads and impacts on fauna, soils and flora	Point 1 & 2 is covered under: 'Habitat destruction and degradation' (includes fragmentation), point 3 was raised in the specialist workshop but felt to be low.
SJ Milton	28		Table 15	2. fencing off of pipeline infrastructure (implications for plant and animal dispersal, tortoise and bird mortality)	See note above
SJ Milton	28		Table 15	3. Risks of leakage and explosion?	Response from the SEA Project Team: No edit needed. It should be noted that block valves will be positioned every 30 km along the pipeline route, which will consist of a concrete slab on the surface that will lead to an inspection chamber. The valves can be automated remotely i.e. to stop a specific section of the line in the event of a leak (i.e. close two valves). If the line needs to be repaired, the remaining gas within the line will be vented off. Therefore, it is understood that the impact of leaks are expected to be low.
SJ Milton	29	8	Text	"comprising of local non mobile species" Delete "of"	Done
SJ Milton	31	3	Text	"variation that is considered acceptable by experts" Give names of experts	Changed to 'this author'
SJ Milton	31	7	Table 18	Is 10% loss acceptable where 80% has already been lost or damaged?	The degree of loss of a feature is implicitly built into its sensitivity class. How much loss has occurred in remnant vegetation types should be reflected in its endangered status/CBA status/sensitivity status.

EXPERT REVIEW AND SPECIALIST RESPONSES: Albany Thicket Biome - Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/Figure	Expert Reviewer Comments	Response from Derek Berliner
SJ Milton	31	23	Text	"Disturbance in arid areas of succulent thickets are prone to invasion karroid species (Milton, & Dean, 2010)" Should this be "invasion OF karroid species? Millton & Dean 2010 dealt with invasive alien species rather than range extensions.	Fixed

6. Integrated Biodiversity and Ecology Assessment (Terrestrial and Aquatic Ecosystems, and Species) – Estuaries

Peer Reviewer: Professor Janine Adams; Nelson Mandela University

EXPERT REVIEW AND SPECIALIST RESPONSES: Estuaries - Gas Pipeline Development						Change has been effected in the report
						No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Name	Reviewer	Page Range	Line/s	Table/Figure	Expert Reviewer Comments	Response from Specialist
Janine Adams		Whole Document			Don't use etc, check throughout document	This has been corrected throughout the report
Janine Adams		pg 13	19		Fix superscript	This has been corrected
Janine Adams		pg 23		Table 2	Legend should indicate what numbers 1-7 are	Relevant description has been added
Janine Adams		pg 25	12		...in the density of benthic organisms and number of taxa	This has been corrected
Janine Adams		pg 25	20		delete "along this coast", repeat in the sentence	This has been corrected
Janine Adams		pg 25	32, 33		change to....especially with respect to the ability of individual and collective systems to absorb and recover from events.	This has been corrected
Janine Adams		pg 38	27, 28		change to....stretch more than 25 km into the corridor	This has been corrected
Janine Adams		pg 39		Figures 12-16	Sensitivity map...	This has been corrected
Janine Adams		pg 43	7, 12, 13		Check here and throughout document for chronological ordering of in text references, must be from earliest to most recent date	This has been corrected
Janine Adams		pg 45	31		delete "increase"	This has been corrected
Janine Adams		pg 46	18		"reduce" instead of "reduced"	This has been corrected
Janine Adams		pg 48	16		increases	This has been corrected
Janine Adams		pg 49	11		threat	This has been corrected
Janine Adams		pg 50	10		alter	This has been corrected
Janine Adams		pg 50	20		Over time	This has been corrected
Janine Adams		pg 50	31		delete "any"	This has been corrected
Janine Adams		pg 51	7		periods when, delete "which"	This has been corrected
Janine Adams		pg 60	10, 11		This will set targets for use of specific chemicals in marine waters....	This has been corrected
Janine Adams		pg 61	5, 14		take out of bold	This has been corrected
Janine Adams		pg 62	24, 26		take out of bold	This has been corrected
Janine Adams		pg 63	5		check Section number	This has been corrected

EXPERT REVIEW AND SPECIALIST RESPONSES: Estuaries - Gas Pipeline Development						Change has been effected in the report
						No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Name	Reviewer	Page Range	Line/s	Table/Figure	Expert Reviewer Comments	Response from Specialist
Janine Adams		pg 64	31		be excavated	This has been corrected
Janine Adams		pg 64	37, 38		no bold	This has been corrected
Janine Adams		pg 65	10		would mostly be required for ROWs	This has been corrected
Janine Adams		pg 65	14		are recommended	This has been corrected
Janine Adams		pg 66	9		where required	This has been corrected
Janine Adams		pg 71	4		correct spelling of Fernandes	This has been corrected
Janine Adams		pg 71-76			check that species names are in italics	This has been corrected
Janine Adams		Overall comments			The report is relevant and uses the most up-to-date datasets to come to relevant conclusions	Noted
Janine Adams		Overall Comments			The report is thorough and represents the impacts and possible mitigation actions accurately.	Noted

7. Integrated Biodiversity and Ecology Assessment (Terrestrial and Aquatic Ecosystems, and Species) – Wetlands and Rivers

Peer Reviewer: Duncan Hay, Catherine Pringle, and Leo Quayle, Institute of Natural Resources

EXPERT REVIEW AND SPECIALIST RESPONSES: Freshwater - Gas Pipeline Development						Change has been effected in the report
						No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Name	Reviewer	Page Range	Line/s	Table/Figure	Expert Reviewer Comments	Responses from Specialists
Kate Pringle		9	20		and therefore requires	Corrected
Kate Pringle		9	24		obtaining EA is not are	Corrected
Kate Pringle		12	4		and builds on	Corrected
Kate Pringle		12	14		Why does the freshwater assessment identify caves, geology and roosts?	Changed as per comments for EGI. The report now mentions freshwater features. Note the EGI Report Responses to Peer Reviewer notes the following: This was a generic sentence copied from CSIR template. It has been reworded to relate to freshwater features such as waterfalls, spray zones etc.
Kate Pringle		13	1		Further the above - should this not be further to the above?	Corrected
Kate Pringle		13	11		I think it would be good to mention that the species information relates to freshwater-dependent species and not all plants, butterflies and reptiles	Changed
Kate Pringle		16	9		EI and ES should be written in full	Corrected
Kate Pringle		16	10		DWS should be written in full	DWS has already been abbreviated in Section 3 on Page 12.
Kate Pringle		16	28		It is unclear why stream order has been included in determining river sensitivity. Could you provide additional justification for this?	Higher stream order usually represents smaller, faster flowing, lower volume rivers higher in the catchment which are more sensitive to impacts.
Kate Pringle		17		Table 1	I would suggest that Ramsar sites be included in the very high sensitivity class	The reason why Ramsar sites were given a "high" sensitivity and not given a very high sensitivity is because they are protected to some extent. We feel that highly sensitive systems outside of protected areas and other conservation areas are more sensitive as they are more likely to be impacted by development.

EXPERT REVIEW AND SPECIALIST RESPONSES: Freshwater - Gas Pipeline Development						Change has been effected in the report
						No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Name	Reviewer	Page Range	Line/s	Table/Figure	Expert Reviewer Comments	Responses from Specialists
Kate Pringle		18	35		You indicate that 141 freshwater plants were selected for analysis as these were categorised as Threatened, Near Threatened or data deficient. Presumably this is the total number of plants in SA in these categories? From this, you then selected 4129 point localities of these plants occurring in the study area? If this is what you have done, then why does the total number of plants in these categories in SA differ between the EGI and Gas report (141 vs 160)? In addition, I would expect the total number of points to be higher in the gas report than the EGI report as it covers a much greater extent (4129 vs 6700). I have picked up a similar issue with the dragonflies, freshwater fish, amphibians, reptiles and mammals. If this is an error, then you may need to re-run your sensitivity analyses. Also please clarify if all selected species occur in the study area or only a portion of those selected from the SA dataset?	The discrepancy has come from earlier report versions. The initial EGI report referred to the total number of species and points that occur within all corridors (both EGI and Gas). Attempts have been made to correct these so that data was specific to either the Gas or EGI corridors. These have now been corrected. Also, selected species occur with the study area (in this case the Gas corridors).
Kate Pringle		19	16		(Gas) - is this meant to be included in the text?	Removed
Kate Pringle		20	19		You indicate that 49 species were selected for the study. You then indicate that point localities for 30 of these were obtained from GBIF and the other 22 from the IUCN data. This totals 52 not 49?	Corrected
Kate Pringle		21	19		You indicate that the data was obtained from Child et al 2016. In the EGI report you list the sources as Bates. Please clarify which is correct and amend one or both reports.	Corrected to Child et al 2016 in the EGI Report.
Kate Pringle		22	9		In order to reduce not reduced	Corrected
Kate Pringle		27-28		Table 2	The numbers of point locations in this table for dragonflies, freshwater fish, amphibians, reptiles, and mammals do not match the number given in the text on pages 18-21.	Corrected and standardised for both reports. These discrepancy stems from previous analyses where total numbers for the entire area covering both EGI and Gas was used.

EXPERT REVIEW AND SPECIALIST RESPONSES: Freshwater - Gas Pipeline Development						Change has been effected in the report
						No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Name	Reviewer	Page Range	Line/s	Table/Figure	Expert Reviewer Comments	Responses from Specialists
Kate Pringle		30		Table 4	The relevant acts, strategies and policies are a bit muddled in this table. I would reorder the national instruments so that NEMA appears first as the framework legislation followed by the various specific environmental management acts (SEMAs) e.g. National Water Act. I would also then list the associated instruments, policies and strategies under the relevant act e.g. the EIA regs under NEMA and the RQOs under the National Water Act.	I disagree, the table has been ordered as per CSIR suggestions and flow from international instruments/legislation down to provincial/regional legislation
Kate Pringle		37		Table 4	Is it necessary to list all the extended power ordinances?	These are not power ordinances but conservation ordinances relevant to freshwater. We just wanted to be thorough.
Kate Pringle		38		Table 4	You have not included provincial legislation for Mpumalanga, Gauteng and Free State.	These provinces do not have separate provincial legislation relevant to freshwater systems/pollution - this national legislation applies in these provinces
Kate Pringle		39	1		I think this chapter should start with an introductory paragraph rather than just a table.	Edited
Kate Pringle		39		Table 5	"The rivers are generally in poor condition" - I might reword this as 50% are in good or fair and 50% are poor or critical.	Reworded
Kate Pringle		41		Table 5	Does Addo fall into both Phase 2 and Phase 7?	Yes, it does
Kate Pringle		42		Table 5	Key impacts - presumably the urbanisation is impacting water quality? Maybe be explicit about this.	Reworded
Kate Pringle		42		Table 5	EOO and AOO should be written in full	EOO and AOO have already been abbreviated in Phase 1 on Page 41.
Kate Pringle		43		Table 5	(Turner and de Villers, 2017).	Corrected
Kate Pringle		44		Table 5	Phase 4: smaller number of rivers	Corrected
Kate Pringle		47-48		Table 5	Acacia karoo should be in italics	Corrected
Kate Pringle				Table 5	Should specific mention not be made of the relevant free flowing rivers?	Have added these in
Kate Pringle		100-101			Have birds been considered elsewhere? There are several key wetland species such as cranes which may be significantly impacted.	A separate study covers the assessment of impacts on avifauna.
Kate Pringle		101			I think you should include a specific section on water quality which covers sedimentation, spills, impacts on groundwater etc.	Added some text to this effect

EXPERT REVIEW AND SPECIALIST RESPONSES: Freshwater - Gas Pipeline Development						Change has been effected in the report
						No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Name	Reviewer	Page Range	Line/s	Table/Figure	Expert Reviewer Comments	Responses from Specialists
Kate Pringle		109			Could you provide a bit more detail on how the different elements were integrated to arrive at a risk category?	Based on the agreed risk assessment approach. Note from the CSIR: The Risk Assessment approach and methodology has been standardised across all specialist studies in terms of consequence vs. probability to calculate risk. The approach will be detailed in the SEA Report and Integrated Biodiversity Chapter.
Kate Pringle		118			This section seems a little out of place here. I think it may fit better at the end of Section 6.	Agreed and moved
Kate Pringle		120	13		HGM should be written in full	HGM has already been abbreviated in Section 4.2 on Page 24.
Kate Pringle		121	3		Remove "as to develop" so that it reads "such as a national-scale"	Corrected
Kate Pringle		121	8		the last sentence may be better as "...planning and design which consider areas of concern"	Corrected
Kate Pringle		121	26		be required to aid in	Corrected
Kate Pringle		123	14		Reference requires a date after the authors	Corrected and Included
Kate Pringle		124	15-18		Line spacing issue	Corrected
Kate Pringle					This report must consider Strategic Water Source Areas and Strategic Groundwater Areas. These areas must be incorporated as a sensitivity value = 4. They are critically important and must be avoided at all costs.	Note from the CSIR: Strategic Water Source Areas (SWSAs) - Surface and Groundwater (Dataset: Council for Scientific and Industrial Research (CSIR), April 2018) has been considered in the Environmental Sensitivity Analysis used to optimise the location of the corridors. It has been rated with a HIGH Sensitivity. This will be captured in the Environmental Sensitivity Map in the SEA Report, as well as in the Integrated Biodiversity Assessment Chapter.

EXPERT REVIEW AND SPECIALIST RESPONSES: Freshwater - Gas Pipeline Development						Change has been effected in the report
						No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Name	Reviewer	Page Range	Line/s	Table/Figure	Expert Reviewer Comments	Responses from Specialists
Kate Pringle					Many wetland resources are groundwater driven. Has groundwater been considered elsewhere? If not, this is a major oversight that must be addressed. If the groundwater has been addressed elsewhere, it would be helpful to cross-reference.	Note from the Project Team: The Gas Pipeline will be constructed below ground at a depth of about 2 m. Based on feedback from the engineers, this is not considered deep enough to impact significantly on groundwater resources and deep aquifers. The specialists believe that the consideration of groundwater is not a major concern as aquatic systems are not driven significantly by groundwater resources, and the impacts from gas pipelines will be minor (and non-existent for EGI). However, this assumes that we are referring to (deeper) groundwater and not subsurface flows. Nevertheless, the following impact has been assessed in the Freshwater Gas Report: <i>Pollution (water quality deterioration) of freshwater ecosystems and potential contamination of groundwater/ subsurface drainage, which could also lead to bioaccumulation or poisoning of fauna and flora.</i>
Kate Pringle					Have estuaries been considered elsewhere?	Estuaries are not considered in the Freshwater Assessment but are the subject of a separate dedicated specialist assessment.

8. Integrated Biodiversity and Ecology Assessment (Terrestrial and Aquatic Ecosystems, and Species) – Avifauna

Peer Reviewer: Jonathan Booth and Robin Colyn, Birdlife South Africa

EXPERT REVIEW AND SPECIALIST RESPONSES: Avifauna - Gas Pipeline Development						Change has been effected in the report
						No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Name	Reviewer	Page Range	Line/s	Table/Figure	Expert Reviewer Comments	Responses from Specialists
R.Colyn		7-8	11	Table 1	With reference to SABAP2 data used: "More than 36% of pentads have four or more lists." Were pentads with four or more cards submitted only used for analyses? Were full protocol and incidental records utilised? My reasoning here is that with range restricted, elusive and low density species it would be imperative to use all available data to represent them on these landscape level scales.	All pentads where data was collected were used irrespective of the number of lists. When SABAP2 data was lacking, it was supplemented with SABAP1 data.
R.Colyn		29	9-18		"The probability of the impacts occurring in a specific habitat class for a specific species was 9 rated for all Red Data species with a SABAP2 reporting rate of >5%" I see the need for a reporting rate cutoff to remove any vagrant or stochastically recorded species that aren't necessarily representative of the specific pentad/s. However, my concern is that range restricted and elusive species might inherently be even less adequately represented than they already sometimes are within SABAP2 data given their detection probability. It might not be a feasible task, but could all SABAP2 data not be used for Red Data species listed are South African endemics? Or alternatively, those SA endemics known to yield low detection probabilities and as such are poorly represented within SABAP2 data?	Where available, actual species data were used to augment the SABAP2 data and in so doing alleviates this concern to some degree e.g. Yellow-breasted Pipit, Barlows Lark, Botha's Lark. The problem with rating impacts for all species, irrespective of their reporting rate, is that it can skew the ratings heavily if many of the species with reporting rates of <5% are Red Data species. This could result in some habitat classes being assigned very high risk ratings due to the presence of these species in the SABAP2 database, while the chances of actually encountering them are negligible. While we take the point that in some cases the low reporting rate is due to other factors than actual scarcity, we believe that in the majority of cases it reflects actual low numbers on the ground. It is also important to bear in mind that this assessment does not replace the project specific bird specialist study, which will still be required, and will include field surveys in all instances except in the case of Very Low sensitivity areas.
J. Booth		10	29		"Some avifaunal specialists did not respond to data requests" - has this resulted in any significant gaps in data? Would it be beneficial if the authors were allowed more time to collect possible missing data in order to increase the level of confidence in their results?	It will never be possible to include all available data from all specialist sources and it is envisaged that such information gaps will be addressed during the site specific assessments to be conducted. See point 11 (second last point) below.

EXPERT REVIEW AND SPECIALIST RESPONSES: Avifauna - Gas Pipeline Development						Change has been effected in the report
						No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Name	Reviewer	Page Range	Line/s	Table/Figure	Expert Reviewer Comments	Responses from Specialists
J. Booth		11	1 - 3		BirdLife South Africa strongly supports this statement; given inherent SEA limitations, the SEA must not preclude a full EIA (and not just a Basic Assessment) taking place at the individual project level.	The level of investigation will not be determined by the legal procedure (BA or EIA) but by the habitat sensitivity level.
J. Booth		11	17 - 18	Table 2	Consider inclusion of the IFC Performance Standards. Performance Standard 6 is of particular relevance.	This was added as recommended.
J. Booth		41	6	Table 5	Could the authors describe how various buffer distances were calculated / what informed the buffer distances?	Buffer distances were defined based on our professional judgment of the extent of the potential impact of the gas infrastructure on avifauna within the defined habitat classes - i.e. drainage lines were deemed less sensitive (60m buffer) than wetlands and waterbodies (200m buffer).
J. Booth		66	3	Table 6	For Very High and High Sensitivity Class: Provincial conservation authorities and any regional conservation NGO's (e.g. Wilderness Foundation and Nature's Valley Trust in the Eastern Cape; Wildlands Conservation Trust in KwaZulu-Natal) should also be notified of any development proposals.	This was added as recommended.
J. Booth		66	3	Table 6	For Very High and High Sensitivity Class: In addition to the stated Implementation and Additional Assessments at Project Level - BirdLife South Africa recommends that the Mitigation Hierarchy, as described in the IFC Performance Standards, is also followed when considering development in these areas.	This was added as recommended.
J. Booth		67		Table 7	Under Row 2 of Table 7 (Stage = Planning), we recommend the following text in the Mitigation Cell: "Avoidance of Very High and High sensitivity areas as much as possible. If these areas cannot be avoided, the Mitigation Hierarchy must be followed (as prescribed by IFC Performance Standards) and there is a high likelihood of a Biodiversity Offset being required."	This was added as recommended.

9. Seismicity Assessment

Peer Reviewer: Professor Andrzej Kijko; University of Pretoria

EXPERT REVIEW AND SPECIALIST RESPONSES: Seismicity – Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table Figure	Expert Reviewer Comments	Responses from Specialists
Prof Andrzej Kijko	General Overview			<p>The report presents a comprehensive study of the potential effects of seismic activity on the planned phased gas pipe network (PGPN) and electricity grid infrastructure (EGI) in South Africa. The report consists from “<i>List of acronyms, abbreviations and units</i>”, brief summary, six chapters and three appendices.</p> <p>The “<i>List of acronyms, abbreviations and units</i>” provide some basic terminology and lexicon used by seismologists, required to understand the findings of the report. The Summary is short but to the point. The report starts with a comprehensive introduction in Chapter 1, followed by the formulation of the scope of the work in Chapter 2, and some quantitative assessments of Probabilistic Seismic Hazard Analysis (PSHA) for the potential locations (corridors) of PGPN and EGI in Chapter 3. Chapter 4 deals with the assessment of associated risk to the pipelines. The Report concludes with Chapter 5 describing “<i>Best Practice guidelines and Monitoring Requirements</i>”, Chapter 6 describing “<i>Gaps in knowledge</i>” and finally the “<i>References</i>”. The Report also has the following three Appendices: Appendix A - “<i>Seismic Hazard in South Africa</i>”, Appendix B - “<i>OpenQuake PSHA computation for South Africa, The Energy Corridors</i>”, and Appendix C - “<i>Vulnerability of PGPN and Monitoring</i>”.</p> <p>The Report is very well structured and organised, easy to read and results are presented in a consistent way. However, in my professional opinion, there are significant shortcomings in the report as discussed below.</p>	Noted.

EXPERT REVIEW AND SPECIALIST RESPONSES: Seismicity – Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table Figure	Expert Reviewer Comments	Responses from Specialists
Prof Andrzej Kijko	Ad. Chapter 1. Introduction (Page 5)	1		This chapter serves as an introduction to the problem. It describes the methodology required to assess the impact of earthquakes on Gas Pipeline Networks (GPN) alternatively termed lifelines in the report. It also summarises what the reader can expect in the following five chapters and three appendices. Authors are aware of the limitations of their work that are listed in Table 2. However, some of the limitations could be easily removed and make the report better.	Noted
Prof Andrzej Kijko	Ad. Table 1. (Page 7)	4	Table 1	Table 1 is very useful. The Authors of the Report used the probabilistic seismic hazard map compiled by Midzi et al. (2018c) as the main source of seismic hazard for South Africa. This article and the subsequent map are, as stated in the report, still under peer review. Along with concerns raised in my comments on Section 3.3.1, I have fundamental reservations against using Midzi et al (2018c) as a source of information at this stage.	Noted. The reviewer's concerns relating to the use of the probabilistic map of Midzi et al (in press) are addressed when responding to the comments on Section 3.3.1.
Prof Andrzej Kijko	Ad. 2.4 Limitations and Assumptions Table 2. Site effect. (Page 8)	4		In studies of seismic hazard and risk for lifelines, the site effect plays a fundamental role (see e.g. Tamaro et al., 2013). The account of site effect (at least its first approximation) can be done by the account of average S velocity (Vs30) of first 30 meters. Information on Vs30 is available for South Africa (Allen and Wald, 2007) and its implementation is easy (e.g. Atkinson and Boore, 2006). Since the impact of site effect from different geological sources can be significant, its implementation would significantly improve the Report.	Noted. The importance of the site effect has been emphasised and reference made to the articles cited by the reviewer.
Prof Andrzej Kijko	Ad. 2.4 Limitations and Assumptions Table 2. Analysis of liquefaction potential. (Page 8)	4		Besides the effect of fault displacement (also known as permanent ground deformation or PGD), the effect of liquefaction is one of the major threats to any pipeline. Since its effect can be fatal to any lifeline, I would have expected that the Report provided at least some idea or even rough quantification of its effect on the pipelines. The Authors should address this aspect.	Noted. The dangers posed by liquefaction are given greater emphasis in the report.
Prof Andrzej Kijko	Ad. 2.4 Limitations and Assumptions Table 2. Active faults. (Page 8)	4		As a rule, the major threat to any lifeline is not so much peak ground acceleration (PGA) or velocity of vibration. The major threat comes from fault displacement in the vicinity of the structure. I am not familiar with details of the mandate the Authors had when they were seconded to perform the hazard and risk analysis, but any assessment of hazard and risk for lifelines is incomplete if quantification of the effect of fault displacements is not provided.	The authors agree that fault displacement is the major threat rather than ground shaking. The authors are of the opinion that the uncertainties in predicting fault displacement are large, and this is beyond the terms of reference of this study.

EXPERT REVIEW AND SPECIALIST RESPONSES: Seismicity – Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table Figure	Expert Reviewer Comments	Responses from Specialists
Prof Andrzej Kijko	Ad. 2.4 Limitations and Assumptions Table 2. The vulnerability of GRN. (Page 8)	4		Again I am not familiar with the mandate the Authors of the Report had, but the title of the report make promises, that the report will provide quantification of risk and damage to the proposed pipelines. The risk quantification is not provided in the report.	<p>The mandate evolved during the course of the study, as it became evident that the way in which the impact of seismicity on the routing of gas pipeline should be assessed differed significantly from the other factors that were included in the study e.g. biodiversity, economics.</p> <p>The quantification of risk required geotechnical and engineering studies well beyond the original scope and budget.</p>
Prof Andrzej Kijko	Ad. 2.5. Relevant Regulatory Instruments. Table 3. Relevant Regulatory Instruments. (Page 9)	4		I like the list of regulations listed in Table 3. However, no mention is made to the major and official source of information for the analysis, which is the latest version of the South African Building Code (SANS 10160-4-2017). The document is missing in Table 3.	<p>Noted.</p> <p>The hazard map in the South African Building Code (SANS 10160-4-2017) has been inserted as Figure 4 and is discussed in the text.</p>
Prof Andrzej Kijko	Ad. Section 3.2. Background. (Page 10)	39		This Section provides a very good review of South African seismicity, with a warning that in low rate seismicity, intraplate regions like South Africa, the unexpected can happen. For example the 1809 and 1969 Western Cape earthquakes, the recent Botswana 6.5 earthquake. The only reservation I have is regarding the assessment of the completeness of the data for the southern African catalogue by Mulabisana (2016). The assumption that starting from 1965, the Southern African catalogue is complete starting from MW = 2.5 is not correct. In 1965, this part of the country the sparse seismic networks were not yet able to detect seismic event with magnitude 2.5.	<p>Noted.</p> <p>This has been corrected.</p>

EXPERT REVIEW AND SPECIALIST RESPONSES: Seismicity – Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table Figure	Expert Reviewer Comments	Responses from Specialists
Prof Andrzej Kijko	Ad. Section 3.2 (p. 11)	21		<p>The study by Meghraoui et al. (2016) identified only the major faults. For hazard and risk analysis as undertaken by Authors of the Report, more detail neotectonic studies are required to make sure all potential faults, including smaller ones, are taken into consideration. I am therefore not convinced Meghraoui et al. (2016) is the appropriate source of information to use in this study. Again, I am not familiar with the mandate the Authors of the Report had, but a more detailed analysis of active faults along the considered energy corridors is required.</p> <p>Such a study can be done in different ways. Youngs et al. (2003) developed the most advanced approach to study the effect of the earthquake that causes a ground displacement (PGD), known as probabilistic fault displacement hazard analysis (PFDHA). This method, however, requires a significant amount of information, which often, is not available. There are at least two alternative and less laborious approaches to assess the effects of ground displacement that can be applied, namely probabilistic, (e.g. ALA, 2001; Lanzano et al., 2013a, b) and deterministic (e.g. Wells et al., 1994). Study of such a nature is crucial in any assessment of seismic hazard and risk for energy and/or pipelines.</p>	<p>Noted.</p> <p>The authors agree that the study by Meghraoui et al. (2016) extremely qualitative and agree that more detailed studies must be done. The authors have cited all studies of active tectonic faulting in South Africa of which they are aware.</p> <p>The authors also agree that efforts should be made to model ground displacements. However, this did not fall within the scope of the present study.</p>

EXPERT REVIEW AND SPECIALIST RESPONSES: Seismicity – Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table Figure	Expert Reviewer Comments	Responses from Specialists
Prof Andrzej Kijko	Ad. 3.3.1 (page 12)	40		<p>All the quantitative assessments of seismic hazard expressed in terms of probability of ground vibration in the vicinity of the considered energy corridors are based on the map provided by Midzi et al. (2018). For the purpose of a study like this reviewed Report, it is imperative to refer only to official South African documents and an official South African seismic hazard maps as provided in the most recent South African Building Code (SANS 10160-4-2017). The map by Midzi et al. (2018) it is not an official document and was not yet published in a peer-reviewed journal. Even, if in the future, it is will be published, it cannot be considered as an official document and standard to be applied unless accepted into South African building guidelines and regulations. It can be referred to as additional information but cannot serve as the main source of information until such time.</p> <p>In addition, the map differs SIGNIFICANTLY from the accepted seismic hazard map in the current South African Building Code (SANS 10160-4-2017). For example, the seismic hazard in Western Cape differs fundamentally with the map by Midzi et al. (2018). In exchange, it shows significant seismic hazard north (ca. 250 km) of Cape Town and Ceres which is not the case in the SANS map. These discrepancies are however not mentioned or discussed in the reviewed Report.</p> <p>This is an import matter. If the all the assessments of seismic hazard provided in the reviewed Report (as e.g. Table 4), are based on a map by Midzi et al. (2018), there are serious concerns that first must be addressed before being accepted.</p>	<p>The Council for Geoscience has been mandated (in terms of the Geoscience Amendment Act 16 of 2010) to be the the custodians of geotechnical information, to be a national advisory authority in respect of geohazards related to infrastructure and development, and to undertake reconnaissance operations, prospecting research and other related activities in the mineral sector; and to provide for matters connected therewith. For example, the Bill seeks to put mechanisms in place to address problems which are associated with infrastructure development on dolomitic land, and empowers the Council for Geoscience to be the custodian of all geotechnical data with the purpose of compiling a complete geotechnical risk profile of the country. The Act is listed in Table 3 (Relevant Regulatory Instruments)</p> <p>On 3 October 2018 the lead author of the paper on probabilistic seismic hazard assessment of South Africa, Dr Vunganai Midzi of the Council for Geoscience, reported that the Journal of Seismology has accepted the paper subject to the correction of minor errors and that the revised paper has been submitted and should be published shortly.</p> <p>Nevertheless, the points raised by the reviewer are noted and discussion of the SANS Code is now included in the report and the discrepancies between the two seismic hazard maps are discussed.</p>

EXPERT REVIEW AND SPECIALIST RESPONSES: Seismicity – Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table Figure	Expert Reviewer Comments	Responses from Specialists
Prof Andrzej Kijko	Ad 4. Risk Assessment (page 20)	1		<p>Base on the title of the chapter, I expected the quantification of the seismic risk posed to the lifelines associated with the seismic hazard. In other words the quantification of the likelihood of a certain amount of damage to infrastructure during the specified time interval. Nothing close to that is contained in the chapter. The Authors provides some quantitative assessments, which create an impression to be the loose collection of information gathered from different sources, and it is unclear where information came from. It is however clear, that the provided information is very approximated and uncertain. In short, the promised risk assessments for future infrastructure in the considered energy corridors are not provided by the report.</p> <p>If I correctly understood the required scope of the report, it supposed to discuss the potential consequences of pipeline damage on the environment. This aspect is not present in the Report.</p>	The Terms of Reference did not require a detailed assessment of pipeline performance under seismic loading or surface rupture caused by an earthquake.
Prof Andrzej Kijko	Ad. Table 6. Proposed consequence table to assess risks posed by earthquakes to GPNs (Page 23)	1	Table 6	The reference to the source of the table is missing.	A discussion of the SANS Code is now included in the report, and the discrepancies between the two seismic hazard maps are discussed.
Prof Andrzej Kijko	Ad. Table 7. Negative impacts applicable to the Gas Corridors. (Page 24)	1	Table 7	Again, I do not know the mandate and the requirements of the Authors of the Report, but the quantification of seismic risk (in my opinion) requires significantly more than just a classification of consequences in terms of “Substantial, Slight, or Moderate”. The same is true for the statements: “extremely likely”, “extremely unlikely”, etc., (as seen in the column “Likelihood”). I expected to see the calculated percentages of expected damage to the proposed pipelines at each site, as well as calculated probabilities of such “extreme likely” or “extreme unlikely” events. At the very least, the risk quantification should have been provided as applied by Lanzano et al. (2013a, b).	<p>The authors followed the methodology provided in their Terms of Reference. Further quantification was not required at this stage of the study.</p> <p>Response from the CSIR: The Risk Assessment template was designed by the CSIR and provided to the specialist for completion. The specialist has completed this accordingly. Quantification of the risks was not part of the Terms of Reference. A semi-quantitative/qualitative assessment was required and has been provided. This has been the approach for all specialist studies.</p>

EXPERT REVIEW AND SPECIALIST RESPONSES: Seismicity – Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table Figure	Expert Reviewer Comments	Responses from Specialists
Prof Andrzej Kijko	Ad. Appendix A. Seismic hazard in South Africa (Page 30)	1		I really enjoyed reading it. This part of the report should be obligatory literature for every student of geophysics in South Africa. The only remark I have is regarding the map of seismic hazard by Fernandez (1996). As far as I know, the map was computed through the application of the Gumbel III extreme distribution and not by Parametric - Historic procedures.	Noted. The description of the method used by Fernandez (1996) has been deleted as it is merely of historical interest.
Prof Andrzej Kijko	General Conclusion			<p>1. All the seismic hazard assessments provided in the Report (probability of ground vibration in the vicinity of the considered energy corridors) are based on the map provided by Midzi et al. (2018). For the purpose of a study like the reviewed Report, it is imperative to refer only to official South African documents. The current officially accepted South African seismic hazard maps as provided in the most recent South African Building Code (SANS 10160-4-2017).</p> <p>2. The Report does not provide an adequate assessment of seismic hazard in terms of ground displacement.</p> <p>3. The Report does not provide an assessment of seismic risk as it is required for lifelines.</p>	<p>1. The paper by Midzi et al has been accepted for publication by the Journal of Seismology and was "in press" on 3 October 2018. A discussion of the SANS Code is now included in the report. It should be noted that the Council for Geoscience is the agency mandated to assess geohazards in South Africa, and so their latest thinking in this regard should be taken into account.</p> <p>2. Very few active faults and instances of surface rupture have been documented. Consequently, the uncertainties with regard to the hazards posed by surface rupture and ground displacement (where? how often? how big?) are far larger than those associated with the hazard posed by ground shaking. Quantitative assessment of the hazard associated with ground displacement is beyond the scope of this study.</p> <p>3. A key component of any risk assessment is a consideration of the vulnerability of the structures and systems. This did not fall within the scope of the present study.</p>

EXPERT REVIEW AND SPECIALIST RESPONSES: Seismicity – Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table Figure	Expert Reviewer Comments	Responses from Specialists
Prof Andrzej Kijko	References			ALA (American Lifeline Alliance) (2001) Seismic fragility formulations for water system. American Society of Civil Engineers (ASCE) and Federal Emergency Management Agency (FEMA).	Reference added to the bulleted list in Section 5.1 that is preceded by the paragraph “Some of the world’s most technologically-advanced countries are exposed to seismic hazard, for example, Italy, Japan and the USA. Standard methodologies have been developed to assess seismic hazard; numerous studies have been conducted to assess the risk posed by earthquakes to lifelines; and engineering specifications for GPNs have been published. It must be emphasised that risk posed by earthquakes is generally not viewed in isolation, but as part of a multi-hazard strategy. ”
Prof Andrzej Kijko				Allen, T.I. and D.J. Wald (2007). <i>Topographic Slope as a Proxy for Seismic Site-Conditions (V_{S30}) and Amplification Around the Globe</i> . Open-File Report 2007-1357. U.S. Department of the Interior, U.S. Geological Survey.	Inserted
Prof Andrzej Kijko				Atkinson, G., and D. Boore (2006). Ground motion prediction equations for earthquakes in eastern North America, <i>Bull. Seismol. Soc. Am.</i> , 96 , 2181–2205.	Inserted
Prof Andrzej Kijko				Lanzano, G., E. Salzano De. Santucci, F. Magistris and G. Fabbrocino (2013a). Performance assessment of continuously buried pipelines under earthquake loadings, 31 , 631–636.	Inserted as 2013c as two papers by these authors were already cited.
Prof Andrzej Kijko				Lanzano, G., E. Salzano De. Santucci, F. Magistris and G. Fabbrocino (2013b). Vulnerability of pipelines subjected to permanent deformation due to geotechnical co-seismic effects. <i>Chem Eng Trans.</i> 32 , 415–420.	Inserted as 2013d as two papers by these authors were already cited.
Prof Andrzej Kijko				Mulabisana, T. (2016). <i>Compiling a homogeneous earthquake catalogue for Southern Africa</i> . MSc dissertation (unpublished), University of the Witwatersrand Johannesburg	The dissertation was already included in the reference list
Prof Andrzej Kijko				SANS (South African National Standard) (2017). SANS 10160-4-2017. Basis of Structural Design and Actions for Buildings and Industrial Structures. Part 4: Seismic Actions and General Requirements for Buildings. Pretoria: South African Bureau of Standards. ISBN 978-0-626-30384-6.	Inserted

EXPERT REVIEW AND SPECIALIST RESPONSES: Seismicity – Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table Figure	Expert Reviewer Comments	Responses from Specialists
Prof Andrzej Kijko				Tamaro, A., S. Grimaz, M. Santulin and D. Slejko (2013). Characterization of the expected seismic damage for a critical infrastructure: the case of the oil pipeline in Friuli Venezia Giulia (NE Italy). <i>Bull Earthquake Eng.</i> , 13 , No. 4, DOI 10.1007/s10518-017-0252-1.	Inserted
Prof Andrzej Kijko				Wells, D.L. and K.J. Coppersmith (1994). New empirical relationship among magnitude, rupture length, rupture width, rupture area, and surface displacement. <i>Bull Seism Soc Am.</i> 84 , 974–1002	Inserted

Peer Reviewer: Dr Alistair Sloan; University of Cape Town

EXPERT REVIEW AND SPECIALIST RESPONSES: Seismicity – Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Responses from Specialists
Dr Alistair Sloan			Noted	General comments. Providing such a risk assessment for lifeline infrastructure in a comparatively stable region, such as South Africa, is a challenging task. This is due to the large uncertainties inherent in assessing the impact of events with repeat times which are much longer than the period for which we have detailed observations. The authors have walked the line between over-confidence and alarmism extremely well, and have communicated the uncertainties involved in a responsible and credible way. The report also highlights methods of reducing these uncertainties and in continuing with this project in a responsible manner and notes the unfortunate lack of data in some areas. Some specific comments are listed below:	Noted
Dr Alistair Sloan	1	12		Mmax appears within the body of the report before it is expanded and defined in the appendix. This explanation should occur here or when it first appears in the body of the report.	Added to the list of acronyms, abbreviations and units on the cover page and the header to Table 4.

EXPERT REVIEW AND SPECIALIST RESPONSES: Seismicity – Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Responses from Specialists
Dr Alistair Sloan	2	12		'could take place anywhere' could be interpreted as meaning that all possible locations are associated with an equal probability. An alternative phrasing that emphasises the utility of identifying active faults might be: Larger tectonic earthquakes ($6.5 < M < 7.5$) are rare in stable regions, but occur both on faults with a recent (100s-10,000s years) history of earthquake activity, and in areas with no known precursory activity. Such events could therefore take place anywhere.	Valid point. The proposed sentence has been inserted.
Dr Alistair Sloan	6	8		typo: does > do	Corrected
Dr Alistair Sloan	7	Table 1		<p>An additional data source that could help to constrain (in particular Mmax) are global catalogues of earthquakes in stable continental regions. The rationale for this is that by considering a broader area of 'similar' continental regions we can make up for the fact that our period of observation is much shorter than the occurrence interval for large earthquakes in any one region.</p> <p>This methodology was followed by Johnston et al. 1994, The Earthquakes of Stable Continental Regions. Volume 1: Assessment of large earthquake potential, Electric Power Research Institute (EPRI), Palo Alto, California, a report which was also intended to constrain hazard assessments for lifeline infrastructure in a stable region.</p> <p>It should be noted that it is difficult to assess whether two regions are really 'similar' (in the sense of having comparable values of Mmax) and this introduces a source of subjectivity to the assessment. This methodology has been influential in hazard assessment of 'lifeline' infrastructure and so could be mentioned as an alternative (though not necessarily superior) method of Mmax estimation. The results of such an analysis would be similar to those presented here.</p>	<p>Valid point.</p> <p>The proposed data source has been added to Table 1, and a mention of this constraint added to Table 2.</p>
Dr Alistair Sloan	8	Table 2		See comment 1. In addition, due to the short period of instrumentation compared to the repeat times of large earthquakes estimates of large earthquakes and Mmax for the instrumental record will have large uncertainties.	Valid point. This limitation is noted in the first row of Table 2.
Dr Alistair Sloan	10	14		suggested edit: significant/extensive damage when $M > 6$	The word 'significant' has been inserted.
Dr Alistair Sloan	11	12 to 13		Perhaps it would be beneficial to indicate the position of these events on Figure 2?	Good suggestion. We will do so.
Dr Alistair Sloan	11	21		Meghraoui et al. (2016): Reference appears to be missing from bibliography.	The reference has been added to the reference list.
Dr Alistair Sloan	12	6		typo: economic	Corrected

EXPERT REVIEW AND SPECIALIST RESPONSES: Seismicity – Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Responses from Specialists
Dr Alistair Sloan	12	24-25		What is meant by 'moderate' dynamic loading? Perhaps a more conservative phrasing of this would be that the probability of large dynamic loading is estimated to be extremely low.	The phrasing suggested by the reviewer has been used.
Dr Alistair Sloan	17-19	Table 4		<p>An explicit definition of Mmax and discussion of the methodology of Mmax estimation and Mmax uncertainty in the main report or appendix B would be beneficial.</p> <p>The value chosen appears to be reasonable when compared to similar regions (see comment 4). It is lower than the largest paleoseismic event interpretation in South Africa (the M8 Soutpansberg event, pg. 42) though perhaps this is because this (very high) magnitude estimate is considered by the authors to be unreliable?</p> <p>There appear to be discrepancies between statements regarding the absence of mapped faults in Table 4 and those depicted in App. B Fig. 1 (e.g. within Corridor 7).</p>	<p>Mmax has been defined in the text.</p> <p>In the present case, the data is too sparse to allow a good level of constraint on Mmax values; hence this parameter was assessed separately, based on the maximum observed magnitude values, as well as consideration of the values assigned for equivalent zones in past studies.</p> <p>The paper (in press) describes the calculation of Mmax as follows. "Techniques, as previously presented by Kijko and Sellevol (1989), were applied to estimate Mmax values. For some zones, alternative Mmax values were estimated using the Wells and Coppersmith (1994) equations that link earthquake magnitude to sub-surface rupture length (Table 1). Faults identified as active in those zones were used in this calculation with the length estimated from segments that can be associated with earthquake locations. Such alternative Mmax values obtained for each source were used in the hazard calculation in conjunction with assigned weights (WM) reflecting the level of confidence in each value. These values and weights are also summarised in Table 1."</p> <p>On 3 October 2018 the lead author (Midzi) reported that the Journal of Seismology has accepted the paper subject to the correction of minor errors and that the revised paper has been submitted and should be published shortly, thus making it unnecessary to go into technical details in this report.</p>

EXPERT REVIEW AND SPECIALIST RESPONSES: Seismicity – Gas Pipeline Development					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Responses from Specialists
Dr Alistair Sloan	21	14		The Hebron fault in Namibia is another example of a southern African fault with clear surface offsets, although the number and magnitude of the events that formed this scarp remain debatable. (e.g. White et al. 2009, Pleistocene to Recent rejuvenation of the Hebron Fault SW Namibia. Geological Society of London, Spec. Pub. 316, 293-317).	We did not refer to the Hebron Fault because of the large uncertainties. However, we agree that it is an important feature, and the sentence proposed by the reviewer has been inserted in the report.
Dr Alistair Sloan	23	2		The dollar-rand conversion seems somewhat low in both 2016 and 2018 exchange rates.	The reviewer is right. In 2016 the R/\$ fluctuated between 14 and 16. We have now used a value of 15, retained the Rand values describing the boundary between 'severe' and 'extreme' consequence levels at R100 billion, but changed the % value from 3% to 2%.
Dr Alistair Sloan	24	Table 7		I initially misinterpreted the second row of this table with reference to the hazard and risk associated with moderate, shallow mining related earthquakes by reading it as implying that there was a very low likelihood of a Mw>5 shallow mining-related earthquake occurring in the vicinity of the pipeline in corridor 3. On rereading it became clear that the likelihood of occurrence of such an event in the vicinity of the pipeline in corridor 3 is moderate, however in regions with flat terrain, no problem soils and appropriate mitigation the likelihood that such an event would actually damage the pipeline is extremely low. It may be worth considering if this distinction could be made clearer.	We have tried to improve Table 7 to avoid misunderstanding
Dr Alistair Sloan	27	1		Expand MASW.	MASW and Vs30 has been expanded.
Dr Alistair Sloan	41	7 to 8		Is there a reference for this statement?	See, for example, https://www.internationalrivers.org/earthquakes-triggered-by-dams , where it is stated "In a paper prepared for the World Commission on Dams, Dr. V. P Jauhari wrote the following about this phenomenon, known as Reservoir-Induced Seismicity (RIS): 'The most widely accepted explanation of how dams cause earthquakes is related to the extra water pressure created in the micro-cracks and fissures in the ground under and near a reservoir. When the pressure of the water in the rocks increases, it acts to lubricate faults which are already under tectonic strain, but are prevented from slipping by the friction of the rock surfaces.'" This conclusion is based on various technical studies.

10. Settlement Planning, Disaster Management and related Social Impacts Report

Peer Reviewer: Peter Magni; Independent Consultant

EXPERT REVIEW AND SPECIALIST RESPONSES: Settlement Planning, Disaster Management and related Social Impacts - Gas					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Author(s) Response
Peter Magni	3	3		define significance of gas pipeline as part of summary - (i.e. replace current phrase with "...development of a gas pipeline network for South Africa")	Amended
Peter Magni	3	6-11		Single sentence paragraph is too long, reader loses sense of meaning. Suggested replacement paragraph: "The study seeks to refine and optimise the location of the proposed corridors that compose the gas pipeline network based on the initial proposal. It considers the planning of the pipeline network from a social, spatial planning and disaster management perspective identifying issues and opportunities in determining the project's final extent.	Amended
Peter Magni	3	14		Economic growth from gas is not sustainable given that the resource is finite. Economic growth derived from gas will peak and decline over time, even if the development of the resource is phased. Rather refer to "economic growth"	Amended
Peter Magni	3	14 - 15		"as well as realising national development objectives related to achieving a more sustainable energy mix for the Country."	Amended
Peter Magni	3	15-18		Break bolded sentence: " However, construction of a gas transmission pipeline has the potential to cause substantial disruption to lives and livelihoods should it be constructed in close proximity of existing settlements. The Pipeline could have a negative impact if it does not take due precaution to limit disruption to existing settlements and developments.	Amended
Peter Magni	3	22-25		Negative impacts of a gas transmission pipeline manifest in land-use (e.g. alienation of existing land uses making these uses untenable), tenure management considerations (e.g. expropriation of land), the potential need for resettlement, restriction in future development potential of a parcel of land and negative impacts on service delivery and local economies.	Amended
Peter Magni	3	35		Should read "finalising the alignment of the proposed corridors"	Amended

EXPERT REVIEW AND SPECIALIST RESPONSES: Settlement Planning, Disaster Management and related Social Impacts - Gas					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Author(s) Response
Peter Magni	5	13 - 15		"Land-use planning is therefore an important dimension of disaster management and it is critically important that relevant authorities have infrastructural maps to guide maintenance workers." There is an inconsistency in this sentence. What is referred to here is not land use management schemes, or spatial development frameworks but infrastructure masterplans or infrastructure asset management plans relevant to the infrastructure type, which are removed to an extent, from land use planning tools. Then there is the subjective statement that land use planning is a dimension of disaster management, when the alternate assertion could also be true. The sentence should be altered so that it is consistent and that subjectivity is removed.	Changed to The availability of Infrastructure masterplans is deemed an important dimension of disaster management and it is critically important that relevant authorities have infrastructural maps to guide maintenance workers
Peter Magni	5	21 -22		Add: "Disaster management therefore requires collaboration between public agencies and private sector pipeline developers and operators ".	Added

EXPERT REVIEW AND SPECIALIST RESPONSES: Settlement Planning, Disaster Management and related Social Impacts - Gas					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Author(s) Response
Peter Magni	5	35 -37		"The fire-fighting capabilities of the affected municipalities were considered as a proxy for the DisM capability of a municipality and, where available, were reviewed as part of this study." Why has a broader consideration of EMS capability within municipalities been excluded? Is it difficult to disaggregate municipal from provincial ambulance services for instance?	<p>Given the large geographic area, and the numerous municipal jurisdictions, it was necessary to identify adequate criteria comparing them along a standard benchmark, with available documentation. Fire-fighting is the most standard EMS service available, and even for that basic measurement, data is not always available.</p> <p>Ambulance services vary between:</p> <ol style="list-style-type: none"> 1. Provincial service delivery 2. District municipal service delivery – usually in the erstwhile Cape Province areas (now Western, Eastern and Northern Cape) 3. Metros service delivery, and 4. Private ambulance services. <p>The available documentation is very limited (mostly on municipal government, and even that is very uneven, as the report shows). Any finer detail would require a field work process, which in this instance would not be very useful, for two reasons: (a) It would soon be outdated (b) Such data-collection should be done as part of a preparation for a gas pipeline project, so that the institutional relationships between the pipeline project and the various municipal and provincial agencies are created – i.e. the process of research is as important as the substance of research.</p> <p>The crucial point in this study is that (a) service delivery is highly varied and uneven, and (b) available documentation is highly uneven.</p>

EXPERT REVIEW AND SPECIALIST RESPONSES: Settlement Planning, Disaster Management and related Social Impacts - Gas					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Author(s) Response
Peter Magni	5	37 - 39		"The review of the DisM capabilities of district municipalities within the gas corridors to respond to a disaster is shown in Figure B below." The highlighted sentence prior to this one speaks to local municipalities. Figure B though, speaks to district municipalities. This is not in keeping to the proposed focus on local municipalities. Why was the representation done for district and not local municipalities?	Figure has been changed, as well as the paragraph
Peter Magni	6	1	Figure B	Figure B needs to be captured at the local municipality level. I think it would be a very sobering map.	Figure has been changed
Peter Magni	6	4 to 6		Sentence needs correction as follows: "The overall suitability of the proposed corridors for the development of a gas transmission pipeline in relation to settlement planning and disaster management is summarised below (Table A)."	Amended
Peter Magni	6 -7		Table A	Southern Coastal Corridor and Inland Corridor, and potentially the western corridor are areas where extraction of gas is to take place, or where the gas is to be brought onshore. As such, do the settlements in these corridors not have a higher employment potential than settlements in the other corridors, and by extension greater potential to grow in population?	<p>The assessment did not consider the employment opportunities to be created downstream by the establishment of a gas corridor since the details regarding employment opportunities are not clear at this stage and would be too speculative. It must also be noted that corridors are assessed individually and are not compared to each other (i.e. not ranked).</p> <p>The calculated assumption regarding buffers was based on past development trends, and the current size of the settlement to cater for future growth. If and when development happens, there would have to be a local detail assessment. Human and Settlement development are not linked to rules of behaviour that are easily predicted. In addition, it was assumed the same growth in all directions. This may not happen and all growth may go in another direction due to ground conditions, cost of development, political decisions, cost of land etc.</p>
Peter Magni	8		Additional Figure	Suggestion: Include a map that highlights the major urban areas in South Africa overlaying this information with icons, or a graph which shows the urban settlements that have shown significant economic growth in the past ten years.	Please see Figure 3 which shows where there is population growth. The economic opportunities are captured within a separate assessment of the SEA

EXPERT REVIEW AND SPECIALIST RESPONSES: Settlement Planning, Disaster Management and related Social Impacts - Gas					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Author(s) Response
Peter Magni	8	11 - 13		Meaning of sentence unclear, change to: "While the proposed gas transmission pipeline is intended to be kept outside cities and towns, these areas, due to population and economic agglomeration, form the anchor points for future gas demand."	Amended
Peter Magni	8	17 - 18		Add sentence that states: Alternatively, the expansion of the gas network to urban areas may stimulate the growth of associated industry and business which may increase the demand for industrial land and servitudes associated with local gas reticulation networks.	Sentence has been added.
Peter Magni	8	38 - 39		Section should read: " whilst at the same time protecting ecologically sensitive areas and critical ecological infrastructure	Amended
Peter Magni	8	41 - 45		Alter as follows: "At a national and regional scale, it is pertinent that the proposed gas transmission pipelines are designed in such a way that the investment in large scale infrastructure is done in support of current and planned future economic nodes and corridors for South Africa in the most effective and sustainable way. To achieve this, national and regional design considerations would need to include:"	Amended
Peter Magni	8	48		In relation to private sector investment, consideration must not only be of future gas related energy demands, but also of the existing gas related industries and how the imposition of the new gas network may benefit or negatively impact these industries.	The economic opportunities are captured within a separate assessment of the SEA
Peter Magni	9	12 - 18		The proposed national pipeline will traverse diverse settlement and socio-economic contexts, often within ambit of cities, towns and settlements. The proposed corridor includes the sparsely populated and arid western areas of the country, through the developed, heavily populated Southern Corridor, and the densely populated rural traditional authority areas of the country which are also the country's most critical water resource areas.	Amended
Peter Magni	9	20 -24		At national, provincial and sub-regional scale consideration of the different contexts of which the corridors consist will be critical to ensure the greatest development return, for the most sustainable long term infrastructure investment. It is imperative that, irrespective of whether the pipeline is developed or not, careful, coordinated and integrated planning must take place.	Amended

EXPERT REVIEW AND SPECIALIST RESPONSES: Settlement Planning, Disaster Management and related Social Impacts - Gas					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Author(s) Response
Peter Magni	9	25		There needs to be a sentence that guides the reader to 1.1, and defines what is to be covered, otherwise the reader is uncertain. The narrative jumps from speaking to the South African experience and the gas project to a US example with no explanation. Add a sub-section titled: "International Gas Pipeline Development Planning Experience"	Added sub-headings
Peter Magni	9 - 10	27 - 30		The international gas pipeline experience in the draft chapter draws solely on developed world examples of the United States and Canada. This chapter should consider developing country examples, and the lessons that these countries might have in relation to gas pipelines in circumstances where planning systems are fragmented, where more than one tenure system is in operation, and where informal/illegal land occupation is a legitimated form of land holding. There is a significant body of literature to draw from. Countries that should be considered in this regard include: Venezuela, Brazil, Peru, Argentina, Trinidad and Tobago and Bolivia as the largest South American natural gas exploiting countries with gas pipelines (https://en.wikipedia.org/wiki/Natural_gas_in_Bolivia). South American countries also have experience in dealing with trans-national gas pipeline if the South African Gas Pipeline needs to consider export to SADC. See Gasoducto Argentina (Yabog pipeline) and Gasoducto Bolivia-Brazil (GASBOL pipeline). For example in the case of Bolivia see: (https://en.wikipedia.org/wiki/Bolivian_gas_conflict) (https://www.nytimes.com/2006/05/02/world/americas/02bolivia.html). The Bolivia experience is particularly informative as to the importance of careful planning in designing gas pipelines and the exploitation of the natural gas resource. In the mid-2000s the perception that the exploitation of natural resources was not benefitting the local population, a view particularly held in urban areas, was a key reason for political change and the election of President Evo Morales and the subsequent nationalisation of the resource. (https://openknowledge.worldbank.org/bitstream/handle/10986/17953/ESM3220Gas0Pipelines01PUBLIC1.pdf;sequence=1). This article covers major development planning considerations related to the GASBOL project. (e.g. See page 24 for standards for right of way servitudes used.	Added text to the Chapter to try and support the comment See section 1.1.1)
Peter Magni	10	32		The document jumps abruptly to the South African planning experience. Please can sub-headings be used to denote such shifts to help the reader? Call the subsection: "Relevant South African Planning Related Policy"	Added sub-headings

EXPERT REVIEW AND SPECIALIST RESPONSES: Settlement Planning, Disaster Management and related Social Impacts - Gas					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Author(s) Response
Peter Magni	11	24		Section 19-20 of the Spatial Planning and Land Use Management Act (2013) makes provision for a Regional Spatial Development Framework (RSDF). At the time of promulgation there was contention as to when, how and why such a spatial planning document would need to be used in circumstances where, Regional Planning and Development was seen as a Concurrent National and Provincial Legislative Competence in terms of Schedule 4 Part A , while municipal planning was a local government competence under Schedule 4 Part B of the Constitution (1996). It is suggested that the Chapter promote the drafting of a RSDF be the correct spatial planning vehicle to use in relation to the proposed bulk gas pipe-line where there is: 1) uncertainty as to the phasing and the timing of the project which may be implemented over decades;2) the need for provinces and municipalities to apply consistent criteria for the assessment of development applications in a situation where most municipalities would not have had to deal with a bulk gas pipeline applications before; 3) there is a need to bridge the planning gap between an environmental assessment that focuses on the status quo and an Environmental Impact Assessment that is reactive to a particular development application. In this manner an environmental sustainability focus can be embedded in the spatial planning considerations for the initiative. This would also address the concern that environmental considerations are not adequately dealt with in spatial planning policy; 4) the geographical area under consideration includes a number of provinces and municipalities; 5) the nature of servitudes, development criteria for bulk, distribution, point gas facilities and gas reticulation consideration for related facilities (e.g. industrial, residential retail uses) can be included in the framework; 6) bulk gas servitudes need to be preserved for an extended period of time from urbanisation; 7) There are differing capacities within municipalities to undertake SDFs. This would be a means of ensuring that the correct safety measures (e.g. LP Gas Safety Regulations) are included in developments from the planning phase.	Added text in Section 10.1. to support this comment

EXPERT REVIEW AND SPECIALIST RESPONSES: Settlement Planning, Disaster Management and related Social Impacts - Gas					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Author(s) Response
Peter Magni	12	15 - 19		The existing Guidelines for Human Settlement Planning and design (2000)(Red Book) considers biogas, 'town gas' (gas pipeline) as used on a limited scale in Johannesburg, Durban, Cape Town and Port Elizabeth, and Liquid Petroleum Gas (portable gas canisters - Eezi Gas, CADAC etc.) in Chapter 12. No guidelines are provided for servitudes for bulk and associated distribution networks and facilities associated to natural gas (It is not known whether more detail has been provided on this matter in the revised Red Book). It would be useful if the Chapter gave the reader an idea as to the servitude sizes used for such bulk and distribution networks, and what the land use considerations would be for required point facilities (e.g. access points, storage facilities, depots etc.). This would assist in defining the detailed land use considerations. A diagram showing the cross-section of such a servitude would be useful.	This is addressed in the SEA Report (Introduction and Background) and not within this Chapter

EXPERT REVIEW AND SPECIALIST RESPONSES: Settlement Planning, Disaster Management and related Social Impacts - Gas					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Author(s) Response
Peter Magni	1 - 144 specifically 16 / 17	10 -11 & 16 - 25		<p>"There is insufficient evidence and information available to asses any benefit to a community at this stage": This is a contested statement. What the chapter needs to do is identify those industries that currently exist that would benefit from having ready access to a bulk gas line. The chapter, from a development planning perspective, also needs to identify the existing gas pipelines and related facilities in the country. This means understanding the products that can be manufactured from natural gas, or which industries could use a reliable bulk source of energy (e.g. It is surprising that SASOL as a major player in the gas/coal/oil space in the Country is not referenced in this chapter or the overview to the SEA) . Given that this is a high level assessment, the chapter does not have to identify every land use in this respect; rather it needs to identify clusters of land uses (i.e. industries and businesses) that meet these criteria. Most of these land uses will be located within or adjacent to an existing settlement. It is in these areas that the opportunities for economic expansion and employment creation will be greatest, where existing skills and institutions would benefit from the proposed gas infrastructure. The Chapter's primary weakness at the moment is that the focus on settlement population and density as the primary determinants in considering location sensitivity creates no-go areas for a bulk gas pipeline in cities and towns. This effectively excludes, or makes it very difficult to motivate for an expansion and intensification of gas distribution networks within existing settlements which would, by extension, be deemed too sensitive to be undertaken in settlements, and to benefit from locations where the skills and industry exist to make the greatest economic benefit from the infrastructure. In identifying cities and large towns as being highly sensitive when considering the location of the bulk gas servitude, one prioritises the pipe-line corridors that avoid settlement and facilitate the direct export of the resource. One needs to consider the political ramifications of a multi-billion rand project that is unable to show that it is benefitting as large a portion of the South African urban population as possible both as source of energy and in terms of job creation. It is strongly advised that a more detailed review of land use, focusing on existing gas industries and allied industries be undertaken so as to show the symbiotic relationship between dense settlement and the proposed gas pipeline.</p>	<p>The economic opportunities are captured within a separate assessment of the SEA.</p> <p>Existing industrial developments and gas transmission pipelines have been considered in the engineering constraints analysis and future intensive energy users are considered in the demand mapping that will be used when refining the proposed corridors, to ensure that while environmental and social considerations have been incorporated, the benefits of gas accessibility is also taken into account.</p>

EXPERT REVIEW AND SPECIALIST RESPONSES: Settlement Planning, Disaster Management and related Social Impacts - Gas					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Author(s) Response
Peter Magni	17	36		The CSIR did analysis for certain of the metropolitan municipalities to determine gaps in emergency services. Could this work not add to the methodology used in the Chapter?	<p>The assessment did not include a gap analysis but rather considered the status-quo based on:</p> <ol style="list-style-type: none"> 1. Their status as “main” or “satellite” fire-fighting offices. 2. Number of fires and incident call-outs. 3. Number of fire fighters, disaster management volunteers and volunteers. 4. Number of vacancies (unfilled posts). 5. Number of “appliances” (vehicles and specialised equipment). 6. The repairs expenditure, to show municipal commitment to Operations and Maintenance. <p>This gap analysis was only done for 4 metros, is mostly out of date, and highly dependent on the final road network and settlement layout which is yet to be developed.</p>

EXPERT REVIEW AND SPECIALIST RESPONSES: Settlement Planning, Disaster Management and related Social Impacts - Gas					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Author(s) Response
Peter Magni	20	20		Please elaborate with a sentence or two on: 1) What analysis is required to provide a detailed perspective of fire-fighting capacity?; 2) Capacity required in the event of a Gas incident from a broader Emergency Management Service needs to be elaborated upon (e.g. ambulance, policing considerations)	<p>1) Amended in the text.</p> <p>2) The aim of this assessment was to provide a high level indication of municipalities on a strategic level that may be of risk in terms of their capacity to respond to a disaster. In addition, the broader Emergency Management Services required would need to be prepared on a project level. The provision of these measures is outside the scope of this assessment.</p> <p>Furthermore, a gas incident can range from small to large. We might have to conclude that a municipality has enough ambulances for a small incident, but not for a medium and large incident. Different types and scales of incident would require different types of services, ranging from (say) 2 ambulances to 50 ambulances, of from (say) 20 policemen to 50 policemen. This is incredibly fine empirical detail which is not feasible in the current study. And all of this would be outdated in (say) 2 years, due to staff changes, financial factors and political dynamics.</p> <p>The point made in the study is that any proposed gas pipeline will have to do a detailed consultation with each municipality, using a proper rubric of comparison, according to each service. That would then require a proper process of methodological planning, engagement, and fieldwork.</p>
Peter Magni	20 / 21	41 / 42		Editing error. Sentence is split over two pages. Needs to be corrected.	Amended

EXPERT REVIEW AND SPECIALIST RESPONSES: Settlement Planning, Disaster Management and related Social Impacts - Gas					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Author(s) Response
Peter Magni	22	1	Table 1	One needs to be careful not to add policy to the table indiscriminately, so the following proposed policy additions need to be considered selectively. The national policy regarding displacement for emergency housing and the relocation of informal settlements (relevant to pipe line construction) is located in the Housing Code (2009) under chapter 4, in the Sections relating Emergency Programme and the Informal Settlement Upgrading Programme. The Housing Code is policy undertaken in terms of the Housing Act (1996).	Included in the relevant literature table.
Peter Magni	22	1	Table 1	Further to the above policy. It would be important when expropriating land for the gas pipeline servitude to detail the existing legislative elements that define and might affect this process, while mentioning that there is a process to review the existing process of land expropriation. Below is the list of legislation that needs to be considered for inclusion that interfaces directly with SPLUMA (Refer to Planning Law Second Edition, Jeannie van Wyk (2012) for detail on the legislation and jurisprudence in question): Constitution 25 Sections(5)-(9), Expropriation Act (1975), Land Survey Act (1997), Deeds Registries Act (1937), Land Tenure Security Act (1989), National Heritage Resources Act (1999), Prevention of Illegal Eviction from and Unlawful Occupation of Land Act (1998)(PIE).	Expropriation of land is not applicable to this project.
Peter Magni	22	1	Table 1	It is important that the distinction to own land for particular land uses as defined in SPLUMA, the Land Survey Act and Deeds Registries Act sits side by side with a complementary perspective on access to land in the country that says that people have a right to be respected as human beings and that occupation of land by a certain group of people, at a given point of time needs to follow due process. This principal is defined in the PIE (1998) Act and upheld by a number of court cases (e.g. Grootboom vs Oostenberg Municipality and Others 2000(3) BCLR). PIE needs to be considered when removing informal settlements or expropriating land. The issue of land rights in Traditional Authorities is a contentious where adopted legislation has not been implemented as intended (e.g. Communal Property Associations Act (1996), Extension of Security of Tenure Act (1997), with different pieces of legislation applicable in different provinces (Ingonyama Trust Act (1994).	See Section 7.1.2 for an inclusion of PIE.

EXPERT REVIEW AND SPECIALIST RESPONSES: Settlement Planning, Disaster Management and related Social Impacts - Gas					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Author(s) Response
Peter Magni	27		Figure 2	The general application is that Phase 1 will be the start of a given project, followed by Phase 2 and so on. If this is not going to be the case please can a different means of referencing the Gas Pipeline Project geographical components be used? In its current form the labelling will create confusion in the minds of the public.	<p>The way in which the corridors are referenced has been provided by the Project Team and a suitable description will be included in the main body of the SEA report.</p> <p>The Phase numbering originated from Operation Phakisa and does not necessarily reflect the order in which the pipeline may be constructed. The proposed project phases are independent of each other and each one will be based on its own business case. It is estimated that one gas transmission pipeline will be constructed within each corridor, as the pipeline will be driven by finding a gas reserve and will only be constructed based on a viable business case.</p>
Peter Magni	27	4		Edit required: 'Although is it is highly unlikely that everyone'	Amended
Peter Magni	29	16-17		At present the general thesis of this chapter is that cities and towns are the most sensitive areas, which need greatest care when constructing and maintaining the gas infrastructure. This thesis is agreed too. But this chapter also needs to highlight the critical role played by dense cities and towns in realising the success of the bulk gas network from not only a socio-economic and political perspective as detailed previously but from a physical perspective. These settlements have the highest concentration of existing linear publicly owned servitudes in the Country. During the detailed planning phases the viability of using these existing servitudes needs to be explored with the responsible departments and entities.	<p>Existing servitudes (road, water pipelines etc.) will be taken into consideration when planning the route for a proposed gas transmission pipeline. These, where applicable, will also be used as "pull" factors when optimising the location of the proposed corridors.</p> <p>It must however be noted that the gas pipeline needs to be located about 5 - 10 km away from railway lines (excluding those lines running on diesel) and power lines due to an induced current created in the pipeline, which causes corrosion issues.</p> <p>Public owned servitudes within settlements would form part of the distribution network which out of the scope of this SEA.</p>
Peter Magni	30	4-12		Why is it that District Municipalities have greater fire fighting capacity than local municipalities? How is that capacity proportioned to the local municipalities?	The analysis of District Municipalities outline their ability or provision to support local municipalities in DiSM

EXPERT REVIEW AND SPECIALIST RESPONSES: Settlement Planning, Disaster Management and related Social Impacts - Gas					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Author(s) Response
Peter Magni	31	2	Figure 7	Why is it that there is no disaster management information available for eThekweni Metro? They are usually forthright with information. Unless what is being said by the map, is that eThekweni is particularly unprepared for a disaster. Then this finding must be highlighted. It is noted that the other Metros have been treated and District Municipalities.	No information was available, this is shown on the maps
Peter Magni	32	2	Figure 8	Figure 8 includes eThekweni's information. Please ensure that this information is captured in Figure 7	Updated
Peter Magni	34		Table 5	Table 5 should include a section for each of the regions identifying where the clusters of existing industrial and gas related land uses exist which would benefit from the construction of the pipeline. These land use clusters should be captured on a map in the chapter.	Refer to the Economic opportunities study as part of the SEA report.
Peter Magni	37	34		7.1.1. The danger of accepting the sensitivity analysis at face value is that the gas pipe lines that intersect major urban areas will not be prioritised, in favour for a strategy that promotes bulk export of natural gas, with no gas related beneficiation being realised in South African Urban Centres where over 60% of the population reside. The socio-economic and political dangers of such prioritisation are too high. This section and the following section need to include the servitude and land benefits of bringing a bulk gas pipeline to urban areas.	The economic opportunities for gas are captured within a separate study. This SEA is only looking at transmission gas pipelines, which are high pressure pipelines for industrial centres. In addition, the viability of such a project (development of a Transmission gas pipeline) would generally require a large customer, such as a power station. Beyond that, supply to industry would be required, followed by supply to homes. This SEA does not address supplying gas to urban or rural households, therefore benefits for bringing bulk gas pipelines to urban areas cannot be considered at this stage. There is no promotion of "bulk export" of natural gas.
Peter Magni	38	41		There needs to be a paragraph that reiterates the current requirements under the land expropriation act, and the ramifications of the Prevention of Illegal Evictions Act for the finalisation of the pipeline servitudes in question	Expropriation is not anticipated. PIE has been added to this section.
Peter Magni	38 - 39	49 - 5		Clarity needs to be provided on how the Emergency Housing Programme of the Department of Human Settlements relates to a Resettlement Action Plan as required by DEA.	Added text
Peter Magni	39	43		add: "and applicable municipal infrastructure masterplans.."	Amended

EXPERT REVIEW AND SPECIALIST RESPONSES: Settlement Planning, Disaster Management and related Social Impacts - Gas					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Author(s) Response
Peter Magni	39	45 - 49		The following sentence does not make sense and needs to be re-written: "The need for gas would probably require the pipeline to be able to service, but at the same time very sensitive design with a much more detailed impact assessment within high density population and economic nodes within the bigger eThekweni, Cape Town, Nelson Mandela Bay and Gauteng city region areas for the gas transmission pipeline."	Amended
Peter Magni	40	5-11		The following sentence does not make sense and needs to be split into two sentences and rewritten: " The same requirements than above will need to be considered in future when increased or specific needs might be identified for increase access to gas as energy resource in fast growing and high density cities including Mbombela/Nelspruit, New Castle, Vryheid, Mthatha, the South Coast Corridor (east of Durban) and the North Coast corridor (north of Durban), the Durban-Pietermaritzburg corridor area and nodes, the coastal corridors of Plettenberg Bay and George, and smaller development concentrations and footprints in the various inland service towns.	Amended
Peter Magni	40	28 - 29		Replace "is too complex to be assessed further (i.e. attach a risk level) as part of this high level SEA." with "requires further investigation."	Amended
Peter Magni	40	31 - 37		Mention the Expropriation Act as the reason why compensation is not paid.	Expropriation of land is not applicable to this project.
Peter Magni	40	45		Add bullet which reads: "Use existing infrastructure servitudes where viable and agreed to."	Added text
Peter Magni	41	8		Does 'segment' as used in this context mean 'Phase'?	A segment refers to a section of the pipeline that will be constructed, not a Phase
Peter Magni	41	38		"through" not "though"	Amended
Peter Magni	42	31		Add Bullet: Location of servitude should not exclude existing or potential business or industry that uses or would benefit from access to a high volume, regular source of natural gas.	Added
Peter Magni	43	7 - 24		Would it be possible to reference an academic study as well as the DEA, 2016 SEA document when associating construction workers, as a specific group, with criminal activity? The accusation is too much of a generalisation and needs to be better supported than it is now.	Added references to DEA 2016 SEA and Energy Sector Management Assistance Program (ESMAP) (2006). Best Practices in Mainstreaming Environmental & Social Safeguards into Gas Pipeline Projects. These are generic impacts/risks that are typically associated with construction phase of large project.

EXPERT REVIEW AND SPECIALIST RESPONSES: Settlement Planning, Disaster Management and related Social Impacts - Gas					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Author(s) Response
Peter Magni	43	29 - 45		As with construction workers, please find an alternative academic reference in relation to the generalisation made regarding work seekers, other than the DEA study. What is being said about work seekers is discriminatory.	Refer to response above.
Peter Magni	43 - 45	47 - 2		Are the management actions proposed in this list compliant with Department of Labour Legislation and associated regulations? How are the rights of the employees affected by these proposals? This section needs to be better referenced, and more carefully considered.	These mitigation measures have been recommended in various Social and Environmental Assessments undertaken in South Africa, which have been approved and implemented. Additional recommendations have been included regarding compliance with the Department of Labour's requirements, as applicable. In addition, relevant management measures will be included in the EMP. The Report has also been updated to include reference to IFC PS2.
Peter Magni	47			Please rectify formatting errors on page, and embed the information boxes	Amended
Peter Magni	48			Please rectify formatting errors on page, and embed the information box	Amended
Peter Magni	55		Table 6	Formatting - Table lines have gone missing, and need to be added	Amended
Peter Magni	56 - 58		Table 8	It is difficult to read this table. Inserting table lines might help. What the table would communicate, does reinforce the position that towns and cities should not be priorities for a gas pipe-line given the sensitivities and complexities associated with providing a bulk servitude and installing the infrastructure. The benefits of a bulk supply of gas to a city or a town are absent from this assessment.	Amended. The economic opportunities are captured within a separate assessment of the SEA. In general, the need for the gas transmission pipeline would require a large customer, such as a power station. Beyond that, supply to industry would be required, followed by supply to homes via distribution and reticulation networks. This project is only looking at transmission of gas, which are high pressure pipelines, mainly for the industrial centres. This SEA does not address supplying gas to urban or rural households, although distribution and reticulation networks will subsequently emanate from the transmission pipeline (take offs).
Peter Magni			Table 9	Table 9 is much easier to read and understand than Table 8. It would benefit from the addition of table lines.	Amended

EXPERT REVIEW AND SPECIALIST RESPONSES: Settlement Planning, Disaster Management and related Social Impacts - Gas					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Author(s) Response
Peter Magni	60	5 - 7		<p>Edit sentence to read: "Regarding potential negative impacts of future gas transmission pipeline within approved corridors, the potential impact on existing mining rights (especially in Gauteng) except from certain requirements of the Mineral and Petroleum Resources Development Act (2002) has been identified as a potential issue to be mitigated through the routing of any future gas pipelines."</p> <p>In the case of Gauteng Mining Companies who hold the mineral rights, they use these rights to allow/direct/ prevent/stall development relative to their surface land holdings.</p>	<p>It is noted that when mineral rights were issued prior to 2002, these may fall outside the jurisdiction of the current permit system but these must still be considered a real right held by company/individual in question when defining the servitude for the gas pipeline.</p> <p>Under the 2002 Act the right to prospect and extract minerals is a limited real right that is maintained by a permit system. As such comments on a development application must be requested from the mineral rights holder as defined on the title deed.</p>
Peter Magni	60	27		At the very least this chapter needs to have identified the clusters of existing industries and business land uses by city and town within South Africa that would benefit from a bulk gas pipe-line.	The economic opportunities are captured within a separate assessment of the SEA
Peter Magni	60	35 - 40		Move paragraph to section above, as it relates to spatial planning and land use considerations and not to disaster management concerns. Insert academic references to validate assertions.	Section moved however, no references included since this is a statement made by the contributing author based on the findings of the material researched
Peter Magni	61	9 - 15		"Such negotiations will inevitably drag on for months, as it will involve two major aspects, namely, spatial co-ordination according to municipal SDFs, which may well have to be adjusted to cater for the pipeline (e.g. urban residential expansion) and administrative capacity, particularly regarding disaster management capacity-building, i.e. assessing current capacity, determining what additional capacity (staff, finances, skills) will be required to deal with potential pipeline problems, and determining the source of such financial support." Provide references to the assertions made in this sentence.	No references included since this is a statement made by the contributing author based on the findings of the material researched
Peter Magni	61 - 62	37 - 32		Instead of a Municipal IDP and SDF approach as currently envisaged, propose a Regional Spatial Development Framework specifically for the bulk gas network that all affected provinces and municipalities would adhere to. In this way the SEA will be realised as a planning tool and can in turn directly assist in EIA assessment, and municipalities will not have to alter their spatial planning and land use instruments just to facilitate a gas pipeline.	Added text to support this statement

EXPERT REVIEW AND SPECIALIST RESPONSES: Settlement Planning, Disaster Management and related Social Impacts - Gas					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Author(s) Response
Peter Magni	62	36 - 37		Delete bullet. Cities and towns are meant to benefit from the gas pipe-line; they should be the primary beneficiaries of the natural gas resource. The political ramifications of not ensuring that the majority of South Africans benefit from their natural resources are great. We must learn from our previous mistakes with gold and platinum and from the experiences of Countries such as Bolivia.	<p>Previous notes about this SEA focusing on high pressure transmission lines and not distribution or reticulation lines stand. The Gas transmission Pipeline is aimed to supply large industrial areas and as such, it is a recommendation that high density population areas should be avoided, as best as possible.</p> <p>While the proposed gas transmission pipeline corridor is intended to be kept outside cities and towns, these areas, due to population and economic agglomeration, also form the anchor points for future gas demand. The subsequent expansion of the gas network to urban areas (via distribution networks) may stimulate the growth of associated industry and business which may increase the demand for industrial land and servitudes associated with local gas reticulation networks.</p> <p>However where it cannot be avoided then various measures will need to be followed, for example ensuring the pipeline has a thicker wall in proximity to settlements.</p>
Peter Magni	72		Appendix A2	Under "Small Towns and Small Service Centres" add sentence that reads. "Planning Capacity may be lacking, and may negatively impact on timeframes in finalising servitudes"	Added
Peter Magni	114		Table E6	"Saldanha Renewable energy industrial growth": What does this project entail? What does it mean for the gas pipe-line? Is this project forming part of the SEA discussions? If so how? If not why not? Is this a future industry cluster that would benefit from bulk gas?	A review of development projects contained in available PGDSs (January 2018) in the corridor area can be found in Appendix E of this report. Given that time lines, phasing, scale, funding and spatial specific implications are not clearly evident from these studies and is subject to change, relevant local and provincial plans will have to be reviewed for each sector closer to the time of final construction. Available planning for the N2 road corridor and possible rail
Peter Magni	114		Table E6	"Laingsburg Renewable energy industrial growth" What does this project entail? What does it mean for the gas pipe-line? Is this project forming part of the SEA discussions? If so how? If not why not? Is this a future industry cluster that would benefit from bulk gas?	

EXPERT REVIEW AND SPECIALIST RESPONSES: Settlement Planning, Disaster Management and related Social Impacts - Gas					Change has been effected in the report
					No change has been effected in the report (i.e. not required and supported by response by Specialist)
Expert Reviewer Name	Page Range	Line/s	Table/ Figure	Expert Reviewer Comments	Author(s) Response
Peter Magni	116		Table E6	"Port St Johns Proposed Renewable Energy Zone" What does this project entail? What does it mean for the gas pipe-line? Is this project forming part of the SEA discussions? If so how? If not why not? Is this a future industry cluster that would benefit from bulk gas?	linkages in the same corridor in future is illustrated in Figure 6 to inform future alignment of the gas corridor servitude.
Peter Magni	117		Table E6	Karoo Shale Gas optimisation? A future province supported location for gas industry.	A Gas opportunity study and a demand mapping exercise have been undertaken to identify the main current and future energy intensive users (including SEZ, IDZ, intensive agriculture, mining etc.). These will form anchor points and will be considered when optimising the location of the proposed corridors, to ensure that economic benefits are looked at.
Peter Magni	123		Table E6	"Richards Bay 2000MW Gas to power Station". This project needs bulk gas. The project is not mentioned or defined in the chapter. Should this not be a reason to prioritise a gas pipe line that affects Richards Bay? What does this project entail? What does it mean for the gas pipe-line? Is this project forming part of the SEA discussions? If so how? If not why not? Is this project part of a future industry cluster that would benefit from bulk gas (e.g. the Aluminium Hub)?	