



**GROOT DRAKENSTEIN SEWER
BASIC ASSESSMENT**

SPECIALIST REPORT: BOTANICAL

J31020

November 2011

DECLARATION OF INDEPENDENCE

I, *Robin Jangle*, as duly authorised representative of *NCC Environmental Services*, hereby confirm my independence (as well as that of *NCC Environmental Services*) as a specialist and declare that neither I nor *NCC Environmental Services* have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of which Arcus GIBB was appointed as environmental assessment practitioner in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), other than fair remuneration for work performed, specifically in connection with the Environmental Impact Assessment for the proposed *Groot Drakenstein Sewer*. I further declare that I am confident in the results of the studies undertaken and conclusions drawn as a result of it – as is described in my attached report.

A handwritten signature in black ink, appearing to read 'Jangle', written in a cursive style.

Signature:

Full Name: Robin Jangle

Date: 29 November 2011

Title / Position: Botanical Specialist

Qualification(s): ND: Nature Conservation *cum laude*

Experience (years/ months): Five (05) years

Registration(s):

EXECUTIVE SUMMARY

A specialist botanical assessment of a proposed sewer pipeline in the Cape Winelands District Municipality was conducted on 13 September 2011.

A desktop study of the receiving environment was conducted to inform the site visit. Resources consulted include: VegMap (2006), SANBI BGIS, SANBI TSP: CREW data (consolidated voucher records incorporating PRECIS) and peers that have performed fieldwork in the area.

The site was systematically traversed and the taxa and assemblages were noted. The proposed route and construction methods were assessed against the receiving environment's sensitivity.

It was found that, with the exception of Meerlust 1006/1, the preferred (proposed) pipeline route traverses entirely transformed environment and no significant impacts are associated with the construction and operation thereof.

Meerlust 1006/1 however, is for the most part good to excellent condition Swartland Alluvium Fynbos and considered irreplaceable. The preferred (proposed) pipeline route will have significant residual impacts if the recommended mitigation measures are not implemented.

BASIC ASSESSMENT FOR THE PROPOSED GROOT DRAKENSTEIN SEWER

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ABBREVIATIONS

CR	Critically Endangered
EN	Endangered
NT	Near Threatened
VU	Vulnerable

1 INTRODUCTION

1.1 Background

NCC Environmental Services was appointed to conduct a specialist botanical study of the proposed sewer pipeline by Cape Winelands District Municipality as per appointment letter 17/3/1/5 dated 13 July 2011.

1.2 Legislative and Policy Context

The pertinent legislation informing this assessment is NEMA: Listing notice 3: List of activities and competent authorities identified in terms of Sections 24(2) and 24D (short title: Environmental Impact Assessment Regulations Listing Notice 3 of 2010). Environmental authorisation is required prior to commencing an activity in specific geographical areas. Activity 12 states: “The clearance of an area of 300 square metres or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation.” This applies to “(a) Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA...” and “(b) Within critical biodiversity areas identified in bioregional plans;”

The Department of Environmental Affairs and Development Planning’s EIA Guideline and Information Document Series: Guideline on Alternatives informed **1.3 Alternatives** (below)

1.3 Alternatives

Alternative 1: No Go

The majority of the pipeline route traverses entirely transformed landscape of no conservation value (e.g. road verges, farmland) and non-sensitive, transformed natural area (e.g. banks of the Berg River) where the potential impacts can be mitigated thereby negating any residual impact. There is therefore no ecological reason for implementing the No-Go.

Meerlust 1006/1 as well as the southern road verge of the Bien Donne road (OP053252) harbours Critically Endangered vegetation. The preferred pipeline route however traverses the existing informal track, which is mostly devoid of flora. The flora occurs in the “middelmannetjie” and comprises mostly grasses. The potential impacts associated with construction can be mitigated thereby negating any residual impact. There is therefore no ecological reason for implementing the No-Go.

Alternative 2: Routing # 1

Refer to **Figure 4** (yellow path). This route follows the gravel road around the outside boundary of Meerlust 1006/1. The pipeline traverses the disturbed/transformed strip of land between the gravel road and the neighbouring fence line except where the road turns in a northerly direction – here the pipeline continues along the fence line until the junction with the east-west trending gravel road in the north.

From a botanical perspective this route is similar to the preferred route. The potential impacts associated with construction can be mitigated thereby negating any residual impact.

This route however may not be feasible from a gravity feed perspective. Considering that the impacts associated with the construction of preferred route can be mitigated to negate any residual impacts, as well as present an opportunity to abate the existing negative impact (informal road) there is no need to seek an alternative routing.

1.4 Assessment Methodology

A desktop study of the receiving environment was conducted to inform the site visit. Resources consulted include: VegMap (2006), SANBI BGIS, SANBI TSP: CREW data (consolidated voucher records incorporating PRECIS) and peers that have performed fieldwork in the area.

A site assessment was conducted on 13 September 2011. The site was systematically traversed and the taxa and assemblages were noted. The proposed route and construction methods were assessed against the receiving environment's sensitivity.

2 DESCRIPTION OF AFFECTED ENVIRONMENT

The proposed pipeline route starts at Meerlust 1006/1, situated along the Bien Donne road (OP053252) and then traverses in a north-north-westerly trend and crosses the Berg River to the existing waste water treatment works north-west of the Pearl Valley Golf Estate and Spa.

The pipeline route comprises 11 properties in total, however except for Meerlust 1006/1 it traverses entirely transformed land of no conservation value.

2.1 Broad Site Description

The proposed pipeline traverses the alluvial plain of the middle reaches of the Berg River. The riparian zone is mostly to entirely transformed and could have supported Fynbos Riparian Vegetation or more likely Cape Lowland Alluvial Vegetation (Critically Endangered). The extensive alluvial plains are for the most part transformed by agriculture, however remnants of the natural vegetation – Swartland Alluvium Fynbos (Critically Endangered) are still to be found at Meerlust 1006/1. An intrazonal vegetation type, Cape Lowland Freshwater Wetlands, also occurs in the road reserve at Meerlust 1006/1.

The Swartland Alluvium Fynbos at Meerlust 1006/1 is in poor to excellent condition – grading from poor at the southern-most edge (parallel to the R45) and increasing in conservation value as one travels eastwards. The site and adjacent property appeared to have burned within the last two years.

A large portion of the remnant of Swartland Alluvium Fynbos at Meerlust is a Critical Biodiversity Area (in prep. N. Helme pers. comms).

2.2 Ecosystem and Community Level

The natural (not transformed) Swartland Alluvium Fynbos is a low to mid-high, open to mid-dense graminoid-shrubland with a well-defined herb layer.

The shrub component is composed of *Searsia angustifolia*, *S. rosmarinifolia*, *Hermannia alnifolia*, *Salvia africana-caerulea*, *S. chamelaeagnea*, *Diospyros glabra*, *Montinia carryophyllacea*, *Cliffortia juniperina*, *Aspalathus linearifolia*, *Stoebe plumosa*, *Athanasia trifurcata*, *Rafnia amplexicaulis*, *Asparagus rubicundus*, *Trichocephalus stipularis*, *Dischisma ciliatum*, *Polygala garcinii*, *Serruria gracilis* (CR) and *Ursinia nudicaulis* amongst others. The graminoid component comprises *Ehrharta calycina*, *Eragrostis curvula*, *Hyparrhenia hirta*,

Melinis repens, *Merxmuellera stricta*, *Pentaschistis pallida*, *Ischyrolepis gaudichaudiana* and *Staberoha distchya* amongst others.

The herb layer is composed of *Acrosanthes teretifolia*, *Pelargonium grossularioides*, *P. candicans*, *P. tabulare*, *Arctotheca calendulifolia*, *Arctotis angustifolia* (CR), *Cotulla ceniifolia*, *C. coronopifolia*, *C. turbinata*, *Dimorphotheca pluvialis*, *Gazania rigida* and *Helichrysum moeserianum* amongst others. Geophytes are particularly well represented, including *Babiana villosula* (EN), *Geissorhiza aspera*, *Gladiolus brevifolius*, *G. gracilis*, *Hesperantha falcata*, *Moraea fugax*, *M. gawleri*, *M. miniata*, *Albuca cooperi*, *Drimia filifolia*, *Lachenalia orchioides*, *L. pustulata* (NT), *L. unifolia*, *Ornithogalum thyrsoides*, *Oxalis glabra*, *O. obtusa*, *O. pes-caprae*, *O. polyphylla*, *O. purpurea*, *Pelargonium triste*, *P. asarifolium*, *Monsonia speciosa* (EN), *Cyphia digitata*, *Haemanthus sanguineus* and *Gethyllis pusilla*. Refer to **Figure 1**.

The untransformed Swartland Alluvium Fynbos at Meerlust 1006/1 must be regarded as being a highly sensitive habitat.

The transformed portion mostly lacks the shrub component and the vegetation comprises mostly a depauperate herb stratum with occasional emergent graminoids. The geophytes flora is however prominent.

The shrub component is represented by occasional (emergent) *Asparagus rubicundus*. The herb stratum is dominated by Geraniaceae (especially *Pelargonium grossularioides* and the exotic *Erodium moschatum*), *Oxalis pes-caprae* and *Rumex cordatus*. The graminoids are represented by *Hyparrhenia hirta*, *Ehrharta longifolia* and exotic annual grasses such as *Briza maxima*, *B. minor* and *Avena fatua*. Geophytes noted were: *Babiana villosula* (EN), *Geissorhiza aspera*, *Gladiolus gracilis*, *Hesperantha falcata*, *Moraea fugax*, *M. gawleri*, *M. miniata*, *Albuca cooperi*, *Drimia filifolia*, *Lachenalia orchioides*, *L. pustulata* (NT), *L. unifolia*, *Ornithogalum thyrsoides* and *Oxalis polyphylla* and *O. purpurea*.

The transformed portion is infested with *Acacia saligna* and *Paraserianthes lophantha*.

The preferred route traverses an informal track that is well-used and therefore devoid of flora except for the “middelmannetjie”, which is vegetated with ubiquitous grasses and low growing herbaceous flora. The track constitutes a transformed area and as it is in use, an existing impact.

Apart from the Red List flora noted above, two other taxa are known from the site – *Diastella buekii* (CR) and *Erica alexandri* (CR). Both of these taxa however occur at the lowermost edge of the site close to the operational sandmine and therefore are not within the scope of this assessment.

The riparian zone of the Berg River is mostly to entirely transformed and could have supported Fynbos Riparian Vegetation or more likely Cape Lowland Alluvial Vegetation (Critically

Endangered). Presently the vegetation comprises only ubiquitous taxa such as *Ehrharta longiflora*, *E. calycina*, *Eragrostis curvula* and *Pennisetum macrourum* (all indigenous grasses) and an admixture of exotic weeds e.g. *Commelina benghalensis*, *Rumex acetosella*, *Persicaria lapathifolia*, *Phytolacca octandra*, *Tropaeolum majus*, *Rhaphanus raphanistrum* and *Acacia mearnsii*. Refer to **Figure 2**.

The vegetation of the riparian zone is not sensitive to disturbance as it is already transformed.



Figure 1 View of excellent condition Swartland Alluvium Fynbos in the road reserve along the Bien Donne road. This particular stretch is the habitat of *Monsonia speciosa* (EN) and *Arctotis angustifolia* (CR)



Figure 3 View of the transformed riparian zone of the Berg River. This habitat would have supported Cape Lowland Alluvium Vegetation however it now supports an admixture of weedy, mostly exotic, taxa.

3 ASSESSMENT OF IMPACTS

3.1 Potential Impacts

3.1.1 Construction

Impact 1: Loss of Swartland Alluvium Fynbos (Critically Endangered)

Table 1 Assessment of impact on ecosystem: **Loss of Swartland Alluvium Fynbos**

Nature	Negative		
Impact Source	Commencement of the proposed scope of works (activities)		
Magnitude	Extent	Medium	
	Intensity	High	
	Duration	High	
	Potential for impact on irreplaceable resources	High	
	Consequence	High	
Significance	Without Mitigation	High	H
	With Mitigation	Low	L
Probability	High		

Swartland Alluvium Fynbos is listed as Critically Endangered as per Anon, 2008¹. The Biodiversity Act (Act 10 of 2004) provides for listing of threatened or protected ecosystems in one of four categories with **Critically Endangered** being the rank assigned to ecosystems with the highest risk of being entirely irreversibly transformed. According to the 2009 NSBAP assessments, 75% of the original extent of Swartland Alluvium Fynbos is transformed, therefore the extent of remaining natural habitat in the ecosystem is less than its biodiversity target (30%).

The intensity of this impact is rated as “High” due to all untransformed remnants being viewed as “irreplaceable” (*i.e.* essential for meeting National targets).

¹ Anon (2008)

Table 2 Significance of impacts during construction

Impact	Nature	Extent	Duration	Intensity	Impact on Irreplaceable Resources	Consequence	Probability	Significance without mitigation	Mitigation Measure (further detailed in the 'Mitigation Measures' section below)	Significance with mitigation	Confidence
Impact 1	Negative	Medium	High	High	High	High	High	High	None	N/A	

3.1.2 Operation

Impact 1: Loss of Swartland Alluvium Fynbos (Critically Endangered)

Table 3 Assessment of impact on ecosystem: ***Loss of Swartland Alluvium Fynbos***

Nature	Negative		
Impact Source	Maintenance to the pipeline (excavation)		
Magnitude	Extent	Medium	
	Intensity	High	
	Duration	High	
	Potential for impact on irreplaceable resources	High	
	Consequence	High	
Significance	Without Mitigation	High	H
	With Mitigation	Low	L
Probability	Medium		

Maintenance to the pipeline, whether routine or emergency, would necessitate the excavation of the pipeline route.

Regardless of the floristic composition of the post-disturbance vegetation, any assemblage comprising 75% indigenous taxa on this particular soil type would be regarded as Swartland Alluvium Fynbos. Therefore it is rated to the same extent as **Table 1 (Construction)**

Impact 2: Loss of exiting indigenous plant communities

Table 4 Assessment of impact on biodiversity: ***Loss of exiting indigenous plant communities***

Nature	Negative		
Impact Source	Failure of the pipeline leading to leaking of sewage and subsequent eutrophication.		
Magnitude	Extent	Medium	
	Intensity	Medium	
	Duration	Medium	
	Potential for impact on irreplaceable resources	High	
	Consequence	High	
Significance	Without Mitigation	High	H
	With Mitigation	Low	L
Probability	Medium		

Failure of the pipeline is a reality unless it is regularly maintained. This impact has been rated Medium for Probability as structural failure is not uncommon.

Fynbos ecosystem processes are intimately associated with the low nutrient status of the soils and an unnatural increase in nutrient status favours the plastic weedy taxa over the typical fynbos taxa.² Eutrophication will therefore favour weeds over the natural fynbos vegetation, resulting in a loss of the natural assemblages. This is of particular importance where large, woody exotic taxa are present (such as the crossing of the Berg River as well as the remaining portion from the riparian zone to the pump station). These taxa have deep root systems capable of affecting the joints of the pipeline.

² Stock, W.D & Allsop, N. in Cowling, 1992.

Table 5. Significance of impacts during operation

Impact	Nature	Extent	Duration	Intensity	Impact on Irreplaceable Resources	Consequence	Probability	Significance without mitigation	Mitigation Measure (further detailed in the 'Mitigation Measures' section below)	Significance with mitigation	Confidence
Impact 1	Negative	Medium	High	High	High	High	High	High	None	N/A	
Impact 2		Medium	Medium	Medium	High	High	Medium	High		Low	

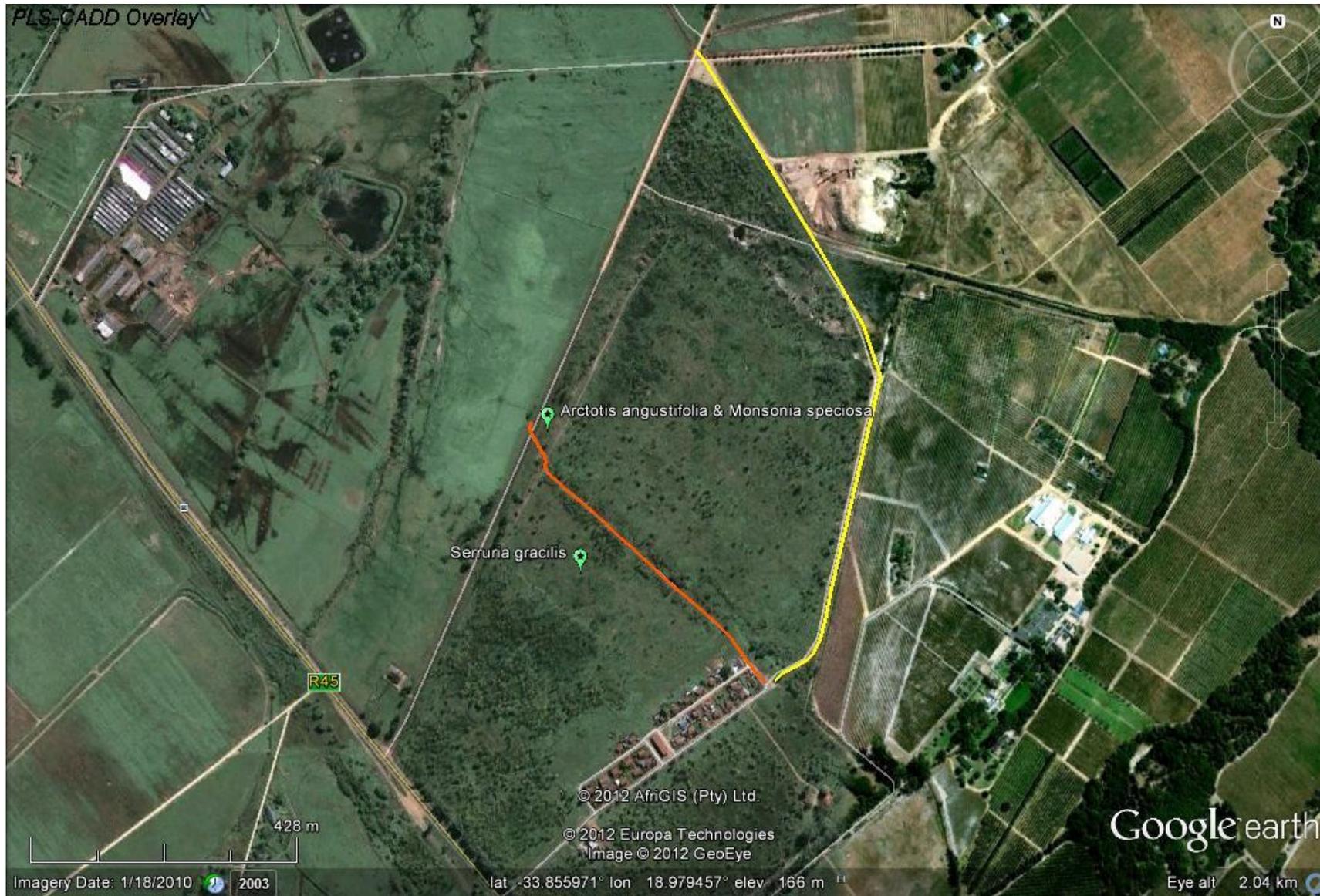


Figure 3 Map showing position of species of conservation concern, preferred route (orange path) and Alternative Routing #1 (yellow path).

3.2 Mitigation Measures

3.2.1 Construction

Impact 1: Loss of Swartland Alluvium Fynbos (Critically Endangered)

The pipeline route must be restricted to the existing 3m wide informal track traversing the property. This entails the following:

- 1) Demarcating the track width with high visibility plastic mesh.
- 2) Informing all staff that the area outside of this is an out-of-bounds area.
- 3) All machinery and personnel are therefore to operate only within the demarcated area (the existing informal track).
- 4) The upper 30cm of the excavated soil will be stored separately on a waterproof tarpaulin and also covered with a waterproof tarpaulin to prevent any loss of material.
- 5) No excavated soil or spoil is to be placed anywhere on or alongside the track.
- 6) A stockpiling area will be demarcated in the disturbed area south of the existing residences.
- 7) No materials will be stockpiled ("laydown" area) anywhere alongside the construction area. All materials are to be stockpiled as per #6 above.
- 8) No refueling of machinery to take place anywhere within the construction area or alongside it. A refueling point must be established away from site, preferably within the existing residential area.
- 9) After the pipeline has been laid the original subsoil must be replaced – leaving room for the original topsoil (with all organic matter) to be replaced as was originally.
- 10) A row of bollards to be placed along the Bien Donne road as well as the Meerlust residential settlement side to prevent further vehicle access to the track. These bollards will extend for at least 10m either side of the original track.
- 11) A specialist assessment of the disturbed area must be conducted after the first winter season post completion of the pipeline at Meerlust 1006/1 to assess the recovery of the vegetation. If the vegetation does not constitute 75% cover of indigenous taxa then the area must be reseeded with perennial taxa occurring on site and monitored again after the following winter.
- 12) An ECO must be appointed to be present at the Meerlust 1006/1 and Berg River crossing portions. The ECO will be on site at these two sections everyday during the construction phase.

3.2.2 Operation

***Impact 1: Loss of Swartland Alluvium Fynbos (Critically Endangered) &
Impact 2: Loss of exiting indigenous plant communities***

According to the 2009 NSBAP assessments, 75% of the original extent of Swartland Alluvium Fynbos is transformed, therefore the extent of remaining natural habitat in the ecosystem is less than its biodiversity target (30%).

The pipeline must be constructed of high quality materials with a long life expectancy to negate the possibility of leakage due to material and/or joint failure.

4 CONCLUSIONS AND RECOMMENDATIONS

With the exception of Meerlust 1006/1 the preferred (proposed) pipeline route traverses entirely transformed environment and no significant impacts are associated with the construction and operation thereof.

Meerlust 1006/1 is for the most part good to excellent condition Swartland Alluvium Fynbos and considered irreplaceable. The preferred pipeline route will have significant residual impacts if the proposed mitigation measures are not implemented.

The No-Go area (all area outside of the existing informal track) must be visibly demarcated and is to be deemed out-of-bounds to all personnel and machinery. Under no circumstances is the area to be used for stockpiling of spoil or as a laydown for materials.

The EMP must also be reviewed by the specialist to ensure that all potentially impacting activities are sufficiently addressed and an ECO must be appointed to ensure compliance.

It is concluded that if the mitigation measures are implemented the construction and operation of the pipeline will not have any residual impact on the receiving environment.

5 REFERENCES

Anon. Threatened ecosystems in South Africa: General Information Draft. 2008. South African National Biodiversity Institute & Department of Environmental Affairs and Tourism.

De Villiers, C.C., Driver, A., Clark, B., Euston-Brown, D.I.W., Day, E.G., Job N., Helme, N.A., Holmes, P.M., Brownlie, S. & Rebelo, A.B. *Fynbos Forum Ecosystem Guidelines for Environmental Assessment in the Western Cape*. 2005. Fynbos Forum and Botanical Society of South Africa, Kirstenbosch.