ALTERNATIVE ROUTE EVALUATION

Evaluation of each route alternative with respect to sensitive ecological features

The objective of this part of the report was to evaluate the potential impacts of the proposed route alternatives on sensitive ecological features. For each route alternative, the distance over the ground that it crosses areas rated as Low, Medium or High was measured. Where the route alternative crosses a feature classified as having High sensitivity, then this is discussed under that route alternative. The distances of each sensitivity class are summarised in Table 1.

Route alternative	DISTANCE WITHIN Sensitivity CLASS (KM)			RATING
	Low	Medium	High	
1A	32.9	10.5	1.2	Not preferred
1B	31.1	16.3	0.4	OK
2A	34.9	0.1	0.0	OK
2B	29.2	0.1	0.4	OK
Common	58.5	19.2	1.1	OK
Short route	116.8	26.6	2.1	Not preferred

Route sections

Common

This is all those parts of the route that are common to all alternatives, i.e. it is the only route option presented for these sections. These sections cover approximately 58.5 km's of habitat classified as having Low ecological sensitivity, 19.2 km's with Medium sensitivity and 1.1 km's with High sensitivity. The High sensitivity section is the crossing of the Orange River valley. This is planned to cross at the railway bridge, thus

confining cumulative impacts of multiple infrastructure. The powerline is forced to cross the river at some point and this is point is preferable to a position that is currently not affected by infrastructure. The areas classified as having medium sensitivity under this route are mostly those classified as Gordonia Dunes.

Option 1A

This is the north-eastern alternative that passes around the northern side of Neus se Berg. This section covers approximately 32.9 km's of habitat classified as having Low ecological sensitivity, 10.5 km's with Medium sensitivity and 1.2 km's with High sensitivity. The High sensitivity section is the crossing of the low mountain range. The vegetation along these ridges is classified as Lower Gariep Broken Veld, which from a natural vegetation perspective is considered to have a HIGH sensitivity to disturbance by the proposed development for the following reasons:

1. there is a chance that this vegetation unit would support populations of threatened plant or animal species, including *Aloe dichotoma* subsp. *dichotoma*, the Black Spitting Cobra and the Beaked Blind Snake, as well as the sensitive plant species, *Hoodia gordonii*.
2. two endemic plant species are found in this vegetation type;
3. the vegetation contains endemics belonging to the Griqualand West or Gariep Centres of Endemism (van Wyk & Smith 2001), namely.*Digitaria polyphylla* and *Crassula corallina* subsp. *macrorrhiza*
4. the vegetation structure is medium and sparse and therefore could be affected by overhead powerlines.

The areas classified as having medium sensitivity under this route are mostly those classified as Gordonia Dunes, but in areas unaffected by existing infrasturcture. This alternative would therefore potentially result in new fragmentation of these areas.

Option 1B

This is the north-eastern alternative that passes around the southern side of Neus se Berg. This section covers approximately 31.1 km's of habitat classified as having Low ecological sensitivity, 16.3 km's with Medium sensitivity and 0.4 km's with High sensitivity. The High sensitivity section is the crossing of the low mountain range, as discussed for option 1A, but the crossing is positioned through a pass where there is already

an existing road and railway line. The areas classified as having medium sensitivity under this route are mostly those classified as Gordonia Dunes, but in areas where there is already an existing road network.

Option 2A

This is the souh-western alternative that passes slightly northwards around the western side of Kenhardt. This section covers approximately 34.9 km's of habitat classified as having Low ecological sensitivity, 0.1 km's with Medium sensitivity and 0.0 km's with High sensitivity. The area classified as having medium sensitivity under this route is a small piece of Gordonia Dunes that will be affected by the Common portion of the route irrespective of whether alternative 2A or 2B is selected.

Option 2B

This is the souh-western alternative that passes slightly southwards around the western side of Kenhardt. This section covers approximately 29.2 km's of habitat classified as having Low ecological sensitivity, 0.1 km's with Medium sensitivity and 0.4 km's with High sensitivity. The High sensitivity section is the crossing of a low ridge west of Kenhardt, but the crossing is positioned through a pass where there is already an existing road and railway line. The area classified as having medium sensitivity under this route is a small piece of Gordonia Dunes that will be affected by the Common portion of the route irrespective of whether alternative 2A or 2B is selected.

Short Route Option

This is an option that follows relatively closely the shortest route between the two end-points. This section covers approximately 116.8 km's of habitat classified as having Low ecological sensitivity, 26.6 km's with Medium sensitivity and 2.1 km's with High sensitivity. The High sensitivity sections are the crossing of the low mountain range around the northern side of Neus se Berg, the Orange River valley and a low ridge just west of Kenhardt.

Discussion of route alternatives

From an ecological perspective route 1B is very preferable to route 1A, due to the fact that it passes through an area already affected by existing infrastructure, i.e. gravel roads, railway line and a farm homestead complex. Route 1A passes through an untransformed area with high sensitivity.

Currently, either route 2A or 2B may be considered since the difference in ecological sensitivity is marginal. Route 2B has a small section of High sensitivity, but this is impacted by other infrastructure. Route 2A is longer and therefore less preferable from this aspect.

The Short Route Option is not preferred since it contains all the disadvantages of option 1A (the passage north of Neus se Berg).