Eskom Holdings Limited

HYDRA-PERSEUS AND BETA-PERSEUS 765KV TRANSMISSION POWER LINES ENVIRONMENTAL IMPACT ASSESEMENT

Soil Impact Assessment

October 2005

EXECUTIVE SUMMARY

An intensive spatial analysis of existing soil, Land Type and Land Cover data was done using Arc-GIS 9.0 software with its Spatial analysis Extension version 9.0. The results of the analysis are shown in detail in Figures 1-3. The methodology and results are briefly discussed in this soils impact assessment report which will be incorporated into the scoping report.

Land Type Data of the Land Type Survey, which has been carried out by the ARC-Institute for Soil, Climate and Water at a scale of 1:50 000 and published at a scale of 1:250 000 was processed for the derivation of soil and agricultural potential along the proposed alternative routes.

Erosion sensitive areas were identified using Land Type soil information. Land uses and existing erosion occurrences was identified from the National Land Cover database.

The impacts were evaluated in terms of the route length affecting different agricultural potential classes, land uses and erosion sensitive areas.

The impacts on soil, agricultural potential and land use are relative low and can be minimised and managed to a fair extent.

The cause of corrosion problems at existing lines needs to be determined to enable identification of similar problematic areas on the proposed alternative routes.

Comparing the impacts on soil, agricultural potential, land use and erosion by the 3 alternative routes, the Western alternative route is the favourable option.

The impacts as determined by the intensive spatial analysis can be lowered to a significant extent by precise planning of the final route considering the indicated impacts and gathering of detail information.

HYDRA-PERSEUS AND BETA-PERSEUS 765KV TRANSMISSION POWER LINES ENVIRONMENTAL IMPACT ASSESSEMENT

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1 INTRODUCTION

1.1 Background

Eskom Holdings Limited (Eskom) intend to build a 765kV transmission line from Perseus substation near Bloemfontein to Hydra substation near De Aar. A proposed study area of approximately 83 km wide and 305 km in length was identified as a corridor for proposed alternative routes.

A helicopter trip from Perseus to Hydra, and by car from Hydra back to Perseus was undertaken to get and overview of the terrain and potential impacts, as well as to assist the specialists in their decision of preliminary alternative routes. Three alternative routes were proposed at approximately 2, 5 and 10 km to the west of the most western existing power line. The length of the three proposed routes varies between 288 and 294 kilometres.

In this scoping report the potential impacts on soil, agricultural potential, land use and erosion was investigated and evaluated using available existing data.

The evaluation was done by an intensive spatial analysis of the alternative routes although the methodology and results are short and briefly discussed.

1.2 Study Approach

1.2.1 Focus of the impact assessment

Impacts on soil by operations such as opencast mining are severe because major changes to soil physical and chemical conditions are created. The impact on soil by the construction of a power line rather lies in the withdrawal, partial withdrawal or change in the land use due to obstructions caused by the towers and anchor lines.

The impact on soil due to the construction of foundations for the towers and anchor lines are almost limited to the size of the concrete slabs, which is small. Productive functioning of the soil can continue thereafter up to the edge of each concrete slab. The natural vegetation will recover around the slabs and the impact in areas utilised for grazing purposes is normally minor.

The major impacts occur on high potential cultivated areas where production of crops are withdrawn due to obstruction caused by the towers and anchor lines. In some cases available land between towers and anchors are withdrawn due to difficulties experienced to work with large mechanical equipment in those areas.

The direct impact on soil physical and chemical potential is therefore much less than the impact on land use practices.

The focus of the impact assessment should therefore be on the change in land use potential. This is less impacted on in low potential land, mostly used for grazing purposes and more impacted on higher potential land, which are mostly utilised for cultivation.

The impact of the power line will therefore be most accurately assessed by determining length of the line crossing over different soil and agricultural potential classes.

Erosion can be caused by structures such as temporary roads during the construction phase, but the existence of towers after construction normally does not cause erosion.

Land use is mostly determine by soil potential, however, the availability of water are often the cause for cultivation of lower potential areas. The Land Use practices is therefore determined by both soil potential and the availability of water.

1.2.2 Methodology

Land Type Data of the Land Type Survey, which has been carried out by the ARC-Institute for Soil, Climate and Water at a scale of 1:50 000 and published at a scale of 1:250 000 was used for the derivation of soil and agricultural potential. The impact on soil was assessed in terms of the length of the alternative routes affecting different agricultural potential classes.

Erosion sensitive areas were identified using Land Type soil information and existing erosion occurrences were identified from the National Land Cover database.

The Land use impact was also evaluated in terms of the route length affecting different Land uses.

1.2.3 Limitations of the study

Detail soil information of the study area is not available. The Land Type soil and terrain inventories show a certain percentage of high potential soil in almost all the Land Type units. The location of these high potential soils is not known and therefore the average agricultural potential of each Land Type unit was used for spatial calculations.

The causes for erosion could be due to physical and chemical instabilities of the soil or due human malpractices or both. The cause of erosion needs to be identified.

Soil chemical data which could be used to derive possible causes of corrosion on existing lines was so limited that no conclusion could be made. The causes for excessive corrosion at existing lines need to be identified before the environmental impact assessment of the final route commences to be able to identify similar problematic areas.

2 DESCRIPTION OF AFFECTED ENVIRONMENT

2.1 Soil, Agricultural Potential and Land Use

The first approximate 5% of the route starting at Perseus substation are dominated by moderately deep, red, freely drained soils with low to intermediate base status and moderate agricultural potential. Land uses in this part are dominated by cultivation.

The following approximately 20% of the route consist of duplex soils with prominent textural contrast between a sandier topsoil and a blocky to prismatic structured subsoil. Brown coloured subsoils are dominant. Non perennial pans occur frequently which is evident of poor internal drainage of soils. Salt precipitations could frequently be observed at the edges of pans which might have high electrical conductivity and might cause erosion. Soil analysis will have to be done in order to determine the chemical status of the soil. This part is dominated by natural grassland.

A further approximate 25% of the route stretching up to approximately 50% of the route is again dominated by shallow to moderately deep, red, freely drained soils with low to intermediate base status and low to moderate agricultural potential. Land uses in this part are dominated by natural grassland with frequent small cultivated areas.

Soils along the Orange River consist of deep alluvial deposits with moderate agricultural potential and land uses are dominated by cultivation.

The part representing approximately 60 to 70 percent of the route is dominated by duplex soils with prominent textural contrast between sandier topsoil and a blocky to prismatic structured subsoil. Red coloured subsoils are dominant. Erosion often occurs and this part is dominated by shrubland and low fynbos.

The last 30% of the route are dominated by shallow red and brown soils underlain by soft carbonates, hardpan carbonates and moderately weathered to hard rock. This part is dominated by shrubland and low fynbos.

3 IDENTIFICATION OF RISK SOURCES

3.1 Soil, Agricultural Potential, Land Use, Corrosivity

The construction of the power line poses no serious risks in terms of soil, Agricultural Potential and Land Use. Mitigation procedures can minimise impacts. A number of power lines are running along the corridor for many years without serious consequences identified.

Activities during the construction phase that might cause erosion such as the construction of roads and base camps need to be identified and controlled.

Corrosive impacts need to be investigated but will be hard to determine on the proposed routes without having determined the cause at existing problematic areas. Eskom indicated that the problem is being investigated and results will be released as soon as it is available.

4 ENVIRONMENTAL ASSESSMENT

4.1 Comparison of Alternative Routes

4.1.1 Agricultural Potential

Table 1 summarizes the impact on agricultural potential in terms of route length per agricultural potential class as spatially shown in **Figure 1**.

The impact on Agricultural potential can be decreased by avoiding the higher agricultural potential areas. The Eastern and Centre alternative is somewhat similar and have a clear higher impact on the higher agricultural potential classes than the Western alternative.

The Western alternative clearly affected the higher agricultural potential classes less and would be the most positive option in terms of impact on Agricultural potential.

Table 1: Summary of Agricultural potential results to compare the impact of the alternative routes

	Eastern Alternative		Centre Alternative		Western Alternative	
Agricultural Potential Class	**Route Length (m)**	**Percentage of Route**	**Route Length (m)**	**Percentage of Route**	**Route Length (m)**	**Percentage of Route**
Low	183 581.9	63.61	184 390.0	63.17	206 475.1	70.28
Low - moderate	54 157.0	18.76	55 475.2	19.01	41 902.4	14.26
Moderate	50 905.1	17.64	52 012.7	17.82	45 494.8	15.48
Total	**288 644.0**	**100.0**	**291 877.9**	**100.0**	**293 872.3**	**100.0**

4.1.2 Land Use and Erosion

Table 2 is an extraction of the Land Use assessment results to compare alternatives as spatially shown in Figure 2.

Table 2: Extraction of Land Use results to compare the impact of the 3 Alternatives Routes

	Eastern Alternative		Centre Alternative		Western Alternative	
Land Use	**Route Length (m)**	**Percentage of Route**	**Route Length (m)**	**Percentage of Route**	**Route Length (m)**	**Percentage of Route**
Cultivation - Dry land	**7166.5**	**2.48**	**4185.6**	**1.43**	6142.4	2.0
Cultivation - Irrigation	**9311.1**	**3.23**	**5814.9**	**1.99**	6361.1	2.2
Wetlands and Water bodies	**1700.3**	**0.59**	**4452.8**	**1.52**	**1796.6**	**0.6**
Erosion	4108.2	1.42	**9052.4**	**3.1**	**2154.9**	**0.7**
Total	**22 286.1**	**7.72**	**23 505.7**	**8.04**	**16 455**	**5.5**

Table 2 shows the Land uses that should rather be avoided due to possible negative environmental impacts as well as problematic issues for the physical constructing of the line. Table 2 is only an extraction of the Land use assessment as shown on **Figure 2**. The highest impacts comparing the alternatives are highlighted in red and the lower impacts in green.

Comparing cultivated dry land and irrigation, the impact by the Eastern alternative is the highest and the Centre alternative the lowest. The Western alternative is higher than the Centre one but somewhat similar.

Comparing wetlands and water bodies, the impact of the Centre alternative is the highest and the Eastern alternative the lowest. The Western alternative is higher than the Eastern one but almost similar.

Comparing the occurrences of erosion, the impact of the Centre and Eastern alternatives is significantly higher than the Western alternative.

Looking at totals of the Land uses that should be avoided as far as possible Western alternative is by far the lowest.

5 RECOMMENDED MITIGATION MEASURES

The spacing and placing of towers would be essential in the higher agricultural potential areas where cultivation and irrigation takes place. Proper placement and will minimise the loss or withdrawal of agricultural land due to obstruction by structures.

The design and/or use of towers that will minimize the loss of high potential land need to be considered.

The cause for severe erosion occurrences at certain areas need to be determined to adapt construction activities accordingly.

Base camps should be constructed in erosion insensitive areas taking soil types and slopes in consideration. Open spaces or bare spots e.g. old farmsteads would be preferred to places where the natural vegetation has to be removed. Old fields, even on high potential land would be preferred above low potential land where natural vegetation has to be removed which might harm the natural buffer against erosion.

Roads and access ways should be confined to a minimum to minimise maintenance and possible erosion.

Causes for excessive corrosion should be determined to enable identification of similar soil conditions on the proposed routes.

6 CONCLUSIONS AND RECOMMENDATIONS

- The general impact on soil physical and chemical conditions is low.
- The focus should be on the impact on agricultural potential, land uses and erosion.
- The placing and spacing of towers will be essential to minimise the impact on higher agricultural potential land.
- The direct impact of a constructed line on erosion is low. The impacts that might cause erosion are mainly during the construction phase.
- All 3 alternative routes affects between 63-70% low potential soils, between 14-19% low to moderate potential soils and between 15-18% moderate potential soils.
- The Western alternative affects the least high potential agricultural land. The impacts of the Eastern and Centre alternative are similar and somewhat higher than the Western alternative.
- The Eastern alterative has the highest affect on cultivated areas and the Centre alternative the least. The Western alternative is slightly higher the Centre one.
- The Centre alternative affects by far the most wetlands and water bodies. The affect of the Eastern and Western alternatives are similar and much lower.
- The Centre alternative affects by far the most erosion affected areas and the Western alternative the least.
- The most favourable alternative in terms of impacts on soil, agricultural potential, land use and erosion are the **Western** alternative.

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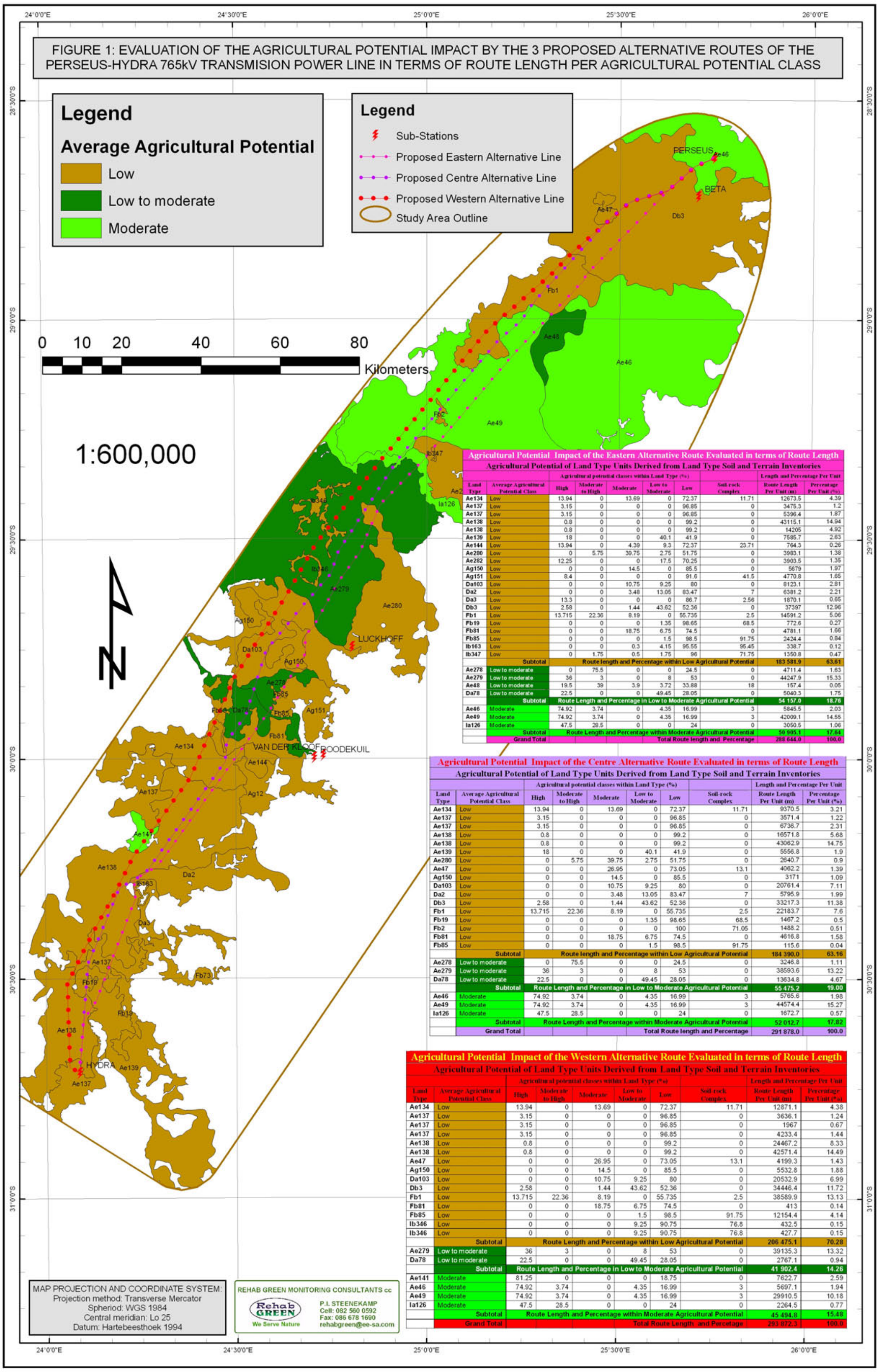


Agricultural Potential Impact of the Eastern Alternative Route Evaluated in terms of Route Length

Agricultural Potential of Land Type Units Derived from Land Type Soil and Terrain Inventories

		Agricultural potential classes within Land Type (%)						Length and Percentage Per Unit	
Land Type	Average Agricultural Potential Class	High	Moderate to High	Moderate	Low to Moderate	Low	Soil-rock Complex	Route Length Per Unit (m)	Percentage Per Unit (%)
Ae134	Low	13.94	0	13.69	0	72.37	11.71	12673.5	4.39
Ae137	Low	3.15	0	0	0	96.85	0	3475.3	1.2
Ae137	Low	3.15	0	0	0	96.85	0	5396.4	1.87
Ae138	Low	0.8	0	0	0	99.2	0	43115.1	14.94
Ae138	Low	0.8	0	0	0	99.2	0	14205	4.92
Ae139	Low	18	0	0	40.1	41.9	0	7585.7	2.63
Ae144	Low	13.94	0	4.39	9.3	72.37	23.71	764.3	0.26
Ae280	Low	0	5.75	39.75	2.75	51.75	0	3983.1	1.38
Ae282	Low	12.25	0	0	17.5	70.25	0	3903.5	1.35
Ag150	Low	0	0	14.5	0	85.5	0	5679	1.97
Ag151	Low	8.4	0	0	0	91.6	41.5	4770.8	1.65
Da103	Low	0	0	10.75	9.25	80	0	8123.1	2.81
Da2	Low	0	0	3.48	13.05	83.47	7	6381.2	2.21
Da3	Low	13.3	0	0	0	86.7	2.56	1870.1	0.65
Db3	Low	2.58	0	1.44	43.62	52.36	0	37397	12.96
Fb1	Low	13.715	22.36	8.19	0	55.735	2.5	14591.2	5.06
Fb19	Low	0	0	0	1.35	98.65	68.5	772.6	0.27
Fb81	Low	0	0	18.75	6.75	74.5	0	4781.1	1.66
Fb85	Low	0	0	0	1.5	98.5	91.75	2424.4	0.84
Ib163	Low	0	0	0.3	4.15	95.55	95.45	338.7	0.12
Ib347	Low	0	1.75	0.5	1.75	96	71.75	1350.8	0.47
	Subtotal	Route length and Percentage within Low Agricultural Potential						183 581.9	63.61
Ae278	Low to moderate	0	75.5	0	0	24.5	0	4711.4	1.63
Ae279	Low to moderate	36	3	0	8	53	0	44247.9	15.33
Ae48	Low to moderate	19.5	39	3.9	3.72	33.88	18	157.4	0.05
Da78	Low to moderate	22.5	0	0	49.45	28.05	0	5040.3	1.75
	Subtotal	Route Length and Percentage in Low to Moderate Agricultural Potential						54 157.0	18.76
Ae46	Moderate	74.92	3.74	0	4.35	16.99	3	5845.5	2.03
Ae49	Moderate	74.92	3.74	0	4.35	16.99	3	42009.1	14.55
Ia126	Moderate	47.5	28.5	0	0	24	0	3050.5	1.06
	Subtotal	Route Length and Percentage within Moderate Agricultural Potential						50 905.1	17.64
	Grand Total				Total Route length and Percentage			288 644.0	100.0

Agricultural Potential Impact of the Centre Alternative Route Evaluated in terms of Route Length

Agricultural Potential of Land Type Units Derived from Land Type Soil and Terrain Inventories

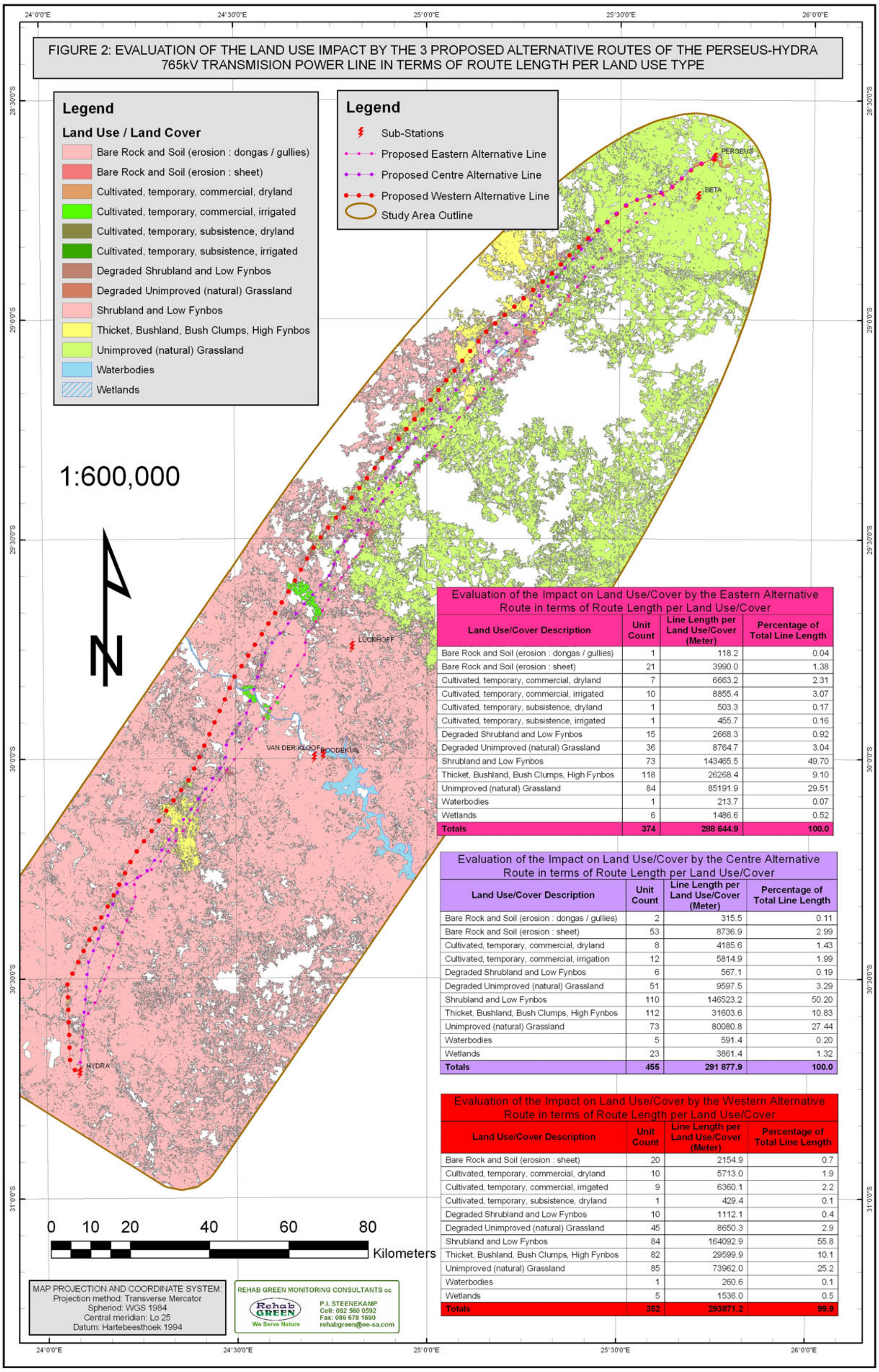
		Agricultural potential classes within Land Type (%)						Length and Percentage Per Unit	
Land Type	Average Agricultural Potential Class	High	Moderate to High	Moderate	Low to Moderate	Low	Soil-rock Complex	Route Length Per Unit (m)	Percentage Per Unit (%)
Ae134	Low	13.94	0	13.69	0	72.37	11.71	9370.5	3.21
Ae137	Low	3.15	0	0	0	96.85	0	3571.4	1.22
Ae137	Low	3.15	0	0	0	96.85	0	6736.7	2.31
Ae138	Low	0.8	0	0	0	99.2	0	16571.8	5.68
Ae138	Low	0.8	0	0	0	99.2	0	43062.9	14.75
Ae139	Low	18	0	0	40.1	41.9	0	5556.8	1.9
Ae280	Low	0	5.75	39.75	2.75	51.75	0	2640.7	0.9
Ae47	Low	0	0	26.95	0	73.05	13.1	4062.2	1.39
Ag150	Low	0	0	14.5	0	85.5	0	3171	1.09
Da103	Low	0	0	10.75	9.25	80	0	20761.4	7.11
Da2	Low	0	0	3.48	13.05	83.47	7	5795.9	1.99
Db3	Low	2.58	0	1.44	43.62	52.36	0	33217.3	11.38
Fb1	Low	13.715	22.36	8.19	0	55.735	2.5	22183.7	7.6
Fb19	Low	0	0	0	1.35	98.65	68.5	1467.2	0.5
Fb2	Low	0	0	0	0	100	71.05	1488.2	0.51
Fb81	Low	0	0	18.75	6.75	74.5	0	4616.8	1.58
Fb85	Low	0	0	0	1.5	98.5	91.75	115.6	0.04
	Subtotal	Route length and Percentage within Low Agricultural Potential						184 390.0	63.16
Ae278	Low to moderate	0	75.5	0	0	24.5	0	3246.8	1.11
Ae279	Low to moderate	36	3	0	8	53	0	38593.6	13.22
Da78	Low to moderate	22.5	0	0	49.45	28.05	0	13634.8	4.67
	Subtotal	Route Length and Percentage in Low to Moderate Agricultural Potential						55 475.2	19.00
Ae46	Moderate	74.92	3.74	0	4.35	16.99	3	5765.6	1.98
Ae49	Moderate	74.92	3.74	0	4.35	16.99	3	44574.4	15.27
Ia126	Moderate	47.5	28.5	0	0	24	0	1672.7	0.57
	Subtotal	Route Length and Percentage within Moderate Agricultural Potential						52 012.7	17.82
	Grand Total				Total Route length and Percentage			291 878.0	100.0

Agricultural Potential Impact of the Western Alternative Route Evaluated in terms of Route Length

Agricultural Potential of Land Type Units Derived from Land Type Soil and Terrain Inventories

		Agricultural potential classes within Land Type (%)						Length and Percentage Per Unit	
Land Type	Average Agricultural Potential Class	High	Moderate to High	Moderate	Low to Moderate	Low	Soil-rock Complex	Route Length Per Unit (m)	Percentage Per Unit (%)
Ae134	Low	13.94	0	13.69	0	72.37	11.71	12871.1	4.38
Ae137	Low	3.15	0	0	0	96.85	0	3636.1	1.24
Ae137	Low	3.15	0	0	0	96.85	0	1967	0.67
Ae137	Low	3.15	0	0	0	96.85	0	4233.4	1.44
Ae138	Low	0.8	0	0	0	99.2	0	24467.2	8.33
Ae138	Low	0.8	0	0	0	99.2	0	42571.4	14.49
Ae47	Low	0	0	26.95	0	73.05	13.1	4199.3	1.43
Ag150	Low	0	0	14.5	0	85.5	0	5532.8	1.88
Da103	Low	0	0	10.75	9.25	80	0	20532.9	6.99
Db3	Low	2.58	0	1.44	43.62	52.36	0	34446.4	11.72
Fb1	Low	13.715	22.36	8.19	0	55.735	2.5	38589.9	13.13
Fb81	Low	0	0	18.75	6.75	74.5	0	413	0.14
Fb85	Low	0	0	0	1.5	98.5	91.75	12154.4	4.14
Ib346	Low	0	0	0	9.25	90.75	76.8	432.5	0.15
Ib346	Low	0	0	0	9.25	90.75	76.8	427.7	0.15
	Subtotal	Route Length and Percentage within Low Agricultural Potential						206 475.1	70.28
Ae279	Low to moderate	36	3	0	8	53	0	39135.3	13.32
Da78	Low to moderate	22.5	0	0	49.45	28.05	0	2767.1	0.94
	Subtotal	Route Length and Percentage in Low to Moderate Agricultural Potential						41 902.4	14.26
Ae141	Moderate	81.25	0	0	0	18.75	0	7622.7	2.59
Ae46	Moderate	74.92	3.74	0	4.35	16.99	3	5697.1	1.94
Ae49	Moderate	74.92	3.74	0	4.35	16.99	3	29910.5	10.18
Ia126	Moderate	47.5	28.5	0	0	24	0	2264.5	0.77
	Subtotal	Route Length and Percentage within Moderate Agricultural Potential						45 494.8	15.48
	Grand Total				Total Route Length and Percetage			293 872.3	100.0

FIGURE 2: EVALUATION OF THE LAND USE IMPACT BY THE 3 PROPOSED ALTERNATIVE ROUTES OF THE PERSEUS-HYDRA 765kV TRANSMISION POWER LINE IN TERMS OF ROUTE LENGTH PER LAND USE TYPE



Evaluation of the Impact on Land Use/Cover by the Eastern Alternative Route in terms of Route Length per Land Use/Cover

Land Use/Cover Description	Unit Count	Line Length per Land Use/Cover (Meter)	Percentage of Total Line Length
Bare Rock and Soil (erosion : dongas / gullies)	1	118.2	0.04
Bare Rock and Soil (erosion : sheet)	21	3990.0	1.38
Cultivated, temporary, commercial, dryland	7	6663.2	2.31
Cultivated, temporary, commercial, irrigated	10	8855.4	3.07
Cultivated, temporary, subsistence, dryland	1	503.3	0.17
Cultivated, temporary, subsistence, irrigated	1	455.7	0.16
Degraded Shrubland and Low Fynbos	15	2668.3	0.92
Degraded Unimproved (natural) Grassland	36	8764.7	3.04
Shrubland and Low Fynbos	73	143465.5	49.70
Thicket, Bushland, Bush Clumps, High Fynbos	118	26268.4	9.10
Unimproved (natural) Grassland	84	85191.9	29.51
Waterbodies	1	213.7	0.07
Wetlands	6	1486.6	0.52
Totals	**374**	**288 644.9**	**100.0**

Evaluation of the Impact on Land Use/Cover by the Centre Alternative Route in terms of Route Length per Land Use/Cover

Land Use/Cover Description	Unit Count	Line Length per Land Use/Cover (Meter)	Percentage of Total Line Length
Bare Rock and Soil (erosion : dongas / gullies)	2	315.5	0.11
Bare Rock and Soil (erosion : sheet)	53	8736.9	2.99
Cultivated, temporary, commercial, dryland	8	4185.6	1.43
Cultivated, temporary, commercial, irrigation	12	5814.9	1.99
Degraded Shrubland and Low Fynbos	6	567.1	0.19
Degraded Unimproved (natural) Grassland	51	9597.5	3.29
Shrubland and Low Fynbos	110	146523.2	50.20
Thicket, Bushland, Bush Clumps, High Fynbos	112	31603.6	10.83
Unimproved (natural) Grassland	73	80080.8	27.44
Waterbodies	5	591.4	0.20
Wetlands	23	3861.4	1.32
Totals	**455**	**291 877.9**	**100.0**

Evaluation of the Impact on Land Use/Cover by the Western Alternative Route in terms of Route Length per Land Use/Cover

Land Use/Cover Description	Unit Count	Line Length per Land Use/Cover (Meter)	Percentage of Total Line Length
Bare Rock and Soil (erosion : sheet)	20	2154.9	0.7
Cultivated, temporary, commercial, dryland	10	5713.0	1.9
Cultivated, temporary, commercial, irrigated	9	6360.1	2.2
Cultivated, temporary, subsistence, dryland	1	429.4	0.1
Degraded Shrubland and Low Fynbos	10	1112.1	0.4
Degraded Unimproved (natural) Grassland	45	8650.3	2.9
Shrubland and Low Fynbos	84	164092.9	55.8
Thicket, Bushland, Bush Clumps, High Fynbos	82	29599.9	10.1
Unimproved (natural) Grassland	85	73962.0	25.2
Waterbodies	1	260.6	0.1
Wetlands	5	1536.0	0.5
Totals	**352**	**293871.2**	**99.9**

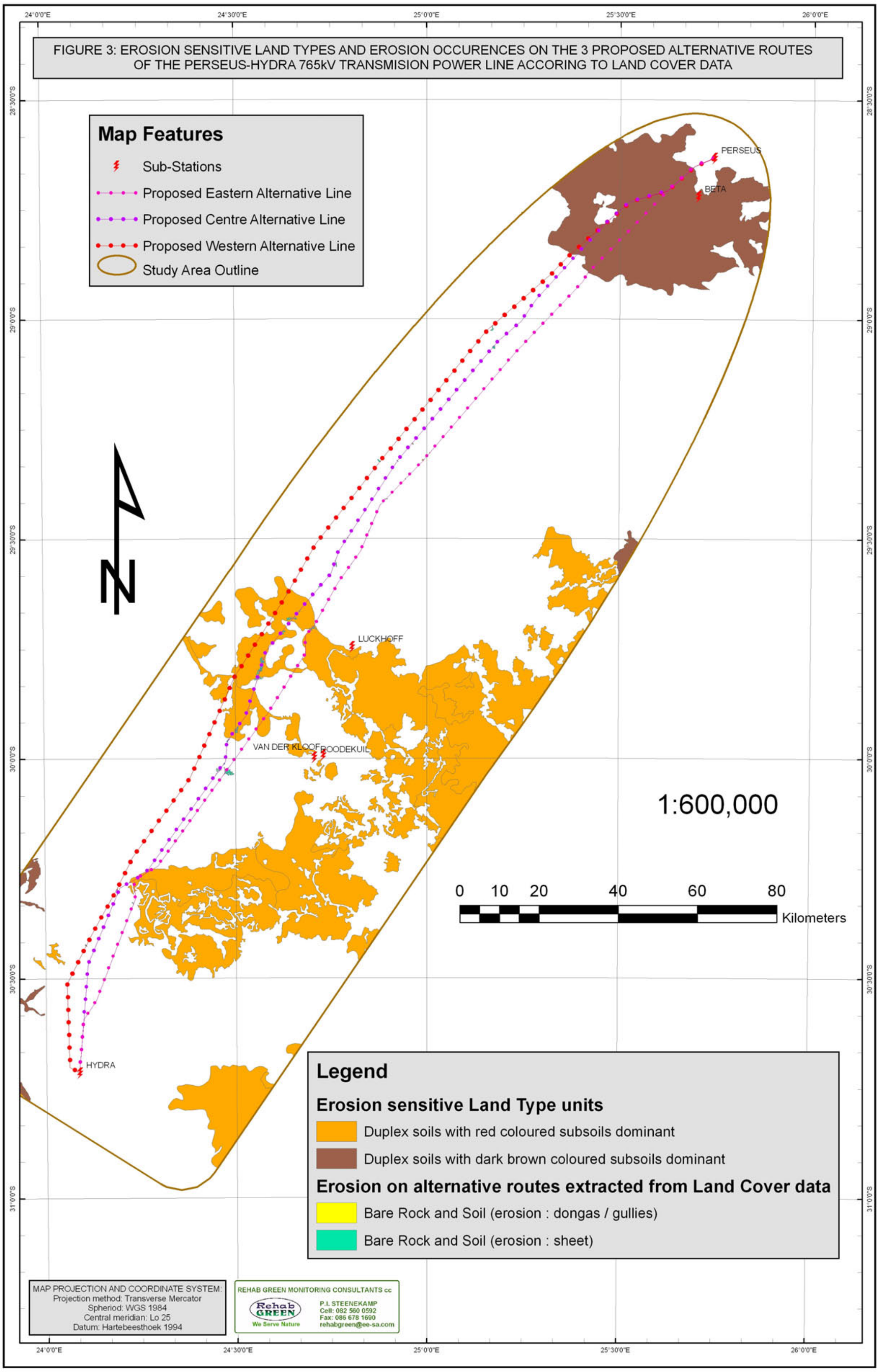


FIGURE 3: EROSION SENSITIVE LAND TYPES AND EROSION OCCURENCES ON THE 3 PROPOSED ALTERNATIVE ROUTES
OF THE PERSEUS-HYDRA 765kV TRANSMISION POWER LINE ACCORING TO LAND COVER DATA
Map Features
Sub-Stations
Proposed Eastern Alternative Line
Proposed Centre Alternative Line
Proposed Western Alternative Line
Study Area Outline
PERSEUS
BETA
LUCKHOFF
VAN DER KLOOF
ROODEKUIL
HYDRA
1:600,000
0 10 20 40 60 80
Kilometers
Legend
Erosion sensitive Land Type units
Duplex soils with red coloured subsoils dominant
Duplex soils with dark brown coloured subsoils dominant
Erosion on alternative routes extracted from Land Cover data
Bare Rock and Soil (erosion : dongas / gullies)
Bare Rock and Soil (erosion : sheet)
MAP PROJECTION AND COORDINATE SYSTEM:
Projection method: Transverse Mercator
Spheriod: WGS 1984
Central meridian: Lo 25
Datum: Hartebeesthoek 1994
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