
**BRAAMHOEK TRANSMISSION INTEGRATION EIA
BRAAMHOEK SUBSTATION /
BRAAMHOEK 400KV TURN-IN /
BRAAMHOEK-VENUS 400KV TRANSMISSION LINE**

**SCOPING REPORT – EXECUTIVE SUMMARY
FINAL**

Introduction

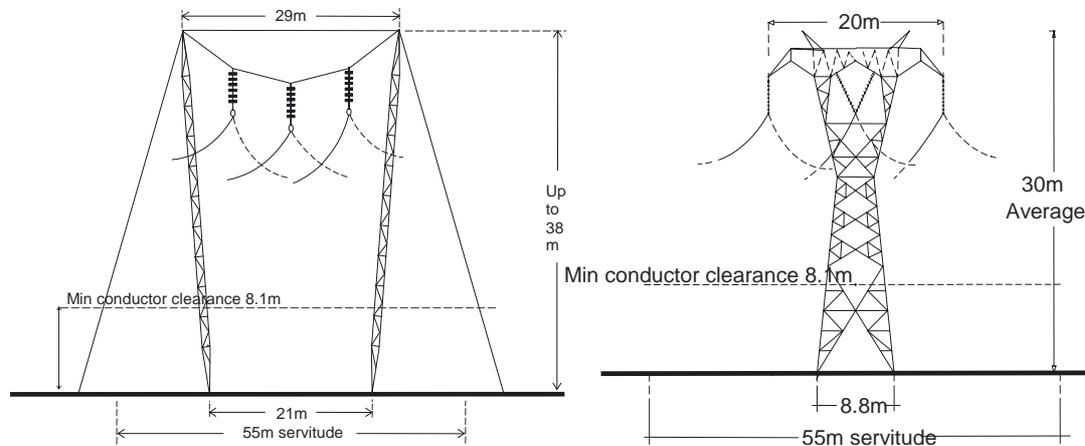
1. In December 2002, the Department of Environment Affairs and Tourism (DEAT) awarded Eskom environmental authorisation for the construction of the Braamhoek Pumped Storage Scheme (Braamhoek P.S.S.). A condition of the authorisation is that Eskom undertakes “a comprehensive Environmental Impact Assessment for all access roads and power lines that connects the scheme to the national transmission grid”.
2. Eskom Transmission is tasked with connecting the scheme to the National Grid, and has defined the extent of the development to effect this connection to include:
 - ▶ The construction of a 400kV Transmission Substation at Braamhoek P.S.S. (=Braamhoek Substation),
 - ▶ Provide an initial connection to the National Grid via a ‘turn-in’ from the nearby Majuba-Venus #2 400kV Transmission line (=Braamhoek Turn-in),
 - ▶ Ensure the reliability of the network by linking Braamhoek Substation directly to the Venus Substation near Estcourt with a new 400kV Transmission line (=Braamhoek-Venus 400kV Transmission Line).
3. The study area is shown on Map 1.
4. Following a Pre-feasibility Study completed in October 2004, applications for permission to undertake Environmental Impact Assessments (EIAs) were submitted to the Department of Environment Affairs and Tourism (DEAT) in November 2004. DEAT approval was granted for detailed Scoping Studies for each of the projects. Separate authorisations from DEAT are required; hence each project has been undertaken as a separate study. Three separate Final Scoping Reports are published, plus a separate report on the public consultation process:
 - Braamhoek-Venus 400kV Line – Final Scoping Report
 - Braamhoek Turn-in – Final Scoping Report
 - Braamhoek Substation – Final Scoping Report
 - Appendix A – Public Participation Process (*to be read in conjunction with all of the above*)
5. Information on the Braamhoek Pumped Storage Scheme is given in each of the three Scoping Reports.

Timeframes

6. Based on the latest growth predictions, it is expected that power from Braamhoek PSS will be required by 2012. The given timeframe for starting the construction of the Transmission projects is 2007.

Technical details – Power lines

7. The main tower type proposed is the Cross-roped suspension tower shown below left, though on bends and difficult terrain the strain tower on the right may be used. A servitude width of 55m is required in both cases.



8. It is important that the Braamhoek Turn-in will comprise two new 400kV lines linking the Braamhoek Substation to the Majuba-Venus #2 line. The Braamhoek Turn-in will run parallel to the Braamhoek-Venus 400kV line, and there will therefore be three 400kV lines in parallel. This distance will be approximately 12km.

9. The Braamhoek-Venus 400kV line is a single 400kV line, and the approximate distance is 94km.

Technical details - Substation

10. The typical substation size and equipment includes the following:

- New station, transformers, reactors, etc.
- Max height of infrastructure expected at 45m
- The substation area will be 400 x 400m, though the actual footprint of the constructed area is understood to be approx. 320 x 160m
- Two connections to the National Grid; Braamhoek Turn-in 400kV line and Braamhoek-Venus 400kV Transmission line.

11. An important aspect of the proposed Braamhoek Substation is that it will be constructed on a working platform created during the Braamhoek P.S.S. tunnel construction. This platform will be located near the access tunnel portals and will be used as a construction camp and storage area for the power station construction. Once this phase is complete, the substation will be constructed on this platform, thereby causing minimal additional damage to the local area.

Alternatives – Braamhoek-Venus 400kV line

12. Three route alternatives have been considered for the new 400kV line connecting Braamhoek to an existing Transmission substation:

- Eastern Route: Running parallel to Majuba-Venus #1 along the eastern side of the study area,
- Western Route: Running parallel to Majuba-Venus #2 along the western side of the study area,
- Middle Route: Following a middle route between the first two.

13. It has been significant in this study that both the Majuba-Venus #1 and #2 lines have vacant servitudes parallel to them (though an additional 20m will still be required). Running power lines next to each other usually has important environmental benefits, namely; use existing access, visual mitigation, reduced risk of bird collisions, erosion management; no relocations of homesteads (if servitude already established), surrounding land development is less affected.
14. The option of underground lines has been addressed in the report in some detail. For cost, and some environmental reasons, underground cables are not seen to be viable here and have not been considered further in the assessment.

Alternatives – Braamhoek Turn-in

15. Two principle alternatives were considered here; along the top of the escarpment and along the base of the escarpment. Depending on alignment in these areas, it is possible that these options will be of similar length (approximately 12km).
16. During the comment period for the Draft Scoping Report, attention was drawn to the possibility of aligning the Turn-in with the access road for the Braamhoek PSS. A local deviation to the original route has been proposed – it reduces a 3.2km section of the Turn-in to a distance of 2.6km, and is straighter than the original. It will be more exposed than the original route, but the difference is seen to be less than the possible benefits of combining with the access road.

Alternatives – Braamhoek Substation

17. Three site alternatives were provided by Eskom, though only one (the eastern option) could make use of the working platform prepared during the construction of the Braamhoek P.S.S. All of the sites are on land now owned by Eskom for the Braamhoek P.S.S.

Assessments - Braamhoek-Venus 400kV line

18. The environmental assessment of each option has been wide ranging, and a very brief summary is presented below. The main criteria affecting the decision of the preferred route were:
19. Social Issues – The Eastern Route has a high population density, and there is seen to be considerable encroachment of houses up to and within the servitude. There is potential for high social disruption and the need for relocation of houses. Existing and planned eco-tourism is also significant in the area, and part of this is critical to land restitution plans. The potential for social disruption on the other routes is less, though with a new servitude required on the Middle Route, the potential impact is still higher than on the Western Route. The Western Route has the lowest population density and has a vacant servitude for much of the proposed alignment.
20. Bird Issues – There are a number of issues relating to birds, but in this study the main concerns are bird collisions with the power line and destruction of habitat. The middle and western areas have more habitat for power line sensitive birds (mainly cranes, storks and bustards in this area) – particularly the open grasslands and wetlands. A number of crane breeding areas have been identified. However, both the Middle and Eastern Routes will be new routes in the more bird sensitive areas, while the Western Route will be parallel to another 400kV line for the entire distance. For this reason the Western Route is seen to offer the least impact on both bird collisions and habitat.

21. Visual Impact – This issue is complex and inspection of the specialist report is encouraged. Power lines of this magnitude are not easily hidden and will have a negative impact in most rural landscapes. The landscape along the Eastern Route has both more human intrusion and has greater capacity to absorb new power lines than the Western Route. The Eastern Route is preferred from a visual perspective. However, the Western Route has a number of linear developments (roads and power lines) in the area, and the proposed line will not affect the visual quality of the area as much as if it were the first line development in the area. Running the new line next to an existing line of similar size will offer some mitigation of the visual impact.
22. Ecology and Archaeology – In this environment, these issues are seen to carry less weight than the issues above primarily because most of the impacts can be avoided by careful placement of the towers and by careful management during the construction phase. Apart from avoidance of Battlefield sites, it is considered by the specialists involved that environmental impacts along all of the routes can be avoided or effectively mitigated. Preference is given for the Western Route as it is next to an existing servitude and that risk of damage is therefore seen to be lower. However, detailed walk-through surveys will be required once preliminary tower placement is made such that localised impacts can be avoided or managed.
23. Preferred route – The Western Route is identified as the preferred route for the new line between Venus and Braamhoek.
24. Stakeholder Concerns – Particular note is made in this summary of landowner concerns that have been raised along the Western Route. These include servitude and infrastructure maintenance and fire hazards. These are mainly management and maintenance related issues and are being addressed by Eskom at senior management level. The issues have been discussed in some detail in the report, but in the final evaluation they did not affect the selection of the preferred route as they were seen to be equally relevant to all the proposed routes. It is important, however, that Eskom addresses and resolves the matters raised and it is understood that they are being investigated.

Assessments – Braamhoek Turn-in

25. Inspection of a possible route along the top of the escarpment by the specialists raised two serious concerns. The collision risk on wetland birds migrating between the wetlands above and below the escarpment was seen to be unacceptably high. Reports of Grey Crowned Crane mortalities on the existing Majuba-Venus #2 line in this area were already a concern. A line across the escarpment would cut across the flight path. Secondly the visual impact was also seen to be unacceptably high as it would run along the crest of the escarpment in a number of places and be highly visible for some distance. This route was deemed a 'no-go' option.
26. There are similar concerns for any route along the base of the escarpment, though the extent of the impacts are seen to be lower. There is a relatively narrow corridor for the Turn-in given constraints of the escarpment slope, wetland areas, the proposed lower reservoir for the Braamhoek P.S.S., and areas of arable land. A route has been plotted that is seen to achieve a balance on minimising impacts on all of these issues.
27. It is also seen to be beneficial to run the proposed Braamhoek-Venus line parallel to the Turn-ins. This will minimise bird and ecological impacts, though it will increase the visual impact of the route.

28. The visual impact of the Turn-in will be moderate to high. It will be considerably less than the alternative along the top of the escarpment, and it will be similar to other routes to the Braamhoek Substation. It is also relevant that the planned De Beers Pass highway and tunnel will be constructed in this area and will pass under the route of the Turn-in. This will also contribute to the change in the visual character of the area, and it is seen to be preferable to confine the Turn-in to the same area.
29. The deviation of this route identified in the comment period of the Draft Scoping Report has been put forward so as to combine the Turn-in route with the access road for the Braamhoek PSS. This deviation is seen to have greater combined environmental benefits, and is the preferred environmental route.
30. The preferred route is therefore the route identified in the Braamhoek Turn-in - Final Scoping Report along the base of the escarpment, including the deviation along the route of the access road..

Assessments – Braamhoek Substation

31. The impact assessment has considered the full range of issues associated with the development of substations. However, the special circumstances of this proposal has had direct bearing on the selection of the preferred substation site. By integrating the construction of the substation within the construction of the Braamhoek P.S.S., and utilising areas disturbed by the latter, the net impact of the Braamhoek Substation is seen to be very low.
32. The only concerns are the drainage of the substation and pollution control (as it is near a watercourse), and the relocation of graves. The former is seen to be managed by the appropriate design of the drainage system on the substation using facilities that are standard on most substations. The grave sites should be addressed before start of construction of the Braamhoek P.S.S. AMAFA is aware of the graves and will need to provide the necessary permits.
33. The other sites will require destruction of additional greenfield area, and are therefore not preferred. Hence the preferred site is the eastern site, on the farm Zaaifontein, identified in the Braamhoek Substation - Final Scoping Report

Recommendations

34. A number of recommendations have been made in the reports, particularly in the Impact tables set out in Appendix 2 of each report. These are seen to be relevant to the implementation of each project, particularly the construction phase. Some of the more general ones include:
- Issues raised by landowners along the preferred route that are related to problems and concerns on the existing power lines in the area need to be followed through by Eskom.
 - In this regard, it is recommended that Eskom clarify landowner's issues relating to servitude access, maintenance and fire management in the servitude and associated responsibilities.
 - Fire management is a particular point of concern raised by landowners along the route. Eskom is urged to clarify fire and vegetation management responsibilities, fire fighting support, and liaise with all local Fire Fighting Associations or Farmers Associations. Written agreements on responsibilities and activities are to be set out between Eskom and the Associations.

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- It is recommended that the Braamhoek-Venus 400kV line and the Turn-in from the Majuba-Venus #2 line be run in parallel, and that the construction of the two should be done simultaneously.
 - Extra attention should be given to earthing the pylons in the whole study area.
 - Construction camps for the projects should be combined and as far as possible. These should be integrated with the construction camps for the Braamhoek P.S.S.
 - It is recommended that Eskom identify the living relatives of the graves at the site as soon as possible such that the process of grave relocation may start. Assistance of councillors at Ladysmith Municipality is to be sought in this regard.
 - Once authorisation is obtained for the route of the line, wayleaves or servitudes will be required from certain authorities where the line crosses their land. These include the N3TC for the planned De Beers Pass highway and Petronet for their pipelines (there is a crude oil line and a refined products line that pass through the area).
 - It is important that Eskom appoints a full time Environmental Control Officer (ECO) for the construction planning and construction phase. This ECO will be able to initiate specialist surveys in the design phase (archaeology and ecology) and will be responsible for drafting a detailed Environmental Management Plan.
 - In support of this, it is recommended that the Department of Agriculture and Environmental Affairs – Kwa-Zulu Natal monitor the construction planning and the construction programme.