Visual

Sensitive receptors in the study area are associated with the occurrence of farmsteads and road users, which are widely spread across the study area. The location of these are presented on the map in **Figure 7.11**. The level of sensitivity is determined by proximity to the ash disposal facility and can be classified as follows:

- **0 – 1.5km.** Short distance view where the facility would dominate the frame of vision and constitute a very high visual prominence.
- **1.5 - 3km**. Medium distance view where the facility would be easily and comfortable visible and constitute a high to moderate visual prominence.
- **3 - 6km**. Medium to longer distance view where the facility would become part of the visual environment, but would still be visible and recognisable. This zone constitutes a moderate to low visual prominence.
- **Greater than 6km**. Long distance view of the facility where it could potentially still be visible though not as easily recognisable. This zone constitutes a very low visual prominence for the facility. It is anticipated that beyond 12 km from the facility any visibility thereof would be of no significance in terms of visual impact.

A number of farmsteads and sections of road fall within the 3 km buffer around the ash disposal facility, which is the zone containing high to medium visual sensitivity. These areas will be investigated in more detail during the EIA phase.

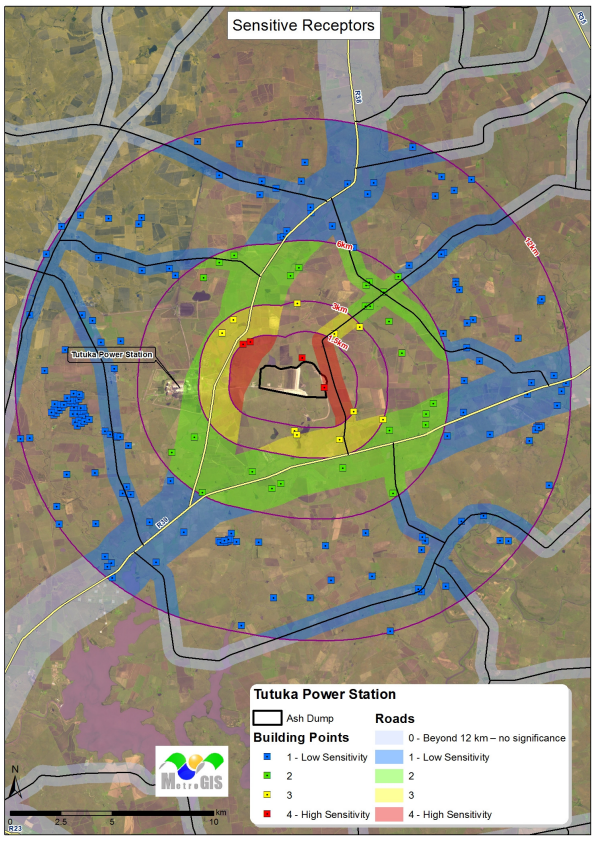

Figure 7.11: Location of possible sensitive receptor areas, i.e. farmsteads and roads.

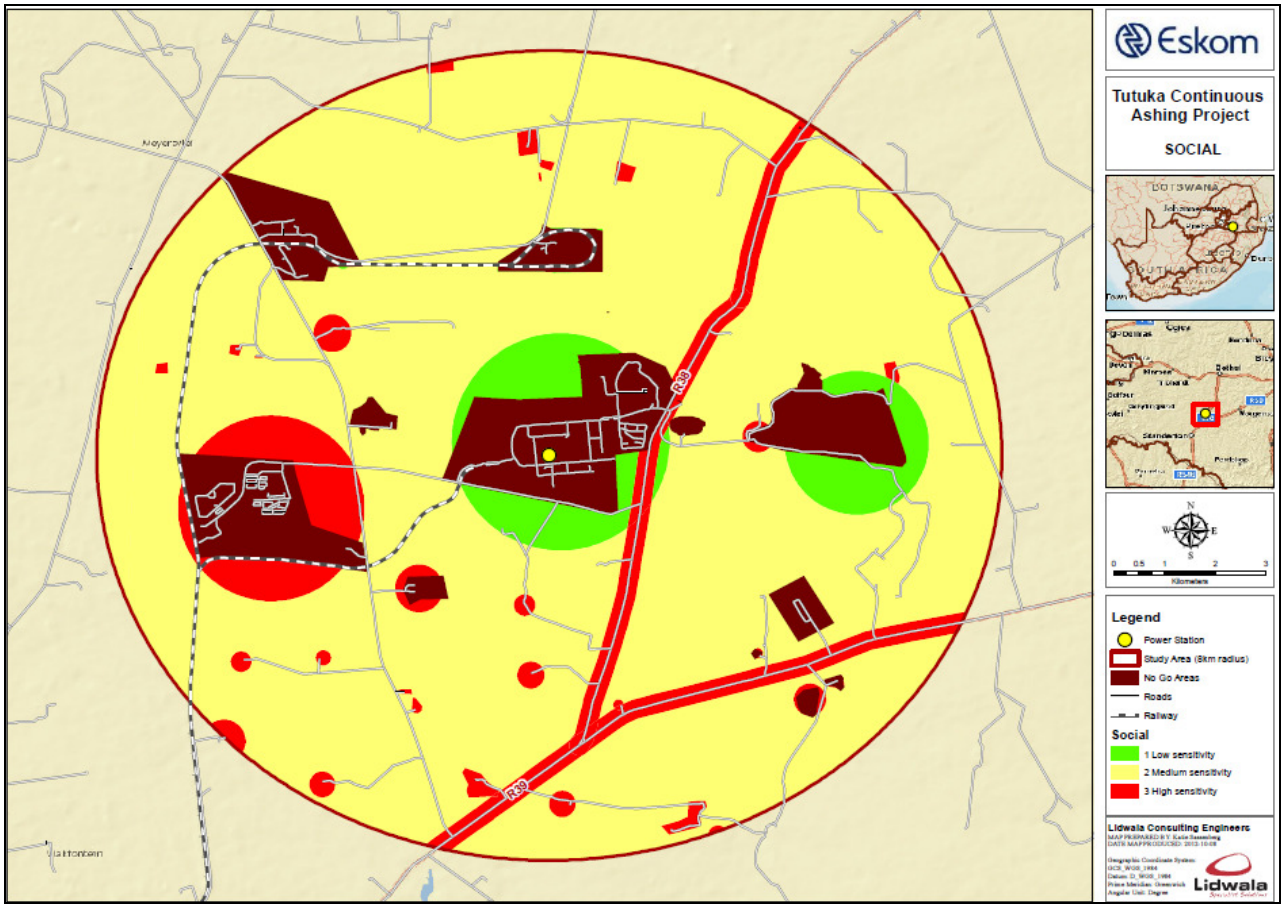

Figure 7.12: Social Sensitivity Map

- ***Air***

The predominant wind direction is east-south-easterly with a ~16% frequency of occurrence. Winds from the south-western sector are relatively infrequent occurring <4% of the total period. Calm conditions (wind speeds < 1 m/s) occur for 9.9% of the time. Winds from the nothwestern sector increases during day-time conditions. During the night-time an increase in east-southeast flow is observed with a decrease in westerly air flow. During summer months, winds from the east-southeast become more frequent, due to the strengthened influence of the tropical easterlies and the increasing frequency of occurrence of ridging anticyclones off the east coast. There is an increase in the frequency of calm periods (i.e. wind speeds <1 m/s) during the winter months of 19.1% with an increase in the westerly flow.

PM_{10} concentrations are likely to exceed the NAAQS 2015 limit of 75 µg/m³ for ~1000m from the source. $PM_{2.5}$ concentrations are likely to exceed the NAAQS 2030 limit of 25 µg/m³ for ~300m from the source. The predicted elemental concentrations from the windblown ash material is predicted to exceed the most stringent effect screening levels up to a distance of 3500m from the source. With water sprays in place for dust suppression, these impacts will reduce significantly. The potential for impacts at the sensitive receptors will also depend on the wind direction and speed which could not be accounted for in this assessment.

If unmitigated, the windblown dust from the ash disposal facility may result in exceedances of effect screening levels up to a distance of 3 500 m from the source with exceedances of PM_{10} NAAQ limits up to a distance of 1 000 m. As the background ambient PM_{10} ground level concentrations may also be elevated in the area it is recommended that the ash disposal facility be mitigated in order to minimise the impacts from this source on the surrounding environment. **Figure 7.13** shows the air quality sensitivity map.

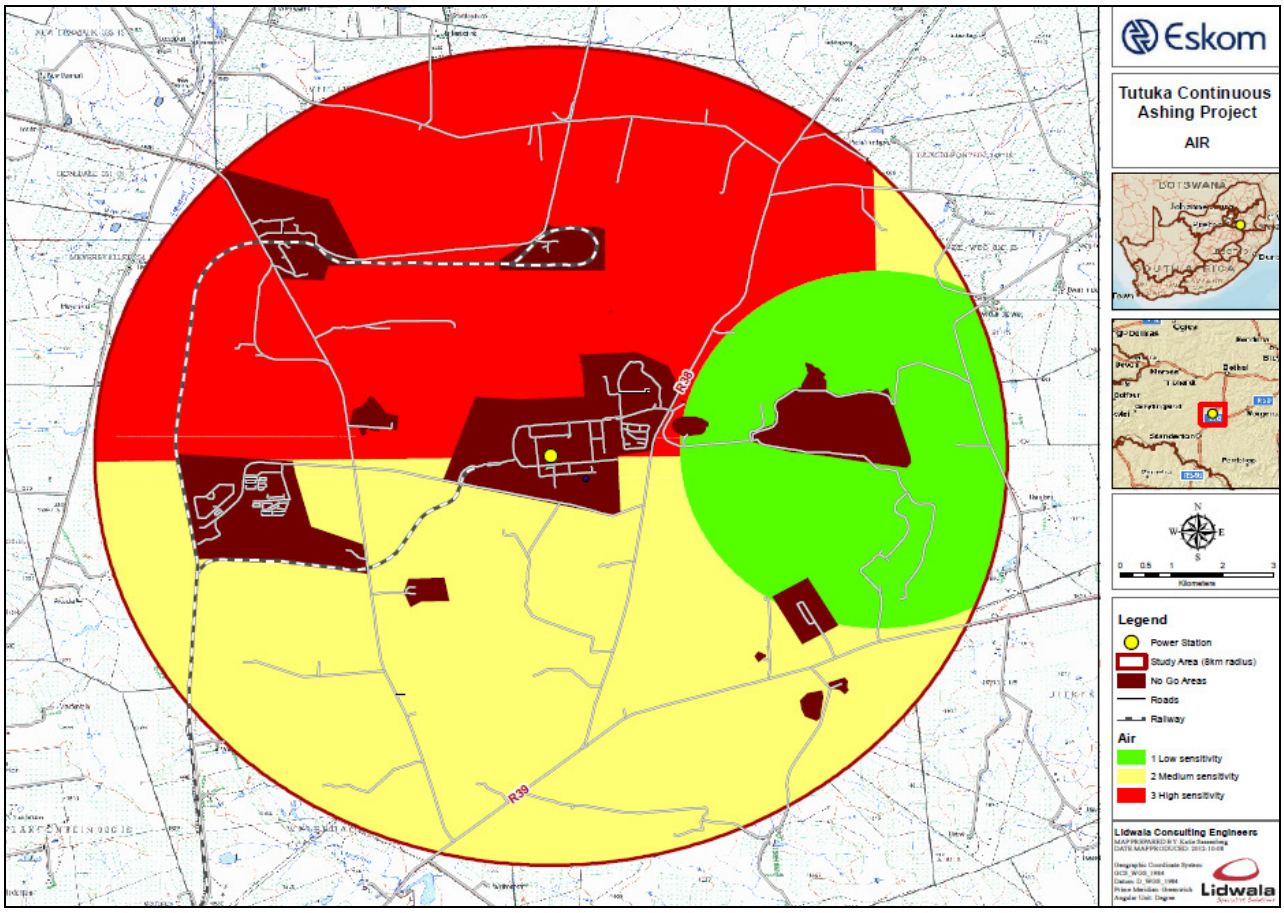

Figure 7.13: Air Quality Sensitivity Map

7.4.3 Final Screening Results

Figure 7.14, 7.15 and **7.16** are the results of overlaying all the specialist input maps together, thereby illustrating the overall environmental sensitivity of the area.

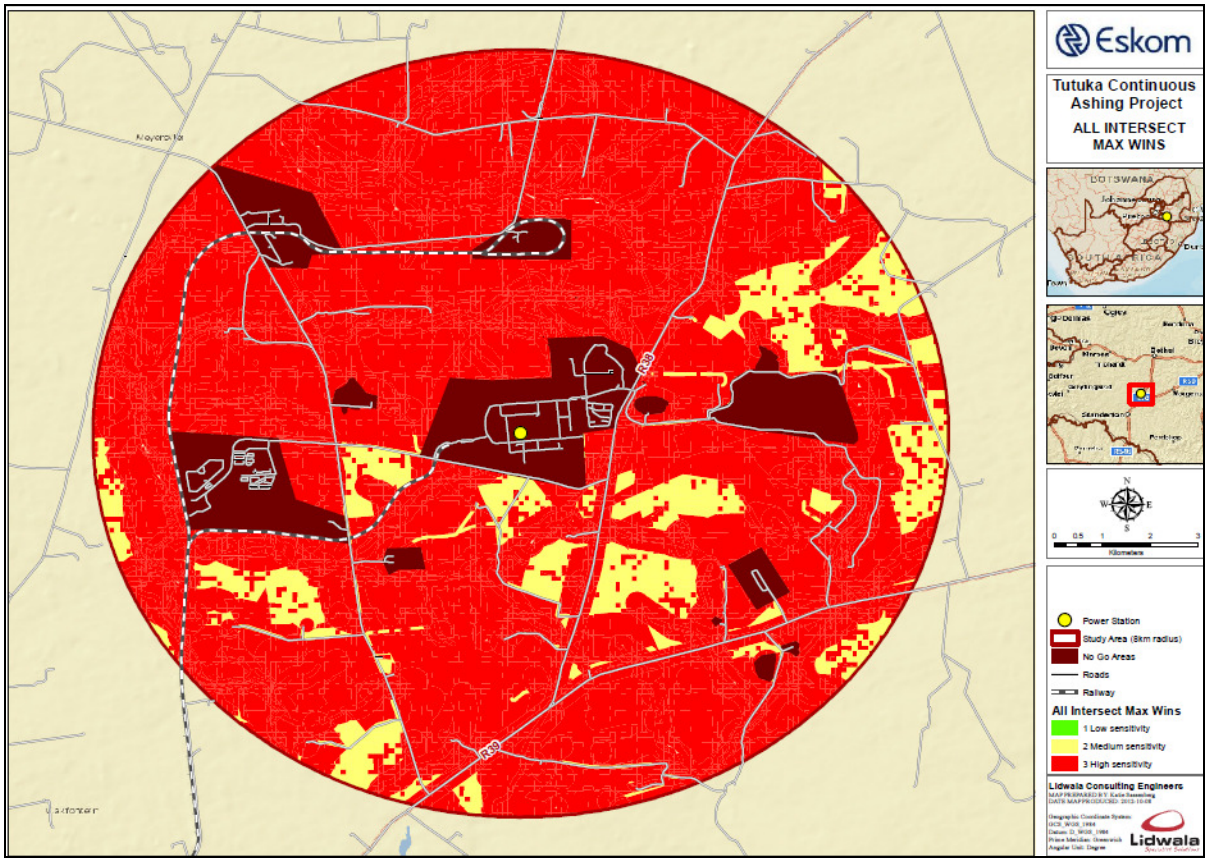

Figure 7.14: Overall Environmental Sensitivity (Max Wins)

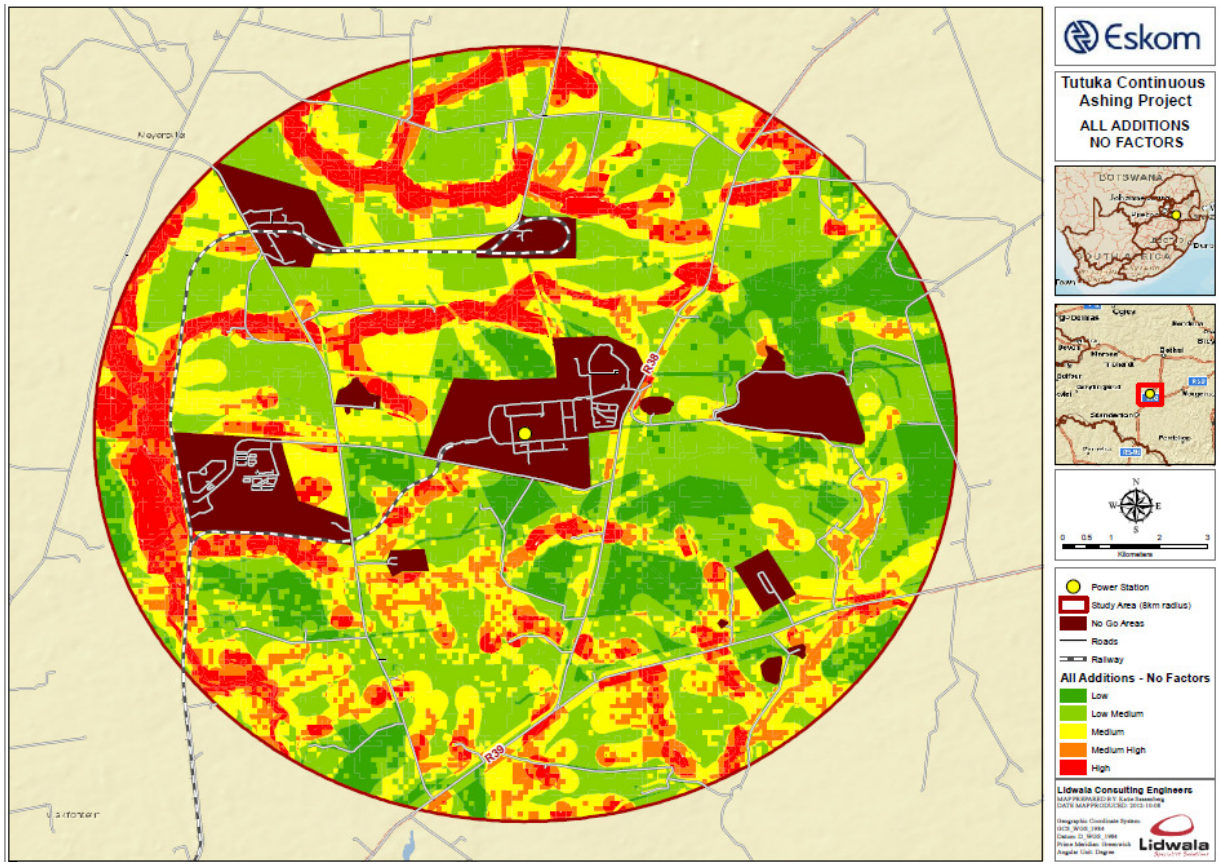

Figure 7.15: Overall Environmental Sensitivity (no factor)

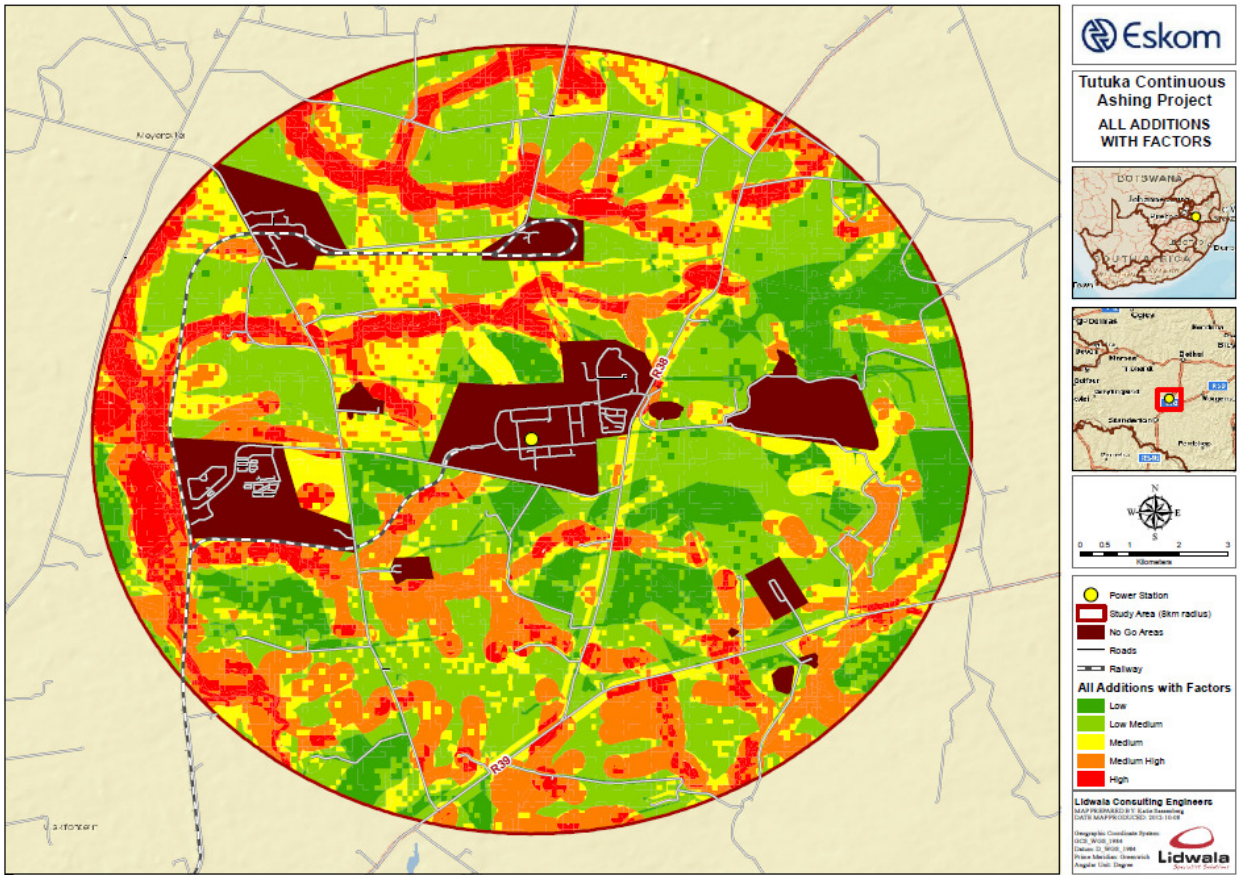

Figure 7.16: Overall Environmental Sensitivity (with adjustment factor)

Utilising the straight forward addition analysis (**Figure 7.15**) it can be concluded that the overall sensitivity of the study area falls within the Low to Medium sensitivity range with only small areas being considered of Medium-High or High sensitivity. However, if one utilises the "max wins" (**Figure 7.14**) mapping technique, where any area marked as sensitive is kept sensitive, it is clear that the majority of the study area can be deemed to be sensitive in one way or form with only a few medium sensitivity areas scattered across the study area.

The above maps were then utilized in order to determine the least sensitive areas of sufficient size that could be considered as alternative sites for the proposed ash disposal facility at Tutuka Power Station. Alternative sites are required to be at least 759 ha in size and are preferably required to fit within the low to low - medium sensitivity areas only and preferably without disturbing any existing infrastructure (**Figure 7.17**).

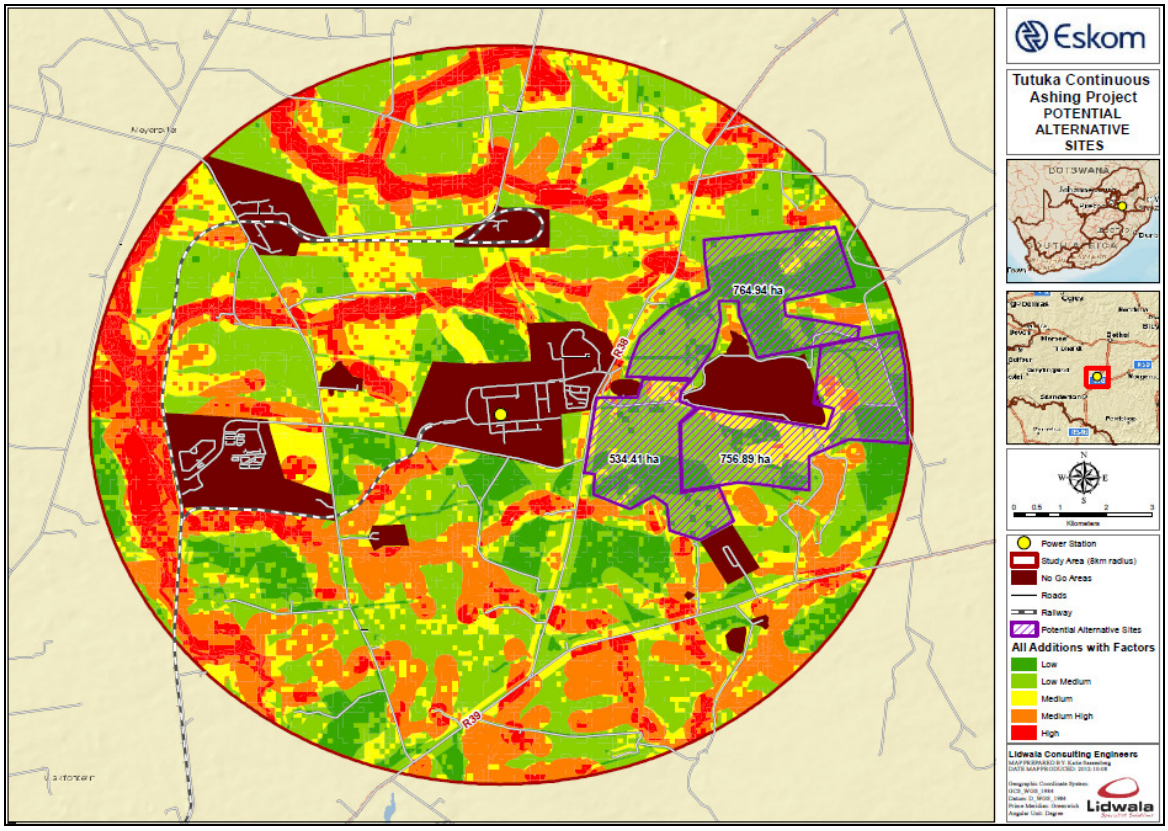

Figure 7.17: The potential areas, within the study area, large enough to accommodate the required area for the ash disposal facility (overlain on sensitivity map).

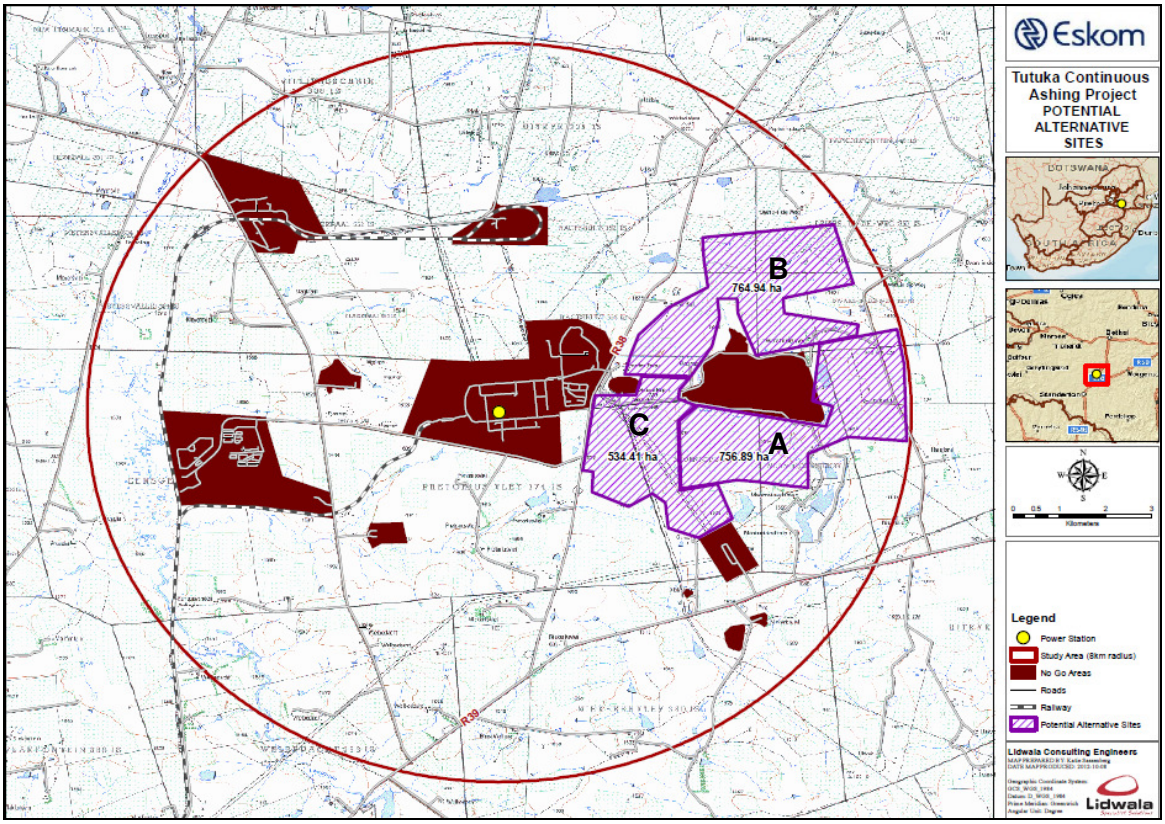

Figure 7.18: The three potential suitable alternative sites that can be evaluated and assessed in the EIA studies (overlain on 1 in 50 000 topographic map).

From the above analysis, three alternative sites can be identified as potentially suitable for the continuous ashing activities required at Tutuka Power Station. It is still noted that the proposed ash disposal facility should be placed as close to the existing ashing activities as possible to ensure that existing impacts are kept together and to limit the impact of associated linear infrastructure such as power lines and conveyor belts.

7.5 Conclusion

This chapter discussed the methodology of how the three potential site alternatives where identified through the use of sensitivity mapping during the scoping phase. These three alternative sites (or combinations thereof) will be investigated and assessed through detailed specialist studies during the EIA phase of the project.

Mitigation and layout alternatives will also form part of the EIA phase, during which a more in depth study will be undertaken as to the optimal mitigation of all potential significant environmental impacts.