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DOCUMENT NUMBER	ISSUE	SYSTEM
W8451/21	0.5	Wolf-Skilpad-Grassridge 132kV Transmission Line

SUBJECT

Electromagnetic Interference Risk Assessment - Wolf-Skilpad-Grassridge 132kV Transmission Line

KEYWORDS

132kV Transmission line, mitigation, interference

DISTRIBUTION

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SUMMARY

The study area is <50m from an existing 132kV transmission line that is to be decommissioned. As no known radio frequency interference (RFI) is experienced due to the existing 132kV transmission line, the risk of RFI from the proposed new transmission line is extremely low.

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1. BACKGROUND

The study site is on both sides of an existing 132kV transmission line (50m either side) and no RFI sensitivity was flagged in the environmental screening report [1]. The current 132kV transmission line will be decommissioned upon completion and commissioning of the proposed Wolf-Skilpad-Grassridge 132kV transmission line. The new Wolf-Skilpad-Grassridge 132kV transmission line is proposed to be constructed in a new servitude directly adjacent to the existing line (±31m from the existing centreline).

2. ACRONYMS

Acronym	Definition
RFI	Radio Frequency Interference

Table 1: Acronyms

3. AIM

The aim of this document is to provide supporting information in lieu of a detailed risk assessment as the screening report did not indicate a RFI assessment requirement

4. REFERENCED AND APPLICABLE DOCUMENTS

[1] SCREENING REPORT FOR AN ENVIRONMENTAL AUTHORIZATION AS REQUIRED BY THE 2014 EIA REGULATIONS – PROPOSED SITE ENVIRONMENTAL SENSITIVITY – 09/11/2021

5. LOCATION

Figure 1: Area map showing the proposed Transmission line route

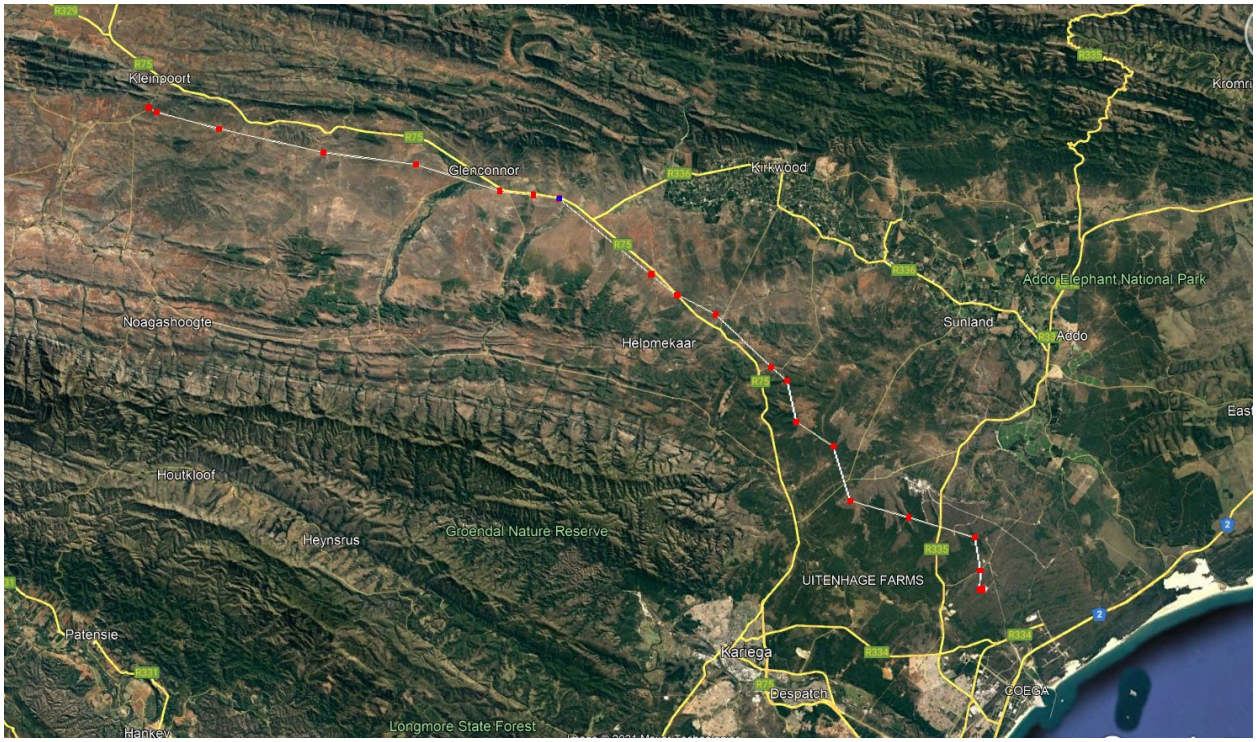

Figure 2: Local map showing the proposed transmission line route

6. TECHNICAL CONSIDERATIONS

6.1 POTENTIAL NOISE SOURCES

In a high voltage environment, the radio frequency interference sources are generally sparking and arcing related. Corona from the lines are generally not associated with high frequency (above 30MHz) interference. Gap-type corona interference can extend to beyond 1GHz. Listed below is the typical RFI generating mechanisms:

- Corona discharge at the surface of the conductors, insulators and fittings;
- Sparking at the insulators;
- Sparking at mounting hardware and contacts; and
- Micro arcing.

Weather conditions has a 10 to 20 dB impact on the noise source with corona being worst during wet weather conditions and sparking/ arcing being worst during dry weather conditions.

6.2 CORONA DISCHARGE

Corona discharge occurs when the electrical field close to a conductor is higher than the electrical withstand capability of the air, resulting in an electrical break down. The breakdown occurs at a local level, hence no flash over will occur. The discharge energy will be fairly low and the frequency band of concern is also low.

Any equipment, fittings and insulators energised to high voltage may generate corona.

Corona is a normal effect and is worst during wet weather conditions.

6.3 SPARKING

Sparking occurs when there is sufficient voltage (> withstand capability of air) to cause electrical breakdown of the air between two metallic objects (avalanche ionisation) and the development of an arc. At least one of the metallic components is electrically floating. This is not necessarily a single event as the components can be charged again after the discharge. The discharge energy is much higher than for corona and the frequency range extends into the GHz domain.

Sparking (gap discharge) is mostly associated with bad contacts and inferior installation practises.

Sparking is worst during dry weather conditions.

6.4 ARCING

Arcing is when ionised air forms a conductive current path between an earthed component and component at line potential. Arcing is associated with a fault condition, of short duration and the arc will normally be interrupted by the protection circuits.

6.5 SWITCHING EVENTS

Switching events such as capacitor bank switching will cause voltage and current transients with frequency components into the GHz band due to steep dV/dt and dI/dt gradients.

Switching events are expected to be on par with current operations and no additional RFI risk is anticipated.

7. PATH LOSS CALCULATION

As no specific RFI sensitive infrastructure has been identified, path loss studies were not required.

8. MITIGATION REQUIREMENTS

No additional RFI mitigation is required when following the standard design and installation practises and using high quality components.

9. CONCLUSION

Corona, sparking and arcing are undesired to avoid power losses and infrastructure damage. Voltage gradients are therefore controlled by design, quality components and good installation practises.

As no RFI sensitive infrastructure has been implicated, no special design techniques or additional mitigation measures would be required.

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