



## SENSITIVITY MAPPING

Environmental sensitivity mapping provides a strategic overview of the environmental, cultural and social assets in a region. The sensitivity mapping technique integrates numerous datasets (base maps and shapefiles) into a single consolidated layer making use of Geographic Information System (GIS) software and analysis tools. Environmental sensitivity mapping is a rapid and objective method applied to identify areas which may be particularly sensitive to development based on environmental, cultural and social sensitivity weightings – which is refined by specialists' input within each respective specialist field based on aerial or ground-surveys. Therefore, the sensitivity mapping exercise assists in the identification of sensitive areas within and surrounding the application area. Table 1 provides an overview of the sensitivity ranking system and Figure 1 provides a visual representation of the combined sensitivity mapping approach.

This sensitivity mapping approach allows for the identification of lower risk areas for positioning the project infrastructure whilst protecting identified sensitive environmental areas/ features through more rigorous mitigation (where possible). Areas identified as no-go would be fully excluded from any project related development regardless of the level of mitigation put forward. Furthermore, environmental sensitivity is used to aid in decision-making during consultation processes, forming a strategic part of environmental assessment processes.

The compilation of the combined sensitivity map for Cluster 2 has taken into consideration the individual ranking of sensitivity by the following respective specialist disciplines:

- Air quality & Health Risk;
- Geohydrology;
- Heritage (*Note: Heritage sites are not visible on the combined sensitivity map due to the small scale of these sites. Please refer to individual heritage sensitivity maps*);
- Hydrology (1:100-year floodlines);
- Noise;
- Social;
- Soils and Agriculture;
- Terrestrial Biodiversity (including Aquatic and Wetlands); and
- Visual.

The individual sensitivity maps for the above mentioned studies are presented in Figure 2 to Figure 20 and Figure 21 presents the risk based consolidated sensitivity/ composite map which provides an overlay of all sensitivity areas however each specialist discipline sensitivities have various management and mitigation measures. Work within the various sensitivity rankings must be managed according to the EMP as well as the recommendations in the individual specialist reports included in the EIA Report.

The application area contains a range of low, medium and highly sensitive areas as well as two no-go areas which are as follows:

1. The Beatrix tailings storage facility has been designated as a no-go area due to the limitations of any development on the facility (damage to this facility would be unacceptable).
2. An area assigned a Very High terrestrial theme sensitivity has been delineated on the farm Adamsons Vley 655 (Portion 0) based on the presence of a protected faunal species. Previous attempts to relocate this species have been unsuccessful and *in situ* conservation remains the preferred outcome. This area should exclude any surface development infrastructure. Consultation and communication with the lead or implementing agent for the sensitive species, Endangered Wildlife Trust (EWT), must be implemented before any construction proximal to the



specific area. Monitoring and Management of the species will be crucial throughout the lifetime of the project and must be discussed and implemented in conjunction with the EWT.

The detailed specialist assessments of the receiving environment within the well and pipeline transects have allowed specific mitigation measures to be put forward for these areas including the high, medium, low and least concern areas and development within the transects must comply with the EMPr. The areas **outside** of the well and pipeline transects have been assessed and ranked based on previous studies as well as desktop analysis (including lidar imagery where possible) and therefore **any activities outside of the ground-truthed transects must follow a risk-based approach to determine what additional measures, if any, must be implemented**. For any minor<sup>1</sup> infrastructure required outside of the well and pipeline transects, a risk-based approach will be undertaken based on the following methodology:

- Infrastructure required within low sensitive areas can be undertaken and managed in line with identified mitigation measures in the EMPr.
- Infrastructure located inside medium or highly sensitive sites on the sensitivity maps require a site-specific pre-commencement assessment. The pre-commencement assessment must address the sensitive aspects on site, as identified in the relevant specialist reports. The pre-commencement assessment must be compiled by the site Environmental Officer (EO) with a suitable environmental qualification and experience. All recommendations of the pre-commencement assessment must be clearly recorded and thereafter implemented on site. The completeness and adequacy of the pre-commencement assessment in respect of identifying and managing on site sensitivities must be included in the monthly ECO reports and annual independent audit reports.

Table 1: Sensitivity rating system for areas outside of the studied well and pipeline transects.

Sensitivity Rating	Description	Management Method
<b>Least Concern</b>	The inherent feature status and sensitivity is already degraded. The proposed development will not affect the current status and/or may result in a positive impact. These features would be the preferred alternative for infrastructure placement.	Comply with EMPr
<b>Low</b>	The proposed development will not have a significant effect on the inherent features status and sensitivity.	Comply with EMPr
<b>Medium</b>	The proposed development will negatively influence the current status of the feature.	Undertake risk-based assessment prior to final infrastructure placement and then comply with EMPr.
<b>High</b>	The proposed development will negatively significantly influence the current status of the feature.	Undertake risk-based assessment prior to final infrastructure placement and then comply with EMPr.
<b>No-Go</b>	No development permitted under any circumstances.	No development permitted under any circumstances.

<sup>1</sup> By “minor” it is important to note that the intention is not to provide for carte-blanch development of areas outside of the transects.

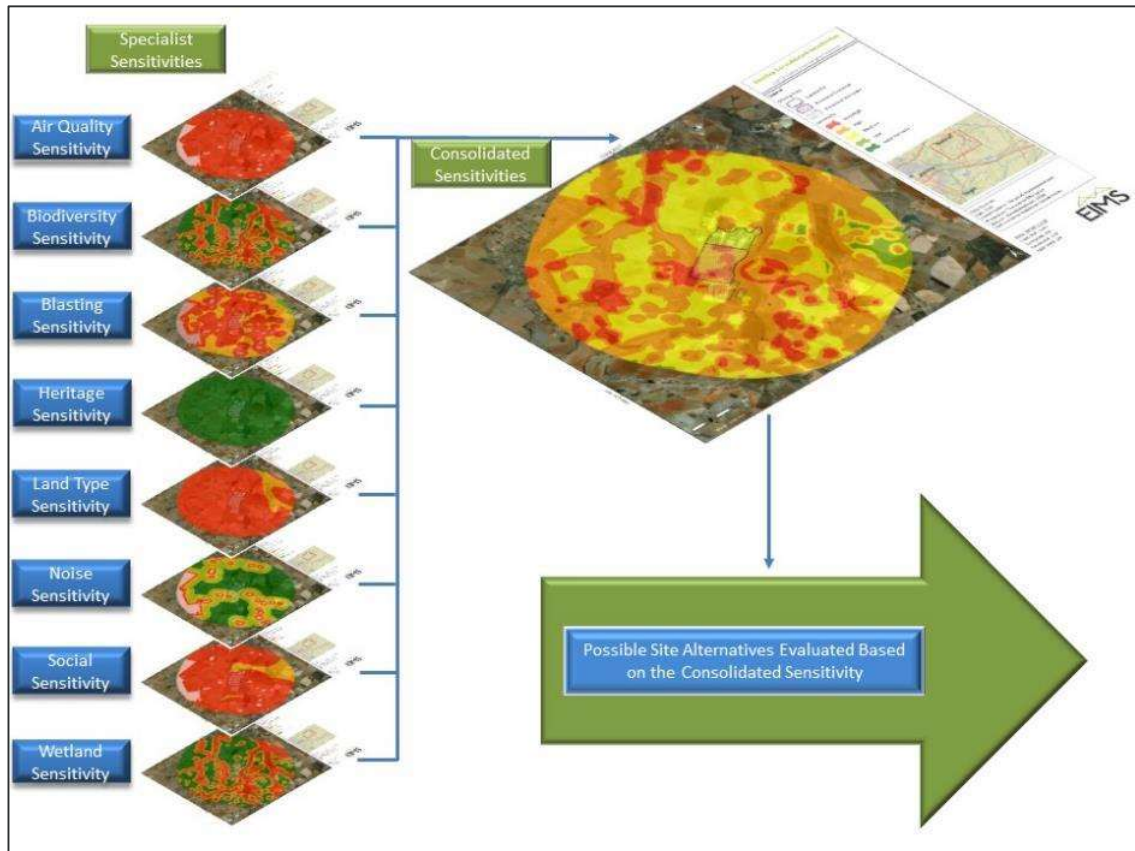


Figure 1: Example of combined sensitivity mapping approach.



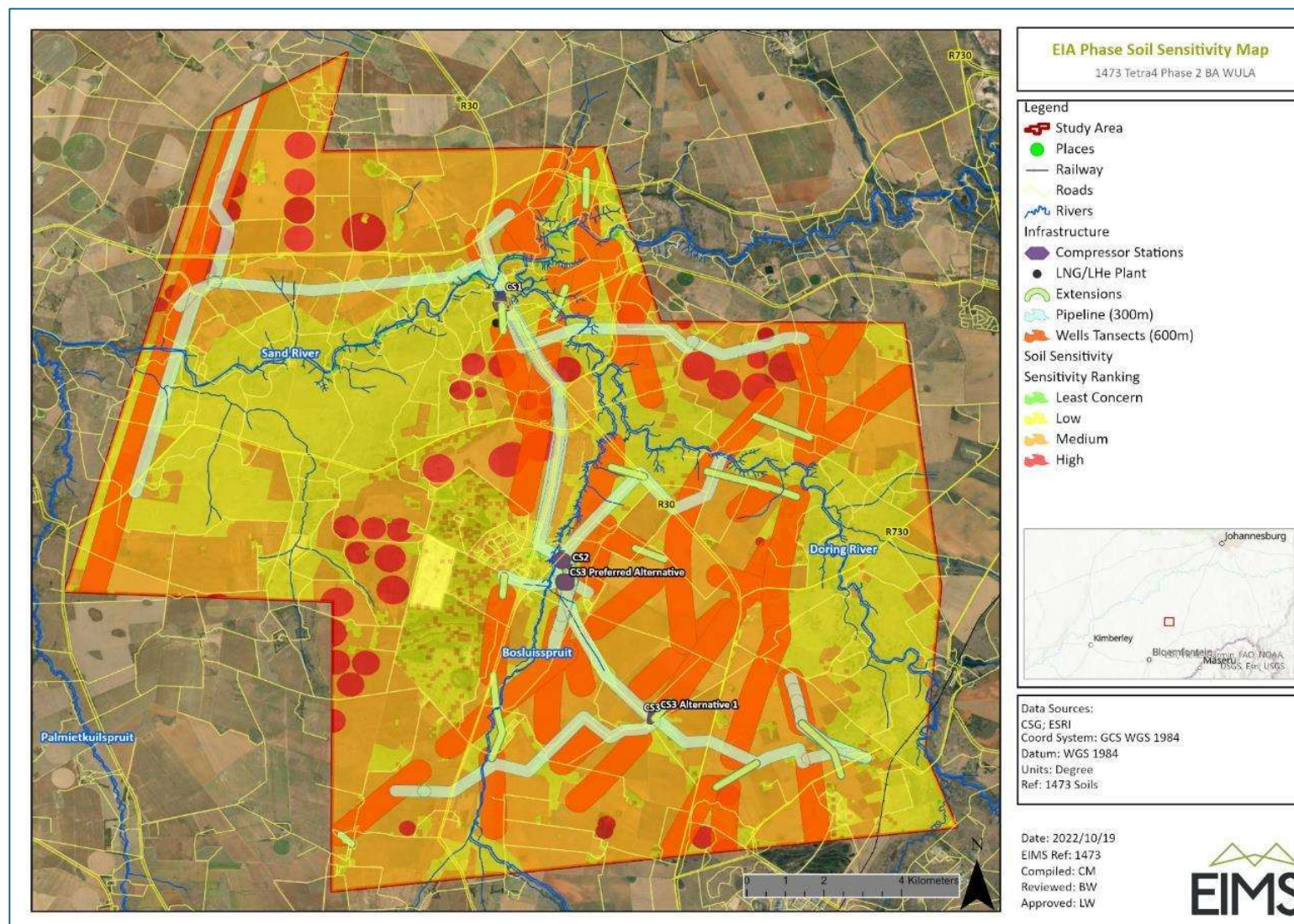


Figure 2: Soils and Agricultural Sensitivity Map.



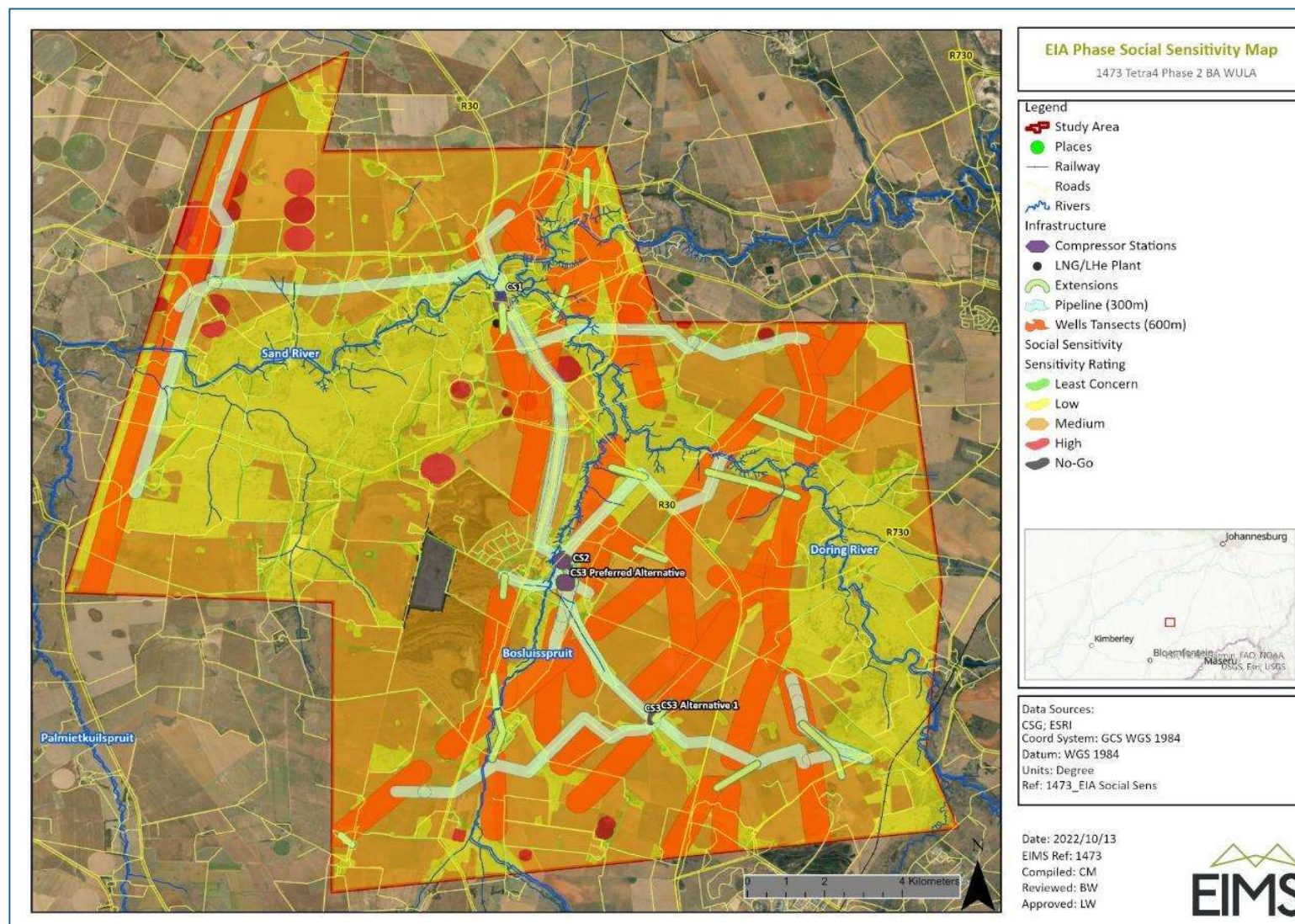


Figure 3: Social Sensitivity Map.



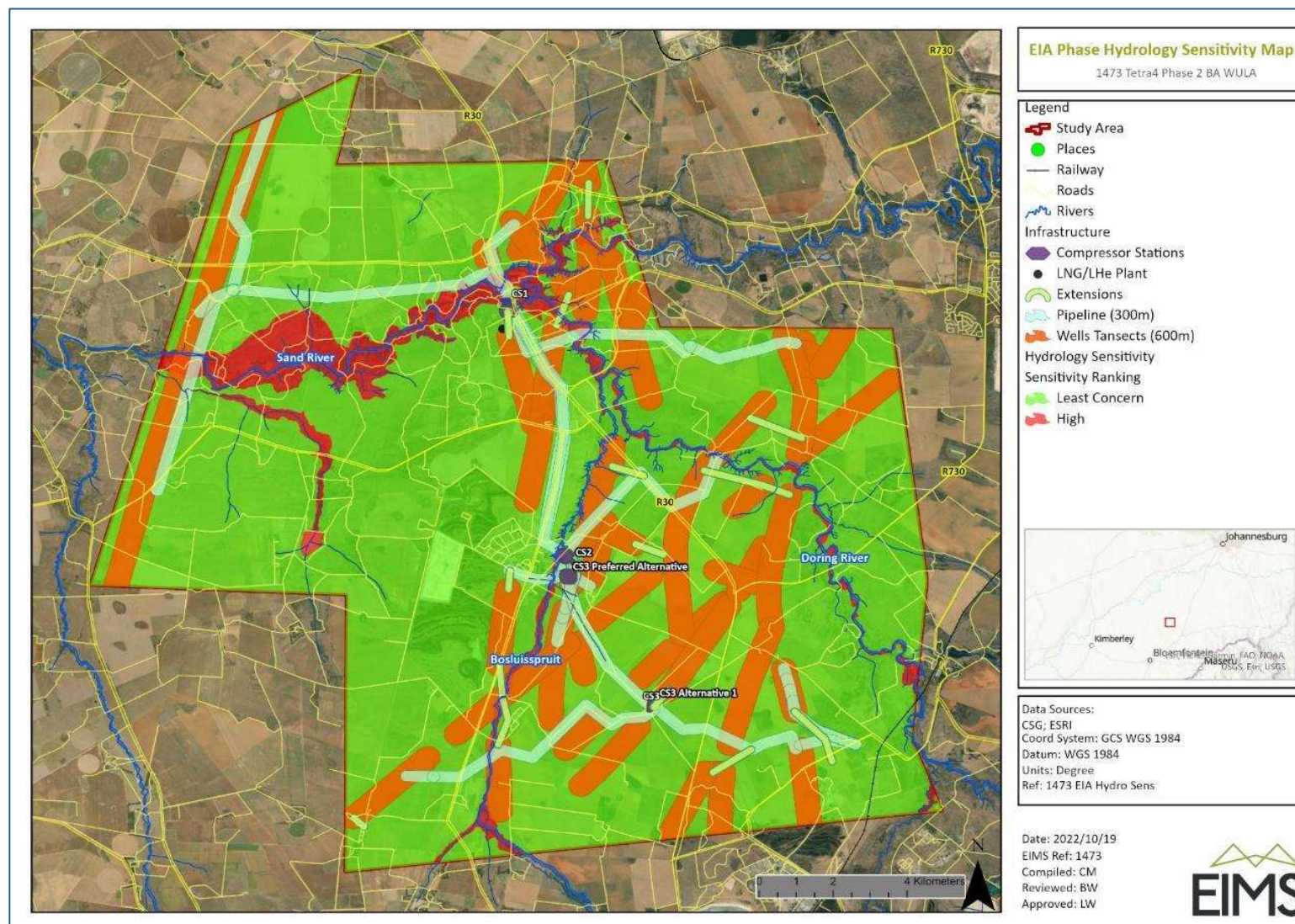


Figure 4: Hydrology sensitivity map (1:100-year floodlines).



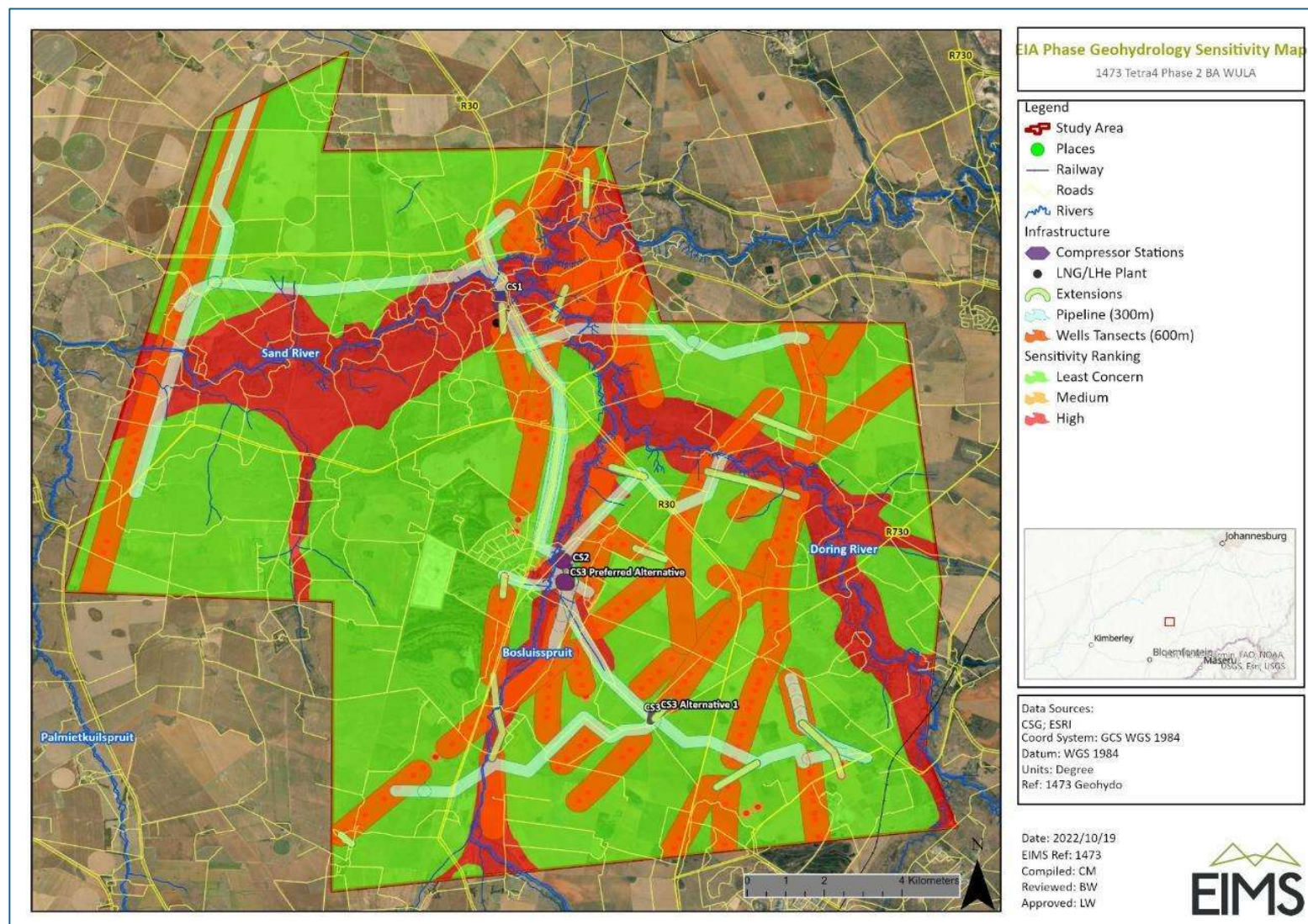


Figure 5: Geohydrology sensitivity map.



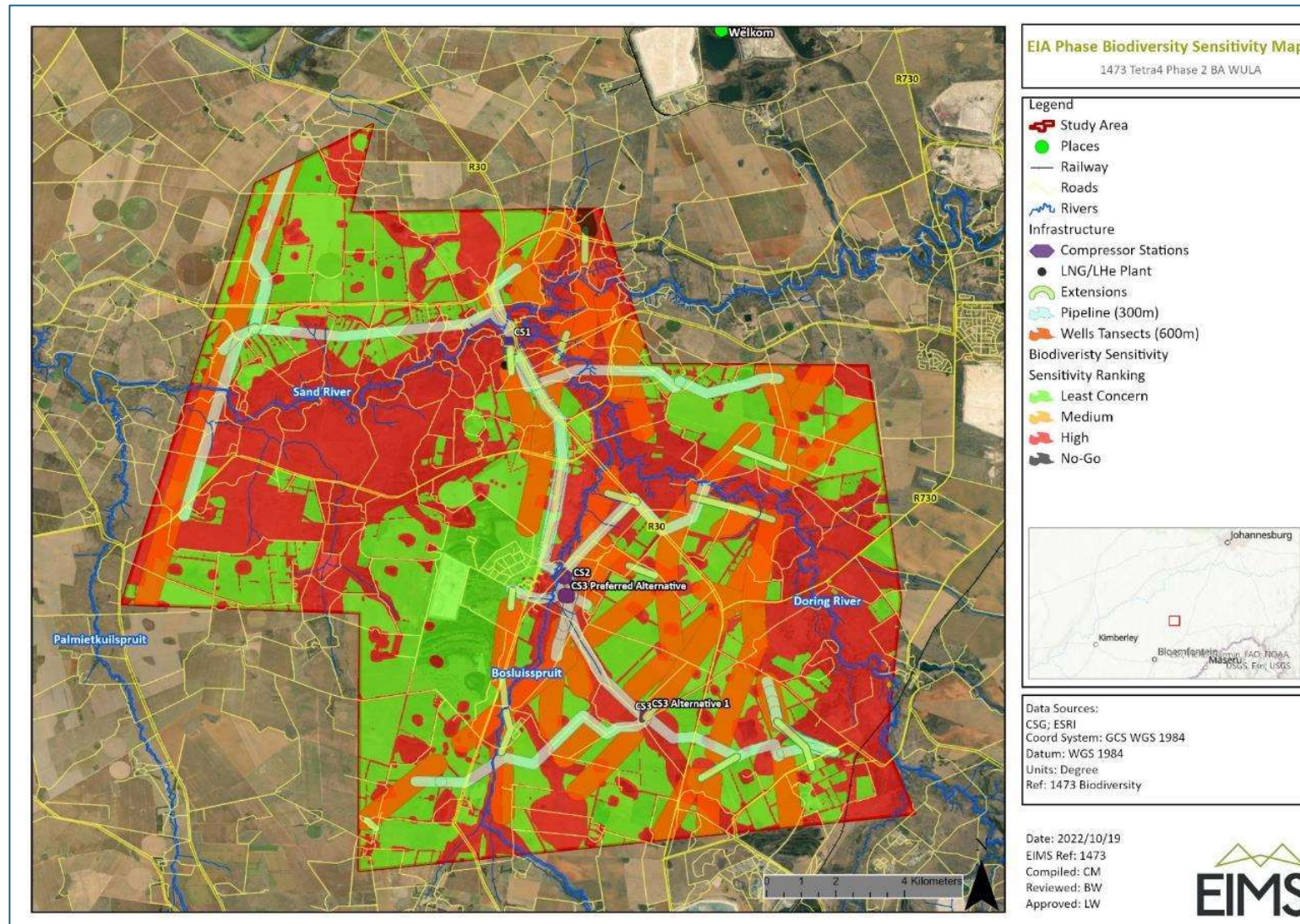


Figure 6: Biodiversity (ecology, aquatic and wetlands) sensitivity map.



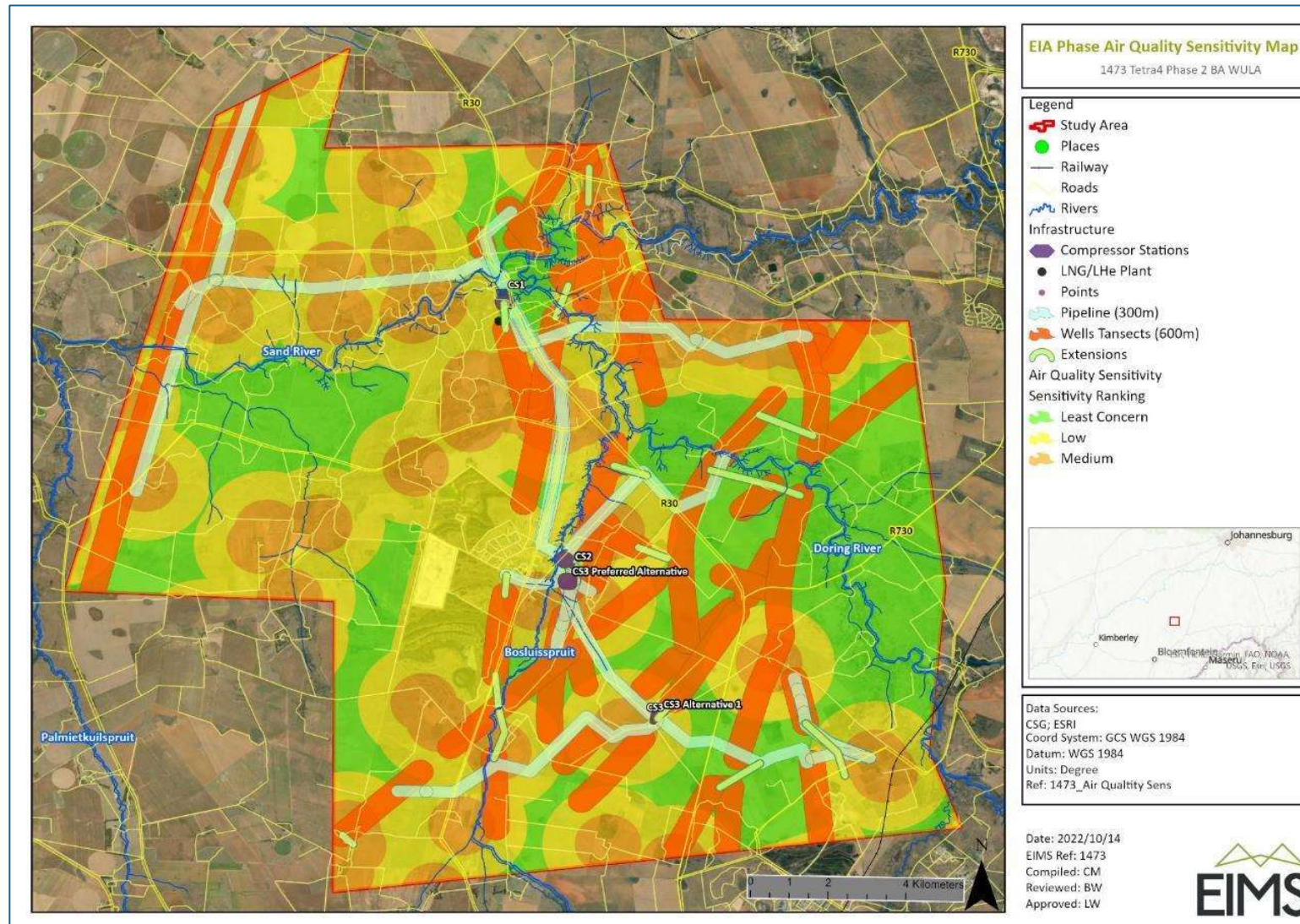


Figure 7: Air quality sensitivity map.



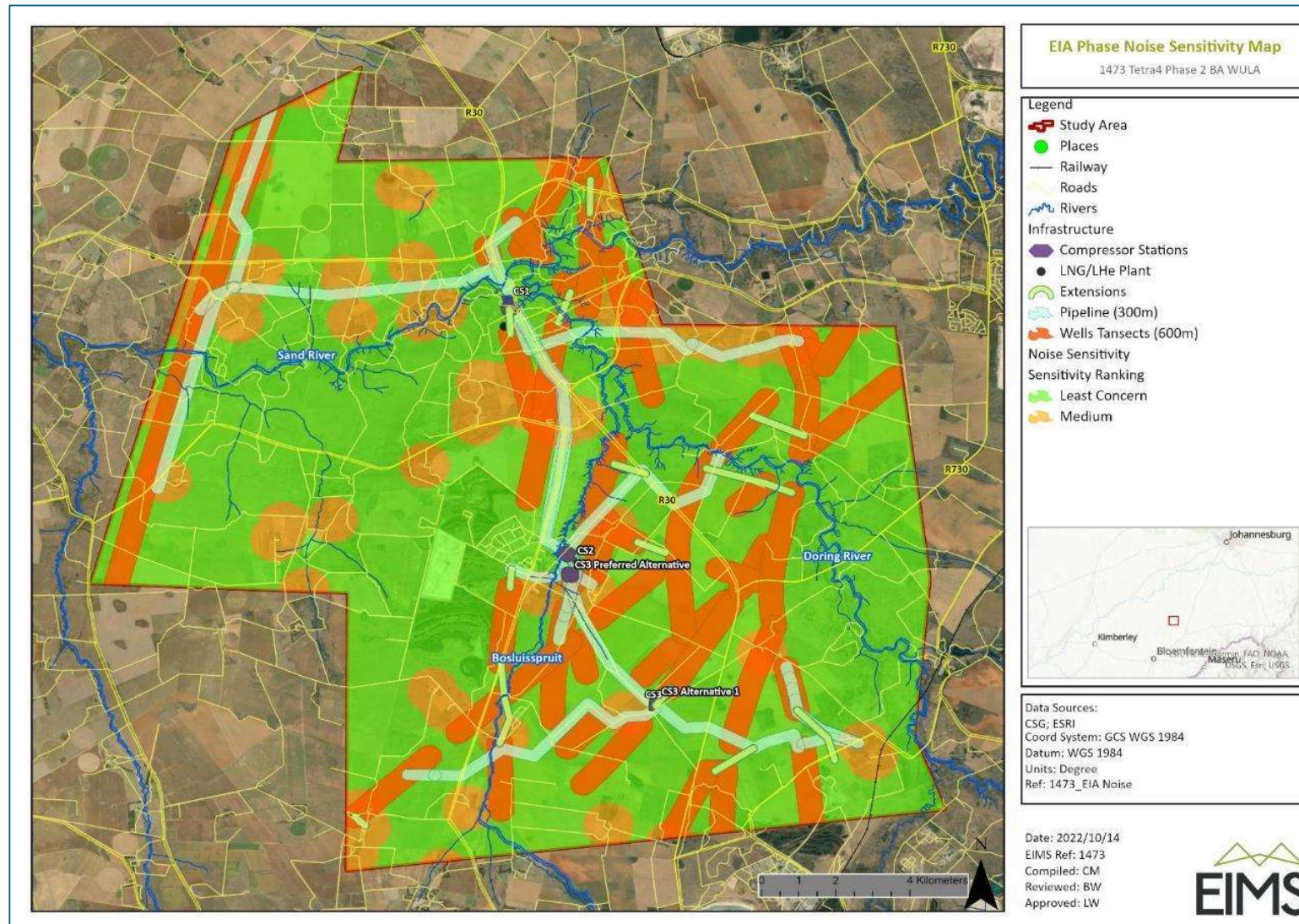


Figure 8: Noise sensitivity map.



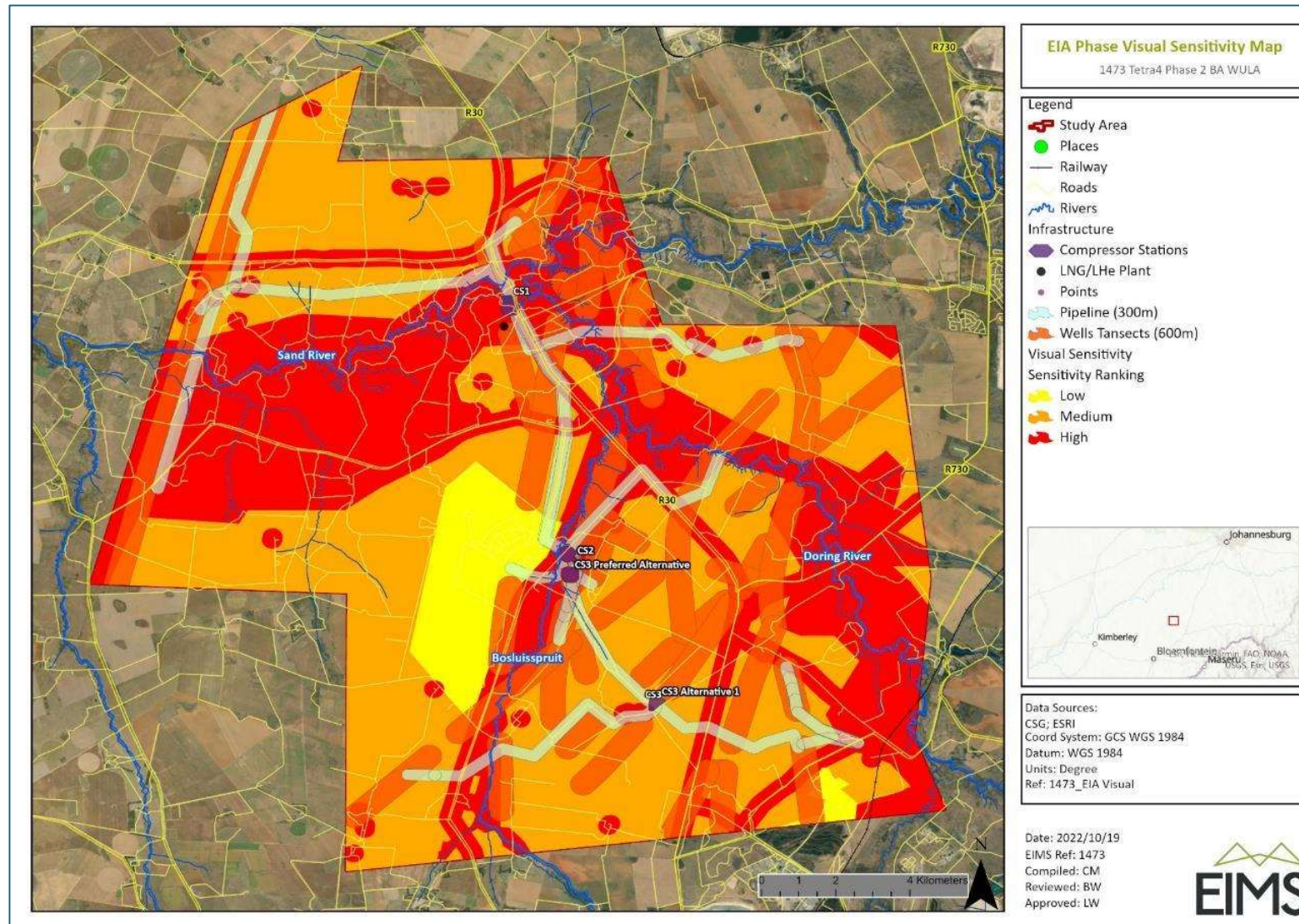


Figure 9: Visual sensitivity map.



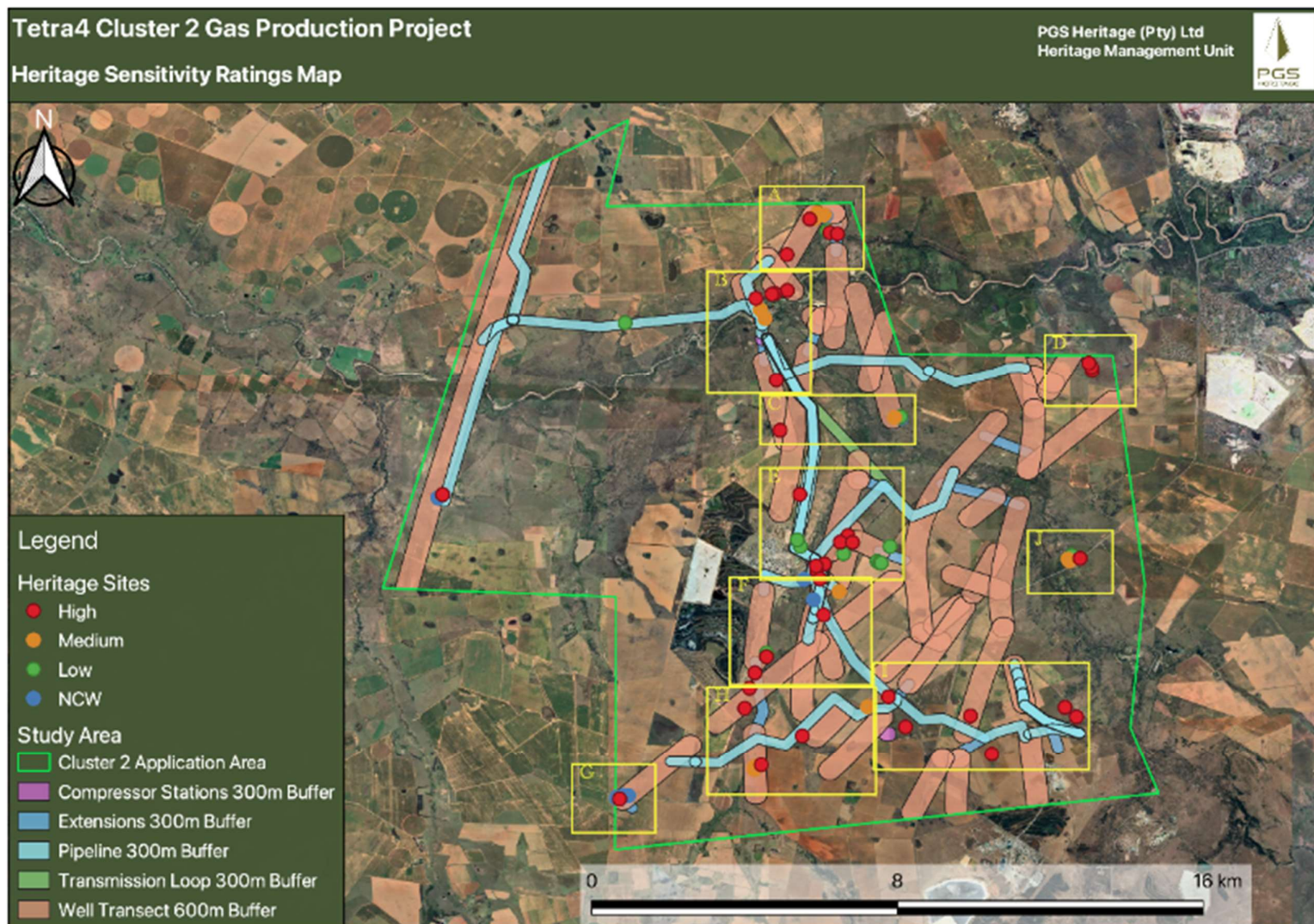


Figure 10: Map showing heritage sensitivity rating of identified heritage resources. See insets below.

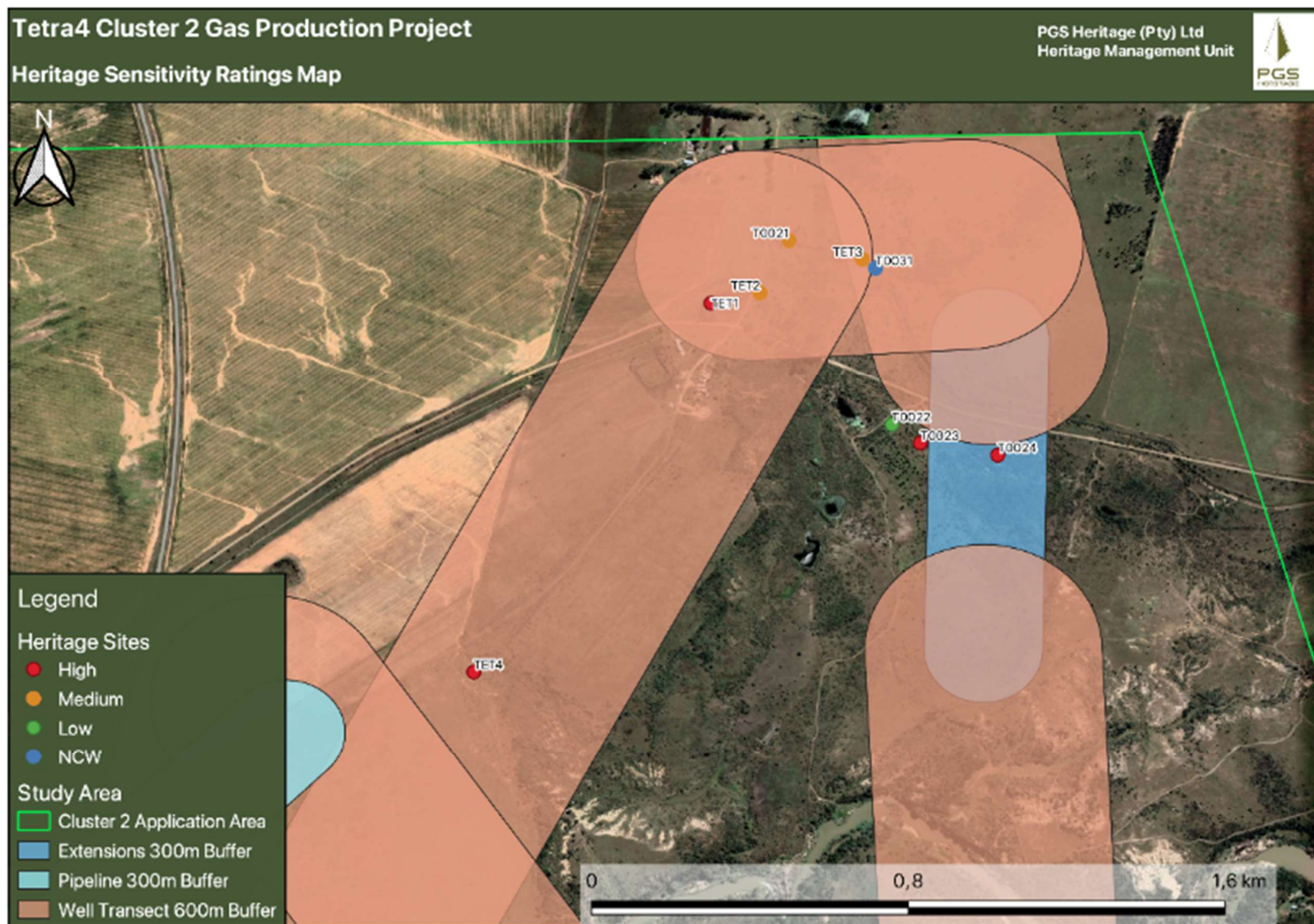


Figure 11: Heritage sensitivity rating of identified heritage resources. Inset A.



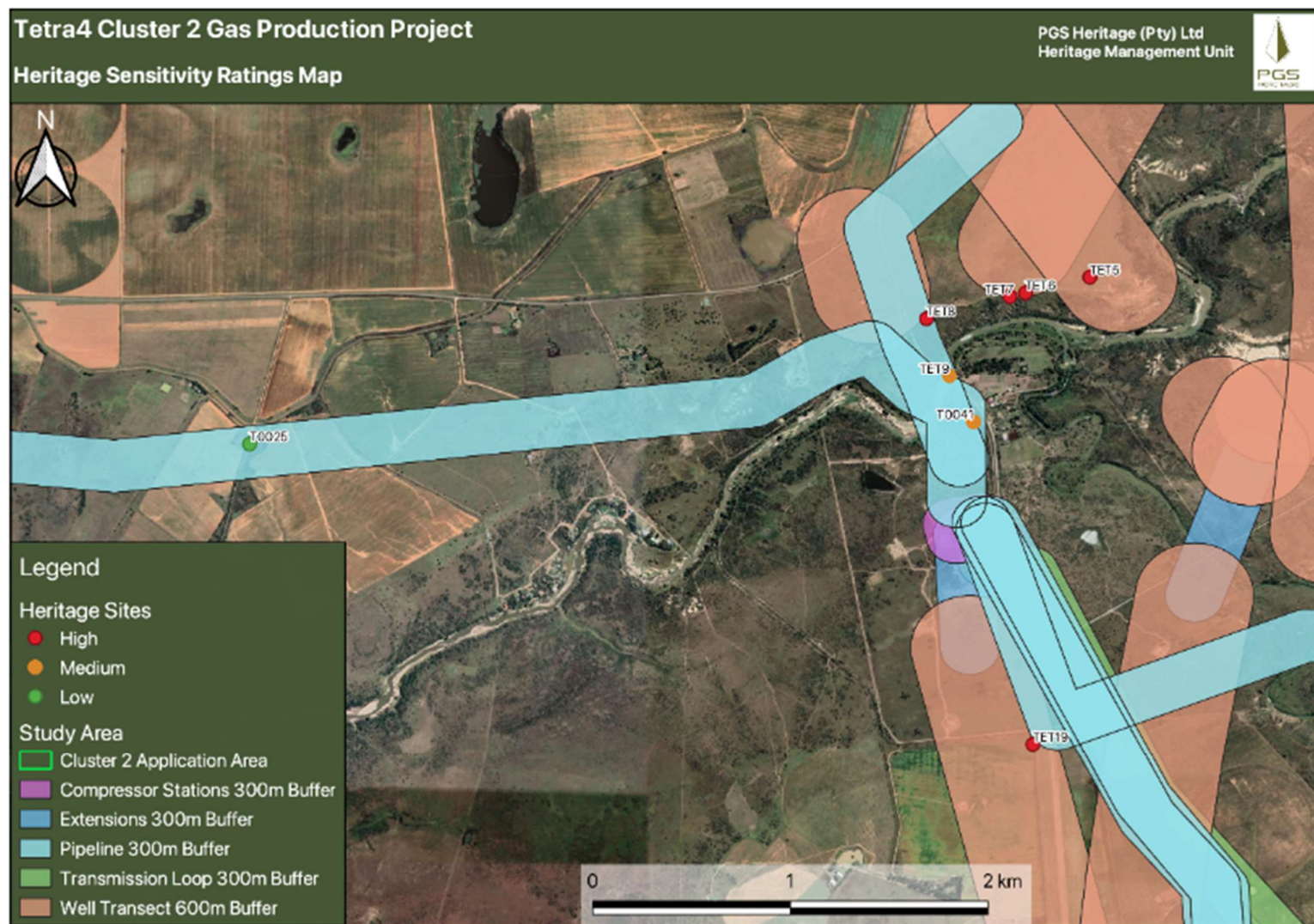


Figure 12: Heritage sensitivity rating of identified heritage resources. Inset B.

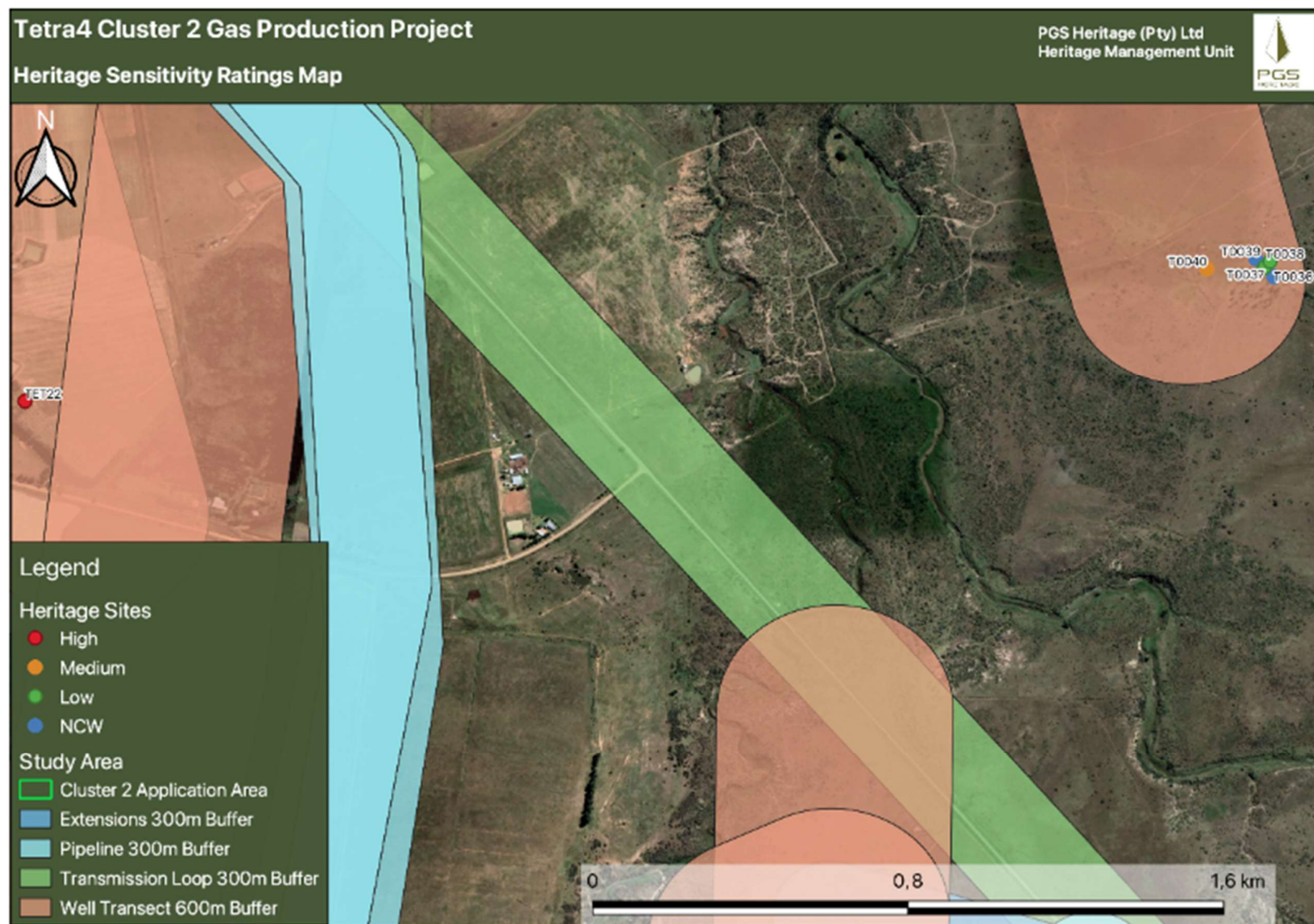


Figure 13: Heritage sensitivity rating of identified heritage resources. Inset C.



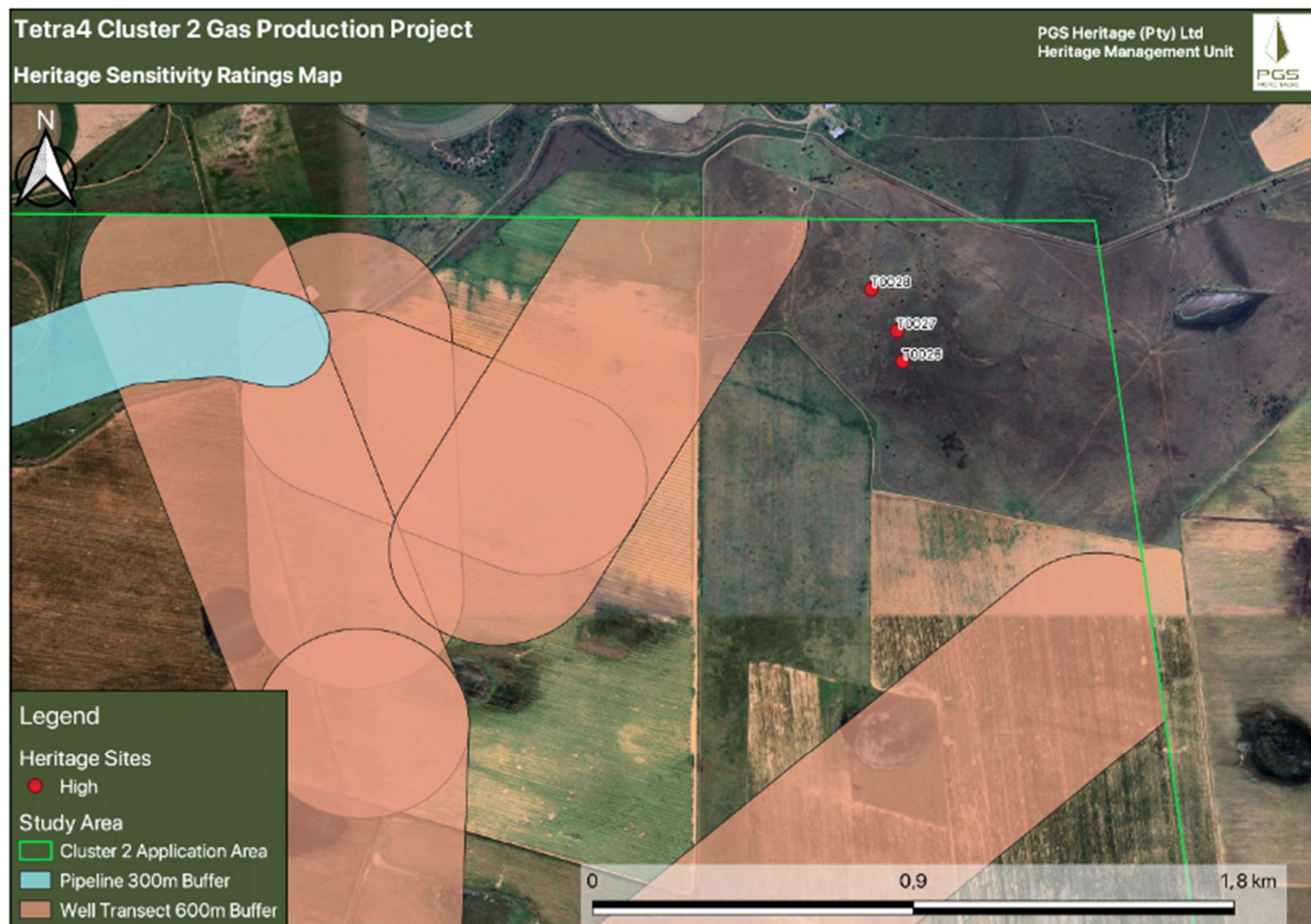


Figure 14: Heritage sensitivity rating of identified heritage resources. Inset D.



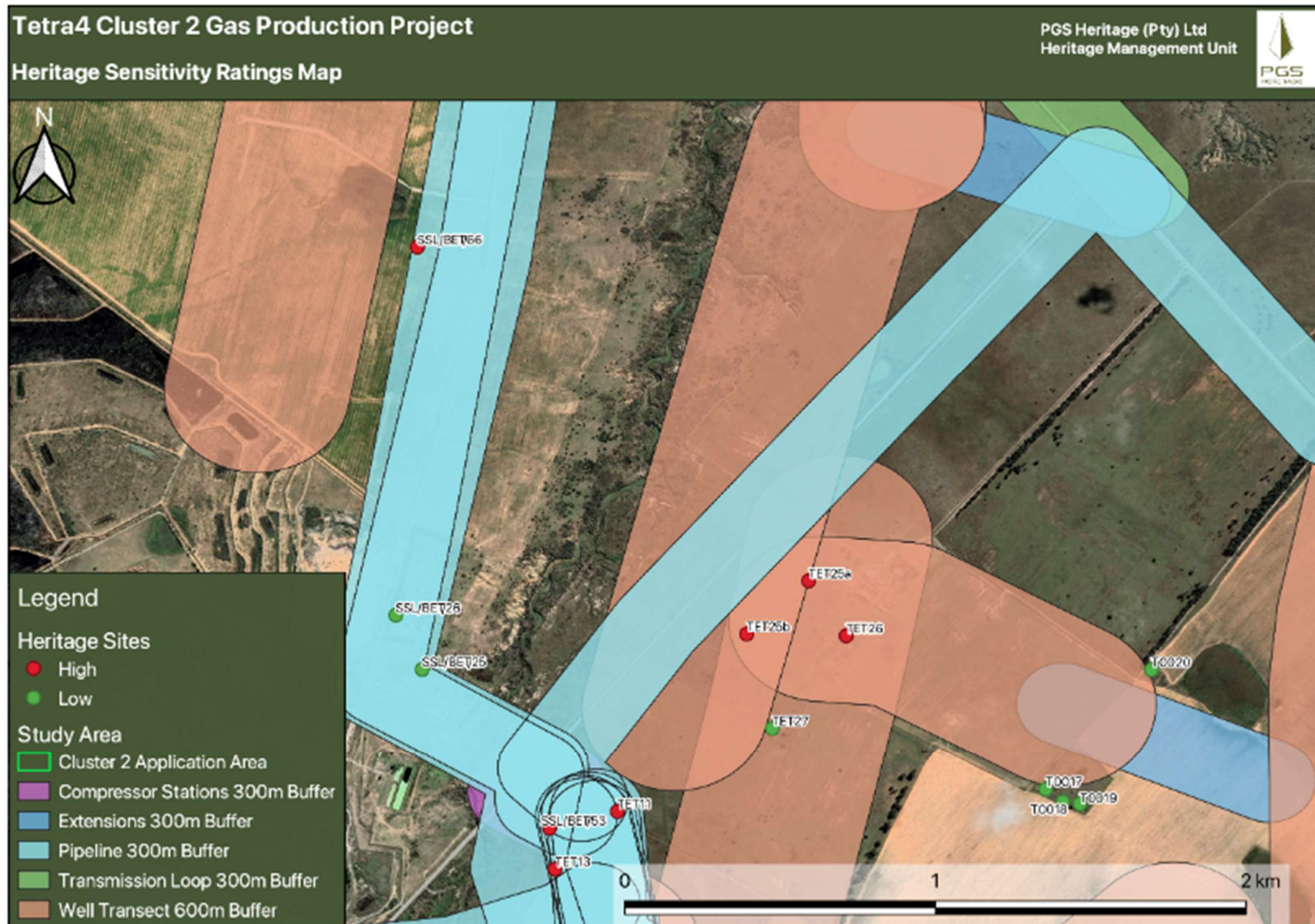


Figure 15: Heritage sensitivity rating of identified heritage resources. Inset E.

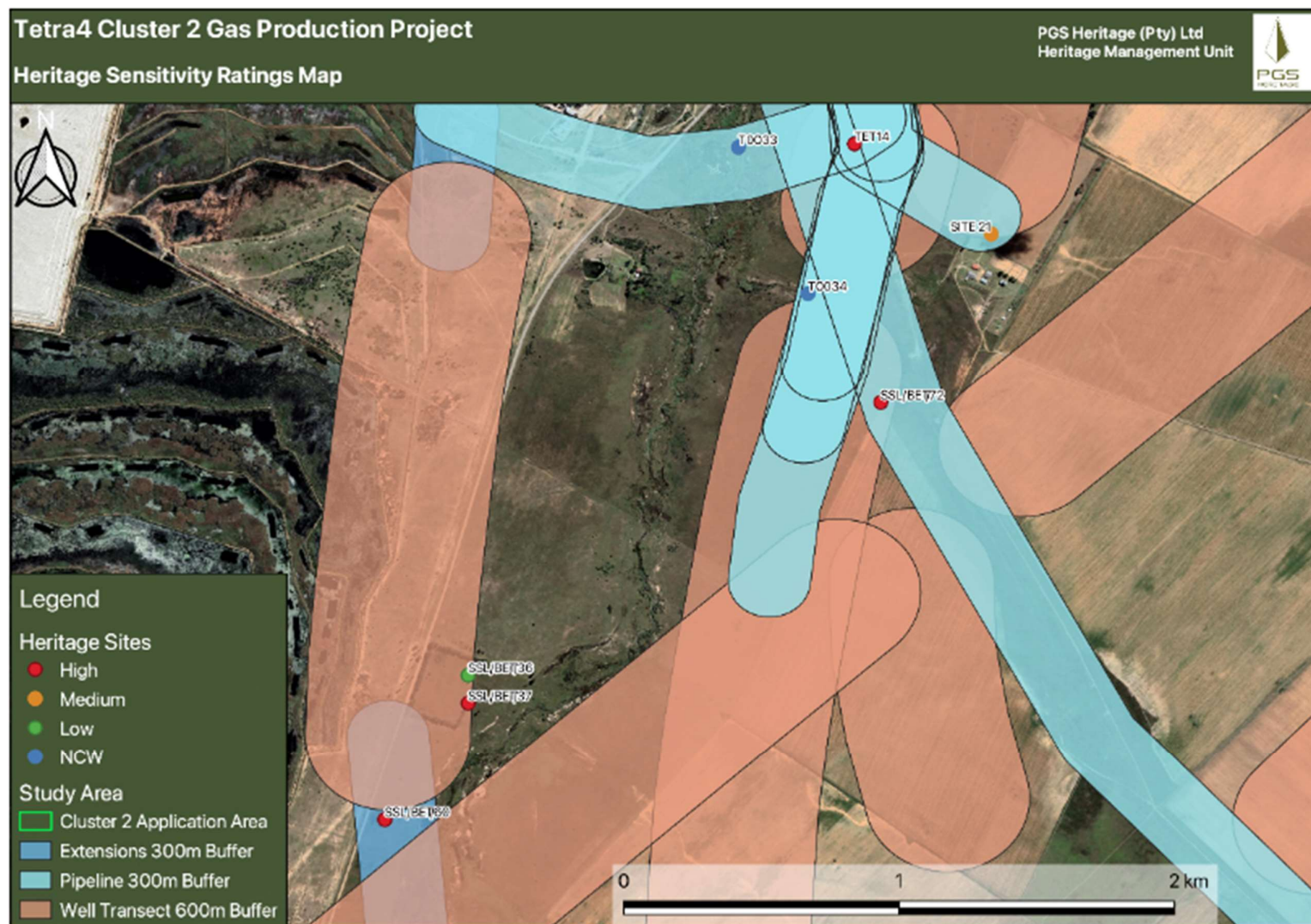


Figure 16: Heritage sensitivity rating of identified heritage resources. Inset F.



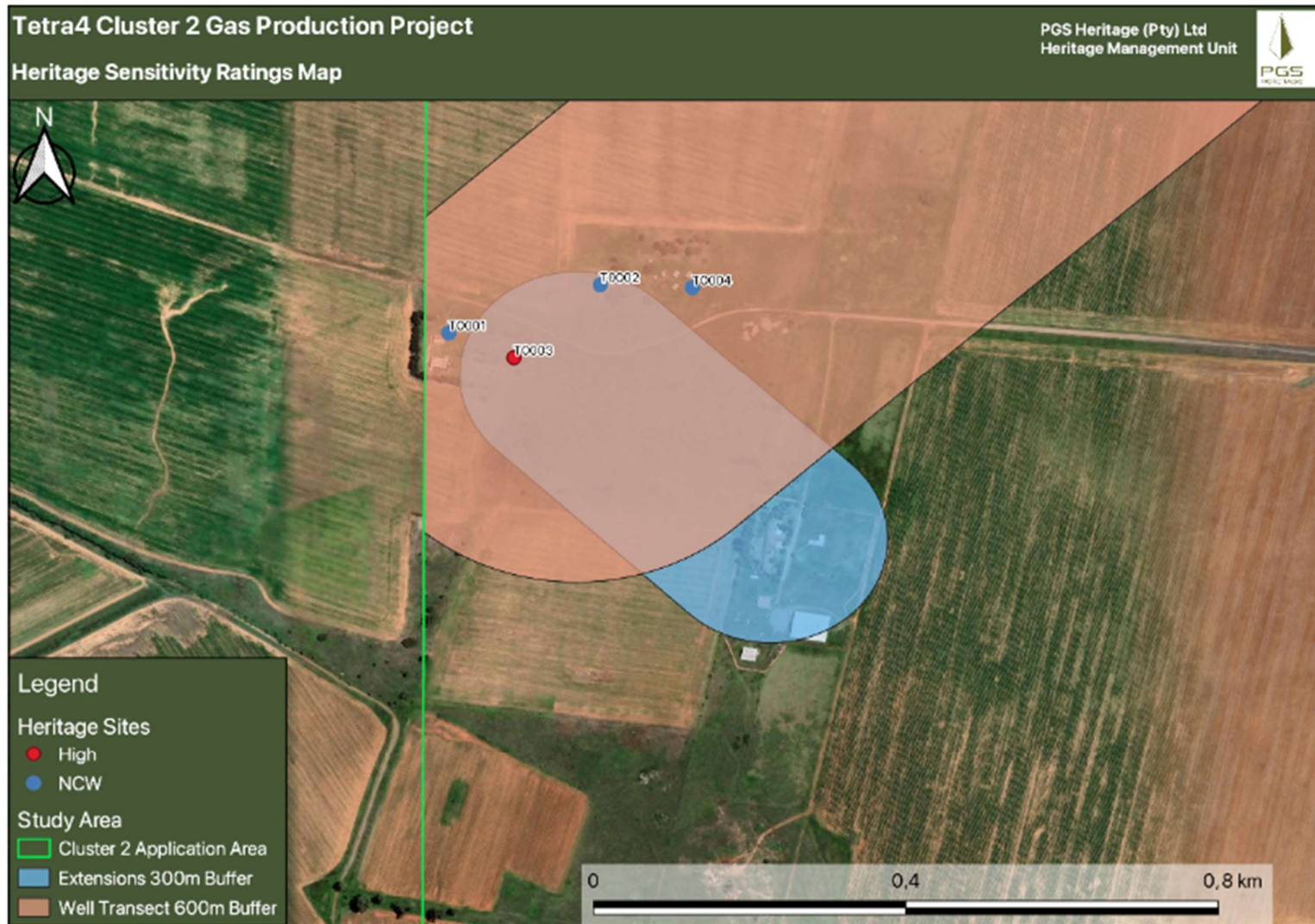


Figure 17: Heritage sensitivity rating of identified heritage resources. Inset G.

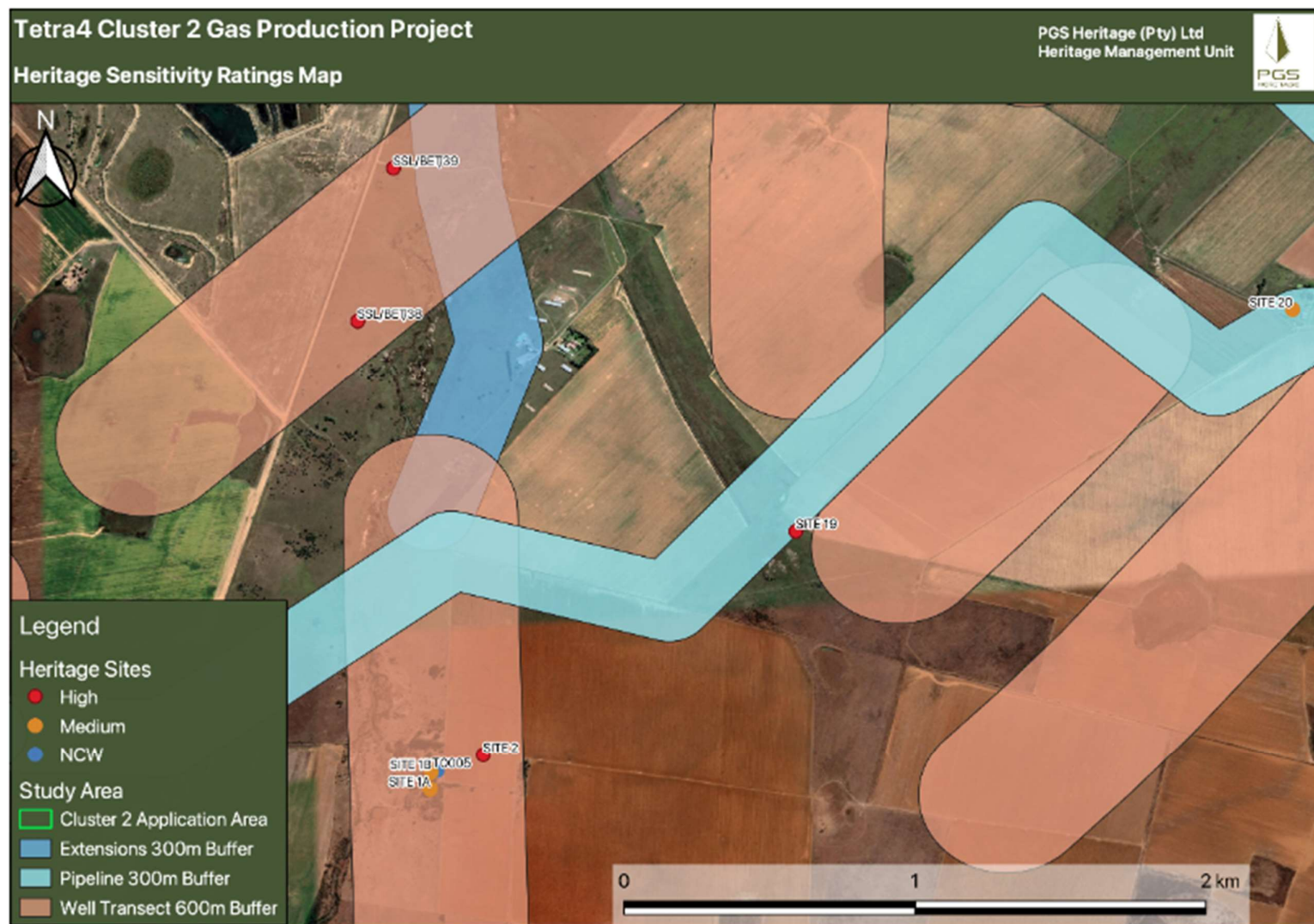


Figure 18: Heritage sensitivity rating of identified heritage resources. Inset H.



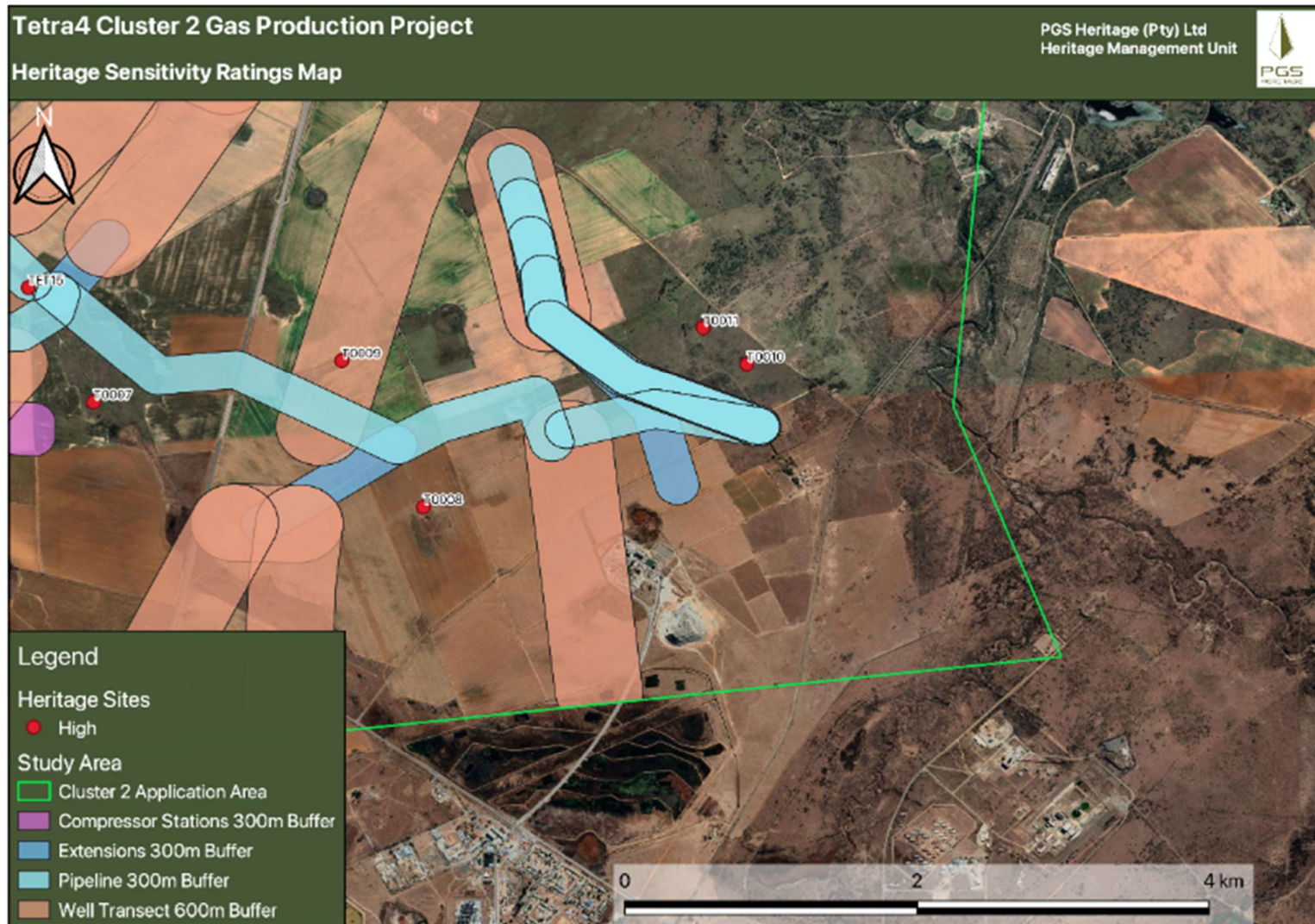


Figure 19: Heritage sensitivity rating of identified heritage resources. Inset I.

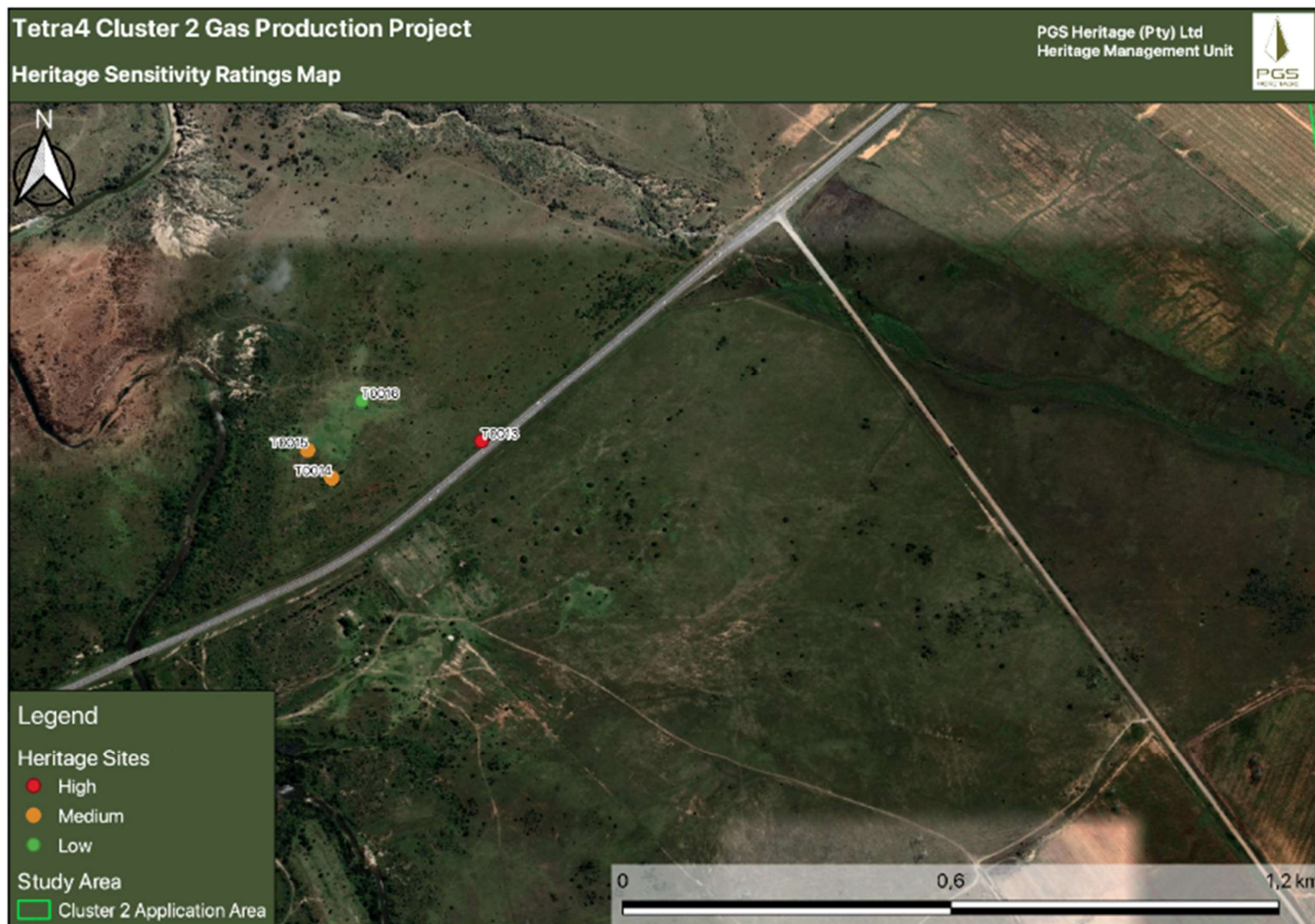


Figure 20: Heritage sensitivity rating of identified heritage resources. Inset J.



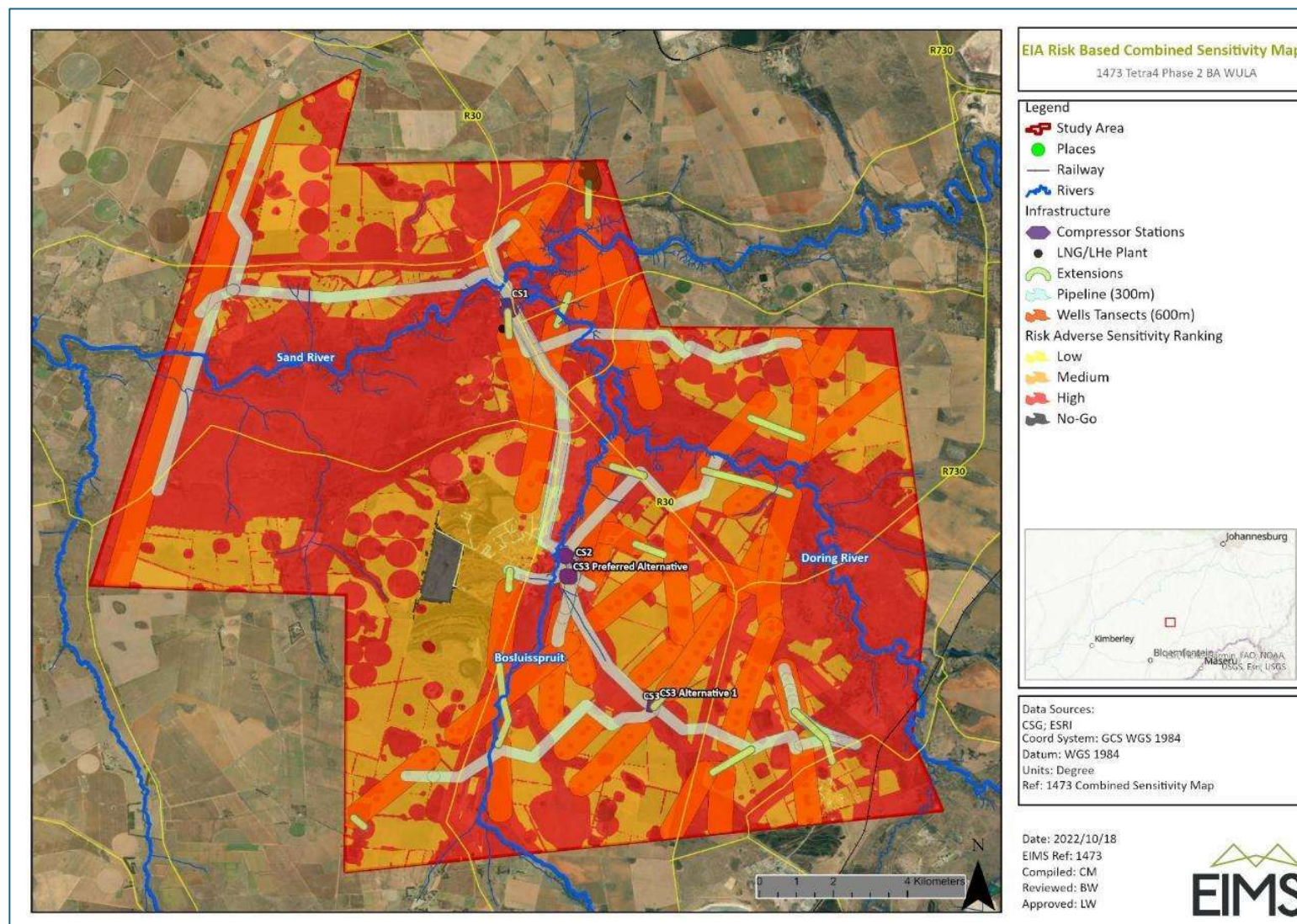


Figure 21: Cluster 2 combined sensitivity map.



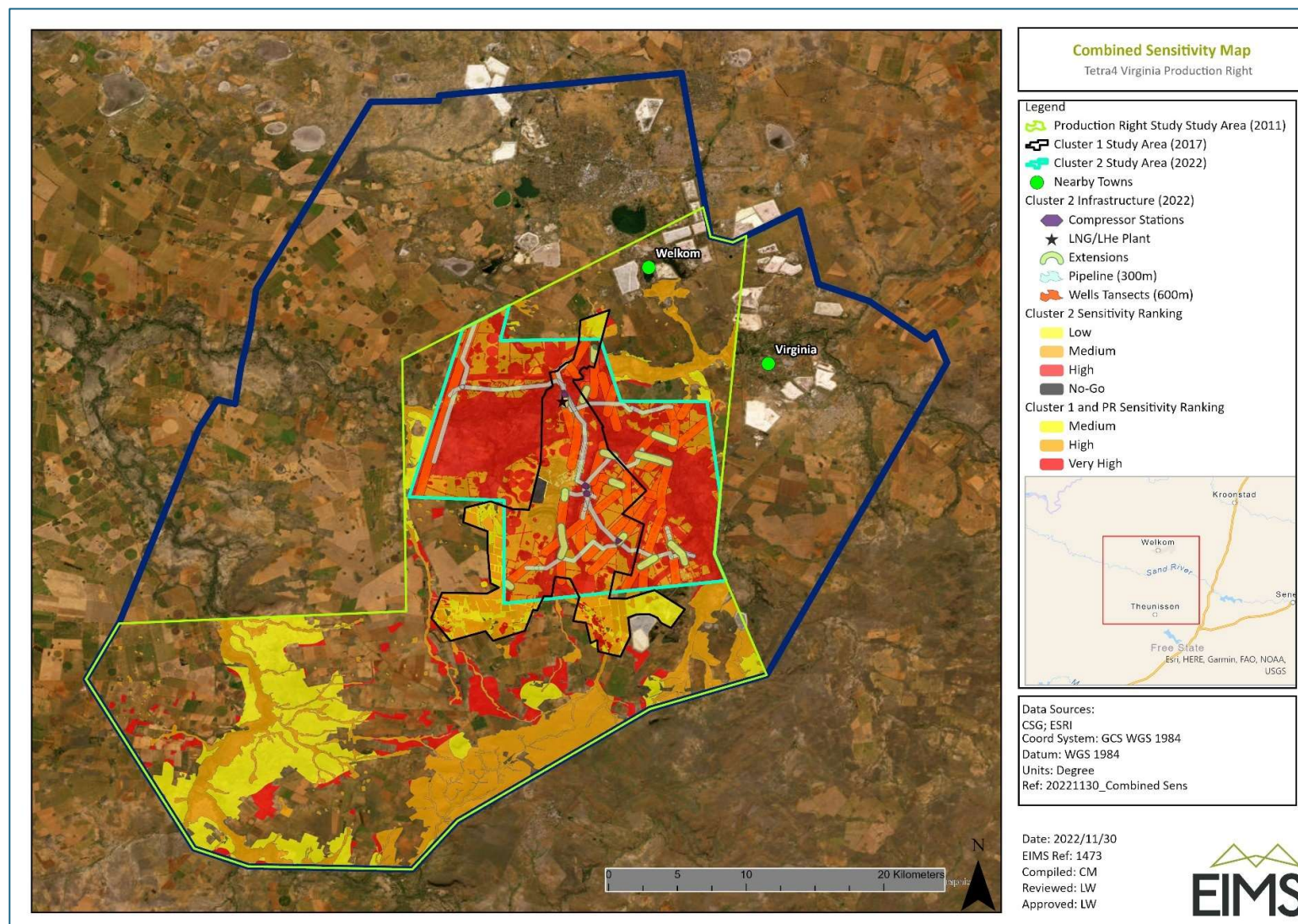


Figure 22: Production Right, Cluster 1 and Cluster 2 sensitivity rankings.





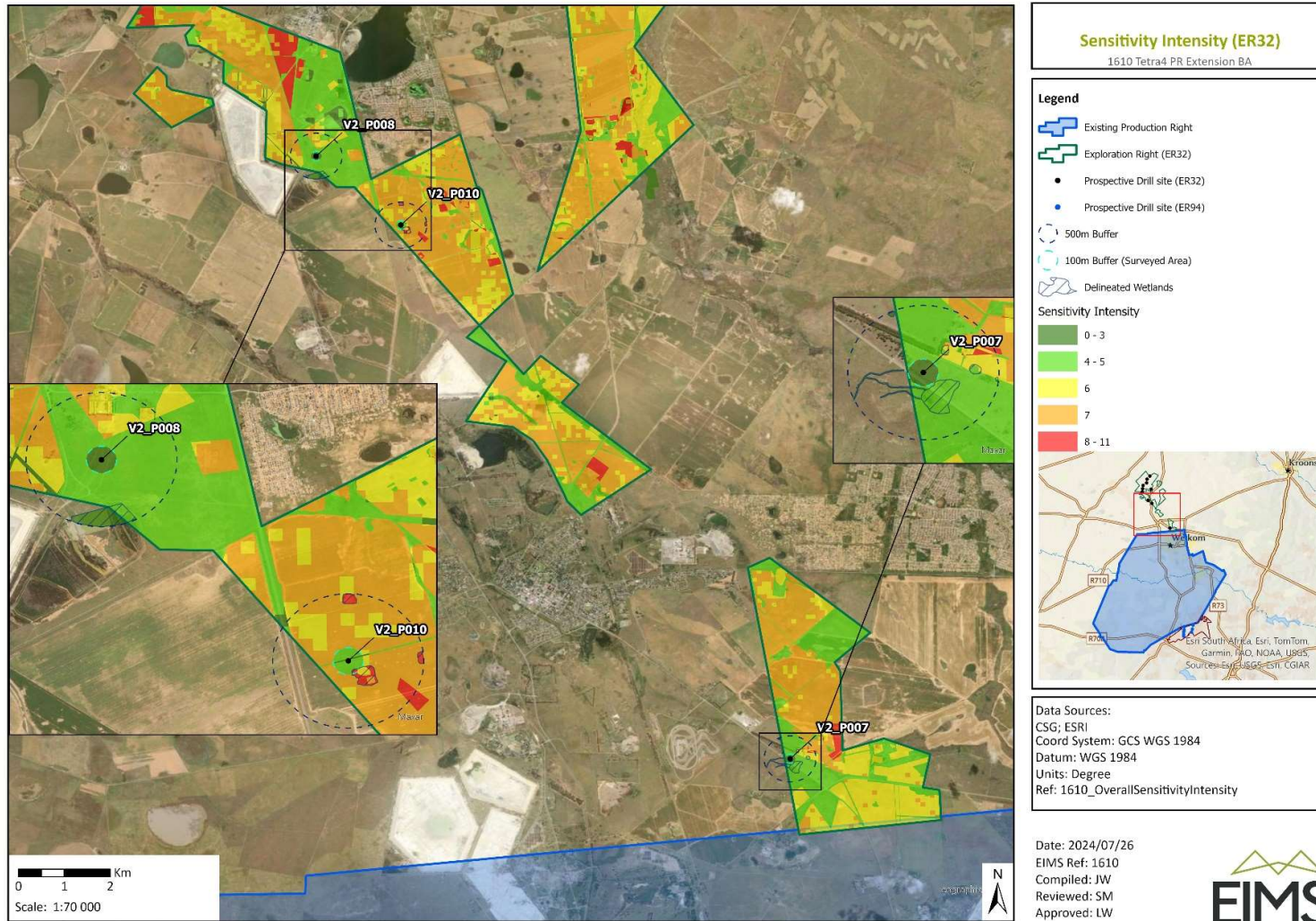


Figure 24: Sensitivity Intensity Map ER32 (south)



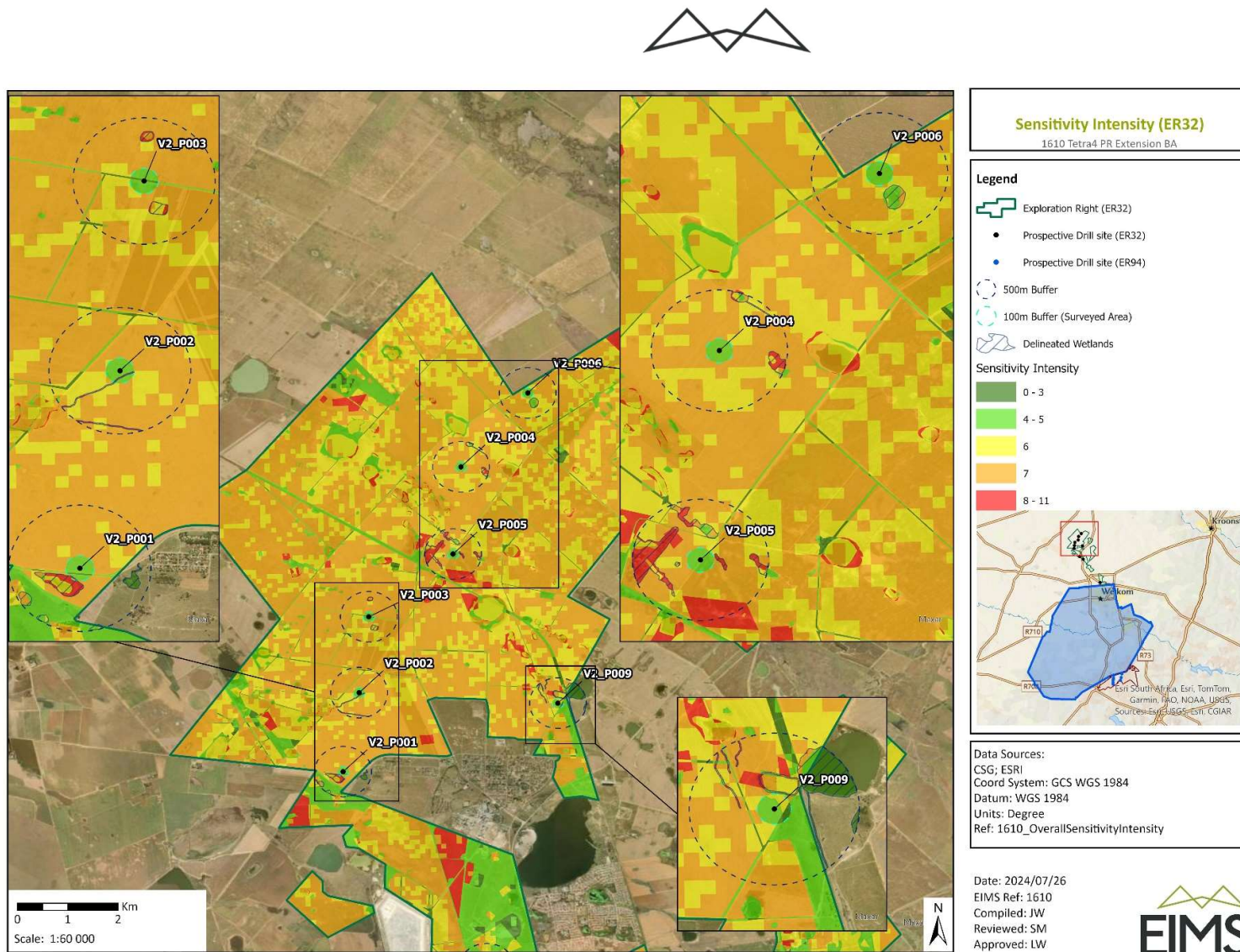


Figure 25: Sensitivity Intensity Map ER32 (north)

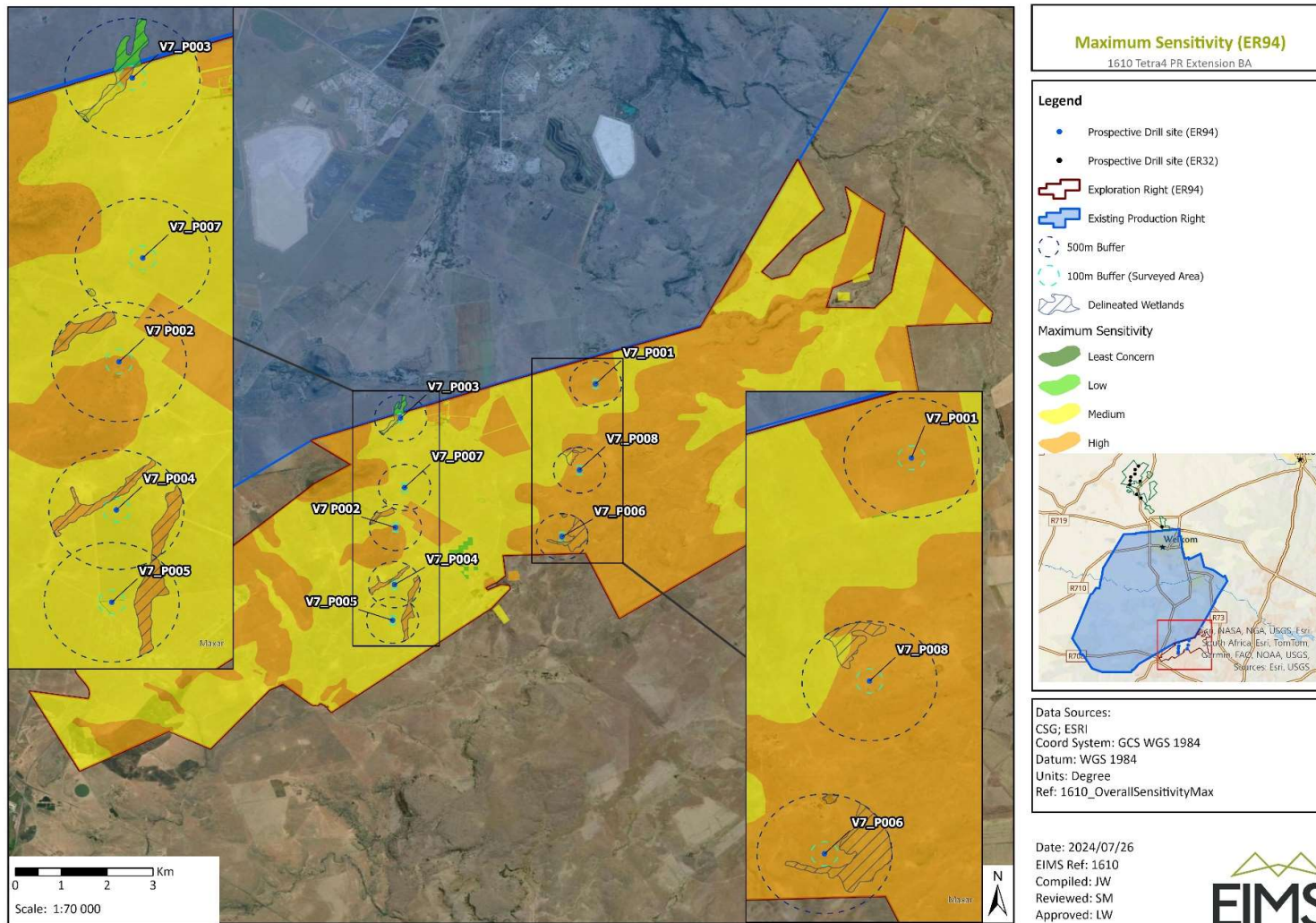


Figure 26: Maximum Sensitivity ER94



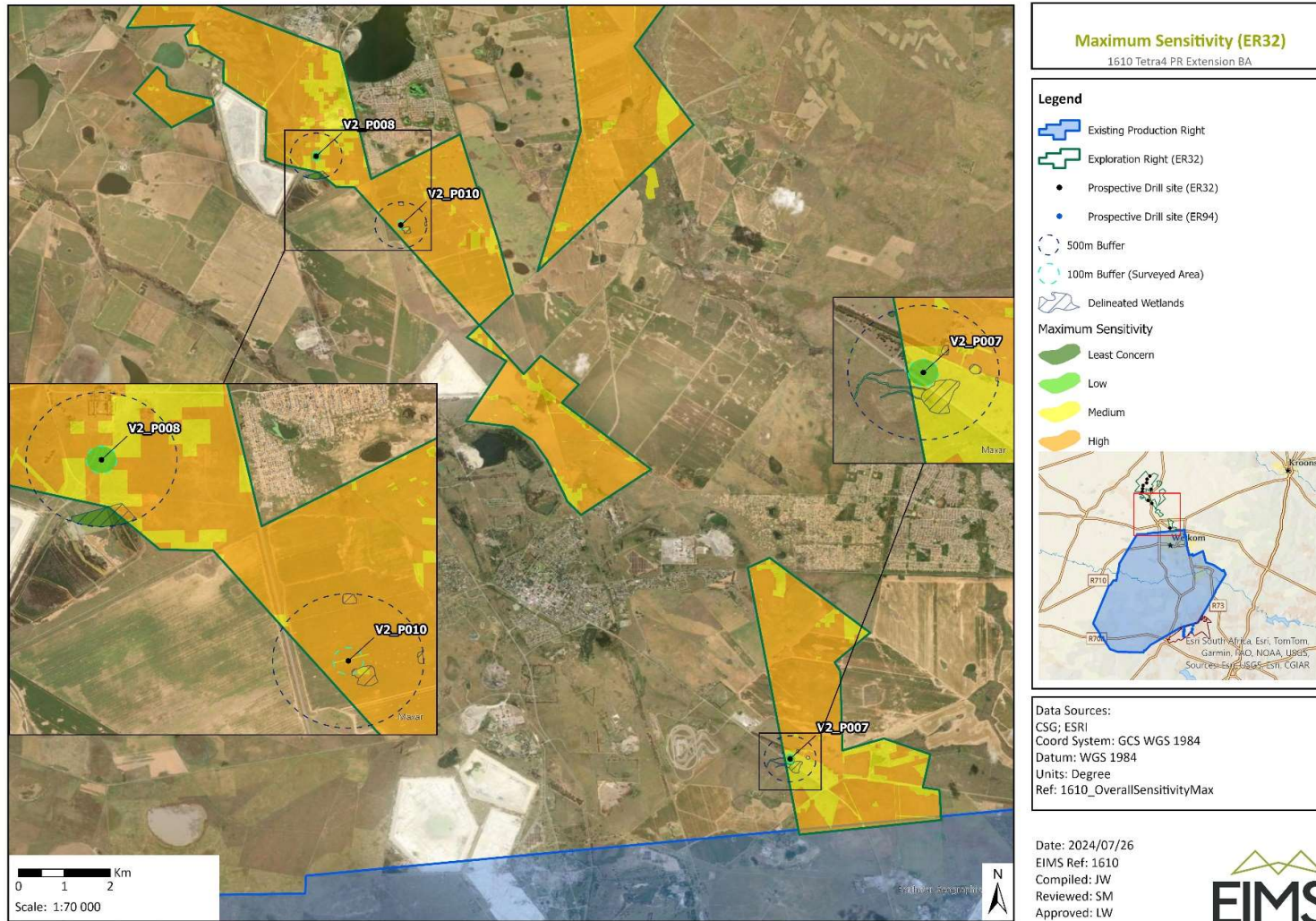


Figure 27: Maximum Sensitivity ER32 (south)

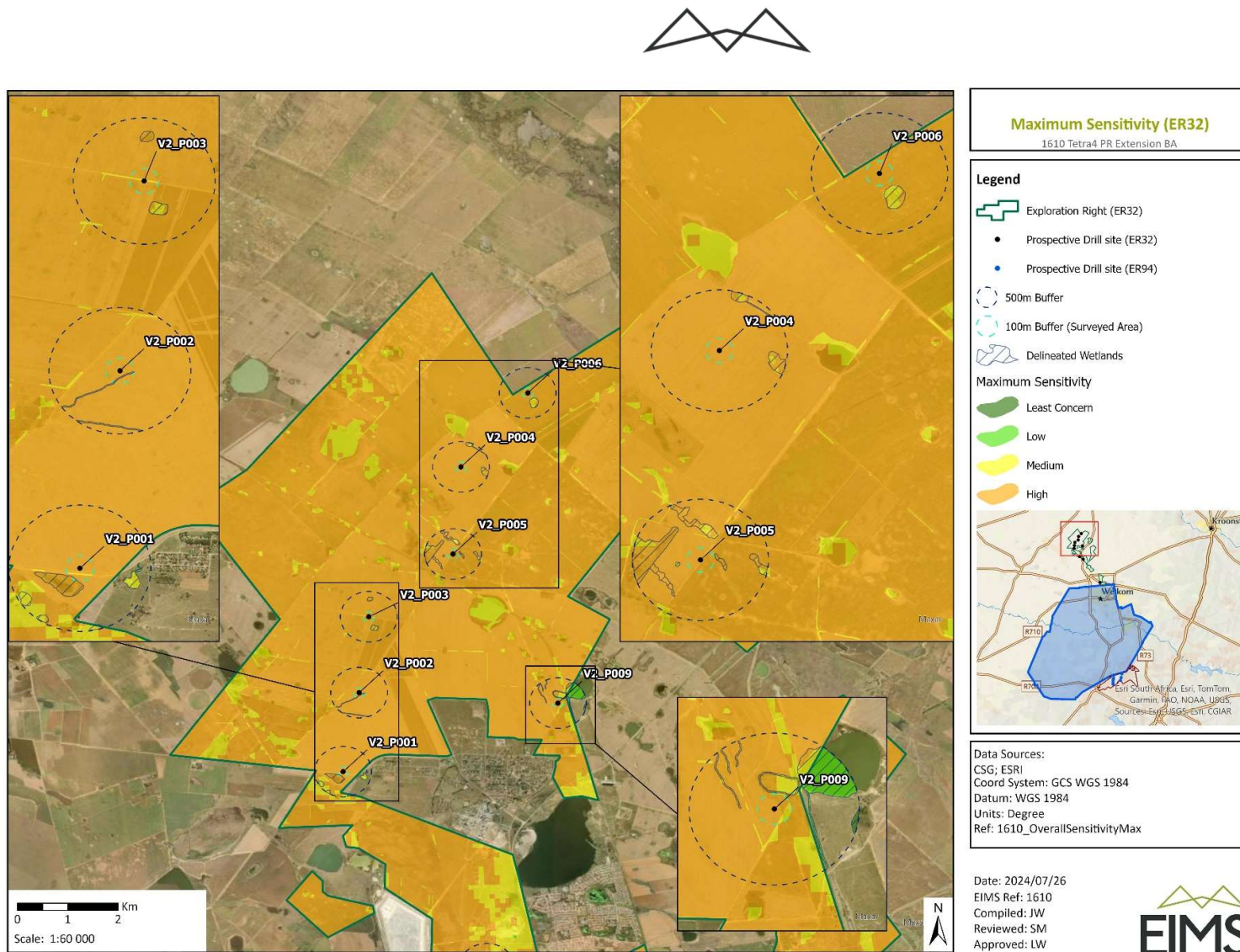


Figure 28: Maximum Sensitivity ER32 (north)



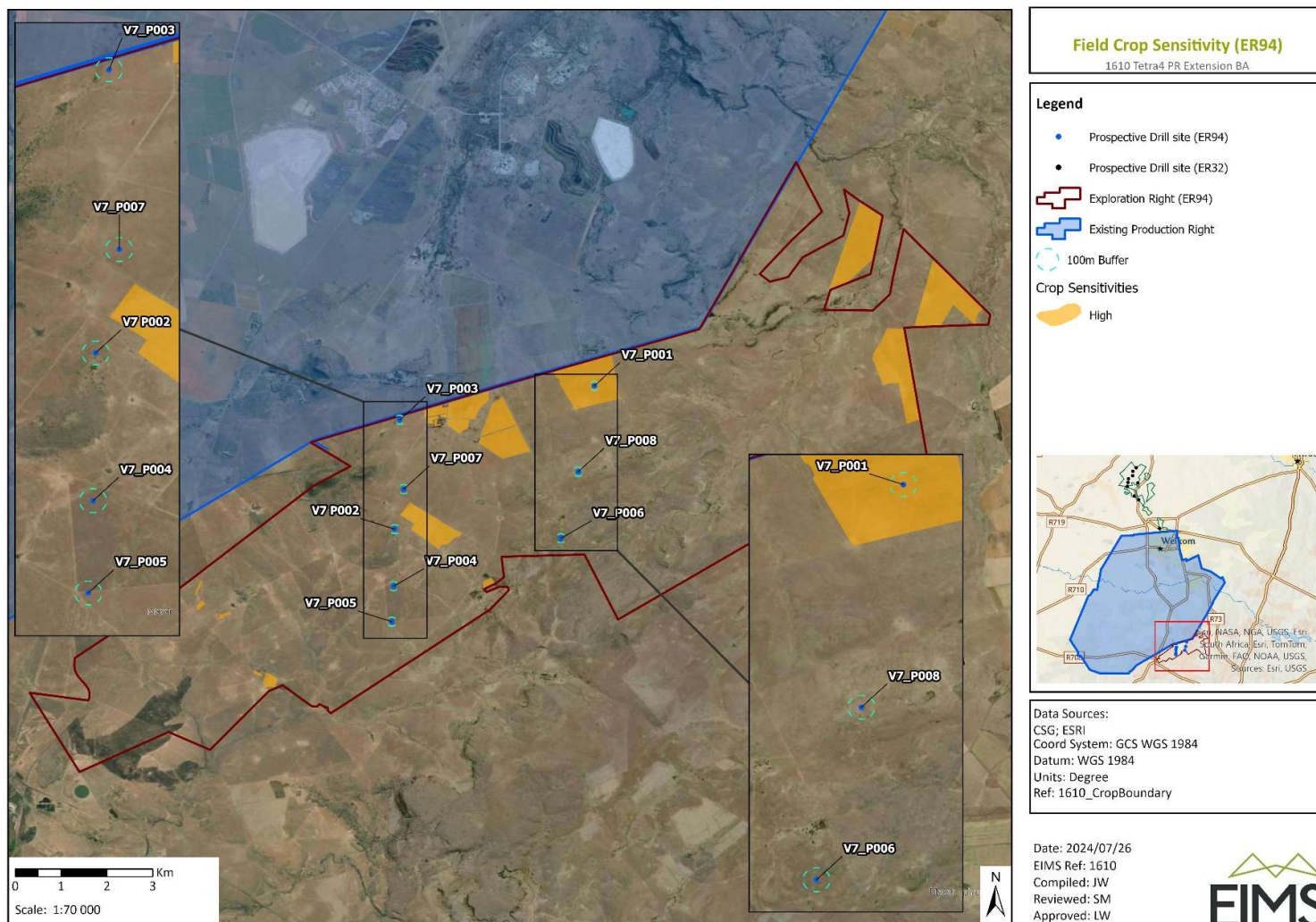


Figure 29: Field Crop Sensitivity ER94

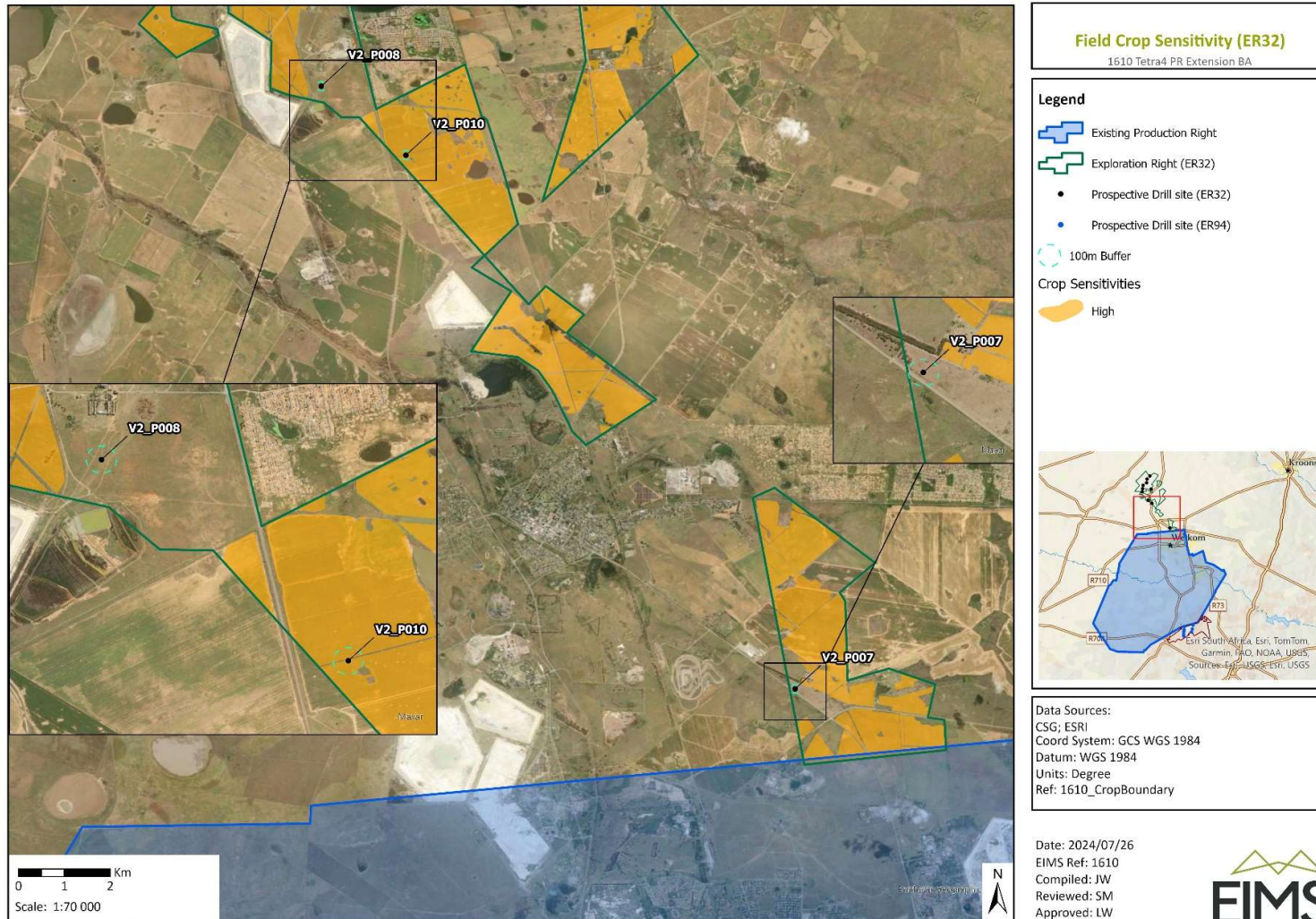


Figure 30: Field Crop Sensitivity ER32 (south)



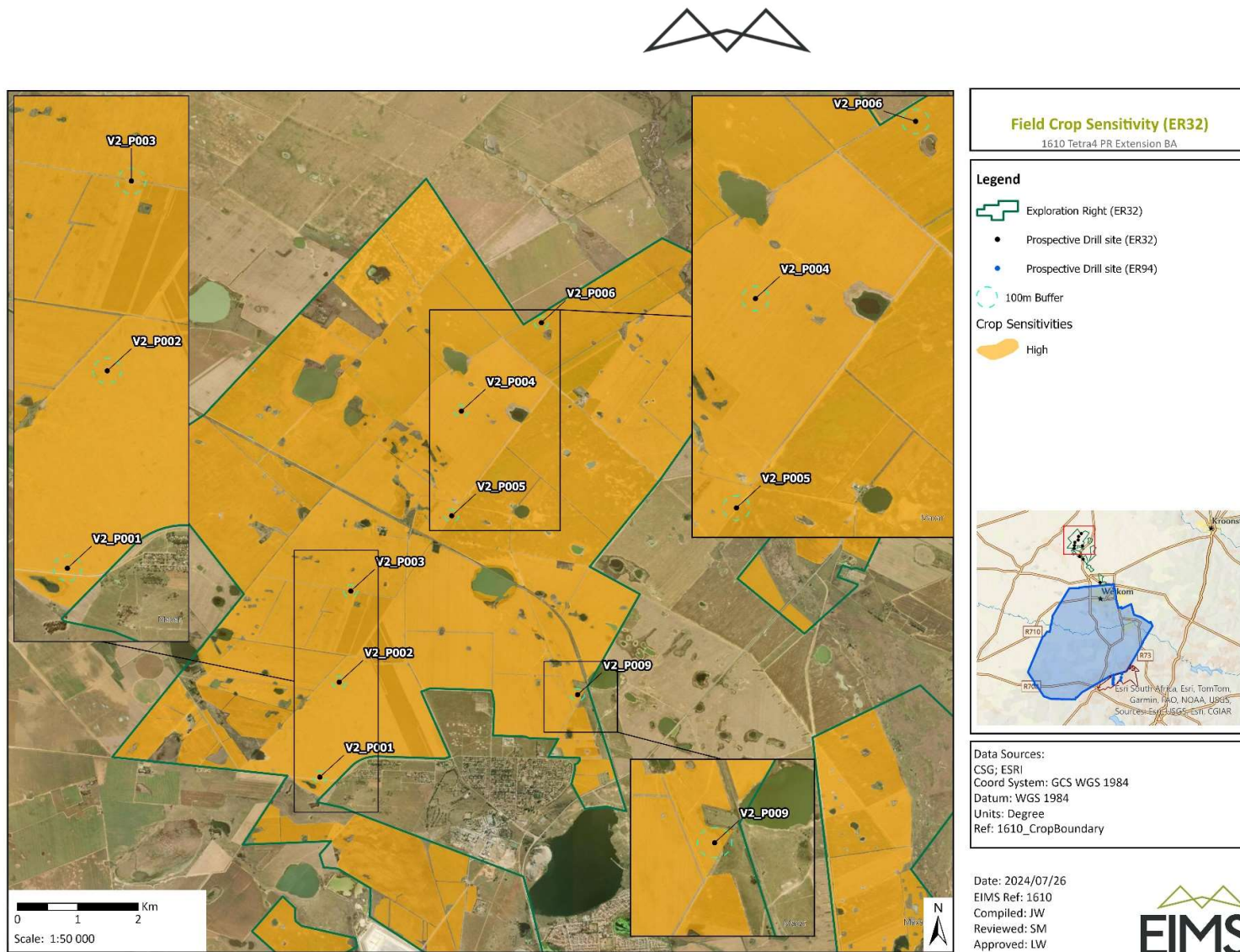


Figure 31: Field Crop Sensitivity ER32 (north)

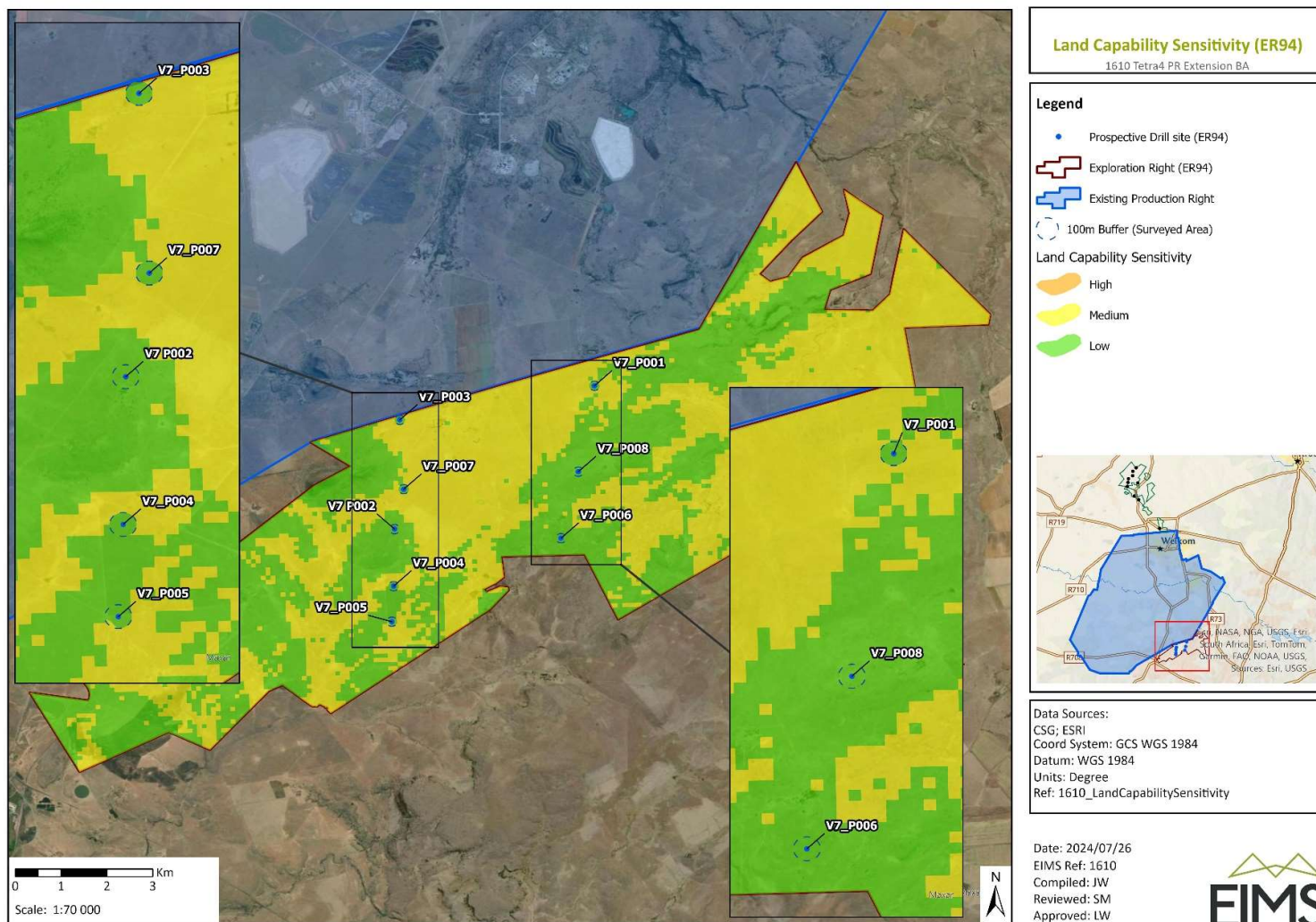


Figure 32: Land Capability Sensitivity ER94



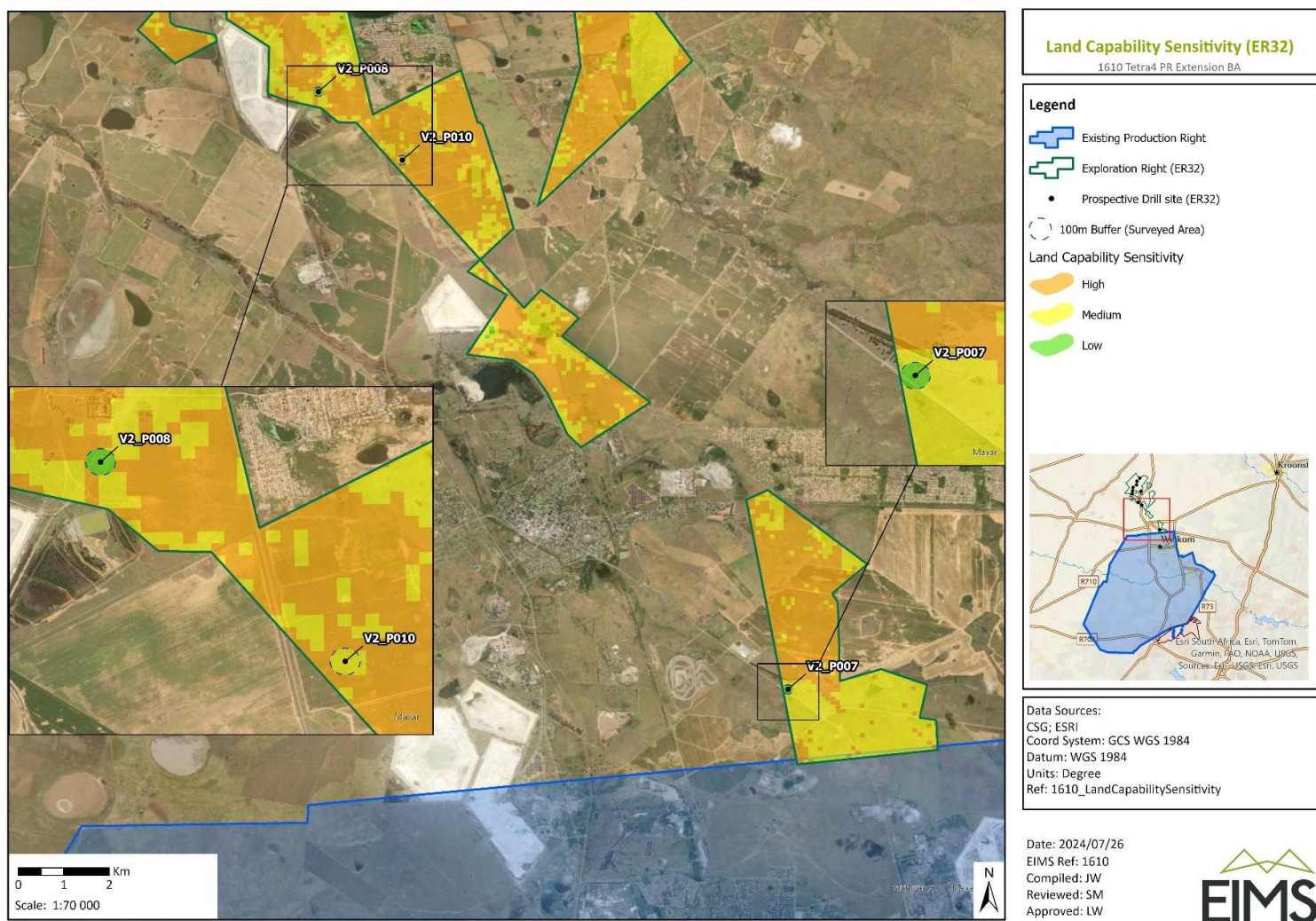


Figure 33: Land Capability Sensitivity ER32 (south)

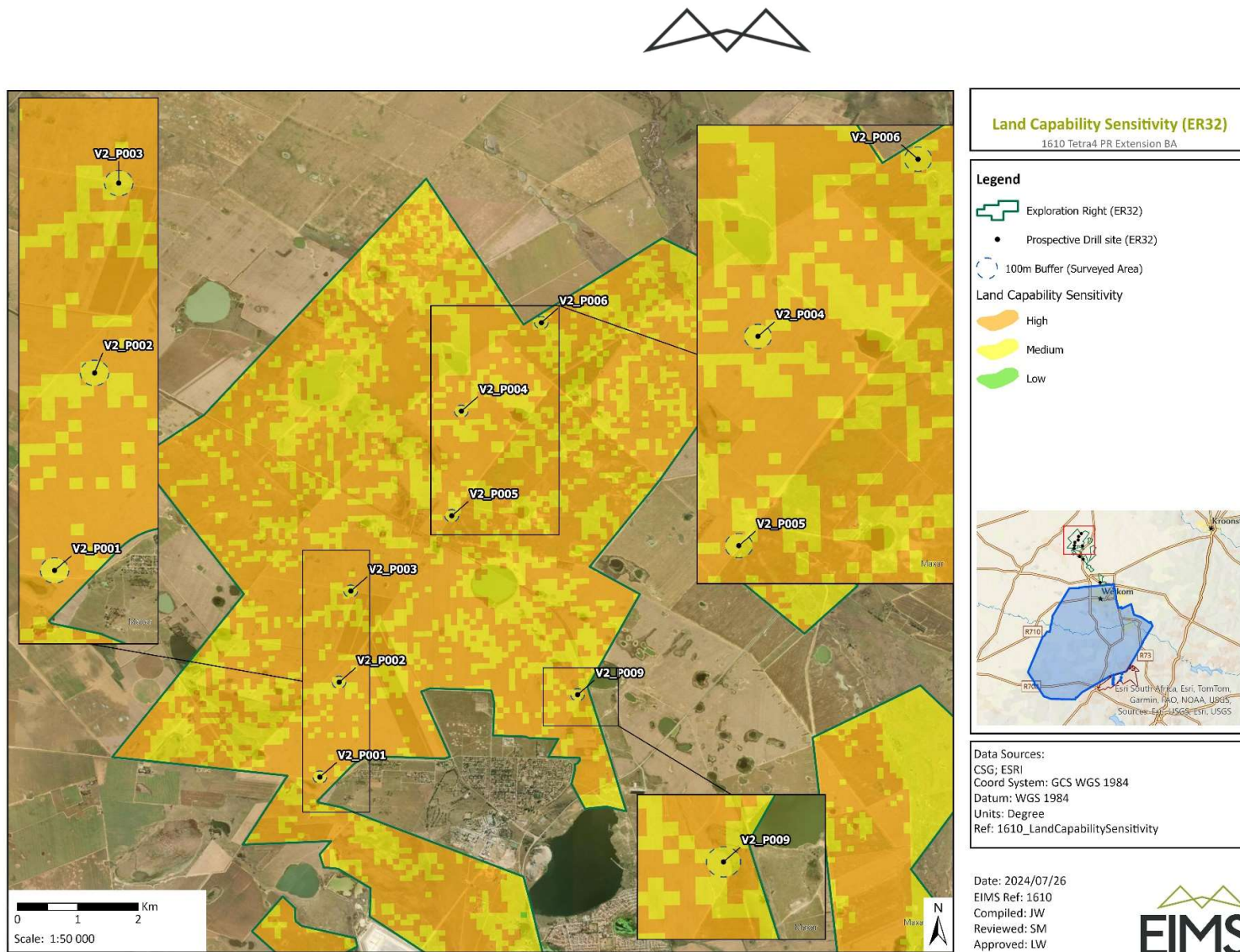


Figure 34: Land Capability Sensitivity ER32 (north)



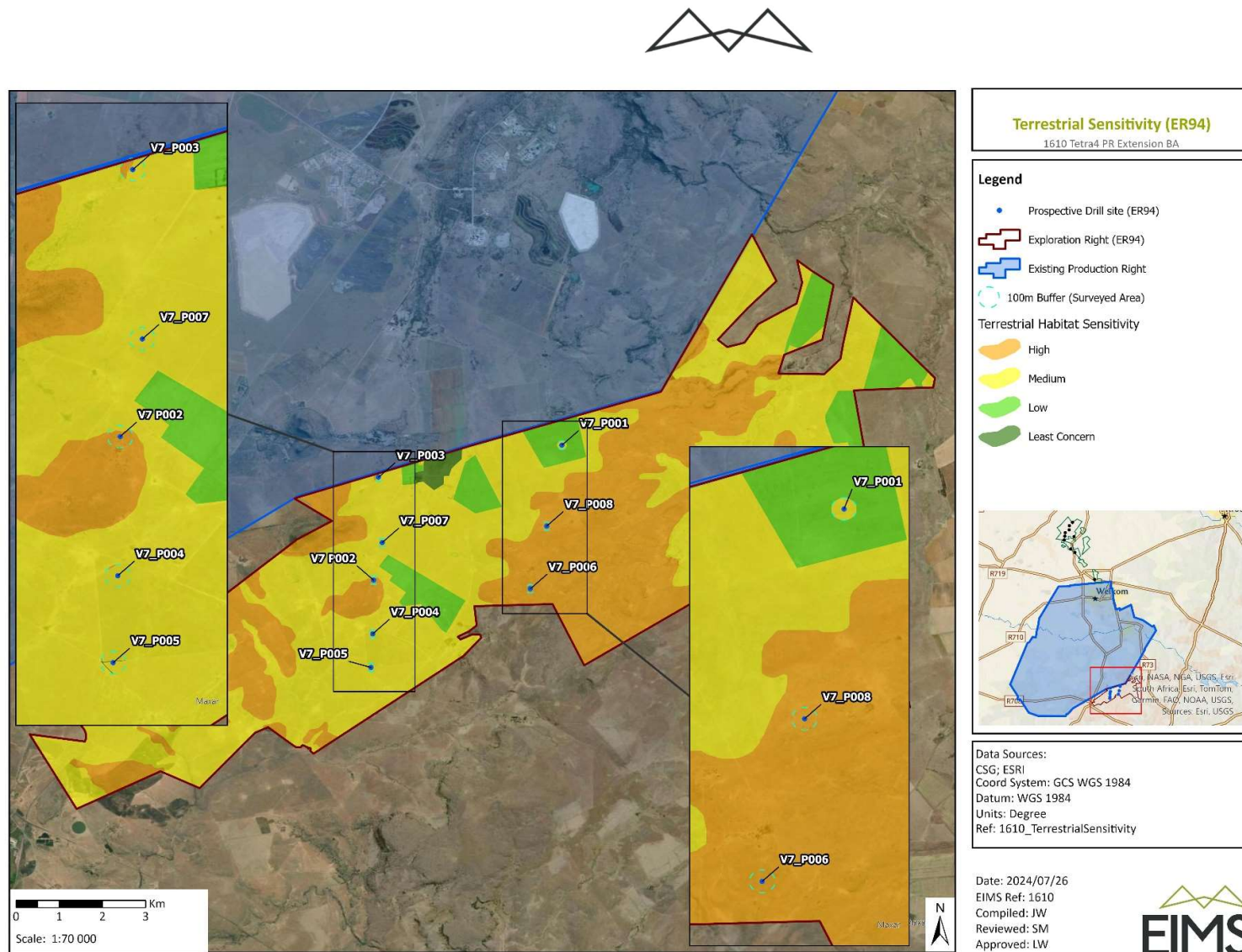


Figure 35: Terrestrial Sensitivity ER94

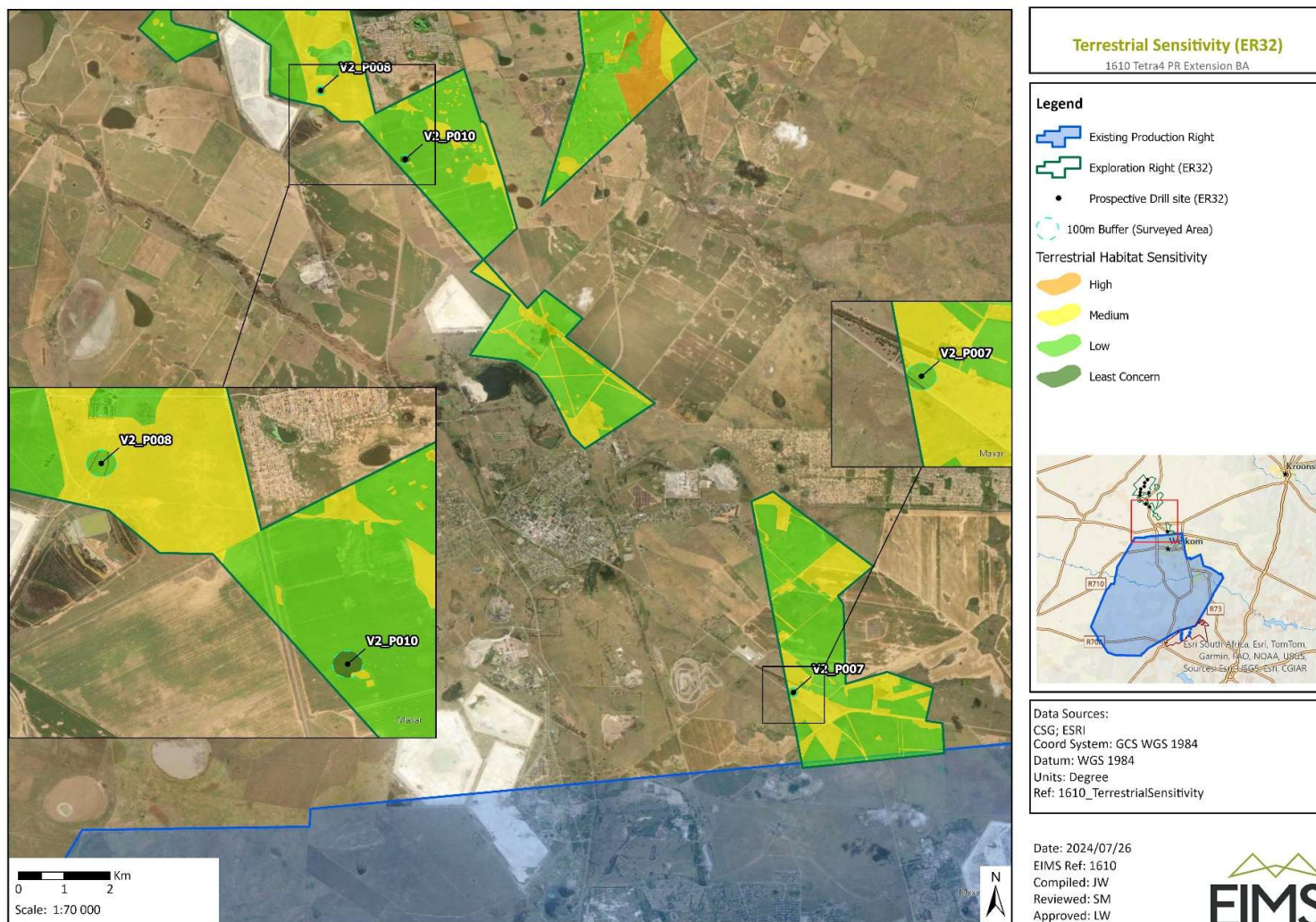


Figure 36: Terrestrial Sensitivity ER32 (south )



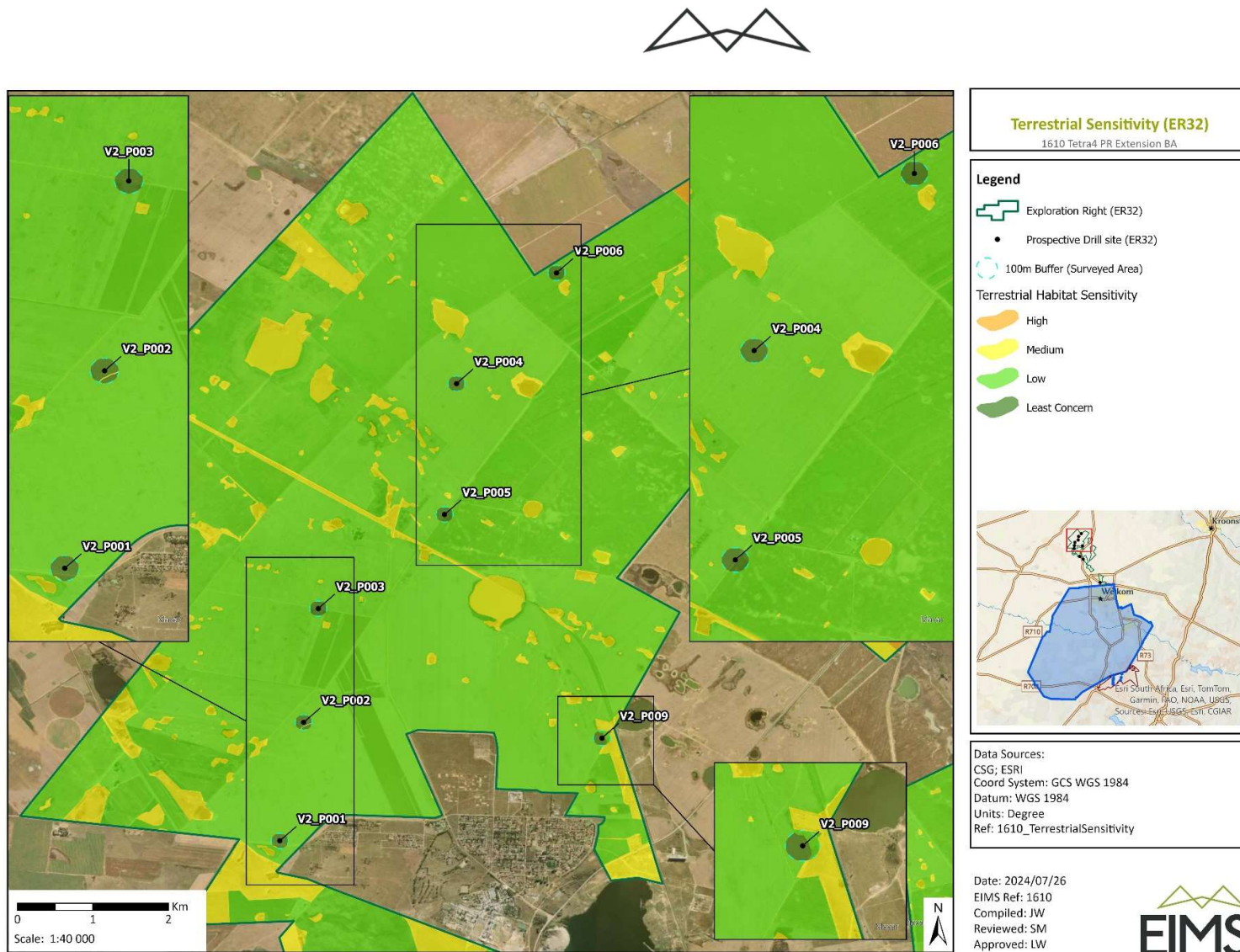


Figure 37: Terrestrial Sensitivity ER32 (north)

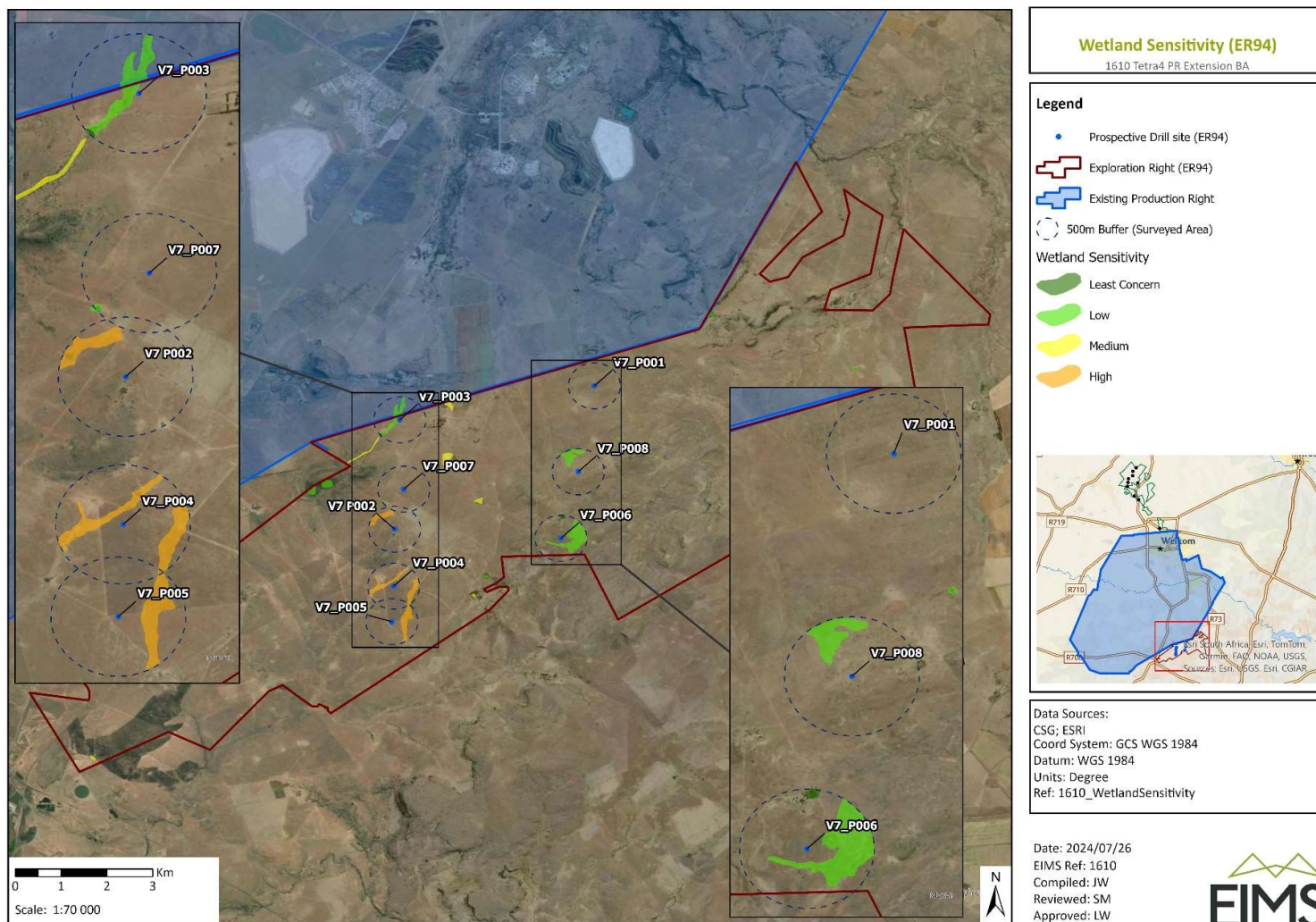


Figure 38: Wetland Sensitivity ER94



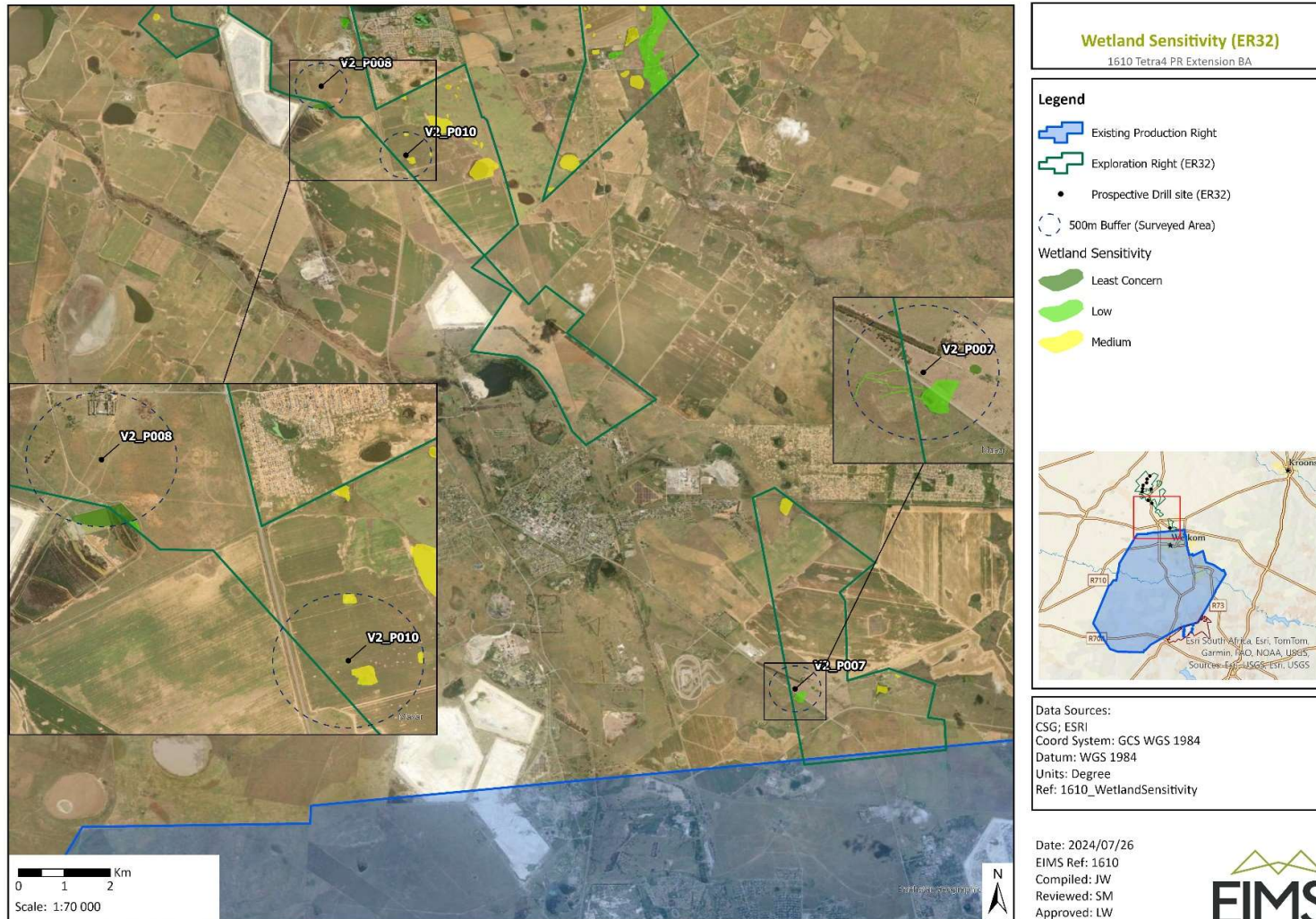


Figure 39: Wetland Sensitivity ER32 (south)

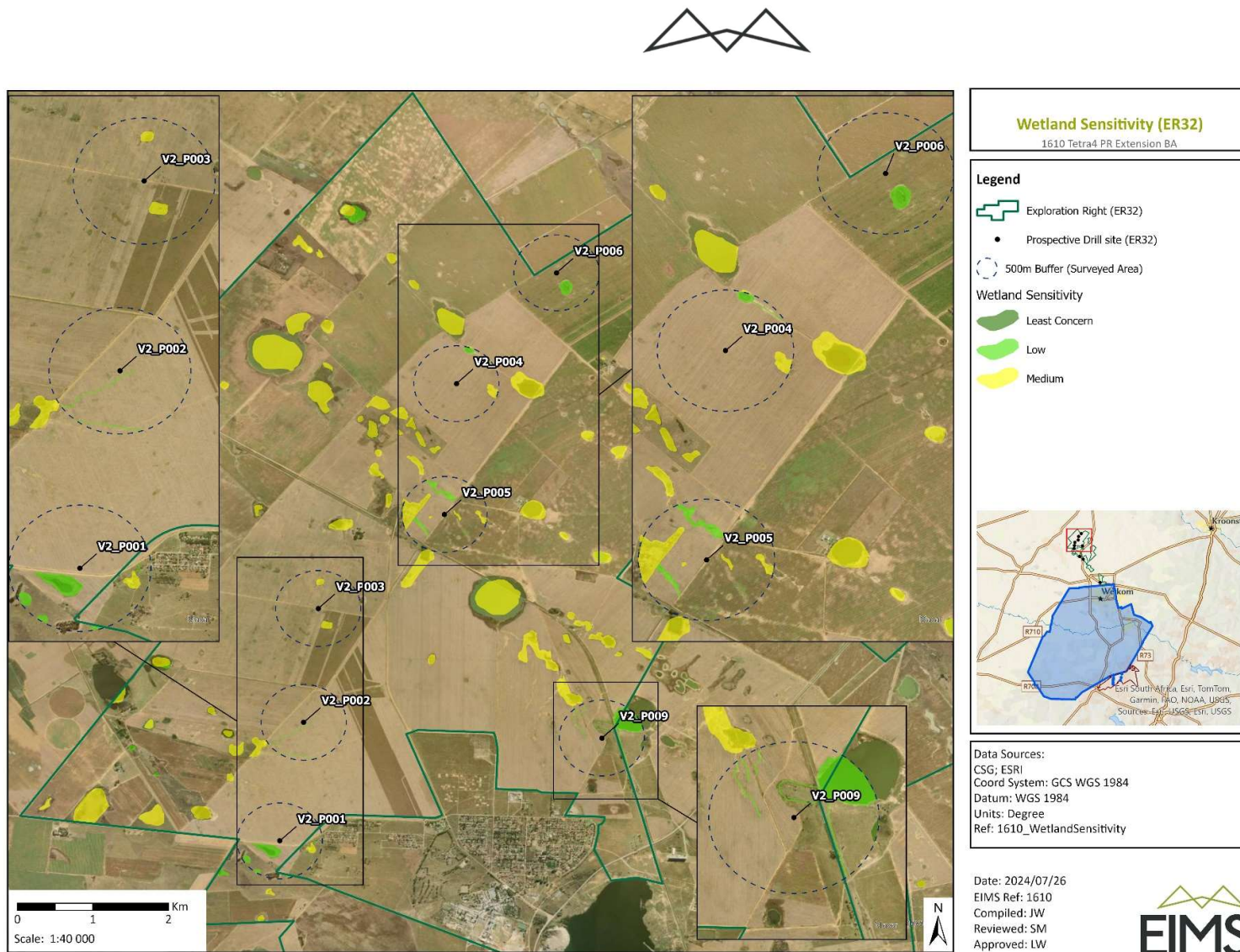


Figure 40: Wetland Sensitivity ER32 (north)



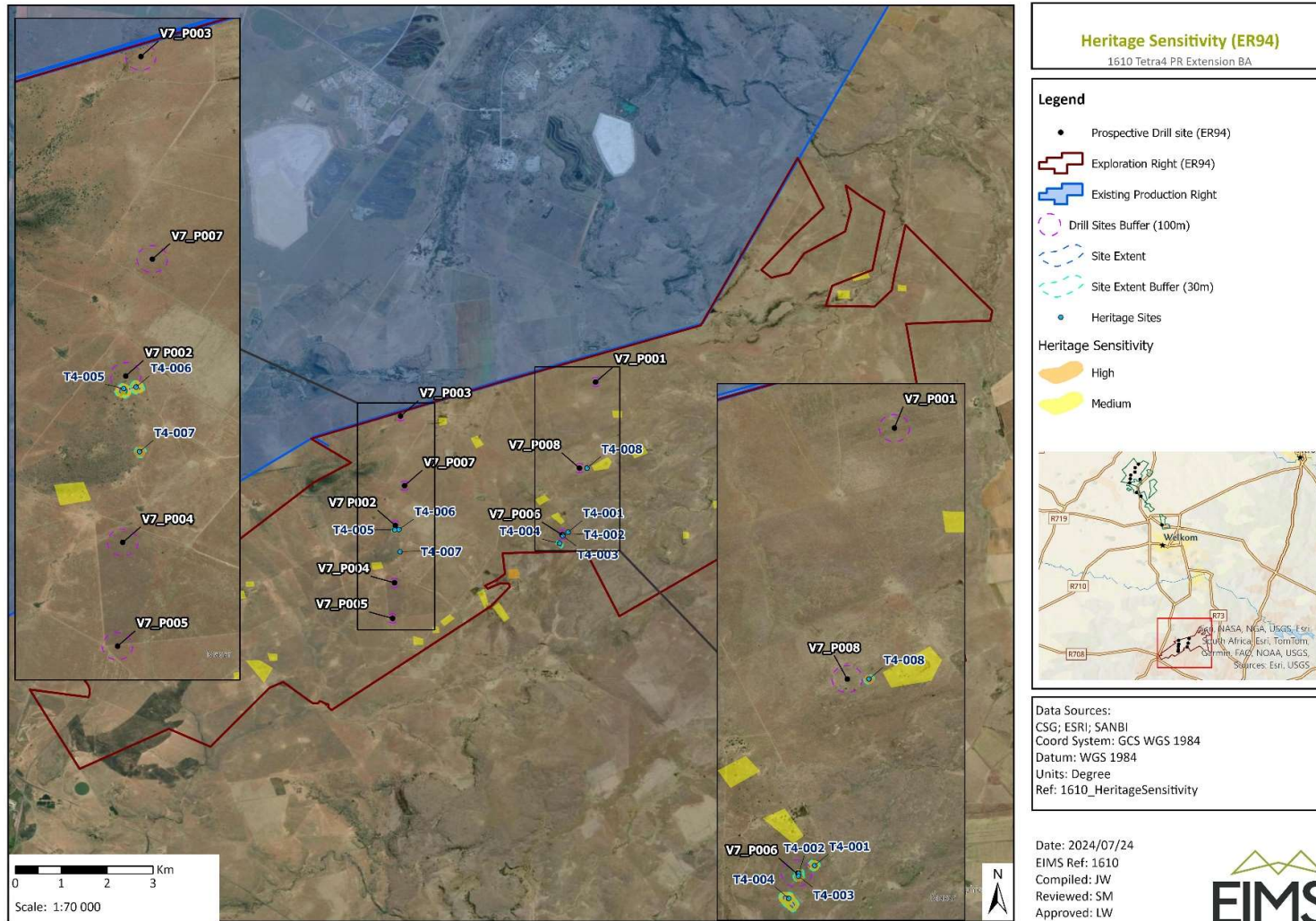


Figure 41: Heritage Sensitivity ER94

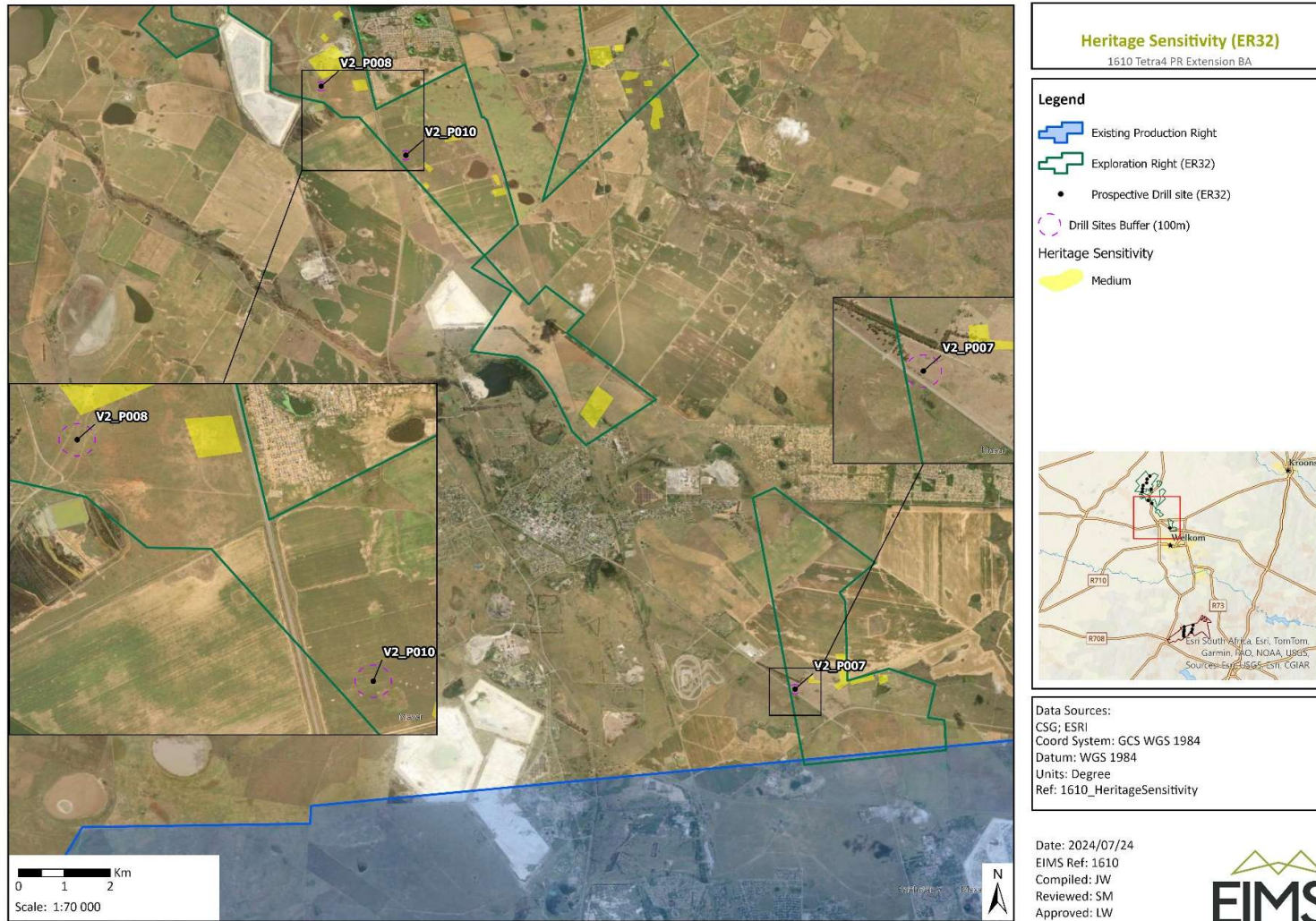


Figure 42: Heritage Sensitivity ER32 (south)



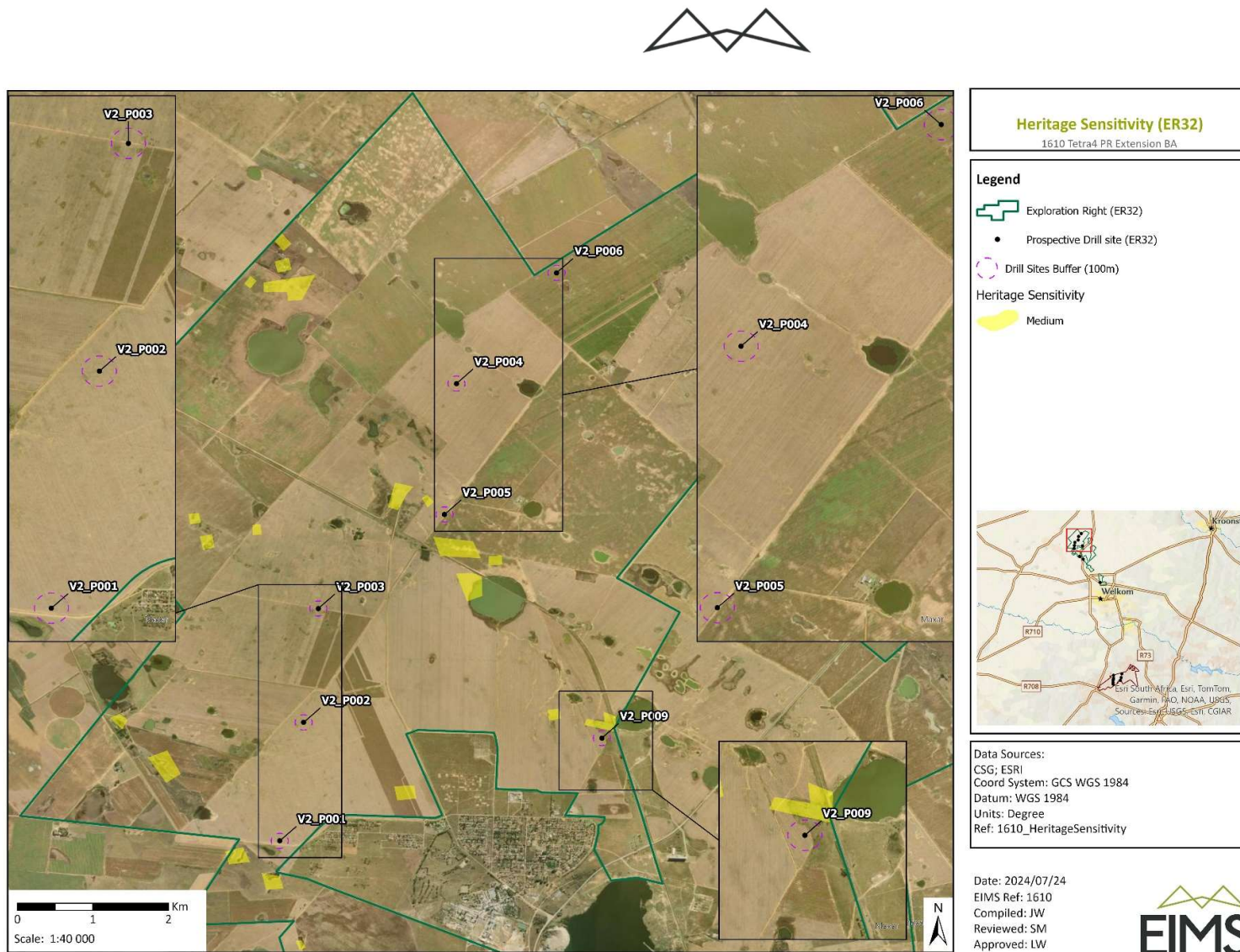


Figure 43: Heritage Sensitivity ER32 (north)