

NATURA VIVA cc
Natural History Education, Tourism, Research

Attn: Ms Robyn Thompson
CES - Environmental and social advisory services
67 African Street
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Date: 10 October 2021

Palaeontological heritage comment:

**BASIC ASSESSMENT OF ACCESS ROAD UPGRADES FOR THE
AUTHORISED HAGA HAGA WIND ENERGY FACILITY NEAR EAST
LONDON, KOMGA DISTRICT, EASTERN CAPE**

The Haga Haga WEF was authorised on 5/07/2019 (DFFE Reference: 14/12/16/3/3/2/1087). The Environmental Authorisation (EA) received an amendment on 03/06/2021 (DFFE Reference: 14/12/16/3/3/2/1087/AM1). The original EIA included a 42 turbine layout and associated internal road network, the amendment reduced the number of turbines to 36 and the internal road network was changed to match. The internal road layout will be built as per the layout submitted during the amendment, within allowable micro siting limits. The WEF has not yet been constructed.

Several of the site access points will require upgrades on farm portions which were not included in the previous applications. WKN Windcurrent is therefore proposing to upgrade the existing roads leading to the access points, which will link up with the approved WEF internal road layout, to allow for access to the site in order for the turbine infrastructure, including but not limited to the blades and tower components, to be transported to the site on large trucks. Due to the length of the blades (up to 100m), the trucks require a minimum road width of 8m with the width increasing at the turning arcs to up to 110m in diameter (55m wide intersection radius) to allow for safe passage. The proposed upgrades are described in Table 1 below and in the following figures.

Combined desktop and field-based Palaeontological Heritage Assessments (PIAs) for the original authorised Haga Haga Wind Farm (WEF) near East London, Komga District, Eastern Cape as well as the associated gridline connection to the Chaba Substation were submitted by the author (Almond 2017a, 2017b, 2017c). These reports were supplemented by a Palaeontological Heritage Comment for the amended WEF layout by Almond (2020). The present Palaeontological Heritage Comment contributes to the Basic Assessment process for the proposed WEF access road upgrades listed in Table 1 and shown in Figures 1 to 5 below.

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Table 1: Summary of proposed access road upgrades for the authorised Haga Haga WEF that are covered by the present Basic Assessment (See also Figure 1)

MAP REF	FARM PORTION	UPGRADE DESCRIPTION
1	RE of Farm 94	Widening of existing intersection
	Portion 2 of Farm 94	Existing road needs to be widened and realigned slightly
2	RE of Farm 111 & Portion 1 of Farm 111	Existing road needs to be widened and realigned slightly
3	Portion 2 of Farm 69	Existing intersection to be widened
4	RE of Farm 225	Existing road needs to be widened and realigned
5		Existing intersection to be widened
6	RE Farm 222 and RE Farm 288	Road widening and/or vegetation trimming and possible clearance

1. Effect on assessed impacts on palaeontological heritage

On the basis of the original combined field scoping survey and desktop study, the impact significance of the construction phase of the authorised Haga Haga Wind Farm development (amended layout) has been assessed as MEDIUM (negative) without mitigation and LOW (positive & negative) after mitigation, adopting a precautionary approach (Almond 2017a, 2020; Table 2 herein). A concentration of recorded fossil wood sites on Farm 447 was proposed as a no-go area, to be protected by a 20 m-wide peripheral buffer zone demarcated by security tape during construction (Almond 2017a, Figs. 44 and 45).

In terms of local palaeontological heritage resources, the proposed upgrades to the access road network, as shown in Table 1 and Figure 1, would have no significant impact on the anticipated impact significance of the project. They will not impact bedrocks of high palaeontological sensitivity while the upgrade footprints are all small and probably disturbed, at least in part. The revised access roads do not overlap with palaeontologically sensitive areas defined in the original PIA report (*ibid.*, Figs. 44 & 45).

It is concluded that anticipated impacts on local palaeontological heritage due to the construction phase of the access road upgrades outlined in this report, are assessed as MEDIUM (negative) before mitigation and LOW (negative and positive) after mitigation. Significant further palaeontological impacts during the operational and decommissioning phases are unlikely.

2. Effect on mitigation measures

The proposed mitigation measures for the Haga Haga access roads should be the same as for the amended Haga Haga Wind Farm. Pending the potential discovery of substantial new fossil remains during construction, no further specialist palaeontological studies or mitigation are considered necessary for this renewable energy development. A tabulated Chance Finds Fossil Procedure is appended to this document.

- The Environmental Control Officer (ECO) responsible for the development should be alerted to the possibility of important fossil remains being found either on the surface or exposed by fresh excavations during construction. This applies especially, but not exclusively, to petrified wood remains with whose appearance the ECO should familiarise themselves, based on illustrations in the PIA report and / or museum material.
- Should new fossil remains - such as blocks or logs of petrified wood, vertebrate bones and teeth, plant-rich fossil lenses or dense fossil burrow assemblages - be exposed during construction, the responsible Environmental Control Officer should alert the Eastern Cape Provincial Heritage Resources Agency, ECPHRA, as soon as possible so that appropriate action can be taken in good time by a professional palaeontologist at the developer's expense. Palaeontological mitigation would normally involve the scientific recording and judicious sampling or collection of fossil material as well as of associated geological data (*e.g.* stratigraphy, sedimentology, taphonomy) by a professional palaeontologist. The palaeontologist concerned with mitigation work will need a valid fossil collection permit from ECPHRA and any material collected would have to be curated in an approved depository (*e.g.* museum or university collection).
- All palaeontological specialist work should conform to international best practice for palaeontological fieldwork and the study (*e.g.* data recording fossil collection and curation, final report) should adhere as far as possible to the minimum standards for Phase 2 palaeontological studies recently developed by SAHRA (2013).
- These recommendations should be incorporated into the Environmental Management Programme (EMPr) for the amended Haga Haga WEF project and be made conditions for its authorisation.

3. Cumulative impacts

Cumulative palaeontological impacts posed by the amended Haga Haga WEF in the context of other renewable energy developments in the broader region were assessed by Almond (2020) as being of MEDIUM (negative) significance without mitigation, but of LOW (positive and negative) significance if the recommended mitigation measures are followed through. Since this study, no further palaeontological heritage assessments for renewable energy (or other major relevant) developments within a radius of 30 km of the Haga Haga Wind Farm project area have become available (REEA and SAHRIS websites).

Anticipated cumulative impacts for the amended WEF project as well as the proposed access road upgrades are assessed as being of MEDIUM (negative) significance without mitigation, but of LOW (positive and negative) significance, provided that the recommended mitigation measures are fully implemented.

The No-Go Option (no WEF development, including no access road upgrades) would probably have a neutral impact on local fossil heritage; fewer fossils would be disturbed or destroyed by construction but, on the other hand, natural destruction of fossils by weathering and erosion would continue and the potential benefits of new fossil data obtained through professional palaeontological mitigation would be lost.

Provided that the mitigation measures for chance fossil finds outlined by Almond (2017a) and reiterated above are followed through in full, there are no objections on palaeontological heritage grounds to the proposed access roads upgrades for the authorised and amended Haga Haga Wind Farm development.

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4. Key references

ALMOND, J.E. 2017a. Proposed Haga Haga Wind Farm near East London, Komga District, Eastern Cape. Palaeontological heritage: desktop & field-based scoping assessment, 60 pp. Natura Viva cc, Cape Town.

ALMOND, J.E. 2017b. Proposed 132 kV overhead powerline between the Chaba Substation and the Haga Haga Wind Energy Facility near East London, Komga District, Eastern Cape. Palaeontological heritage: basic assessment, 35 pp. Natura Viva cc, Cape Town.

ALMOND, J.E. 2017c. Revised route for the proposed 132 kV overhead powerline between the Chaba Substation and the Haga Haga Wind Energy Facility near East London, Komga District, Eastern Cape. Palaeontological heritage comment, 3 pp. Natura Viva cc, Cape Town.

ALMOND, J.E. 2020. Part 2 Environmental Authorisation Amendment for the Haga Haga Wind Energy Facility near East London, Komga District, Eastern Cape. Palaeontological heritage comment, 6 pp. Natura Viva cc, Cape Town.

Impact Phase: Construction								
Nature of Impact: Potential disturbance, damage or destruction of fossil heritage resources preserved at or beneath the ground surface due to surface clearance as well as excavations for WEF access roads.								
	Severity	Extent	Duration	Consequence	Probability	Confidence	Status	Significance
Without Mitigation	Medium	Low	High	Medium	Medium	Medium	Negative	Medium
With Mitigation	Low	Low	High	Medium	Low	Medium	Negative & Positive	Low
Reversibility of impacts			Irreversible – palaeontological heritage resources are non-renewable and key contextual data for fossils (sedimentology, taphonomy) is difficult or impossible to reconstruct following disturbance.					
Loss of irreplaceable resources			Possible – well-preserved, scientifically valuable vertebrate fossils are scarce within the WEF project area but well-preserved fossil wood does occur here. Many of the fossils concerned are probably of widespread occurrence outside the WEF project area, including the access road footprint.					
Possibility of avoidance, management or mitigation of potential impacts			YES – effective mitigation of chance fossil finds during the construction phase is feasible.					
Mitigation measures:								
1) Safeguarding of chance fossil finds (preferably <i>in situ</i>) during the construction phase by the responsible ECO, followed by reporting of finds to ECPHRA. 2) Recording and judicious sampling of significant chance fossil finds by a qualified palaeontologist, together with pertinent contextual data (stratigraphy, sedimentology, taphonomy). 3) Curation of sampled fossil material within an approved repository (museum / university fossil collection) by a qualified palaeontologist.								

Table 2: Palaeontological heritage impact assessment table for the construction phase of the proposed access road upgrades for the authorised Haga Haga WEF covered by the present Basic Assessment process (N.B. Significant further impacts are not anticipated in the operational and de-commissioning phases).

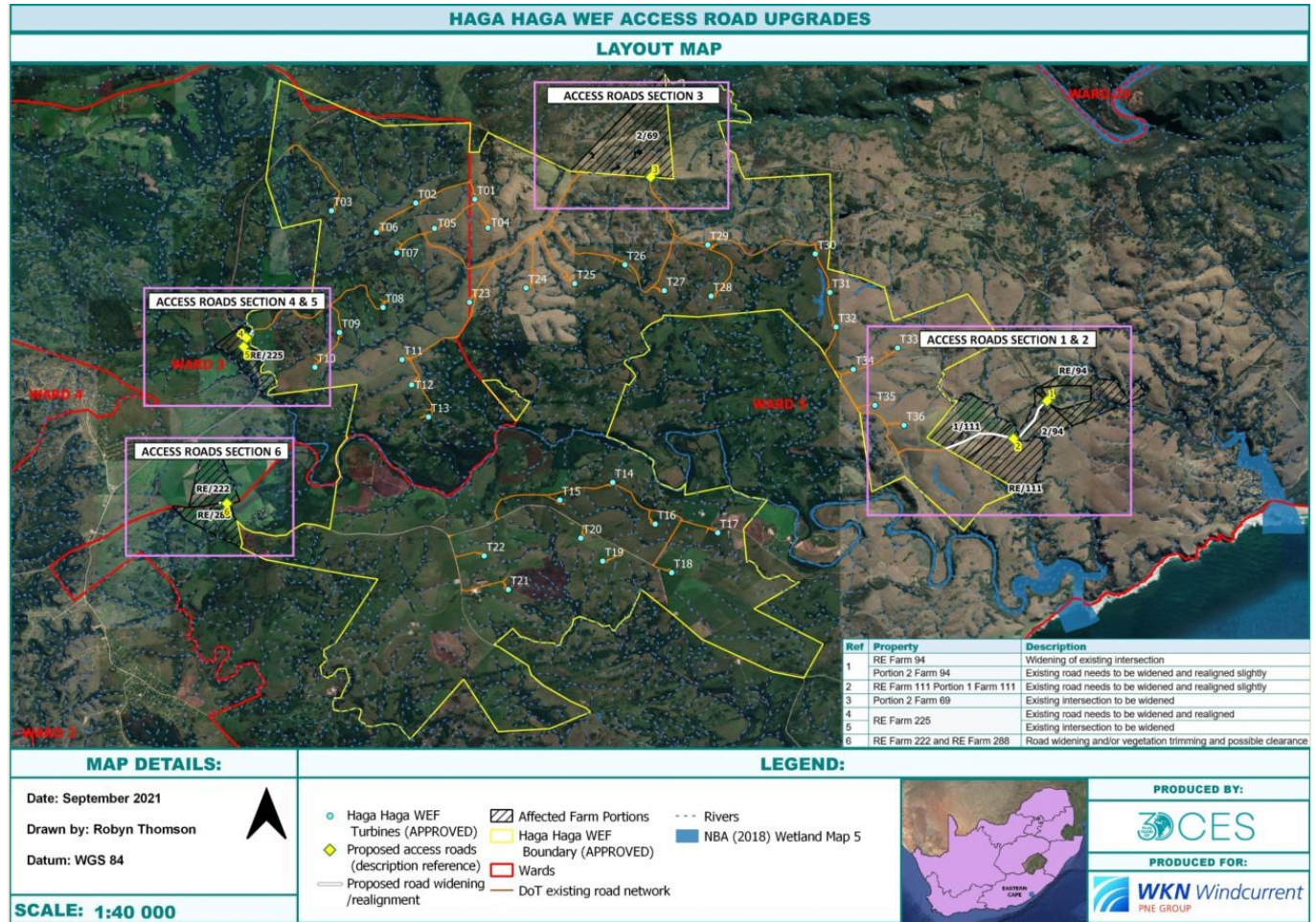


Figure 1: Google Earth© satellite image showing the Haga Haga WEF project area (yellow polygon) as well as the amended layout of the wind turbine positions and internal access road network (orange). Proposed upgrades to several of the site access points and roads on farm portions (cross-hatched polygons) which were not included in the previous application are annotated on the map (see following four figures for details).

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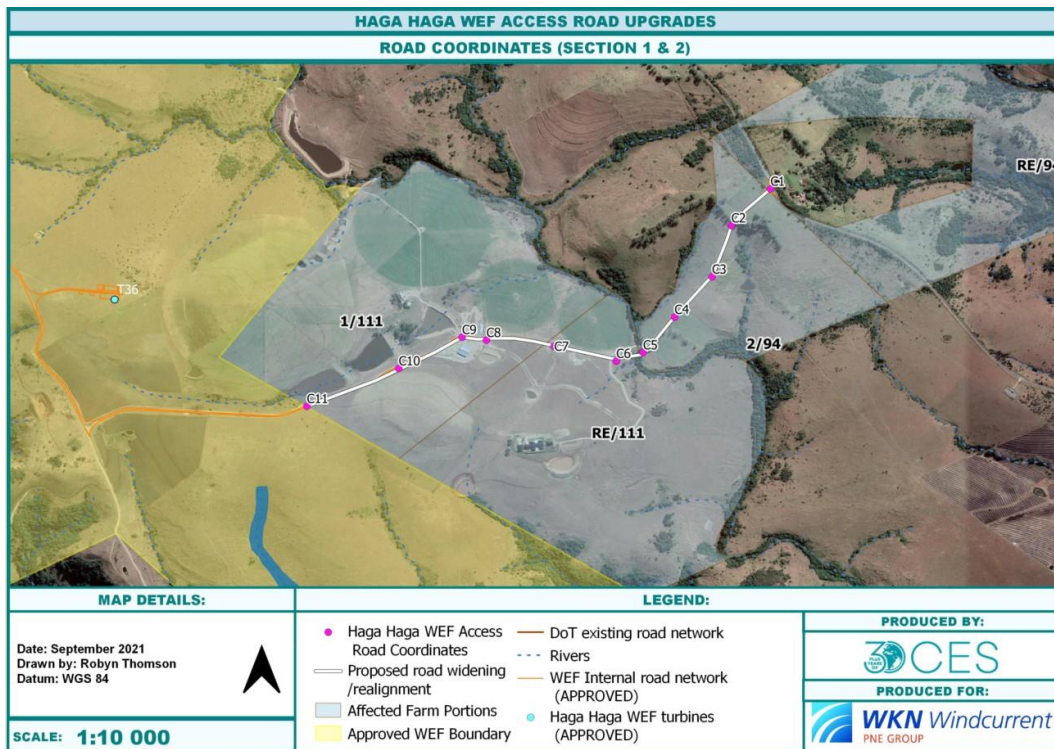


Figure 2: Proposed Haga Haga WEF access road upgrades (Sections 1 & 2).

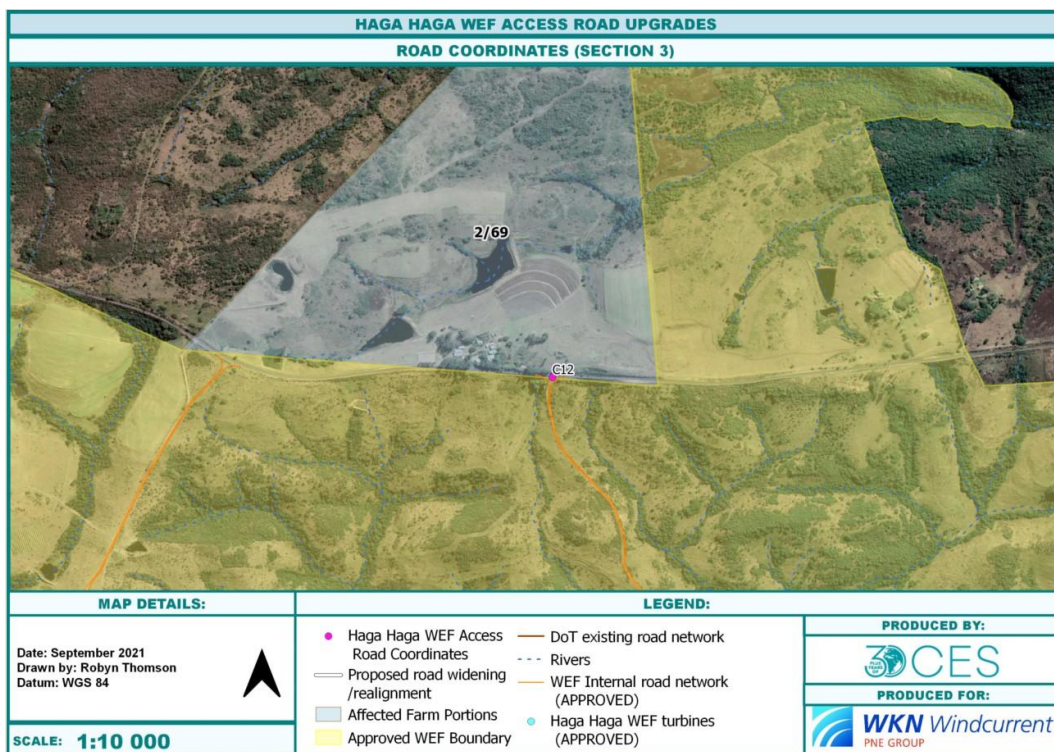


Figure 3: Proposed Haga Haga WEF access road upgrades (Section 3).

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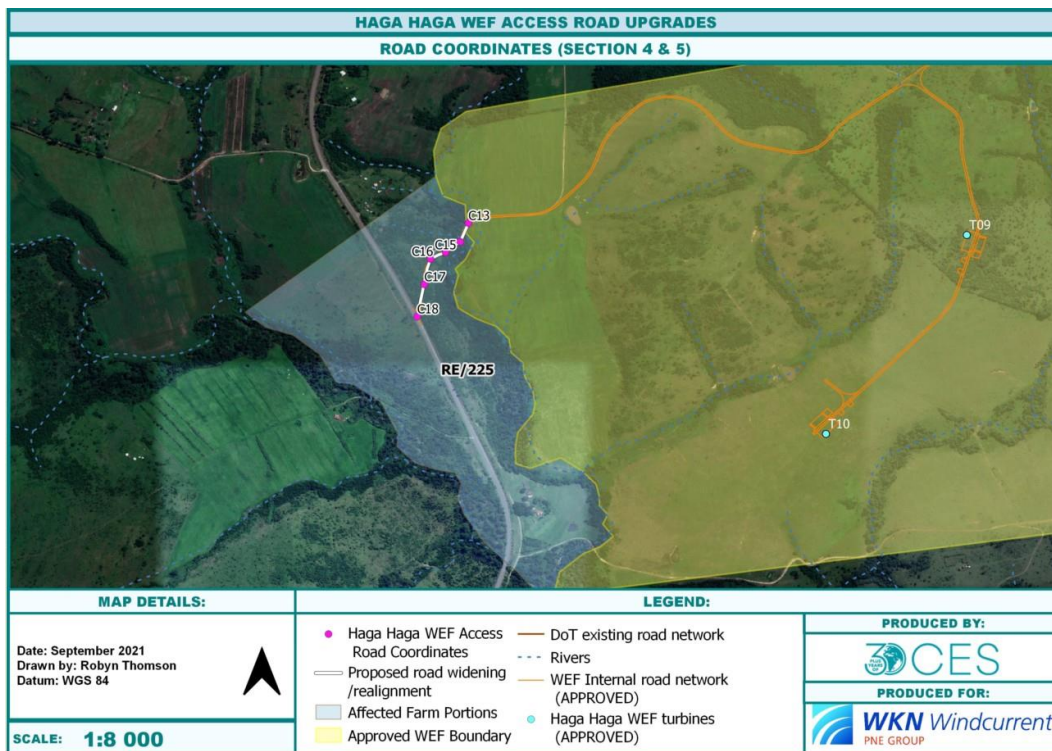


Figure 4: Proposed Haga Haga WEF access road upgrades (Sections 4 & 6).

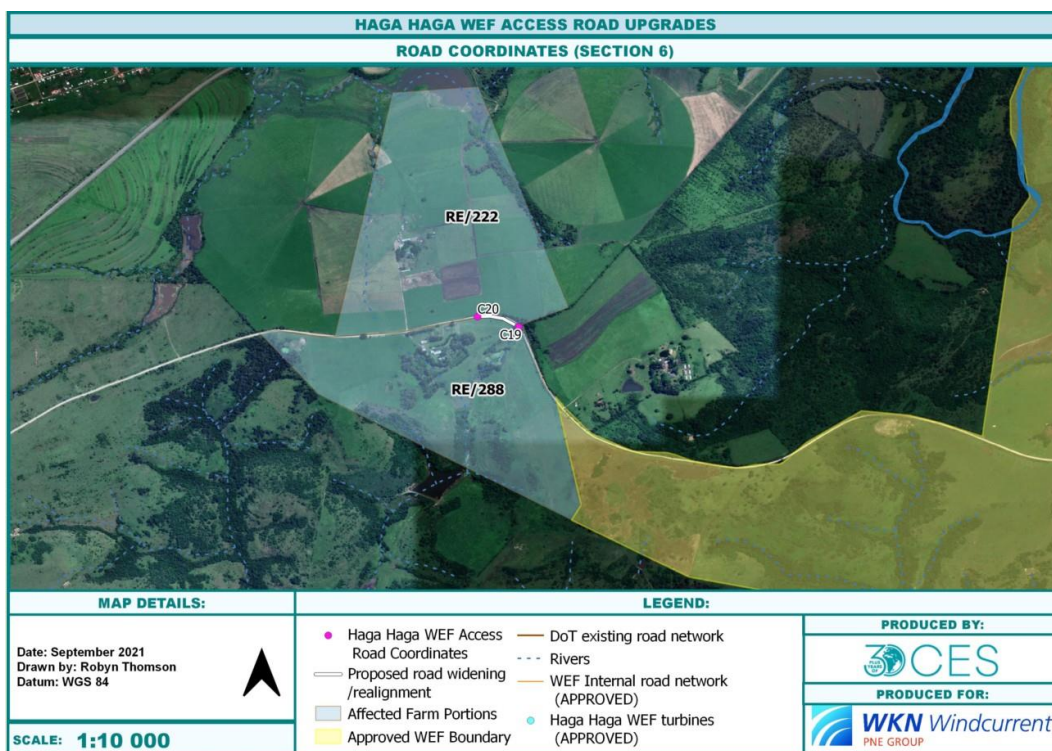


Figure 5: Proposed Haga Haga WEF access road upgrades (Section 6).

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APPENDIX - CHANCE FOSSIL FINDS PROCEDURE: Access road upgrades for the Haga Haga Wind Farm near East London	
Province & region:	EASTERN CAPE: Komga District
Responsible Heritage Resources Agency	ECPHRA (Contact details: Mr Sello Mokhanya, 74 Alexander Road, King Williams Town 5600; smokhanya@ecphra.org.za)
Rock unit(s)	Balfour Formation (Beaufort Group), Masotcheni Formation (Pleistocene – Holocene)
Potential fossils	Fossil bones, teeth of vertebrates, petrified wood, trace fossils (<i>e.g.</i> vertebrate burrows) in the Balfour Formation. Fossil teeth, bones and horn cores of mammals, calcretised trace fossils and reworked petrified wood in Pleistocene and younger colluvial and alluvial deposits.
ECO protocol	1. Once alerted to fossil occurrence(s): alert site foreman, stop work in area immediately (<i>N.B.</i> safety first!), safeguard site with security tape / fence / sand bags if necessary.
	2. Record key data while fossil remains are still <i>in situ</i> : Accurate geographic location – describe and mark on site map / 1: 50 000 map / satellite image / aerial photo Context – describe position of fossils within stratigraphy (rock layering), depth below surface Photograph fossil(s) <i>in situ</i> with scale, from different angles, including images showing context (<i>e.g.</i> rock layering)
	3. If feasible to leave fossils <i>in situ</i> : <ul style="list-style-type: none"> • Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation • Ensure fossil site remains safeguarded until clearance is given by the Heritage Resources Agency for work to resume
	3. If <i>not</i> feasible to leave fossils <i>in situ</i> (emergency procedure only): <ul style="list-style-type: none"> • <i>Carefully</i> remove fossils, as far as possible still enclosed within the original sedimentary matrix (<i>e.g.</i> entire block of fossiliferous rock) • Photograph fossils against a plain, level background, with scale • Carefully wrap fossils in several layers of newspaper / tissue paper / plastic bags • Safeguard fossils together with locality and collection data (including collector and date) in a box in a safe place for examination by a palaeontologist • Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation
	4. If required by Heritage Resources Agency, ensure that a suitably-qualified specialist palaeontologist is appointed as soon as possible by the developer.
	5. Implement any further mitigation measures proposed by the palaeontologist and Heritage Resources Agency
Specialist palaeontologist	Record, describe and judiciously sample fossil remains together with relevant contextual data (stratigraphy / sedimentology / taphonomy). Ensure that fossils are curated in an approved repository (<i>e.g.</i> museum / university / Council for Geoscience collection) together with full collection data. Submit Palaeontological Mitigation report to Heritage Resources Agency. Adhere to best international practice for palaeontological fieldwork and Heritage Resources Agency minimum standards.

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