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19 February 2020

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By email: christelle@ecosphere.co.za

Dear Christelle

PROPOSED POWERLINE RISIVILLE/MCKAY FEEDER LINE UPGRADE: HERITAGE SCREENING

Thank you for providing project information with regards to the proposed upgrading of the Risiville/Mckay Feeder Line near Vereeniging from a capacity of 11kV to 22kV (Figures 1 & 2). The proposal is to reuse the same alignment along Hawthorn Street but then switch to the northern side of Grens Street for the west-east section of the route (the existing powerline is on the southern side of this road). The total length of the proposed upgrade is 3.3 km. Along Hawthorn Street the new poles will be placed in the same foundation holes utilised by the existing 11kV power line, but new holes will be excavated along Grens Street. The old line would be decommissioned and removed. It is noted that the surface along the south side of Grens Street is sloping an unsuitable for the new powerline, hence the need to move it to the north side of the road.

This screening study is to be submitted to Provincial Heritage Resources Authority Gauteng (PHRA-G; responsible for built environment and cultural landscapes) and the South African Heritage Resources Agency (SAHRA; responsible for archaeology and palaeontology) via the online South African Heritage Resources Information System (SAHRIS) in motivation for exemption from further studies.

Several types of heritage resources could conceivably be impacted and these are dealt with in turn.

Archaeology

Although Iron Age remains occur widely in the Gauteng area, the majority are located close to rock outcrops because the rocks were used in the construction of stone-walled settlements. Stone Age artefacts can be expected to occur in very low densities (essentially precolonial litter). Other archaeological materials are unlikely to occur. Only one previous survey in the immediate vicinity is known to have occurred. Van Vollenhoven (2008)¹ did not locate any significant materials in an area just southwest of the present project (along the edge of the urban area). A road construction project has been proposed along Grens Street but

¹ Van Vollenhoven, A.C. 2008. A report on a Cultural Heritage Impact Assessment for two proposed water pipe lines in the Midvaal municipal area, Gauteng Province. Unpublished report prepared for Nature & business Alliance Africa (Pty) Ltd.

has not yet been assessed (Bokamoso 2015)². The low likelihood of isolated finds being made means that no significant impacts to archaeological resources are expected.

Palaeontology

The SAHRIS Palaeosensitivity map shows the site to be of very high palaeontological sensitivity. Because of this a brief specialist assessment was commissioned in order to inform this screening study. Dr John Almond examined the area from the desktop and produced the report attached to this letter as Appendix 1. He finds that the study area is underlain by sediments of the Vryheid Formation which are internationally renowned for the rich assemblages of plant fossils they contain. He notes that the surface lacks rock outcrops and that the uppermost bedrock is likely to be well-weathered due to proximity to the surface. In addition, the project is most likely to impact largely the younger, unconsolidated superficial sediments which are considered to be of low palaeontological sensitivity. No significant impacts to palaeontological resources are expected and Dr Almond sees no need for any further assessment for this project, so long as a chance fossil finds procedure is incorporated into the Environmental Management Plan. He has appended one to his report and this can be extracted for use.

Graves

Unmarked precolonial graves can occur anywhere and their locations can be impossible to predict. However, given the alignment of the proposed project along an existing servitude and road, and between ploughed lands, as yet undiscovered graves are highly unlikely to occur.

Built environment

Just one building occurs close to the route. This lies at the southern end of Hawthorn Street, on its eastern side (Figure 6). It is not possible to tell whether the house existing in 1961 is still present within the modern structure, but at the minimum the original building does appear, from its roofscape, to have been extensively modified. It will not be impacted in any way and is of no further relevance.

Cultural landscape

Cultural landscapes can be defined briefly as “the spatial manifestation of the relations between humans and their environment” (Marquart & Crumley 1987: 1)³. The study area is rural in nature with gravel roads, tree lines and arable lands characterizing the landscape. The edge of the urban landscape of Vereeniging is not far away to the southwest, however. The tree lines are the most visibly striking elements of the cultural landscape and the 600 m tree line along the northern side of Grens Street will be impacted. It will either need to be trimmed or else trees will be removed where necessary in order to create the necessary safety distance between the trees and the powerline. Figures 6 and 7 show that in 1961 there were no tree lines along either Grens or Hawthorn Streets. Figure 8 shows the Grens Street tree line to still be absent but the Hawthorn

² Bokamoso Environmental. 2015. Draft Environmental Scan for the Route Determination Stage of the Proposed Road K47, between the proposed Road K83 and the Proposed PWV 20, in the Vereeniging Area, Gauteng Province. Unpublished report prepared for Gauteng Department of Roads and Transport.


³ Marquart, W.H. & Crumley, C.L. 1987. Theoretical issues in the analysis of spatial patterning. In: Crumley, C.L. & Marquart, W.H. (eds) Regional Dynamics: Burgundian Landscapes in Historical Perspective. San Diego: Academic Press.

Street one is just visible (i.e small, young trees). Figure 9 shows that by 1985 the Grens Street tree line was still not present but that along Hawthorn had grown up considerably. It is only the younger tree line (along Grens Street) that will be affected. While it is an integral part of the cultural landscape it should be noted that it is not an historical tree line and that other tree lines occur in the surrounding area including along Brocket Street both north and south of its Grens Street intersection.

Conclusions

This screening study has found that only one aspect of heritage will be affected. This relates to the removal of all or part of a 600 m long tree line along the northern side of Grens Street. The tree line is not historical (it is less than 35 years old). Given the presence of several other tree lines in the vicinity, the removal of this one is unlikely to constitute an impact of high significance. Because of the need to construct a safe powerline, there seems no point in further assessment of the cultural landscape impacts. Accordingly, this study recommends that PHRA-G and SAHRA should allow this project to proceed without the need for an HIA.

Yours sincerely



Jayson Orton

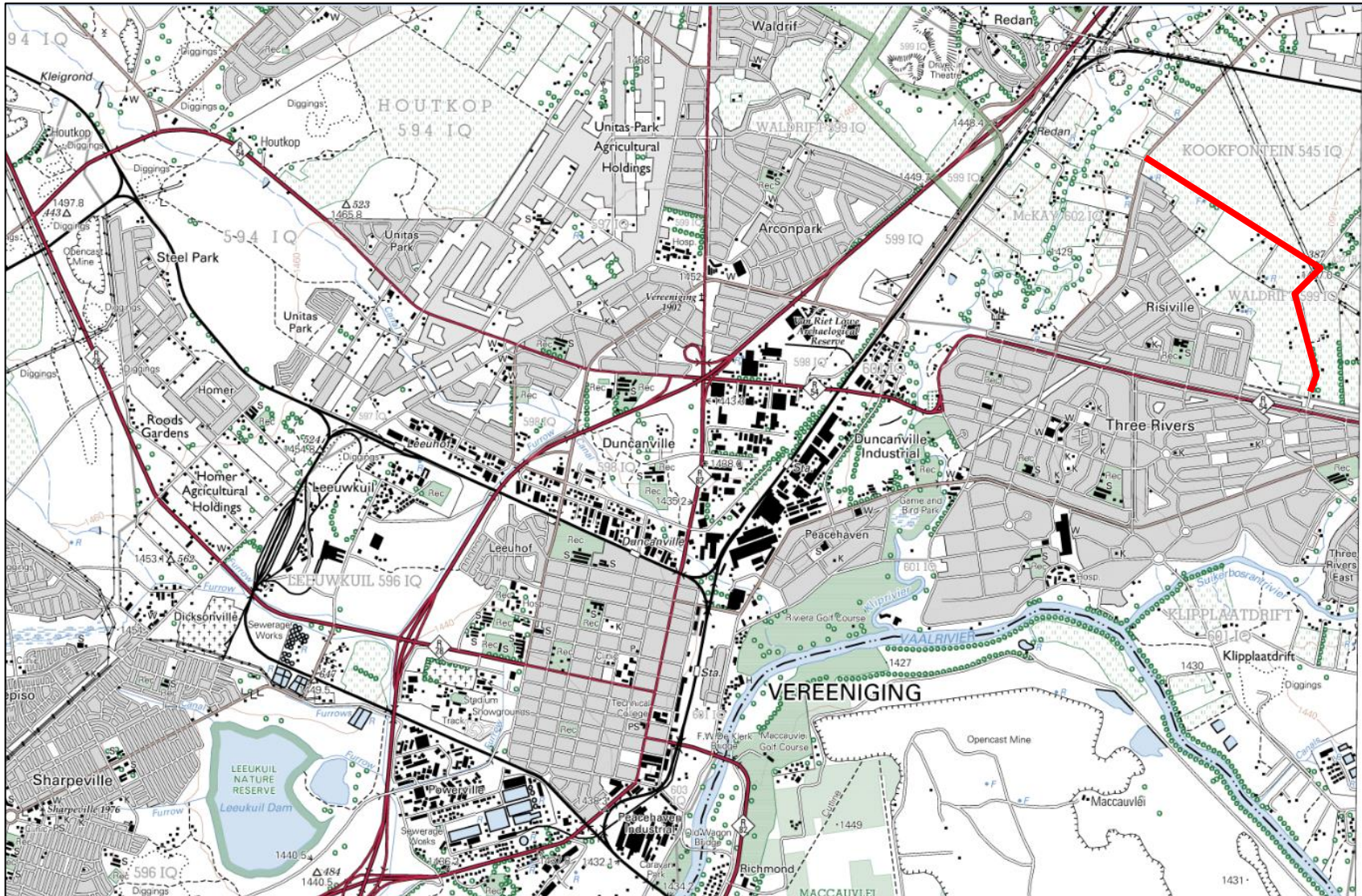


Figure 1: Extract from mapsheet 2627DB showing the location of the proposed powerline upgrade at the north-eastern edge of Vereeniging.

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Figure 2: Aerial view of the study area showing the alignment of the powerline proposed for an upgrade.

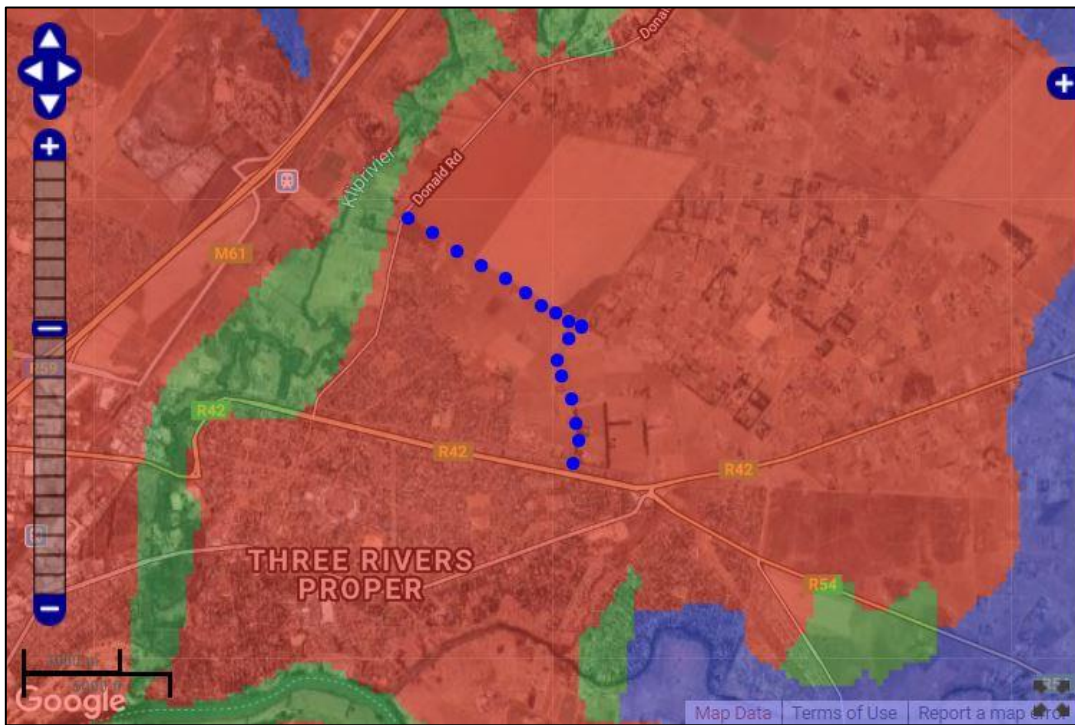


Figure 3: Extract from the SAHRIS Palaeosensitivity Map showing the study area (blue dotted line) to be of very high sensitivity (red shading).



Figure 4: View towards the southeast along Grens Street from the north-western end of the study area at the Brockett Street intersection. Source: Google Earth Street View.



Figure 5: View towards the north along Hawthorn Street from the south-eastern end of the study area. The pylon in view is where the upgrade commences. Source: Google Earth Street View.



Figure 6: Aerial photos from 1961 (Job 438, strip 022, photograph 03212) and 2019 (Google Earth) showing the nature of the landscape 60 years ago. The inset shows the house at the southern end of Hawthorn Street.

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Figure 7: As above but focused on Grens Street and showing the tree line to be absent.

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Figure 8: Aerial photos from 1969 (Job 653, strip022, photograph 05679) showing the tree line along Grens Street to be absent. The line along the southern end of Hawthorn Street is present but still small.



Figure 9: Aerial photos from 1985 (Job 881, strip 005, photograph 03071) showing the tree line along Grens Street to be absent. The line at the southern end of Hawthorn Street, however, was already present. The ends of the powerline are arrowed.

Appendix 1: Palaeontological screening study

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PIA INPUT: RECOMMENDED EXEMPTION FROM FURTHER PALAEOLOGICAL STUDIES
PROPOSED UPGRADE OF THE RISIVILLE / MCKAY 11 KV FEEDER LINE NEAR
VEREENIGING, MIDVAAL LOCAL MUNICIPALITY, GAUTENG PROVINCE

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February 2020



Figure 1. Google earth© satellite image showing the alignment for the Risiville / Mckay 11kV feeder line near Vereeniging, Midvaal Local Municipality, Gauteng Province.

1. Geological context

The project area for the 3.3 km-long Risiville / Mckay 11kV feeder line is situated within flat-lying agricultural terrain at c. 1450-1470 m amsl. on the north-eastern outskirts of Vereeniging (Fig. 1). The route is already disturbed by the existing powerline, road and agricultural developments. The meandering course of the Suikerbosrantrivier runs 3 to 5 km to the south of the project area, while there is a small tributary stream course just to the west and an opencast coalmine less than 2.5 km to the west. Satellite images suggest that the project area is mantled by alluvial soils and there is no bedrock exposure here.

The geology of the study area near Vereeniging, which lies towards the northern edge of the Main Karoo Basin, is shown on 1: 250 000 sheet 2626 West Rand (Council for Geoscience, Pretoria) (Fig. 2). A geological sheet explanation for this map has not yet been published but a more detailed geological map for Vereeniging has been published more recently by Bosch & Cronwright (2009). The Risiville / Mckay powerline project area is underlain by Middle Permian fluvio-deltaic sediments of the **Vryheid Formation** (Ecca Group, Karoo Supergroup) (Pv, grey in Fig. 2). This formation contains important seams of coal near-surface in the Vereeniging region, as shown by the opencast mines in the area (Johnson *et al.* 2006). It is likely that the subsurface Vryheid sediments within the development footprint are weathered and disturbed near surface. Outcrop

strips of Late Caenozoic alluvium (pale yellow in Fig. 2) run along the tributary stream of the Suikerbosrantrivier west and just outside the powerline project area.



Figure 2: Extract from 1: 250 000 geology sheet 2626 West Rand showing the route of the existing Risiville / McKay 11kV feeder line (orange line) on the NE outskirts of Vereeniging, Gauteng Province. The region is underlain by Middle Permian deltaic sediments of the Vryheid Formation (Ecca Group, Karoo Supergroup) (Pv, grey). A narrow strip of Late Caenozoic alluvium (pale yellow) is associated with a stream tributary of the Suikerbosrantrivier drainage system just to the west.

2. Palaeontological heritage

The Vryheid Formation is internationally famous for its Middle Permian fossil plants of the *Glossopteris* Flora of Gondwana (e.g. Plumstead 1969, 1973, Anderson & Anderson 1985, MacRae 1999, McCarthy & Rubidge 2005, Johnson *et al.* 2006, Prevec 2016) and its palaeosensitivity is therefore generally rated as Very High. Rich plant fossil assemblages – most notably well-preserved compression fossils preserved within shaly facies between coal seams - include rare mosses, lycopods and ferns (sphenophytes and others) as well as abundant and diverse representatives of the glossopterid “seed ferns”, cordaitaleans, conifers and ginkgoales. Other fossil groups represented include rich palynomorph assemblages (spores and pollens), leaf cuticles, algae, low-diversity non-marine trace fossils and sparse invertebrate faunas (e.g. non-marine bivalves, insects, conchostracan crustaceans). Vertebrate fossils are very poorly represented, comprising disarticulated fish remains (e.g. scales) as well as unsubstantiated reports of occasional “labyrinthodont” amphibians.

The Vereeniging coalfields have historically yielded especially rich Early Permian (late Sakmarian to late Artinskian) macrofossil plant assemblages of the *Glossopteris* Flora, including early examples of glossopterid leaves with attached fructifications (Leslie 1903, Leslie 1921, Anderson & Anderson 1985, Le Roux & Anderson 1977, Adendorff *et al.* 2003, Prevec *et al.* 2008, Bosch & Cronwright 2009 and refs. therein) However, the fossiliferous plant beds at Vereeniging are now largely inaccessible (Prevec *et al.* 2008). Palynomorph (spore and pollen) assemblages from the region have been treated by Millstead (1994). The Vereeniging palaeoflora is a typical Early Permian Gondwanan assemblage dominated by:

- Several spp of *Glossopteris* leaves (incl. gangamopteroid forms)
- *Noeggerathiopsis*
- *Palaeovittaria*
- Various lycophytes (e.g. *Cyclodendron*)
- Ferns (*Asterotheca*, *Sphenopteris*, *Liknopetalon*)
- Conifers (*Walkomiella*)
- Ginkgoalean leaves (*Ginkgophyllum*)
- Sphenophyte stems
- *Botrychiopsis*
- Range of scale leaves and seeds

3. Conclusions and recommendations

The Early Permian fluvio-deltaic bedrocks of the Vryheid Formation (Ecca Group) are potentially highly fossiliferous in the Vereeniging area where unusually rich fossil plant assemblages have been recorded in the past. However, within the Risiville / Mckay 11kV feeder line project footprint the Vryheid Formation bedrocks are likely to be highly-weathered and disturbed near-surface. Pylon footings are small and shallow and will largely (or perhaps entirely) impact Late Cenozoic alluvial soils and gravels of low palaeontological sensitivity. The powerline footprint is minuscule compared with that of nearby open-cast mines that are exploiting local, highly-fossiliferous coal seams. Late Cenozoic superficial sediments in the area (e.g. soils, colluvium) are likely to be of low palaeontological sensitivity. The additional or cumulative impact on local heritage resources posed by the proposed powerline development is considered to be negligible (Very Low impact significance).

There are no objections on palaeontological heritage grounds to authorisation of the proposed powerline development. Pending the discovery of substantial new fossil remains during construction, it is recommended that exemption from further specialist palaeontological studies is granted for the proposed upgrade of the Risiville / Mckay 11kV feeder line near Vereeniging, Gauteng Province

Any substantial fossil remains (e.g. vertebrate bones and teeth, shells, well-preserved plant remains) encountered during excavation should be reported to SAHRA for possible mitigation by a professional palaeontologist (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). A tabulated Chance Fossil Finds Procedure is appended to this report.

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CHANCE FOSSIL FINDS PROCEDURE: UPGRADE OF THE RISIVILLE / MCKAY 11 KV FEEDER LINE NEAR VEREENIGING		
Province & region:	Gauteng, Midvaal Local Municipality	
Responsible Heritage Resources Agency	SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za	
Rock unit(s)	Early Permian Vryheid Formation (Ecca Group, Karoo Supergroup) Late Caenozoic alluvium, calcretes along water courses and calcrete hardpans	
Potential fossils	Potentially rich assemblages of plant fossils (<i>Glossopteris</i> Flora), including tree trunks, stumps and roots, palynomorphs, rare insects, conchostracans, low diversity trace fossil assemblages within Ecca Group bedrocks. Bones, teeth and horn cores of mammals, freshwater molluscs, calcretised termitaria and other trace fossils within Late Caenozoic 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> : <ul style="list-style-type: none"> • 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 (e.g. rock layering) 	
	3. If feasible to leave fossils <i>in situ</i> : 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): <i>Carefully</i> remove fossils, as far as possible still enclosed within the original sedimentary matrix (e.g. 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 (e.g. 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.	