

**PHASE 1 ARCHAEOLOGICAL IMPACT
ASSESSMENT FOR A PROPOSED MINING
RIGHT APPLICATION ON THE FARM
CROPWELL 384/1
BETWEEN KURUMAN AND KATHU,
NORTHERN CAPE.**

NC30/5/1/3/2/11005MP

David Morris
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Executive Summary

This is a Phase 1 Archaeological Impact Assessment for proposed borrow pit mining for gravel and filling material on the farm Cropwell 384/1 situated between Kuruman and Kathu, on the western foot slope of the Kuruman Hills.

The 5 ha area of proposed mining was examined and, besides traces of previous borrow pit quarrying, no material traces of past human, archaeological or historical, graves or farm infrastructure, were noted inside the area of expected impact. Proposed haul road access is to follow existing roads.

From an archaeological and cultural heritage perspective the significance of impact scores LOW in terms of the criteria applied.

1. Introduction

This report provides a Phase 1 Archaeological Impact Assessment for a proposed mining application on the farm Cropwell 384/1 situated north of the N14 road between Kuruman and Kathu, Northern Cape (NC30/5/1/3/2/11005mp).

The investigator was contacted by Mr Klaas van Zyl (082 8898696) on behalf of Alcon Civil Projects (Pty) Ltd (contact Carinus Maritz Joubert 082 969 8794 E-Mail: cmecivils@gmail.com), to undertake the Phase 1 AIA on a 5 Ha proposed mining area on Portion of Portion 1 Farm Cropwell No 384, situated 21 km west of Kuruman, north of the N14 to Kathu, in the John Taolo Gaetsewe District Municipality, Northern Cape. The property is registered in the name of National Government of the Republic of South Africa (Title deed T3462/2017, Vryburg Deeds Office).

The aim of this Phase 1 impact assessment is to determine the occurrence and nature of archaeological heritage traces or features within the footprint of the proposed mining (borrow pit) area.

1.1 Focus and Content of Specialist Report: Archaeology

This is a stand-alone Phase 1 Archaeological Impact Assessment report and incorporates the following information:

- » Introduction to the Specialist in terms of qualifications, accreditation and experience to undertake the study (1.2, below)
- » Description of the affected environment (2)
- » Description of heritage features of the region (2.1)
- » Description of issues identified ahead of the study (2.2)
- » Methodology of determining the significance of the impacts and assumptions as well as scoping phase predictions (3)
- » Observations and Assessment of impacts (4)
- » Conclusions (5)

1.2 Archaeology Specialist

The author of this report is an archaeologist accredited as a Principal Investigator by the Association of Southern African Professional Archaeologists, having previously carried out surveys and fieldwork on sites in the region (e.g., Beaumont & Morris 1990; Morris & Beaumont 2004; Chazan et al. 2017).

The author works independently of the organization commissioning this specialist input, and provides this Phase 1 AIA (archaeology and colonial material culture traces but not palaeontology) within the framework of the National Heritage Resources Act (No 25 of 1999).

The National Heritage Resources Act no. 25 of 1999 (NHRA) protects heritage resources which include archaeological and palaeontological objects/sites older than 100 years, graves older than 60 years, structures older than 60 years, as well as intangible values attached to places. The Act requires that anyone intending to disturb, destroy or damage such sites/places, objects and/or structures may not do so without a permit from the relevant heritage resources authority.

Heritage is assessed in terms of a NEMA application, and must comply with section 38(3) of the NHRA. SAHRA would then comment and make recommendations on the potential impacts.

(Where archaeological sites and palaeontological remains are concerned, the South African Heritage Resources Agency (SAHRA) at national level acts on an agency basis for the Provincial Heritage Resources Agency (PHRA) in the Northern Cape. The Northern Cape Heritage Resources Authority (formerly called Ngwao Bošwa ya Kapa Bokone) is responsible for the built environment and other colonial era heritage and contemporary cultural values).

2. Description of the affected environment and potential impacts

The environment in question is situated on the western footslope of a spur of the Kuruman Hills which run north-south between Kuruman and Kathu (Figure 1). The sloping local landscape is composed of amygdaloidal and andesitic lava (with tuff agglomerate, chert and red jasper) within the Ongeluk Formation (Postmasburg Group) of the Transvaal Supergroup. Topsoil is limited on the upper slope, thickening as the topography begins to level downslope. Vegetation consists of Kuruman Thornveld.

Mining is proposed to be in the form of an opencast mine. Disturbed areas are to be demarcated as laydown and stockpile areas, with topsoil cleared and stockpiled separately for later use in the rehabilitation phase (oversize material and rocks also removed and stockpiled separately for quarry rehabilitation).



Figure 1. Location of proposed mining site between Kuruman and Kathu.

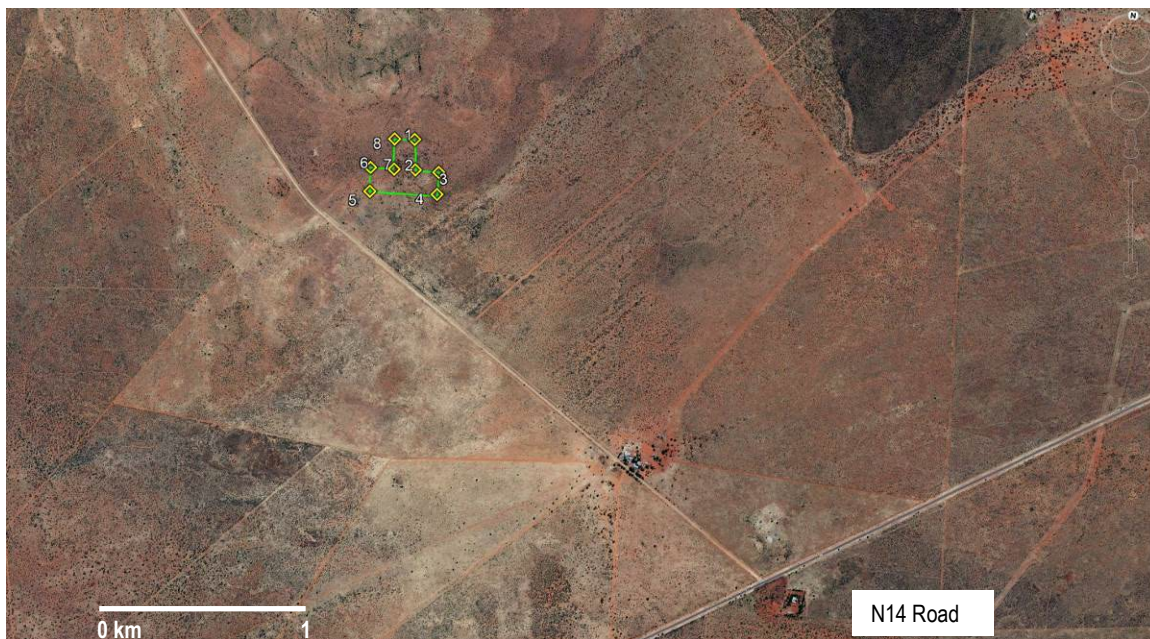


Figure 2. Google Earth image indicating the proposed Cropwell borrow pit mining site north of the N14 road between Kuruman and Kathu.



Figure 3. A view upslope at the Cropwell quarry site

2.1 Description of heritage features of the region

From records at the McGregor Museum and on SAHRIS no previous archaeological survey work had been carried out on the property Cropwell 384.

Significant archaeological sites are known from the wider region, most notably the Grade 1 National Heritage Site of Wonderwerk Cave some 50 km south east of Cropwell, and the Kathu Archaeological Complex about 30 km south west of the farm.

Broadly speaking, the archaeological record of this region reflects the long span of human history from Earlier Stone Age times (some 2 million years, at Wonderwerk Cave, to about 250 000 years ago), through the Middle Stone Age (to about 30 000 years ago), to the Later Stone Age (up to the protocolonial era). The last 2000 years was a period of increasing social complexity with the appearance of farming (herding and agriculture) alongside foraging, and of ceramic and metallurgical (Iron Age) technologies alongside an older trajectory of stone tool making. Iron Age pottery has been found at and near Kathu and at sites in the Langeberg west of the study site.

Of interest in this area is evidence of early mining of specularite, a sparkling mineral that was used in cosmetic and ritual contexts in from early times (Beaumont 1973). Rock art is known in the form of rock engravings, e.g., at Beeshoek (near Postmasburg) and Daniëlskuil, and as finger paintings at Wonderwerk Cave and in small shelters in the Kuruman Hills and Langeberg (Fock & Fock 1984; Morris 2016).

Wonderwerk Cave (Chazan et al. 2017) and the Kathu sites provide important sequences and contexts against which to assess the age and significance of any Stone Age finds that may be made at Cropwell.

There is no indication of Early Iron Age occupation in this drier western interior, with the highveld being occupied by Later Iron Age farmers (Sotho-Tswana) from the mid-second-millennium CE. The western edge of this spread was represented by Tlhaping and Tlharo in the later eighteenth century and occupied by them (alongside, or with enclaves of, San and Korana, and frontier communities of Griqua) until the colonial wars, particularly the Phokwane and Langeberg Wars of 1878-9 and 1896-7, whereafter land – incorporated into the colony – was divided into white-owned farms.

The main axis of colonial penetration north of the Orange River had been the so-called missionary road through Tsantsabane (Postmasburg) to Kuruman, passing up the western flank of the Kuruman Hills, close by Cropwell farm. Colonial towns emerged in the late nineteenth century, notably, Kuruman in proximity to the LMS Moffat Mission Station, and a secular colonial municipality from 1895, while Kathu sprang up as a mining centre in the mid-twentieth century. Kuruman was fortified (and besieged) during the Anglo-Boer War. Colonial farmsteads dot the landscape, and graves of settlers and labour associated with these farms occur.

2.2 Description and evaluation of environmental issues and potential impacts identified in the scoping phase

Heritage resources including archaeological sites are in each instance unique and non-renewable resources. Area and linear developments/mining can have a permanent destructive impact on these resources. The objective of an AIA would be to assess the sensitivity of such resources where present, to evaluate the significance of potential impacts on these resources and, if and where appropriate, to recommend no-go areas and measures to mitigate or manage said impacts.

A relatively localised (5 ha) area impacts are expected in the case of the proposed Cropwell quarrying operation, with linear impacts limited to existing roads through and across a part of the farm.

2.2.1 Direct, indirect and cumulative impacts (in terms of nature, magnitude and extent)

The destructive impacts that are possible in terms of heritage resources would tend to be direct, once-off events occurring during prospecting events. In the long term, the proximity of operations in a given area could result in secondary indirect impacts resulting from the movement of vehicles and people in the immediate or surrounding vicinity. There are no known heritage resources in the local area outside of the area of proposed mining.

3. METHODOLOGY

A site visit was carried out on 16 March 2023 in the company of a Plant/Concrete Foreman from Alcon Civil Projects (who facilitated access onto communal land), and the full extent of the proposed borrow pit was investigated on foot.

3.1 Assumptions and limitations

It was assumed that, by and large in this landscape, with its relatively sparse vegetation between scattered thorn trees, and generally shallow to absent topsoil, surface archaeological visibility would be reasonable to good. The at times steeply sloping hill side topography is composed of largely exposed bedrock and scree, while the lower slope levels off with shallow sandy topsoil. It was found that substantial parts of the area were disturbed by previous quarrying so that in parts the original surfaces were already mined away. However, there remains potential for significant features to be obscured below the present surface. In the event of chance finds being made during mining or any related operation (these could include an unmarked burial, an ostrich eggshell water flask cache, or a high density of stone tools, for instance), work should cease and the find reported to the heritage authority for further investigation and decision on possible mitigation.

3.2 Scoping: predictions prior to the field visit

» It was noted that significant sites are known in the wider area, particularly Wonderwerk Cave and the Kathu Complex, and rock art in the form of engravings and finger paintings in different landscape settings; the implication being that sites with similar features could be found elsewhere in the same general landscape. Yet, it has been noted that Wonderwerk Cave, the Kathu sites and the rock art occurrences are in often highly

singular topographic occurrences (in a unique cave; around sinkhole occurrences and in rock shelters/distinctive rock exposures, respectively).

It was not expected that the Cropwell site would share any of the features that distinguish the above major archaeological sites. The occurrence of andesitic rock exposures on the Cropwell slope might support rock engravings, however.

- » In the vicinity of farm homesteads there could be noteworthy heritage features including possible colonial/recent farm graves. However, the localized Cropwell mining site is some distance from the nearest homestead.

3.3 Potentially significant impacts to be assessed in the EIA process

Any area or linear, primary and secondary, disturbance of surfaces in proposed mining site could have a destructive impact on heritage resources, where present. In the event that such resources are found, they are likely to be of a nature that potential impacts could be mitigated by documentation and/or salvage following approval and permitting by the South African Heritage Resources Agency and, in the case of any built environment features, by the Northern Cape Provincial Heritage Authority. There may be some that could require preservation *in situ* and hence modification of proposed prospecting configuration.

Disturbance of surfaces includes any construction: of a structure or plant, a road, a pipeline or powerline, or any other *clearance of*, or *excavation* into, a land surface. In the event of archaeological materials being present such activity would alter or destroy their context (even if the artefacts themselves are not destroyed, which is also obviously possible). Without context, archaeological traces are of much reduced significance. It is the contexts as much as the individual items that are protected by the heritage legislation.

3.4 Determining archaeological significance

In addition to guidelines provided by the National Heritage Resources Act (Act No. 25 of 1999), a set of criteria based on Deacon (nd) and Whitelaw (1997) for assessing archaeological significance has been developed for Northern Cape settings (Morris 2000a). These criteria include estimation of landform potential (in terms of its capacity to contain archaeological traces) and assessing the value to any archaeological traces (in terms of their attributes or their capacity to be construed as evidence, given that evidence is not given but constructed by the investigator).

Estimating site potential

Table 1 (below) is a classification of landforms and visible archaeological traces used for estimating the potential of archaeological sites (after J. Deacon nd, National Monuments Council). Type 3 sites tend to be those with higher archaeological potential, but there are notable exceptions to this rule, for example the renowned rock engravings site Driekopseiland near Kimberley which is on landform L1 Type 1 – normally a setting of lowest expected potential. It should also be noted that, generally, the older a site the poorer the preservation, so that sometimes *any* trace, even of only Type 1 quality, can be of exceptional significance. In light of this, estimation of potential will always be a matter for archaeological observation and interpretation.

Assessing site value by attribute

Table 2 is adapted from Whitelaw (1997), who developed an approach for selecting sites meriting heritage recognition status in KwaZulu-Natal. It is a means of judging a site's archaeological value by ranking the relative strengths of a range of attributes (given in the second column of the table). While aspects of this matrix remain qualitative, attribute assessment is a good indicator of the general archaeological significance of a site, with Type 3 attributes being those of highest significance.

Table 1. Classification of landforms and visible archaeological traces for estimating the potential for archaeological sites (after J. Deacon, National Monuments Council).

Class	Landform	Type 1	Type 2	Type 3
L1	Rocky surface	Bedrock exposed	Some soil patches	Sandy/grassy patches
L2	Ploughed land	Far from water	In floodplain	On old river terrace
L3	Sandy ground, inland	Far from water	In floodplain or near feature such as hill	On old river terrace
L4	Sandy ground, Coastal	>1 km from sea	Inland of dune cordon	Near rocky shore
L5	Water-logged deposit	Heavily vegetated	Running water	Sedimentary basin
L6	Developed urban	Heavily built-up with no known record of early settlement	Known early settlement, but buildings have basements	Buildings without extensive basements over known historical sites
L7	Lime/dolomite	>5 myrs	<5000 yrs	Between 5000 yrs and 5 myrs
L8	Rock shelter	Rocky floor	Sloping floor or small area	Flat floor, high ceiling

Class	Archaeo-logical traces	Type 1	Type 2	Type 3
A1	Area previously excavated	Little deposit remaining	More than half deposit remaining	High profile site
A2	Shell or bones visible	Dispersed scatter	Deposit <0.5 m thick	Deposit >0.5 m thick; shell and bone dense
A3	Stone artefacts or stone walling or other feature visible	Dispersed scatter	Deposit <0.5 m thick	Deposit >0.5 m thick

Table 2. Site attributes and value assessment (adapted from Whitelaw 1997)

Class	Attribute	Type 1	Type 2	Type 3
1	Length of sequence/context	No sequence Poor context Dispersed distribution	Limited sequence	Long sequence Favourable context High density of arte/ecofacts
2	Presence of exceptional items (incl regional rarity)	Absent	Present	Major element
3	Organic preservation	Absent	Present	Major element
4	Potential for future archaeological investigation	Low	Medium	High
5	Potential for public display	Low	Medium	High
6	Aesthetic appeal	Low	Medium	High
7	Potential for implementation of a long-term management plan	Low	Medium	High

4. OBSERVATIONS AND ASSESSMENT OF IMPACTS

The ways in which archaeological and other heritage traces or values might be impacted by the proposed prospecting is summed up with reference to the National Heritage Resources Act (No 25 of 1999) in the following terms: it would be any act or activity that would result immediately or in the future in the destruction, damage, excavation, alteration, removal or collection from its original position, any archaeological material or object. The most obvious impact in this case would be land surface disturbance (quarrying) at the borrow pit site. Access to the mining site is proposed to use existing roads.

4.1 Fieldwork observations

The Cropwell borrow pit site was visited on 16 March 2023. In summary the findings can be reported in relation to predictions made in the scoping report (see 3.2 above):

4.1.1 Presence of significant sites:

No Stone Age traces were observed on the moderately to steeply sloping hillside.

Several exposures of amygdaloidal andesite were inspected for possible rock engravings, but none was found.

The only 'heritage' features observed were remains of previous quarrying from which it was clear that the site was formerly used as a borrow pit, most likely for road construction in the area. Some metal objects were observed.

Apart from these mining features, no colonial/recent/farming infrastructure, homesteads, ruins, or graves were noted.



Figure 4. Thicker sand on the lower slope of the hillside, no stone artefacts observed.



Figure 5. Rubble and stony ground disturbed over much of the site by prior quarrying.



Figure 6. Partially rehabilitated previous quarry edge.



Figure 7. Quarry edge and broken andesite pieces from previous borrow pit operation.



Figure 8. Old quarry edge.



Figure 9. Exposed bedrock – not suitable for rock engravings – none found.

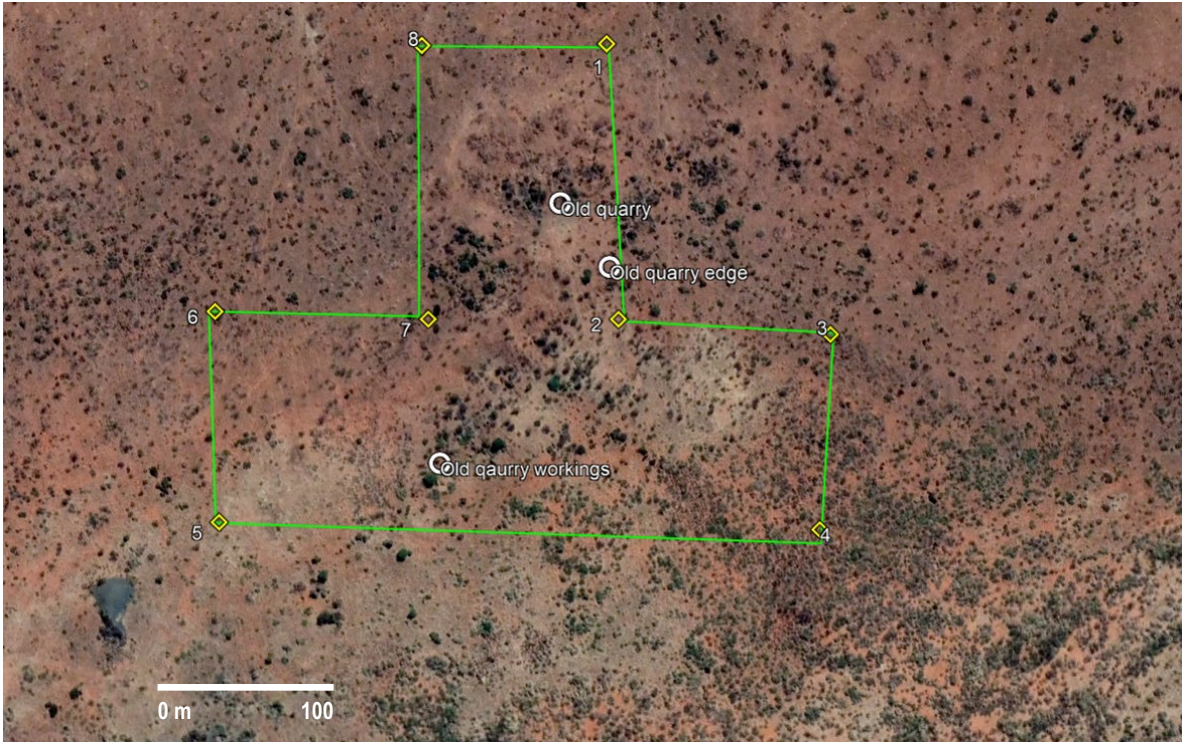


Figure 10. View westward from highest point above the earlier borrow pit operations.



Figure 11. Metal object found in old quarry.

Site	Lat	Long	Description
1	27.30.07	23.14.16	Edge of historical quarry
2	27.30.08	23.14.17	Edge of historical quarry with metal objects
3	27.30.11	23.14.14	Historical quarrying
4	27.30.13	23.14.08	Historical man-made sand dam



4.1.2 Colonial era features such as graves:

None noted (see above).

4.2 Characterising the archaeological significance (Refer to 3.4 above)

In terms of the significance matrices in Tables 1 and 2 under 3.4 above, any archaeological observations that might have been made would fall under Landform L1 Type 1. As archaeological traces they would most likely fall under Class A3 Type 1. All of these ascriptions (Table 1) reflect poor contexts and low significance for these criteria.

For site attribute and value assessment (Table 2), no assessment is made except for the traces of previous mining activity (less than 100 years old and hence not strictly 'archaeological'), falling under Type 1 for Classes 1-7, again reflecting low significance, low potential and absence of contextual and key types of evidence.

4.3 Characterising the significance of impacts – preliminary findings for part of the property

The following weighted criteria are used in this study to characterise the significance of direct, indirect and cumulative impacts:

- » **Nature:** description of what causes the effect, what will be affected, and how it will be affected.
- » **Extent:** whether the impact will be local (limited to the immediate area or site of development) or wider:
 - * local extending only as far as the development site area – assigned a score of 1;
 - * limited to the site and its immediate surroundings (up to 10 km) – assigned a score of 2;
 - * will have an impact on the region – assigned a score of 3;
 - * will have an impact on a national scale – assigned a score of 4; or
 - * will have an impact across international borders – assigned a score of 5.
- » **Duration:**
 - * the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
 - * the lifetime of the impact will be of a short duration (2–5 years) – assigned a score of 2;
 - * medium-term (5–15 years) – assigned a score of 3;
 - * long term (> 15 years) – assigned a score of 4; or

- * permanent - assigned a score of 5.

» **Magnitude:**

- * 0 is small and will have no effect on the environment;
- * 2 is minor and will not result in an impact on processes;
- * 4 is low and will cause a slight impact on processes;
- * 6 is moderate and will result in processes continuing but in a modified way;
- * 8 is high (processes are altered to the extent that they temporarily cease); and
- * 10 is very high and results in complete destruction of patterns and permanent cessation of processes.

» **Probability** of actual occurrence:

- * 1 is very improbable (probably will not happen);
- * 2 is improbable (some possibility, but low likelihood);
- * 3 is probable (distinct possibility);
- * 4 is highly probable (most likely); and
- * 5 is definite (impact will occur regardless of any prevention measures).

» **Significance**, determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.

- » the **status**, which will be described as either positive, negative or neutral.
- » the degree to which the impact can be reversed.
- » the degree to which the impact may cause irreplaceable loss of resources.
- » the *degree* to which the impact can be *mitigated*.

The **significance** is determined by the following formula:

S = (E+D+M) P; where

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance weightings** for each potential impact are as follows:

- » < 30 points: Low (i.e., where this impact would not have a direct influence on the decision to develop in the area),
- » 30-60 points: Medium (i.e., where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- » > 60 points: High (i.e., where the impact must have an influence on the decision process to develop in the area).

4.3.1 Impact tables summarising the significance of impacts (with and without mitigation)

4.3.1.1 For part of Cropwell property already examined

Nature: Acts or activities resulting in disturbance of surfaces and/or sub-surfaces containing artefacts (causes) resulting in the destruction, damage, excavation, alteration, removal or collection from its original position (consequences), of any archaeological material or object (what affected).		
	Without mitigation	With mitigation
Extent	1	n/a
Duration	5	n/a
Magnitude	2	n/a
Probability	2	n/a
Significance	16	n/a
Status (positive or negative)	Neutral	Neutral
Reversibility	No	No
Irreplaceable loss of resources?	Yes, where present. None noted.	
Can impacts be mitigated?	No mitigation regarded as necessary	Not necessary
Mitigation: Mitigation Measures: Artefact densities – zero. Chance finds may change this but not expected. Unlike biological processes, heritage destruction generally has a once-off permanent impact, hence highest 'Duration' weighting. Overall significance indicated in this matrix returns a LOW value (<30 points). Mitigation measures are not considered necessary.		
Cumulative impacts: Cumulative Impacts: where any archaeological contexts occur the impacts, unless mitigated, are once-off permanent destructive events. Chance finds may be made but are not expected.		
Residual Impacts: -		

5. CONCLUSIONS

The 5-ha area of proposed mining at Cropwell was examined and, besides traces of previous borrow pit quarrying, no material traces of past human, archaeological or historical, graves or farm infrastructure, were noted inside the area of expected impact. Proposed haul road access is to follow existing roads.

From an archaeological and cultural heritage perspective the significance of impact scores LOW in terms of the criteria applied.

No mitigation measures are considered necessary for the sites located thus far.

Should any chance finds of archaeological sites/features or graves be made during any phase of the operation of the borrow pit, it must be reported immediately to a heritage authority so that specialist investigation and evaluation can take place to determine a way forward.

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