

**McGregor Museum
Department of Archaeology**



**RECTIFICATION AND/OR REGULARISATION OF
ACTIVITIES RELATING TO THE BESTWOOD TOWNSHIP
DEVELOPMENT NEAR KATHU, NORTHERN CAPE:
PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT**

**David Morris
February 2014**

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Executive summary

This Phase 1 Archaeological Impact Assessment (AIA) addresses one aspect (archaeology) of the rectification and/or regularisation of activities relating to the Bestwood Township Development near Kathu in the Northern Cape. The Bestwood Township Development will ultimately consist of a substantial residential settlement (of some 5 500 units) including some commercial and industrial components to the development.

The first phase of the project has progressed without full compliance to the satisfaction of SAHRA, so that rectification and/or regularisation is now required. This latter process is being managed by independent environmental consultants, Jeffares & Green Pty Ltd.

The Bestwood Township Development is located on *Remainder*, and *Portion 3* of *Farm Bestwood 459* is situated immediately east of the town of Kathu (Gamagara Local Municipality) in the Northern Cape. The proximity of the development, particularly, to archaeological landscapes of high significance in and around Kathu highlights the potential of this development impacting on similar archaeological material within Phase 1 and 2 of the project area and/or beyond.

This study undertakes a desktop background / literature search to establish what could be found within the project area / on the land parcel from an archaeological perspective; and further undertakes an archaeological impact assessment (AIA) of the project area (including field observation) which includes Phase 1 and Phase 2 of the development, including the construction/management camp located on erf 8434, as well as the affected area where the sewage pipeline traverses third party land (west of the development area as well as east of the development area), the location of the wastewater treatment works (WWTW) where construction has ceased until further notice, and the construction / lay-down / stockpile area on the south-eastern side of Phase 1. This assessment factors in that disturbance to the area has already been undertaken and that the work was in response to meeting SAHRA's requirements to 'rectify' the current situation.

An issue recently discussed is the distribution of archaeological deposits between the known significant archaeological sites occurring in and around Kathu. This is an archaeological landscape with variable densities of material. A previous survey at the Bestwood Township Development found that the aeolian sands at the surface are generally relatively sterile from an archaeological perspective; and that the underlying calcretes are also regarded as being archaeologically sterile. These had been the major working assumptions with which recent work at Kathu Townlands took issue since: instances of calcrete overlying potentially significant archaeological deposits have been found; superficial sands may mask situations where dolines occur with potential for sinkhole infill similar to the Kathu Pan sites; and sands may overlies artefact-rich horizons sub-surface, as at the Bestwood sand quarries. These are the questions that this study addresses.

It is found that the Bestwood Township Development study area is situated on flat terrain which is covered by a shallow surface capping of aeolian sands (Gordonia Formation), as little as 15 cm or less

at the southern end and up to a metre thickness at the northern end. Beneath it lie well-developed calcretes or surface limestones (Mokolane Formation) that may total 30 m or more in thickness locally. Both these units have been found to be nearly sterile from an archaeological point of view, although sparse, mainly isolated occurrences of flakes mainly of jaspilite (banded ironstone) are found within or at the base of the sands. This virtual lack of archaeological sediments contrasts strikingly with nearby places such as Kathu Townlands with its 1 m thick gravel units comprising mainly densely accumulated artefacts.

The possibility that Kathu Townlands-like archaeological deposits extend beneath the surface, specifically under the calcrete (a possibility raised by Walker *et al.* (2013) for some the landscape abutting Kathu Townlands itself) would appear to be effectively ruled out by observations made at this locale in particular (which does not mean that the possibility does not hold for other places in the surrounding landscape). Owing to the masking of sands in the vicinity of Erf 8434, at the northern-most extent of the study area, it has not been possible to discount completely the possibility of subsurface dolines (Almond 2014) which may then contain infill similar to that noticed at the Kathu Pan solution hollows (i.e. archaeological deposits with palaeofauna).

The overall impact significance of the Bestwood Township Development is considered to be LOW for archaeological resources within the project footprint. Hence no further specific archaeological studies are recommended at this point. However, provision should be made for monitoring of any further trenches opened up in the course of developing / undertaking further construction in Phase 2 of the project and especially in the event of any further disturbance in Erf 8434 where some potential for sub-surface doline features exists (Almond 2014). As part of the management plan for the project, the Environmental Compliance / Control officer (ECO) for the project should also be aware of the potential impacts and should notify SAHRA immediately in the event of any archaeological deposits or features being encountered. Such a find would need to be investigated and any mitigation measures deemed necessary put in place. Work should be halted in the vicinity of a suspected site of archaeological significance until assessment and any possible mitigation has been completed and approval has been granted by SAHRA for recommencement of the project.

1. Introduction: Bestwood Township Development

A substantial residential settlement (amounting to 5 500 units) with institutional and commercial components has been planned and partially constructed on a portion of the farm Bestwood which lies immediately east of the town of Kathu (Gamagara Local Municipality) in the Northern Cape. A positive Record of Decision (RoD) for the proposed development was issued by Northern Cape Department of Tourism, Environment and Conservation on 13 November 2008. An outline of the project as it has unfolded to date has been provided in the form of a report by Ms Tamara Drake of Jeffares & Green (Dec 2013, submission to SAHRA), extracts from which are adapted as part of this introduction.

1.1. The Bestwood Township Development

The Bestwood Township Development is located on *Remainder*, and *Portion 3* of *Farm Bestwood 459* immediately east of the town of Kathu, Northern Cape. The development is divided into Phase 1 and Phase 2 and “consists of a mixed use human settlement comprising of (sic) affordable housing, general residential, institutional and commercial opportunities, fulfilling the needs of the various mining expansion programmes for the region” (*General Sales Project Information*, Oct 2011). The development, together with new extensions within/around the town of Kathu was expected to

create a new regional node for the Northern Cape with towns such as Olifantshoek, Postmasburg, Kuruman and Hotazel benefiting from the initiative. The phased development at Bestwood would be undertaken on a 200 ha portion of the farm Bestwood No. 459 RD which is situated adjacent to the N14 national road and opposite the entrance to Kathu from the N14.

The Housing Impact Fund of South Africa (“HIFSA”) is a subsidiary of Old Mutual Investments which is involved in financing the development of approximately 3 300 residential units within the Bestwood development, all of which will be constructed on *Erven 8440, 8439, and 8438* as part of Phase 1.

The following map (**Figure 1a**) is an extract from an annotated site layout plan provided by Jeffares and Green.

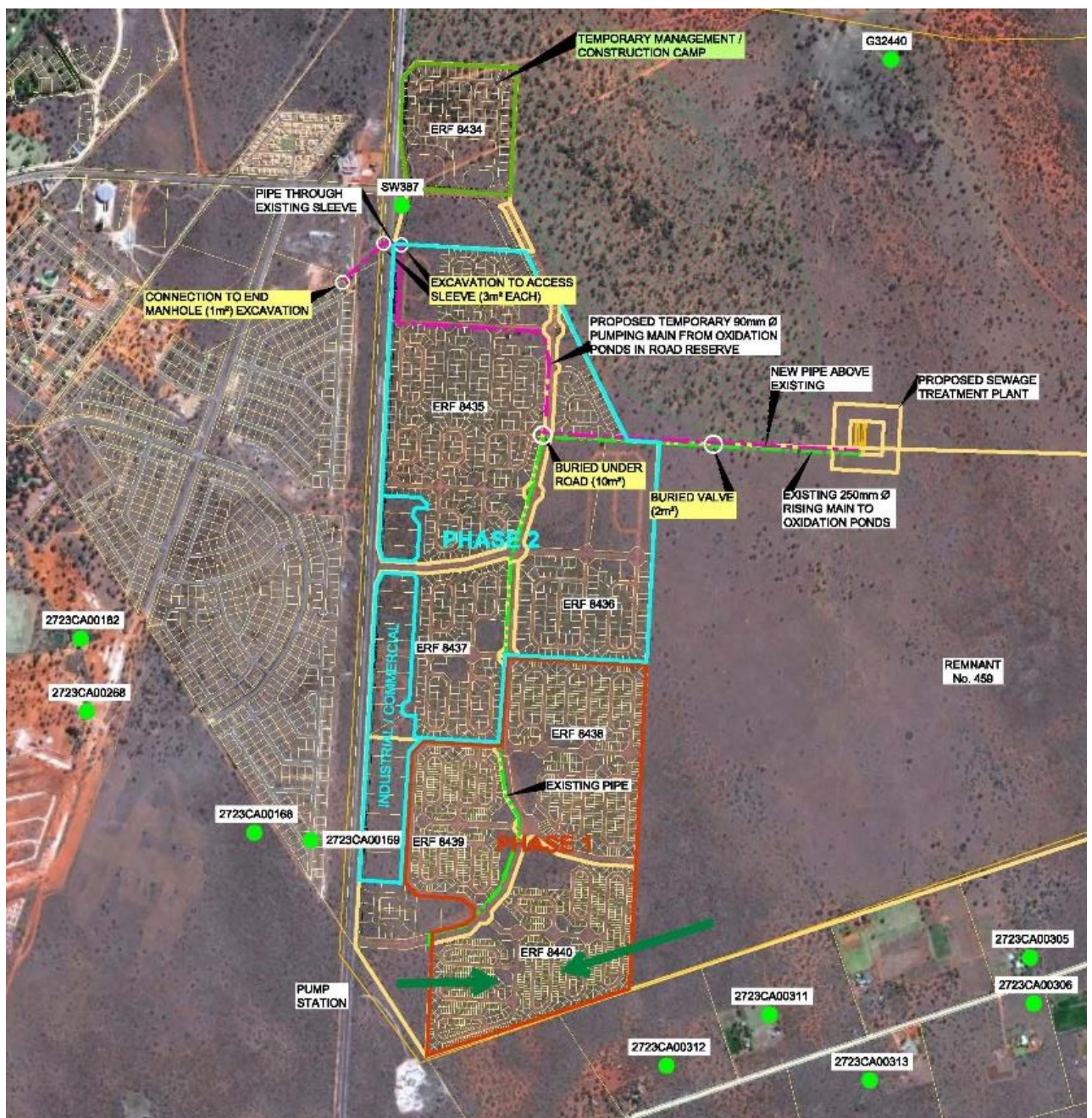


Figure 1a. Extract from an annotated site layout plan provided by Jeffares and Green



Figure 1b. Updated Google Earth image of the project area [accessed 13 February 2014]

The remaining 2 200 houses and industrial/commercial developments form part of Phase 2 of the construction phase. A temporary management/construction camp has also been built on erf 8434 (north of the site). [A further such camp has been erected immediately east of erf 8440] (refer to the area circled in green in **Figure 1b**). Construction of the Waste Water Treatment Works (“WWTW”) to service the development had begun, but construction ceased in November 2013 owing to a Water Use License in terms of the National Water Act (Act 36 of 1998) not having been obtained from the competent authority. Discussions were being held in this regard with the relevant competent authorities to regularise/rectify a number of issues on site, which included the WWTW and temporary management /construction camp (on erf 8434). These issues also extend to matters of compliance in terms of the National Heritage Resources Act (Act 25 of 1999), which is the context of this report.

1.2. Development progress – construction and compliance

By the end of 2013 approximately 280 residential units had already been built and were currently occupied on Erf 8440 (see green arrows in **Figure 1**), which is part of Phase 1 of the Bestwood development. Fifty further residential units awaited transfer, and it was expected that another 300 houses would be constructed by the end of February 2014. Earthworks and services had been laid in both the Phase 1 and Phase 2 areas, with more development (top structures) having been built in Phase 1. Services already constructed as of the middle of December 2013 included: roads, internal

sewers, internal water reticulation, internal gas reticulation and storage units, and external works (borehole and rising main to the Municipal reservoir and water tower, water supply line from the Municipal reservoir and water tower to the Bestwood development, sewer pump station and rising main to the oxidation pond and Bestwood WWTW). Some of the latter external work had traversed (and negatively impacted) the important Kathu Townlands archaeological site.

1.3. Potential impacts on heritage resources: archaeological assessment

The proximity of the development, particularly, to archaeological landscapes of high significance in and around Kathu highlights the potential of this development impacting similar archaeological material within Phase 1 and 2 project areas and/or beyond. All such material or traces is protected by South Africa's National Heritage Resources Act (Act 25 of 1999).

Responsibility for archaeological heritage in the Northern Cape is currently (and until such time as the Northern Cape heritage authority, Ngwao Boswa jwa Kapa Bokone, is accredited as competent) vested in the South African Heritage Resources Agency or SAHRA (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). Correspondence made available by SAHRA indicates that only a partial assessment from a heritage perspective had been carried out in advance of the project and that requests were made by SAHRA from 2008 for enhanced archaeological impact assessments to be furnished. These were as yet not forthcoming.

In response, Jeffares & Green (Contact details: Ms Tamara Drake. Jeffares & Green (Pty) Ltd. 14 Central Square, Pinelands, Cape Town, 7405, South Africa. P.O. Box 38561, Pinelands, Cape Town, Western Cape, 7430, South Africa. Tel: +27 21 532 0940. Fax: +27 21 532 0950. Email: draket@jgi.co.za), appointed as Independent Environmental Consultants to project manage the rectification and/or regularisation of activities relating to the Bestwood Township Development, have appointed the author of this report, from the McGregor Museum Archaeology Department, as a specialist sub-consultant, to address the archaeological aspect by way of a site visit and a brief as outlined below.

The author is independent of the organization commissioning this input, and provides this specialist report within the framework of the National Heritage Resources Act (No 25 of 1999). He is accredited as a Principal Investigator by the Association of Southern African Professional Archaeologists and has worked as an archaeologist in the Northern Cape since the 1980s.

1.3.1. Terms of reference - scope of work: archaeology

It was agreed that the archaeologist should:

- Undertake a desktop background/literature search to establish what could be found within the project area/on the land parcel from an archaeological perspective.
- Undertake an archaeological impact assessment of the project area (including field observation) which includes Phase 1 and Phase 2 of the development, including the construction/management camp located on erf 8434, as well as the affected area where the proposed sewage pipeline¹ (pink dashed line) traverses third party land (west of the development area as well as east of the development area), the location of the wastewater

¹ It should be noted that although the temporary sewage pipeline is still under assessment by the SAHRA, during the 23 January 2014 site visit, the temporary sewerage pipeline had already been constructed

treatment works (WWTW) where construction has ceased until further notice, and the construction / lay-down / stockpile area on the south-eastern side of Phase 1. This assessment/evaluation would factor in that disturbance to the area has already been undertaken and that the work was in response to meeting SAHRA's requirements to 'rectify' the current situation.

In compliance with the relevant guidelines on conducting specialist studies/reporting for EIA/to meet SAHRA's requirements, the specialist study was to:

- Describe the nature and significance of archaeological material within the affected study area.
- Assess all potential impacts in terms of J&G's standardised impact assessment criteria based on the current circumstances where construction has already begun and/or in some instances, been completed.
- Consider any cumulative impacts, negative or positive, based on the current circumstances where construction has already begun and/or in some instances, been completed.
- Where required/relevant (based on the fact that construction has already begun and in some instances has been completed), the specialist report was to contain all information that would meet and satisfy SAHRA's requirements as the decision-making authority and with reference to SAHRA correspondence dated 19 November 2008 and 9 December 2008
- Based on the disturbance already undertaken on site, provide recommendations on the most effective way to remove and/or salvage any material of archaeological significance, if and where it is deemed necessary.
- Where necessary, to apply for and obtain the necessary Section 35 permit and any other heritage approvals relating to archaeological aspects in terms of the National Heritage Resources Act.
- Where possible, provide mitigation measures that could be implemented to remediate/reduce the potential impact to archeological resources (where present and required) based on the fact that construction has already begun and in some instances has been completed.
- Make available the archaeological report to the palaeontologist for alignment of reporting if required.

In response to SAHRA's indication that a potential cease works order may be issued for the site (as communicated to Jeffares & Green), and based on the motivation letter submitted to SAHRA by Jeffares & Green (T. Drake, Dec 2013) SAHRA provided a written response (dated 9 January 2014) to the J&G motivation letter (18 December 2013) regarding the potential cease works order stating that:

- No development may proceed on the area demarcated as Phase 2 until such time that SAHRA has had time to review and provide its comment and recommendations of the specialist studies.
- Development may continue in the area demarcated as Phase 1 with provision that the archaeologist visits the area².

1.4. Legislative framework

² The site visit /fieldwork was undertaken by the author on 23 January 2014

The National Heritage Resources Act (Act 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 (specifically, Section 35) requires that anyone intending to disturb, destroy or damage such sites, objects and/or structures may not do so without a permit from the relevant heritage resources authority.

In respect of archaeology, an Archaeological Impact Assessment is required, resulting in a specialist report to enable the relevant heritage resources authority/ies (currently, for the Northern Cape, SAHRA) to authorise (or decline to authorise) the disturbance or alteration, or destruction of heritage resources, with or without mitigation.

Legislation for both environment and heritage require that development activities must be preceded by an assessment of the impact undertaken by qualified professionals. Archaeological Impact Assessments (AIAs) are specialist reports that form part of the wider heritage component of:

- 1) Heritage Impact Assessments (HIAs) called for in terms of Section 38(1) of the National Heritage Resources Act (NHRA), Act No. 25, 1999 by a heritage resources authority.
- 2) Environmental Impact Assessments (EIA) or Environmental Management Programmes (EMP) as required in terms of other legislation³ listed in s. 38(8) of the NHRA.

2. Background to the archaeology of Kathu

A number of significant archaeological sites are known to occur in and around Kathu, research at some of which has been published internationally, and some material from which has been exhibited in museums in Europe and the USA, and has featured on South African postage stamps. Most recently one of the Kathu Pan sites has been key to discussions on the earliest innovation of spear technology at 500 000 years BP. Currently in progress is a move towards national heritage grading (grade 1) for a suite of key 'sites' in and near Kathu.

An important point made in a recent Phase 2 assessment report on Kathu Townlands (Walker *et al.* 2013) is that it is not so much *sites* (with clearly defined edges and cadastral integrity) that are at issue, but an archaeological landscape which is dynamic through time. In this view the entire area that includes Kathu is archaeologically sensitive – underscoring the need for adequate heritage assessment in a rapidly growing urban and mining context. However, it is equally clear that archaeological resources are not uniformly distributed across and within this landscape, for the foci of past human activity and the densities of traces they generated evidently varied relative inter alia to resources including water (undoubtedly one of the considerations at the Kathu Pan doline occurrences) and raw materials (perhaps the principal factor at Kathu Townlands). Other local areas may have had relatively minor pull in terms of the resources they offered to people of the past, and in consequence are relatively less sensitive in terms of twenty-first century development.

An issue identified by Walker *et al.* (2013), in fact the “main difficulty” in reviewing previous work, “is understanding where deposits are located, and where they are not.”

Walker *et al.* (the present author being a co-author in that work) provide a summary of information from archaeological studies and surveys in the Kathu area, which serves as a solid baseline description of the Kathu archaeological landscape as it is presently understood.

³ National Environmental Management Act (Act 107 of 1998), as amended.

The archaeological deposits at Kathu are enormous and represent a tremendous amount of early human activity. The Kathu Complex presents an opportunity unique in South Africa to explore early human behaviour at the scale of the landscape rather than discreet sites. This set of localities also raises the obvious question of why hominin occupation was so dense in this particular area. A review of these deposits (as individual 'sites') is useful. (Walker et al. 2013:34-5).

The main 'site' clusters are Kathu Pan, located north west of the town of Kathu, Townlands site in the eastern perimeter (west of the Bestwood Township Development), with further localities to the east of the town, including observations elsewhere on Bestwood farm and along the western flank of the Kuruman Hills.

2.1. Sites and research observations

2.1.1. Kathu Pan

The site of Kathu Pan 1 has produced a sequence of ESA deposits including St 4a attributed to the Fauresmith and dated to ca. 500,000 BP. Research on this site has produced the earliest evidence for human use of spears for hunting (Wilkins, *et al.*, 2012) and some of the earliest known evidence of blade production (Wilkins & Chazan, 2012). Kathu Pan 1 is unique among the sites of the Kathu Complex in that it includes faunal remains (Klein, 1988). The fauna from Kathu Pan 1 include species such as hippopotamus that point to a far wetter environment than is found in the region today (Walker *et al.* 2013).

2.1.2. Kathu Townlands

An enormously rich deposit of Early Stone Age (ESA) characterised as a banded-ironstone quarry site which as yet remains to be described in detail in terms of spatial extent, though seemingly spread over not less than some 250 000 m². The south eastern part of the Kathu Townlands site was subjected to intensive investigation in relation to the Rooisands Mall project (part of the site was subsequently destroyed), revealing (consistently with Beaumont's earlier work at Kathu Townlands) that deposits up to a metre deep are exceedingly rich in artefacts, including bifaces and debitage, and material consistent with its interpretation as a quarry site. **Figure 2** provides an indication of the location of Kathu Townlands in relation to the Bestwood Township Development. An important finding, documented in test excavations and development-related trenches, was that the apparent edge of the 'site' as it dips beneath the sands is misleading, and that calcrete growth sub-surface to the east of this point incorporates artefacts albeit in diminishing thicknesses (Walker et al. 2013). It remained a moot question as to how much further eastwards and to what depth the artefacts continue, beneath what becomes a calcrete surface.

2.1.3. Bestwood sand quarries

The archaeological deposits on the Farm of Bestwood 459, specifically those discovered in a sand quarrying activity, were first described in 2008 (Dreyer, 2008). **Figure 2** locates the sand quarries in relation to the Bestwood Township Development. These deposits, situated to the east and north east of the Bestwood Township Development, have since become a central portion to the archaeological research being undertaken at Kathu (Chazan, *et al.*, 2012). A preliminary investigation in 2010 identified a lithic industry characterized by well-made handaxes, well retouched scrapers, occasional blades and a great diversity of core types, including choppers, polyhedrons, discoidal cores and unidirectional Levallois cores. In 2012, excavations by Chazan and Walker opened an area of 36 m² exposing these deposits in plan. This excavation confirmed that the industry found in

surface collection is found *in situ* in a single horizon under the covering sands. Artefacts are all extremely fresh and do not show evidence of either transport or extensive exposure. It is highly likely that archaeological material extends beyond the limits of the quarry. A field visit by Chazan and Morris in 2011 found handaxes in a disused quarry approximately 1 km. to the south that is now filled by dumped calcrete blocks (refer to **Figure 2**). Further field observations in 2012 and 2013 in adjacent sand quarry operations have revealed artefact rich deposits directly beneath the sands further to the south. The sands that cover the Bestwood 1 archaeological horizon extend northwards towards the east of Uitkoms. Early Stone Age tools are found dispersed across these hills, in some areas at very high density, lying directly on exposed bedrock (Walker *et al.* 2013).

2.1.4. Uitkoms

There are also archaeological materials in the area around the Kathu Cemetery and across the farm of Uitkoms that have been designated by Beaumont as Uitkoms 1, 2, 3 & 4. At Uitkoms 1 foot search and a test pit pointed to similar lithic densities, debitage frequencies those found at Kathu Townlands 1 (Beaumont 2008). Uitkoms 4 is described as a buried site at approximately -100 m wide, “where bifaces are very similar to those from the quarries, but with a formal tool incidence about a thousand times higher, and like that at a typical occupation site” (Beaumont 2008: 3). There has not yet been any controlled excavation at Uitkoms 4 or analysis of collections from Uitkoms 1. Uitkoms 2 & 3 are observed artefact deposits in road cuttings along the N14 (Walker *et al.* 2013). Refer to **Figure 2** which locates the Uitkoms sites in relation to the Bestwood Township Development.

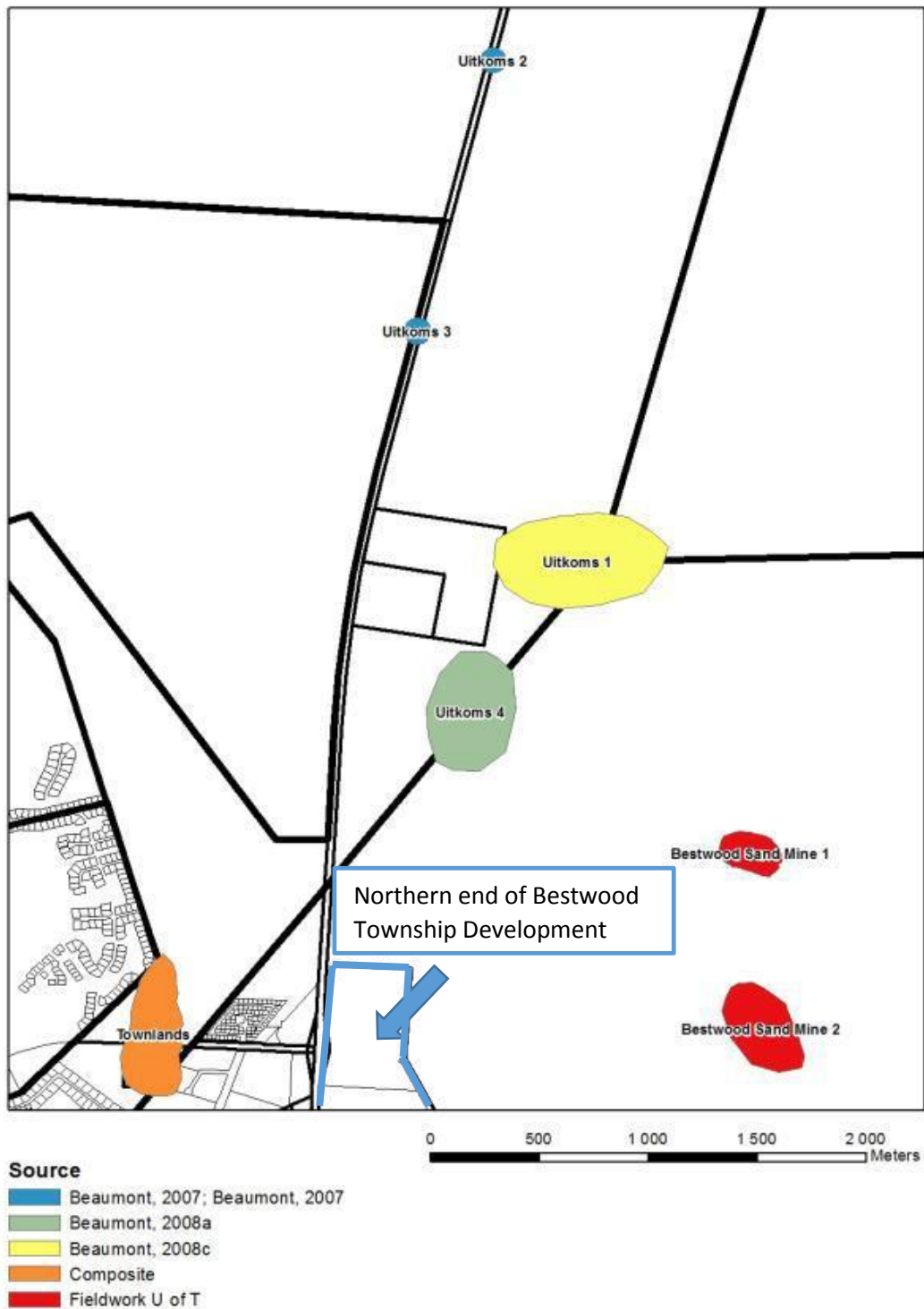


Figure 2. Map showing Townlands, the Bestwood sand quarry occurrences and the Uitkoms observations to the west, north and east of the Bestwood Township Development.

2.2. Observations made in AIA surveys

Walker *et al.* (2013) report on several Archaeological Impact Assessment (AIA) projects that have been undertaken in the vicinity of Kathu, mostly on the eastern side of the town and including the

initial survey carried out on the Bestwood Estate (Bestwood Township Development). The Bestwood Township Development features in red in the following map.

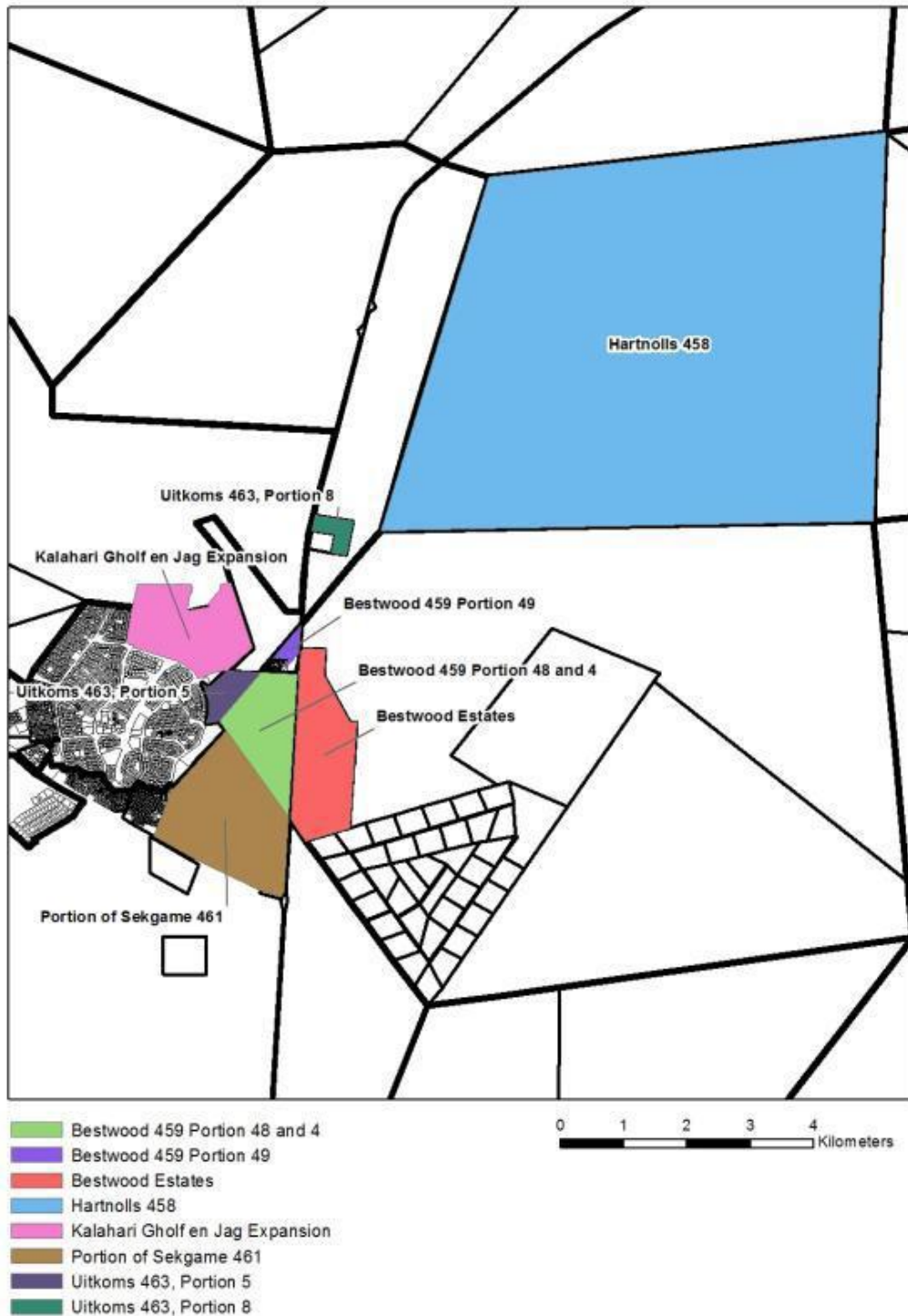


Figure 3. Map (from Walker *et al.* 2013) indicating properties surveyed in AIA projects east of Kathu

For an AIA undertaken to enable the expansion of the golf estates (*Kalahari Gholf en Jag Expansion* - Beaumont, 2006a), calcrete was found at the surface over virtually the full extent of the property, with no observed superficial archaeology. There was no subsurface investigation of the extent of the

deposit. This study placed on record an Iron Age ceramic surface scatter and a 'Late Pietersburg Middle Stone Age (MSA) site, both on the northern side of Kathu.

Various other surveys around Kathu Townlands (Bestwood 459 Portion 48 and 4; Uitkoms 463, Portion 5 – Beaumont 2006b & c) likewise found calcrete 'bedrock' at the surface over the area around Kathu Townlands, the *visible* extent of the latter being mapped for the first time in the second of these two surveys (Walker *et al.* 2013). Proposed rezoning of Bestwood 459 Portion 49 (Beaumont 2008a) was supported by a report describing calcrete bedrock across its extent, considered archaeologically sterile. A report for a housing development on Sekgame 461 (Beaumont 2008b) likewise reports calcrete bedrock of Tertiary age and hence archaeologically sterile, noting isolated artefact finds at the surface of the calcrete where roads have cut through superficial aeolian sands. The sands are reported to thicken to about a metre towards the north of the property. Walker *et al.* (2013) question how the continuous presence of calcrete underlying the sands was established.

Surveys on the farm Hartnolls 458 (Dreyer 2006; Beaumont 2007) found extensive deposits composed of banded ironstone (where exposed from under sand) with artefacts, comparable to the Townlands site, occurring by the "hundreds of millions, if not billions" (Beaumont in email appended to his 2007 report). West of Hartnolls 458 is Uitkoms 463, Portion 8 (Beaumont 2008c) where the geological setting is described as "rarely exposed banded ironstones / jaspilites of Precambrian age" mostly covered by the Hutton Sands, the latter found to be archaeologically sterile. It is not established, note Walker *et al.* (2013), whether the underlying geology is uniformly of banded ironstone or whether archaeological deposits occur at the base of the aeolian sands.

2.3 Earlier investigation at the 'Bestwood Estates' (Bestwood Township Development)

A report provided by Dreyer (2008) was intended to assess impact of the proposed large housing development called 'Bestwood Estates', i.e. the Bestwood Township Development, which is the subject of this study. SAHRA correspondence (Jerardino to van Tonder, 9 Dec 2008) details the events surrounding the provision of an HIA in 2008, initially omitting either an archaeological or a palaeontological Phase 1 assessment, and the subsequent submission of the Dreyer report. The correspondence notes further that the author of said report was accredited for Iron Age but not Stone Age archaeology, and recommends at the least scrutiny of this work by a principal investigator appropriately accredited. This sequence of events forms part of the lead-up to the present task.

Critiquing the Dreyer report, Walker *et al.* (2013) note that "no methods of investigation were provided ... just that the project area was visited on the 6th of August 2008 and investigated."

At least two mechanical excavations of archaeological test pits were undertaken, and GPS coordinates and photographs were provided for two of these excavations. The excavations were described as archaeologically sterile, but no description of the resulting trenches was provided. From the photographs provided of the back dirt from these test pits, it appears as if only the red Hutton sands were excavated and neither the calcrete nor the ironstone that underlie these sands were reached.

(In footnote 26 Walker *et al.* (2013) remark that no associated permit for the above-mentioned test pit activity was linked to the report on SARHIS (the only permit issued for work on the Farm of Bestwood 549 was Permit 72 issued to Michael Chazan and David Morris. <http://www.sahra.org.za/node/2026>).

It was not clear what area of the property was examined. The report refers also to the archaeological deposits discovered in the sand quarry located on the farm of Bestwood (see paragraph 2.1.3. above) which is far beyond the proposed development. (It happens to be the first account of those deposits).

The management recommendations given in Dreyer's impact assessment were that the proposed development would not impact on heritage resources and that no mitigation measures were required. The recommendation was however tempered by a caveat that there was a likelihood of archaeological deposits possibly being discovered during construction – in which case construction should cease so that the deposits might be evaluated for their significance.

3. The affected environment

3.1. Terrain and implications

The terrain in which the Bestwood Township Development is situated is a flat plain immediately east of the national road by-passing Kathu on its eastern side. It is seemingly underlain by a calcrete deposit (which is now substantially exposed in the development area Phase 1) and mantled by aeolian sand which is/was as shallow as about 15-20 cm or less (the calcrete substrate sometimes naturally exposed) at the southern end, deepening to about a metre at the northern end. Correspondingly, shallower-soil vegetation including *Tarchonanthus camphoratus* (vaalbos) and *Acacia mellifera* (swarthaak) predominates towards the south, with *Acacia erioloba* (camelthorn) becoming a prominent feature where the soil becomes deeper. Clearings and trackways in the mid to southern part of the property have frequently exposed the calcrete substrate while in the north the sand roads do not penetrate to the base of this superficial deposit.

A consistent issue in the assessment of the presence or absence of archaeological deposits in and around Kathu, it will have become clear, is the fact that the landscape is often capped by (1) generally older Mokalanen Formation (Almond 2014) calcrete (not uniformly ancient – Walker *et al.* 2013) and (2) younger Gordonian Formation aeolian sands (Almond 2014). In places such as Kathu Pan, north west of Kathu, the Mokalanen Formation calcrete contains a series of solution hollows (sinkholes or dolines) which are in-filled with Quaternary and Holocene sediments rich in both archaeological and fossil remains (see 2.1.1. above). Outcropping above/between the bodies of calcrete in places are the far older Late Archaean to Early Proterozoic rocks of the Transvaal Supergroup, here in the form of banded ironstone bedrock features (which also form the hills east and north east of Bestwood), with one highly significant exposure near the study site being the Kathu Townlands occurrence (2.1.2. above). These rocks provided raw materials on which artefacts were made, the outcrops being utilised particularly in ESA times as quarry/workshop sites.

The issue is that the more recent sediments frequently obscure any view of archaeological sediments that may lie beneath said sands or calcrete or within doline infill where sinkholes may have formed.

The construction work already completed or in progress in Phase 1 of the Bestwood township site, and that associated with the provision of services (water, sewage, etc.) in Phase 2 of the Bestwood township site have effectively provided windows through and into the more recent sand and calcrete sediments in the study area. As a result clearer statements (with greater confidence / certainty) can now be made on the likely presence or absence of sensitive archaeological deposits (as has also been the case with regard to palaeontology – Almond 2014).

3.2. Methodology including assumptions and limitations

It was proposed to inspect the property cognizant of the consistent previous findings that the aeolian sands are generally relatively sterile from an archaeological perspective (noted also in test excavations in Dreyer's (2008) report for the Bestwood Township Development); and that the calcretes are also generally regarded as being archaeologically sterile. These are the major working assumptions, already highlighted as issues, above. This is because:

1. There are instances, such as at the margins of the visible Kathu Townlands occurrence, perhaps replicated elsewhere, where the calcrete may be shallow, overlying potentially significant archaeological deposits;
2. Superficial sands may be masking situations where dolines occur with potential for sinkhole infill similar to the Kathu Pan sites;
3. Sands may overlies gravels such as at the Bestwood sand quarries, with artefact-rich horizons on the surface of said gravels.

Hence inspection of any trenching on the property was an important aspect of the work. Information (and images) gleaned from the developer concerning previous trenching and bore-holing would also provide important information.

It was realised that, over certain parts of the property, especially the northern part where the covering sands are thickest, obtaining definitive clarity on the above three possibilities would be difficult without engaging in a substantial Phase 2 archaeological investigation, or alternatively putting in place monitoring of any disturbance in key locales within the development. The most sensitive part of the development (highest potential for submerged dolines – Almond 2014), but at the same time perhaps that least likely to have major deep-trenching impacts, may be that at Erf 8434, Temporary Management/Construction Camp.

4. Observations

Phase 1 of the Bestwood Township Development

Development of Phase 1 of the project, on Erven 2438-2440, has, as mentioned, progressed substantially with 280 residential units occupied, a further fifty awaiting transfer and 300 more expected to be completed by the end of February 2014.

In consequence the terrain there has been transformed, top soil having been cleared prior to laying of services, building of roads and construction of housing.

Effectively, this has provided an opportunity to observe the top of the calcrete and, where this has been trenched, the top 3 or 4 metres of calcrete.

At no point within these modified parts of the landscape were any in situ archaeological materials noted. At GPS point 294 there is a localised scatter of banded ironstone, including some artefacts, which was difficult to explain other than that the material was derived from elsewhere – an explanation confirmed by Mr Fred Cawood who indicated that the material was dumped here, for stabilising the sand, probably from a gravel pit or trench somewhere else in the Kathu area.



Cleared landscape – the view south westwards from GPS point 287.



Parts of the gas reticulation at Bestwood Township Development (above and below): sunk into the top of the calcrete.





Deep trenching at point GPS 290, indicating at least a few metres thickness of calcrete.

Mr Cawood mentioned that the deepest trenching on the development was to 11 m, still within calcrete, while a borehole in the vicinity had encountered banded ironstone and, below it, dolomite, at 30 m depth. Inspection of heaps of calcrete in the disturbed areas yielded no archaeological artefacts whatsoever, so that this author is confident that these sediments, exposed just beneath the sands in the Phase 1 area of the project are essentially archaeologically sterile.

Phase 2 of the Bestwood Township Development

Inspection of undisturbed areas in Phase 2 revealed that widely scattered/isolated artefacts made on jaspilite (banded ironstone) occur singly on the surface, usually where the sands are shallowest over calcrete.



Artefacts widely scattered (density generally much less than 1 per 10 x 10 m) in the vicinity of GPS point 296.



GPS track in northern part of the Bestwood Township Development.

An opportunity to observe the calcrete body at some depth and in section was available in a depth trench inspected at GPS point 285.



At this point up to 40-50 cm of aeolian sands capped the calcrete which is at least a several metres deep – with no artefacts being noted during a careful inspection of these sediments. It would seem reasonable to extrapolate these observations eastwards and westwards to the boundaries of the development from this point.

Wastewater Treatment Works (WWTW) and sewage pipeline

The vicinity of the Wastewater Treatment Works was inspected, while photographs of the site taken during construction were made available to the author. Both the field inspection and the photographs suggest a situation somewhat comparable with the landscape in the Phase 1 area of the development, namely relatively shallow aeolian sands over calcrete of several metres thickness.



Photograph showing preparation for the construction of the Waterwater Treatment Works: shallow aeolian sands with subsurface calcrete formation (above), the latter (below), during construction of the Works, at least 11 m in thickness (F. Cawood pers.comm.). (Photos: Mr Fred Cawood)





Completed Wastewater Sewage works at GPS position 292.



Topsoil removed to the surface of the calcrete immediately east of the Wastewater Treatment Works.

The route of the sewage pipeline, a temporary line planned to be laid above-ground was followed: it traverses surface sands towards the national road, crosses under it to the Kathu side for linking to a connection point near the Rooisands Mall development. On the Kathu side of the road a similar geological setting appears to pertain with relatively shallow topsoil mantled over calcrete, again without trace of archaeological deposits in the vicinity.



Pipeline route (above and below): no archaeological deposits were in evidence at any point.



Temporary construction sites

A new construction camp has been erected immediately east of Erf 8440, as can be seen comparing the following images:



Construction camp east of Erf 8440. The impact of this site on archaeological deposits, similar to any that would have occurred on project the Phase 1 area (Erf 8440), would have been minimal.

The temporary construction camp at the northern end of the development (Erf 8434) is situated where the aeolian sands are at their thickest. This is also a vicinity which falls within the alignment of

the Vlermuisleegte pans that extend to the northwest of the study area. Almond (2014) suggests that if solution hollows exist anywhere in the Bestwood project area, it is most conceivable that they might occur here, hidden beneath the cover sands. Such dolines could contain fossil-bearing sediments similar to those at Kathu Pan, north west of the town.

Disturbances at the camp do not penetrate through the thick sand so that no firm observations can be made for this part of the site, although it is possible, perhaps even likely, that conclusions drawn for the southern end of the project area would pertain here.

5. Conclusions on significance of archaeological resources at Bestwood and Impact Assessment

The Bestwood Township Development study area is situated on flat terrain which is covered by a shallow surface capping of aeolian sands (Gordonia Formation), as little as 15 cm or less at the southern end and up to a metre thickness at the northern end. Beneath it lie well-developed calcretes or surface limestones (Mokolanen Formation) that may total 30 m or more in thickness locally. Both these units have been found to be nearly sterile from an archaeological point of view, although sparse, mainly isolated occurrences of flakes mainly of jaspilite (banded ironstone) are found within or at the base of the sands. This virtual lack of archaeological sediments contrasts strikingly with nearby places such as Kathu Townlands with its 1 m thick gravel units comprising mainly densely accumulated artefacts. These contrasts must reflect strong activity patterning in a Stone Age landscape structured around resources such as surface access to raw materials for the manufacture of stone tools.

The possibility that Kathu Townlands-like archaeological deposits extend beneath the surface, specifically under the calcrete (a possibility raised by Walker *et al.* (2013) for some the landscape abutting Kathu Townlands itself) would appear to be effectively ruled out by observations made at this locale in particular (which does not mean that the possibility does not hold for other places in the surrounding landscape). Owing to the masking of sands in the vicinity of Erf 8434, at the northern-most extent of the study area, it has not been possible to discount completely the possibility of subsurface dolines (Almond 2014) which may then contain infill similar to that noticed at the Kathu Pan solution hollows (i.e. archaeological deposits with palaeofauna).

5.1 Assessing impact of the development

Impact assessment criteria for ensuring a comprehensive and standardised assessment of potential impacts are applied in order to determine the overall impact significance. The following criteria are taken into consideration:

- the extent and location of the impact;
- the duration of the impact i.e. short term, long term, intermittent or continuous;
- the magnitude/intensity of the impact i.e. high, medium, low;
- the likelihood or probability of the impact actually occurring;
- the extent to which the impact can be reversed;
- the degree to which an impact may cause irreplaceable loss of a resource;

- the cumulative impacts;
- the mitigatory potential of impacts; and
- the significance of the impact on a local, regional or global level.

Disturbance, damage or destruction of archaeological resources preserved in the project footprint is most likely in the construction phase, and had already occurred during construction in Phase 1 of the project. Any area or linear, primary and secondary, disturbance of surfaces would have a once-off negative impact on heritage resources, where present. Disturbance of surfaces includes any construction: of a road, a pipeline, or preparation of a site for construction, 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.

Limited operational phase impacts would be expected to occur within the already disturbed project footprint.

The extent of possible construction and operational phase impacts on archaeological resources is predicted to be generally minimal on account of the lack of specifically archaeological deposits observed in the project footprint. This includes both Phases 1 and 2 of the Bestwood Township Development project as well as the construction/management camps (I include the second of these which has been constructed east of Erf 8440); also the location of the WWTW and the route of the sewage pipeline across the study footprint and where it traverses third party land west of the national road.

The overall impact significance of the Bestwood Township Development is reckoned to be LOW for archaeological resources within the project footprint. Similarly, cumulative impacts within the project footprint are predicted to be of LOW significance, noting however that highly significant archaeological deposits occur in the surrounding area and that secondary impacts of the development need to be monitored closely relative to proposed heritage grading and buffer zones around known sites of significance.

I rate the degree of confidence for this assessment as high for Phases 1 and 2 of the project as well as the WWTW and sewage pipeline; and medium for the Erf 8434 construction camp where there remains some potential for solution hollow infill deposits masked by deeper cover sands (Almond 2014).

The above assessment against the specified criteria is summarised in the following table:

Table 1: Impact Assessment for the Bestwood Township Development: Archaeological Resources

CRITERIA	RATING	DESCRIPTION
Extent of the impact	LOW	The impact would be site specific, i.e. limited to the township development footprint and would not extend to known sites of high archaeological significance in the surrounding area.
Duration of impact	PERMANENT	Where archaeological resources are disturbed the effect is a once-off permanent impact.

Intensity of impact	LOW	No archaeological deposits other than widely dispersed, isolated 'off-site' debitage ⁴ was noted in the study area, in striking contrast to known archaeologically rich deposits elsewhere on the farm Bestwood and the nearby Kathu Townlands. There were no indications of subsurface strata or features containing archaeological deposits. In the event that any feature such as a doline containing archaeological materials is encountered during construction, impact intensity on such feature would be locally HIGH.
Probability of impact occurring	DEFINITE	A very low density of archaeological remains in the form of widely dispersed stone artefacts was noted across the development footprint (exposed mainly where covering sands are thinnest). These would definitely be impacted, although the significance of that impact would be considered to be low.
Degree of Reversibility	LOW	Destructive impact of disturbance of archaeological remains is irreversible.
Irreplaceability of a resource	LOW	Such archaeological traces and contexts as would be disturbed by the development would be irreplaceable but are considered to be of low significance. Impact would result in a partial loss of a resource but the overall archaeological heritage of the Kathu area would not be significantly be affected.
Cumulative Impacts	LOW	Cumulative impacts <i>within the project footprint</i> are predicted to be low. The archaeological landscape of the Kathu area as a whole contains highly significant elements and locales so that any secondary impacts need to be carefully monitored. The grading of specific sites and definition of buffer zones by SAHRA would help to minimise the potential for secondary and cumulative impacts.
Determination of Significance	LOW	The impacts on archaeological resources of the Bestwood Township Development are assessed to be of low significance within the project / development footprint.

5.2. Recommended mitigation measures

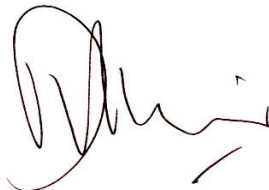
Because the **overall impact significance** of the project is predicted to be **low** as far **as archaeological resources** are concerned, **no further specific archaeological studies are recommended at this point**. However, provision should be made for monitoring of any further trenches opened up in the course of developing / constructing within Phase 2 of the project and especially in the event of any further disturbance in Erf 8434 where some potential for sub-surface doline features exists (Almond 2014).

⁴ sharp-edged waste material left over after making a stone tool.

As part of the management plan for the project, the Environmental Compliance / Control officer (ECO) for the project should be aware of the potential impacts and should notify SAHRA immediately in the event of any archaeological deposits or features being encountered (SAHRA, Tel: 021 462 4502. Fax: 021 462 4509; 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000). Such a find would need to be investigated and any mitigation measures deemed necessary put in place. Work should be halted in the vicinity of a suspected site of archaeological significance until assessment and any possible mitigation has been completed and approval has been granted by SAHRA for recommencement of the project.

Declaration of Independence

I, **Dr. David Morris** declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed development project, application or appeal in respect of which I was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of my performing such work.

A handwritten signature in black ink, appearing to read 'D. Morris', with a stylized flourish at the end.

Dr David Morris

Archaeologist, Archaeology Department, McGregor Museum, Kimberley

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