

Annexure B

APPLICATION FOR AN ARCHAEOLOGICAL PERMIT

**TO DESTROY, DAMAGE, EXCAVATE, ALTER, DEFACE OR OTHERWISE DISTURB ANY
ARCHAEOLOGICAL SITE,**

OR

DESTROY, DAMAGE, EXCAVATE, REMOVE FROM ITS ORIGINAL POSITION,

OR

COLLECT ANY ARCHAEOLOGICAL MATERIAL OR OBJECT

OR

**BRING ONTO OR USE AT AN ARCHAEOLOGICAL SITE ANY EXCAVATION EQUIPMENT OR
ANY EQUIPMENT THAT ASSISTS IN THE DETECTION OR RECOVERY OF METALS OR
ARCHAEOLOGICAL MATERIAL OR OBJECTS,**

**PROTECTED IN TERMS OF SECTION 35(4) OF THE NATIONAL HERITAGE RESOURCES ACT
(ACT 25 OF 1999)**

FILL IN ALL SECTIONS RELATING TO YOUR APPLICATION.

1. DETAILS OF ARCHAEOLOGICAL SITE

- 1.1 Name and physical address of site: **Pinnacle Point Site 5-6, 13B, and 30**
- 1.2 Erf/Stand/Farm name and number: **Erf 15387 (a portion of Erf 2001), Boplaas, Mossel Bay**
- 1.3 Type of site (Provide a short description of the site, on a separate sheet): **PP5-6 is a rockshelter currently being excavated, PP13B is a previously excavated cave, and PP30 is a previously excavated hyena den**
- 1.3.1 Period, era, age or date of site: **PP5-6 is Middle Stone Age and dates from ~90-50 ka, PP13B is Middle Stone Age, currently dated from ~162 ka to 90 ka, PP30 is a paleontological site dated to ~150 ka**
- 1.4 Magisterial district in which the site, place or structure is situated (essential): **Mossel Bay**
- 1.4.1 Planning authority (if known): **Municipality of Mossel Bay & DEA&DP**
- 1.5 Is the site a declared provincial heritage site or provisionally protected place? **YES / NO**
If so, please attach a photocopy of the gazette notice or provide the following information: **attached**
- 1.5.1 Date of notice of declaration or provisional protection in the *Government Gazette* or *Provincial Gazette* (**14/12/2012**) (if known): **attached**
- 1.5.2 Number of notice of declaration or provisional protection in the *Government Gazette* or *Provincial Gazette* (if known): **Provincial Gazette 7075**
- 1.5.3 Number of *Government Gazette* or *Provincial Gazette* (if known): **7075**
- 1.5.4 Date of publication of the *Government Gazette* or *Provincial Gazette* (**14/12/2012**) (if known):
- 1.6 Current use of property: **the wider area is under development and occupation, PP5-6 and PP13B are below the cliffs and not in a development area, PP30 is in developed area**
- 1.7 Cadastral or geographical co-ordinates of the site, place or structure (Mark the position of the site on a copy of a 1:10 000 map / aerial photograph or a 1:50 000 map and include this in your application): **PP5-6 is S-34.205579, 22.091592, PP13B is S34.207705, E22.089513 and PP30 is S34.20223, E22.07948, see Figure 1 and 2**
- 1.7.1 Name and number of 1:50 000 (or larger scale) map: **WGS 84 3422 AA**
- 1.7.2 Latitude and longitude (where possible supply decimal version): **PP5-6 is S34.205579, E22.091592, PP13B is S34.207705, E22.089513 and PP30 is S34.20223, E22.07948**
- 1.7.3 Spatial Referencing System:
 Global position Datum: Old Cape / **WGS84** / Other (Please specify date of reading):
- Trigonometry Date of map:
- Other Date of recording: **2003**

2. DETAILS OF THE APPLICANT - Matthews

- 2.1 Name and Title: **Dr Thalassa Matthews**
Address: **Residential: 23 Bunker Rd, Lakeside**

Cape Town, South Africa

- 2.2 Postal code: **7945**
- 2.3 Contact numbers:
- 2.4.1 Telephone area code: Telephone number: (w) **021 481 3877** (h) **021 7886767**
- 2.4.2 Facsimile area code: Facsimile number: **0214813887**
- 2.4.3 Cellular phone number: **083 9525910**
- 2.4.4 E-mail: **tmatthews.matthews@gmail.com**
- 2.5 Qualifications and experience of the applicant: **Considerable archaeological field and research experience, long-time member of the research team working at Pinnacle Point**
- 2.6 Current academic status of the applicant: **Applicant holds a doctorate and has several years post-doctoral research experience.**
- 2.7 Identity number / Passport number of the applicant: **SA ID: 6709240121 087**
- 2.8 Declaration of applicant: I, Thalassa Matthews, hereby declare that I undertake to comply with the conditions and restrictions or directions under which Heritage Western Cape may issue the permit for which I am applying.



Signature of applicant: _____ Date: 10.07.2015

- 2.9 Declaration of Research Supervisor if applicant is a research student:
I, hereby declare that I will support this project and will assist the student to comply with the conditions and restrictions or directions under which Heritage Western Cape may issue the permit for which this student is applying.
Signature of Research Supervisor: _____ Date:

2. DETAILS OF THE APPLICANT - Marean

- 2.1 Name and Title: **Curtis W. Marean, Ph.D.**.....
- 2.2 Address: **In USA - Institute of Human Origins, School of Human Evolution and Social Change, Arizona State University, Tempe, Arizona, USA. In South Africa – MAPCRM, Private Bag X5, Suite 40, Hartenbos 6520**
.....
- 2.3 Postal code: **6520**.....
- 2.4 Contact numbers:
- 2.4.1 Telephone area code: **001-480** Telephone number: (w) **965 7796**..... (h) **396 8387**.....
- 2.4.2 Facsimile area code: Facsimile number: **none**.....
- 2.4.3 Cellular phone number: **in SA 07608906153**.....
- 2.4.4 E-mail: **curtis.marean@asu.edu**.....
- 2.5 Qualifications and experience of the applicant: **PhD, considerable archaeological field and research experience**.....
- 2.6 Current academic status of the applicant: **Full professor, associate director Institute of Human Origins**.....
- 2.7 Identity number / **Passport number** of the applicant: **505414393**.....

- 2.8 Declaration of applicant: I, **Curtis W. Marean** hereby declare that I undertake to comply with the conditions and restrictions or directions under which Heritage Western Cape may issue the permit for which I am applying.



Signature of applicant: _____ Date: 8 Sept 2015

- 2.9 Declaration of Research Supervisor if applicant is a research student: **NA**
I, hereby declare that I will support this project and will assist the student to comply with the conditions and restrictions or directions under which Heritage Western Cape may issue the permit for which this student is applying.
Signature of Research Supervisor: _____ Date:

3. NAME AND ADDRESS OF AUTHORISED REPRESENTATIVE(S) OF THE APPLICANT WHO WILL BE PERMANENTLY ON SITE DURING THE ACTION

- 3.1 Name and Title: **NA**.....
- 3.2 Address:
- 3.3 Postal code:
- 3.4 Contact Details:

- 3.4.1 Telephone area code: (.....) Telephone number:
- 3.4.2 Facsimile area code: (.....) Facsimile number:
- 3.4.3 Cellular phone number:
- 3.4.4 E-mail:
- 3.5 Identity number:.....
- 3.6 Qualifications and/or relevant experience of authorised representative/s:
- 3.7 Will the authorised representative/s undertake the actions under supervision of the applicant? Yes/No
- 3.8 Declaration: I, hereby declare that I will undertake the actions under the supervision of the applicant.

Signature of authorised representative: _____ Date:

4. DETAILS OF THE REGISTERED OWNER OF THE SITE (A letter from the owner giving the following details and comment on the planned action may be submitted)

- 4.1 Name and Title: not relevant.....not relevant
- 4.2 Address:
- 4.3 Postal code:.....
- 4.4 Contact detail:
- 4.4.1 Telephone area code: Telephone number:
- 4.4.2 Facsimile area code: Facsimile number:
- 4.4.3 Cellular phone number:
- 4.4.4 E-mail:
- 4.5 Identity number:.....
- 4.6 Declaration: I, , am fully aware of this application and accept its contents.

Signature of owner: __ _____ Date:

- 4.7 Comments from owner on planned action (if any)

5. PURPOSE OF THE APPLICATION (place a cross in the appropriate block(s) below)

- 5.1 Type of work/Nature of activity:
- 5.1.1 Destruction for the purpose of:
 - Analysis Dating Restoration Other
- 5.1.2 Damage for:
 - Analysis Dating Restoration Other
- 5.1.3 Excavation
- 5.1.4 Alteration
- 5.1.5 Defacement
- 5.1.6 Disturbance
- 5.1.7 Removal from its original position
- 5.1.8 Collection
- 5.1.9 Use of excavation equipment or any equipment that assists in the detection or recovery of metals or archaeological material or objects
(If relevant, provide a motivation for the use of mechanical excavation equipment or any equipment that assists in the detection or recovery of metal or archaeological material or objects.)
- 5.1.10 Removal of graffiti at a rock art site
- 5.2 Period for which the permit is required (maximum three years)/ Proposed date of completion of activity:
From: 1 Oct 2015 To: 30 Sept 2017.....
- 5.4 Re-application for permit Date and number of previous permit: (dd/mm/yy):

6. DESCRIPTION OF AND MOTIVATION FOR THE ACTION PROPOSED

(Provide a short description of the proposed action which must be supported by the documentation specified in 7 and 9 hereunder, as well as a full motivation for the proposed action, with reference to conservation policy and/or principles, where appropriate.)

We will sample and analyse fossil ungulate remains from Pinnacle Point so as to reconstruct changes in their ancient demography as a proxy for environmental change. It is known that demographic changes can be reconstructed from ancient DNA studies. Our focus will be on grazing species that once inhabited the now-submerged Agulhas Plain. Their populations should rise and fall as that plain expands and contracts, respectively.

7. DETAILS OF COLLABORATING INSTITUTION WHERE THE APPLICANT WILL BE BASED WHILE UNDERTAKING THE PROJECT

- 7.1 Name of the collaborating institution:
- 7.2 Name and Title of Head of the collaborating institution:
- 7.3 Identity number of the Head of the collaborating institution:
- 7.4 Address:
- 7.5 Postal code:
- 7.6 Telephone area code: (.....) Telephone number:
- 7.7 Facsimile area code: (.....) Facsimile number:
- 7.8 Cellular phone number:
- 7.9 E-mail:
- 7.10 Declaration of the Head of the collaborating institution: I,
in my capacity as of the
hereby declare that the applicant will be based at this institution while undertaking the project and that I support the application.

Signature of the Head of the collaborating institution: _____ Date:

8. DETAILS OF THE COLLABORATING INSTITUTION WHERE MATERIALS AND RECORDS WILL BE STORED AND CURATED

- 8.1 Name of the collaborating institution: **Iziko South African Museum**.....
- 8.2 Name of Head of the collaborating institution: **Mr Paul Tichmann, Acting Director, Social Histories Collections Department**
- 8.3 Identity number of the Head of the collaborating institution.....
- 8.4 Address: **Iziko Museums, Box 61 Cape Town**
- 8.5 Postal code:
- 8.6 Telephone area code: **(021)** Telephone number: **481 3800/467 7217**
- 8.7 Facsimile area code: **(021)** Facsimile number: **481 3993**
- 8.8 Cellular phone number: **073 1796708**.....
- 8.9 E-mail: **ptichmann@iziko.org.za**
- 8.10 Declaration of the Head of the collaborating institution: I, Mr Paul Tichmann
in my capacity as Acting Director of the Social Histories Collections Department, Iziko Museum
hereby declare that the collaborating institution has an official written collections policy and undertakes to store and curate the material and records from this project, once completed.

Signature of Head of the collaborating institution: _____ Date:

We will sample and analyse fossil ungulate remains from Pinnacle Point so as to reconstruct changes in their ancient demography as a proxy for environmental change. It is known that demographic changes can be reconstructed from ancient DNA studies. Our focus will be on grazing species that once inhabited the now-submerged Agulhas Plain. Their populations should rise and fall as that plain expands and contracts, respectively.

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- 7.4 Address:
- 7.5 Postal code:
- 7.6 Telephone area code: (.....) Telephone number:
- 7.7 Facsimile area code: (.....) Facsimile number:
- 7.8 Cellular phone number:
- 7.9 E-mail:

7.10 Declaration of the Head of the collaborating institution: I,
in my capacity as of the
hereby declare that the applicant will be based at this institution while undertaking the project and that I support the application.

Signature of the Head of the collaborating institution: _____ Date:

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- 8.3 Identity number of the Head of the collaborating institution:
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in my capacity as Acting Director of the Social Histories Collections Department, Iziko Museum
hereby declare that the collaborating institution has an official written collections policy and undertakes to store and curate the material and records from this project, once completed.

Signature of Head of the collaborating institution: *P. Tichmann* Date: 04/09/2015

9. DOCUMENTATION TO ACCOMPANY THIS APPLICATION

9.1 LOCALITY PLAN showing where the site is and a SITE PLAN showing the layout of the property and pertinent features relevant to the planned action.

See attached Figures 1 and 2.

9.2 SITE DESCRIPTION (see 1.3).



Figure 1. The location of Pinnacle Point relative to Mossel Bay

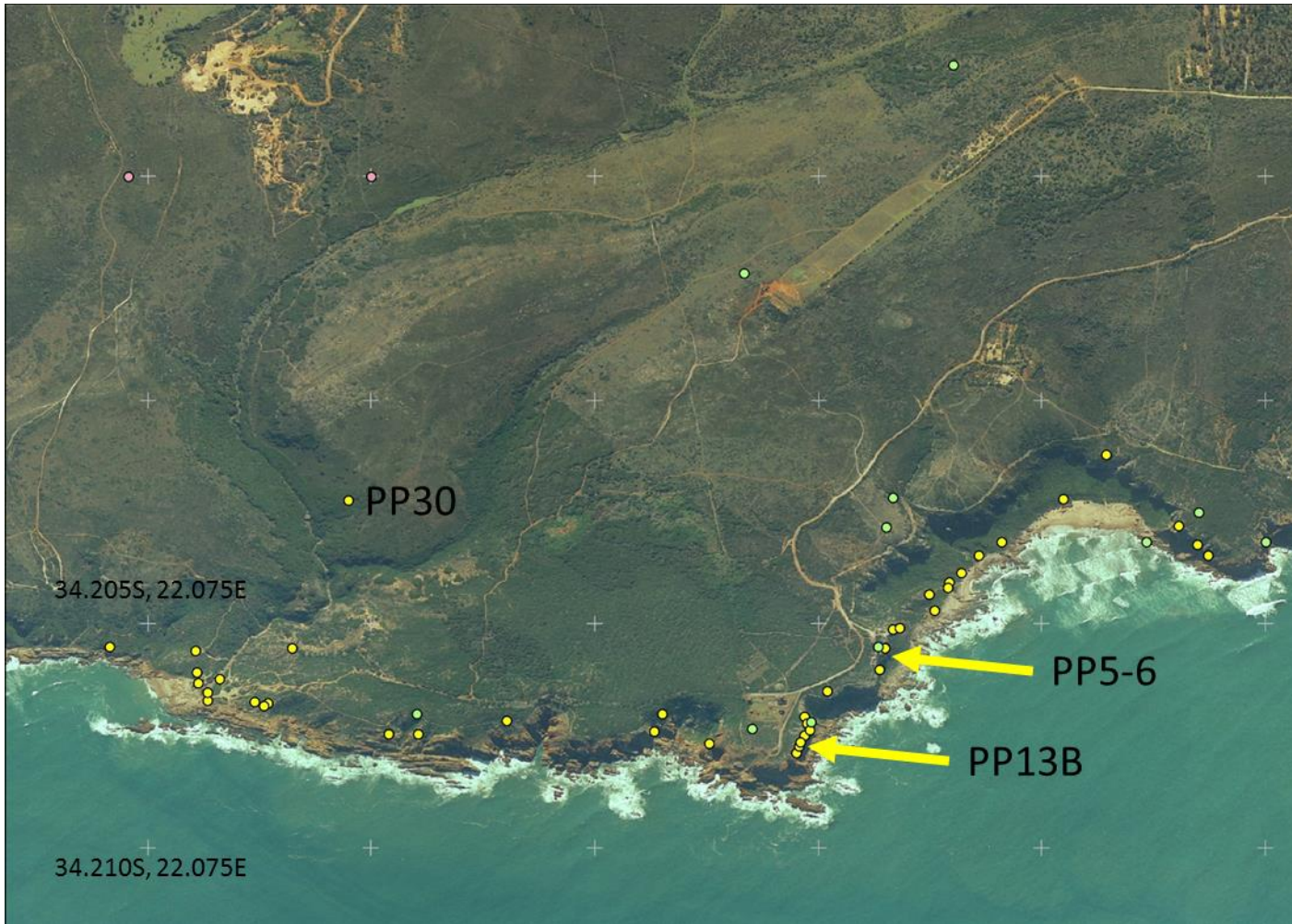


Figure 2. The specific placement of the sites excavated and from which samples will be selected.

PROJECT DESCRIPTION AND MOTIVATION including relevant scientific background, motivation for use of mechanical equipment and plans for conservation of the site after the planned action (see 6) including plans for conservation of the site after the action.

In historic times the coast of South Africa, due to its peculiar floral ecosystem, has few large mammals and very few of the migratory species so typical of the rest of Africa. Yet, in the archaeological sites on the coast, the bones of large migratory species are common (Klein 1983). Underlying the sea in this region is a shallow gradually descending shelf that, during periods of lowered sea level, would be exposed. Our 3D computer model of this underwater feature shows that during the glacial maximum the coastline was 95 km distant (Fisher et al. 2010). Because summer rains dominate the land to the east, and winter rains to the west, we hypothesize that a seasonal migration of large mammals existed on this once exposed plain, and that early modern humans hunted them from the caves, providing them with valuable foraging returns during harsh glacial cycles (Marean 2010). If this is true, genetics of the fossil animal bones should show a pattern where the population size of the migratory species expands during glacials and contracts during inter-glacials. We propose to extract the ancient DNA from the bones of these ancient animals and directly test this hypothesis. An ancillary benefit of this study will be that it will be the first to use ancient DNA of fossil animals to address questions of climate and environmental change in Africa, and thus open a new research direction.

DNA Extraction

DNA Extractions will be conducted at the ASU Ancient DNA Laboratory, a Class 10,000 clean-room facility located in a separate building from the Molecular Anthropology Laboratory, under the direction of Dr. Anne Stone. Standard controls, such as the use of extraction blanks and full body coverings, are implemented rigorously in this lab to minimize sample contamination (Cooper and Poinar 2000). An extraction protocol designed for use with ancient skeletal material (bone and dentin) which maximizes recovery of short degraded DNA fragments will be used (Dabney et al. 2013). For calculus, the extractions will be performed as in Warinner et al. (2014). Samples will be extracted twice in order to ensure replication of results. For samples with dental calculus, we will ideally perform one extraction using tooth roots and another using calculus. PCR (Polymerase Chain Reaction) amplification of a small region of human mitochondrial DNA (mtDNA) will be used to screen the extracts for presence of DNA and to check for contamination of the extraction process by lab personnel (Pääbo 1989).

DNA library preparation, Targeted Enrichment, and Sequencing

Samples will be converted into DNA libraries by repairing the ends of all DNA fragments in the extract and then attaching universal adapters, which are used as starting sites for later amplification and sequencing (Briggs and Heyn 2012; Knapp and Hofreiter 2010). All DNA fragments are then amplified in bulk. This process effectively immortalizes each sample, allowing use of the library for many forms of downstream analyses while reducing material demands on valuable ancient samples (Briggs and Heyn 2012; Meyer and Kircher 2010). Also, during library preparation, the DNA from each individual will be tagged with a unique index, allowing us to multiplex libraries together while still being able to identify each one individually (Kircher et al. 2012). Libraries are screened for quality through Real-Time (or quantitative) PCR (qPCR). Each library is assessed three times: (1) after initial library preparation (pre-indexing), (2) after adding the indices, (3) and after amplification.

In order to ensure that only DNA fragments of interest are sequenced, we will isolate complete mitochondrial genomes from the indexed libraries through targeted enrichment with

in-solution hybridization. This process captures relevant sequences using DNA baits that only hybridize to target mtDNA fragments (Horn 2012; Maricic et al. 2010). For this analysis, the baits will be designed based on the complete genome sequences of the relevant species of bovid or a closely related extant bovid (available mtDNA genome sequences are deposited in GenBank: <http://www.ncbi.nlm.nih.gov/genome/>). In cases where the sample is from an unidentified bovid, the DNA will be captured using baits made from several species (chosen based on the size of bovid if known). The enriched mtDNA libraries will be pooled and sequenced using the high-throughput technology of the Illumina MiSeq, which is an ideal platform for sequencing small genome targets (Glenn 2011).

Data analyses

Illumina sequence reads will be de-multiplexed, trimmed and quality filtered using a bioinformatics pipeline designed for aDNA (Schubert et al. 2014). MtDNA reads will be mapped to the relevant bovid mtDNA genome using BWA (Li and Durbin 2009) with seed disabled to improve mapping accuracy (Schubert et al. 2012). SNP genotyping will be performed using SAMtools (Li et al. 2009), which has been found to produce accurate variant calls when working with low coverage genomes (Cheng et al. 2014). PCR duplicates will also be removed using SAMtools. Authenticity of the aDNA sequences will be assessed by examining DNA damage patterns with MapDamage (Jonsson et al. 2013) and by identifying sequence reads with postmortem degradation using the PMD tools program (Skoglund et al. 2014). Geneious will be used to visualize the results of the mapping assembly and to assess coverage of the relevant genes (Geneious, created by Biomatters, available from <http://www.geneious.com/>). The consensus sequences generated will be used for phylogenetic analyses in MEGA (Tamura et al. 2013). MEGA will be used to generate Neighbor-Joining and Maximum Likelihood trees. The best model of evolution for creating the trees will be chosen based on the Akaike Information Criterion values (Akaike 1974) obtained using the model test in MEGA. Bootstrap values will be inferred from 1000 replicates in order to obtain statistical support for the nodes and robustness of tree topology. Bayesian analyses will be carried out using BEAST (Drummond and Rambaut 2007), which will also be used to estimate the divergence times of the different bovid species. Markov Chain Monte Carlo runs with 10,000,000 generations will be carried out, with sampling at every 1,000 steps. The program TRACER will be used to check convergence of the results, so as to ensure adequate effective sample size (Rambaut et al. 2014). A 10% burn-in will be used and a target tree will be generated to summarize the posterior probabilities for each node on the tree. The FigTree program will be used to visualize the results including the divergence times (<http://tree.bio.ed.ac.uk/software/figtree/>). To explore whether extensive genetic drift and reductions in effective population size may have affected mtDNA diversity in the pre-contact population, we will build a Bayesian skyline plot using BEAST (Drummond et al. 2005). Skyline plots reconstruct demographic history by using coalescent methods to estimate the likely genealogy from sequence data (Ho and Shapiro 2011). We will use a Bayesian approach which accommodates heterochronous data and incorporates a model accounting for aDNA damage (Rambaut et al. 2009). Given that our samples are dated, we will be able to provide a strong temporal calibration for plot estimation.

For this project, we plan to sample, bone, teeth, and dental calculus (when it is present). All of these can be viable sources of ancient DNA (aDNA) in poorly preserved remains (Black et al. 2014; De la Fuente et al. 2012; Leney 2006; Pilli et al. 2013). Approximately 50-100 mg of calculus will be collected with a dental scaler as in Warinner et al. (2014). Depending on size, teeth will be sliced transversally at the cemento-enamel junction using a Dremel drill or a small hand saw as in Schuenemann et al. (2011) such that a small portion of the root is

taken (for a total of 150-250 mg). This method preserves the tooth crown for future study. For bone, approximately 1 gram will be sampled. The outer surface of the tooth roots or bone will be removed with the Dremel wheel. This step removes contaminants and inhibitors that may be present on the surface and improves the ratio between contaminant and endogenous DNA (Rohland and Hofreiter 2007). Bone and tooth roots will be pulverized by blunt force with a hammer covered in aluminum foil or with a SPEX bone mill. Additional precautions will be taken to avoid contamination such as single use of Dremel wheels and bleach decontamination and UV irradiation of tools between uses (Gilbert et al. 2006).

Sample Description and List

The samples for this study will come from Pinnacle Point 30 and 13B. PP30 is a hyena accumulation that appears to have accumulated relatively quickly. PP13B is a Middle Stone Age site that dates between ~160-50 ka. Our samples are drawn from a variety of layers so that we can determine the level of aDNA preservation throughout the site. We will sample from a variety of teeth and postcranial bones so as to determine the best specimens for preservation.

The sample list is provided here, and photographs of all samples are also attached. The specimen number is on each photograph. Note that only small samples will be taken from the specimens, and the specimens will remain intact. Note also that in the SACP4 database system, the Lot Number and Specimen Numbers holds all the coordinate and context data for the specimen.

Specimen Number	Site	Lot Number
22230	PP13B	682
22929	PP13B	743
34615	PP13B	782
42117	PP13B	1051
42143	PP13B	1051
45264	PP13B	1333
45409	PP13B	1352
45713	PP13B	1417
45792	PP13B	1418
52675	PP13B	1114
52943	PP13B	1117
53810	PP13B	1495
64546	PP13B	1572
66615	PP30	1931
67018	PP30	1988
67189	PP30	2108
67209	PP30	2097
67429	PP30	2133
67768	PP30	2100
67838	PP30	2249
67867	PP30	2276
67923	PP30	2701
80107	PP30	1673
115433	PP30	2399

103263	PP5-6	3339
103338	PP5-6	3341
103387	PP5-6	3341
106386	PP5-6	3246
107010	PP5-6	3226
120970	PP5-6	3428
129996	PP5-6	1154
134571	PP5-6	1171
160907	PP5-6	8013
182998	PP5-6	8212
212474	PP5-6	8358
213839	PP5-6	8358
213848	PP5-6	8358
221351	PP5-6	8411
236530	PP5-6	8502
252980	PP5-6	8602
253542	PP5-6	8602
291594	PP5-6	9000
291843	PP5-6	9000
291999	PP5-6	9000

References

- Akaike H. 1974. A new look at the statistical model identification. . IEEE Transactions on Automatic Control 19(6):716-723.
- Black J, Kerr S, Henebry-Delfon L, and Lorenz JG. 2014. Dental calculus as an alternate source of mitochondrial DNA for analysis of skeletal remains. SCA Proceedings 25:1-7.
- Briggs AW, and Heyn P. 2012. Preparation of next-generation sequencing libraries from damaged DNA. Methods in molecular biology 840:143-154.
- Cheng AY, Teo YY, and Ong RT. 2014. Assessing single nucleotide variant detection and genotype calling on whole-genome sequenced individuals. Bioinformatics 30(12):1707-1713.
- Cooper A, and Poinar HN. 2000. Ancient DNA: Do it right or not at all. Science 289:1139.
- De la Fuente C, Flores S, and Moraga M. 2012. DNA from human ancient bacteria: A novel source of genetic evidence from archaeological dental calculus. Archaeometry 55(4):766-778.
- Drummond AJ, and Rambaut A. 2007. BEAST: Bayesian evolutionary analysis by sampling trees. BMC evolutionary biology 7:214.
- Drummond AJ, Rambaut A, Shapiro B, and Pybus OG. 2005. Bayesian coalescent inference of past population dynamics from molecular sequences. Mol Biol Evol 22(5):1185-1192.
- Fisher, E. C., et al. (2010). "Middle and Late Pleistocene Paleoscape Modeling along the Southern Coast of South Africa." Quaternary Science Reviews 29: 1382-1398.
- Gilbert MT, Hansen AJ, Willerslev E, Turner-Walker G, and Collins M. 2006. Insights into the processes behind the contamination of degraded human teeth and bone samples with exogenous sources of DNA. International Journal of Osteology 16(2):156-164.

- Glenn TC. 2011. Field guide to next-generation DNA sequencers. *Molecular ecology resources* 11(5):759-769.
- Ho SY, and Shapiro B. 2011. Skyline-plot methods for estimating demographic history from nucleotide sequences. *Molecular ecology resources* 11(3):423-434.
- Horn S. 2012. Case study: Enrichment of ancient mitochondrial DNA by hybridization capture. In: Shapiro B, and Hofreiter M, editors. *Ancient DNA: Methods and Protocols*. New York: Humana Press. p 189-196.
- Jonsson H, Ginolhac A, Schubert M, Johnson PL, and Orlando L. 2013. mapDamage2.0: fast approximate Bayesian estimates of ancient DNA damage parameters. *Bioinformatics* 29(13):1682-1684.
- Kircher M, Sawyer S, and Meyer M. 2012. Double indexing overcomes inaccuracies in multiplex sequencing on the Illumina platform. *Nucleic Acids Res* 40(1):e3.
- Klein, R. G. (1983). Palaeoenvironmental implications of Quaternary large mammals in the Fynbos Region. *Fynbos Palaeoecology: A preliminary synthesis*. H. J. Deacon, Q. B. Hendey and J. J. N. Lambrechts. Pretoria, Cooperative Scientific Programmes: 116-138.
- Knapp M, and Hofreiter M. 2010. Next Generation Sequencing of Ancient DNA: Requirements, Strategies and Perspectives. *Genes* 1(2):227-243.
- Leney MD. 2006. Sampling skeletal remains for Ancient DNA (aDNA): A measure of success. *Historical Archaeology* 40:41-49.
- Li H, and Durbin R. 2009. Fast and accurate short read alignment with Burrows-Wheeler transform. *Bioinformatics* 25(14):1754-1760.
- Li H, Handsaker B, Wysoker A, Fennell T, Ruan J, Homer N, Marth G, Abecasis G, and Durbin R. 2009. The Sequence Alignment/Map format and SAMtools. *Bioinformatics* 25(16):2078-2079.
- Marean, C. W. (2010). "Pinnacle Point Cave 13B (Western Cape Province, South Africa) in context: The Cape Floral kingdom, shellfish, and modern human origins." *Journal of Human Evolution* 59(3-4): 425-443.
- Maricic T, Whitten M, and Paabo S. 2010. Multiplexed DNA sequence capture of mitochondrial genomes using PCR products. *PloS one* 5(11):e14004.
- Meyer M, and Kircher M. 2010. Illumina sequencing library preparation for highly multiplexed target capture and sequencing. *Cold Spring Harbor protocols* 2010(6):pdb prot5448.
- Pääbo S. 1989. Ancient DNA: extraction, characterization, molecular cloning, and enzymatic amplification. *Proceedings of the National Academy of Sciences, USA* 86:1939-1943.
- Pilli E, Modi A, Serpico C, Achilli A, Lancioni H, Lippi B, Bertoldi F, Gelichi S, Lari M, and Caramelli D. 2013. Monitoring DNA contamination in handled vs. directly excavated ancient human skeletal remains. *PloS one* 8(1):e52524.
- Rambaut A, Ho SY, Drummond AJ, and Shapiro B. 2009. Accommodating the effect of ancient DNA damage on inferences of demographic histories. *Mol Biol Evol* 26(2):245-248.
- Rambaut A, Suchard MA, Xie D, and Drummond A. 2014. Tracer v1.6. <http://beast.bio.ed.ac.uk/Tracer>.
- Rohland N, and Hofreiter M. 2007. Ancient DNA extraction from bones and teeth. *Nat Protoc* 2(7):1756-1762.
- Schubert M, Ermini L, Der Sarkissian C, Jonsson H, Ginolhac A, Schaefer R, Martin MD, Fernandez R, Kircher M, McCue M et al. . 2014. Characterization of ancient and modern genomes by SNP detection and phylogenomic and metagenomic analysis using PALEOMIX. *Nat Protoc* 9(5):1056-1082.

- Schuenemann VJ, Bos K, DeWitte S, Schmedes S, Jamieson J, Mittnik A, Forrest S, Coombes BK, Wood JW, Earn DJ et al. . 2011. Targeted enrichment of ancient pathogens yielding the pPCP1 plasmid of *Yersinia pestis* from victims of the Black Death. *Proc Natl Acad Sci U S A* 108(38):E746-752.
- Skoglund P, Northoff BH, Shunkov MV, Derevianko AP, Paabo S, Krause J, and Jakobsson M. 2014. Separating endogenous ancient DNA from modern day contamination in a Siberian Neandertal. *Proc Natl Acad Sci U S A* 111(6):2229-2234.
- Tamura K, Stecher G, Peterson D, Filipski A, and Kumar S. 2013. MEGA6: Molecular Evolutionary Genetics Analysis version 6.0. *Mol Biol Evol* 30(12):2725-2729.
- Warinner C, Rodrigues JF, Vyas R, Trachsel C, Shved N, Grossmann J, Radini A, Hancock Y, Tito RY, Fiddyment S et al. . 2014. Pathogens and host immunity in the ancient human oral cavity. *Nature genetics* 46(4):336-344.

9.3 VISUAL AIDS including photographs, videos of the site in its present form, where appropriate. Please provide captions and dates to all photographs.

Photo graphs of all the specimens to be sampled are attached.

9.4 Details and outcome of any PREVIOUS SUBMISSIONS made to any other authority (the former National Monuments Council (NMC), SAHRA, etc.) in respect to this application.

9.6 ANY ADDITIONAL PERTINENT INFORMATION that you believe will assist Heritage Western Cape to consider your application.

10. PLEASE NOTE:

10.1 Unless both the applicant and the head of the department / head of the institution which curates the material, sign the application form, and the registered owner either signs or supplies a letter approving the project, this form will not be processed by Heritage Western Cape.

10.2 **Applications are considered to be public documents and are open to public scrutiny. Should you wish your application to be kept confidential, please motivate your request on a separate sheet.**

When completed, please return this form to:

The Secretariat
Heritage Western Cape Permit Committee
Private Bag X9067
CAPE TOWN
8000

Telephone: 021 424-0410
Fax 021 424-0457



Enquiries Troy Smuts

Tel: 021 483 9543

Email: troy.smuts@westerncape.gov.za

Date: 12 March 2014

Case No: 14021203TS0225M

Auto IDs: 2494 - 2849

iLifa leMveli leNtshona Koloni
Erfenis Wes-Kaap
Heritage Western Cape

PERMIT

**In terms of section 35(4) of the National Heritage Resources Act (Act 25 of 1999)
and the Western Cape Provincial Gazette 6061, Notice 298 of 2003**

Attention: Dr Curtis Marean

MAPCRM

Private Bag X5

Suite 40

Hartenbos, 6520

CASE NUMBER: 14021203TS0225M

ARCHAEOLOGICAL PERMIT: EXCAVATION ON PINNACLE POINT SITE 5 AND 6 ON ERF 15387 (A PORTION OF ERF 2001), BOPLAAS, MOSSEL BAY

The matter above has reference.

To: Dr C. Marean in association with Dr T. Matthews

of: The Institute of Human Origins, School of Human Evolution & Social Change, Arizona USA

for: Excavation, removal and collection

of: Middle Stone Age Material

from: Pinnacle Point Site 5 and 6

at: Erf 15387 (a portion of Erf 2001), Boplaas, Mossel Bay

1. This permit is valid until 12 March 2017.

Terms and Conditions:

1. If the permit holder is not to be present on the site at all times then HWC must be provided with the names and qualifications of the authorized representatives.
2. Adequate recording methods as specified in the Regulations and Guidelines pertaining to the National Heritage Resources Act must be used.
3. A final report, in both digital and hardcopy format, MUST be submitted to HWC on or before 12 March 2017. An extension to this permit can be granted on submission of a progress report (if work was initiated) and a letter stating reasons for the extension. HWC reserves the right to withhold further permits if progress is not deemed satisfactory.
4. All material collected and excavated, as well as field notes and records, will be curated by the Iziko: South African Museum.
5. Reprints of all published papers or copies of theses or reports resulting from this work must be lodged with HWC.
6. If a published report has not appeared within three years of the lapsing of this permit, the report in terms of the permit will be made available to researchers on request.
7. It is the responsibility of the permit holder to obtain permission from the landowner for each visit, and conditions of access imposed the landowner must be observed.
8. HWC shall not be liable for any losses, damages or injuries to persons or properties as a result of any activities in connection with this permit.
9. HWC reserves the right to cancel this permit by notice to the permit holder.

Should you have any further queries, please contact the official above and quote the case number above.

Yours faithfully

Andrew B Hall

Chief Executive Officer

Heritage Western Cape

FEATURES OF CULTURAL SIGNIFICANCE, STRUCTURES AND UNMARKED BURIALS, SITUATED ON OR AT THE PINNACLE POINT SITE COMPLEX ON ERF 15387 AND PTN OF ERF 2001 AND BOUNDED BY THE GPS CO-ORDINATES BELOW, IN THE DIVISION OF MOSSEL BAY, EDEN DISTRICT.

By virtue of the powers vested in Heritage Western Cape, as the provincial heritage resources authority for the province of the Western Cape, in terms of section 27 of the National Heritage Resources Act, Act No. 25 of 1999, archaeological and palaeontological sites, unmarked burials, the landscape and natural features of cultural significance and structures situated on or at the Pinnacle Point Site Complex in the division of Mossel Bay, Eden District, and as reflected by the GPS co-ordinates below, are hereby formally protected under Section 27 of the Act bearing the provisions of Sections 34, 35 and 36 of the Act in mind.

HERITAGE WESTERN CAPE

**DECLARATION OF HERITAGE RESOURCES AS PROVINCIAL HERITAGE SITES
PINNACLE POINT SITE COMPLEX**

In terms of Section 27 of the National Heritage Resources Act, No. 25 of 1999, Heritage Western Cape hereby declares the Pinnacle Point Site Complex, fully described in the schedule, as a Provincial Heritage Site.

Significance

The Pinnacle Point Site Complex (PPSC) preserves in a short stretch of coastline Africa's densest concentration of well-preserved archaeological sites, some of which date to the time of the origin of our species (*Homo sapiens*). All the Pinnacle Point sites have excellent fossil bone preservation in the older layers, unlike many other caves along the Cape coast. The Pinnacle Point Site Complex contains some of the world's oldest evidence for coastal exploitation (shellfish), some of the earliest radiometrically dated use of pigment (ground red ochre), and early evidence for heat treatment technology. Later Stone Age sites are abundant at the Pinnacle Point Site Complex as well, and the most recent pre-colonial human occupation of the area is represented by coastal shell midden deposits.

The Pinnacle Point Site Complex preserves a rich record for palaeoclimate and palaeoenvironment in the form of speleothems, raised beaches, fossil dunes, and palaeontological assemblages. All are spread continuously across the area and together provide a valuable record of human, climate, and environmental co-evolution in Africa. The Pinnacle Point Site Complex preserves a unique sequence of human occupation from 170,000 years ago to pre-colonial human occupation embedded in a rich record for climate and environmental change.

FORMELE BESKERMING VAN ARGEOLOGIESE EN PALEONTOLOGIESE TERREINE, LANDSKAP EN NATUURKENMERKE VAN KULTURELE BETEKENIS, STRUKTURE EN ONGEMERKTE GRAFTE, GELEË OP OF BY DIE PINNACLE POINT-TERREINKOMPLEKS OP ERF 15387 EN GEDEELTE VAN ERF 2001 EN BEGREN S DEUR DIE GPS-KOÖRDINATE HIERONDER, IN DIE AFDELING MOSSELBAAI, DISTRIK EDEN.

Kragtens die bevoegdheid verleen aan Erfenis Wes-Kaap, as die provinsiale erfenishulpbronowerheid vir die provinsie Wes-Kaap, ingevolge artikel 27 van die Wet op Nasionale Erfenishulpbronne, Wet No. 25 van 1999, word argeologiese en paleontologiese terreine, ongemerkte grafte, die landskap en natuureienskappe van kulturele betekenis en strukture geleë op of by die Pinnacle Point-terreinkompleks in die afdeling Mosselbaai, distrik Eden, en soos getoon deur die GPS-koördinate hieronder, hierby formeel beskerm kragtens artikel 27 van die Wet, met inagneming van die bepalings van artikels 34, 35 en 36 van die Wet.

ERFENIS WES-KAAP

**VERKLARING VAN ERFENISHULPBRONNE TOT PROVINSIALE ERFENISTERREINE
PINNACLE POINT-TERREINKOMPLEKS**

Ingevolge artikel 27 van die Wet op Nasionale Erfenishulpbronne, No. 25 van 1999, verklaar Erfenis Wes-Kaap hierby die Pinnacle Point-terreinkompleks, volledig beskryf in die bylae, tot 'n Provinsiale Erfenisterrein.

Betekenis

Die Pinnacle Point-terreinkompleks (PPTK) bewaar in 'n kort stukkie kuslyn Afrika se digste konsentrasie van goed bewaarde argeologiese terreine wat uit die tyd van die ontstaan van ons spesie (*Homo sapiens*) dateer. Al die Pinnacle Point-terreine het uitstekende fossielbeenbewaring, anders as baie grotte langs die Kaapse kus. Die Pinnacle Point-terreinkompleks bevat die wêreld se oudste bewys van kusbenutting (skulpvis), die vroegste radiometries gedateerde gebruik van pigment (gemaalde rooi-oker) en die vroegste bewys van hittebehandelingstechnologie. Latere Steentydperk-terreine is ook volop by die Pinnacle Point-terreinkompleks, en die mees onlangse voorkoloniale bewoning van die gebied word deur kusskulp-afvalafsettings verteenwoordig.

Die Pinnacle Point-terreinkompleks bewaar 'n ryk rekord vir paleoklimaat en paleo-omgewing in die vorm van speleoteme, opgehefde strande, fossielduine en paleontologiese groepe. Alles is aaneenlopend dwarsoor die gebied versprei en bied

gesamentlik 'n wêreldwyd ongeëwenaarde rekord van mede-ontwikkeling van mens, klimaat en omgewing. Die Pinnacle Point-terreinkompleks bewaar 'n unieke opeenvolging van menslike bewoning van 170 000 tot voorkoloniale bewoning, ingebed in 'n ryke rekord vir klimaat- en omgewingsverandering.

UKHUSELO OLUSESIKWENI LWEZIZA ZEZIDALWA NEZINTO EZAZIKHO MANDULO, UBUME BOMHLABA KUNYE NEEMPAWU ZENDALO EZIBALULEKILEYO KWIMIBA YEZENKCUBEKO, NEZAKHIWO KUNYE NAMANGCWABA ANGABHALWANGA UKUBA NGAWOBANI AKWI -PINNACLE POINT SITE COMPLEX EKWISIZA ESINGU-15387 NESINGU-2001 NEZIKUMDA ONEZIKHOMBISI NGEZANTSIS EZIKUMHLABA OSEMOSSEL BAY, KWISITHILI I-EDEN.

Ngokwegunya elinikwe liCandelo leLifa leMveli leNtshona Koloni, njengogunyaziwe wezibonelelo zelifa lemveli zephondo leNtshona Koloni, ngokwemiqathango yecandelo 27 loMthetho iNational Heritage Resources Act, ongunombolo 25 ka-1999, iziza zezidalwa nezinto ezazikho kudala, amangcwaba angabhalwanga, ubume bomhlaba kunye neempawu zendalo ezibalulekileyo kwimiba yezenkcubeko ezikwi-Pinnacle Point Site Complex ekwiSiza esikumhlaba osisahulo oseMossel Bay, kwiSithili saseEden, njengoko kuboniswe nazizikhombisi zendlela ezilapha ngezantsi, ziyakhuselwa ngokusesikweni phantsi kweCandelo 27 loMthetho onemiqathango yamaCandelo 34, 35 no-36 oMthetho ochaziweyo.

ICANDELO LELIFA LEMVELI LENTSHONA KOLONI

ISIBHENGEZO SEZIBONELELO ZEZIZA ZELIFA LEMVELI ZEPHONDO EZIKWI-PINNACLE POINT SITE COMPLEX

Ngokwemiqathango yeCandelo 27 loMthetho iNational Heritage Resources Act, Nombolo 25 ka-1999, iCandelo leLifa leMveli leNtshona Koloni libhengeza iPinnacle Point Site Complex, echazwe ngokupheleleyo kwiShedyuli njengeSiza seLifa leMveli sePhondo.

Ukubaluleka

I-Pinnacle Point Site Complex (PPSC) ilondoloza ibathwana leziza ezidibeneyo ezikunxweme lezinto ezazikho kudala esele zijike zangamatye nezigcinwe kakuhle kakhulu ezisuka kumaxesha amandulo okuqala kobukho bokhokho bethu esasivela kubo thina (*Homo sapiens*). Kuzo zonke iziza zePinnacle Point kulondolozwe amathambo asele engamatye ezinto ezazikho kudala, mathambo lawo angekhoyo kunxweme lweKapa. I-Pinnacle Point Site Complex iqulathe obona bungqina budala bezinto ezazikho kumalwandle amakhulu (iimbaza), iveti eyayisetyenziswa kudala (imbola ebomvu ekhiwa emhlabeni), nobungqina bobugcisa bokushushubeza obabusetyenziswa kuqala. Iziza zamva zeStone Age ziliqela apha kwiPinnacle Point Site Complex, kananjalo kukwakho nobungqina bokuhlala kwabantu kule ndawo phambi kokuba eli lizwekazi libe phantsi kwamazwe aphesheya, phambi kwexesha lobukoloniyali.

IPinnacle Point Site Complex ilondoloze oovimba abatyebileyo bemozulu yamaxesha amandulo, kwanokuba indalo yayimi njani na ngaloo maxesha ngokuthi ujonge ubume bemiqolomba, ukuphakama kweelwandle, iingquzu zeentlabathi ezikufuphi neelwandle, neendlela eziqokelelelele ngayo izinto ezazikho mandulo. Zonke ezi zinto zithe saa kulo mmandla yaye xa zidibene zinika ingxelo engenakuthelekiswa kunye nayiphi na eyake yakho yokudaleka koluntu, imozulu kunye nako konke okusingqongileyo. IPinnacle Point Site Complex igcine ulandelelwano lweziganeko zokuhlala koluntu emihlabeni ukusukela ngo-170,000 ukuya kwixesha laphambi kobukoloniyali obulondolozwe kuvimba otyebileyo wokutshintsha kwemozulu nendalo nokusingqongileyo.

Schedule

The demarcation of the Provincial Heritage Site is as follows:

The southern border of the site is the provincial boundary at the coastline.

The coordinates in the following list have UTM easting and northing values that demarcate the interior border of the Pinnacle Point Site Complex. The columns labeled "UTM Easting" and "UTM Northing" are projected using the Universal Transverse Mercator system, Zone 34 South, WGS84 datum. Refer to the attached map.

Bylae

Die afbakening van die Provinsiale Erfenisterrein is soos volg:

Die suidelike grens van die terrein is die provinsiale grens by die kuslyn.

Die koördinate in die volgende lys bevat UTM-oostermeting- en -noordermetingwaardes wat die binnelandse grens van die Pinnacle Point-terreinkompleks afbaken. Die kolomme met opskrifte "UTM-oostermeting" en "UTM-noordermeting" word geprojekteer aan die hand van die Universele Transversale Mercator-stelsel, Sone 34 Suid, WGS84-verwysing. 'n Kaart wat die benaderde grense van die terrein toon, is saam met die kennisgewing gepubliseer word.

Ishedyuli

Ukucandwa kweSiza seLifa leMveli sePhondo kumi ngolu hlobo:

Umda ongezantsi wesiza ngumda wephondo okunxweme lolwandle.

Ezi zikhombisi ezi kolu ludwe lungezantsi ziqulethe amanani ahlula iUTM esempuma kwi-UTM esemantla ecanda umda ophakathi wePinnacle Point Site Complex. Iikholam ezibhalwe "UTM Easting" no-"UTM Northing" zibalwe kusetyenziswa idatha ye-Universal Transverse Mercator system, Zone 34 South, WGS84.

Kuza kubakho imephu eya kukhapha isaziso segazethi eza kubonisa imida yesiza.

FID	UTM Easting	UTM Northing
1	600968.207	6215018.722
2	600992.701	6214997.997
3	601018.186	6214988.896
4	601050.166	6214993.286
5	601073.717	6214983.866
6	601078.427	6214967.851
7	601073.717	6214951.836
8	601085.964	6214936.763
9	601098.210	6214919.806
10	601119.877	6214914.154
11	601137.776	6214901.907
12	601151.907	6214890.603
13	601157.559	6214874.588
14	601167.922	6214862.341
15	601182.053	6214852.921
16	601207.353	6214842.687
17	601239.518	6214815.239
18	601253.649	6214799.224
19	601259.301	6214790.745
20	601266.947	6214779.161
21	601274.314	6214794.959
22	601284.312	6214809.238
23	601296.637	6214821.563
24	601310.916	6214831.562
25	601326.714	6214838.928
26	601343.551	6214843.440
27	601360.916	6214844.959
28	601378.281	6214843.440
29	601395.118	6214838.928
30	601410.916	6214831.562
31	601425.195	6214821.563
32	601437.521	6214809.238
33	601447.519	6214794.959

34	598781.695	6214513.451
35	598783.215	6214530.816
36	598787.726	6214547.653
37	598795.093	6214563.451
38	598805.091	6214577.730
39	598817.417	6214590.056
40	598831.695	6214600.054
41	598847.493	6214607.421
42	598864.330	6214611.932
43	598881.695	6214613.451
44	598899.060	6214611.932
45	598914.977	6214607.750
46	598938.203	6214599.548
47	598964.162	6214589.987
48	598981.485	6214583.492
49	599001.064	6214578.053
50	599008.536	6214575.658
51	599015.795	6214572.677
52	599022.794	6214569.129
53	599029.489	6214565.036
54	599035.838	6214560.424
55	599042.964	6214558.049
56	599049.958	6214555.429
57	599056.745	6214552.311
58	599063.288	6214548.709
59	599069.553	6214544.644
60	599075.508	6214540.137
61	599109.773	6214551.474
62	599127.926	6214571.383
63	599151.665	6214606.428
64	599156.111	6214612.486
65	599160.998	6214618.194
66	599166.301	6214623.518
67	599171.988	6214628.430
68	599199.552	6214650.481
69	599209.461	6214665.344
70	599216.061	6214674.153
71	599228.387	6214686.479
72	599242.666	6214696.477
73	599258.464	6214703.843
74	599275.301	6214708.355
75	599292.666	6214709.874

76	599297.009	6214709.780
77	599307.226	6214709.336
78	599306.510	6214716.621
79	599306.452	6214723.942
80	599307.051	6214731.238
81	599308.303	6214738.451
82	599310.198	6214745.523
83	599359.038	6214918.521
84	599361.307	6214925.553
85	599368.674	6214941.351
86	599378.672	6214955.630
87	599390.997	6214967.956
88	599405.276	6214977.954
89	599421.074	6214985.321
90	599437.911	6214989.832
91	599455.276	6214991.351
92	599472.641	6214989.832
93	599489.478	6214985.321
94	599505.276	6214977.954
95	599519.555	6214967.956
96	599531.881	6214955.630
97	599541.879	6214941.351
98	599549.245	6214925.553
99	599551.360	6214919.063
100	599592.479	6214776.493
101	599594.361	6214768.850
102	599595.636	6214761.082
103	599596.296	6214753.239
104	599596.337	6214745.368
105	599595.759	6214737.518
106	599594.565	6214729.738
107	599592.764	6214722.075
108	599590.365	6214714.579
109	599582.998	6214698.781
110	599573.000	6214684.502
111	599560.674	6214672.176
112	599546.395	6214662.178
113	599530.597	6214654.811
114	599513.760	6214650.300
115	599508.862	6214649.681
116	599508.439	6214642.032
117	599507.419	6214634.440

118	599505.808	6214626.950
119	599503.616	6214619.610
120	599500.856	6214612.463
121	599497.546	6214605.555
122	599493.706	6214598.926
123	599471.216	6214563.207
124	599463.197	6214552.210
125	599454.638	6214543.209
126	599436.117	6214526.012
127	599432.351	6214522.686
128	599418.072	6214512.688
129	599402.274	6214505.322
130	599385.437	6214500.810
131	599368.072	6214499.291
132	599346.905	6214499.291
133	599332.316	6214500.567
134	599308.754	6214481.718
135	599289.468	6214453.248
136	599283.280	6214445.054
137	599280.572	6214441.957
138	599247.515	6214405.702
139	599251.597	6214405.216
140	599257.140	6214404.398
141	599270.684	6214401.020
142	599301.419	6214391.032
143	599304.712	6214389.897
144	599311.347	6214387.210
145	599322.202	6214382.354
146	599330.850	6214382.145
147	599339.059	6214381.609
148	599347.196	6214380.401
149	599355.206	6214378.527
150	599363.034	6214376.002
151	599370.629	6214372.841
152	599377.938	6214369.067
153	599384.913	6214364.705
154	599395.171	6214357.686
155	599403.211	6214356.480
156	599410.487	6214355.112
157	599417.641	6214353.209
158	599424.636	6214350.782
159	599431.431	6214347.844

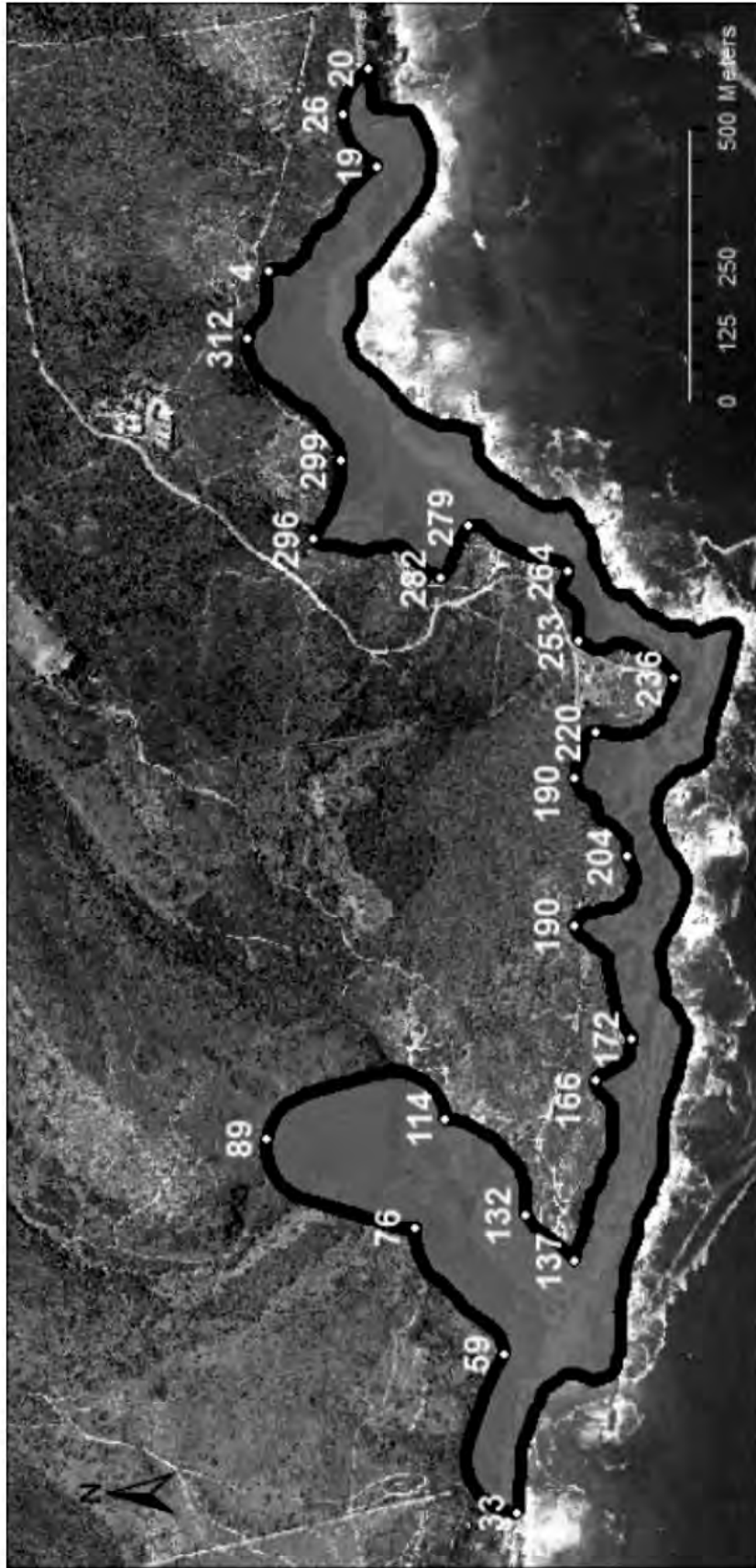
160	599437.991	6214344.411
161	599453.189	6214335.726
162	599457.527	6214335.156
163	599483.474	6214334.566
164	599510.221	6214335.270
165	599538.042	6214339.300
166	599563.251	6214366.497
167	599579.427	6214367.421
168	599587.861	6214363.237
169	599594.679	6214345.699
170	599615.178	6214307.994
171	599644.445	6214301.241
172	599656.161	6214297.771
173	599658.230	6214296.993
174	599660.984	6214299.385
175	599672.166	6214310.372
176	599686.445	6214320.370
177	599702.243	6214327.737
178	599719.080	6214332.248
179	599736.445	6214333.768
180	599742.150	6214333.605
181	599745.904	6214333.390
182	599752.238	6214335.753
183	599758.725	6214337.656
184	599765.331	6214339.088
185	599778.300	6214340.757
186	599805.832	6214343.885
187	599818.652	6214353.673
188	599826.236	6214369.270
189	599836.867	6214383.136
190	599851.195	6214401.623
191	599865.985	6214405.783
192	599884.934	6214390.993
193	599890.481	6214367.421
194	599897.414	6214352.631
195	599898.800	6214330.908
196	599914.257	6214307.199
197	599922.432	6214303.793
198	599929.766	6214300.383
199	599935.935	6214297.205
200	599938.077	6214298.332
201	599949.179	6214289.774

202	599961.658	6214294.395
203	599972.288	6214298.555
204	599983.381	6214302.715
205	599995.398	6214305.488
206	600009.726	6214305.950
207	600024.978	6214310.572
208	600034.222	6214318.892
209	600043.928	6214326.749
210	600052.343	6214340.111
211	600064.264	6214360.951
212	600084.138	6214365.110
213	600099.390	6214368.808
214	600107.710	6214394.228
215	600124.349	6214401.623
216	600138.676	6214405.783
217	600157.626	6214401.161
218	600179.349	6214395.615
219	600201.072	6214390.069
220	600217.249	6214381.287
221	600220.946	6214366.959
222	600219.560	6214344.312
223	600216.324	6214318.892
224	600218.635	6214299.017
225	600224.653	6214276.830
226	600229.153	6214269.972
227	600233.626	6214264.108
228	600237.630	6214257.914
229	600241.139	6214251.427
230	600244.133	6214244.687
231	600252.671	6214242.381
232	600257.513	6214240.598
233	600268.540	6214239.022
234	600271.763	6214238.508
235	600290.275	6214228.302
236	600304.140	6214220.907
237	600321.703	6214216.285
238	600331.409	6214221.832
239	600340.191	6214229.227
240	600345.737	6214238.008
241	600356.368	6214246.790
242	600359.603	6214257.420
243	600362.376	6214269.437

244	600367.460	6214279.143
245	600374.393	6214289.774
246	600378.091	6214302.253
247	600382.250	6214311.034
248	600386.410	6214323.051
249	600384.099	6214333.219
250	600373.624	6214345.291
251	600372.544	6214364.186
252	600376.242	6214375.741
253	600382.712	6214387.296
254	600392.418	6214398.850
255	600404.495	6214399.703
256	600425.696	6214397.464
257	600437.713	6214397.464
258	600447.881	6214401.161
259	600454.352	6214408.556
260	600461.747	6214417.338
261	600472.688	6214429.186
262	600482.109	6214430.128
263	600493.414	6214430.128
264	600506.602	6214423.534
265	600520.733	6214419.766
266	600532.980	6214428.244
267	600534.864	6214439.549
268	600542.161	6214467.410
269	600545.095	6214484.037
270	600549.604	6214500.860
271	600551.904	6214506.617
272	600564.966	6214536.583
273	600568.508	6214543.907
274	600572.641	6214550.915
275	600577.337	6214557.559
276	600582.563	6214563.794
277	600588.285	6214569.578
278	600594.464	6214574.871
279	600604.576	6214585.567
280	600605.208	6214608.235
281	600571.604	6214629.466
282	600516.965	6214649.249
283	600506.602	6214659.612
284	600515.081	6214683.163
285	600528.269	6214696.352

286	600535.806	6214707.656
287	600549.937	6214718.961
288	600558.415	6214731.208
289	600565.952	6214742.512
290	600563.195	6214755.500
291	600561.882	6214774.329
292	600551.810	6214811.111
293	600555.751	6214819.869
294	600562.320	6214850.521
295	600568.450	6214877.669
296	600569.326	6214890.806
297	600580.711	6214900.439
298	600630.629	6214869.349
299	600691.244	6214850.095
300	600723.274	6214849.153
301	600753.420	6214855.747
302	600765.666	6214866.109
303	600775.087	6214879.298
304	600789.218	6214884.008
305	600805.232	6214898.139
306	600818.421	6214913.212
307	600825.958	6214931.111
308	600842.914	6214952.778
309	600861.756	6214980.098
310	600874.002	6214996.112
311	600899.438	6215015.896
312	600924.873	6215023.432
313	600948.424	6215025.316
314	600968.207	6215018.722

MAP SHOWING APPROXIMATE BOUNDARIES OF THE PINNACLE POINT SITE COMPLEX
 KAART WAT BENADERDE GRENSE VAN DIE PINNACLE POINT-TERREINKOMPLEKS TOON
 IMEPHU EBONISA UMLINGANISELO WEMIDA YE-PINNACLE POINT SITE COMPLEX



THE NUMBERS SHOW THE UTM POINTS INCLUDED IN THE SCHEDULE
 DIE SYFERS TOON DIE UTM-PUNTE WAT IN DIE BYLAE VERSKYN
 AMANANI ABONISA IINDAWO ZE-UTM EZIBANDAKANYWE KWISHEDYULI

CITY OF CAPE TOWN

NOTICE

**CITY OF CAPE TOWN: CREDIT CONTROL AND DEBT COLLECTION FIRST AMENDMENT
BY-LAW, 2012**

Notice is hereby given that that in terms of section 13, of the Local Government: Municipal Systems Act, Act 32 of 2000, the City of Cape Town has passed the City of Cape Town: Credit Control and Debt Collection First Amendment By-law, 2012, as set out below, thus amending the City of Cape Town: Credit Control and Debt Collection By-law, 2006 as published in the Provincial Gazette Number: 6364, on 15 June 2006, at page 1054.

The English version was the adopted version

GENERAL EXPLANATORY NOTE:

- [] Words in bold type in square brackets indicate omissions from existing enactments.
 _____ Words underlined with a solid line indicate insertions in existing enactments.

By-law

To amend the City of Cape Town: Credit Control and Debt Collection By-law, 2006 in order that the By-law meets the requirements of more recent court judgments and to bring it in line with the City of Cape Town: Credit Control and Debt Collection Policy and to enhance the ability of the City to collect debt holistically.

Substitution of section 9 of the City of Cape Town: Credit Control and Debt Collection By-law, 2006

- 1 The following section is hereby substituted for section 9 of the City of Cape Town: Credit Control and Debt Collection By-law:

“9. Power to restrict, [or]disconnect or discontinue supply of service

- (1) The City Manager may restrict, [or]disconnect or discontinue the supply of any service to the premises of any user or debtor whenever such user or debtor of a service—
- (a) fails to make payment on the due date;
 - (b) fails to comply with an arrangement; [or]
 - (c) fails to comply with a condition of supply imposed by the Municipality; or
 - (d) tenders a negotiable instrument which is dishonoured by the bank, when presented for payment.
- (2) The City Manager may reconnect and restore full levels of supply of any of the restricted, disconnected or discontinued services only—
- (a) after the arrear debt, including the costs of disconnection or reconnection, if any, have been paid in full and any other conditions has been complied with; or