



Aboriginal Heritage Act 2006 Practice Note: Subsurface Testing

This Practice Note is prepared under section 143 of the *Aboriginal Heritage Act 2006* (the Act). It provides guidance about **subsurface testing** as it relates to the preparation of Cultural Heritage Management Plans required under the Act. The Practice Note covers:

- What is a Cultural Heritage Management Plan
- When a Cultural Heritage Management Plan may include subsurface testing
- Why subsurface testing may be required
- Who must supervise subsurface testing
- What to consider when developing a subsurface testing strategy and methodology
- How much subsurface testing is necessary;
- What are the subsurface testing methods and their usefulness
- What is important when analysing and reporting on subsurface testing
- What are some archaeological standards relevant to subsurface testing.

What is a Cultural Heritage Management Plan?

A Cultural Heritage Management Plan (a plan) is required for an activity (i.e. the use or development of land) if the activity is a high impact activity and falls in whole or in part within an area of cultural heritage sensitivity. The terms 'high impact activity' and 'cultural heritage sensitivity' are defined in the *Aboriginal Heritage Regulations 2007* (the Regulations). A plan must also be prepared when an activity requires an Environmental Effects Statement, or when the Minister for Aboriginal Affairs requires. A person may also elect to prepare a plan even if not required under the Act.

An approved plan must be submitted by the sponsor of an activity to a responsible authority before the necessary statutory approval can be granted and/or before works can start.

A Cultural Heritage Management Plan involves an assessment of an area to determine the nature and extent of any Aboriginal cultural heritage that may be present. Knowledge about Aboriginal heritage that may be impacted may be gained through background research, interviews with Aboriginal people, a ground surface survey, **subsurface testing** and/or archaeological excavation.

A Cultural Heritage Management Plan determines how the proposed activity can be carried out and avoid harm to any Aboriginal cultural heritage present. If this is not possible, it considers how to conduct the activity in a way that minimises any harm. For more information about plans see Aboriginal Affairs Victoria's (AAV) website at www.aboriginalaffairs.vic.gov.au

When may a Cultural Heritage Management Plan include subsurface testing?

The Regulations prescribe standards for preparing Cultural Heritage Management Plans based on the level of assessment required to develop the plan. In some cases a standard assessment may be all that is required, while in other circumstances a complex assessment may be required (for further information visit the AAV website).

Regulation 59(4) specifies that a **standard assessment** may include the following subsurface investigations: ground penetrating radar survey, resistivity survey, remote sensing, ground magnetic survey, electromagnetic survey, and soil and sediment testing with a manual auger no larger than 12cm in diameter. Testing with a manual auger will be the only type of subsurface testing method for a standard assessment discussed below as the other type of subsurface investigations do not involve ground disturbance.

A **complex assessment** is required when Aboriginal cultural heritage is, or is likely to be, present in the activity area, and when it is not possible to identify the nature, extent, and significance of the Aboriginal cultural heritage in the activity area unless a complex assessment is carried out (Regulation 60). A complex assessment involves the disturbance (or excavation) of part of the activity area to uncover or discover Aboriginal cultural heritage (Regulation 61(1)). Such disturbance is referred to as **subsurface testing** (Regulation 64 (b), Schedule 2 (9)). A complex assessment is not required if the proposed activity will not harm Aboriginal cultural heritage in that area (Regulation 60(2)).

Why may subsurface testing be required?

Subsurface testing may be required to determine:

- the stratigraphy and general subsurface nature of the area being investigated
- whether there may be subsurface cultural deposits present in areas of impact or where the surface visibility is poor
- the nature, extent and significance of any cultural heritage visible on the surface of the ground.

Who must supervise subsurface testing?

Regulations 61(3) specify that for a complex assessment a person appropriately qualified in archaeology must conduct or supervise any subsurface testing and this must be carried out in accordance with proper archaeological practice. Aboriginal Affairs Victoria advises that such a person should also be responsible for developing a subsurface testing strategy and methodology, and for analysing the results.

What should you consider when developing a subsurface testing strategy and methodology?

Subsurface testing is used to find out what is below the surface of the ground. It should provide enough information to make reasonable predictions about the presence of Aboriginal cultural heritage, and assist in determining the nature, extent and significance of any Aboriginal cultural heritage that may be impacted by the activity. Therefore careful thought should go into developing a subsurface testing strategy and identifying the appropriate methodology to achieve the most effective results.

Developing a subsurface testing strategy includes formulating some initial predictions or questions about potential cultural landscapes that may contain Aboriginal cultural heritage material in the affected area. Relevant information in developing this should include information obtained through the desktop assessment, such as:

- knowledge about the Aboriginal cultural heritage and history of the area
- information about the area's landforms, geomorphology and palaeo-environmental history.

Although not mandatory, a ground surface survey or standard assessment should generally be carried out to refine the predictions or questions derived from the desktop assessment. This information helps to set up some parameters of where and how to sample the proposed activity area(s).

In developing a subsurface sampling strategy and methodology it is also useful to consider what type of information subsurface testing may uncover, and how this may be useful in preparing the Cultural Heritage Management Plan. Subsurface testing may assist in obtaining information on:

- understanding the geomorphology by interpreting the stratigraphy across the area
- identifying cultural deposits, including any or multiple *in-situ* deposits
- the depth of cultural material
- the horizontal extent and thickness of any cultural deposits
- the density and type of artefactual material, and any variation across the site
- the age of cultural material either through direct dating methods, determining the age of relevant geological strata or comparative typology of artefacts
- the depth of the base sterile layer or bedrock across the site and how this relates to the depth of the proposed area of impact
- any previous ground disturbance.

This type of information will assist in defining and understanding the nature, extent and significance of any subsurface Aboriginal cultural heritage material with reasonable confidence. Along with the results of the ground surface survey, it will enable appropriate heritage protection and mitigation measures to be developed in the Cultural Heritage Management Plan.

The Regulations (r. 61(3)) specify that subsurface testing must be carried out in accordance with proper archaeological practice. The subsurface testing strategy and methodology must define the amount and type of subsurface sampling to be conducted as well as outline appropriate subsurface testing methods and techniques. Subsurface testing must be conducted in a safe manner and adhere to relevant safe work practices. It is important to incorporate some flexibility in the strategy, taking into account the results of subsurface testing as they become available.

When developing the subsurface testing strategy and methodology it is also important to consult with the relevant Registered Aboriginal Party(ies), where one exists and has elected to evaluate the plan, about the proposed methodology (section 60 of the Act). However, as mentioned above, a person appropriately qualified in archaeology should develop the final subsurface testing strategy and methodology.

The rationale for any subsurface testing strategy and accompanying methodology should be clearly explained and documented in the Cultural Heritage Management Plan. Any changes during field work should be outlined and justified in the plan.

How much subsurface testing is necessary?

A subsurface testing strategy should be sufficient to enable you to know, with reasonable confidence, whether the proposed high impact activity will cause harm to Aboriginal cultural heritage, and if so, how the proposed development can be altered to avoid harm and/or minimise any harm.

Subsurface testing of cultural heritage places is harmful and should only occur where this assists in providing guidance on avoiding harm from the proposed activity or to minimise any harmful impact. It should not generally be carried out in areas where the activity will not cause any harm.

If there is a fairly dense scatter of Aboriginal cultural heritage material visible on the ground surface only limited sampling on and off site, i.e. next to the visible Aboriginal cultural heritage material, may be required. However, if there is potential for buried stratified deposits, no surface evidence of cultural material, a very sparse artefact scatter or only some isolated artefacts, then subsurface sampling will need to include larger and more closely spaced test pits. As a general rule each landform or landform element that is likely to contain Aboriginal cultural heritage should be tested. This could form the basis of stratifying the sample. Landforms or strata that are more likely to contain cultural deposits should be tested more thoroughly. In addition, sampling should occur spatially across the area of impact, not just in a linear fashion.

What subsurface testing methods are there and which are most useful?

There are a number of subsurface testing methods that may be used as part of preparing a Cultural Heritage Management Plan. These are described and comments provided about their appropriate use in accordance with proper archaeological practice (Regulation 61(3) and 61(7)).

Manual auger – Manual augering is the only subsurface testing method that disturbs the ground which may be used as part of undertaking a standard assessment. Regulation 59(4)(f) states that soil and sediment testing may be carried out with a manual auger no larger than 12cm in diameter. It may only be used to assist in defining the nature and extent of *identified* Aboriginal cultural heritage. A manual auger may not be used as a ‘site discovery’ survey technique in a standard assessment.

Because of the narrowness of the auger this subsurface testing method is only useful in certain circumstances. It can, for example, assist in defining the extent of an Aboriginal earthen mound or shell midden, but is unlikely to be of any use for defining the extent of stone artefact scatters. Sieving requirements: 100%.

Augering may also be used as part of a complex assessment. It may be used as described above for a standard assessment. A manual auger can also assist in identifying major changes in stratigraphy, but where sediments are loose, these may crumble in the auger, making it difficult to obtain a controlled sample sequence of the stratigraphy (Regulation 61(4)). In such circumstances a sand auger should be used.

In a complex assessment augering may be used to supplement the results from controlled test pit excavations, i.e. providing additional spatial information when tracing the extent and characteristics of certain lenses or layers identified in the test pits. In these circumstances it is less destructive and labour intensive than excavating additional test pits.

In a complex assessment an auger may have a slightly larger diameter, although it is recommended that this be less than 25cm. Mechanical augers may sometimes be used when a manual auger cannot reach a particular depth and/or when the sediments are too hard for a manual auger. They may also be of assistance in guiding the use of mechanical excavations under limited circumstances discussed below. Sieving requirements: 100%.

Shovel probe – These are generally small shallow shovel/spade diggings. They provide no vertical archaeological control and only some horizontal control. They should not be used on any known cultural heritage place, and may only be used in off-site situations. Shovel probes are of limited value beyond creating windows where ground surface visibility is poor and therefore cannot be used to determine the nature, extent and significance of sub-surface deposits. Sieving requirements: 100%.

Shovel/spade test pit – These are usually small test pits, up to about 50cm x 50cm in size. They should be excavated in stratigraphic layers and/or arbitrary levels (maximum of 5 – 10cm spits). They can give you reasonable vertical control and may be appropriate as an initial investigative technique. However, shovel/spade test pits are of little value for investigating deposits with low or variable artefact densities. In some circumstances, such as dense midden deposits, shovel/spade test pits can help establish the depth of the deposit and/or the extent of the midden material. Sufficient care in excavation techniques will need to be taken when excavating any *in-situ* cultural deposits. Sieving requirements: 100%.

Test pit – These are generally 1m x 1m controlled excavation squares, but may be larger squares. While a spade may be used to excavate the top root/plough zone if there is no cultural material, the rest should normally be excavated manually and in accordance with proper archaeological practice. Excavation should be in stratigraphic layers and/or arbitrary levels (maximum of 5 – 10cm spits) to a sterile layer dating to before human occupation, or to bedrock. The test pit should have straight vertical walls and maintain consistent horizontal dimensions, i.e. not step down and become smaller. If the depth of the test pit is, or becomes a safety issue, a larger area should be opened and excavated in a controlled manner. A test pit is the most useful method for carrying out controlled subsurface testing. It can be useful for understanding and documenting the stratigraphy and may be used on-site or off-site. Sieving requirements: 100%.

Test trench – A trench is a long narrow excavation and therefore more extensive method of subsurface testing. Sieving requirements are 100% and excavation must be controlled in order to document the location of any Aboriginal cultural material uncovered. It is not well suited for preparing Cultural Heritage Management Plans as in order to obtain the necessary control it can be labour intensive. Trenching can be quite destructive if it cuts through cultural deposits.

Mechanical excavation – Mechanical excavation should not be used in areas where minimal ground disturbing activity is planned as it has the potential to result in more disturbance and damage to Aboriginal heritage values than the proposed activity. Mechanical excavation can be very destructive; one scrape can completely remove small, discrete or shallow features, or occupation deposits.

If machinery is used the regulations require that the disturbance be conducted on a detailed stratigraphic basis (Regulation 61(5)), i.e. the stratigraphy must be established beforehand. And if the use of machinery results in finding occupation deposits or features, then the deposits or features must be uncovered and assessed by controlled excavation (Regulation 61(6)). Controlled excavation consists of an archaeological investigation using accepted stratigraphic methods and standard hand-held archaeological equipment (Regulation 61(7)). Only if it is not practicable to use standard hand-held equipment can mechanical equipment be used to proceed with the investigation in as careful a manner as an excavation using the standard hand-held equipment (Regulation 61(7)(b)). Sieving requirements: 100%.

Mechanical excavation should only be used when manual excavation is not practicable such as when the cultural deposits are deep and below extensive sterile layers or when the area to be investigated is too large to systematically sample by manual excavation. However, mechanical excavation should be carried out in a controlled manner. Machine operators, using appropriate machines, should be able to excavate in even, horizontal scrapes, on the stratigraphic basis that was established beforehand. Any Aboriginal cultural heritage material found through sieving should be able to be provenanced to the appropriate stratigraphic layer and approximate horizontal location. It is, for example, not appropriate to report that 200 Aboriginal stone artefacts were found in a 400m x 1m trench that was 3m deep; greater locational precision is generally warranted. Mechanical excavation should be conducted in a manner that will assist in determining the nature, extent and significance of any Aboriginal cultural heritage that may be impacted by the proposed activity. Note, that where occupation deposits or features are encountered, these must be uncovered and assessed by controlled excavation.

Mechanical excavations, during a subsurface testing phase, have been appropriate and successfully carried out in some extensive sandy landforms. Techniques used have included using a mud bucket to remove a spit of an appropriate depth for the length of the trench. At the completion of each mechanically excavated spit an additional 25cm on each side of the trench was manually excavated to expose a clean section and to prevent the displacement of artefacts between spits.

What is important when analysing and reporting on subsurface testing?

There are a number of principles that should be followed when analysing and reporting on subsurface testing. They accord with proper archaeological practice.

- Information should be obtained in a controlled manner useful for **analysis**. This means that you should be able to quantify results using appropriate spatial control (e.g. stratigraphic control, calculating artefact densities, and measuring any variation across the area of impact).
- Results must be properly documented and **reported** on in the Cultural Heritage Management Plan. This means that the reader or user of the plan has sufficient detailed information to understand and reconstruct what happened and why, as well as when using the data provided in the report be able to understand how the conclusions and recommendations were reached.

What are some archaeological standards relevant to subsurface testing for Cultural Heritage Management Plans?

Regulation 61(3) requires that subsurface testing for a complex assessment must be carried out in accordance with proper archaeological practice. These include but are not limited to the following standards:

Subsurface testing

- Establish a site datum (coordinates for the datum should follow requirements for recording coordinates as outlined in AAV's *Standards for Recording Victorian Aboriginal Heritage Places and Objects*).
- A topographic map of the area may need to be prepared if not available for the proposed activity area. This will assist with stratigraphic and vertical control of subsurface testing and assist in documenting landform and site formation processes.

- Subsurface testing units should be linked to the site datum (including level heights), i.e. part of the site grid. Use a logical numbering system and identify all coordinates of a test pit or trench; for an auger hole or shovel test one coordinate (southwest coordinate) will be sufficient.
- Establish the subsurface nature and stratigraphy of the area manually before you use any machines.
- Cultural or occupation deposits must always be excavated in a controlled manner using accepted stratigraphic methods; note that occupation deposits may be *in situ*, dispersed or disturbed. All cultural layers and any adjacent non-cultural layers/ areas should be excavated manually with trowels or other small implements unless it is not practicable to do so. Where it is not practicable to excavate manually, mechanical equipment may be used provided that it is used as carefully as would be normal with manual tools.
- As a rule of thumb you need to be conservative in your techniques when doing subsurface testing as you are establishing what is below the surface.
- Machinery use must be justified, that is the reasons why it is not practicable to excavate manually are to be provided, e.g. for health and safety reasons or the impracticality of excavating a thirty metre trench entirely by hand.
- Excavate in stratigraphic layers and/or arbitrary levels (maximum of 5 – 10cm spits) to base sterile layer, i.e. layer dating to before human occupation, or to bedrock; any features should be excavated separately and also in stratigraphic layers and/or arbitrary levels.
- Do not 'step down', i.e. diminish the size of a test pit as you go down except when: a) the excavation needs to be several metres deep (under these circumstances your initial excavation area should be fairly large so that the base of the test pit will still be 1m x 1m), or b) you have already reached the base sterile layer and you wish to obtain a better understanding of this layer.
- Excavate below any possible cultural deposits to the base sterile layer, i.e. layer dating to before human occupation, or bedrock. If a cultural deposit sits on sterile clay, make sure you demonstrate that you have excavated to sterile sediments.
- Investigate what if any disturbance has occurred to the cultural place, how extensive it is and how will this affect your analysis.
- If stratigraphy and/or a cultural deposit is visible in an exposure, e.g. a cliff face, manually clean back the face to properly establish the stratigraphy.
- Carry out 100% sieving on all subsurface testing; sieve size should be no greater than 5mm for artefacts and midden material, augmented by a smaller sieve size for charcoal and smaller artefacts.
- Take pH samples, describe soils and document Munsell colours of spits and stratigraphic layers and features.
- Where available and relevant obtain dating samples of cultural deposits and or stratigraphic layers.
- Use photographic boards and include an appropriate scale.
- Spoil heap and sieving area should be at a reasonable distance from the testing area.
- Any salvage excavation can only occur once a Cultural Heritage Management Plan, which must include a detailed salvage methodology, has been approved.

Reporting

- Describe how, why and what subsurface testing took place.
- Describe the tools, techniques and methodology used.
- Ensure all information is clearly documented and is legible in the Cultural Heritage Management Plan.
- Clearly label subsurface testing areas on maps; label plans, section and stratigraphic drawings and indicate where cultural material or dating samples come from – label GPS reading locations.
- Use proper scales on maps, section and stratigraphic drawings – avoid vertical or horizontal exaggeration.
- Do not include schematic section drawings.
- Include at least one representative test pit or trench section to scale. Include additional representative section drawings for any stratigraphic profile changes. This should include horizontal and vertical scale bars, clear labelling of layers or legend, and show vertically where artefacts were found.
- Include all data in tables, identifying their spatial context.
- Analyse stratigraphy and clearly describe how you have defined discrete cultural deposits or layers within a site – e.g. based on stratigraphy, feature, age, variation in assemblage or landform element.
- Where appropriate, present and analyse data by defined discrete cultural deposits or components – do not lump data for the whole site or test pit.
- Ensure subsurface testing areas are clearly documented on relevant Heritage Register forms.
- All material recovered should be labelled/ catalogued with reference to their provenance.

The disturbance or excavation of land to uncover or discover Aboriginal cultural heritage is destructive and it is important that it only be carried out when necessary to identify and document the extent, nature and significance of Aboriginal cultural heritage that may be threatened by the proposed activity. Test excavations should not be designed as salvage operations, nor should they be undertaken in areas that will not be affected by the proposed activity.