A quick guide to archaeological excavation

Starting off - cleaning

During an excavation there is typically a set pattern in the way in which the archaeology is treated. Once a trench or area is opened, it will be cleaned of all loose soil in order to clearly identify any archaeology.

- When cleaning, trowel in a straight line, not in circles. Keep in line with everyone else and trowel in the same direction (*see image below*).
- Keep spoil to a minimum as you work. **DO NOT** leave mounds of spoil isolated in cleaned areas.
- **DO NOT** walk over your, or anyone else's, nicely trowelled area. Many a friendship has been broken this way.
- An open area with lots of features will often be photographed (before everyone walks on it again) and planned before excavation of individual features begins.

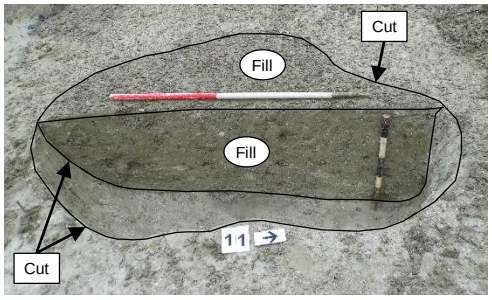
Photographs of features and areas **ALWAYS** need a scale, a North arrow and an identifying number (a trench / area number and / or a context number).

Plans **ALWAYS** need a drawing number (taken from the site's drawing index), a scale, a North arrow, context numbers, and a title including what the drawing shows, the initials of drawer and the date drawn.

An archaeologist's tool kit

- 4" pointing trowel
- Hand shovel & bucket
- Shovel, mattock, spade & wheelbarrow
- Stiff hand brush (only for cleaning stones / masonry)
- Fine tools such as a leaf trowel, paint brushes and dentistry tools (for excavating small and delicate objects)
- Surveyors tape & hand tape
- Stationary (4H pencil, eraser, sharpener, pen and permanent marker pen)
- Finds bags of assorted sizes, waterproof (Tyvek) labels, seed trays and archive boxes
- Digital camera, photo scales, photo numbers, north arrow, compass
- 6" nails, string, foldback or bulldog clips, masking tape, line level, plumb bob
- Drawing board & clipboard
- Recording materials (gridded drafting film, recording sheets, site index)
- Mechanical digger

Above: Cleaning an area of archaeology.



Above: This pit has been half-sectioned (i.e. the excavator has created an arbitrary line across it and removed one half of the feature leaving a clean vertical section). This reveals the feature's fill and the shape of its cut in both horizontal plan and vertical section.

Excavating the archaeology

Most sites are excavated using a Single Context recording system, whereby every cut, fill of a feature and layer are issued a unique identifying number, called a Context (taken from the site's context index). There are three basic types of Context:

- **CUT** = an event in the past which has deliberately removed part of the archaeological sequence (e.g. digging a ditch, pit, post-hole or foundation trench).
- **FILL** = a contained deposit of material filling in the hole left by the cut.
- **LAYER** = an uncontained horizontal deposit of material.

When excavating, contexts are removed one at a time from top to bottom (from most recent to oldest in the archaeological sequence) and from known to unknown (starting in the area where the sequence is clearest / best understood).

The bottom of a layer or edge of a cut is usually identified when there is a change in colour and/or texture from the soil currently being removed. This is the time to stop excavating and start recording (*see the excavation sequence table below*).

CIRCULAR FEATURES, such as pits and post-holes, are usually excavated as a half-section - the feature is divided in two and one half of the fill is taken out to show the shape of the cut and what the fill contains. **LINEAR FEATURES**, such as ditches and foundation trenches, are typically excavated by taking out a series of 1m wide slots along their length. **LAYERS** are usually excavated in their entirety, although a temporary bulk may be left through it to demonstrate its relationship with higher and lower layers.

Features (cuts & fills)	Layers
1. Clean the feature	1. Clean the layer
2. Excavate the feature (often by half-sectioning it)	2. Photograph the layer
3. Photograph the feature	3. Draw the layer (plan) & take levels
4. Draw the feature (plan & section) & take levels	4. Excavate the layer
5. Excavate the rest of the feature if required. Write the context sheets for each context	5. Write the context sheet
6. Make sure all finds, records, photos etc. are clearly labelled and cross-referenced. **REMEMBER** – Many sites will not be written up until months or years later. It is essential, therefore, that all records are **COMPLETE** and **ACCURATE** during the dig.	

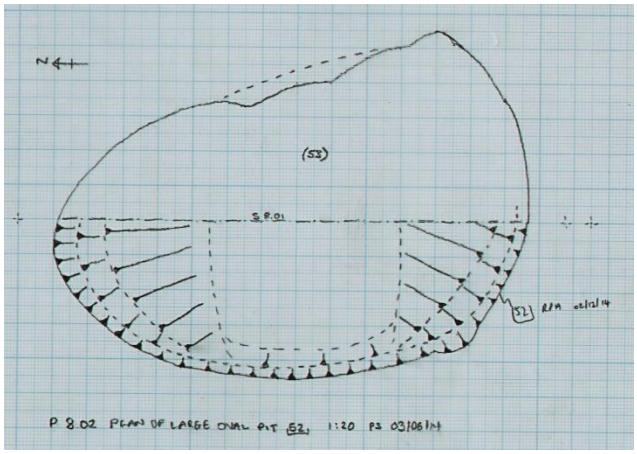
Good troweling

- The 4" pointing trowel is your best friend!
- Always trowel in the same direction.
- Angle the trowel to use the straight edge to evenly scrape the surface. **DO NOT** use the point or the corner, which will leave a groove, or the flat underside of the trowel which will smear the archaeology.
- Scrape away the surface of the archaeology in level slices, **DO NOT** dig into it.
- Sweep the trowel across the ground with your arm, not your wrist, otherwise you will eventually damage your wrist.

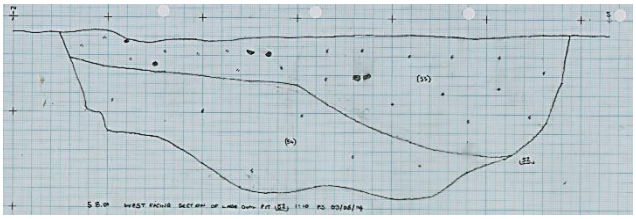
Finds

Finds are key to dating most features and layers so it is essential to look after them. They **MUST** always be kept in a clearly labelled tray or bag with the correct context number.

If you are not sure where a find came from, or which context it belongs to then save it as U/S (unstratified). It is better to lose the finds provenance than mess up the dating sequence.



Above: Plan of a pit.



Below: Section across a pit.

Drawings

A drawing of a feature or layer is often better than a photograph because it is possible to highlight context changes more clearly on a drawing. Archaeological drawings are meant to be simple, precise and clear representations of the archaeology. No artistic skills are required!

Archaeology is drawn in two ways.

- **PLAN** = a horizontal representation of the feature/s or area excavated. Plans are drawn by taking measurements from a site grid or a base line. Planning points can be created by nails placed in the ground but remember, **DO NOT** remove the nails until your planning points have been recorded on the site grid or by dGPS / EDM.
- **SECTION** = a vertical cross-section through the feature under excavation showing the relationship between multiple layers, or the fill and shape of a cut. Sections use section points in much the same way as plans (often they are the same planning points) but on a vertical plane with a string line tied between them. A line level is used to make sure the string is perfectly level.

Drawings are made on gridded drafting film at two main scales.

- **PLANS** are generally drawn at 1:20 so that 1m equals 5cm on the drawing.
- **SECTIONS** are generally drawn at 1:10 so that 1m equals 10cm on the drawing.
- Occasionally you might be asked to draw something at 1:50 (1m equals 2cm) or 1:100 (1m equals 1cm).

REMEMBER – Draw with a hard pencil (4, 5 or 6H), label all context numbers, add a drawing number, title, scale, initials and date.

- **PLANS** – Mark the position of section drawings and label them, add a North arrow. If a site grid is being used add the grid co-ordinates too.
- **SECTIONS** – Orientate the section points (i.e. E, W etc.) and state facing direction (i.e. south facing).

The Matrix

Stratigraphy is a term used to describe the order in which archaeological events (soil layers, cut features and their fills) were created. It forms the basis for **ALL** archaeological excavation and analysis. Every cut, fill and layer is given a unique context number which is used to create a matrix.

The matrix is a flow chart which shows the order in which every context occurred. To fully understand a site it is **CRITICALLY IMPORTANT** to record your feature or layer's stratigraphic relationship with the surrounding archaeology.

- What is it **ABOVE**? What is it **BELOW**? Is it the **SAME AS** another context?
- These relationships **MUST** be accurately recorded on the context sheet during the excavation.

REMEMBER - The matrix seeks only to record the stratigraphic sequence of deposition, not the direct physical contact other features and layers have with the context. The matrix runs from the oldest (or first event) at the bottom, to the newest (or last event) at the top.

Taking a level

Whilst we can draw and photograph features we also need to know their relative height in relation to other features. This is usually done using a dumpy level and a telescopic staff – basically a telescope on a fixed horizontal plane looking at a big vertical ruler! – or electronically using dGPS / EDM.

A reading is taken on a reference point (called a **temporary bench mark** or **TBM**) which has a known height above sea level. This is called the **back sight** (**BS**). Further readings are taken at relevant points on the archaeology, these are called **fore sights** (**FS**).

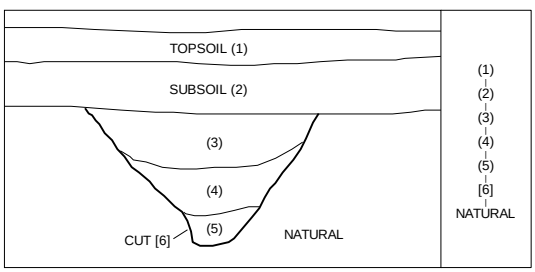
Working out the height of the archaeology uses the following calculations.

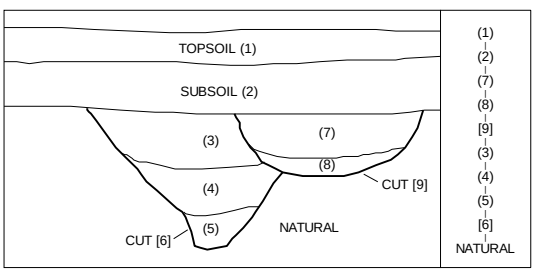
- TBM + BS = Instrument Height (IH)
- IH – FS = Reduced Level (RL, your archaeological spot height).

REMEMBER – Record where you took levels on you plan or section. Record the readings for the TBM, BS, FS, RL & IH on your drawing or in a level index.

Right: The matrix for a single feature.

Far right: If a second feature was dug later (i.e. cutting the original feature) the matrix would look like this.





How to Process Archaeological Finds

Finds processing is a crucial part of archaeological fieldwork but whilst it may seem self explanatory there are a number of important practices which should be followed for good 'pot washing'.

Ideally, finds processing should be carried out during the fieldwork or within days / a week of its completion. Finds left uncleaned in muddy bags for too long can 'sweat', potentially damaging them.

TIP: If you are unable to process your finds immediately, punch holes in the bags to allow the finds to breath. Whilst some finds will be more sensitive to being stored dirty, most will survive fine if left for a while (see page 2 for guidelines for treatment and storage of finds).

Labelling

Finds should be cleaned, recorded and put into labelled seed trays to dry. **PLEASE** be careful not to mix up the finds from different areas and contexts.

A waterproof label or labelled bag **MUST** be kept with the finds at every stage of washing and drying. This **MUST** contain the following information:

Fieldwalking	Test-pitting	Excavation
Site Code	Site Code	Site Code
Field No.	Test-Pit No.	Trench or Area No.
Transect & Stint or Grid No.	Layer No.	Context No.

Setting up, Washing & Drying

1. Lay newspaper down on the work surface, fill one or two washing up bowls with water (about half full) and place on the newspaper. If using two bowls - one is for washing, the other for rinsing.
2. Line a seed tray with newspaper, this is the drying tray.
3. Take a bag of finds and empty it into a second (unlined) seed tray. Write a label copying what is written on the bag and place it in the drying tray.
4. Select a find. Wash it carefully and thoroughly (see Washing Tips). Rinse in the rinsing bowl and place in the labelled drying tray.
5. Continue until all finds from the bag are washed. If there are too many finds for one tray you **MUST** write finds labels for every additional tray.
6. Remember, every context / find bag **MUST** have its own labelled tray. **DO NOT** mix up the finds.
7. Leave the finds for about 3-6 days to thoroughly dry. If they still have mud on them they may need rewashing. **DO NOT** re-bag wet or damp finds.
8. Once dry, sort and bag the finds from each context by find type. Select clean, appropriately sized bags to put them in. **REMEMBER:** Exactly copy the information from the finds label in the drying tray onto the new bag using permanent marker pen.

Health & Safety

- Some artefacts can have sharp edges, so be careful.
- Wear **GLOVES** if you have open cuts or sores on your hands, or if you have allergies to elements in the soil, or if your hands react to prolonged contact with water.
- **REMEMBER:** Some people are allergic to latex and nitrile gloves.
- Be alert for **COMTAMINANTS** in the soil, such as petrol and oil. Keep a look out for asbestos which can look deceptively like pottery.

What equipment will you need?

- Washing up bowls
- Toothbrushes of assorted hardness
- Wooden cocktail stick / skewer
- Small cellulose sponge
- Newspaper
- Seed trays
- Finds bags of assorted sizes
- Waterproof (Tyvek) labels
- Permanent marker pen

Washing Tips

Most finds can be washed and left to dry in the drying trays on site. Non-fragile pieces of pottery, bone or stone should be gently washed with clean water and a toothbrush.

DO NOT leave finds to soak in the bowl. This can dissolve fragile pottery and metal and may lead to contexts being mixed up if a find is accidentally left in the bowl.

Avoid hard scrubbing of finds as this can cause damage. If it looks like the toothbrush will cause damage, use a sponge instead. Don't forget to wash the edges as well as the front and back of finds such as pottery sherds.

Finds with a lot of soil sticking to them should first be cleaned with a plastic or wooden implement (**NEVER** use a metal implement for cleaning).

Use a wooden cocktail stick / skewer to extract mud from hollows and odd shapes. This is particularly useful for cleaning bone. If possible, remove all mud in the middle of the bone.

If the water gets too dirty, replace it with clean water (as a rough guide, if you cannot see down 5cm the water needs changing!).

DO NOT dunk large finds like bricks and tiles into the washing water as they will soak it up and take longer to dry.

Fragile finds should **NEVER** be washed. Keep an eye out for paint on stonework or wall plaster and also for Anglo-Saxon and prehistoric pottery (this usually looks like old biscuit or dried mud!). These can be damaged by washing. Instead, carefully remove excess soil with a dry toothbrush and allow to dry. **DO NOT** wash metal or organic finds.

Use the guidelines on page 2 for what to wash and what not to wash.

Guidelines for post-excavation treatment and storage of finds

Material	Condition	Treatment	Storage
Antler	-	Wash	Dry perforated finds bag
Basket/wicker	-	Keep wet, do not wash or clean	Double bag, water to cover, keep in wet box.
Bone (animal)	-	Wash	Dry perforated finds bag
Bone (human)	-	Wash	Dry perforated finds bag
Copper	Green corrosion	Dry out, do not wash or clean	Dry perforated finds bag in dry box with silica gel, cushion with acid free tissue.
Ceramic (stable)	-	Wash	Dry perforated finds bag
Ceramic (fragile)	Soft, breaking up, painted decoration	Dry for 2-3 days to harden before washing gently	Dry perforated finds bag
Fibre	-	Keep wet, do not wash or clean	Double bag, water to cover, keep in wet box.
Flint artefacts	-	Wash with fingers/sponge	Dry perforated finds bag
Flint (burnt)	Stable	Wash	Dry perforated finds bag
Flint (burnt)	Breaking up	Dry Brush	Dry perforated finds bag
Glass (stable)	-	Wash	Dry perforated finds bag
Glass (medieval or otherwise unstable)	Iridescent (shiny patina/coating), flaking badly, possibly opaque	Keep wet, do not wash	Double bag, water to cover, keep in wet box.
Gold	-	Wash	Dry perforated finds bag
Flaking gilding	-	Do not wash or clean	Contact conservation lab
Horn	Laminates	Wash gently	Double bag, water to cover, keep in wet box.
Iron	Magnetic attraction, brown or sometimes blue corrosion products	Dry out, do not wash or clean	Dry perforated finds bag in dry box with silica gel, cushion with acid free tissue.
Iron slag	Vesicular	Dry out, do not wash or clean	Dry perforated finds bag in dry box with silica gel, cushion with acid free tissue.
Ivory	Criss-cross lines	Keep wet, do not wash or clean	Double bag, water to cover, keep in wet box.
Jet	Black, shiny, resembles plastic	Wash gently with fingers/sponge	Double bag, water to cover, keep in wet box.
Lead/pewter	Heavy, grey/white corrosion	Dry out, do not wash or clean	Dry perforated finds bag in dry box with silica gel, cushion with acid free tissue.
Leather	-	Wash gently with fingers/sponge	Double bag, water to cover, keep in wet box.
Plaster (painted wall)	-	Damp sponge, do not immerse in water	Dry perforated finds bag
Resin (amber)	-	Keep wet, do not wash or clean	Double bag, water to cover, keep in wet box.
Shale	Grey or black, laminates	Keep wet, do not wash or clean	Double bag, water to cover, keep in wet box.
Shell (discard unless from significant dump)	-	Wash gently with fingers	Dry perforated finds bag
Silver	Black/mauve corrosion	Dry out, do not wash or clean	Dry perforated finds bag in dry box with silica gel, cushion with acid free tissue.
Stone (except shale or gilded)	-	Dry brush or wash	Dry perforated finds bag
Wood	-	Wash gently with fingers/sponge	Double bag, water to cover, keep in wet box.

Structure from Motion (SfM) Photogrammetry

What is SfM Photogrammetry?

Today, SfM Photogrammetry is used in a wide range of fields from topographic mapping to the movie and gaming industry and it is increasingly used for cultural heritage preservation by archaeologists. It provides a rapid, extremely versatile and cost-effective tool for recording and analysing complex objects and surfaces using computer software which turns a sequence of two-dimensional digital photographs into a three-dimensional model. Under suitable conditions, the technique is a powerful method of capturing high-resolution georeferenced three-dimensional surfaces with complete textures and sub-centimetre accuracy. It can be applied to photographs taken during archaeological excavations, building surveys and laboratory conservation.

The software looks for points of commonality in overlapping photographs of a single object or surface from which it can extrapolate virtual camera positions and a three-dimensional point cloud (right, a) which can be converted to a polygon mesh (b). The photographs can then be used to render the surface reconstruction to create a photo-realistic effect (c).

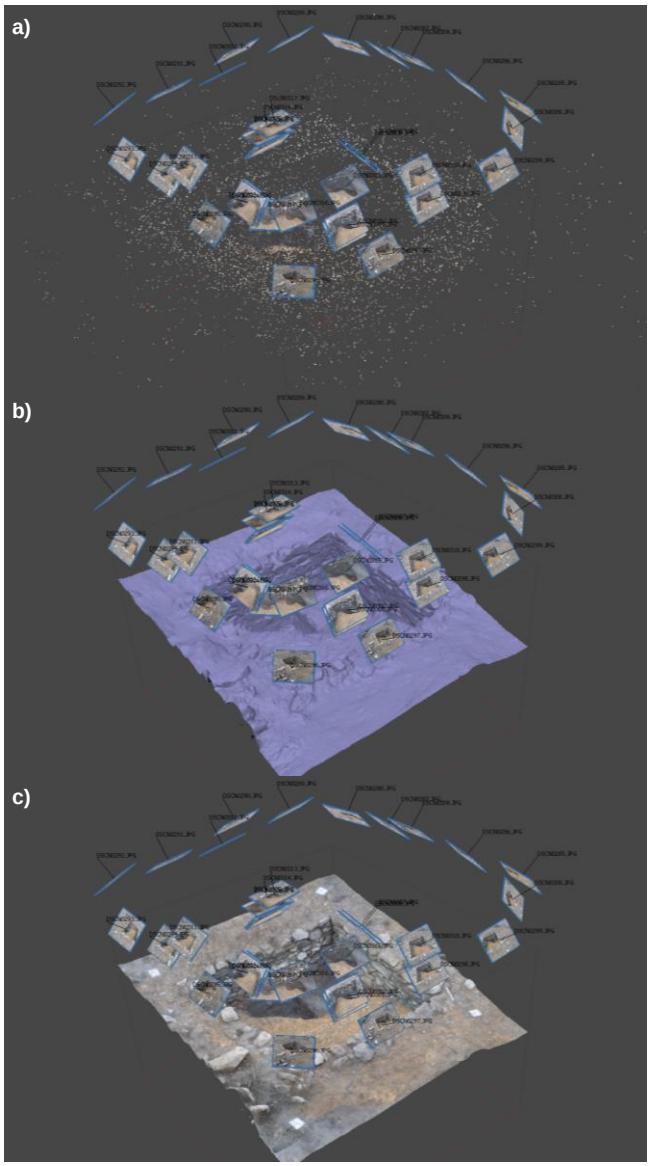
Archaeologists use SfM Photogrammetry for a variety of outputs:

- To create a plan of a feature or area (to replace a hand-drawn plan)
- To produce a section or profile across a feature or area (to replace a hand-drawn section drawing)
- To create a digital terrain model (DTM) or digital elevation model (DEM) – in this way it can be used similar to LiDAR.
- To produce a complex 3D model to aid analysis of the archaeological sequence.
- To produce a 3D model for educational purposes, providing a fun and interactive tool that can be used in the classroom by schools to study archaeological material that is no longer accessible, or is only accessible in museums.

REMEMBER: Think carefully about what your desired outcomes are for the model, then tailor your survey accordingly. If you only need a simple plan of a spread of stones you will need fewer photographs than you would for a complex model of a large area.

What equipment will I need?

- A good digital camera or camera phone
- Georeference markers
- Close range SfM Photogrammetry software



Modelling a medieval stone-lined pit at Highcross Street, Leicester. Using SfM photogrammetry Agisoft Metashape. Image: ULAS

Where can I get SfM Photogrammetry software?

There are many photogrammetry software tools available. Some are professional, requiring a licence and having an often high associated cost, but there are good open source photogrammetry tools available too. The following is a list of available software. The Leicestershire Fieldworkers has not tried all of these programmes and cannot guarantee that they are all suitable for archaeological recording.

- **COLMAP** https://colmap.github.io/index.html# FREE
- **MESHROOM** https://alicevision.github.io/#meshroom FREE
- **MICMAC** https://micmac.ensg.eu/index.php/Accueil FREE
- **OPENDRONEMAP** https://www.opendronemap.org/ FREE
- **REGARD3D** http://www.regard3d.org/ FREE
- **VISUALSFM** http://ccwu.me/vsfm/ FREE
- **3DF ZEPHYR** https://www.3dflow.net/ FREE VERSION & TRIAL
- **AGISOFT METASHAPE** https://www.agisoft.com/ FREE TRIAL
- **AUTODESK RECAP** https://www.autodesk.com/products/recap/overview FREE TRIAL
- **iWitnessPRO** https://iwitnessphoto.com/ FREE TRIAL
- **PHOTOMODELER** https://www.photomodeler.com/ FREE TRIAL
- **REALITYCAPTURE** https://www.capturingreality.com/Home FREE TRIAL

How to record using SfM Photogrammetry

Prepare the feature / area

- Clean the feature and tidy up the immediate area.
- Include 3-8 georeference markers, a small scale, north arrow and context number. **TIP:** Keep these to the side out of the way so they can be cropped / removed from the model at a later date if required.

Lighting & weather conditions

- Cloudy dry days are best. Make sure that there are no shadows. Partial rain can create varying colours on stones, ideally photograph only damp or dry archaeology.

Camera Settings

- Use a high resolution camera, ideally a DSLR. Check highest quality settings are selected (e.g. RAW+jpg).
- Shoot in manual mode, only vary the shutter speed.
- Shoot at a high F-number (e.g. f/9 - f/22) to ensure all of the subject is in focus.
- Shoot at a low ISO (e.g. 100-300) to reduce grain on the images.
- **TIP:** If you do not have a digital camera, a good camera phone can also produce excellent results.

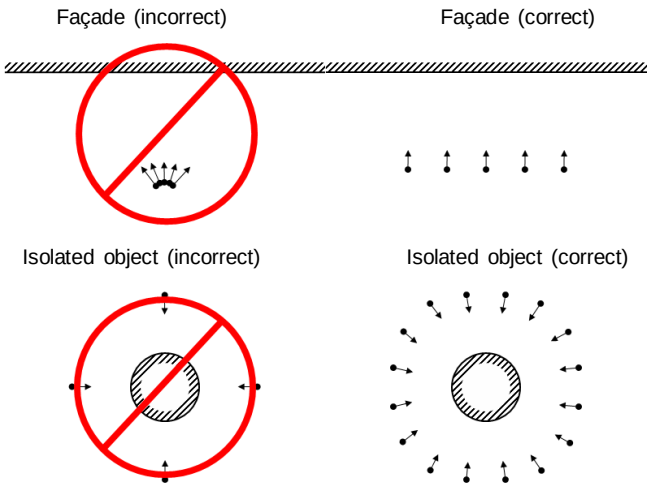
Carrying out the photo survey

- Plan you photo locations. You need to take a sequence of overlapping photos with each photo in a different location with an overlap of around 60%. This is the **MOST IMPORTANT** rule of photogrammetric recording. The higher the percentage of matched area, the greater success the software will have matching points and creating a higher quality model.
- **TIP:** A simple way to achieve this is to photograph, sidestep, photograph, sidestep, photograph, sidestep etc.
- Take photos as you walk all the way around the feature / area. You need to be roughly the same distance and height from the feature at all times.
- **REMEMBER:** Look for hard to see points and blind spots. Repeat the circuit at higher and lower angles to capture hidden areas as required. Do close-ups on areas that have particularly important details.
- Always use landscape orientation if possible and do not zoom in.
- Whilst the entire feature / area does not need to be in every photo, photos should be taken with good focus of most of the subject area. This increases the amount of points that can be detected, and therefore increases the quaintly of the model.
- Avoid photographs with moving objects (e.g. other archaeologists, random animals, etc.).

Further Reading

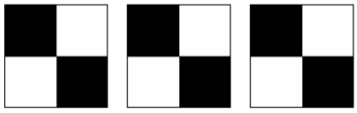
Historic England (2017) *Photogrammetric Applications for Cultural Heritage: Guidance for Good Practice*
https://historicengland.org.uk/images-books/publications/photogrammetric-applications-for-cultural-heritage/

The following diagrams show the appropriate methods for capturing features / areas.



Georeferencing the survey

- If you want to use the model to create a plan or section of your feature / area, the survey will need to be georeferenced by including **AT LEAST** three survey markers at various points around the feature.



- **TIP:** For the best outcome, place 6-8 markers around the feature, covering a variety of heights.
- Add more markers if needed for large features / areas.
- Make sure the markers are accurately located with a grid co-ordinate and spot height, either using dGPS / EDM, or in relation to a site grid and temporary bench mark (using surveyors tapes and a dumpy level).
- Only remove the markers once you have downloaded and checked the survey data and processed the model.

Other things to consider

- If you are creating multiple models, have an index sheet for them in your site indices.
- If you are using SfM photogrammetry to replace hand-drawn plans and sections you will need to devise a pro-forma recording sheet, ideally including an annotated print out or sketch of the model, site code, context number etc.
- Show the georeferenced markers and their co-ordinates on the plan on the recording sheet.
- Add structure / feature details that would usually be included on a measured hand-drawn plan.
- Add extra height information as needed (to show slope or other discrete height differences) as you would on a measured hand-drawn plan.
- Data processing will depend on the software you are using.

How to Dig an Archaeological Test Pit

What is a test pit?

An archaeological test pit is a small 1m sq trench dug in a series of layers to a depth of approximately 1m. The archaeological material collected from the different layers tell us something about how the area was used in the past. Test pits can be dug quickly and easily using everyday garden tools, and their small size makes them ideal for investigating built-up areas such as village centres. Digging groups of test pits allows us to say something about the way in which settlement patterns may have changed over time.

This guide provides step-by-step instructions for digging and recording a test pit. How to process archaeological material from your pit is detailed in **Fieldwork Guide #5**. How to interpret your results is detailed in **Fieldwork Guide #3a**.

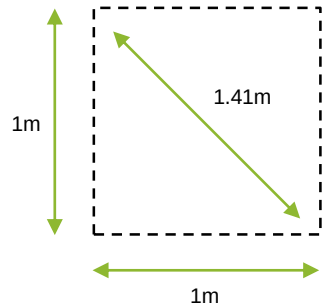
What equipment will you need?

- A 3m or 5m metal tape measure
- A 30m tape measure
- 4 large metal nails or plastic tent pegs
- 4m of string
- A large plastic sheet
- A sharp spade
- A mattock
- A hand shovel
- A pointing/archaeology trowel
- 2 buckets
- A garden sieve with a 1cm mesh
- Several seed trays
- Re-sealable plastic bags
- A permanent marker
- A camera
- A compass
- A clipboard
- Pens, pencils and eraser
- A Test Pit Recording Booklet (which can be downloaded from: **http://leicsfieldworkers.co.uk**

Getting Started (Quick Reference Guide Step 1)

Before you start to dig, fill in the front cover of your **Test Pit Recording Booklet** (right). The following information is required:

- Site code – This is a unique code created to identify your project. It might be an accession number given to you by your local museum, or it might be a code you have created for your project. Everything relating to your project should be labelled with this code.
- Test pit number – Each test pit in your project should be numbered and no two test pits should share the same number.
- Test pit location – If the test pit is located in a garden then the address of the property will help locate it. If it is in a public space then the name of an adjacent road or feature will suffice. Alternately, your area of work may be given a name, i.e. Field 1.
- Grid reference – If you have access to a GPS handset, or have a GPS app on your phone, then an Ordnance Survey grid reference for the pit can be obtained easily. Alternately, the grid reference can be worked out from an Ordnance Survey map of the area.
- Test pit team names – A list of everyone who has worked on your test pit.
- Date of excavation – The date(s) on which your test pit was dug.



TIP: As long as all four sides of your test pit are 1m long and the diagonal measurements across the pit both measure 1.41m, the corners of your test pit will all be at right-angles and the test pit will be square.

Laying out your test-pit (Steps 2-3)

Your test pit should be laid out in a convenient location with plenty of space around it to work in and store the excavated soil. Try to **AVOID** placing your test pit close to drains, foundations or under trees, as you do not want to cause any damage.

First, mark out your 1m square test pit using string and 4 nails. To do this:

- Tie one end of the string to a nail and push it into the ground. Measure 1m along the string, stick a second nail into the ground and wrap the string around it.
- To lay out the right-angled corner of the square, measure another 1m along the string and pull the string tight to roughly the right spot where the third corner should be.
- At the same time, use the tape measure to measure 1.41m diagonally across the square from the first nail. The point at which 1.41m on the tape measure and 1m on the string cross will be the corner. Mark this with a third nail and wrap the string around it.
- Repeat this process to locate the fourth corner, this time measuring diagonally from the second nail, and then run the string back to the first nail to complete the square.

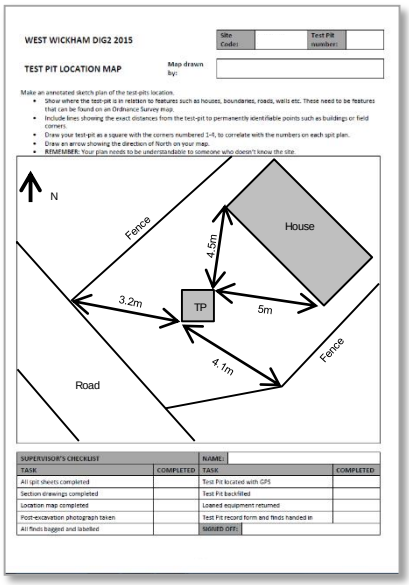
Now, lay out the plastic sheet that you are going to use to store all the excavated soil on. This needs to be at least 2m away from the test pit to ensure that the soil does not fall back into the hole and to give you plenty of room to work safely around the pit.

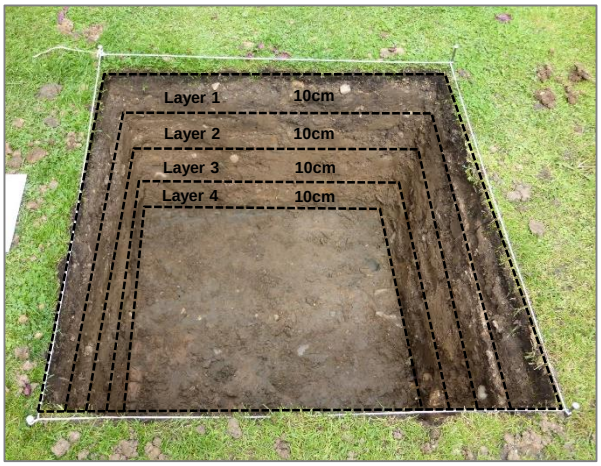
Recording you test-pit's location (Step 4)

First, turn to page 2 of the **Test Pit Recording Booklet** and fill out the **Test Pit Location Map** so that anyone reading the results of your test pit will know exactly where it was dug.

- Show where the test-pit is in relation to features such as houses, boundaries, roads, walls etc. These need to be features that can be found on an Ordnance Survey map.
- Include lines showing the exact distances from the test-pit to permanently identifiable points such as buildings or field corners.
- Draw your test pit as a square with the corners numbered 1-4, to correlate with the numbers on each layer plan and the section drawings.
- Draw an arrow showing the direction of North on your map.

REMEMBER, your plan needs to be understandable to someone who doesn't know the site.





De-turfing your test-pit (Step 8)

If your test pit is located in a grassed area then you will need to take the turf off before you can start digging deeper. To do this, use a sharp spade to carefully cut across the surface of the pit to create small squares no more than a spade's width across (approx. 20cm by 20cm). Then push the spade firmly under the grass so that you can lift off a square of turf about 5cm thick. Place the turf to one side and look after it as you will be replacing it once you have finished the pit.

Starting your test-pit (Steps 5-7)

You will be digging your test pit in 10cm layers. Each of these 10cm layers will require a separate **Layer Record Form** to be completed in your **Test Pit Recording Booklet**. These begin to be filled in before you start to dig a layer (the left-hand column) and are completed after you have finished digging (the right-hand column).

BEFORE you begin to dig, start filling in the first **Layer Record Form** (Page 3). Fill in the four boxes in the top right-hand corner – Site Code, Test Pit Number, Layer Recorded By and Layer Number.

Complete recording sections 1-4 on the **Layer Record Form**:

1) Measure the depth of the top of the layer at the four corners of your test pit. Layer 1 will be 0cm, Layer 2 should be 10cm etc.
2) Draw a neat plan of the surface of the layer in your test pit using the 10cm square gridded box, so that every 1cm on your drawing represents 10cm in the test pit (For Layer 1 the plan may just show grass).
3) Try and draw your plan from the south with north at the top – draw an arrow in the box above your plan to show what direction north is in. Make sure all of your subsequent plans are drawn from the same position as the first.
4) Use box 4 to describe what you have drawn and for any other explanatory notes.

In addition, you need to set up a finds trays for each layer before you start digging it. Use a seed tray and place a re-sealable plastic bag in it onto which you have written the **site code**, **test pit number** and **layer number** in permanent pen. All the artefacts from this layer will go into the tray in the first instance and into the bag once they have been washed and dried.

Digging your test-pit (Steps 9-12)

Once you have removed the turf, you will need to start digging your test pit using the mattock, spade, trowel and hand shovel. The equipment you use will depend on what the soil is like in your test pit. If the soil is hard, gently loosen it with the mattock and then shovel the loosened soil out into buckets. **REMEMBER**, you are digging the test pit in a series of 10cm thick layers so do not get carried away! Use the tape measure to keep track of how deep you are digging by measuring the corners of the test pit.

As soon as there is enough loosened soil in the bottom of your test pit to get in your way, use the hand shovel to get it out of the pit into a bucket to be sieved. At all times, keep the bottom of the test pit as level and horizontal as possible.

NEVER pull an artefact out of the ground. Instead, excavate the soil around it and when it is completely exposed gently lift it up and place it in your finds tray.

Empty the contents of each bucket of soil into your sieve a bit at a time (holding the sieve over the plastic sheeting). It is a lot easier to sieve small amounts and you will be able to spot finds more easily. Take care when lifting buckets of heavy soil. Sieve all the soil as it is excavated and keep anything and everything that you think might be made by people or interesting for some other reason. **IF IN DOUBT, KEEP IT!!!**

Once all the finds have been taken out of the sieve and placed in the finds tray, tip the residue out onto the plastic sheeting. Put more soil into the sieve and continue.

How to dig a test pit

a) Break up the soil using the mattock.

b) Remove soil from the pit into a bucket with the shovel.

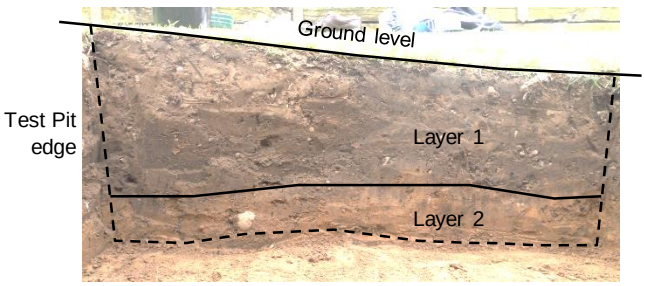
c) Keep the base of the pit level with a trowel, only dig out 10cm at a time.

d) Sieve soil onto the plastic sheet and place any finds in a labelled bag.

STOP work if one of the following happens!

- You hit bedrock!
- You hit 'natural' – the term used for layers that have never been disturbed by humans.
- You find a feature that you think should be left intact and undisturbed.
- You reach 1m in depth (a suggested safe depth).
- If you find a cable, human bone, asbestos, weird things that fizz, etc.
- You run out of time!

Once any of these things above happens, make sure that you finish recording the layer you are working on and move on to **Step 16** (right).



Finishing a layer and starting the next one (Steps 13-15)

Once you have reached the bottom of the layer you should stop and complete the **Layer Recording Form** (sections 5-8):

5) Using Guide 1: Soil Composition at the front of the **Test Pit Recording Booklet** describe what the soil in the layer is made of.

6) Using Guide 2: Soil Colour describe the colour of the soil

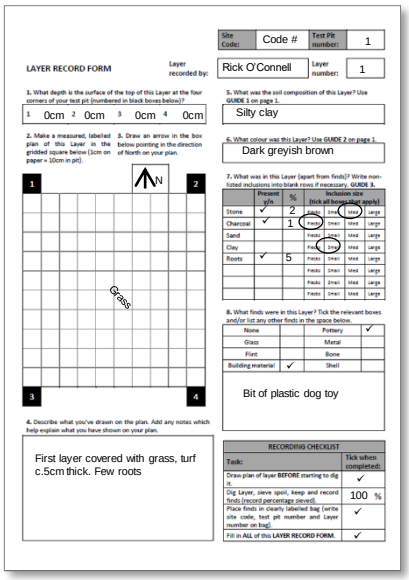
7) Using Guide 3: % of inclusions in the layer, complete section 7.

8) List all the finds recovered from this layer.

Finally, check through the **Recording Checklist** (bottom right of the form) to ensure that you have not forgotten anything.

Once you are happy that the layer is fully dug and recorded take your filled finds tray to the finds processors and start filling out the details on the next **Layer Recording Form**.

Now, it is simply a matter of repeating this process (Steps 5-15, excluding Step 8).


LAYER RECORD FORM

Site Code: Code # Test Pit number: 1

Layer recorded by: Rick O'Connell Layer number: 1

1. What depth is the surface of the top of this Layer at the four corners of your test pit (numbered in black boxes below)?
1 0cm 2 0cm 3 0cm 4 0cm

5. What was the soil composition of this Layer? Use GUIDE 1 on page 1.
Silty clay

6. What colour was this Layer? Use GUIDE 2 on page 1.
Dark greyish brown

2. Make a measured, labelled plan of this Layer in the gridded square below (1cm on paper = 10cm in pit).

3. Draw an arrow in the box below pointing in the direction of North on your plan.

Grass

7. What was in this Layer (apart from finds)? Write non-listed inclusions into blank rows if necessary. GUIDE 3.

	Present y/n	%	Inclusion size (tick all boxes that apply)			
Stone	✓	2	Frags	Small	Med	Large
Charcoal	✓	1	Frags	Small	Med	Large
Sand			Frags	Small	Med	Large
Clay			Frags	Small	Med	Large
Roots	✓	5	Frags	Small	Med	Large
			Frags	Small	Med	Large
			Frags	Small	Med	Large
			Frags	Small	Med	Large

8. What finds were in this Layer? Tick the relevant boxes and/or list any other finds in the space below.

None		Pottery	✓
Glass		Metal	
Flint		Bone	
Building material	✓	Shell	

Bit of plastic dog toy

4. Describe what you've drawn on the plan. Add any notes which help explain what you have shown on your plan.

First layer covered with grass, turf c.5cm thick. Few roots

RECORDING CHECKLIST

Task:	Tick when completed:
Draw plan of layer BEFORE starting to dig it.	✓
Dig Layer, sieve spoil, keep and record finds (record percentage sieved)	100 %
Place finds in clearly labelled bag (write site code, test pit number and Layer number on bag)	✓
Fill in ALL of this LAYER RECORD FORM.	✓

Recording your last layer (Step 16)

Turn to the **Final Layer Record Form** (Page 14 in the Test Pit Recording Booklet). Fill in your test pit details, draw your final plan (of the bottom of the test pit), explain why you have stopped digging and add any other comments that you think might help the person writing the final report. Finally, check through the Recording Checklist (bottom right of the form) to ensure that you haven't forgotten anything.

REMEMBER to make sure that your photograph your finished test pit before you backfill it.

Your photograph/s should contain a recognisable scale, your test pit number and an arrow pointing towards north. Make sure that you get the whole test pit in the photograph, including the side and the bottom of the pit.

Recording your test-pit's sections (Step 17)

Next, you need to draw all 4 sections (sides) of your test pit. By doing this you will record any changes in the appearance of the layers you have dug through, and you will also be able to record the position of anything that you have left embedded in the side of the test pit.

Turn to the Sections Drawing Form at the back of the booklet (Page 15). Draw and label what you see on each side of your test pit, with 1cm on the section representing 10cm in your pit.

The numbers on the top corners of each section drawing should correspond with the numbers at the corners of your layer plans. This will enable anyone in the future to see which section drawing represents which side of the test pit.

Make sure you draw a line to show the bottom of your test pit (i.e. if your test pit has gone down 70cm, the line showing the bottom will be at 7cm on the section) and cross-hatch the non-excavated area below this.

How to Dig an Archaeological Test Pit

Finishing the test-pit and backfilling (Steps 18-20)

Once you have finished digging and recording your pit use the checklist at the bottom of Page 2 to make sure that you have not forgotten to do something. When done, you can fill the test pit in again using the spoil from the plastic sheet. Place large stones and the like into the pit first and then shovel the soil back in on top. Keep stamping the soil down regularly as you fill in the pit; replace the turf if you removed any. You may find that there is a little bit of a mound left when your test pit is filled in. This is normal and it will go as the soil settles over the coming weeks / months.

Tidy up the area around your test pit, clean and return any borrowed equipment, all of your finds and the completed **Test Pit Recording Booklet** to your excavation base.

Finally, have a cup of tea and a big bit of cake. You deserve it!

Quick Reference Test Pit Digging Guide

STEP	WHERE TO WORK	WHAT TO DO
1	Booklet	Fill out the Site Code, Test Pit Number, Location, Grid Reference and your team members' names on the front cover of your Test Pit Recording Booklet.
2	At test pit site	Measure out your 1m square test pit with tape, string and nails.
3	Near test pit	Lay out your plastic sheeting (for safety this should be at least 2m away from the test pit).
4	Booklet	Fill in all parts of the Test Pit Location Map on Page 2 of the Test Pit Recording Booklet.
5	Booklet	Fill in the details in the top right of the 1st Layer Record Form page in your Test Pit Recording Booklet (Page 3).
6	Booklet	Complete recording steps 1-4 on the Layer Record Form.
7	Beside test pit	Write the Site Code, Test Pit Number and Layer Number on a plastic resealable bag using permanent marker pen. Place it in a finds tray.
8	In test pit	Before first layer ONLY. Neatly remove turf (if present) with a spade. This should be in small squares (no more than 20cm x 20cm and 5cm thick). Place turf at one end of your plastic sheet and give it a water.
9	In test pit	Use a mattock to loosen soil in the test pit and the shovel to put soil into a bucket. Keep the bottom of the test pit as level as possible and the sides straight. Try not to get soil on the grass.
10	On spoil heap	Sieve every bucketful of soil onto the plastic sheeting (holding the sieve over the plastic sheeting). Pick out of the sieve anything you see that looks man-made (these are your finds) and tip the residue onto the spoil heap on top of the plastic sheeting.
11	Beside test pit	Place any finds in the finds tray.
12	In test pit	Continue digging until you have removed 10cm from the whole surface of the pit. Use your trowel and hand shovel to remove all loose soil from the exposed surface and leave it level.
13	Booklet	Fill in the rest of the Layer Record Form by filling in steps 5-8 (Use Guides 1-3 at the beginning of the Test Pit Recording Booklet to help).
14	Booklet	Ensure all tasks on the Recording Checklist are complete.
15	Booklet	Begin the next layer by starting a new Layer Record Form, i.e. by returning to step 5.
Repeat steps 6-15 (omitting step 8) for layer 2 and all subsequent layers until you have finished your test pit, then go to step 16.		
16	Booklet	Fill in all parts of the FINAL Layer Record Form (Page 14) in your Test Pit Recording Booklet. Photograph your test pit (the photo should contain a scale, test pit number and north arrow).
17	Booklet	Fill in all parts of the Sections Drawing Form (Page 15).
18	Beside test pit	Use the checklist at the bottom of page 2 to make sure you have not forgotten to do something.
19	In test pit	Backfill your test pit and replace turf AS NEATLY AS POSSIBLE.
20	In test pit	Tidy your site, collect up and clean your equipment and return everything to your excavation base.

An introduction to interpreting test-pit data

Soil in your back garden, or out in a field often contains a low-density **'background scatter'** of historic cultural material – pottery, building material, clay tobacco pipe, glass, metalwork etc. This **MAY NOT** be indicative of an underlying archaeological site. Instead, it could be evidence for prolonged non-intensive relocational deposition, typically associated with the improvement of cultivation soil (e.g. manuring and marling of soil with imported domestic waste to improve its quality).

Key to identifying intensive archaeological activity (a site) near your test-pit, therefore, is dependent on recognising anomalies in this background scatter. To do this, artefacts from the test-pit must be **IDENTIFIED** (categorised and spot-dated), **QUANTIFIED** (counted and weighed) and **INTERPRETED**.

REMEMBER – interpretation is an inexact science. We are making inferences regarding quantity, character and distribution of recovered material derived from a very small sample area (a test-pit will typically investigate no more than 1 cubic meter of soil).

Unknowns:

- How representative is the material in the test-pit of activity in the vicinity?
- What factors (both historical and contemporary) might have affected deposition, movement and preservation of material in the test-pit?

For the purposes of test-pitting:

- A **SITE** is a concentration of archaeological material from a test-pit which is of sufficient quantity to suggest that activity was occurring in the immediate vicinity of the test-pit.
- A **SCATTER** is a low-density group of archaeological material from a test-pit which is not considered to be of sufficient quantity to suggest that activity was occurring in the immediate vicinity. Its presence in the soil may be due to other relocational activities.


Small worn pottery sherds = less likely to be occupation nearby


Large sharp-edged sherds = more likely to be occupation nearby

Things to consider when interpreting your data

The following are general guidelines which can be followed when analysing test-pit data **BUT THERE IS NO** standard formulae for assessment and these guidelines should be flexibly applied and tailored to individual projects.

Pottery from some periods is less common than from others. Therefore, similar sherd count / weight from different periods can, in some circumstances, have widely different significance.

- 1-2 sherds of relatively rare and / or fragile prehistoric or Anglo-Saxon pottery could (cautiously) be interpreted as evidence of occupation in the immediate vicinity of a test-pit. While for periods where pottery was more widely used and was more durable, a larger quantity / weight of sherds may be required to draw a similar inference.

Therefore, a good rule of thumb for yields of Roman, medieval or post-medieval pottery per test-pit (where a test-pit averages 1 cubic meter of excavated material) is:

- Less than 5 sherds dated to one particular period = unlikely to be occupation of that period nearby. Pottery deposition is more likely a result of non-intensive relocational activity which may be contemporary with, or later than, the pottery.
- More than 10 sherds = likely to indicate occupation nearby.
- Between 5-10 sherds = could indicate occupation nearby depending on site-specific and / or test-pit specific factors.

When considering the pottery assemblage, sherd size, weight and condition are also important in determining the likelihood and / or proximity of occupation.

- Individual sherd weight over 5g = greater potential for occupation nearby.
- Individual sherd weight under 3g = less significance for occupation nearby.
- Worn edges = prolonged relocational activity (i.e. frequent repetitive movement in cultivation soil).
- Sharp edges = little relocational activity, (i.e. infrequent repetitive movement, recovery probably from near original deposition site).

So small worn sherds are less likely to be evidence of nearby occupation than larger sharp-edged sherds (in assemblages of mixed condition, greater emphasis would usually be placed on the dominant material condition present).

When considering small assemblages of Roman, medieval or post-medieval pottery (i.e. 9 sherds or less), these could indicate intensive activity nearby if all the sherds derived from one or more of the following:

- A restricted number of adjacent 10cm thick layers, usually just 1 or 2, in the test-pit.
- A layer or layers in the test-pit which contained no identifiably later material, with no identifiably later material coming from all layers beneath it either.
- A layer in the test-pit which contained other significant finds suggesting a specific period of activity.
- An archaeological feature (e.g. a pit, post-hole, wall or surface)

It is important therefore to consider the general appearance of the soil in each layer, the entire finds assemblage and any other pertinent evidence.

Finding the Story in your test-pit

Analysing material from test-pits, particularly pottery, allows the development of a place over time to be reconstructed in a way that documentary evidence rarely permits. However, this **DOES NOT** mean that the data should be used in isolation. It is important to use all sources of information available, both archaeological and historical. This is particularly true of post-medieval and modern finds assemblages where analysis of the material **MUST** compliment known historical information (maps, historic documents, photos, oral history etc.).

REMEMBER – care **MUST** be taken when interpreting the material as any inferences made are inevitably based on small samples which are potentially affected by a range of biases. Conclusions drawn from the study of multiple test-pits at the same property or across a wider settlement / landscape will be more reliable than those from a single test-pit, and negative evidence (i.e. when nothing was found in a test-pit) should be used with considerable caution.

What does negative evidence mean?

The absence of evidence is not necessarily the evidence of absence. If nothing was found in a test-pit you **MUST** ask yourself why. For example:

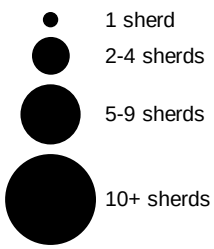
- **Was the test-pit dug to natural?** An unfinished test-pit means that data collection is incomplete and something could have been missed.
- **Was the test-pit's location the right place to dig?** Was there evidence of ground disturbance, truncation from modern landscaping or soil importation from unknown sources? Reduced ground levels may have destroyed evidence of occupation whilst raised ground levels may have buried it, making it harder to reach, and could have introduced contaminants which make the provenance of any finds recovered uncertain.

If modern considerations for negative evidence can be ruled out, what historic considerations are there?

- **Could historic activity be aceramic?** Were people not using pottery during specific periods, possibly influenced by availability / proximity of kilns and markets and / or their affluence?
- **Could more efficient removal of pottery from occupation sites to communal middens or surrounding fields be a factor?** Maintenance and improvement of soil fertility is a major pre-occupation of arable farmers of every social level during all periods of history. It could be the case, therefore, that a relative absence of material from test-pits in known occupation sites (i.e. historic village cores) counterbalanced by a low-density scatter of contemporary material from more marginal test-pits is still evidence of occupation in the wider landscape even if it does not provide information about activity in the immediate vicinity of each test-pit.
- **Finally, is historic activity dispersed and, therefore, potentially harder to find archaeologically?** Could your site be polyfocal or dispersed settlement rather than nucleated. This could affect the relative amounts of material present in groups of test-pits and can produce a greater number of negative test-pits than might have first been expected.

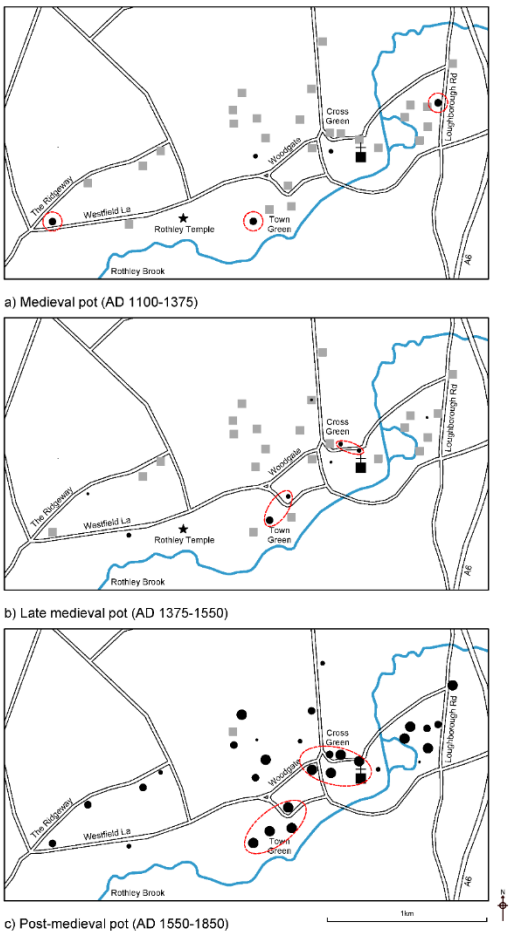
Plotting test-pit data

Data from multiple test-pits is usually plotted as a series of dot distribution maps (for find type / period), using a series of graduated dots to represent an increasing data range at each test-pit location (right). Alternate methods use different coloured dots, a graduated colour system or heat maps to represent the data. These show spatial patterns as a visual scatter, making them an effective method for revealing anomalies, trends and changes across a settlement / landscape over time. Maps can be created manually or using GIS software.



When looking at the material from your test-pit, ask yourself the following questions:

- Where was the test-pit located?
- What is already known about the site's history?
- Was the test-pit finished / natural reached?
- What soil / archaeology was found?
- What type of material was present?
- What is the date range of the material?
- Can changes be seen in the type / quantity of material over time?
- What do the finds suggest about the nature of activity nearby - domestic, industrial, commercial, agricultural etc.?
- Is there anything else of interest in the test-pit?
- How does material relate to the known history of the site? Is it consistent or inconsistent? Why?



Above: Pottery distribution maps for three historic periods, showing how pottery quantities changed through time at the village of Rothley in Leicestershire. Data suggests that the village evolved from a series of dispersed / isolated occupation sites (ringed in red) in the medieval period to concentrate around two greens in the late medieval and post-medieval period (polyfocal settlement), and that the village's modern nucleated appearance is a product of recent development (post 1850 in this case).