

# Safe Working Around Utilities (UK)

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**FAME** Advice for Archaeological Practitioners

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The FAME Health and Safety Guides are produced by the FAME Health and Safety Working Group to provide advice to FAME members to foster safe systems of work for development-led archaeological practice. They are not designed to replace existing, detailed guidance available from the Health and Safety Executive (HSE) / Health and Safety Authority (HSA) and other bodies, and must always be used in conjunction with that guidance, clearly referenced in each guide, where applicable.

## **FAME Health and Safety Guide 2: Safe Working Around Utilities (UK)**

**Version 2, updated August 2024.**

**V2 changes:** Minor change of formatting, adding of links to other guides, added health and safety group member names and new material on 'use of metal road pins', 'use of insulated tools', and 'pot-end cables'. Some additional changes in phrasing as well, to increase clarity. Replaced broken links.

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## KEY MESSAGES

- Damage to utilities can cause fatal or serious injury as well as significant disruption and environmental damage; this can also delay a project and incur considerable costs.
- It is the duty of the client in the first instance to obtain and supply all available information relating to the presence of utilities.
- You should plan site activities to avoid contact with utility risk areas as far as reasonably practicable and if additional utilities are identified during the works then you must modify your activities if they risk contact with the utility.
- You can never rule out coming across additional utilities when digging, even if nothing is shown on plans. Always treat anything you find as live until confirmed otherwise.

## 1 Introduction

Every year people at work are injured, and some are killed, due to accidental contact with underground and overhead services. Research by the Energy Networks Association has found that, since 2015, an average of 70 people a year are seriously injured as a result of contact with underground electricity cables. Since archaeological operations often begin early in the development cycle you may be the first to need to know where these services are on a site.

Adherence to the contents of these documents and the recommended further reading will help your organisation develop a risk management approach for working around utilities and will support the development of a safer digging culture. The safety of your staff and the public supersedes any archaeological consideration.

## 2 Legal

The Health and Safety at Work Act 1974 (HASAWA) requires us to ensure the safety of our workers and others so far as is reasonably practicable. Whilst there are a number of regulations made under the

act none, of those that apply fully to archaeologists, address what we should do to deal with utilities.

Therefore, it is important to follow guidance produced by the Health and Safety Executive (HSE) and the major utility owners. Where it becomes necessary, courts will look at guidance produced by these bodies to assess what was 'reasonably practicable'.

An archaeological organisation should not accept any risk that does not naturally sit within its competencies or the scope of its professional works. Under HASAWA and, specifically where it applies, under the CDM Regulations 2015 (see FAME Technical Paper no. 1), the client is best placed and has a legal duty to supply all information relating to risks that may be encountered during archaeological works; this includes information on utilities.

### 3 Definitions

The published HSE guidance [HSG47 Avoiding Danger from Underground Services] uses the term utilities in a broad sense to mean buried, on-surface and overhead services.

HSG47 defines buried services as

“ All underground pipes, cables and equipment associated with electricity, gas, water (including piped sewage) and telecommunications. Also includes other pipelines which transport a range of petrochemical and other fluids. It does not include underground structures such as railway tunnels etc. ”

We can similarly define overhead services as cabling for the transfer of electrical power and for telecommunications. There may be rare situations where there is overhead pipe work (some buried or overhead pipework, usually associated with older buildings, may be lagged with asbestos; this is not addressed in this paper).

The term buffer is used in this document to mean the lateral separation from the alignment of a service, whether underground or overground, within which you must not plan to work.

## 4 Archaeology practice

Risk control is achieved through a hierarchy of management activities.

**PLAN** the work

**LOCATE** the services

**DIG** safely

### Planning

Understanding the scale and scope of risk from utilities is a time-consuming process – not least because of the lead times required to obtain some sources of information. It is important that managers allow sufficient time to obtain, assess and respond to utilities information. It is wise to ask for this information early and to record the request.

The first source should be clients – though they may not be aware of their responsibility and may not provide the best quality of information. What you should request is PAS 128 cat D compliant utility information. PAS 128 specification for underground utility detection, verification and location provides a recognised standard for the quality of utilities survey data. The client may need to use sources such as utilities supply companies, utilities survey companies and utilities information aggregation services.

Line Search Before You Dig is a free online search tool that is widely used by the construction industry. It currently provides an excellent starting point to check and supplement information provided by the client. See <https://lsbud.co.uk/>.

Planning can be supported by observations made during a site visit. This will establish whether there are any clear and obvious utilities (public and/or private) at the work site and, given the nature of the work, whether these will pose a risk.

You need to respond to the information you obtain, and remember, you are not just planning your excavations. Consider how you will bring plant onto site, where spoil heaps will be located, and where welfare units need to be craned into place/located. Contact with overhead lines is possible in any of these situations and underground pipes may be crushed under the weight of plant. The network owner operator should be contacted, by you or your client, before any excavation work takes place as they may have specific requirements or consents – some publish these on their websites.

Any potential conflicts between utility risk areas and areas of excavation, spoil or equipment storage, site access or vehicle tracking should be identified. Site activities should be modified and planned to avoid conflict with utility risk areas.

An additional complication is where a third party has already made proposals for trench locations. They will need to be advised if trenches need to be resized or relocated. They may not appreciate that their proposals must be changed if the trench cannot be dug safely.

The law requires that where possible you should eliminate or avoid the risk. In some circumstances utilities can be removed by the utility supplier or temporarily disabled. It is essential this is considered if it is not possible to maintain safe buffers between the work and the utilities.

### **Locating**

The location and type of utilities should be plotted accurately on a base plan of the proposed site, which should also show the proposed limits of archaeological excavation and plant working zones. Consideration should be given to the required buffer zones and vertical clearances needed for each type of utility. These areas should be represented graphically on the plan and listed in the Risk Assessment.

Buffer zones may be specified by utility owners, be prescribed in guidance or specified by the client. It is good practice to have your own standard buffer distances for services where the owner or client does not specify.

Your first task on site is to verify the plan as far as you are able. Services could be on alignments different from official information or at a different depths. Your planning information will tell you they are there, but not always precisely where. It is unwise to completely trust the utility locations on the plan. There will also be rare occasions, especially on private land, where new services have been put in and these may be evident from recent ground disturbance.

Once trenches have been accurately staked out the excavation area should be swept with a Cable Avoidance Tool (CAT) and signal generator (Genny) to scan for services before breaking ground. This document does not cover how to use a CAT & Genny but this should always be carried out by a competent and trained operative.

You will need to amend the plan if the on-site situation is different to that planned for.

### **Safe Working**

Work on site should always begin with a safety induction and the presence or assumed absence of utilities should always be covered.

Wherever possible the trenches will have been sited and the plant movement planned to avoid working within buffers. Buffer zones should always be marked out, e.g. with rope and cones, to avoid accidental work, especially plant movement, within those zones.

As stated above, the area should be swept with a CAT & Genny to scan for services before breaking ground, but the CAT & Genny should continue to be used as excavation progresses, especially in deeper excavations such as urban sites. The sweep/scan should be repeated after stripping of each layer. This is because it is foreseeable that unidentified buried services may be present whose signal is being masked by the overlying soil layers.

The CAT & Genny is not infallible. As you strip you may come across data cables, redundant cables or plastic pipes but you should never assume that a service is dead; always treat it as live until confirmed otherwise. If any unexpected service is encountered, for example a “Pot-End” cable, then the work must stop.

### What is a pot-end cable?

Occasionally, cables are terminated in the ground by means of a seal, sometimes with additional external mechanical protection. These 'pot-ended' cables, as they are called, may be live and should not be assumed to represent abandoned or disused cables. "Pot-Ends" are not detectable with a Cat & Genny, even when live. A GRP detector is required to identify this type of service.

If damage is caused to underground services, work must stop, the area cordoned off, the site may need to be evacuated, and it must be reported to the client/owner and/or emergency services immediately, as well as to your H and S Advisor.

This document does not cover how to use a CAT & Genny but some points to note on the CAT & Genny are:

- They should be used by persons who have been trained (3-year refresher needed).
- The equipment should be regularly serviced and calibrated by a specialist provider at regular intervals, not exceeding 12 months.
- The CAT & Genny should be used together to provide the full picture of the excavation area.
- The CAT & Genny will not detect all utilities e.g. plastic pipes.

### Working within buffers

Working within buffers should be avoided wherever possible but tracking across buried services might be unavoidable. Advice can be obtained from the relevant utility provider, but in these instances use of ground-guards or other measures might be helpful to reduce risk from heavy machinery damaging buried services.

One of the most common examples of work within buffers is where there is a need to pass beneath overhead utility services. In this situation the detailed guidance in GS6 (Avoiding danger from overhead power lines) must be followed.



The erection, placing, setting of maximum height and safe use of 'goalposts' will, usually, be required and will involve liaison with the utility provider. Also, the appropriate plant machinery must be identified, with height restrictors fitted if necessary. The height of any overhead lines may need to be measured. A non-contact measuring device must be used. The utility provider will often do this for you, but suitable devices are widely available.

If excavations within safe buffer distances for overhead or underground utilities cannot be avoided, expert advice from relevant utility providers must be sought to create an excavation plan and agree a safe excavation method. It may not be possible to use mechanical excavators. The safe excavation method must be set out in the Risk Assessment as a method statement or safe system of work.

### **Use of metal road pins**

An increasing number of clients are against the use of metal road pins on sites. This is because they could be driven in and damage a cable or gas pipe and cause harm. They might also puncture a water pipe or drain.

On many of the sites where archaeology is undertaken this is unlikely, however, use of metal road pins in unscanned and unexcavated ground either with netlon or as primary setting-out may pose a risk. A client objecting to this use is making a reasonable request. Wooden posts have been successfully used as an alternative with netlon. Other options are not covered in this guidance.

Use of metal pins for setting levels and recording, for example section pins, takes place after a site should have been scanned and usually after mechanical excavation. This use is necessary for archaeological recording to a high standard, and no adequate alternative, that works in all situations, has been identified. This risk of striking an unknown service when using metal pins in this way is likely to be negligible but should be risk assessed on a site-by-site basis.

### **Use of insulated tools**

The HSE states that insulated hand tools should be used when digging near buried services. Hand excavation outside of the buffers described

above is clearly not near known buried services. Insulated tools are heavier and have a different balance. Their use increases musculoskeletal risk, sometimes by a considerable amount.

Insulated tools are only relevant to the risk of damaging electric cables.

If there is real risk of striking a buried service with tools and insulated tools are to be used, it is logical that flame retardant PPE is worn. Both these measures are however at the bottom of control hierarchy, providing mitigation of harm not full protection. Neither should be specified as a substitute for the other controls covered in this guide.

Archaeologists following this guidance and hand excavating outside buffers should not need to use insulated hand tools, and by correlation, flame retardant PPE neither. Insulated hand tools should, however, be considered if hand excavation has to take place within a buffer zone or where there is a foreseeable expectation of unmapped gas/electric services. If archaeologists are required to use insulated tools as they are digging near services they must also receive extra training on safe digging techniques near services.

## 5 Additional information and caveat

The above seeks to offer broad guidance to Archaeological Practitioners. However, it does not cover all eventualities and circumstances that may be encountered. For further advice please contact your internal or external competent source of health and safety advice.

## 6 Further reading

The main, well-established guidance is:

**GS6 Avoiding Danger from Overhead Power Lines**

<http://www.hse.gov.uk/pubns/gs6.htm>

**Guidance HSG47 Avoiding Danger from Underground Services**

<http://www.hse.gov.uk/pubns/books/hsg47.htm>

**CITB GE700D High Risk Activities.**

<https://www.citb.co.uk/standards-and-delivering-training/health-and-safety-publications-and-support-materials/ge700-companion-content/ge700-weblinks/d-high-risk-activities/>

**Highways England Utility Strike Avoidance working group**  
<https://www.highwaysafetyhub.com/utility-strike-avoidance-group.html>

**Line search before you dig website**

<https://lsbud.co.uk/>

**Utility Strike Avoidance Group**

<https://www.utilitystrikeavoidancegroup.org/>

**Information about PAS 128**

<https://www.pas128.co.uk/>

**Street Works - ‘Avoiding Danger from Underground Services’ and to ‘Utilities Guidelines on Positioning and Colour Coding of Apparatus’.**

<http://streetworks.org.uk/resources/publications/>

**The theory of buried cable and pipe location**

<https://www.radiodetection.com/sites/default/files/Theory-Buried-pipe-manual-V10.pdf>

**FAME Health and Safety Guides**

[Construction \(Design and Management\) Regulations 2015 \(2020\)](#)

Safe Working Around Utilities (UK) (2021, revised 2024)

[Near-Miss Reporting \(2022\)](#)

[Medication Side-Effects: Heat and Sun Sensitivity \(2023\)](#)

[Safe Working for Archaeologists as part of UK Construction Projects \(2024\)](#)