

# Your Service Avoidance Quick Reference Guide





**All excavation activities have a potential to cause serious harm, injury or even death to those that come into contact with underground services. Many workers have received life changing injuries through bad practice, taking shortcuts and lack of information.**

This guide provides a look at the essential control measures required to undertake safe digging and avoid underground services through safe systems of work and awareness.

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# What documentation do I need?

Before any digging starts. You must have all the appropriate documentation with you and understand it's content. As a minimum you must understand and work in accordance with the following documentation.

## Essentials

- Clients order
- Daily Briefing
- Risk Assessment
- Point of work risk assessment
- Safe system of work
- STATS /GPR plans (A3, Colour, Legend)
- Permit to dig / Plane



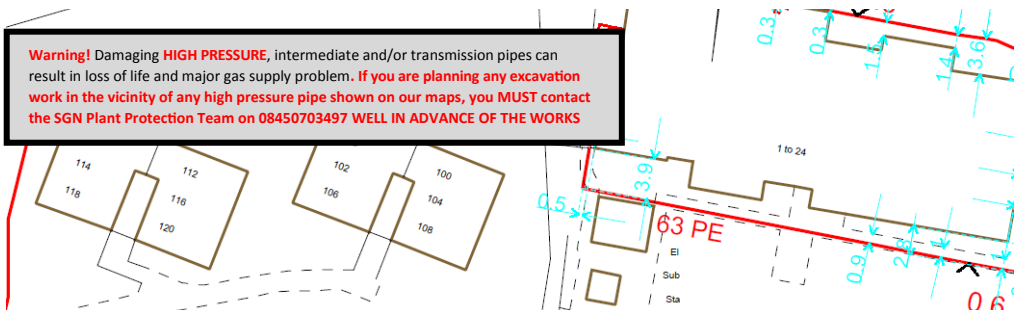
## Guidance

- Mechanical service avoidance wheel,
- 10 steps to safer digging
- HSG47
- USAG Best Practice—Services encased in concrete



Be aware of electrical drawings marked EHV (extra high voltage), UHV (ultra high voltage) and gas board drawings marked with medium or high pressure gas main. **Do not proceed** if the STATS drawings contain this information; contact your supervisor and request assistance from the asset owner.

**Warning!** Damaging **HIGH PRESSURE**, intermediate and/or transmission pipes can result in loss of life and major gas supply problem. **If you are planning any excavation work in the vicinity of any high pressure pipe shown on our maps, you MUST contact the SGN Plant Protection Team on 08450703497 WELL IN ADVANCE OF THE WORKS**



## What PPE do I need?

PPE is the last line of defence against harm to you. Clothing has the potential to ignite from a flash spark or electrical discharge.

Any clothing worn on the outside must be **flame retardant** to a minimum standard of EN ISO 14116:2008. All other PPE must be worn in accordance with company policy and local legislation. You should refer to the Kier Highways PPE Standard and Catalogue for further guidance.

**Eye Protection:** MUST be used when carrying out tasks where debris could result in injuries to your eyes. You must check the safety glasses/goggles you have are correct for the task you are to undertake.

**Head Protection:** MUST be worn when working around plant. Also when identified in your risk assessment and safe system of work or sites under the control of others.

**Ear Defenders.** Ear plugs are not ear defenders. These will not be accepted if they are being used on site. You MUST wear hearing protection at levels above 85Db.

**Respiratory Protection** If you are working in a dusty or potentially dusty environment – FFP3 face masks MUST be worn. You must be face fit tested to ensure the mask creates a seal and is working efficiently.

**High Visibility Jacket and Trousers** You MUST have as a minimum flame retardant, high visibility class 2 trousers, flame retardant, class 3, long sleeved vest or jacket, this must be worn with the front FASTENED.

**Hand Protection** There are many varieties of sizes, styles and construction materials. Remember gloves are not a one size fits all solution some are water proof others offer high friction palms and protection against chemical compounds, please make sure you select the correct style for the task you are to undertake.

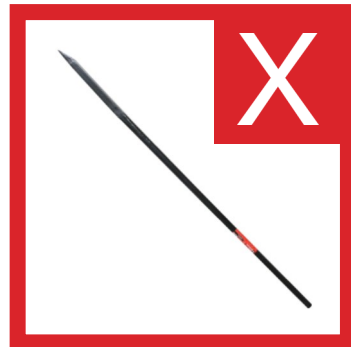
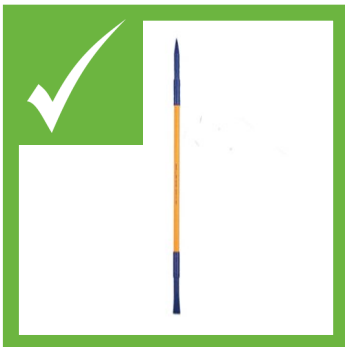
**Foot Protection** Laced up safety boots must be worn with toe, mid sole protection and ankle support. Slip on boots and 'riggers' are unacceptable.



## What equipment do I need?

You will need all the relevant tools, plant and equipment to carry out the works in a safe and timely manner. Shovels, spades, picks, ground rods and road pins must all be insulated. All non-insulated tools are prohibited.

### Know the difference!



## Ground surveying

An essential task before any excavation is undertaken, is to survey the surrounding area for signs of buried services. There are many signs which can give you an indication of what might be present in the ground.

### Make sure you look for these!

Marker Posts	Stopcocks/fire hydrants/meter covers
Manholes/Ducts/Access covers	Gullies/manholes/drainage rodding points
Street signs/Bollard lights	Bridges/culverts/tunnels etc.
Service Duct markers	Overhead services
Evidence of service trenches	Overhead services that go underground
Service entries into buildings	Talk to locals for their service knowledge



## Ground surveying

The next step is to use a cable avoidance tool (CAT) to locate and mark identified services. The CAT and Genny must only be a model that has the downloadable data function or better. The eCAT4+ and EaZiCAT i750 are the preferred models for use.

You must ensure the CAT is within its calibration date, checked for defects, used in all available modes and only operated by a trained and competent user.



### Genny

Locates signals induced by a Genny. There are various ways of applying the Genny signal. Using a Genny is the most reliable way to detect a pipe or cable.



### Power

Detects signals originating from power transmission networks. These signals may be found on any pipe or cable, not just power cables. Some power cables DO NOT radiate detectable power signals.



### Radio

Detects radio signals originating from distant radio transmitters as they travel along underground pipes and cables. Radio signals are not always present. Always use a Genny before excavating.



### Avoidance

Avoidance Mode speeds the process of pre-dig scanning by searching for Power, Radio and Genny signals simultaneously.

**Beware!** Some HV cables may not emit signals in power mode due to being well balanced or not under load. Always use radio and genny for a better chance of locating. Furthermore, power signals may not be found on power cables that are switched off (e.g. a street light cable during daylight hours).





# Ground surveying

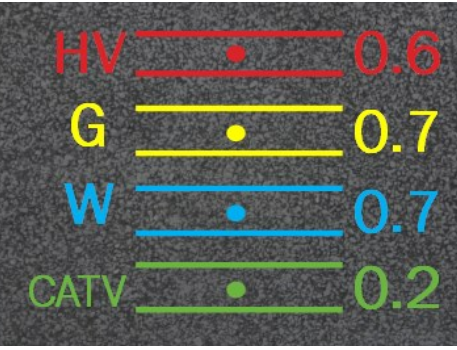
Once you have a clear reading, mark-up the line of identified services, outside of the area to be excavated. This should be done using the correct colour coded line marker spray as shown below. Depth and type of services should also be written if known.



Use the correct coloured spray



Spray indicated line of service



Spray the type and depth of services if known

You can identify services using the **colour coded standard** in more recent installations:

Colour	Service
Red	Electricity - some high voltage cables
Orange	Street lighting in England and Wales and traffic control cables
Blue	Water main
Yellow	Gas
Purple	Highways England standard for ducting on Motorways and all-purpose trunk roads
Grey	Telecommunications
Green	Cable television and some telecommunications
Brown	Sewer/drainage

## Safe digging, around identified services

Once all ground surveying has been completed and all foreseeable measures have been taken to identify the location of services, safe digging can proceed. The safest means of excavation is by use of an air lance or vacuum excavator. Where these options are not available you must adhere to the following control measures.



Use insulated hand tools with curved edges. Ease spades & shovels into the ground with gentle foot pressure, do not throw or spike into the ground.

Make frequent and repeated use of locators during the course of the work, re-scanning layers every 100-150mm. Service location is likely to become more accurate as cover is removed.

Once identified, where practicable, no mechanical excavation is to be within 500mm of the marked area as a minimum.

Make every effort to excavate alongside the service rather than directly above it as the force applied to hand tools can be controlled more effectively

Once services are exposed, protect them by clearly marking their position and making all aware of their presence.

Do not move services, except in consultation with the owner. Do not use as handholds or footholds for climbing out of excavations. Support suspended services using only approved methods.



Mark indicative lines



Dig 0.5m from known services



Dig trial holes and slit trenches where possible

## Services encased in concrete

### WORK MUST STOP! - Follow the USAG Process



Services encased or surrounded by concrete pose additional risks. The combination of the unknown, with additional force required to remove the concrete (even if only to create space for a component or working room) brings additional risk to those carrying out the work.

The concrete may be concealing faults, adversely loading the services, weakening them, or preventing accurate identification of the services. The concrete may provide anchorage to pipelines and associated fittings and their removal or complete exposure of the concrete should be avoided to minimise the risk of failure of the anchor



### CONTACT YOUR SUPERVISOR

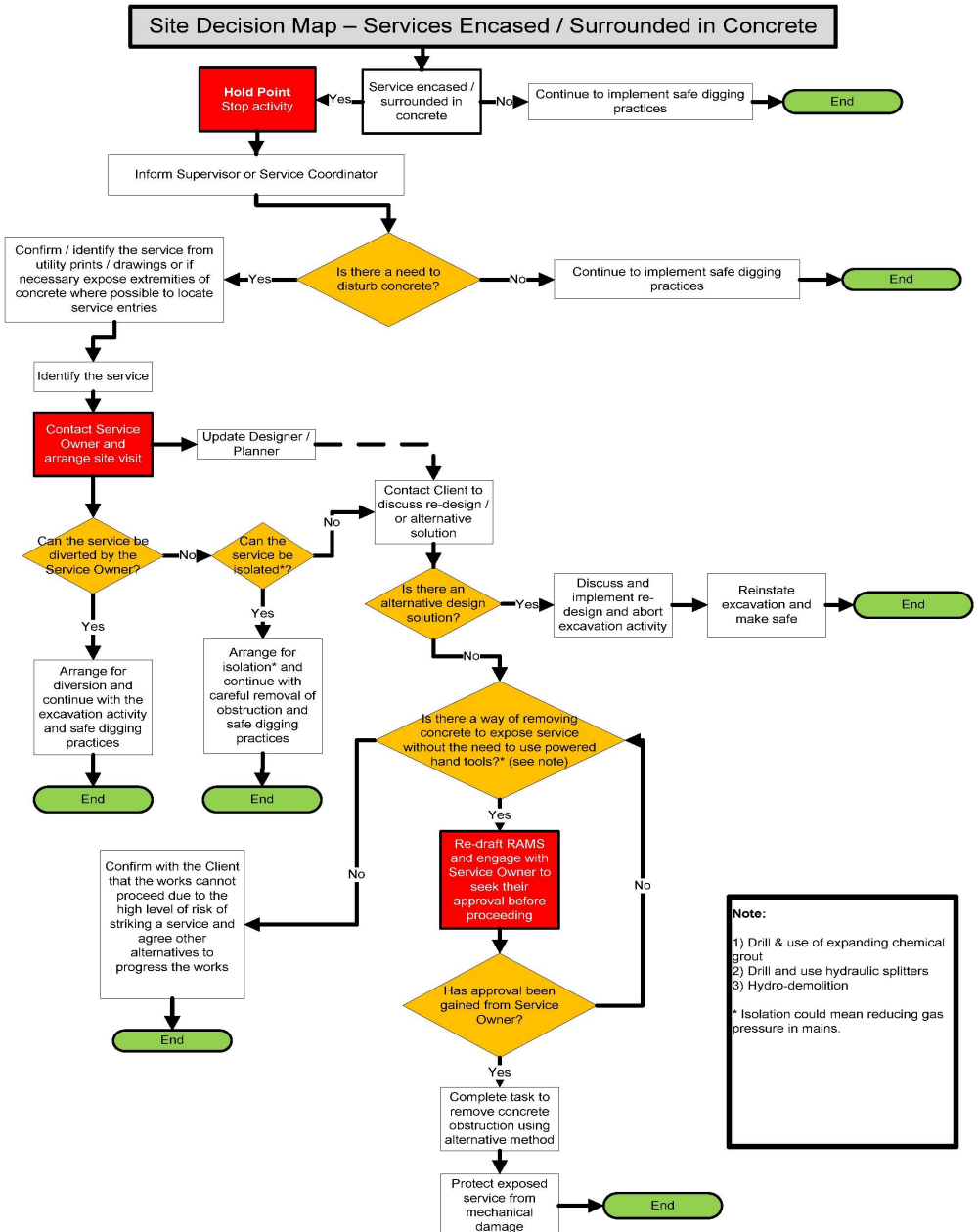
#### 11,000kv cable strike!



One of the men, who was 22 at the time of the incident, hit the cable with a jackhammer when removing old brickwork and suffered serious burns to his arms, legs, hands and face. He was in hospital for nearly a month receiving treatment to his injuries. The other operative also received life changing injuries .

**Don't let this be you!**

# Services encased in concrete





## Protecting services

Once exposed, services may need to be supported and should never be used as hand-holds or footholds for climbing out of excavations.

You must provide support to minimise the risk of damage (the utility owner should be contacted to provide advice on the support mechanism to be used).

Sometimes there may be joints in cables. They need proper support and should not be roughly treated. Do not move, except in consultation with the owner. All exposed services must be protected and supported; the maximum span a service can be unsupported is 1.2m. Colour coding flags or posts may be used to mark the ground where services are identified.



Colour coded flags or posts may be used as identification

Do not allow water to collect in the excavation and ensure you check the faces after rainfall. For long duration excavations permanent sump pumps and air sampling / ventilation should be available.



Provide protection of the service against damage, e.g. steel plates, sand over surface or supports for services that span across an excavation.

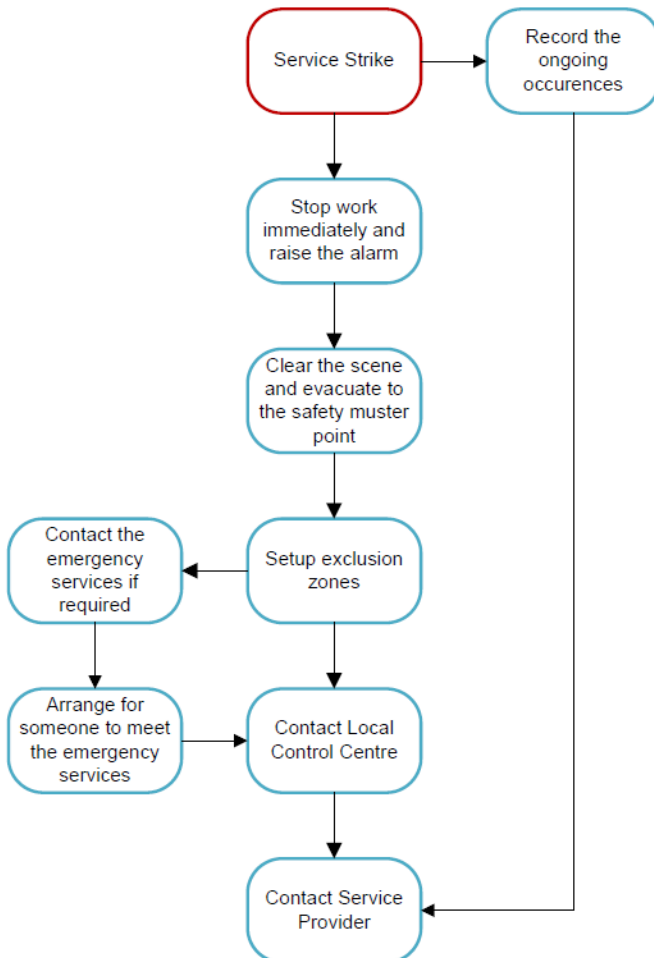
Use barriers at appropriate distances to keep exposed services out of the path of moving vehicles and ensure that all personnel on site are aware of their location by clearly marking their position.



## Emergency procedure

If you strike any underground service. Report it immediately to your supervisor. Do not attempt to move, adjust or interact with the service any further. Clear the area. Do NOT approach the service until advised it is safe to do so by the service owner. Electric cables are likely to be re-energised as part of the fault testing process on some circuits and pose serious risk of secondary electrocution or flash over.

Ensure adequate protection is applied to prevent entry and contact the emergency services if required. The relevant service provider will also need to be contacted to inform them of the damage. Your local network control centre and immediate line manager must also be informed of all service strikes **as soon as they occur**.



## Useful Contacts

Amend details to suit contract

<b>POLICE AMBULANCE, FIRE</b>	101(Police Only) 999 (Emergencies)	<a href="http://www.police.uk">www.police.uk</a>
<b>NHS</b>	111	<a href="http://www.nhs.uk">www.nhs.uk</a>
<b>UKPN</b>	0800 028 0247	<a href="http://www.ukpowernetworks.co.uk">www.ukpowernetworks.co.uk</a>
<b>SOUTHERN GAS</b>	0800 111 999	<a href="http://www.sgn.co.uk">www.sgn.co.uk</a>
<b>THAMES WATER</b>	0800 714 614	<a href="http://www.thameswater.co.uk">www.thameswater.co.uk</a>
<b>BT</b>	0207 356 5000	<a href="http://www.bt.com">www.bt.com</a>
<b>ENVIRONMENT AGENCY</b>	0800 807060	<a href="http://www.environment-agency.gov.uk">www.environment-agency.gov.uk</a>
<b>LINE WATCH (PETROCHEM)</b>	01488 662750	<a href="http://www.linewatch.co.uk">www.linewatch.co.uk</a>
<b>VIRGIN MEDIA</b>	0207 356 5000	<a href="http://www.virginmedia.com">www.virginmedia.com</a>
<b>NATIONAL GRID</b>	0870 888 3113	<a href="http://www2.nationalgrid.com">www2.nationalgrid.com</a>

## Kier Services

### Highways

#### Head office

Tempsford Hall  
Sandy  
Bedfordshire  
SG19 2BD

**T:** 01767 355000

**E:** [info@kier.co.uk](mailto:info@kier.co.uk)



[www.kier.co.uk](http://www.kier.co.uk)

