

**Title: Danger from Underground Cables and Pipelines**

**CPoP:** G:4

**Date:** September 2020

**Author:** James Corringan

**Post:** Quality and Safety Systems Manager

Further information is available in the Corporate Health and Safety Manual

Please search for 'Electrical Safety' on LCC Connects

	Page
<b>CONTENTS:-</b>	
Introduction	1
Definitions	2
Scope and Application	2
Design and Planning	2
Works Order	4
Construction Phase	5
Emergency Action	7

First Issue Date: July 1998  
Re-Issue Dates: August 06,  
August 10, June 11, September 11,  
September 14, September 17,  
September 20  
Revision No: 7  
Last Reviewed: September 2020  
Next Review Due: September 2023  
Reviewer: James Corringan

# PLACE HEALTH AND SAFETY MANUAL

## 1. Introduction

The damage to underground cables, pipelines and equipment can cause fatal or severe injury, predominantly from electricity cables and Gas pipelines, although pipelines which carry oil or water under pressure also pose a high risk.

Puncturing or even slight damage to electricity cables can result in burns and can be fatal in severe cases. Injuries are usually caused by the explosive effects of arcing current and by any associated fire or flames.

Fracturing gas pipelines can cause leaks which may lead to asphyxiation, fire or explosion. If the gas comes into contact with a naked flame or a spark from work equipment this may lead to fatalities or extreme burns.

Fracturing of water mains by disturbing ground can result in flooding and lead to the possibility of drowning or trench collapse in extreme cases. A jet of water from a main also has the potential to injure a person. Contamination from sewers is also possible.

Damage to communications cables especially fibre optic is unlikely to result in injury but may require expensive repairs and can cause considerable disruption.

Other pipelines could be carrying flammable or toxic substances and may lead to risk of fire, explosion, asphyxiation or contamination.

The disturbance of ground near to any service can contribute to any of the above damage. A safe system of work shall be employed when the ground is being disturbed.

Applicable legislation includes The Electricity at Work Regulations, New Roads and Street Works Act (NRSWA), the Management of Health and Safety at Work Regulations and the Construction (Design and Management) Regulations (CDM Regulations).

Under the CDM Regulations duty holders have responsibilities for managing health and safety on construction sites. The following are duty holders who have specific responsibilities depending on the type of works to be undertaken, Client, Principal Designer, Principal Contractor, Designer, Contractor and Worker. For further guidance see Place directorate [Code of Practice G2](#)- Construction (Design and Management) Regulations.

Service providers have a legal duty to maintain records of underground cables, pipelines and equipment and make available plans and relevant details to those who make requests for information.

## PLACE HEALTH AND SAFETY MANUAL

### 2. Definitions

A competent person is someone who has received formal training in safety in relation to underground services and use of cable detection tools.

The term 'service(s)' means all underground pipes, cables and equipment associated with the Electricity, Gas, Water (including piped sewage), and telecommunication industries. It also includes other pipelines which transport a range of petrochemical and other fluids and other privately owned services.

The term excavation(s) within this Code of Practice shall include for any works which involve physically penetrating the ground at or below the surface level.

### 3. Scope and Application

This Code of Practice applies to all construction work and Investigations undertaken by or on behalf of Place directorate where excavation works are to take place.

### 4. Design and Planning

Taking the CDM Regulations into consideration, dangers from underground services can be avoided by careful planning before the work starts. The presence of underground services shall be identified as early as possible from service drawings received from the service owners / operators. At this stage also consider underground mapping services that utilise other techniques such as Ground Penetrating Radar, Site Inspections and Surveys. Be aware that there are limitations to these methods e.g. Cat and Genny will not detect fibre optic cables. These can be supplemented with trial holes to identify potential hazards before works are started. Further information can be found in the HSE guidance document HSG47 Avoiding Danger from Underground Services.

Risk assessments shall be developed and consider how the works are to be carried out ensuring local conditions are taken into consideration, these could include the presence of privately owned cables or pipelines, where this is the case owners or occupiers shall be consulted. Site visits may be required to verify locations.

Use the hierarchy of control measures outlined in the Management of Health and Safety at Work Regulations ERIC PD. Where possible eliminate the risks by design e.g. move the location of the excavation away from known underground services, divert the services prior to work or consider if the service supply can be disconnected temporarily.

## PLACE HEALTH AND SAFETY MANUAL

Always be aware when areas containing services may be affected by excavation works, see Place directorate [Code of Practice G11](#) – Excavation Works. Liaise with the service providers and ensure full consultation as required at the earliest practical dates. Advance notification to the relevant service provider is required for work within the vicinity of the following services:

THE FOLLOWING ARRANGEMENTS ARE REQUIRED BY THE SERVICE PROVIDER FOR WORKS IN THE VICINITY OF UNDERGROUND CABLES AND PIPELINES IN THE HIGHWAY. THESE REQUIREMENTS SHALL BE ADDRESSED AT DESIGN STAGE	
<b>UNDERGROUND GAS &amp; ELECTRIC LINES</b>	
UNDERGROUND HIGH PRESSURE GAS  (ABOVE 7 BAR GAUGE)	CONTACT THE SERVICE PROVIDER AT DESIGN STAGE WHERE WORK IS PROPOSED IN THE VICINITY OF HIGH PRESSURE GAS LINES.  REMOVAL OF THE CONSTRUCTION LAYERS ON A HIGHWAY TO A DEPTH OF 0.3m IS PERMITTED BUT MAY REQUIRE SUPERVISION FROM THE SERVICE PROVIDER.
UNDERGROUND INTERMEDIATE PRESSURE GAS  (2 – 7 BAR GAUGE)	CONTACT THE SERVICE PROVIDER AT DESIGN STAGE FOR WORKS PROPOSED WITHIN 3.0m OF INTERMEDIATE PRESSURE GAS LINES.
UNDERGROUND 66 & 132 kV ELECTRIC CABLES	CONTACT THE SERVICE PROVIDER AT DESIGN STAGE WHERE WORK IS PROPOSED WITHIN 10m OF A 66 OR 132 kV ELECTRIC CABLE.
<b>ALL OTHER UNDERGROUND SERVICES</b>	
ALL UNDERGROUND CABLES AND PIPELINES	MECHANICAL EXCAVATORS SHALL NOT BE USED WITHIN 0.5m OF UNDERGROUND CABLES OR PIPELINES, HAND DIG ONLY.
<b>IF IN DOUBT CONTACT THE SERVICE PROVIDER.</b>	

## PLACE HEALTH AND SAFETY MANUAL

### **Guidance for dealing with Services where prior notification of works is not required by the Service Provider.**

For small works – AMT small civil works gangs – Designers produce NRSWA drawings and check for all underground services. Where the Service Provider is not contacted at this stage the following shall apply. If the main/cable is directly under the works area being repaired then part of the works instruction shall include for safe digging practices to complete a slip trench/trial hole across the specific area of the highway to the depth of the designed construction, to establish that the pipe/cable is not within the existing/proposed layers. If the pipe/cable is not present then the works can continue but by employing safe digging practices only.

For larger sites that require mechanical excavation - Designers produce NRSWA drawings and check for all underground services as normal. Where the service Provider is not contacted at this stage the following shall apply. If the main/cable is directly under the works then prior to works being issued, a slip trench/trial hole shall be dug by using safe digging practice across the specific area of the highway to locate the main/cable and to prove the depth. Designers should then contact the service provider for approval for mechanical excavation giving the depth of the main/cable found. Once approved, the works can go ahead with care being taken at all times. If approval is not given, a reasonable and acceptable method of working must be agreed with the service provider and the Contractors before starting works.

Having reduced the risks to a level as low as reasonably practicable by design, information of any control measures for the remaining risks along with current service plans shall be provided to the personnel who are to undertake the works on site.

## 5 Orders

Under NRSWA, up to date information from the Service Operator / Service Provider shall be obtained before works which could affect underground services are carried out however there are exceptions to this requirement – see below. Details of services shall be supplied to contractors as part of the contract documentation or accompanying the order in the case of term contracts.

There are certain tasks where it has been agreed that NRSWA drawings are not necessary. These are agreed by the LCC alliance Health and Safety Group. Safe digging practices must still always be followed. See – '[Are NRSWA Drawings Required](#)' within the Alliance / Health and Safety Section of the QMS.

## PLACE HEALTH AND SAFETY MANUAL

NRSWA drawings expire after 3 months.

For alliance schemes only. If the works are due to start on site between 3 and 6 months following issue of the drawings then Street Works notices may be checked to see if any utility has sent in a notice. If nothing has been entered, you should inform the Contractors, in writing, that no notices have been received by utility companies. If a notice has been received, new NRSWA plans must be provided and also following 6 months new NRSWA plans must be issued. NRSWA drawings should be produced to a suitable scale (preferably 1:500) to allow all Utility Company information to be read clearly. If Contractors find they cannot identify apparatus from the drawings and they cannot read the drawings properly then they must request a new set from the Designer.

Certain tasks, e.g. resurfacing a long rural carriageway may mean that a smaller scale is suitable. However, these plans should be reviewed by the Designer prior to issue with the order to ensure that they clearly identify services. If it is deemed that certain locations within the project require the larger scale of 1:500, for example at investigative coring locations, then these additional drawings should be provided.

It is the Contractors responsibility to inform the Designer, in writing, if NRSWA drawings are out of date – 2 weeks notice is required to allow us to check the Street Works system or provide a new set of plans.

For non alliance schemes, NRSWA drawings expiring after three months shall be replaced with new drawings issued at this time.

The Contractor should be asked for a method statement at the commencement of the works detailing his method of service location, excavation and ground penetration techniques that he will use. It should also confirm the method of backfilling around services where applicable, since any damage could present a danger both in the short term and long term.

### 6 Construction Phase

Ensure that all information regarding underground services are current and control measures are communicated to all relevant site staff. Safe systems of work (RAMPS/GSOPS/Hazard Awareness Forms and any documentation from Utility Companies) shall be adhered to and will include the following :

Whenever undertaking excavation works a set of current service plans shall be available on site. Service plans can give a good indication of where underground services exist however they are rarely completely accurate and should not be relied upon on their own.

A competent person shall undertake a visual assessment of the area for obvious signs of electrical equipment, phone boxes, street lighting, marker posts etc. These areas shall be avoided where possible.

## PLACE HEALTH AND SAFETY MANUAL

A competent person shall use cable avoidance tools (CAT) and Genny to confirm the location of services.

The service line can be marked out using a waterproof crayon / spray paint or a small wooden peg on grass / earth sites, this shall be completed under the guidance of the competent person, the remarking of these locations shall be maintained as required.

When using detection equipment the absence of a positive reading shall not be taken as proof that a service is not present or that a cable is not live.

Any services found shall be presumed to be live and dangerous until otherwise confirmed.

Safe digging practices shall be used to hand dig trial holes to confirm the exact location and depth of the service. Keep using the CAT even whilst hand digging as other services may be present.

When hand digging, never use picks, forks or other pointed implements.

As a minimum do not use hand held power tools or mechanical excavation within 500mm of a known service, however advice from the service provider shall be sought as this distance may be increased depending on the nature of the service. .

Make sure that exposed services are suitably supported and that they are not handled or used to climb in or out of a trench. Where services have to be supported the method shall be agreed with the appropriate service provider. Take particular care when working near thrust blocks for pressurised services, advice from the service provider may be required.

Using concrete to encase buried cables and pipelines is bad practice however, it is not uncommon to find cables and pipelines encased within concrete. If concrete is encountered in the vicinity of services within an excavation careful consideration shall be given regarding how to progress. The service owner shall be contacted and may wish to attend the site. A safe system of work will need to be agreed and communicated. Further guidance is available within HSG47.

Services should not be left exposed for longer than necessary. Where services are left exposed for longer periods suitable fencing shall be used to protect the services from potential damage by site machinery & vehicles.

When excavations are to be reinstated around exposed services whether temporary or permanent, a suitable safe system of work shall be used to restore the ground as far as is reasonably practicable to its former state. Further guidance is available within HSG47.

Always report any near misses to your Line Manager / Supervisor.

## PLACE HEALTH AND SAFETY MANUAL

It must be recognised that undertakers' drawings do not assure accuracy and that the position and depth of equipment is not guaranteed. The presence of markers, protection or warning tape cannot be relied on. Consequently, all excavations must proceed with caution.

### 7. Emergency Action

If there is a serious accident, seek medical help urgently for anyone who has been harmed, do not approach an injured person unless they are well clear of any immediate danger, do not move an injured person unless they are in further immediate danger.

In the event of an accident the contact telephone numbers of the service providers should be in a prominent position near a telephone to enable immediate contact to be made. Emergency numbers are also included within the service plans.

Do not go near damaged equipment until told by the service operator's authorised person that it is safe to do so.

If a gas pipe is broken or if a smell of gas is detected, all personnel shall be removed from the vicinity. All sources of heat and naked flames shall be extinguished. Enforce no smoking, Turn off engines. Ensure that occupiers of nearby buildings are warned as the pipe may have been damaged inside the building as well.