

## **Unit 1 Location and avoidance of underground apparatus**

This unit covers the requirements that you must meet when locating and avoiding underground utilities' apparatus. **You must ensure that you act in accordance with all current specifications and procedures and that you follow safe working practices at all times when carrying out the activities covered in this unit. The Code of Practice specified in this unit is *Specification for the Reinstatement of Openings in Highways*.**

The unit contains the following four elements, which you must cover:

- 1.1 Interpret plans showing location of underground apparatus
- 1.2 Identify types of underground apparatus encountered during excavation
- 1.3 Identify risks of, and implications of, damage to underground apparatus
- 1.4 Use pipe and cable location equipment

In element 1.1, you will need to carry out a survey of the work site to establish that the plans correspond with the site details. You will need to check that the symbols on the plans have been interpreted accurately, and that the information recorded on plans can be identified easily. You will need to ensure that the site has been marked clearly to avoid possible misinterpretation of the plans, and that the information provided on the plans is applied correctly to the current site.

In element 1.2, you will need to ensure that the possible types of underground apparatus are identified and that the appropriate safety procedures are observed at all times during their identification.

In element 1.3, you will need to carry out a risk assessment exercise to identify the risks and implications of damage to the different types of underground apparatus.

In element 1.4, you will need to select appropriate pipe and cable location equipment. You must check the equipment selected and prepare it correctly for use. You will need to complete the necessary search procedures, following the safety standards stated in the current specifications, and you must review and interpret the results of your search correctly.

**Please note:** *Where the term **utilities' apparatus** is used within these qualifications, this includes the following:*

- *gas mains (plastic and metallic)*
- *water mains (plastic and metallic)*
- *sewers and drains*
- *electricity cables (low- and high-voltage)*
- *telecommunications and television cables*

# Unit 1 Location and avoidance of underground apparatus

## Element 1.1 Interpret plans showing location of underground apparatus

Performance criteria			
<p>You must show that:</p> <ol style="list-style-type: none"> <li>you survey the work site to establish that the plans correspond with the site details</li> <li>you review the <b>symbols on plans</b> and interpret them accurately</li> <li>you check that the information recorded on the plans is easy to identify</li> <li>you ensure that the information on the plans is applied correctly to the current site</li> <li>you mark the site clearly to avoid ambiguity and misinterpretation of the plans</li> <li>you identify <b>safe working practices</b> for locating and avoiding underground apparatus, that are in accordance with current relevant <b>specifications and procedures</b></li> </ol>			
Knowledge requirements	Related performance criteria		
<p>You need to know:</p> <ol style="list-style-type: none"> <li>how to check that the plans correspond to the site details</li> <li>how to interpret symbols on plans accurately</li> <li>the types of services that you might encounter and how to identify them on the plans</li> <li>how to apply information on the plans to the site</li> <li>why the site must be clearly marked and how to mark the site clearly</li> <li>safe working practices to consider when locating and avoiding underground apparatus</li> </ol>	<p>a</p> <p>b</p> <p>b, c</p> <p>d</p> <p>e</p> <p>all</p>		
Range to be covered			
<ol style="list-style-type: none"> <li>You must show that you review <b>symbols on plans</b> that cover the following services:               <ol style="list-style-type: none"> <li>water</li> <li>gas</li> <li>sewers</li> <li>telecommunications</li> <li>electricity</li> </ol> </li> <li>You must show that you identify <b>safe working practices</b> including the following:               <ol style="list-style-type: none"> <li>safe use of tools and equipment</li> <li>use of appropriate personal protective equipment for locating and avoiding underground apparatus, including as necessary:                   <table border="0"> <tr> <td> <ul style="list-style-type: none"> <li>• high visibility jacket or waistcoat</li> <li>• hard hat</li> <li>• ear defenders</li> </ul> </td> <td> <ul style="list-style-type: none"> <li>• gloves</li> <li>• protective footwear</li> <li>• waterproof clothing</li> </ul> </td> </tr> </table> </li> <li>precautions to minimise danger or inconvenience to road users</li> <li>precautions to minimise danger or inconvenience to road users</li> <li>precautions to minimise damage to equipment or apparatus</li> </ol> </li> <li>You must show that <b>specifications and procedures</b> are:               <ol style="list-style-type: none"> <li>Health and Safety Executive Guidelines (<i>HSG 185: Health and Safety in Excavations</i>)</li> <li>Specification for the Reinstatement of Openings in Highways (guidance for those carrying out excavations)</li> </ol> </li> </ol>		<ul style="list-style-type: none"> <li>• high visibility jacket or waistcoat</li> <li>• hard hat</li> <li>• ear defenders</li> </ul>	<ul style="list-style-type: none"> <li>• gloves</li> <li>• protective footwear</li> <li>• waterproof clothing</li> </ul>
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# **Unit 1 Location and avoidance of underground apparatus**

## **Element 1.1 Interpret plans showing location of underground apparatus**

### **Evidence requirements**

- Your evidence must cover all the performance criteria, all the knowledge requirements and all the range items listed in this element.
- You must complete the following tasks, using the plans provided, for an actual or simulated excavation in a footway or carriageway, containing the apparatus listed below:
  - A. Locate the site.
  - B. Interpret the symbols on the plans.
  - C. Mark the type and position of the apparatus on the site surface. The apparatus will include water and gas mains, sewers, and electricity and telecommunication cables.

### **Specification of works**

- The site located and marked must contain all types of common underground apparatus including metallic and plastic water and gas mains, sewers and drains, and electricity, telecommunications and television cables.
- The assessment must take place at a site with physical characteristics that conform to the definition of 'street' at section 48 or 'road' at section 107 of the New Roads and Street Works Act 1991.

### **Assessment conditions**

- The assessment will be undertaken by a qualified assessor, who will observe you interpreting plans showing the location of underground apparatus.
- The site at which you are assessed must conform to the specifications listed above. Real equipment must be used, that complies with the requirements of the Code of Practice.
- You may provide supplementary evidence of competence from your workplace if you wish to do so. Where this includes a documented observation report, a qualified Street Works operative, supervisor or assessor must provide this.

### **Additional information for candidates and assessors**

- The adopted specification for the works should correspond to the *Specification for the Reinstatement of Openings in Highways*. (Further details are provided within S1.8: *Apparatus within Road Structures* and *Notes for Guidance, NG1.8*)

# Unit 1 Location and avoidance of underground apparatus

## Element 1.2 Identify types of underground apparatus encountered during excavation

Performance criteria			
<p>You must show that:</p> <p>a) you identify the different types of underground <b>utilities' apparatus</b> on site</p> <p>b) you follow <b>safe working practices</b> when identifying underground <b>utilities' apparatus</b> that are in accordance with current relevant <b>specifications and procedures</b></p>			
Knowledge requirements	Related performance criteria		
<p>You need to know:</p> <p>1 the different types of underground utilities' apparatus that could be encountered during excavation, and how to distinguish between them</p> <p>2 safe working practices when identifying underground utilities' apparatus on site</p>	<p>a</p> <p>b</p>		
Range to be covered			
<p>I. You must show that <b>utilities' apparatus</b> includes:</p> <ol style="list-style-type: none"> <li>i. gas mains (plastic and metallic)</li> <li>ii. water mains (plastic and metallic)</li> <li>iii. sewers and drains</li> <li>iv. electricity cables (low- and high-voltage)</li> <li>v. telecommunications and television cables</li> </ol> <p>II. You must show that <b>safe working practices</b> are:</p> <ol style="list-style-type: none"> <li>i. safe use of tools and equipment</li> <li>ii. use of appropriate personal protective equipment when identifying underground apparatus, including as necessary:               <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <ul style="list-style-type: none"> <li>• high visibility jacket or waistcoat</li> <li>• hard hat</li> <li>• ear defenders</li> <li>• eye protection visor/goggles</li> </ul> </td> <td style="width: 50%; vertical-align: top;"> <ul style="list-style-type: none"> <li>• dust mask</li> <li>• gloves</li> <li>• protective footwear</li> <li>• waterproof clothing</li> </ul> </td> </tr> </table> </li> <li>iii. use of risk assessment methods to identify and control hazards on site</li> <li>iv. precautions to minimise danger or inconvenience to road users</li> <li>v. precautions to minimise danger or inconvenience to site personnel</li> <li>vi. precautions to minimise damage to equipment or apparatus</li> </ol> <p>III. You must show that <b>specifications and procedures</b> are:</p> <ol style="list-style-type: none"> <li>i. Health and Safety Executive Guidelines (HSG 185: Health and Safety in Excavations)</li> <li>ii. Specification for the Reinstatement of Openings in Highways</li> </ol>		<ul style="list-style-type: none"> <li>• high visibility jacket or waistcoat</li> <li>• hard hat</li> <li>• ear defenders</li> <li>• eye protection visor/goggles</li> </ul>	<ul style="list-style-type: none"> <li>• dust mask</li> <li>• gloves</li> <li>• protective footwear</li> <li>• waterproof clothing</li> </ul>
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# **Unit 1 Location and avoidance of underground apparatus**

## **Element 1.2 Identify types of underground apparatus encountered during excavation**

### **Evidence requirements**

- Your evidence must cover all the performance criteria, all the knowledge requirements and all the range items listed in this element.
- You must complete the following tasks, using the plans provided, for an actual or simulated excavation in a footway or carriageway, containing the apparatus listed below:
  - A. Identify all underground apparatus on site.

### **Specification of works**

- The types of apparatus identified must cover all types of common underground apparatus including metallic and plastic water and gas mains, sewers and drains, and electricity, telecommunications and television cables.
- The assessment must take place at a site with physical characteristics that conform to the definition of 'street' at section 48 or 'road' at section 107 of the New Roads and Street Works Act 1991.

### **Assessment conditions**

- The assessment will be undertaken by a qualified assessor, who will observe you identifying types of underground apparatus encountered during excavation activities.
- The site at which you are assessed must conform to the specifications listed above. Real equipment must be used, that complies with the requirements of the Code of Practice.
- You may provide supplementary evidence of competence from your workplace if you wish to do so. Where this includes a documented observation report, a qualified Street Works operative, supervisor or assessor must provide this.

### **Additional information for candidates and assessors**

- The adopted specification for the works should correspond to the *Specification for the Reinstatement of Openings in Highways*. (Further details are provided within S1.8: *Apparatus within Road Structures* and *Notes for Guidance, NG1.8*)

# Unit 1 Location and avoidance of underground apparatus

## Element 1.3 Identify risks of, and implications of, damage to underground apparatus

Performance criteria							
<p>You must show that:</p> <p>a) you assess the risk of damage to <b>utilities' apparatus</b> on site and identify potential <b>situations of risk</b> to <b>utilities' apparatus</b></p> <p>b) you identify the potential <b>implications of damage</b> to <b>utilities' apparatus</b> and ensure that you have contingency plans in place in case they should arise</p> <p>c) you follow <b>safe working practices</b> for locating and avoiding underground utilities' apparatus, that are in accordance with current relevant <b>specifications and procedures</b></p>							
Knowledge requirements	Related performance criteria						
<p>You need to know:</p>							
1 the factors to consider when assessing the risk of damage to underground utilities' apparatus	a						
2 what constitutes a potential situation of risk of damage to underground utilities' apparatus	a						
3 the potential implications of damage to underground utilities' apparatus	b						
4 how to plan to limit the effects of damage to underground utilities' apparatus	b						
5 safe working practices for locating and avoiding underground utilities' apparatus	c						
Range to be covered							
<p>I. You must show that <b>utilities' apparatus</b> includes:</p> <ol style="list-style-type: none"> <li>i. gas mains (plastic and metallic)</li> <li>ii. water mains (plastic and metallic)</li> <li>iii. sewers and drains</li> <li>iv. electricity cables (low-and high-voltage)</li> <li>v. telecommunications and television cables</li> </ol> <p>II. You must show that you consider potential <b>situations of risk</b> to underground utilities' apparatus, including:</p> <ol style="list-style-type: none"> <li>i. insufficient care taken during excavation</li> <li>ii. inadequate protection or support for exposed apparatus</li> <li>iii. inadequate warnings and safeguards on site</li> </ol> <p>III. You must show that you consider potential <b>implications of damage</b> to underground utilities' apparatus, including:</p> <ol style="list-style-type: none"> <li>i. disruption of service</li> <li>ii. disruption of traffic</li> <li>iii. health hazards</li> <li>iv. safety hazards</li> </ol> <p>IV. You must show that <b>safe working practices</b> include the following:</p> <ol style="list-style-type: none"> <li>i. safe use of tools and equipment</li> <li>ii. use of appropriate personal protective equipment, including as necessary:               <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">• high visibility jacket or waistcoat</td> <td style="width: 50%;">• gloves</td> </tr> <tr> <td>• hard hat</td> <td>• protective footwear</td> </tr> <tr> <td>• ear defenders</td> <td>• waterproof clothing</td> </tr> </table> </li> <li>iii. use of risk assessment methods to identify and control hazards on site</li> <li>iv. precautions to minimise danger or inconvenience to road users</li> <li>v. precautions to minimise danger or inconvenience to site personnel</li> <li>vi. precautions to minimise damage to equipment or apparatus</li> </ol>		• high visibility jacket or waistcoat	• gloves	• hard hat	• protective footwear	• ear defenders	• waterproof clothing
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# Unit 1 Location and avoidance of underground apparatus

## Element 1.3 Identify risks of, and implications of, damage to underground apparatus

### Range to be covered (contd.)

- V. You must show that **specifications and procedures** are:
- i. Health and Safety Executive Guidelines (HSG 185: Health and Safety in Excavations)
  - ii. Specification for the Reinstatement of Openings in Highways (guidance for those carrying out excavations)

### Evidence requirements

- Your evidence must cover all the performance criteria, all the knowledge requirements and all the range items listed in this element.
- You must complete the following tasks, using the plans provided, for an actual or simulated excavation in a footway or carriageway:
  - A. Identify the common risks of damage to underground apparatus during excavation.
  - B. Identify the potential implications of damage caused to underground apparatus during excavation.
  - C. Ensure that contingency plans are in place to limit the effects of damage caused to underground apparatus during excavation.

#### **Specification of works**

- The assessment must cover all types of common underground apparatus including metallic and plastic water and gas mains, sewers and drains, and electricity, telecommunications and television cables.
- The assessment must take place at a site with physical characteristics that conform to the definition of 'street' at section 48 or 'road' at section 107 of the New Roads and Street Works Act 1991.

#### **Assessment conditions**

- The assessment will be undertaken by a qualified assessor, who will observe you identifying the risks and implications of damage to underground apparatus.
- The site at which you are assessed must conform to the specifications listed above. Real equipment must be used, that complies with the requirements of the Code of Practice.
- You may provide supplementary evidence of competence from your workplace if you wish to do so. Where this includes a documented observation report, a qualified Street Works operative, supervisor or assessor must provide this.

#### **Additional information for candidates and assessors**

- The adopted specification for the works should correspond to the *Specification for the Reinstatement of Openings in Highways*. (Further details are provided within S1.8: *Apparatus within Road Structures and Notes for Guidance, NG1.8*)

# Unit 1 Location and avoidance of underground apparatus

## Element 1.4 Use pipe and cable location equipment

Performance criteria	
<p>You must show that:</p> <ol style="list-style-type: none"> <li>you select appropriate <b>equipment</b> for the pipe and cable location activity</li> <li>you check that the <b>equipment</b> to be used is fit for purpose and prepare it for use</li> <li>you complete the necessary search procedures for underground <b>utilities' apparatus</b></li> <li>you interpret the results of the search procedures accurately</li> <li>you compare the results you have obtained from your search with the information on the site plans</li> <li>you follow <b>safe working practices</b> for the use of pipe and cable location equipment, that are in accordance with the current relevant <b>specifications and procedures</b></li> </ol>	
Knowledge requirements	Related performance criteria
<p>You need to know:</p>	
1 the capabilities and limitations of different equipment in locating different types of underground utilities' apparatus	a
2 how to ensure that the selected equipment is fit for purpose and how to prepare it for use	b
3 how to use the selected pipe and cable location equipment	b, c
4 the risks associated with operating pipe and cable location equipment	b, c, f
5 how to interpret the results of search procedures accurately	d, e
6 how to compare the results of your search with the information on site plans	e
7 safe working practices for using pipe and cable location equipment	all
Range to be covered	
<p>I. You must show that the <b>equipment</b> includes:</p> <ol style="list-style-type: none"> <li>appropriate hand tools</li> <li>proprietary pipe and cable location equipment</li> <li>markers</li> </ol> <p>II. You must show that you search for <b>utilities' apparatus</b> including:</p> <ol style="list-style-type: none"> <li>water mains (metallic and plastic)</li> <li>gas mains (metallic and plastic)</li> <li>sewers and drains</li> <li>electricity cables (low- and high-voltage)</li> <li>telecommunications and television cables</li> </ol> <p>III. You must show that <b>safe working practices</b> include:</p> <ol style="list-style-type: none"> <li>safe use of tools and equipment</li> <li>use of appropriate personal protective equipment, including as necessary: <ol style="list-style-type: none"> <li>high visibility jacket or waistcoat</li> <li>hard hat</li> <li>ear defenders</li> <li>eye protection visor/goggles</li> <li>dust mask</li> <li>gloves</li> <li>protective footwear</li> <li>waterproof clothing</li> </ol> </li> <li>use of risk assessment methods to identify and control hazards on site</li> <li>precautions to minimise danger or inconvenience to road users</li> <li>precautions to minimise danger or inconvenience to site personnel</li> <li>precautions to minimise damage to equipment or apparatus</li> </ol>	

# Unit 1 Location and avoidance of underground apparatus

## Element 1.4 Use pipe and cable location equipment

### Range to be covered (contd.)

- IV. You must show that **specifications and procedures** are:
- i. Health and Safety Executive Guidelines (*HSG 185: Health and Safety in Excavations*)
  - ii. Specification for the Reinstatement of Openings in Highways
  - iii. Equipment manufacturer's instructions and search procedures

### Evidence requirements

- Your evidence must cover all the performance criteria, all the knowledge requirements and all the range items listed in this element.
- You must complete the following tasks, using the plans provided, for an actual or simulated excavation in a footway or carriageway, and all common types of underground apparatus as listed in the range to be covered:
  - A. Select appropriate location equipment, check it and prepare it for use.
  - B. Carry out search procedures for underground apparatus on the site.
  - C. Mark the position of underground apparatus on the surface.
  - D. Interpret the information obtained from the search procedures.
  - E. Compare the information obtained from the search procedures with the information obtained from plans.

#### Specification of works

- The searches carried out must cover all types of common underground apparatus including metallic and plastic water and gas mains, sewers and drains, and electricity, telecommunications and television cables.
- The assessment must take place at a site with physical characteristics that conform to the definition of 'street' at section 48 or 'road' at section 107 of the New Roads and Street Works Act 1991.

#### Assessment conditions

- The assessment will be undertaken by a qualified assessor, who will observe you using pipe and cable location equipment.
- The site at which you are assessed must conform to the specifications listed above. Real equipment must be used, that complies with the requirements of the Code of Practice.
- You may provide supplementary evidence of competence from your workplace if you wish to do so. Where this includes a documented observation report, a qualified Street Works operative, supervisor or assessor must provide this.

#### Additional information for candidates and assessors

- The adopted specification for the works should correspond to the *Specification for the Reinstatement of Openings in Highways*. (Further details are provided within S1.8: *Apparatus within Road Structures* and *Notes for Guidance, NG1.8*)