ROADS AUTHORITIES & UTILITIES COMMITTEE (SCOTLAND)

CODE OF PRACTICE ON RECORDING OF UNDERGROUND APPARATUS IN ROADS

Version 1.0

CODE OF PRACTICE ON RECORDING OF UNDERGROUND APPARATUS IN ROADS

Foreword

As the Scottish Road Works Commissioner, two of my main statutory functions are to promote compliance with the New Roads and Street Works Act 1991 (the Act) and to promote good practice. I am therefore pleased to promote and endorse this Code of Practice on the Recording of Underground Apparatus in Roads.

Under section 138 of the Act, undertakers are required to record every item of apparatus belonging to them that is situated in the road. This is to be achieved as soon as is reasonably practicable after its placement, alteration of position or in locating it when executing any other road works. These records require to be kept up to date and to be made available for inspection.

It is recommended that this Code of Practice shall apply equally to roads authorities.

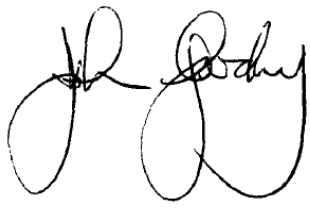
While the Act does not make any provision for Scottish Ministers to issue or approve a Code of Practice on the keeping of records, the Roads Authorities and Utilities Committee of Scotland (RAUC(S)) has agreed that it would be prudent to have a non-statutory code covering such matters.

This is the first edition of the Code of Practice on Recording of Underground Apparatus in Roads and applies in Scotland only.

This Code of Practice was prepared by a working party of RAUC(S). The members of the working party have put in a considerable effort to produce this code and I wish to state my appreciation for their work.

This Code of Practice exists to serve the needs of the Scottish road works community as it strives to improve its performance in the management of works in roads. If you have any comments on this Code of Practice, they can be fed back through my office at enquiries@roadworksscotland.gov.uk and we will ensure that they are considered by RAUC(S) for future revisions.

This Code of Practice will come into force on 1 April 2011.



John Gooday
Scottish Road Works Commissioner
November 2010

1 INTRODUCTION

1.1 Section 138 of the New Roads and Street Works Act 1991, hereinafter referred to as "the Act", requires undertakers to provide (subject to such exemptions as may be prescribed), keep up to date and make available for inspection, records of every item of apparatus belonging to them in the road as soon as reasonably practicable after:

a. placing it in the road or altering its position, or

b. locating it in the course of executing any other works.

1.2 Failure to comply is an offence and may give rise to a liability to compensate persons suffering loss or damage as a consequence of the failure.

1.3 There are no current proposals to implement sections 138(1)(c) and 139 of the Act, which cover the recording of apparatus found by any person executing works of any description in the road where it is not clear who is the owner of that apparatus. However, best endeavors to record apparatus as it is discovered during unrelated works should be made so this information is captured for the benefit of all. Where the ownership or responsibility of the apparatus is unknown, the relevant details should be recorded as an Unidentified Buried Object (UBO) within the SRWR system, refer to 4.6.

1.4 The following are exempt from the obligation to disclose records:

a. instances where compliance with it would be in breach of a requirement of national security;

b. any apparatus placed by an undertaker within its existing apparatus, whose position has already been recorded;

c. any apparatus previously not recorded and placed in the road prior to the implementation date of this Code of Practice. However, this exemption does not apply where the undertaker has altered the position of such apparatus, or located apparatus belonging to them in the course of executing other works, after the implementation date;

1.5 Apparatus placed under the New Roads & Street Works Act 1991, Section 109

1.5.1 Under Section 109 of the Act, persons or bodies placing apparatus in the road having been given permission by the Roads Authority (RA) become 'undertakers' and subject to the full requirements of the Act, including Section 138. Currently, there are two categories of 'undertaker' as temporarily 'created' under Section 109 of the Act.

1.5.2 The first of these are Utility Connections Providers (UCPs), formerly known as Utility Infrastructure Providers (UIPs). These are bodies which have a licence from the appropriate Regulator to provide such apparatus but which do not hold a licence to open the public road to do so.

Under the special arrangements pertaining to UCPs in Scotland as provided for in an agreement supplementary to the 'Co-ordination Code of Practice' as provided for in RAUCs Advice Note 19, Third Parties and Special Cases.

UCPs are required to provide as-laid records of the apparatus they install. These records will be placed directly into the Scottish Road Works Register (SRWR) by the UCP who will be responsible for achieving the relevant accuracy as outlined by this Code of Practice. The responsibility for the maintenance of the records in question will remain in all respects with the UCP until an adoption process removes that record. The latter bodies should refer to this guidance in respect of this duty.

1.5.3 The second category of 'undertaker' includes all other persons or bodies, corporate or non-corporate, who wish to place apparatus in the road. This category also includes UCPs wishing to place apparatus within the territory of an RA which does not wish to enter into the formal agreement referred to in the preceding paragraph. All such persons or bodies should be required to provide to the RA as-laid records of the apparatus to the relevant accuracy as a legitimate condition of granting permission under the Section 109.

1.5.4 The RA has a duty under the 'Co-ordination Code of Practice' (Paragraph 6.4.8) to hold such records and/or transcribe them onto their individual internal records of such apparatus. Thereafter, in respect of Plant Information Requests (PIRs) or other Notices posted on the SRWR, the RA is responsible for considering these items of apparatus and for responding and providing plans as necessary. However, this duty may be met by accurately recording such apparatus on the SRWR together with the details of the person or body responsible for the apparatus Paragraph 6.4.8 of the Co-ordination Code of Practice strongly recommends the recording of information in the SRWR in any case.

A caveat in respect of the second category of undertaker (UCPs usually excepted) relates to the somewhat unusual case where any part of the apparatus in question is subsequently adopted. In this case, the rules of Paragraph 1.5.2 apply as to the role of the adopting utility in respect of the record of the apparatus on the SRWR.

1.6 Apparatus placed under the Roads (Scotland) Act 1984, Section 61

1.6.1 There is no statutory requirement for the RA to record the location of apparatus placed under Section 61 of the Roads (Scotland) Act 1984. However, it is in the long term interests of RAs themselves as well as undertakers that the location of such apparatus is recorded in a mutually accessible location. Accordingly **it is strongly recommended** that as-laid records of such apparatus to the required accuracy are obtained from permission holders as a legitimate condition of granting that permission.

The RA should then record the information in the SRWR together with the details of the person or body responsible for the apparatus as if it were apparatus provided under S109. This being the case, it is also recommended that S109 is used to give relevant permissions rather than S61. See RAUC(S) Advice Note 19 Third Parties and Special Cases for further guidance on this latter element. Apparatus placed under S61 should be

recorded in the SRWR in the Works under Licence Layer, this being the only location where direct graphical information may be added.

1.6.2 A special case in relation to Section 61 relates to permission granted to install apparatus in a proposed public road. As an adjunct to granting a Road Construction Consent (RCC) under Section 21 of the Roads (Scotland) Act, RAs should simultaneously grant permission under S61 (to a separate body or bodies if necessary) and, as a requirement of the latter, be provided with as-laid drawings of the installed apparatus all as required in the preceding paragraph. The RA's action would then be to record such apparatus in the SRWR unless confirmation was received in writing from the holder of the permission under S61 that the apparatus or any item of such had already been adopted. As in Paragraph 1.5.2, if apparatus were adopted subsequent on recording by the RA, the adopting undertaker would remove that record from the SRWR

1.6.3 In any case where the granting of an RCC does not apply, granting permission under S61 to the relevant body or bodies would be a stand-alone requirement.

1.6.4 Whether roads are to be constructed under an RCC or otherwise, an alternative to the use of S61 is to enter into the RCC or adoption agreement if no RCC is appropriate, the condition that adoption will be *inter alia* on the receipt of appropriate as-laid apparatus drawings.

1.6.5 A corollary of the foregoing paragraphs is that the location of apparatus in roads built from the outset as private roads will not be known and recorded except by voluntary agreement with the developer. Even if such information were provided, the RAs may not wish to handle that information as being of no interest or benefit to them. In this respect, it should be remembered that Street Lighting may have such an interest as private roads often have public lighting. In these circumstances, those installing or adopting apparatus are required to record this information as part of their records

1.7 Notes in Respect of Paragraphs 1.5 and 1.6

1.7.1 The onus of ensuring that the records of as-laid apparatus meets the standards set out in this Code of Practice rests with the persons or bodies given permission under any of the arrangements outlined in Paragraphs 1.5 and 1.6. However, except in the case of UCPs under Paragraph 1.5, it is strongly recommended that all records will be received and input into the SRWR by the RA.

It would be inappropriate for the RA to simply lodge the information on the SRWR without carrying out a reasonable degree of checking of these records and such checking is strongly recommended

1.7.2 Examples of such checking could include the following:

- Checking the as-laid records against notes as to the rough locations of apparatus taken while attending development sites in respect of RCC or other duties;
- Comparison with road drainage and street lighting drawings submitted as part of the RCC or other permission application and approval procedure;
- Random checking of the location of surface boxes and other visible street furniture; and
- Simple checks as to orientation of drawings presented especially in relation to foregoing checks.

1.7.3 In the case of development or similar roads, if apparatus is to be placed by the adopting licensed or statutory undertaker who will be adopting the apparatus, sections 1.5 and 1.6 do not apply. The undertaker will place and record the apparatus within its records as if the road were public irrespective of what permissions are required and issued by the RA.

1.7.4 It is recognised that on very limited occasions apparatus may be placed which is either or both not adopted or of which the RA is not aware. Such circumstances cannot be legislated for.

1.8 Apparatus Placed for Road Purposes

1.8.1 In respect of apparatus for roads purposes (see Appendix C), RAs will regularly place (whether directly or through consultants and/or contractors) new apparatus in new built roads or during maintenance works or will alter the position of existing apparatus during the course of such work types. It is strongly recommended that in conjunction with the Asset Management regime, a formal procedure for recording such apparatus in accordance with this Code of Practice is put in place.

1.8.2 In light of the foregoing it is strongly recommended that RAs' maintenance and design sections to keep accurate records of the as-laid position of apparatus (and of the position of 'roads' apparatus discovered during such works) and to have fail-safe procedures for these records to be placed on the SRWR or transferred to the section which has the responsibility of placing the records on the SRWR.

1.9 Reasonable Care

1.9.1 This Code of Practice does not alter the common law responsibility of persons proposing to excavate in the road to take reasonable care before commencing excavation by using their best endeavours to obtain the records of all apparatus installed in a road, and thereafter in locating and avoiding damage to the apparatus.

2 SCOPE

2.1 Whilst the Act does not require a statutory Code of Practice, the Roads Authorities and Utilities Committee of Scotland (RAUC(S)) has agreed that the principles set out in this Code of Practice should be adopted not only by all undertakers carrying out road works under the Act but, also by roads authorities in the recording of their own apparatus. The recommendations in this Code of Practice should be regarded as minimum requirements for all concerned. RAUC(S) therefore strongly recommends that roads authorities adhere to the Code of Practice. A schedule of types of road work authorities owned apparatus is to be found at Appendix C.

2.2 The purpose of this Code of Practice is to enhance the quality of record keeping of underground apparatus installed within the road and to encourage the making available of information relating to such apparatus.

2.3 The specific aims of this Code of Practice are to minimise:

a. injury to operatives and others;

b. disruption to undertakers' customers;

c. inconvenience to road users;

d. damage to apparatus.

2.4 This Code of Practice sets a common standard for the establishment, maintenance and making available of records of underground apparatus. It is in all parties' interests to try to provide as much detail as is reasonably practical.

2.5 This Code of Practice does not cover records of apparatus installed in a road before its implementation date, except where:

a. the position of the apparatus owners own apparatus is altered, or

b. apparatus owners locate their own apparatus in the course of other works.

c. apparatus owners are made aware of their apparatus by others in the execution of their works.

2.6 An apparatus owner must make records available for inspection free of charge at all reasonable hours during the working day, as defined in s157(2) of the Act by any person having authority to execute road works of any description in the road or otherwise appearing to the apparatus owner to have a sufficient interest. It is recommended that records should be made available to authorised users by electronic means (eg through web pages). This would be of particular assistance to enquirers living or working at some distance from the location of the records.

2.7 Any records provided are deemed to be invalid after a period of three months from date of receipt, and new information should be sought if information is required after this period. This does not imply that information provided is held accurately and confirmation of any data being used is essential where excavation works are being proposed.

3 ESTABLISHMENT OF STANDARDS

3.1 GENERAL

3.1.1 The adoption of common recording standards within this Code of Practice is intended to improve the quality and consistency of all records of apparatus.

3.1.2 The standards contained in this chapter are framed in terms of what is both reasonable and achievable using a map base.

3.1.3 Whilst this Code of Practice introduces consistent standards, these cannot provide a precise measure of location and it is important to note that the tolerances in this Code of Practice demand careful onsite plant location and excavation procedures.

3.2 FORM OF THE RECORD

3.2.1 Apparatus owners have a certain amount of discretion as to the form of their statutory records. Whatever the form of record keeping adopted by individual apparatus owners, they should always ensure that persons exercising their right to inspect the record are supplied with appropriate, intelligible information to enable them to identify apparatus.

3.2.2 The record of every item of apparatus belonging to the apparatus owner shall be in one of the following forms, which may be either on paper or in the form of an electronic record, or a combination of both:

3.2.3 a location or route map drawn on mapping which is related to the National Grid and prepared to an accuracy at least equivalent to Ordnance Survey maps of similar scales (although the use of County Series Ordnance Survey maps for the purposes of this Code of Practice is to be phased out.

3.2.4 a statement of co-ordinates derived from a Geographical Information System (GIS) for example, in the National Grid. The co-ordinates can be measured using satellite based surveying techniques (the Global Positioning System – GPS – for example) or more traditional methods of data capture; and

3.2.5 if available, such diagrams, sketch maps or descriptions as may be necessary to identify the item of apparatus and the date that record was created.

3.3 ACCURACY

3.3.1 The location of apparatus should be measured to an accuracy of plus or minus 300 millimetres on the ground and recorded at a minimum accuracy of plus or minus 500 mm of the actual position of the plant.

3.3.2 Accuracy in recording the location of apparatus cannot be guaranteed and, for this reason solely depending on the accuracy stated in the record can be misleading and dangerous. Wherever possible apparatus owners should seek to guarantee the accuracy of the location of their apparatus to the standards set down in paragraph 3.6. However, it should be recognised that the apparatus may have been moved by a third party subsequent to the last time its position was recorded.

3.3.3 The introduction of new technologies may make it possible and cost effective for records to be made and maintained to improved standards of accuracy. Roads authorities and apparatus owners should keep their recording

procedures under continual review so as to take full advantage of such opportunities.

3.3.4 Building lines, kerb lines and geographical features may also be used as reference points, supplementing and linked to dimensions from more permanent features, provided their use is clearly stated in the record. These are all subject to alteration without the knowledge of apparatus owners and consequently, despite their best efforts, positions indicated in records may be inaccurate to some degree.

3.3.5 Where greater accuracy is achieved than stated in 3.6, these should be identified on plans. This is of particular note where GPS recording of new or found apparatus is adopted when such apparatus is exposed.

3.4 Accuracy confidence rating

3.4.1 To minimise data clutter on records the use of accuracy confidence ratings is recommended to assist with recording and locating apparatus.

Accuracy confidence rating table

Confidence rating	Level of accuracy	Comments
A	+/- 100mm in x, y and z dimensions	The use of GPS to obtain absolute actual plant location points as attribute data of the item. If in any doubt about the availability of good GPS signal then reduce confidence level to B
B	+/- 300mm on the ground and +/- 500mm of actual position of plant	Standard accuracy of recording plant locations using traditional measurement techniques on site for recently recorded plant.
C	+/- 1m to center line of plant in x and y dimensions	Records lifted from historical records which has established reasonably accurate location information
D	None given	Records lifted from historical records and indicate the presence of a service within that location (default standard)

3.4.2 By recognising the introduction of new technology developments to enhance accurate positional recording, this Code of Practice encourages the use of Buried Plant Position Indicators (radio tagging) especially for high risk / value assets at node points, junctions etc. where costs permit .

3.5 MAINTENANCE OF RECORDS

3.5.1 Apparatus owners must make or amend records of their apparatus within 3 months or as soon as reasonably practicable after:

3.5.2 completion of the work of placing apparatus in the road, or altering its position; or

3.5.3 locating apparatus belonging to the apparatus owner concerned in the course of other works, except emergency or urgent works, carried out by that apparatus owner.

3.5.4 All apparatus owners are strongly recommended to review those items identified as UBO within the Section 109 layer of the SRWR, on a quarterly basis. Apparatus owners should take positive action to update their records where appropriate and remove any information adopted from the UBO information.

3.6 ISSUING OF RECORDS

3.6.1 Apparatus owners supplying information should ensure they are as accurate as the guidance within this code of Practice, however, they are also recommended to include a statement as to accuracy of records. The following is provided as sample text:

> **'The information supplied is given in good faith as a guide to locating underground apparatus. Its accuracy cannot be guaranteed, nor does it include comprehensive information about the existence or location of service pipes or cables to individual premises. The responsibility for locating and avoiding damage to apparatus on site shall be that of the persons proposing to excavate in the road who shall be liable to the apparatus owner and any third party who may be affected in any way for any loss or damage caused by their failure to do so'.**

3.7 USING THE RECORD TO LOCATE UNDERGROUND APPARATUS

3.7.1 Locations should not be scaled from the location or route maps referred to in paragraph 3.5.a. These should only be used to indicate the general position of underground apparatus, which should be more accurately located with the use of sketches and other information.

3.7.2 Records should be carefully examined to determine whether kerb lines, building lines or other features might have altered since the information was recorded. Apparatus would normally be expected to be found to the accuracy provided for in paragraph 3.6. However, where the record proves to be less reliable than that, the search should be widened until the apparatus is found before the main excavation is progressed. It must always be assumed that recorded apparatus, which does not become exposed, where indicated, is

nevertheless present in the vicinity and its position must be clearly established before proceeding.

3.8 SAFE DIGGING PRACTICES

3.8.1 Valuable guidance is given in HSG 47 "Avoiding Danger from Underground Services"[1] which must be consulted by all persons proposing to excavate in the road.

3.8.2 The adoption of safe systems of work when excavating in any ground is essential.

3.8.3 Not all apparatus is shown on records and requests for information may not reach all apparatus owners and hence care should be taken when excavating.

3.8.4 This requires as a minimum, the presence on site of plant location plans of all affected utility companies, location of cable and pipes using radio detection carried out by competent and specifically trained staff and careful excavation to locate apparatus having regard to the service type, the use of air picks to excavate is recommended.

3.8.5 It should be borne in mind that apparatus, especially cables and small diameter pipes, may have been inserted into existing apparatus e.g. clay or cast iron pipes which convey no sense of what they contain. Even drilling a cast iron pipe may not reveal that it carries a cable or similar.

3.8.6 It should be remembered that several types of underground apparatus have no 'allocated position' in Table 1 of Appendix B and even in the unlikely event of the recommended positioning being followed carefully by all parties, such apparatus could appear anywhere in the cross section. Examples are CCTV cables (although relevant surface boxes may assist), district heating pipes and, to a certain extent, street lighting cables.

3.9 SERVICE RECORDS

3.9.1 Persons proposing to excavate in the roads should assume that all premises are supplied by service pipes and cables when records showing detailed information are not available. Advice given in Appendix B of this Code of Practice should be used to indicate the likely routes of services.

3.10 REDUNDANT APPARATUS

3.10.1 Owners of redundant apparatus remaining in the road are responsible for maintaining relevant, suitably annotated records in accordance with this Code of Practice. Responding to notices is also a responsibility of such owners.

3.10.2 This duty does not expire until the apparatus is completely removed from the road.

[1] "HSG 47 Avoiding danger from underground services" Revised: Health and Safety Executive published by the Stationery Office London 30 December 1999 ISBN 0717617440.

3.10.3 The fact of redundant apparatus being decommissioned, cut-off, in filled or any such does not affect the foregoing duty.

4 PROVISIONS RELATING TO PERSONS PROPOSING TO EXCAVATE IN THE ROAD

4.1 In addition to section 3. 8 (above) those proposing to carry out excavations should obtain relevant information e.g. Road Authorities' conditions of consent to execute works in a road and take all reasonable steps to establish if apparatus will be affected and the location of that apparatus before commencing the works.

4.2 All works undertaken on a public road must have the necessary traffic management arrangements to execute the works. Advanced programming provision must be given to the noticing requirements as set out on the Code of Practice for Coordination and any statutory and legal processes associated with establishing temporary traffic notice/orders.

4.3 The person proposing to excavate in the road should advise the owners of apparatus already in the road via the SRWR of the nature and the extent of the proposed works and provide access to the works site as required.

4.4 Those proposing to carry out works are reminded of the requirements contained in Section 126 of NRSWA regarding qualifications of supervisors and operatives. This requirement is to ensure that supervisors/operatives using specialist plant location equipment and other such technologies carry evidence of being certificated as competent in that equipments use.

4.5 Unrecorded or wrongly located apparatus as indicated on the supplied location plans, discovered during the works, should be brought to the attention of the relevant utility or authority so that their records can be updated.

4.6 If the owner of the apparatus is unknown the object should be recorded as an Unidentified Buried Object (UBO) within the SRWR. It is recommended that the object should be recorded using two photographs, one of the object in relation to nearby apparatus and the second to indicate the specific location enabling the objects location to be referenced to local properties etc. This data should be recorded within the SRWR on the Section Works under License Layer.

4.7 Recording of new or found apparatus along with the objects identity or otherwise should be carried out using GPS and directional indicators where that technology is available. Good practice of recording apparatus using photographic techniques along with directional indicators is encouraged to assist mapping the underground environment.

5. GENERAL GUIDANCE

5.1 The items included in this section should not be taken to form part of the Code of Practice but rather they are matters of general guidance included to assist in understanding and dealing with the real issues of the Code of Practice and with the Community Apparatus Records representation of apparatus.

5.2 Absolute accuracy of locations (especially those historically recorded) are likely to be more or less so depending on the date of the surveys used for the background mapping. Different historical records within the one 'archive' could even have been recorded against maps of differing accuracy at different times. Recent Ordnance Survey Positional Accuracy Improvements (PAI) will also have a bearing on the accuracy of longer term records.

5.3 Notwithstanding what has gone before in this Code of Practice, it is generally considered that, everything else being equal, the inclusion of apparatus information is somewhat more important than the accuracy of the location of that apparatus. When labelling apparatus for accuracy, custodians should err on the conservative side.

5.4 It should also be remembered that a graphical record, whether historic or modern may well be inaccurate when two or more items of apparatus from the same 'owner' lie side by side simply due to the need for these to be visibly separate items. The scale width of a line and/or the distance to a visibly separate one may well distort locational accuracy significantly.

5.5 With regard to graphical records, just as is the case in respect of physical apparatus in the ground, care must be taken not to assume that apparatus runs in a straight line between recorded location points.

5.6 There may be occasions, e.g. adjacent to MoD facilities, where it would be inappropriate to show the location of certain apparatus. In such circumstances a note should always be made visible to the effect that, 'Apparatus exists at this location but, for details, reference should be made to [undertaker name and contact details]'. Instances of such should be kept to an absolute minimum and such a procedure should never be entered into simply for the convenience of the apparatus owner.

5.7 Similarly, there may be occasions when utilities or Roads Authorities are aware that apparatus is present but its whereabouts is unknown pending a future survey. A common example might be (non-combined) road drainage. As above, a note should be made visible with the wording, '[Such & such] apparatus present but no records available'.

5.8 The EU's 'Inspire' Directive should be borne in mind by public bodies.

5.9 All users of the information presented through the Community Apparatus Records should be aware of the general disclaimer relevant to the complete project.

5.10 There are occasions when, especially for a Roads Authority, the best information of apparatus locations especially in developments may be scanned information from initial Road Construction Consent or similar proposal plans there having been, or being, no checks on where apparatus is actually placed in the ground during construction. Street lighting cables and road drainage in developments are cases in point. Such scanned information should be made available to the Community Apparatus Records system with an appropriate accuracy quoted.

APPENDIX A GLOSSARY OF TERMS

(Terms used in this Code of Practice that are defined in the Act shall have the same meaning as they have in the Act.)

Apparatus Owner	any person owning apparatus situated in the road, including undertakers, licensees and road authorities.
Community Apparatus Records	Records of both road and undertakers apparatus
Person proposing to excavate in the road	any person carrying out works that involves breaking open the road, including undertakers, licensees, roads authorities, bridge authorities and transport authorities or contractors operating on their behalf.
Geographic Information System (GIS)	a computer system for capturing, storing, checking, integrating, manipulating, analysing and displaying data related to spatial locations.
Global Positioning System (GPS)	a US Department of Defence satellite-based navigation system. It is designed so that a passive user can obtain a three-dimensional position anywhere on the Earth's surface.
PAI	Positional Accuracy Information
Plant locating equipment	proprietary pipe and cable locating instruments.
Service pipes or lines	a pipe or line or apparatus for the purpose of providing a supply or service to a customer's premises of the type described in subparagraphs (3) (a), (b) and (c) of paragraph 7 of Schedule 4 to the Act, together with all apparatus associated with it.
Road	Refer to definition within the Road (Scotland) Act 1984.

APPENDIX B TYPICAL ROUTES FOR SERVICE PIPES AND CABLES

B.1 GENERAL

B.1.1 Persons proposing to excavate in the road should expect that the majority of premises are supplied with gas, electricity, communications, sewerage and water services. It is safest therefore to assume that each premise is supplied with all five types of service until the persons proposing to excavate in the road can confirm by site investigation those that are not present.

B.1.2 In most circumstances service pipes or cables are laid along the shortest possible route from the main to the service entry position or meter. It is likely, therefore, that the service will travel at right angles from the main to the premises.

B.1.3 Main pipes and cables are not always placed on both sides of the road. If for any reason the record of a particular utility main is not available to persons proposing to excavate in the road, it is safest to assume that the main is situated on the opposite side of the road to the premises and that the services cross the road. This should continue to be the assumed route of the services until the persons proposing to excavate in the road are able to confirm their positions and routes. However, as far as excavating near the main is concerned, the persons proposing to excavate in the road should assume that it might be on either side of the road in the footway or the carriageway unless and until they have confirmation of the exact position of the main.

B.1.4 Service pipes and cables are normally laid at shallower depths than mains. The specific advice for individual utilities, which follows in this Appendix, indicates the depths that may be expected.

B.1.5 Indications of service routes may show on the pavement surface or at the boundary of the premises:

- reinstatement of the road, made when the service was installed, often lasts many years before the road is completely resurfaced and will indicate the route of the pipe or cable;
- gas and water services often include service valves or stopcocks respectively. Gas service valve boxes are situated in the road near the boundary of the premises. Water stopcock boxes may be situated either in a similar position to gas service valves or just inside the boundary of the premises, say, in a front garden;
- water services may also be fitted with an underground meter that may be situated either in the road or just inside the boundary of the premises;
- cable television services are laid to the curtilage of every premise in the franchise area, whether or not a supply enters the premises. These may terminate at a small junction box placed as close as possible to the boundary of the premises;
- gas, electricity and water meters may be placed in meter boxes situated on an outside wall of the premises;
- gas, electricity and telecomms services may enter the premises above ground level, giving an indication of the line of the service;
- where no indications of service positions show outside premises it may be possible to check the entry positions from inside, thereby giving an

indication of the likely service routes;

- road lighting columns and traffic signs all have an electricity service, mostly supplied from electricity cables situated in the footpath;
- the position of traffic signal and other traffic control cables and loops can be clearly seen on the surface of the road, as a saw cut filled with mastic.

B.1.6 The following NJUG Publications offer useful advice:

NJUG Guideline on the Positioning and Colour Coding of Underground Utilities Apparatus – Volumes 1 & 2 This is a live document that may be revised from time to time and may be downloaded free of charge from the NJUG web site at www.njug.org.uk

There now follows an extract (after obtaining express permission from NJUG to do so) from the above document which was correct at the time of this Code of Practice being published but should be checked against the current version on the NJUG web site as indicated above for any revisions.

TABLE 1 – Recommended Colour Coding of Underground Utilities Apparatus
All depths are from the surface level to the crown of the apparatus

Utility	Duct	Pipe	Cable	Marker Systems	Recommended Minimum Depths	
					Footway/Verge	Carriageway
Electricity HV (High Voltage)	Black or red Duct or tile	N/A	Red or black	Yellow with black and red legend or concrete tiles	450-1200mm	750-1200mm
Electricity LV (Low Voltage)	Black or red Duct or tile	N/A	Black or red	Yellow with black legend	450mm	600mm
Gas	Yellow	Yellow or yellow with brown stripe (removable skin revealing white or black pipe)	N/A	Yellow with black legend	600mm footway 750mm verge	750mm
Water non Potable & Grey Water	N/A	Black with green stripes	N/A	N/A	600 – 750mm	600 – 750mm
Water - Firefighting	N/A	Black with red stripes or bands	N/A	N/A	600 – 750mm	600 – 750mm
Oil / fuel pipelines	N/A	Black	N/A	Various surface markers Marker tape or tiles above red concrete	900mm *All work within 3 metres of oil fuel pipelines must receive prior approval*	900mm *All work within 3 metres of oil fuel pipelines must receive prior approval*
Sewerage	Black	No distinguishing colour / material (e.g.: Ductile Iron may be red; PVC may be brown)	N/A	N/A	Variable	Variable
Telecomms ○ ● ● ●	Grey, white, green, Black, purple	N/A	Black or light grey	Various	250 – 350mm 145mm slot cut	450 - 600mm
Water	Blue or Grey	Blue polymer or blue or uncoated Iron / GRP. Blue polymer with brown stripe (removable skin revealing white or black pipe)	N/A	Blue or Blue/black	750mm	750mm minimum
Water pipes for special purposes (e.g. contaminated ground)	N/A	Blue polymer with brown stripes (non-removable skin)	N/A	Blue or blue/black	750mm	750mm minimum

These guidelines describe utility industry practice. However, it should not be assumed that all apparatus will conform to the recommendations for positioning and colour coding contained in this publication.

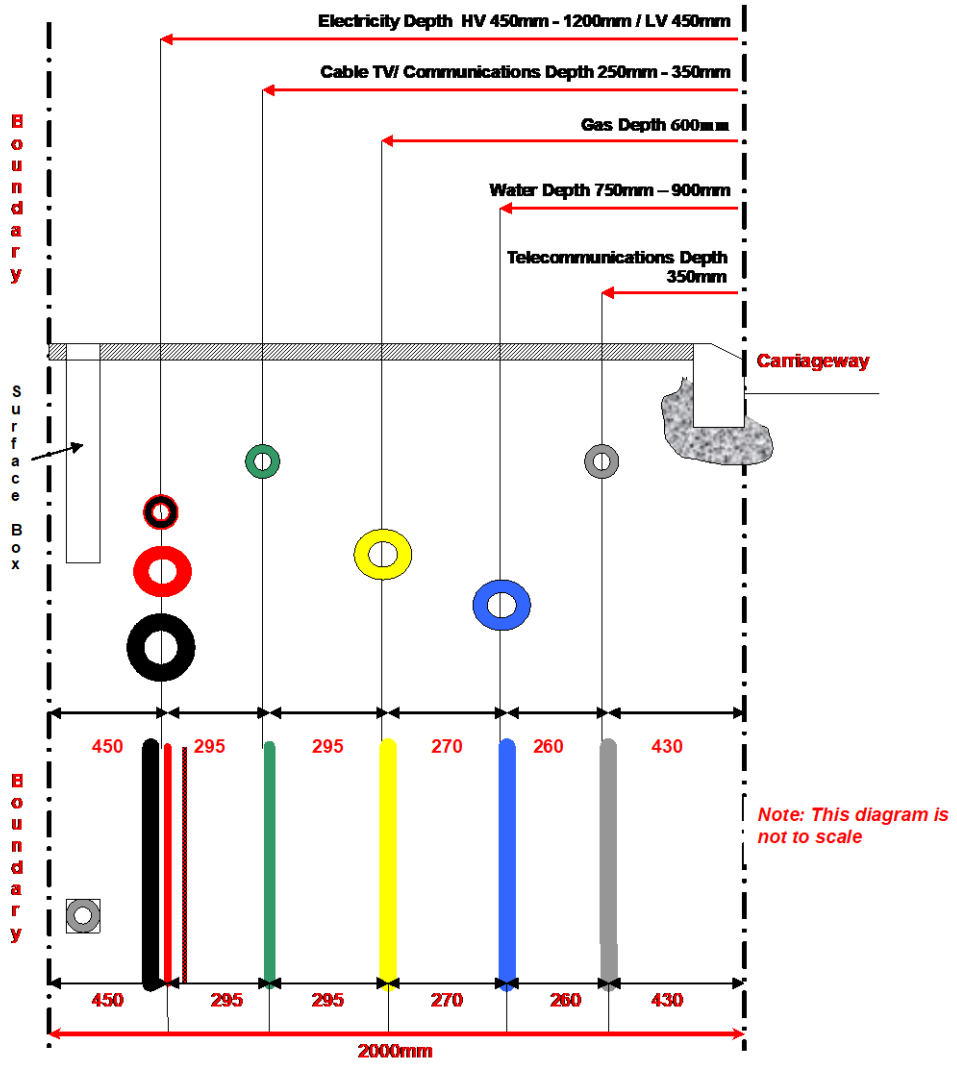
TABLE 2 – Recommended Colour Coding of Other Underground Apparatus

All depths are from the surface level to the crown of the apparatus

Asset Owner	Duct	Pipe	Cable	Marker Systems	Recommended Minimum Depths	
					Footway	Carriageway
Road Works Authority Services **At the time of publication the following were current examples of known road works authority apparatus colour coding**						
Street Lighting	Purple	N/A	Purple	Yellow with black legend or purple	450mm	450mm
Other						
Traffic Control	Orange		Orange	Yellow with black legend		
Street Furniture	Black	N/A	Black	Yellow with black legend	450mm	600mm
Telecoms	Purple/orange	N/A	Black	Various		
Motorways and Trunk Roads						
Communications	Black or grey	N/A	Black	Yellow with black legend		
Road Lighting	Purple	N/A	Purple	Yellow with black legend		

These guidelines describe utility industry practice. However, it should not be assumed that all apparatus will conform to the recommendations for positioning and colour coding contained in this publication.

FIGURE 1 - Recommended Positioning of Utility Apparatus in a 2 metre Footway



1 All depths are to upper surface of apparatus

2 This table does not show Roads Authority apparatus or apparatus such as CCTV cables or district heating pipes.

3 It should be remembered that any apparatus may lie in the carriageway rather than in the footway. This may especially be the case locally where a surface box occupies the footway causing apparatus to divert into the carriageway.

B.2 TELECOMMUNICATIONS CABLES

B.2.1 Telecommunication cables can be copper, co-axial or optical fibre and are currently laid in PVC duct that may be coloured grey, green, white or purple. Older duct may be earthenware, asbestos cement, iron or pitch fibre. Common cable colours include light grey, black, mauve, brown and orange. Fibre optic cables may additionally be laid in a subduct within the main duct. The duct ranges in size from 25mm to 110mm external diameter. These can also use a combination of sub duct with bundled tubes laid on top

B.2.2 Services may enter premises from below ground or overhead from cables supported by poles. Cable services are laid to the curtilage of every premise in the franchise area, whether or not a supply enters the premises and terminate at a small junction box placed as close as possible to the boundary of the premises. Other below ground services may rise up outside the wall before entering the premises.

B.2.3 Below ground cable services are normally laid from a supply cable situated in the nearest footway which is normally between 250mm and 450mm cover to the crown of the duct. However, site conditions may cause the duct to be laid shallower or deeper. Marker tape is sometimes laid above the duct and can be green, yellow with a blue legend or white with a black legend.

B.2.4 Duct laid in carriageway is normally laid between 450mm cover and 600mm cover, dependent upon the type of carriageway and roads authority requirements. Again, site conditions may cause the duct to be laid shallower or deeper.

B.2.5 Fibre Optic cables used for Broadband may be slot cut in the footway to a minimum depth of 145mm

B.2.6 Telecommunication companies will often assist with the location of their apparatus on site.

B.3 ELECTRICITY

B.3.1 Electricity service cables are generally laid directly in the ground and are connected to the nearest adequate mains cable. Service cables are installed to meet the load required and may often be identical to the cables used as mains feeders.

B.3.2 Most electricity cables are coloured black, though some high voltage cables are red. Where ducts are used, they have normally been coloured black if of modern plastic construction although from around 2009/10 a move is being made to the use of red ducts. Protection tiles may be placed in the ground above a cable, made out of concrete, clay or plastic. Where marker tapes are used, they are usually coloured yellow with a black legend.

B.3.3 Most electricity service cables are laid at a depth of 600mm cover under carriageways and 450mm cover in footways, though these depths can alter due to unforeseen circumstances or because of interference by other excavators some time later.

B.3.4 All dwellings, shops, offices and factories can be assumed to be served by an electricity service cable. Road lighting columns, telephone kiosks, road signs and other road furniture are also provided with electricity service cables.

B.3.5 It is common practice for the main feeder cable to be laid only on one side of the road. Service cables to properties on the other side of the road will therefore cross the carriageway. In most cases there will be no permanent surface marker posts or other visible signs to indicate the presence of cables.

B.3.6 Most electricity service cables belong to the local electricity company but some private cable networks may be owned by other bodies such as the roads authority, the road lighting authority, National Grid, Ministry of Defence, railway companies and private companies etc.

B.3.7 Electricity cables carrying power to street lights and to illuminated signs also exist in the ground. Further information regarding these may be found at Chapter C3

B.3.8 Traffic signal cables are normally laid at a depth of 600mm in carriageways and 450mm cover in footways, though some extra-low voltage cables may be laid in the footway at 250mm cover. It should be noted that vehicle detector loops and their interconnecting cables are laid in slots in the carriageway at a depth of only 65mm cover.

B.3.9 It is essential to note that road lighting and traffic control cables may not be carrying a current during daylight hours but they are “live” at all times and will arc if struck.

B.3.10 Road lighting or traffic control cables may be coloured black, purple or orange. Where ducts are used for road lighting and traffic control, they are normally coloured orange in England, although one electricity supply company uses black ducts, and marked with the legend “Road Lighting Cable Below” or “Traffic Signals”. Where marker tape is used for road lighting and traffic control, it is normally yellow with a black legend.

B.4 GAS

B.4.1 Gas services are normally laid directly in the ground and are connected to the nearest suitable gas main, which could be on the opposite side of the road. Gas services are normally laid at approximately 600mm in the carriageway and 450mm in the footway, rising to approximately 375mm in private ground. However, there may be a number of circumstances that cause gas services to be laid at shallower depths. The actual depths of services should be determined by careful working practices.

B.4.2 Gas service pipes were traditionally made of iron or steel, sometimes encased in black bitumen or black PVC. During the 1970s new steel service pipes were encased in yellow PVC sheathing and yellow polyethylene pipe came into increasing use. During the 1980s yellow polyethylene pipe became the most commonly used material for gas mains and services. In 1987 intermediate pressure mains made from High Density PE, which are orange in colour, were introduced. There were also a number of instances of mains made of asbestos cement and special provision has been made for highlighting their presence on location records.

B.4.3 Where ducts are used, they are usually coloured yellow or pale green, though in the past ducts, which were mostly used for road crossings, were made from a variety of materials, including pitch fibre, PVC, steel or clay. Where marker tape is used it is usually coloured yellow with a black legend.

B.4.4 In urban areas it should be assumed that all properties have a gas service pipe. Many domestic premises will have an above ground service entry or external meter box which will give an indication of the line of the service. Commercial or industrial premises, flats and multiple occupancy dwellings, will have service valve boxes situated in the road and similar service valves are increasingly being used on new domestic services.

B.4.5 Most of the underground gas network is operated by Scotland Gas Network but private gas networks are increasing in frequency, particularly in connection with new housing or commercial developments.

B.4.6 Persons proposing to excavate in the road should beware that yellow polyethylene gas service pipes are sometimes wrongly used as ducts on building sites to carry electricity cables. Discarded mains and service gas pipes are also sometimes wrongly used as ducts for electricity cables and other apparatus. This practice creates an unnecessary risk to health and safety and occurrences should be reported to the appropriate authorities.

B.5 SEWER SYSTEMS

B.5.1 Responsibility for public sewers in Scotland rests with Scottish Water.

B.5.2 Private sewers and drains, which may or may not be in the road, are the responsibility of their respective owners who may, by deed, have corporate responsibility. Local authorities have, under public health legislation, power in certain circumstances to carry out work in such installations.

B.5.3 Sewer pipes and drains have to operate with a line and level which cannot be varied in order to provide a fall to aid gravity flow of the effluent and often have to cross the footway at right angles in order to reach the public sewer in the carriageway. Older sewers were usually of brick but smaller sizes were often of fired clay or earthenware. The most popular materials today are concrete, earthenware, ductile iron, and plastics.

B.5.4 Manholes at approximately 80m intervals in the carriageway will indicate the line of the main sewer in a road and manholes at the boundary of each premises will indicate the line of the private drain connecting with it.

B.5.5 In addition to the foul sewers there are of course all the drainage or surface water sewers that tend to consist of gullies and pipes connected at manholes. There may in some cases be culverts that may be a large pipe or of another type of construction, and which may lie only a little way under the road surface.

B.6 WATER

B.6.1 That part of a water service that is laid in the road up to the boundary of the premises is known as the communication pipe and usually ends in a stopcock. The remainder of the water service to the premises is known as the supply pipe. The stopcock box will usually indicate the line of the pipe, as will an underground meter box if one has been fitted.

B.6.2 Water mains are normally laid at a depth of 900mm cover and communication and supply pipes usually at a depth of approximately 750mm cover to avoid freezing in cold weather.

B.6.3 Older water services were laid in lead, copper galvanised steel or black

polyethylene. Since 1980 most water service pipes are laid in blue polyethylene. Small amounts are still laid in bare copper, blue or green sheathed copper or galvanised steel. Most pipes are laid directly in the ground but, where ducts are used, they are coloured blue. Very little use is made of marker tapes above services but when used they are also coloured blue.

B.6.4 Persons proposing to excavate in the road should beware that blue polyethylene water service pipes are sometimes wrongly used as ducts on building sites to carry electricity cable.

APPENDIX C ROADS AUTHORITY APPARATUS

C1 ITEM COVERAGE

C1.1 Roads authorities should, in accordance with this Code of Practice, record the position of the following apparatus:

- road lighting cables and ducting (see C3)
- highway drainage (see also item C2.4)
- CCTV cables and ducting

C2 GENERAL

C2.1 There are numerous other items of roads apparatus which, by virtue of their being classed as services, are not covered by this Code of Practice. There should, however, be reference to most of these items under associated data tables on the Scottish Road Works Register (SRWR). Reference should be made to the SRWR at every opportunity. Typically, these items could include:

- traffic signal loops and ducting
- vehicle detector loops and ducting
- ice prediction detector cables and ducting
- traffic/speed camera cables and ducting
- traffic monitoring camera cables and ducting
- variable message sign cables and ducting
- automatic bollards cables and ducting
- height protection systems cables and ducting
- toll booth and barrier cables and ducting

C2.2 In addition to the above, further information may be recorded on the gazetteer under roads with special engineering difficulties. Typically, these items could include:

- culverts
- wildlife tunnels
- foundations to structures

C2.3 There are many old stone culverts that are uncharted and if uncovered may appear dry and unused. However no assumption that they are redundant should be made and if damaged they should always be properly repaired unless advised otherwise by the roads authority.

C2.4 Surface water drainage tends to consist of a system of gullies connected by pipework to the main sewer. Whilst these piped connections are not covered by this Code of Practice, they tend to be at shallow depths at the start of the run from the gully pot. Persons proposing to excavate in the road should ascertain the direction of the pipework by examining the gully pot prior to any excavation.

C2.5 Persons carrying out excavations in the road should take care when excavating close to lighting columns and traffic signs to avoid the risk of them being disturbed.

C2.6 Traffic signal cables are normally laid at a depth of 600mm in carriageways

and 450mm in footways, though some extra-low voltage cables may be laid in the footway at 250mm.

C2.7 CCTV cables are generally laid at a depth of 550mm in the carriageway and 450mm in the footway.

C2.8 Although the depths given above are what is targeted, much of this infrastructure has to accommodate previously laid and congested apparatus and consequently may be laid at a lesser depth.

C2.9 Persons carrying out excavations in the road should take particular note that vehicle detector loops for traffic signals or traffic counters and ice detection sensors are contained within the bituminous layers of the road and are particularly susceptible to damage if extreme caution is not taken.

C3 STREET LIGHTING & ILLUMINATED TRAFFIC SIGNS

C3.1 Care should be taken to avoid excavating close to street lighting columns or traffic signs to avoid the risk of disturbing them.

C3.2 Road lighting or traffic signal cables may be coloured black or purple. Where ducts are used to carry such cables, they may be coloured black, purple or orange. Where marker tape is used, it is normally yellow with a black legend. Older cables may be marked by earthenware tiles above them.

C3.3 It is essential to note specific daytime safety issues relating to cables carrying electricity to street lighting and to illuminated road signs (and to other non-roads street furniture with a lighting element such as telephone boxes, bus shelters and illuminated advertisements.)

Electricity to street lights and signs may either be delivered by roads authority cable from a central connection point with the power company's cables or directly by the power company's cables. In the latter case, even if the street lighting or signs are not illuminated during the day, voltage is present and, if the cable is struck, dangerous current will flow. The same applies in situations where electricity is supplied by roads authority cable and the street lights are controlled by individual photo cells.

Roads Authority cables carrying supplies to lights and signs will not normally have voltage present when the lamps are not illuminated if the system is controlled by area time clock or a single area photo cell. However, it must be realised that the system of control present in any particular location cannot be determined with any certainty by observation so the worst case scenario must be assumed. In addition, street lights may be switched on during the day by lighting operatives carrying out maintenance emphasising that it must be assumed that all cables to street lights and illuminated signs are live at all times.

It should also be recognised that cables which are not carrying current during the day (when most detection is carried out) may not be detectable by passive CAT apparatus.