Volume 2

NJUG GUIDELINES ON THE POSITIONING OF UNDERGROUND UTILITIES APPARATUS FOR NEW DEVELOPMENT SITES

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Issue 4: 29th October 2013

NJUG has a vision for street works, this vision is simply:

- **Safety is the number one priority**
- **Utilities deliver consistent high quality**
- **Utilities work together and in partnership with local authorities and contractors to minimise disruption**
- **Utilities keep the public fully informed on all aspects of works**
- **Utilities maximise the use of sustainable methods and materials**
- **Damage to underground assets is avoided**

This document forms part of that vision.

Mark Ostheimer
Operations Director

NJUG Guidelines on the Positioning of Underground Apparatus for New Development Sites

The following volumes constitute the NJUG Publications. They are living documents and may be amended from time to time. There is no attempt to describe any specific industry process as each utility has its own specifications and procedures. Not all the publications will necessarily be available at one time as individual volumes will be published when available.

NJUG PUBLICATIONS	
Current	*Previous*
VOLUME 1	
NJUG Guidelines on the Positioning and Colour Coding of Underground Utilities' Apparatus	NJUG 4 & 7
VOLUME 2	
NJUG Guidelines on the Positioning of Underground Utilities Apparatus for New Development Sites	NJUG 2, 5 & 6
VOLUME 3	
NJUG Guidelines on the Management of Third Party Cable Ducting	New
VOLUME 4	
NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees	NJUG 10
VOLUME 5	
NJUG On-Site Environmental Good Practice Guidelines	New
VOLUME 6	
NJUG Guidelines on Co-ordination, Co-operation and Communication	New

The following NJUG publications have not been reviewed and have been completely withdrawn:

NJUG 3 – Cable Locating Devices
NJUG 8 – Performance Guide for the Assessment of Metallic Pipe and Cable Locators
NJUG 9 – Recommendations for the Exchange of Records of Apparatus between Utilities
NJUG 11 – Proposed Data Exchange Format for Utility Map Data
NJUG 12 – NJUG Specification for the Digitisation of Large Scale OS Maps
NJUG 13 – Quality Control Procedure for Large Scale OS Maps Digitised to OS 1988
NJUG 15 – NJUG/Ordnance Survey Service Level Agreement (Technical) for Digital Map Products and Services

CONTENTS

Background

This section supersedes NJUG 2 'Provision of Mains and Services by Public Utilities on Residential Estates', NJUG 5 'Model Guidelines for the Planning and Installation of Utility Supplies to New Building Developments', and NJUG 6 'Services Entries for New Dwellings on Residential Estates'.

The individual service entry diagrams previously published in NJUG 6 have been removed due to the many variations now applied by each industry. Some of the guidelines given in previous NJUG publications have now been superseded by technological developments within the industry and by individual utility specifications.

For individual specifications and service layouts reference should be made to the appropriate utility company.

Scope

It is clear that many of the problems arising between developers and utilities occur as a result of a mutual failure to appreciate fully each other's activities and internal procedures. This document therefore sets out the particular requirements of the various organisations involved at each stage so that these can be co-ordinated with the developer's programme and is intended to encourage cooperation and communication between developers and utilities.

1. PLANNING – PRELMINARY ENQUIRY STAGE

1.1 Preliminary Enquiry

When preparing for an acquisition of land a developer will require information about the position and availability of existing utility services. At this early stage it is unlikely that detailed plans will be available to enable a formal application for supply to be made. However, preliminary plant enquiries could assist with initial costings.

Preliminary enquiries will also provide contact between the developer and the utility and ensure that consultation takes place at an early point in the project. At this stage the developer should appoint a co-ordinator.

1.2 Early Consultation

Early consultation is essential to ensure that any special considerations are identified, such as:

- ordering of special items of plant;
- disconnection of existing supplies;
- arrangements for protecting and / or diverting existing utility apparatus;

- siting of, acquisition of and early access to land required for plant or governor houses, substations and large items of apparatus.

1.3 Variations

Wherever practicable utilities should notify the developer of any relevant changes that affect the estimated costs and timescales in relation to the provision of services to the development.

Similarly the developer should notify the utilities if it is decided to delay, make changes to or abandon the development.

2. LIAISON AND CO-ORDINATION

2.1 Construction (Design and Management) Regulations (CDM)

The current CDM health and safety regulations outline the responsibilities and duties of persons involved in the planning, design, building (including demolition) and commissioning of construction projects. They will help you to:

- Improve health and safety in your industry
- Have the right people for the right job at the right time to manage the risks on site
- Focus on effective planning and managing risk - manage the risk not the paperwork

Reference should also be made to the Regulations and Approved Code of Practice (ACoP) throughout all stages of a project. The ACoP has special legal status and gives practical advice for all those involved in construction work. If you follow the advice in the ACoP you will be doing enough to comply with the law in respect of those specific matters on which it gives advice.

Information and advice given regarding utility apparatus location and identification is essential to the development of site specific Health and Safety plans. Hazards and risks from utility apparatus associated with the project design should be identified by consultation and co-operation between the designers, developers and utility apparatus owners.

2.2 Health and Safety Executive Publication HSG 47, 'Avoiding Danger from Underground Services'

In line with Health and Safety Executive guidelines HSG47 apparatus records must be obtained from asset owners. In general mains and services are owned and maintained by regulated utilities and local authorities, however, some apparatus is owned and maintained by private organisations. Accordingly designers and developers should contact all appropriate organisations for information regarding their apparatus. The response will often be in the form of a standard plant enquiry record which may comprise of written and / or

diagrammatic details. These plant enquiry records come in various formats including electronic, CD's and paper.

3. SITE CONDITIONS PRIOR TO THE INSTALLATION OF APPARATUS

3.1 Apparatus Installed by a Developer

On new development sites where utility apparatus is installed by the developer or a third party the guidelines contained within **Volume 1 – 'NJUG Guidelines on the Positioning and Colour Coding of Underground Utilities' Apparatus'** should be followed. Any deviation from these guidelines should only be conducted with the agreement of the asset owner. Any variation to depth of cover must permit access to all utility apparatus. Further guidance on depth of cover and colour coding is detailed within Volume 1.

3.2 Apparatus Installed by a Utility

Where the apparatus is to be installed by a utility the following guidelines apply:

a) To allow utilities to install their apparatus in the correct position footways and carriageways should be clearly marked out by:
   - constructing a kerb or a permanent and substantial kerb race (depending upon local highway authority requirements);
   - suitably marking the line and level of back of footway and boundary lines.

b) Footways, footpaths and other routes should be clearly marked out to final line and level with suitable pegs or pins, or brought up to formation or final level.

c) The planned route is as free as is practical of hard materials such as bricks, hardcore or stone rubble.

d) All routes should be maintained clear of all building and other materials during the installation of apparatus.

e) If service entry points are not evident markers should be provided to indicate the position at which the service connection is required.

f) Developers should mark both ends of pre-installed road crossing ducts to indicate their position. Ducts laid by the developer should be suitably spaced to avoid congestion at exit and entry points to facilitate the potential installation of joint boxes, bends etc. Ducts laid for cable installation must include draw ropes.

g) Provision should be made to permit adequate access for utility plant and machinery.

h) The developer should contact the utility to determine the minimum length of lay to be prepared before commencement of installation.

i) The developer should ensure effective co-ordination of utility installation works to avoid delay and potential conflict.

j) Routes under overhead electricity lines must be marked in accordance with HSE Guidance Note GS6.

k) Where ducts are installed by a developer or third party, particular attention should be paid to the appropriate colour coding. For further details see Table 1 and Figure 1.

It is important to follow the above guidelines as utilities reserve the right to reschedule their work if the site has not been adequately prepared.

4. DURING CONSTRUCTION

As far as reasonably practicable utilities should ensure that once work has commenced, the works programme is completed within the agreed period.

Particular attention should be paid to:

a) The correct reinstatement of all construction levels to the developer's specified standards.
b) The removal or re-distribution of surplus spoil and other materials where necessary.
c) The protection of line and level markers.
d) The use of ducts specifically allocated for the installation of apparatus beneath carriageways, footways, footpaths and paved or landscaped areas.
e) The co-ordination and communication of changes to planned routes, plant / apparatus positions or service connection entry points.
f) The communication of any interruptions to the programme and the expected date of recommencement.

5. EARLY ACCESS TO PLANT AND GOVERNOR HOUSES, SUBSTATION SITES AND OTHER SPECIAL SITES

Where plant houses, governor houses, substation sites or other special structures have to be erected on the development, early access to the sites is important.

Developers and utilities should ensure that:

a) The necessary wayleaves, easements and land acquisitions are completed in sufficient time.
b) Appropriate measurements, lines and levels etc should be in place by the programme date.

6. COMMISSIONING OF APPARATUS

Where chambers and / or surface boxes are installed by the developer on behalf of a utility the developer should ensure that they are set in the correct position in accordance with individual utility specifications prior to the completion of footway, carriageway and other surfaces. Damaged or incorrectly

installed chambers or boxes should be immediately reported to the appropriate utility.

Each utility has specific processes which have to be undertaken prior to the commissioning of apparatus for service. These processes vary in duration and should be co-ordinated accordingly.

7. DISTRICT HEATING

A district heating installation typically consists of a highly insulated "heat main" of flow and return pipes distributing hot water (or steam) to buildings which are connected via junction points.

The proximity of district heating apparatus may affect the efficiency and operation of other underground apparatus. Before such apparatus is laid contact must be made with all appropriate existing apparatus owners.

Installers of district heating should consider the location, spacing and depth of cover to avoid potential conflict with other existing underground apparatus.

Owners of other underground apparatus should be aware of the potential safety issues and dangers of working in proximity to district heating apparatus and should make contact with the existing owners of such apparatus. The local authority may be able to advise as to the ownership of the district heating network.

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 EHV (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	*** See row below	N/A	Black legend on PE pipes every linear metre.	600mm footway 750mm verge	750mm
	***** PE** - up to 2 bar - yellow or yellow with brown stripes (removable skin revealing white or black core pipe). - between 2 to 7 bar -orange. **Steel pipes** may have yellow wrap or black tar coating or no coating. **Ductile Iron** may have plastic wrapping **Asbestos & Pit / Spun Cast Iron** – No distinguishable colour					
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 (eg: Ductile Iron may be red; PVC may be brown)	N/A	N/A	Variable	Variable
Communications ○ ● ● ●	Grey, white, green, black, purple	N/A	Black or light grey	Various	250 – 350mm	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

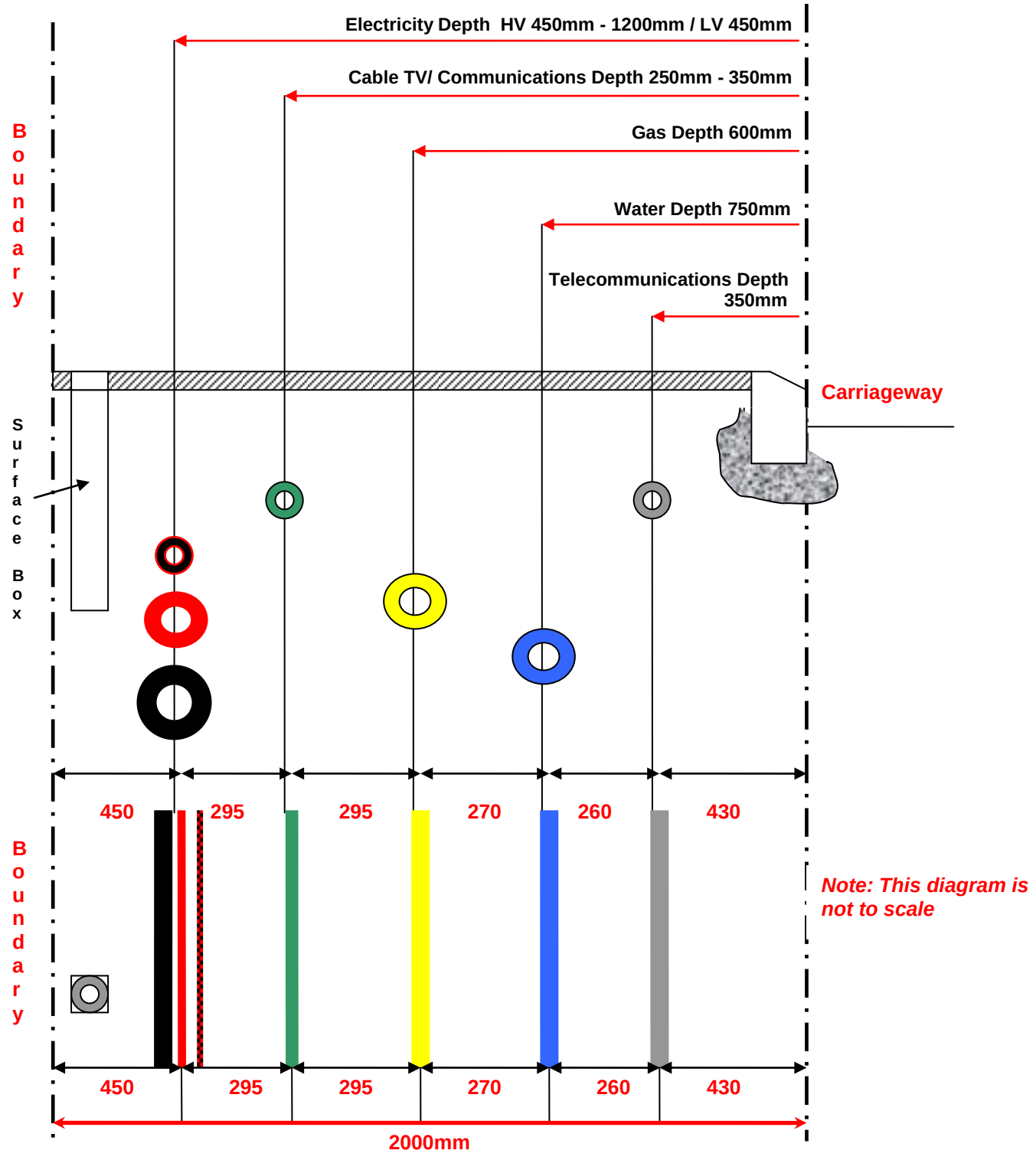
All depths are from the surface level to the crown of the apparatus

Asset Owner	Duct	Pipe	Cable	Marker Systems	Recommended Minimum Depths	
					Footway	Carriageway
Highway Authority Services **At the time of publication the following were current examples of known highway authority apparatus colour coding but local variations may occur**						
Street Lighting						
England and Wales	Orange	N/A	Black	Yellow with black legend	450mm	600mm
Scotland	Purple	N/A	Purple	Yellow with black legend	450mm	450mm
Northern Ireland	Orange	N/A	Black or orange	Various	450mm	450mm
Other						
Traffic Control	Orange	N/A	Orange	Yellow with black legend		
Street Furniture	Black	N/A	Black	Yellow with black legend	450mm	600mm
Communications	Light grey	N/A	Light grey or black	Yellow with black legend		
CCTV	Purple	N/A				
Motorways and Trunk Roads						
England and Wales						
Communications	Purple	N/A	Grey	Yellow with black legend	450mm	
Communications Power	Purple	N/A	Black	Yellow with black legend		
Road Lighting	Orange	N/A	Black	Yellow with black legend		
Scotland						
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

Note – the same positioning should apply in the carriageway/service strip (if safe and practical to do so) where a development has no footway(s) available for services and/or the boundary of the property is on the carriageway (please refer to minimum depths in carriageways). For further advice please contact the asset owner.



GLOSSARY

Apparatus	Equipment such as valves, stopcocks, chambers, cabinets, transformer chambers etc and includes any structure for the lodging of apparatus.
Carriageway	A way constituting or comprised in a highway, being a way (other than a cycle track) over which the public have a right of way for the passage of vehicles.
Cycle track	A way constituting or comprised in a highway over which the public have a right of way on pedal cycles with or without a right of way on foot.
District heating	District heating utilizes a centralized boiler installation to provide heat for a number of buildings such as individual houses, blocks of social housing, local council offices, schools etc.
Duct / ducting	Structure (usually cylindrical) used to convey and protect apparatus
Fibre optic	The use of very thin glass or plastic fibres through which light can be transmitted to carry information from a source to a receiver, especially for telecommunication, television and information technology systems.
Footpath	A highway over which the public have a right of way on foot only, not being a footway.
Footway	A way comprised in a highway which also comprises a carriageway, being a way over which the public have a right of way on foot only.
GRP	Glass Reinforced Plastic
High Voltage	Electricity cables over 1000 volts (>1kV)
Low Voltage	Electricity cables up to and including 1000 volts (1kV)
Main	Structure (usually cylindrical) used to convey water or gas or oil generally greater than 50mm diameter.
NJUG	National Joint Utilities Group Limited.
Pipe	Longitudinal structure (usually cylindrical) used to convey water, gas or oil.
Service strip	A strip of designated land alongside a carriageway or footway used to convey services.
Sub-duct	Longitudinal structure (usually cylindrical) laid inside ducts used to carry smaller diameter cables such as fibre optic.
Tiles	Impact resistant cover constructed of earthenware, concrete or polyethylene for protecting underground cables
Utility	An undertaker by statute that has a legal right to provide customer services (e.g. communications, electricity, gas, water)

Verge	A strip of land which may form part of the public highway alongside a carriageway or footway, which may contain services.

APPENDIX A

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