

## The Building Regulations 2010

# Infrastructure for electronic communications

APPROVED DOCUMENT

# R

## Volume 2: Physical infrastructure for high-speed electronic communications networks

Requirement R1: High-speed-ready in-building physical  
infrastructure

2022 edition – for use in England

## 2022 edition

This approved document supports requirement R1 of Schedule 1 to the Building Regulations 2010.

This approved document takes effect on 26 December 2022 for use in England. It does not apply to work subject to a building notice, full plans application or initial notice submitted before that date, provided the work is started on site before within the period of 12 months beginning with that day.

# Introduction

## What is an approved document?

Approved documents are approved by the Secretary of State and give practical guidance on common building situations about how to meet the requirements of the Building Regulations 2010 for England. Different approved documents give guidance on each of the technical parts of the regulations. These are all listed in the back of the approved documents. In addition to guidance, some approved documents include provisions that must be followed exactly, as required by regulations or where methods of test or calculation are approved by the Secretary of State.

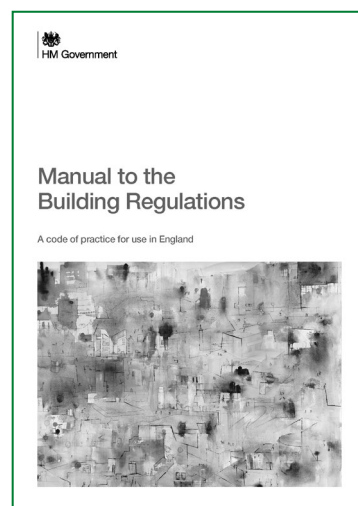
Each approved document covers the requirements of the Building Regulations 2010 relating to a different aspect of *building work*. *Building work* must also comply with all other applicable requirements of the Building Regulations 2010 and all other applicable legislation.

## How is construction regulated in England?

Most *building work* being carried out in England must comply with the Building Regulations 2010. The Building Regulations are made under powers in the Building Act 1984.

Building Regulations protect the health and safety of people in and around buildings, they also provide for energy and water conservation and access to and use of buildings.

The *Manual to the Building Regulations* (references to this in the introduction are taken from the first edition) gives an overview of the building regulatory system in England. You can access the most recent version of the manual at: [www.gov.uk/guidance/building-regulations-and-approved-documents-index](http://www.gov.uk/guidance/building-regulations-and-approved-documents-index).



## How do you comply with the Building Regulations?

*Building work* must meet all relevant requirements of the Building Regulations. To comply with the Building Regulations, it is necessary both to follow the correct procedures and meet technical performance requirements.

The approved documents set out what, in ordinary circumstances, may be accepted as one way to comply with the Building Regulations. Note, however, that:

- Complying with the guidance in the approved documents does not guarantee that *building work* complies with the requirements of the regulations – the approved documents cannot cover all circumstances. Those responsible for *building work* must consider whether following the guidance in the approved documents is likely to meet the requirements in the particular circumstances of their case.
- There may be other ways to comply with the requirements than those described in an approved document. If those responsible for meeting the requirements prefer to meet a requirement in some other way than described in an approved document, they should seek to agree this with the relevant building control body at an early stage.

Those responsible for *building work* include agents, designers, builders, installers and the building owner. For further information, see Chapter 7 in Volume 1 and paragraphs A26, B2 and F2 in Volume 2 of the *Manual to the Building Regulations*.

The Building Regulations can be contravened by not following the correct procedures or not meeting the technical performance requirements. If the building owner or those responsible for the works contravene the Building Regulations, the local authority may prosecute them in the magistrates' court. For further information on enforcement and sanctions in the existing system, see Chapter B in Volume 2 of the *Manual to the Building Regulations*.

## What do the Building Regulations cover?

'*Building work*' is a legal term for work covered by the Building Regulations. Where a building is not exempt, the Building Regulations apply to all types of *building work* as defined in regulation 3 of the Building Regulations. For further information, what constitutes *building work* is covered in Chapter A, Volume 2 of the *Manual to the Building Regulations*.

The Building Regulations contain sections dealing with definitions, procedures and the expected technical performance of *building work*. For example, the Building Regulations:

- a. define what types of building, plumbing and heating work are classed as *building work* in regulation 3 (for further information see paragraphs A14 to A16 in Volume 2 of the *Manual to the Building Regulations*).
- b. specify types of building that are exempt from the Building Regulations (for further information see Table A1 and paragraph A11 in Volume 2 of the *Manual to the Building Regulations*).
- c. set out the notification procedures to follow when undertaking *building work* (for further information see Figure 2.1 in Volume 1 of the *Manual to the Building Regulations*).
- d. set out the technical requirements (see Table 7.1 in Volume 1 of the *Manual to the Building Regulations*) with which the individual aspects of building design and construction must comply in the interests of the health and safety of building users, of energy efficiency (for further information see paragraphs A12(d)–(f), A14(f)–(h), A22, A23, B2(c) and F24 in Volume 2 of the *Manual to the Building Regulations*), and of access to and use of buildings.
- e. set out the standards for building materials and workmanship in carrying out *building work* (for further information see Chapter 7 in Volume 1, and paragraphs F8 to F11 in Volume 2 of the *Manual to the Building Regulations*).

## When must a building control body be notified?

It is often necessary to notify a building control body of planned *building work*. To help ensure that work complies with the Building Regulations, those responsible for *building work* may need to use one of the two types of building control body listed below:

- a. a local authority building control body (for further information see Chapter B in Volume 2 of the *Manual to the Building Regulations*)
- b. an approved inspector (for further information see Chapter E in Volume 2 of the *Manual to the Building Regulations*).

If *building work* consists only of installing certain types of services or fittings (e.g. fuel-burning appliances or replacement windows) and the building owner employs an installer that is registered with a relevant competent person scheme designated in the regulations, a building control body does not need to be notified.

Third party schemes of certification and accreditation of installers can provide confidence that the required level of performance for a system, product, component or structure can be achieved. Building control bodies may accept certification under such schemes as evidence of compliance with a relevant standard. However, a building control body should establish before the start of the building work that a scheme is adequate for the purposes of the Building Regulations.

For further information about third party certification schemes and competent person schemes, see Chapter 5 in Volume 1 and Chapter C in Volume 2 of the *Manual to the Building Regulations*.

## How to use this approved document

Each approved document contains:

- general guidance on the performance expected of materials and *building work* in order to comply with each of the requirements of the Building Regulations, and
- practical examples and solutions on how to achieve compliance for some of the more common building situations.

They may not provide appropriate guidance if the case is unusual in terms of its design, setting, use, scale or technology. Non-standard conditions may include any of the following:

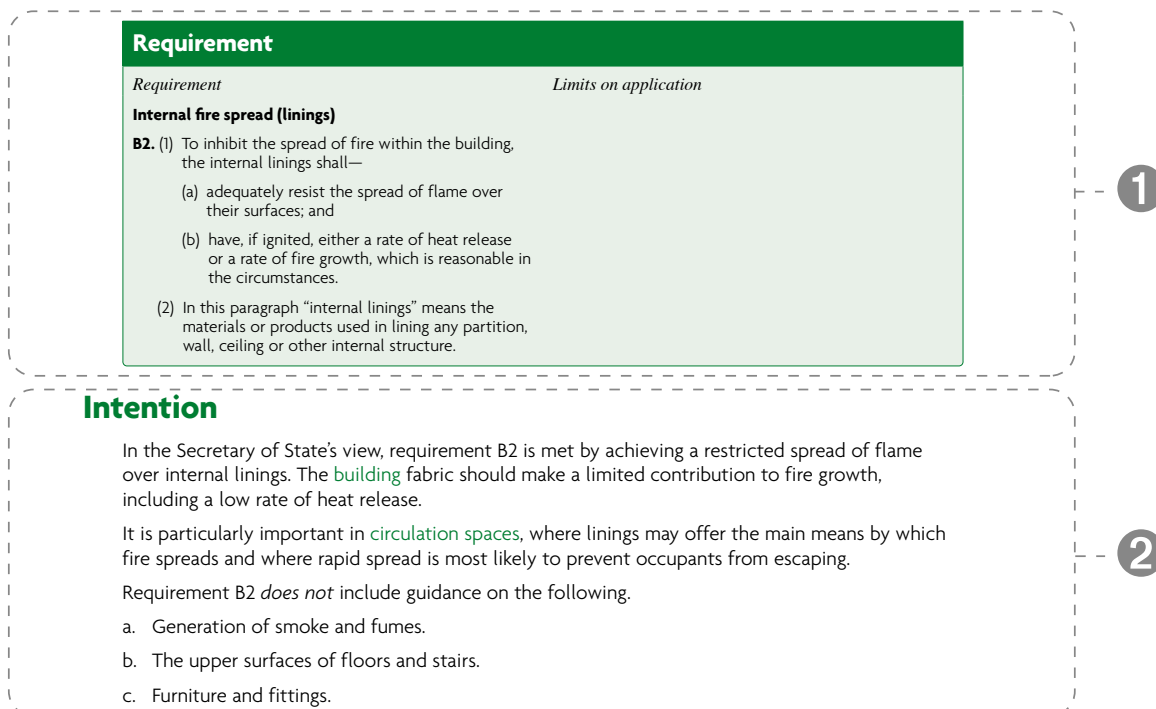
- difficult ground conditions
- buildings with unusual occupancies or high levels of complexity
- very large or very tall buildings
- large timber buildings
- some buildings that incorporate modern construction methods.

Anyone using the approved documents should have sufficient knowledge and skills to understand the guidance and correctly apply it to the *building work*. This is important because simply following the guidance does not guarantee that your *building work* will comply with the legal requirements of the Building Regulations. Each approved document contains legal requirements (which you must follow) and guidance (which you may or may not choose to follow). The text in a box with a green background at the beginning of each section of an approved document is taken from the Building Regulations. This text sets out the legal requirements.

The explanation which follows the legal requirements is guidance (see Diagram *i* below). The guidance then explains one or more ways to demonstrate how *building work* can be shown to comply with the legal requirements in common circumstances. The terms in **green lettering** in an approved document are key terms, listed and explained in the appendix to that approved document. Guidance in the approved documents addresses most, but not all, situations that building owners will face. Situations may arise that are not covered. You or your advisers will need to carefully consider whether following the guidance will mean that the requirements of the Building Regulations will be met.

**B2****Requirement B2: Internal fire spread (linings)**

This section deals with the following requirement from Part B of Schedule 1 to the Building Regulations 2010.

**Key**

- 1 The law: extract from the Building Regulations 2010.
- 2 Statutory guidance.

Diagram *i* The relationship between regulations and guidance in the approved documents

For further information about the use of technical guidance, see Chapter 7 in Volume 1 and Chapter F in Volume 2 of the *Manual to the Building Regulations*.

**Where to get further help**

If you are unsure whether you have the knowledge and skills to apply the guidance correctly, or if you do not understand the technical guidance or other information in this approved document or the additional detailed technical references to which it directs you, you should seek further help. Some sources of help are listed below.

- a. Your building control body may be able to help in many cases.
- b. If you are registered with a competent person scheme, the scheme operator should be in a position to help.
- c. Suitably qualified and experienced construction professionals should also be engaged where necessary.

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## Section 0: Introduction

- 0.1** This approved document, Approved Document R, Volume 2, contains the following sections:
- Section 1: High-speed-ready in-building physical infrastructure
  - Appendix A: Key terms
  - Appendix B: Documents referred to.
- 0.2** This approved document provides guidance on how to comply with the requirements for **in-building physical infrastructure** for **high-speed electronic communication networks** when new buildings are erected or when existing buildings are subject to **major renovation works** (but requirement R1 does not apply where requirement RA1 applies, e.g. when new dwellings are erected).
- 0.3** A separate approved document, Approved Document R Volume 1, provides guidance on how to comply with the requirement to install gigabit-ready physical infrastructure and a connection to a gigabit-capable public electronic communications network when new dwellings or a building containing one or more dwellings are erected.

# Requirement R1: High-speed-ready in-building physical infrastructure

This section deals with requirement R1 of Schedule 1 to the Building Regulations 2010.

## Requirement

### *Requirement*

**Part R Infrastructure for electronic communications**  
**High-speed-ready in-building physical infrastructure**  
**R1**

- (1) Building work must be carried out so as to ensure that the building is equipped with a high-speed-ready in-building physical infrastructure, up to a network termination point for high-speed electronic communications networks.
- (2) Where the work concerns a building containing more than one dwelling, the work must be carried out so as to ensure that the building is equipped in addition with a common access point for high-speed electronic communications networks.

### *Limits on application*

Requirement R1 applies to building work, other than building work to which paragraph RA1 applies, that consists of—

- (a) the erection of buildings; or
- (b) major renovation works to buildings.

## Performance

In the Secretary of State's view, a building will meet requirement R1 if it is designed and constructed so that **high-speed electronic communications networks** can be installed in the future.

# Section 1: In-building physical infrastructure

## Introduction

- 1.1 Requirement R1 applies to new buildings and to existing buildings that are subject to **major renovation works**, including existing dwellings subject to such works. See paragraph 1.5 for types of building and building work that are exempt. Requirement R1 does not apply where requirement RA1 applies, e.g. when a new dwelling or a building containing one or more dwellings is erected.
- 1.2 Requirement R1 is to provide the **in-building physical infrastructure** so that, in future, copper or fibre-optic cables or wireless devices capable of delivering broadband speeds greater than 30 Mbps can be installed.  
**NOTE:** A standard copper telephone cable, when connected to a service provider's fibre network, can deliver broadband speeds up to 70 Mbps.
- 1.3 The requirement is to provide only the **in-building physical infrastructure**, from the service provider's **access point** to the occupier's **network termination point**. Multi-dwelling buildings that are subject to **major renovation works** must be equipped with a common **access point** capable of serving all the dwellings within the building.
- 1.4 It is not a requirement to provide any network cabling or equipment, or any **in-building physical infrastructure** that extends internally beyond the **network termination point**. Nor is it a requirement to provide any external or site-wide infrastructure beyond the **access point** or common **access point**. The developer and broadband service provider should agree who will install such external infrastructure.

## Application

- 1.5 Requirement R1 does not apply to the following types of building or building work.
  - a. The erection of a new dwelling described in requirements RA1 and RA2 for gigabit-ready physical infrastructure and gigabit-capable connections (see Approved Document R Volume 1: Physical infrastructure and network connection for new dwellings). A new dwelling may be a dwelling-house or a flat in a building that contains one or more dwellings.  
Dwellings include the following:
    - i. new housing developments
    - ii. self-build new dwellings
    - iii. new dwellings in mixed-use developments (including live/work units, e.g. a flat (dwelling) that is a workplace for people who live there, and for people who do not live there).
  - b. Buildings and work described in Classes 2 to 7 of Schedule 2 (Exempt buildings and work) to the Building Regulations – for example, sheds, domestic greenhouses, garages, conservatories and other small detached buildings with no sleeping accommodation.

- c. Buildings included in the schedule of monuments maintained under section 1 of the Ancient Monuments and Archaeological Areas Act 1979.
- d. Buildings for which compliance with requirement R1 would unacceptably alter their character or appearance and that are either of the following:
  - i. listed in accordance with section 1 of the Planning (Listed Buildings and Conservation Areas) Act 1990
  - ii. in a conservation area designated in accordance with section 69 of the Planning (Listed Buildings and Conservation Areas) Act 1990.
- e. Buildings occupied by the Ministry of Defence or the armed forces of the Crown, or otherwise occupied for purposes connected to national security.
- f. Buildings in isolated areas where the prospect of a high-speed connection is considered too remote to justify equipping the building with **high-speed-ready in-building physical infrastructure** or an **access point** or common **access point**. For example, areas that are so isolated that no duty is placed on a communications provider (under the Electronic Communications (Universal Service) Order 2003) to meet the full cost of installing a telephone line to the building.
- g. **Major renovation works** if the cost of compliance with requirement R1 would be disproportionate to the benefit gained. A person wishing to take advantage of this exemption would need to demonstrate to a building control body that in the particular case the cost of compliance would be unreasonable, taking into account the work required and the available alternative means of high-speed broadband delivery.

## Ductwork for copper and fibre-optic cables

- 1.6** A suitable position for at least one **network termination point** should be identified for the erection of a new building other than a dwelling, for an existing building (including an existing individual dwelling) that is subject to **major renovation works**, and for each dwelling in an existing multi-dwelling building that is subject to **major renovation works**. Suitable ducting should be provided to connect all such **network termination points** to an appropriate **access point** or common **access point**.
- 1.7** Diagram 1<sup>1</sup> shows a possible arrangement for the physical infrastructure for a single-occupancy building. The **access point** is on an outside wall and is connected by a through-wall duct<sup>2</sup> to a **network termination point**.

<sup>1</sup> The diagrams show underground ducts for network cables outside the building, but this does not preclude the use of overhead lines.

<sup>2</sup> For copper cables, the duct may simply be a hole drilled in the wall. Note the downwards slope to the outside to prevent rainwater ingress.

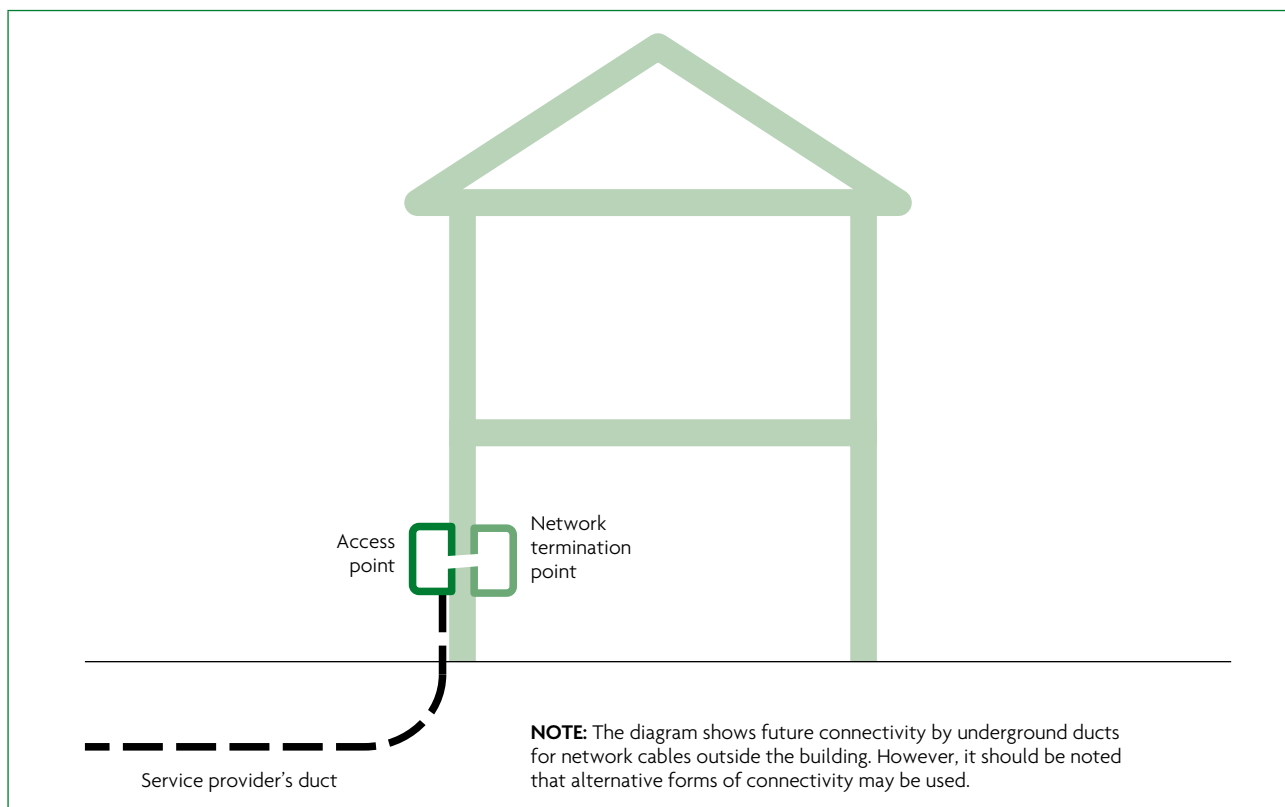


Diagram 1 Schematic example of the in-building physical infrastructure for a single-occupancy building

- 1.8** A multi-dwelling building subject to **major renovation works** should have a common **access point** and dedicated vertical and horizontal service routes so that service providers can connect from the common **access point** to the **network termination point** in each dwelling. Diagram 2 shows a possible arrangement for the physical infrastructure for a multi-dwelling building.
- 1.9** The **in-building physical infrastructure** should comply with all relevant requirements of the Building Regulations. These include the requirements of Part B of Schedule 1 to the Building Regulations (Fire safety), including the need for fire stopping at penetrations through compartment walls, floors and ceilings, and the ban on combustible materials in the external walls of relevant buildings (regulation 7 of the Building Regulations).

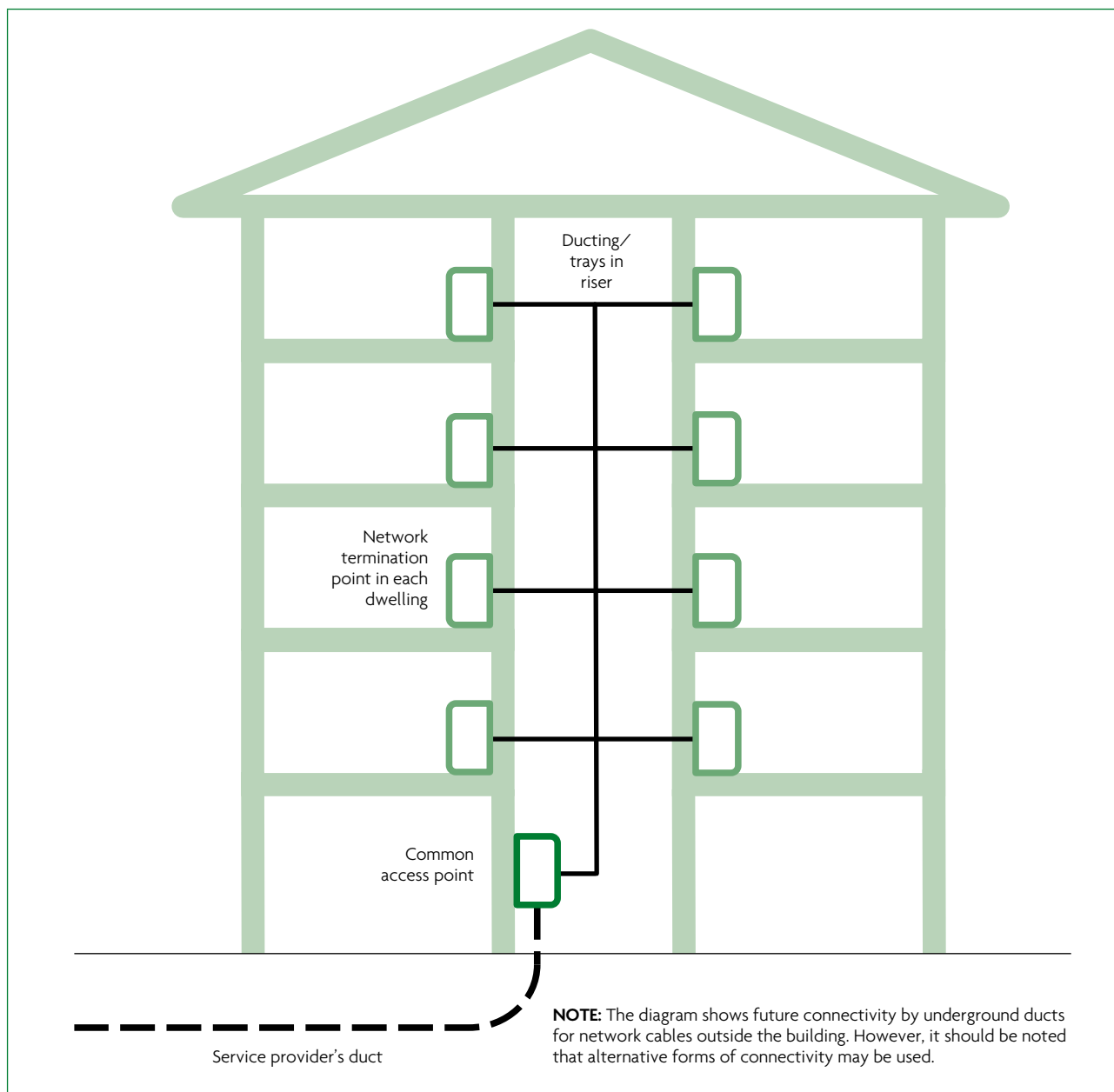


Diagram 2 Schematic example of the in-building physical infrastructure for a multi-dwelling building that is subject to major renovation works

**1.10** This guidance (Approved Document R, Volume 2: Physical infrastructure for high-speed electronic communications networks) applies also to dwellings subject to **major renovation works** in mixed-use multi-unit buildings. The requirement is for the common **access point** to serve each of the dwellings within the building. Other units may also use the common **access point**, or they may have an entirely separate **in-building physical infrastructure**.

## Satellite and wireless communications

- 1.11 The design of the **in-building physical infrastructure** should take account of satellite and wireless technologies where there is evidence that the required network speeds could be met.

### Further information

- 1.12 Publicly Available Specification (PAS) 2016, *Next generation access for new build homes – Guide*, provides best practice guidance on infrastructure and cabling for broadband networks in new homes.
- NOTE:** Developers should refer to PAS 2016 and manufacturers' specifications for guidance on the duct dimensions, bending radii etc. required to allow copper and fibre optic cables to be installed in the future.
- 1.13 The NHBC Foundation's *The Connected Home* guide covers the benefits of current and future smart technologies. The guide recommends that housebuilders 'future proof' new homes by including additional hard wiring.

## Appendix A: Key terms

The following are key terms used in this document and defined in regulation 44C of the Building Regulations 2010 (as amended):

**Access point** A physical point, located inside or outside the building, accessible to undertakings providing or authorised to provide public communications networks, where connection to the high-speed-ready in-building physical infrastructure, or as the case requires the gigabit-ready physical infrastructure, is made available.

**High-speed electronic communications network**  
An electronic communications network which is capable of delivering broadband access services at speeds of at least 30 Mbps.

**High-speed-ready in-building physical infrastructure** In-building physical infrastructure intended to host elements, or enable delivery, of high-speed electronic communications networks.

**In-building physical infrastructure** Physical infrastructure or installations at the end-user's location, including elements under joint ownership, intended to host wired or wireless access networks, where such access networks are capable of delivering electronic communications services and connecting the building access point with the network termination point.

**Major renovation works** Works at the end-user's location encompassing structural modifications of the entire in-building physical infrastructure, or of a significant part of it.

**Network termination point** A physical point at which an occupier is provided with access to high-speed electronic communications networks.

**NOTE:** The 'occupier' is the subscriber to the broadband service. The termination point is typically inside the building, but may be outside the building for wireless connections.



## Appendix B: Documents referred to

### Legislation

(available via [www.legislation.gov.uk](http://www.legislation.gov.uk))

Ancient Monuments and Archaeological Areas Act 1979, c. 46

Building Regulations 2010, SI 2010/2214

Planning (Listed Buildings and Conservation Areas) Act 1990, c. 9

### Standards

**PAS 2016** Next generation access for new build homes – Guide [2010]. Publicly Available Specification produced by BIS (as was, now BEIS) and the British Standards Institution (BSI). Available at <https://www.gov.uk/government/publications/pas-2016-2010-next-generationaccess-for-new-build-homes-guide>

### Other documents

#### NHBC Foundation

([www.nhbcfoundation.org](http://www.nhbcfoundation.org))

NF67 *The Connected Home: Designing and Building Technology into Today's New Homes* [2016]. Available at <https://www.nhbcfoundation.org/publication/the-connected-home/>



# List of Approved Documents

The following documents have been published to give guidance on how to meet the Building Regulations. You can find the date of the edition approved by the Secretary of State at [www.gov.uk](http://www.gov.uk).

**Approved Document A**

Structure

**Approved Document B**

Fire safety

Volume 1: Dwellings

**Approved Document B**

Fire safety

Volume 2: Buildings other than dwellings

**Approved Document C**

Site preparation and resistance to contaminants and moisture

**Approved Document D**

Toxic substances

**Approved Document E**

Resistance to the passage of sound

**Approved Document F**

Ventilation

Volume 1: Dwellings

**Approved Document F**

Ventilation

Volume 2: Buildings other than dwellings

**Approved Document G**

Sanitation, hot water safety and water efficiency

**Approved Document H**

Drainage and waste disposal

**Approved Document J**

Combustion appliances and fuel storage systems

**Approved Document K**

Protection from falling, collision and impact

**Approved Document L**

Conservation of fuel and power

Volume 1: Dwellings

**Approved Document L**

Conservation of fuel and power

Volume 2: Buildings other than dwellings

**Approved Document M**

Access to and use of buildings

Volume 1: Dwellings

**Approved Document M**

Access to and use of buildings

Volume 2: Buildings other than dwellings

**Approved Document O**

Overheating

**Approved Document P**

Electrical safety – Dwellings

**Approved Document Q**

Security – Dwellings

**Approved Document R**

Infrastructure for electronic communications

Volume 1: Physical infrastructure and network connection for new dwellings

**Approved Document R**

Infrastructure for electronic communications

Volume 2: Physical infrastructure for high-speed electronic communications networks

**Approved Document S**

Infrastructure for the charging of electric vehicles

**Approved Document 7**

Materials and workmanship

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