Promoting competition and investment in fibre networks: Telecoms Access Review 2026-31

Volume 2: Market definition and SMP assessment

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Consultation

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Section

1. Introduction and approach

1.1 In this volume (Volume 2) we set out our reasoning and proposals for identifying product markets and geographic markets, and for our significant market power (SMP) analysis for the markets we are reviewing in the UK (excluding the Hull Area).[1] These markets are:

- physical infrastructure
- wholesale local access (WLA)
- leased line access (LLA)
- inter-exchange connectivity (IEC)

1.2 Where we provisionally find an undertaking has SMP, we propose remedies in Volumes 3, 4, 5 and 6.[2]

Scope of the telecoms access market review

Residential and business services included in this review

1.3 In this review, we are considering telecoms services providing broadband connectivity at a fixed location. These locations include residential and business premises. Retail services delivered over broadband connections include landline, broadband and TV for residential consumers; and for businesses, services include landline and broadband (often in packages offering different speeds and packages tailored to the needs of businesses).

1.4 Broadband services are typically provided over a local access network and there are many different local access network technologies, each with different capabilities. The main access network technologies are copper wires, fibre-to-the-cabinet (FTTC) which uses a combination of copper wires and fibre cables, hybrid fibre-coaxial (HFC) cable and full fibre (fibre-to-the-premises (FTTP)). This review covers all of these access network technologies.

1.5 Over the past two decades, access networks have been developing to support increasingly higher broadband speeds and the latest developments are able to support speeds of 1,000 Mbit/s (1 Gbit/s) or more. Accordingly, these latest networks are referred to as gigabit capable. The two main access network technologies that are gigabit-capable are HFC and FTTP.

1.6 In addition, businesses sometimes use an uncontended connection, usually fibre, known as a 'leased line', for high-capacity data services.

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[1] When we refer to the UK, throughout this consultation document, we mean the UK excluding the Hull Area (i.e. the area defined as the 'Licensed Area' in the licence granted on 30 November 1987 by the Secretary of State under section 7 of the Telecommunications Act 1984 to Kingston upon Hull City Council and Kingston Communications (Hull) plc (KCOM)). We separately found that KCOM had SMP in various markets in the Hull Area in October 2021. See Ofcom, 2021. Statement: Promoting competition in fibre networks – Hull Area Wholesale Fixed Telecoms Market Review 2021-26. We will consider the Hull Area markets again in a separate review for the period 2026-31, with a consultation planned for 2025-26.

[2] As we did not make any market power determination in the WFTMR 2021 for the markets for wholesale fixed analogue exchange lines (WFAEL), wholesale integrated services digital network (ISDN2 and ISDN30), and wholesale broadband access (WBA), they are not included within this review.

1.7 Telecoms services provided to consumers on the move are not part of this review. However, wireless connections (using mobile, satellite or fixed wireless access technology) may be used to deliver some retail services at a fixed location (for example, to deliver landline services and to provide broadband connections for some residential consumers and businesses) and we therefore take these into account where relevant in this review.

1.8 We give an overview of the broadband and leased line markets in Section 2 of this Volume.

Markets to be reviewed

1.9 In this review we are considering the wholesale markets that support retail telecoms services provided at fixed locations, not the whole value chain for fixed telecoms retail services.

1.10 In particular, we are reviewing the following markets:

- The physical infrastructure market: wholesale access to telecoms physical infrastructure, such as underground ducts or telegraph poles, that can be used for deploying a telecoms network.
- The wholesale local access (WLA) market: wholesale services used by telecoms providers to sell broadband to residential consumers and small businesses.
- The leased line access (LLA) market: wholesale services used by telecoms providers to sell high quality, uncontended capacity and high-speed lines, typically more suited to businesses.
- The inter-exchange connectivity (IEC) market: wholesale services used by telecoms providers to carry broadband traffic between BT exchanges located in different geographic areas.

1.11 The most upstream wholesale market is the physical infrastructure market while the three downstream wholesale markets are the WLA, LLA and IEC markets. The retail markets encompass services for residential consumers and businesses customers (e.g. standalone broadband or a bundle of broadband and landline services) and are further downstream from the three wholesale downstream markets.

Approach to market definition

1.12 This volume (Volume 2) sets out our provisional conclusions on market definition and the assessment of competition in the relevant markets which determines whether an undertaking has SMP. Annex 5 provides a summary of the relevant regulatory framework.

1.13 In the remainder of this section, we summarise our market definition in the WFTMR21 and explain our approach to defining WLA and LLA product and geographic markets in this review.

Our approach to defining product and geographic markets

1.14 In the WFTMR21, we started our analysis of relevant markets with the market for physical infrastructure, as this is the most upstream market, finding one single geographic market. This reflects our preferred approach to regulation which is to intervene at the most upstream level of the value chain to minimise regulation in downstream markets and to

promote competition as far back into the network as possible.[3] As we explained in the WFTMR21, physical infrastructure is a key component of network build. We then defined a WLA product market, a LLA product market, and an IEC product market. We finally defined different geographic markets reflecting different competitive conditions:

- WLA: we defined an Area 2, where we believed there was already, or there was likely to be the potential for, material and sustainable competition to BT in the commercial deployment of competing networks, and Area 3, where we believed the potential for such material and sustainable competition to BT was unlikely.
- LLA: we defined an Area 2 and Area 3 based on whether there was likely to be the potential for material and sustainable competition to BT in the commercial deployment of competing networks. We also identified the Central London Area (CLA) and the High Network Reach (HNR) Area, where there were BT and two or more rival networks providing LLA services.
- IEC: we identified each BT exchange as a separate market and grouped them into three categories for the purposes of our SMP assessment: exchanges where BT plus two or more Principal Core Operators (PCOs)[4] were present (BT+2); exchanges where BT plus one PCO was present (BT+1); and exchanges which were BT Only.

1.15 Since 2021, as we set out in Volume 1 and Section 2 of this volume, there has been significant investment by Openreach and other network operators in deploying new FTTP networks. There is further deployment planned after 2026, albeit slowing down from the current pace. However, alternative network operators (altnets) are still in the process of establishing themselves, with take-up of their services varying between providers and geographic areas. In addition to the deployment of new FTTP networks, we have also seen an increase in deployment of leased line networks since 2021 in some geographic areas.

1.16 Given that network competition is therefore still developing in the WLA and LLA markets, we propose to continue to distinguish markets where there is or there is likely to be the potential for material and sustainable competition, and markets where we believe this is unlikely. We also consider whether we should define any other geographic markets.

1.17 In addition, we continue to consider separately the markets for the supply of wholesale access services for residential consumers and small businesses, and the markets for high quality services targeted at larger businesses (leased lines).

1.18 We have seen evidence that new networks are being used to supply both broadband and leased line services in some areas, and by some providers. We think that it remains possible that the WLA and LLA markets may converge more closely in the future. At this stage, our analysis suggests that the competitive dynamics of those markets continue to be different. However, when considering our remedies, we consider the impact that network operators'

[3] Our approach to market analysis is broadly consistent with the WFTMR21 and has been set out in more detail in the 2019 PIMR Statement (for more details, see: Ofcom. 2019. Promoting competition and investment in fibre networks: review of the physical infrastructure and business connectivity markets. Volume 1, Paragraphs 3.9-3.21).

[4] A PCO is a telecoms provider with its own network infrastructure, which has a substantial footprint, and offers a wholesale inter-exchange connectivity service to other telecoms providers, as described in the WFTMR21 (Ofcom. 2021. Promoting investment and competition in fibre networks – Wholesale Fixed Telecoms Market Review 2021-26. Annex 25).

rollout will have across all of the downstream markets, to ensure our objectives are best met (see Volume 1, Section 2, on our objectives).

1.19 We recognise that there is inherent uncertainty in defining forward-looking geographic markets, particularly during a dynamic period in which network competition is still developing. We have therefore used our regulatory judgment to assess the evidence available and to take a view on likely developments over the period of the review.

Structure of the rest of this volume

1.20 The rest of this volume is structured as follows:

- Section 2 gives an overview of market context.
- Section 3 considers the physical infrastructure market.
- Section 4 considers the wholesale local access market.
- Section 5 considers the leased line access market.
- Section 6 considers the inter-exchange connectivity market.
- Section 7 sets out the competition concerns arising from our proposed findings that BT has SMP in each of the relevant markets.

2. Market context

2.1 In this section, we set out background information on the retail and wholesale markets for the provision of broadband and leased line services. This covers:

- For broadband services:
  - Structure of the broadband market
  - Retail and wholesale broadband availability
  - Retail and wholesale broadband take-up
  - Retail broadband pricing
  - Broadband consumers attitudes and usage
  - Alternative technologies delivering fixed telecoms services
- For leased line services:
  - Structure of the leased line market
  - Service take-up and usage

Broadband

2.2 As set out in Section 1, our review considers telecoms services provided at a fixed location. These are delivered over a variety of technologies, and can deliver a range of services, including broadband.

2.3 In this section we give some additional context on the broadband market.

Structure of the broadband market

The broadband supply chain

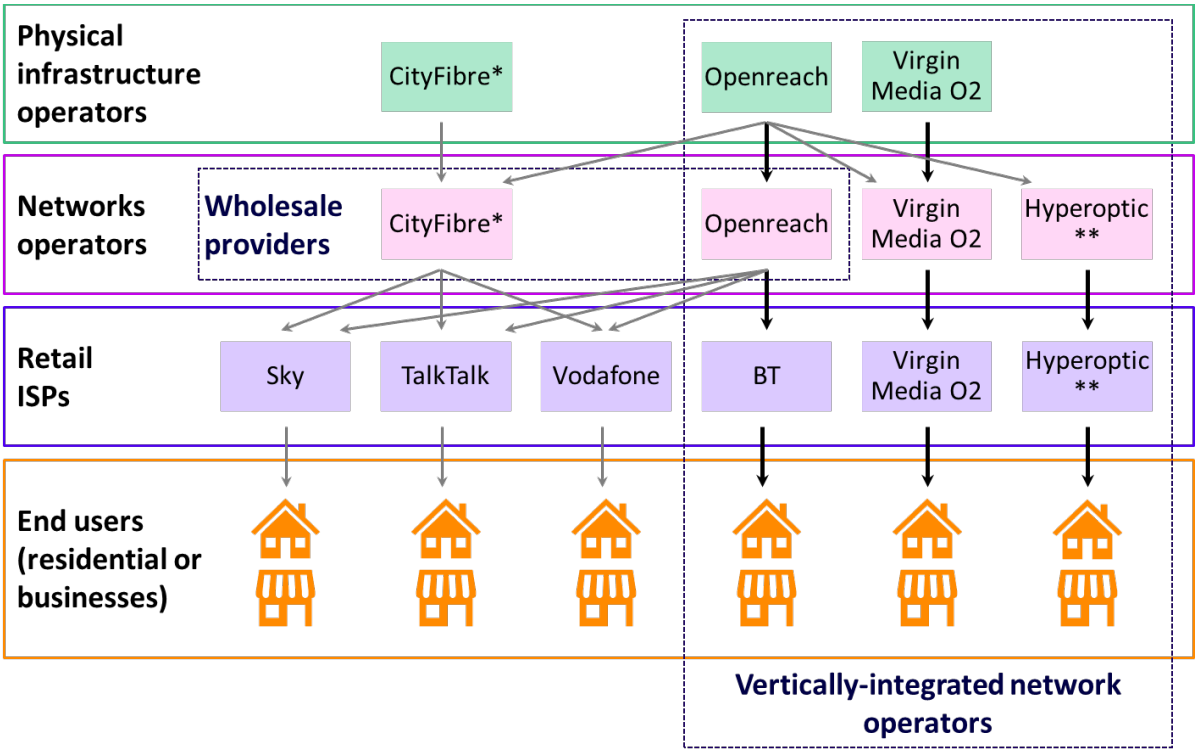
2.4 There are many providers involved in delivering broadband services, as outlined in Figure 2.1. These providers range from those that build and operate the network infrastructure itself, to those that provide the services to consumers.[5] Some providers operate at all levels of the value chain (i.e. vertically-integrated network operators), while others operate only in parts of the value chain (e.g. wholesale providers).[6] In recent years, many new network operators have entered the market, deploying alternative network infrastructure for wholesale and/or retail provision of broadband services. These newer providers are known as altnets.[7]

2.5 We explain the different types of providers operating in the broadband value chain in more detail below, explaining the functions of physical infrastructure operators, network

[5] When referring to consumers throughout this broadband section, we mean residential consumers and businesses that use broadband services similar to residential consumers, unless otherwise specified.
[6] The upstream part of the market is for wholesale services, which are those services that telecoms providers provide for themselves and sell to each other. The most downstream part of the market is retail services – those sold directly to residential consumers and businesses.
[7] Altnet is short for an alternative network provider which is not Openreach or Virgin Media O2. An altnet is an organisation operating within the UK that builds its own network infrastructure for wholesale and/or retail provision of broadband services. Some altnets also offer leased line services, and we refer to these as multi-service networks.

operators, and the retail internet service providers (ISPs), as well as the difference between vertically-integrated network operators and other types of providers.

Figure 2.1: Broadband supply chain – examples only



Source: Ofcom. 2025.
*Notes: Companies included in the diagram are provided **as examples only** and are not intended to provide an exhaustive picture of the broadband telecoms market. *CityFibre uses a mix of self-build and PIA.**Hyperoptic uses PIA and Openreach leased lines* [8]

Physical infrastructure operators

2.6 Physical infrastructure operators build and operate the infrastructure in which telecoms networks equipment is deployed, like ducts and poles.

2.7 Network operators (discussed below) may build their own physical infrastructure for their own use or use by other network operators or retail ISPs. Network operators may also use third parties' physical infrastructure, or a combination of this and their own physical infrastructure.

2.8 As discussed in Volume 3, Section 5, Openreach is currently mandated to provide specific network access in the form of physical infrastructure access (PIA). As mentioned in Volume 1, as of December 2024, over 170 providers had registered to use Openreach's physical infrastructure, and 140 of them had already deployed network using this access (or had placed orders to do so). These providers had ordered 185,000 km of duct (compared to a total of 496,000 km in Openreach's network), and over 111,000 km had already been used. They had ordered approximately 1.3m attachments to poles across Openreach's 4.1m poles, of which 830,000 attachments had already been used.[9]

[8] Hyperoptic. May 2023. Hyperoptic Response: Ofcom Consultation – Improving broadband information for consumers. CityFibre. June 2022. CityFibre Blog. Repurposing yesterday's network for our Full Fibre future.
[9] As discussed in Volume 1, Section 2.

2.9 Different providers use PIA to different extents; for instance, we note that generally altnets use PIA to deploy their networks in greater proportion than leased line providers do.[10] Some providers may use a combination of self-build and PIA (such as CityFibre), and others may use mostly PIA.

Wholesale providers

2.10 Network operators build and operate their own fixed telecommunications networks.

2.11 Some network operators are **wholesale providers**; they do not sell broadband services directly to end-users, but instead sell network access to retail ISPs who then sell broadband services to residential consumers and small businesses.[11]

2.12 **Openreach** operates BT's network, is the largest wholesale provider in the UK with near-universal coverage and provides wholesale services to c.650 retail ISPs.[12] We discuss Openreach and BT Group in more detail below.

2.13 Other examples of wholesale providers include CityFibre and nexfibre:

- **CityFibre** currently covers 4.3m premises and plans to cover 8m premises.[13] CityFibre provides wholesale services to retail providers such as TalkTalk and Vodafone and has entered into an agreement to do so with Sky in August 2024.[14]
- **nexfibre**[15] currently covers 2m premises and is targeting 5m premises by 2026.[16] [17] nexfibre's anchor tenant is Virgin Media O2 (VMO2), and nexfibre intends to make its network available to other ISPs in the future.

Vertically-integrated network operators

2.14 Some network operators are also vertically integrated, meaning they control all stages of broadband service delivery, from owning or using physical infrastructure, to selling directly to consumers and businesses. Examples of vertically-integrated network operators include BT Group, VMO2 and some of the altnets deploying FTTP, such as Hyperoptic or Community Fibre.

2.15 The BT Group is the largest vertically-integrated network operator. The group includes the upstream wholesale entity, Openreach, which manages BT's network and since 2018, has been a separate subsidiary within BT group.[18] Openreach's network previously used

[10] See Volume 2, Section 3, footnote 146.
[11] Among businesses, broadband services are primarily used by micro and small businesses, and larger businesses more likely to use leased lines, which are discussed later in this volume.
[12] Openreach. Openreach website. Accessed on 5 March 2025.
[13] CityFibre. Our Rollout. Accessed on 15 January 2025.
[14] CityFibre. 11 February 2025. CityFibre delivers first full year of profitability, with Sky to launch in 2025. Accessed on 18 February 2025.
[15] nexfibre is a joint venture between InfraVia Capital Partners, Liberty Global and Telefónica. nexfibre. About nexfibre. Accessed on 27 February 2025. VMO2 is a 50:50 joint venture between Liberty Global and Telefónica SA. VMO2. Hello, we're Virgin Media O2. Accessed on 27 February 2025.
[16] nexfibre. Nexfibre network passes 2 million premises. Accessed on 14 January 2025.
[17] FTTP refers to fibre-to-the-premises, however this can also be referred to as fibre-to-the-home (FTTH), fibre-to-the-building (FTTB) or full fibre. See Annex 22, Glossary, for the full definition.
[18] Openreach became a separate subsidiary in BT Group as a result of commitments that BT made to give Openreach greater strategic and operational independence from BT Group to address competition concerns identified by Ofcom in 2016. For more details, see annual reports by Ofcom's Openreach Monitoring Unit.

primarily copper-based technologies,[19] including FTTC (explained below), but in the last few years, Openreach has been deploying a new network using fibre cables running directly to premises (FTTP). Openreach had deployed FTTP to 17m premises as of January 2025.[20] It has plans to extend its FTTP footprint to 25m premises by 2026, with ambitions to extend to 30m premises by the end of 2030.[21] The Openreach network is used by downstream retail divisions of BT (e.g. BT, EE, Plusnet) who sell services directly to consumers, as well as other retail ISPs and network providers.

2.16 VMO2 is currently the second largest vertically-integrated network operator. As outlined above, VMO2 has recently entered an agreement with nexfibre whereby nexfibre will carry out VMO2's new FTTP build (in areas where VMO2 is not already present) with VMO2 operating as a build partner. In areas where nexfibre is or plans to be present, VMO2 will act as wholesale customer of nexfibre (as the anchor tenant), and use the nexfibre network to provide services.[22] VMO2 and nexfibre are separate companies, but due to the arrangements between them, we report the combined footprint of VMO2 and nexfibre in the following paragraphs.

2.17 Together, VMO2 and nexfibre cover over 18m premises nationwide.[23] VMO2 operates a mainly Hybrid Fibre Coaxial network (HFC, explained below) covering most urban areas of the UK. It announced in 2021 that it would be upgrading its HFC network to FTTP by 2028.[24] As discussed above, VMO2 is also expanding its retail coverage as the anchor tenant for the FTTP network being deployed by wholesale altnet nexfibre. As of the end of 2024, VMO2 and nexfibre's combined FTTP coverage was 6.4m premises.[25]

2.18 Many of the vertically-integrated altnets are more geographically concentrated or specialised. For example, Community Fibre is mainly present in London, covering about 1.3m premises,[26] Gigaclear focusses on rural areas, covering about 580,000 premises,[27] and Hyperoptic focuses on new build and blocks (multi-dwelling units (MDU)), covering about 1.7m homes in 64 towns and cities.[28]

Retail internet service providers (ISPs)

2.19 Retail ISPs are predominantly focussed on providing residential consumers and small businesses with broadband services. They include both those that use their own networks

[19] Copper-based broadband: A broadband service where the physical connection between the local access aggregation node and the network termination equipment (NTE) comprises copper wires either in whole or in part. Openreach products used to deliver copper-based broadband include, but are not limited to LLU, SLU, MPF/SMPF, FTTC, G.fast, SOTAP, SOGEA, and SOG.fast.

[20] Openreach. 6 January 2025. A record year for UK broadband build and usage. Accessed on 14 January 2025.

[21] Openreach. Our Full Fibre Broadband Build Plans. Accessed on 18 February 2025.

[22] VMO2. Bringing our gigabit services to more areas with new fibre technology switch on - Virgin Media O2 . Accessed on 6 March 2025. nexfibre. nexfibre's new full fibre network goes live with launch of Virgin Media O2's services - nexfibre. Accessed on 6 March 2025.

[23] Virgin Media O2. 19 February 2025. Virgin Media O2 publishes Q4 and full year results to 31 December 2024.

[24] Virgin Media O2. Virgin Media O2 bolsters future network with fibre upgrade plan. Accessed on 15 January 2025.

[25] Virgin Media O2. 19 February 2025. Virgin Media O2 publishes Q4 and full year results to 31 December 2024.

[26] Community Fibre. 27 August 2024. Community Fibre announces strong customer growth with 300k customers switching to 100% full fibre broadband across the capital.

[27] ISP Review. Gigaclear Extends UK Rural FTTP Broadband Cover to 580,000 Premises. Accessed on 4 March 2025.

[28] Hyperoptic. 2024. Mid-Year Update Report for the Six Months to 30 June 2024. Accessed on 14 January 2025. Which, December 2024, Hyperoptic Broadband Review. Accessed on 6 March 2025.

to provide services, and those that use others' networks. They may also provide other services that use the broadband connection such as digital landlines or streaming services.

2.20 The majority of residential consumers and small businesses purchase broadband services from a small number of large retail ISPs, including BT (across the BT brand and the other brands it owns, EE and Plusnet), Sky, VMO2, TalkTalk and Vodafone.

2.21 Retail fixed broadband connection shares are split across many retail ISPs. Our data provides estimates of the share of active retail broadband connections in the UK in 2023. BT (32%), Sky (22%), VMO2 (20%) and TalkTalk (8%) accounted for most (82% share) retail broadband connections. BT (including EE and Plusnet) remained the largest UK broadband provider in 2023, with a 32% share of retail connections. Other retail ISPs, such as Vodafone, Gigaclear, and Hyperoptic, together accounted for an 18% market share, a three percentage point increase since 2021.[29]

Residential and business broadband products offered

2.22 All retail ISPs offer a range of products which may be differentiated by, for example, the services included as a bundle with the broadband service, or the choice of headline broadband speeds. Providers offer FTTP packages with speeds ranging between around 70 Mbit/s to 900 Mbit/s,[30] and products with speeds above 1 Gbit/s are also increasingly being offered.[31] Contract lengths vary between 12 to 24 months, although some providers offer monthly rolling contracts.[32] The different packages and speeds are offered at a range of different price points.

2.23 Some of the ISPs providing residential broadband services also offer a range of broadband packages targeted at business users, particularly 'small office/home office' and 'micro-businesses'. There are also a number of smaller ISPs who are specialist providers of these business broadband services. Business broadband products typically offer a range of additional features compared to residential broadband products, e.g. increased customer support.[33] Products may also be tailored to the needs of different types and size of

[29] BT includes Plusnet and EE. TalkTalk's share of broadband connections refers to TalkTalk Consumer (i.e. retail), rather than PlatformX's wholesale connections. Ofcom. 18 July 2024. Communications Market Report 2024. Interactive Data, Telecoms and Networks, Fixed telecoms connections by ISP (%)

[30] For example, Sky offers packages that offers download speeds ranging from 75 – 900 Mbit/s. Other examples of ISPs offering speeds up to 900 Mbit/s include BT, TalkTalk, Sky, or VMO2. See: BT. BT broadband. Accessed on 21 February 2025. TalkTalk. Our best broadband deals. Accessed on 21 February 2025. Sky. Sky Broadband Speeds. Accessed on 21 February 2025. VMO2. VMO2 broadband deals. Accessed on 24 February 2025.

[31] For example, Community Fibre offer packages with speeds from 100 Mbit/s to 3 Gbit/s. Community Fibre. Community Fibre. Broadband Packages. Accessed on 19 February 2025. VMO2 also offer speeds of up to 2 Gbit/s using the nexfibre network. VMO2. VMO2 switches on residential 2Gbps broadband service and launches symmetrical speed options. Accessed on 4 March 2025.

[32] For example, Sky and TalkTalk have minimum 24-month terms, while Gigaclear have a minimum 18-month term. Hyperoptic and VMO2 offer 1 month rolling contracts. BT. BT Broadband deals. Accessed on 21 February 2025. TalkTalk. TalkTalk Full Fibre. Accessed 21 February 2025. Sky. Sky Broadband Speeds. Accessed on 21 February 2025. VMO2. No contract broadband. Accessed on 24 February 2025. Hyperoptic. Hyperoptic broadband only price plans. Accessed on 24 February 2024.

[33] Other examples of additional features include cloud apps (e.g. Office 365 or Dropbox), static IP addresses or faster upload speeds.

organisation.[34] However, not all businesses may need the extra features provided by business broadband products, and some may purchase residential broadband: Ofcom research in 2022 found that 58% of micro-sized businesses, 8% of small businesses and 5% of medium-sized businesses were subscribing to residential broadband products.[35]

2.24 While smaller businesses may purchase business broadband packages for their organisations, larger businesses may purchase leased lines, which we discuss later in this section.

Retail and wholesale broadband availability

Broadband services can be delivered using a variety of technologies

2.25 There are four primary types of fixed line technologies for fixed broadband access. More information about these types of technologies can be found in Annex 6, Overview of telecoms networks.

- **Asymmetric Digital Subscriber Line (ADSL)** – Copper (telephone) cables are used to connect the exchange to each premises. The theoretical maximum download speed for ADSL is around 24 Mbit/s, however, actual speeds delivered diminish with the length of cable from exchange to the premises and average at around half of this.
- **Fibre to the cabinet (FTTC)** – FTTC involves optical fibre to the street cabinet, with copper cables connecting the cabinet to the premises. FTTC uses 'very high-speed digital subscriber line' (VDSL) technology. As with ADSL, speeds diminish with the length of the copper cable, with the maximum download speed for premises close to the cabinet normally up to 80 Mbit/s.[36]
- **Hybrid fibre coaxial (HFC) cable** – HFC is provided via optical fibre to a street cabinet and via coaxial cable from the cabinet to the premises. Because coaxial cable has less signal loss compared to telephone copper wires, HFC can deliver higher speeds over longer distances. In the UK, HFC is provided by VMO2, and its cable network can deliver gigabit speeds.[37]
- **Full fibre or 'fibre to the premises' (FTTP)** – The connection from the exchange to the premises is provided entirely over optical fibre. Generally, distance to the premises does not affect the speed delivered. FTTP can deliver gigabit speeds.[38]

2.26 Fixed broadband connections can also be categorised based on the download speed they provide, described below.

- We use the term **standard broadband** to describe broadband services with download speeds below 30 Mbit/s. This can be delivered by ADSL, FTTC, HFC and FTTP.[39]

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[34] For example, Virgin Media O2 offers broadband products for small businesses (1-10 employees). See Fibre Business Broadband & Phone Deals for 2025 | Virgin Media Business. Accessed on 28 January 2025.
[35] Ofcom. 2022. SME consumer experience in the communications market 2022.
[36] Another technology known as G.fast is also sometimes deployed at, or near, a limited number of cabinets offering higher speeds than VDSL.
[37] HFC access networks are shared between a large number (usually hundreds) of premises.
[38] Most FTTP access networks use Passive Optical Network (PON) approaches where capacity in the downstream and upstream direction is shared between around 30 to 60 users.
[39] This includes decent broadband, which refers to broadband connections with a download speed of at least 10 Mbit/s and an upload speed of at least 1 Mbit/s.

- **Superfast broadband** is used to describe broadband with download speeds of at least 30 Mbit/s. This can be delivered over FTTC, HFC, and FTTP technologies. Superfast broadband provides faster speeds for typical home activities, such as for one person streaming 4K/UHD video, and allows a one-hour HD TV episode to be downloaded in under four and half minutes. Several devices can also work simultaneously over superfast broadband. Superfast broadband is available to almost all of UK premises.[40] [41]
- **Gigabit-capable broadband** can offer download speeds of 1 Gbit/s and above and can only be delivered by HFC and FTTP. In comparison to superfast broadband, gigabit-capable broadband enables sufficient speeds to download a one-hour HD TV episode in eight seconds. We discuss gigabit-capable broadband coverage in the next section.[42]

Gigabit-capable and FTTP broadband coverage have increased since 2021

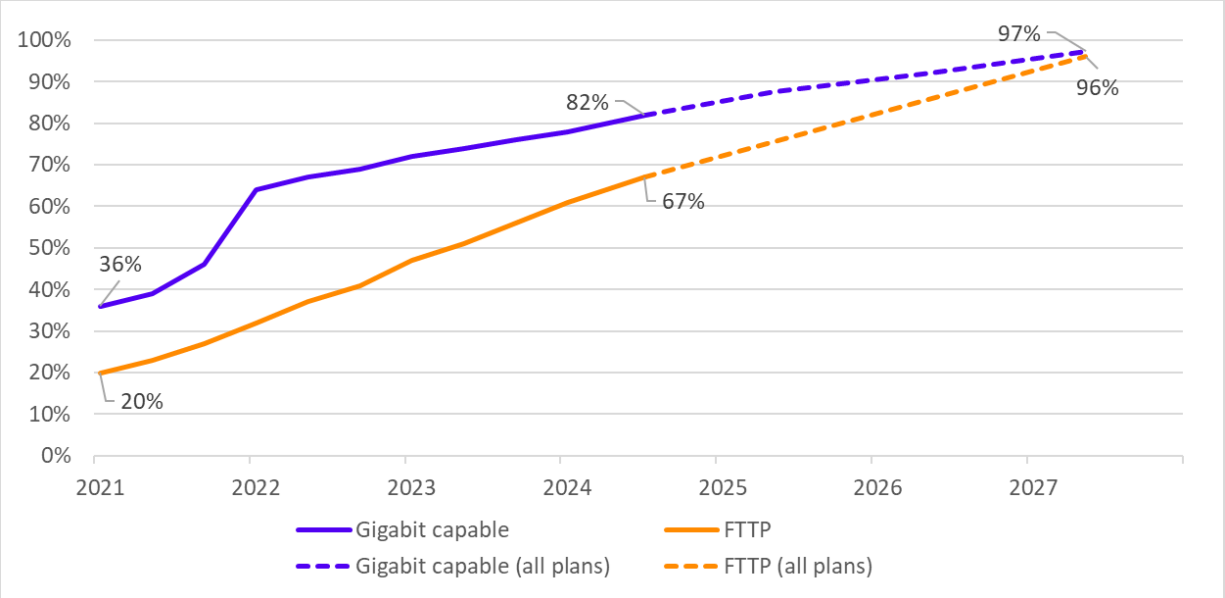
There has been substantial progress in the roll-out of FTTP and gigabit-capable networks

2.27 Since the publication of the WFTMR Statement in March 2021, there has been substantial progress in the roll-out of gigabit-capable networks. This has been driven by the deployment of FTTP networks by both Openreach and altnets, as well as VMO2's upgrade of its HFC network to be able to deliver gigabit speeds, which was completed in December 2021.[43] [44]

2.28 Figure 2.2 illustrates the progress made in FTTP broadband and gigabit-capable broadband availability from January 2021 for all premises,[45] as well as planned coverage until May 2027. Both FTTP and gigabit-capable broadband availability have increased since 2021. For example, access to FTTP broadband has increased from 20% of premises in January 2021 to 67% in July 2024.

[40] As of July 2024, 98% of residential premises across the UK have access to superfast broadband. Ofcom. 5 December 2024. Connected Nations 2024.
[41] We also sometimes refer to **ultrafast broadband**, which is used to describe broadband services capable of delivering a minimum download speed of 300 Mbit/s. This can be delivered over G.fast, HFC or FTTP.
[42] Ofcom. 5 December 2024. Connected Nations. Page 7.
[43] Gigabit-capable broadband can be delivered over both FTTP and HFC technologies, so as operators roll out FTTP, gigabit-capable coverage for residential consumers and businesses will increase.
[44] Virgin Media O2. 7 December 2021. Virgin Media O2 completes gigabit upgrade in boost for Britain's broadband target. Accessed on 11 February 2025.
[45] The Connected Nations narrative reports focus on residential premises only, while figures reported here are for all premises, i.e. residential and commercial, which can be found in the interactive reports provided with each Connected Nations publication.

Figure 2.2: FTTP and gigabit-capable broadband existing and planned coverage, 2021 to 2027



Source: Ofcom analysis of Connected Nations coverage data (collected 2021-2024) and planned network deployment data (collected May 2024). For more details see Annex 7.
Notes: we use all network deployment plans provided by operators, as opposed to, for example, only plans that are fully funded or are in the process of being built. Figures provided are for all premises covered by the Connected Nations data, residential and commercial, rather than residential premises. Gigabit-capable coverage of residential premises was 83% in July 2024, and FTTP coverage was 69%.

2.29 We expect the increase in the coverage of gigabit-capable broadband to continue well into the 2026-31 review period. Plans submitted in 2024 indicate that 97% of premises could have access to gigabit-capable broadband by May 2027, with the increase driven mostly by FTTP build. A number of providers have announced FTTP build plans, for instance Openreach aims to reach 30m homes and businesses with full-fibre access by 2030.[46] Overall, FTTP coverage is expected to increase from 67% as of July 2024 to 96% across the UK by May 2027.[47]

2.30 The rate of FTTP deployment is expected to slow down compared to recent years, given the significant build progress to date, which has resulted in coverage of about two thirds of the UK (as mentioned above, FTTP coverage stands at 67%, as of July 2024). Different altnets have built at varying rates, while some altnets have paused build plans. However other altnets, such as nexfibre and Netomnia/brsk, continue to accelerate their build.[48] As coverage reaches very high levels, the remaining premises without gigabit-capable broadband coverage are likely to be the most difficult to connect.[49]

Coverage varies across the UK

2.31 While the availability of gigabit-capable broadband has increased across the UK, there are variations. For instance, urban areas see a higher availability than rural areas. As of July 2024, 87% of premises in urban areas have access to gigabit-capable broadband compared

[46] Openreach. 2024. Our Full Fibre Broadband Build Plans . Accessed on 11 February 2025.
[47] FTTP planned coverage figures are dependent on networks completing planned deployments.
[48] nexfibre. 9 January 2025 nexfibre network passes 2 million premises. Accessed on 6 March 2025; Netomnia. 11 February 2025. Netomnia passes 110,000 premises in Liverpool. Accessed on 6 March 2025.
[49] Ofcom. 4 September 2024. Connected Nations - Planned Network Deployment

with 53% in rural areas. In addition, across the UK nations, Northern Ireland has the highest availability of gigabit-capable broadband as of July 2024, at 93% of premises compared with 83% for England, 76% for Scotland and 72% for Wales.[50]

2.32 In the WFTMR21, we found that the level of material and sustainable competition, both actual and/or potential, varied in different parts of the UK. We therefore defined two geographic markets for the provision of the wholesale services that support the delivery of broadband (the wholesale local access market or WLA, as mentioned in Section 1 of this Volume):

- WFTMR21 Area 2, where we considered that there was, or there was likely to be the potential for, material and sustainable competition to BT in the commercial deployment of competing networks; and,
- WFTMR21 Area 3, where we considered there was not, and there was unlikely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks.[51]

2.33 As shown in Table 2.1, the availability of gigabit-capable broadband in both WFTMR21 Areas 2 and 3 stands at 89% and 64% respectively as of July 2024.

Table 2.1: Gigabit-capable broadband and FTTP current and planned coverage across the UK

Area of UK	Coverage as of July 2024	Planned coverage as of January 2030
Gigabit-capable coverage		
UK	82%	98%
WFTMR21 WLA Area 2	89%	99%
WFTMR21 WLA Area 3	64%	94%
FTTP coverage		
UK	67%	97%
WFTMR21 WLA Area 2	69%	98%
WFTMR21 WLA Area 3	63%	94%

Source: Ofcom analysis of Connected Nations coverage data (collected August 2024), Connected Nations planned network deployment (collected May 2024), and additional planned network deployment data provided for TAR (collected August-September 2024, for additional detail see Annex 7). Base: 31.9m premises.

[50] July 2024 data: Ofcom. 5 December 2024. Connected Nations 2024, Interactive Report.
[51] We did not define an Area 1 market, where there are at least two rival networks to BT. See Volume 2, Section 4.

There is a wide range of network operators involved in the rollout of FTTP

2.34 The rollout of FTTP networks across the UK has been driven by both Openreach and altnets.

2.35 As discussed above, Openreach has rolled out FTTP to 17m premises as of January 2025.[52] This includes 3.2m premises in WFTMR21 Area 3, which exceeded Openreach's original commitment to cover 3.2m premises by March 2026.[53] It has plans to extend its FTTP footprint to 25m premises by 2026, with ambitions to extend to 30m premises by the end of 2030.[54]

2.36 As we also mentioned above, VMO2 operates a mainly HFC network covering most urban areas of the UK but is upgrading its HFC network to FTTP by 2028.[55] Additionally, VMO2 is also expanding its coverage as the anchor tenant for the FTTP network being developed by wholesale altnet nexfibre.

2.37 There are also a substantial number of altnets rolling out FTTP networks across the UK. We discussed some examples of these above, but there are many more altnets who are delivering connectivity across the country.[56] Altnet size, geographic location, and business model vary widely, with a long tail of small altnets.

2.38 Despite this fragmentation, overall altnet deployment is increasing the availability of an alternative network to Openreach. Table 2.2 below shows that in July 2024, across the UK, 70% (22.5m) of premises had access to gigabit-capable broadband from at least one other network in addition to coverage from Openreach.[57] For WFTMR21 Area 2 this increases to 82% of premises but drops to 43% for premises in WFTMR21 Area 3. Based on operators' plans, the proportion of premises with access to at least one network in addition to Openreach could rise to 85% for the UK overall by January 2030, reaching 92% for WFMTR21 Area 2 and 70% for WFTMR21 Area 3.

Table 2.2: Percentage of premises covered by Openreach and with current or planned gigabit-capable coverage from at least one other network, broken down by WFTMR21 WLA Areas 2 and 3

Area of UK	Coverage as of July 2024	Planned coverage as of January 2030
UK	70%	85%
WFTMR21 WLA Area 2	82%	92%
WFTMR21 WLA Area 3	43%	70%

Source: Ofcom analysis of Connected Nations coverage data (collected August 2024), Connected Nations planned network deployment (collected May 2024), and additional planned network deployment data provided for TAR (collected August-September 2024, for additional detail see Annex 7). Base: 31.9m premises.

[52] Openreach. 6 January 2025. A record year for UK broadband build and usage. Accessed on 14 January 2025.
[53] Openreach. 26 June 2020. Letter to Ofcom.
[54] Openreach. Our Full Fibre Broadband Build Plans. Accessed on 18 February 2025.
[55] Virgin Media O2. 29 July 2021. Virgin Media O2 bolsters future network with fibre upgrade plan. Accessed on 15 January 2025.
[56] See for instance the list of fixed providers submitting data for our 2024 Connected Nations Report. Ofcom. 5 December 2024. Connected Nations 2024: Methodology Annex. Page 15.
[57] For Openreach coverage by any technology is taken into account, whereas for other networks only gigabit-capable coverage is included.

Some network build is publicly subsidised

2.39 As discussed in Volume 1, Section 1, public sector investment is also playing a role in achieving connectivity across the UK to ensure coverage for those homes and businesses not included in operators' commercial roll-out plans. This includes the Government's Project Gigabit scheme, which is delivered by Building Digital UK (BDUK) working with industry partners and local bodies,[58] [59] as well as separate schemes from the Scottish Government, the Northern Ireland Executive and the Welsh Government.

2.40 BDUK indicated in its November 2024 update that most Project Gigabit contracts have been awarded and are being delivered by Openreach and altnets, with only a small number of procurements remaining.[60] As of November 2024, there were 30 contracts in place across England and Wales, targeting 1m premises. In Scotland, the Reaching 100% (R100) programme seeks to ensure every home and business in Scotland can access superfast broadband. As of March 2024, the R100 programme has delivered over 70,000 connections, including nearly 5,000 through the Scottish Broadband Voucher Scheme.[61] The Northern Ireland Executive's broadband scheme, Project Stratum, is nearing completion and, as was reported in the 2024 Connected Nations report, it has brought full-fibre broadband to over 78,000 predominantly rural premises of September 2024.[62] The Welsh Government's Superfast Cymru project was completed in 2023, having connected 44,000 homes and businesses.[63]

[58] UK Government. About us – Building Digital UK. Accessed on 6 March 2025.
[59] UK Government. Project Gigabit. Accessed on 5 March 2025.
[60] BDUK. 27 November 2024. Project Gigabit progress update – November 2024. Accessed on 15 January 2024.
[61] Scottish Government. R100, data insights. Accessed on 5 March 2025.
[62] Department for the Economy. Project Stratum. Accessed on 6 March 2025.
[63] Welsh Government. 6 December 2023. Tens of thousands of homes and businesses can access gigabit capable speeds as rollout of full fibre broadband smashes targets. Accessed on 7 March 2025.

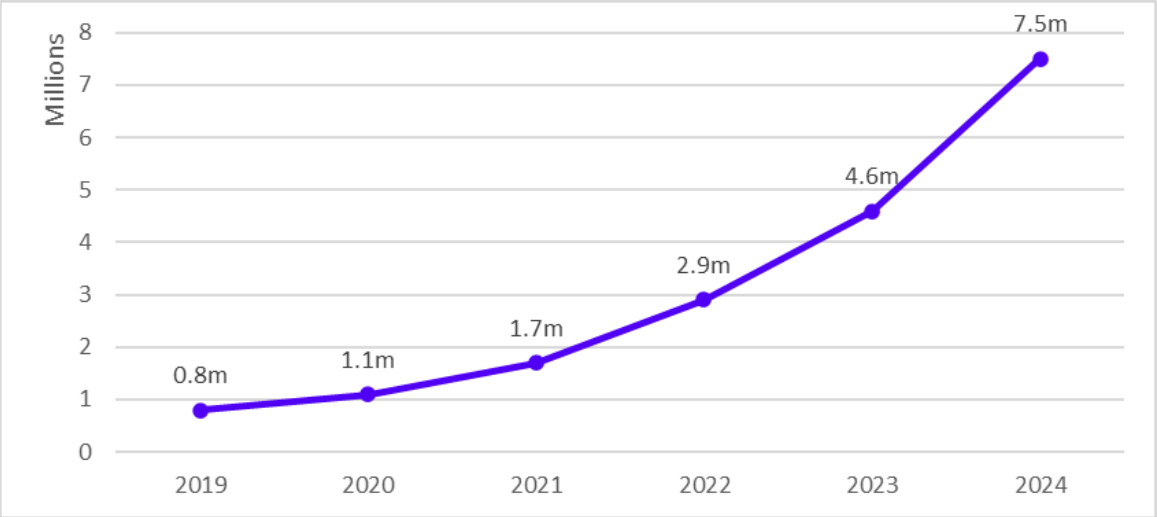
Retail and wholesale broadband take-up

Take-up of gigabit-capable broadband and FTTP is also increasing

2.41 As a result of greater coverage and an increase in network operators offering gigabit-capable broadband, take-up of these services has increased across the UK. Gigabit-capable broadband take-up across the UK (as a percentage of premises where a gigabit-capable network is available) is 49% across all premises. This is an increase of seven percentage points from 2023 (42%).[64]

2.42 Likewise, take-up of FTTP has increased from 28% in 2023 (of all premises where FTTP is available) or 4.6m premises, to 35% or 7.5m premises in 2024 (Figure 2.3).

Figure 2.3: FTTP take-up, 2019-2024

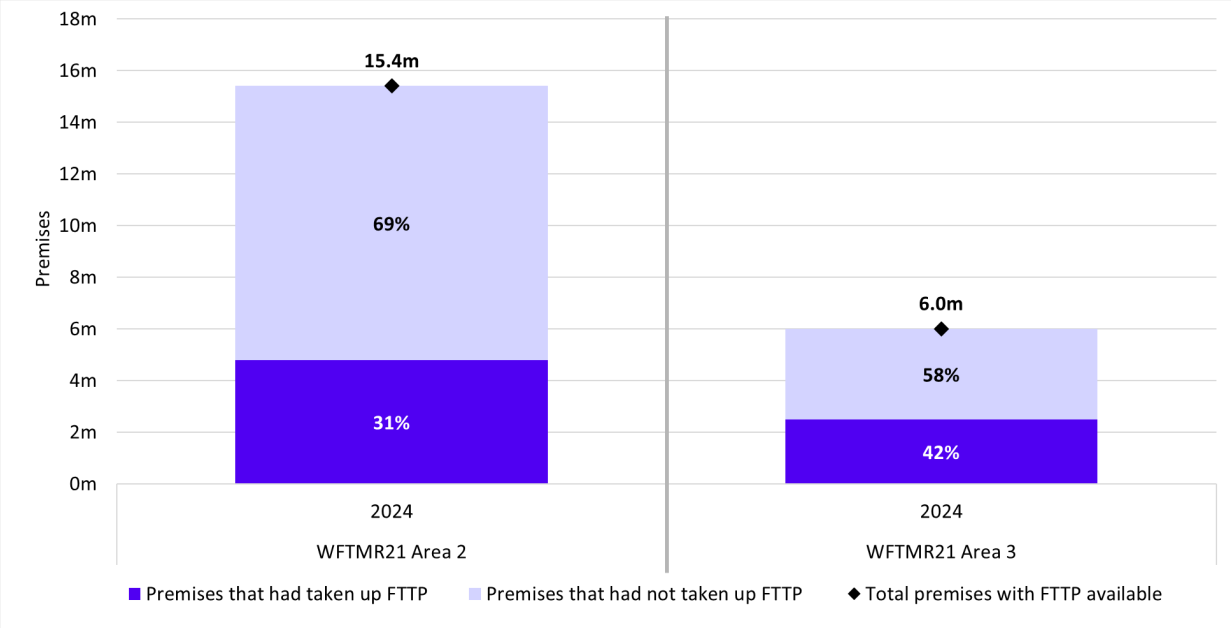


Source: Ofcom. 5 December 2024. Connected Nations.

2.43 While FTTP take-up has increased across the UK, take-up as a proportion of premises with coverage available is higher in WFTMR21 Area 3 than in WFTMR21 Area 2 (Figure 2.4). In WFTMR21 Area 2, take-up is 4.8m premises in 2024, which represented 31% of premises with FTTP available. For WFTMR21 Area 3, the equivalent figures were 2.5m premises, or 42% as a proportion of premises with FTTP available. This may be because, compared to WFTMR21 Area 2, a higher proportion of consumers in WFTMR21 Area 3 could not access speeds that met their needs before full-fibre rollout.

[64] Ofcom. 5 December 2024. Connected Nations 2024.

Figure 2.4: FTTP coverage and estimated take-up by WFTMR21 WLA Area 2 and WFTMR21 WLA Area 3, July 2024



Source: Ofcom analysis of Connected Nations data (collected August 2024).
Note: Only FTTP coverage and active connections in the postcode sectors in the WFTMR21 classifications were included. A small number of active connections could not be allocated to any postcode sector.

Take-up of FTTP differs by providers and networks

2.44 Openreach had approximately 35% take-up on its FTTP network as of September 2024.[65] By comparison, an INCA and Point Topic report found that altnets had an average take-up rate of approximately 15% at the end of 2023.[66] Further data published by Point Topic (and altnets themselves) shows that take-up varies depending on the altnet.[67] [68]

2.45 There are many potential reasons for the differences in take-up rates, including market presence, size and business models of providers. For example, Openreach's incumbency advantages include having established relationships with large retail ISPs, meaning take-up of Openreach's network will be higher.[69] Furthermore, our 2024 Connected Nations report found that the time elapsed since build impacts take-up rates, meaning that the longer FTTP has been available in a particular area, the higher the take-up.[70]

[65] BT Group. 1 February 2024. FY25 financial results & briefings - Half year to September 2024.
[66] Point Topic, INCA. April 2024. Metrics for the UK independent network sector. Accessed on 14 February 2025.
[67] A Point Topic report found that take-up from a selected group of altnets was on average 17% (as of September 2024), but there was substantial variation, with Hyperoptic, Fibrus Community Fibre and Gigaclear achieving take-up rates in the range of 20-30%. Point Topic. 13 December 2024. Q3 2024 UK ISP and network supplier metrics – a market overview. Accessed on 5 March 2025.
[68] Hyperoptic reported take-up at 29% of fully serviced homes in June 2024. Hyperoptic. 2024. Mid-Year Update Report for the Six Months to 30 June 2024. Accessed on 14 January 2025.
[69] See Volume 3, Section 1 and Keystone. 3 March 2023. The effect of BT Openreach's Equinox 2 on Altnets. Accessed on 7 March 2025.
[70] Ofcom. 5 December 2024. Connected Nations 2024.

There has been an increase in take-up at higher speeds

2.46 Ofcom analysis found that take-up of faster broadband services has increased since the WFTMR21, with take-up of superfast broadband services increasing across residential premises.[71]

2.47 Our analysis of provider forecast data to 2031 indicates that providers expect a decline in the number of connections with speeds below 80 Mbit/s (below 30 Mbit/s connections declining from a low base and 30-80 Mbit/s connections declining from a higher base). The number of connections at speeds greater than 300 Mbit/s is expected to rise substantially over the period to 2031.[72]

Providers use various strategies to incentivise take-up of FTTP

2.48 Network operators have made significant investments in rolling out FTTP networks, and so need to drive take-up of those services to generate revenue and therefore returns. For altnets, this means encouraging consumers to switch from another network onto their FTTP networks.[73] For retail ISPs that offer services over legacy copper-based networks,[74] it also means encouraging consumers to migrate from legacy copper-based networks to FTTP.

2.49 This is because many of the retail ISPs on Openreach's network have a large number of existing consumers on the current copper-based infrastructure delivering ADSL and FTTC-based broadband services. Those providers will ultimately need to migrate their base from copper-based services to Openreach's FTTP network or to rival networks. Eventually Openreach's copper-based network can be decommissioned to avoid the costly running of two parallel networks.[75] We discuss our regulatory support for copper retirement in Volume 3, Section 2.[76]

2.50 To incentivise take-up of FTTP by their consumers, on the retail side, ISPs have used a number of strategies. For instance, they may price FTTP services attractively compared to other broadband services, introduce specific promotional offers for new consumers with discounted rates, or bundle services with additional services such as Pay TV or landline.

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[71] Ofcom. 18 July 2024. Communications Market Report. Page 3; Ofcom. 22 July 2021. Communications Market Report. Page 3.

[72] Ofcom forecasts based on information provided by relevant parties: [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[73] Either directly or, if they only offer wholesale services, also indirectly through ISPs.

[74] A service where the physical connection between the local access aggregation node and the network termination equipment (NTE) comprises copper wires either in whole or in part. Openreach products used to deliver these or related services include, but are not limited to WLR, ISDN, LLU, SLU, MPF/SMPF, FTTC, G.fast, SOTAP, SOGEA, and SOG.fast. See Annex 22, Glossary.

[75] Openreach. Openreach puts the stopper on copper. Accessed on 17 February 2025.

[76] In parallel to the upgrading of the broadband infrastructure, the technology used to deliver landline calls needs to be replaced. Providers of traditional landlines, like BT and VMO2, are therefore also in the process of migrating consumers from the traditional Public Switched Telephony Networks (PSTN) to digital landlines provided over broadband. Ofcom. 7 February 2024. Moving landline phones to digital technology: what you need to know. Accessed on 5 March 2025.

2.51 In some other cases, retail ISPs may also proactively offer existing consumers the opportunity to migrate onto a new FTTP service.[77] For example, we have seen evidence of providers trialling approaches to engage with consumers about migrating to FTTP (TalkTalk).[78] We have also seen evidence of providers incentivising migration by offering FTTP for the same price as consumers' lower-bandwidth FTTC service (Sky).[79] We discuss the prices of broadband services in more detail below.

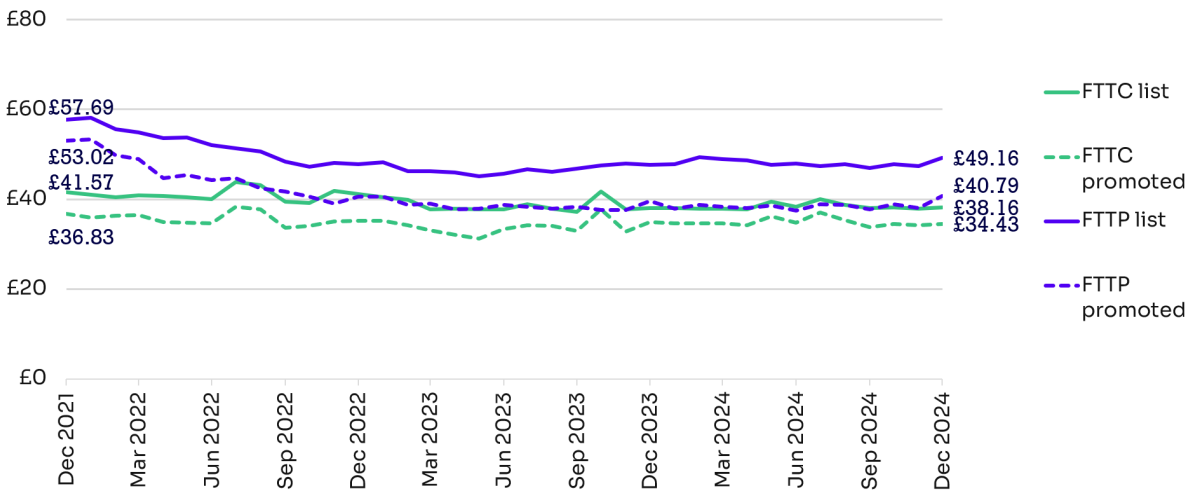
2.52 On the wholesale side, Openreach introduced offers for its wholesale FTTP services, 'Equinox', which was followed by a second offer, 'Equinox 2'. Those offers introduce lower prices to retail ISPs using the Openreach platform – such as BT, Sky, TalkTalk and Vodafone – if they agree to use mainly Openreach's FTTP products for new orders (where Openreach FTTP is available) instead of Openreach copper-based broadband services products.[80] For further detail, please refer to Volume 3, Section 2.

2.53 Altnets which provide wholesale services can also compete with Openreach with pricing strategies. For example, [✂] noted that [✂].[81] Similarly, [✂] noted that [✂].[82]

Retail broadband pricing

2.54 The prices of residential FTTP services have reduced considerably since 2021, as shown in Figure 2.5 and Figure 2.6. Standalone fixed broadband FTTP prices are also much closer to the price of FTTC, despite the fact that headline speeds can be higher on FTTP. For instance, the majority of residential consumers take broadband as part of a bundle of services, and the average list prices of FTTC broadband bought on a standalone basis, or in a dual-play bundle with a landline, are close to the promoted prices of similar services with full-fibre broadband.

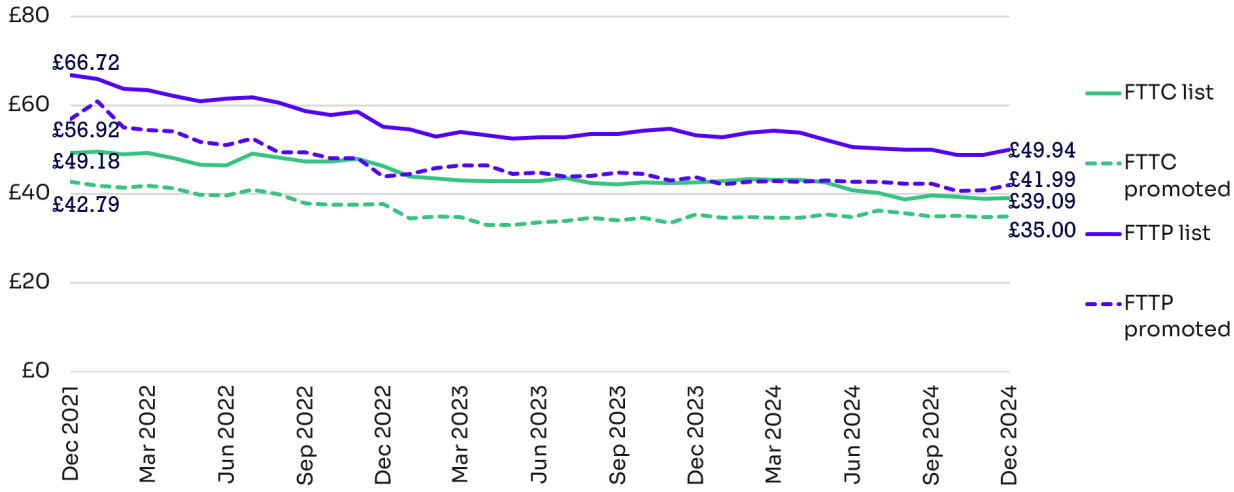
Figure 2.5: Prices for standalone residential broadband services delivered on FTTC and FTTP networks since WFTMR21 (average monthly real-terms prices)



[77] [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂].
[78] TalkTalk Telecom Limited response dated 19 August 2024 to s135 notice dated 8 July 2024, question C1.
[79] Sky UK Limited response dated 23 August 2024 to s135 notice dated 8 July 2024, question D2.
[80] Ofcom. 2023. Ofcom's decision on Openreach's 'Equinox 2' pricing offer.
[81] [✂] response dated [✂] to s135 notice dated [✂], question [✂].
[82] [✂] response dated [✂] to s135 notice dated [✂], question [✂].

Source: Ofcom / Pure Pricing's Monthly Broadband Pricing Tracker reports.
Notes: Represents monthly average of list and promoted available tariffs for new consumers. FTTC: from BT, EE, Plusnet, TalkTalk, Zen; FTTP: from BT, Community Fibre, Gigaclear, Hyperoptic, Plusnet, Shell, TalkTalk, VMO2, Zen. When available promotions include the promoted price and any 'gifts' offered; FTTP includes cable services; adjusted for CPI (December 2024 prices).

Figure 2.6: Prices for residential dual-play landline and fixed broadband bundles delivered on FTTC and FTTP networks since WFTMR21 (average monthly real-terms prices)



Source: Ofcom / Pure Pricing's Monthly Broadband Pricing Tracker reports.
Notes: Represents monthly average of list and promoted available tariffs for new consumers. FTTC: from BT, EE, NOW, Plusnet, Shell/Post Office, Sky, TalkTalk, Vodafone, Zen; FTTP from: BT, Community Fibre, Hyperoptic, KCOM, Shell, Sky, TalkTalk, VMO2, Vodafone, Zen. When available promotions include the promoted price and any 'gifts' offered; FTTP includes cable services, adjusted for CPI (December 2024 prices).

2.55 For broadband products targeted at businesses, which may offer additional features compared with residential broadband products as discussed above, prices range from £24 to £70 depending on the nature of the bundle.[83]

Broadband consumers attitudes and usage

Consumers consider several factors when choosing broadband

2.56 Reliability, price, and speed appear to be the most important factors in consumers' choice of broadband packages, according to surveys undertaken both on behalf of different ISPs[84] and for Ofcom.[85]

[83] For example, see business broadband packages from: Sky. Superfast 76/19Mbps Unlimited Business Broadband Provider | Sky Business; BT. Our Best Business Broadband & Phone Deals 2024 | BT Business; VMO2. Supercharge your Business with Volt | Virgin Media O2; and, TalkTalk. Full Fibre Broadband for Business | FTTP Deals. All accessed on 19 November 2024.
[84] For instance, evidence from [✂] indicates that reliable connections are most valued amongst its customers, with its consumer research concluding that speed and WiFi guarantee add more value to broadband packages than other features including 4G back-up, [✂] response dated [✂] to s135 notice dated [✂], question [✂]. Similarly, [✂] consumer research concluded that reliability was a core customer concern, [✂] response dated [✂] to s135 notice dated [✂], question [✂].
[85] Ofcom. 8 March 2024. Broadband terminology research.

2.57 To ensure good value for money, some consumers recontract with existing providers under new packages or renew their existing contract if they are happy overall with the service. These consumers often look for rewards for their loyalty (i.e. additional package features at no additional cost).[86] Consumers who continue to buy their broadband service from the same provider but without renewing or switching to a new contract are referred to as being 'out of contract'.

2.58 In other cases, consumers will switch providers if they are looking to improve one or more aspects of their service, including to avoid price rises or to get faster speeds.[87]

There has generally been an increase in data usage in recent years

2.59 Since the WFTMR21, there has been an increase in data usage across the UK. Average monthly data usage has increased from 453 GB per connection (across all broadband technologies) in 2021, to 535 GB per connection in 2023.[88] Consumers with FTTP broadband connections also appear to have higher data usage than consumers with other types of broadband. Data collected for the 2024 Connected Nations report shows an average monthly data usage of an average of 766 GB for FTTP connections only. These higher usage figures may reflect consumers with higher data needs choosing full-fibre broadband, as well as some consumers making more use of data intensive applications once they have migrated to higher speed technologies.[89]

2.60 Consumers go online for a wide range of activities, such as emailing, online shopping, making and receiving video calls, or streaming content.[90] Larger households or family households have greater demand for higher speeds, as multiple occupants are online simultaneously, so tend to value higher speed packages.[91] Many people regularly work from home, which places an additional importance on the speed, quality, and reliability of their broadband (see Annex 8).[92]

Satisfaction with broadband is generally high

2.61 Data from Ofcom's Comparing Customer Service report shows that the vast majority of consumers are satisfied with their broadband service.[93] Table 2.3 shows that, in 2022, 82% of residential broadband consumers were satisfied with their service overall, and levels of

[86] For example, see: [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂].
[87] For example, [✂] found in 2023 that the key reasons for choosing a broadband provider were better customer service, followed by price and connections speeds. [✂] response dated [✂] to s135 notice dated [✂], questions [✂]
[88] Ofcom. 19 December 2023. Connected Nations 2023. Page 17.
[89] Ofcom. 5 December 2024. Connected Nations 2024. Page 13.
[90] Ofcom. 28 November 2024. Online Nations 2024 – interactive report.
[91] [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]
[92] For example, [✂] research found that majority of workers regularly work from home, with most working up to 4 days a week from home. This therefore places significant importance on the quality and reliability of their broadband connections. [✂] response dated [✂] to s135 notice dated [✂], question [✂]
[93] Ofcom. 4 September 2023. Comparing customer service: mobile, home broadband and landline – interactive report.

satisfaction were largely in line with this across all providers in this sector, with the exception of Plusnet (whose consumers satisfaction level was the highest).[94]

2.62 Eighty per cent of residential broadband consumers were satisfied with the speed of their service.

Table 2.3: Satisfaction with broadband services among residential consumers, 2022

	BT	EE	Plusnet	Sky	TalkTalk	VMO2	Vodafone	Average
Satisfaction with overall service	83%	85%	89%	82%	78%	81%	83%	**82%**
Satisfaction with speed of service	80%	81%	83%	80%	76%	82%	82%	**80%**

Source: Ofcom. 18 May 2023. Comparing customer service: mobile, home broadband and landline. Page 13.

Alternative technologies delivering fixed telecoms services

2.63 This section has so far focused on fixed line broadband connections. However, broadband services can also be provided to fixed locations using wireless services. We summarise the three main ways to do this, and discuss each in greater detail in Section 4.

Mobile broadband

2.64 Consumers can also use mobile networks to meet their broadband service needs.[95]

2.65 4G remains the backbone for mobile broadband, with UK 4G geographic coverage from at least one operator at 95% as of September 2024. The 4G network carries 78% of monthly mobile data traffic. While 5G has the capacity to offer higher speeds than 4G, coverage is still evolving and varies by mobile network operator (MNO) (see Annex 6). As of September 2024, 5G geographic coverage from at least one operator stood at 48%-60% (across a range covering Very High and High Confidence levels).[96] While this still lags 4G coverage, there has been substantial growth. In September 2022, 5G geographic coverage from at least one operator was at 17%-25% (across a range covering Very High and High Confidence levels).[97] [98]

[94] Ofcom. 7 May 2021. Comparing customer service: mobile, home broadband and landline.
[95] They can do so by connecting to a 4G or 5G mobile network when they are at home using their mobile phone, a dongle or similar equipment.
[96] When reporting on mobile availability predictions, we refer to confidence ranges reflecting the likelihood of on the ground coverage for consumers as high confidence and very high confidence associated with signal strength. For additional detail, please see the methodology annex of the 2024 Connected Nations report.
[97] Ofcom. 5 December 2024. Connected Nations 2024.
[98] We note that mobile coverage in the future may be affected by the Vodafone / Three UK merger. The merger was approved by the CMA on 4 December 2024, and subject to legally binding commitments which include the delivery of a network investment plan to improve network quality across the combined networks. CMA. 4 December 2024. Vodafone / CK Hutchison JV merger inquiry. Accessed on 10 March 2025.

Fixed wireless access

2.66 In a fixed wireless access (FWA) network, wireless links are used to provide broadband connectivity to a fixed location, such as a residential premises. There are two ways in which FWA can be delivered:

- FWA from MNOs; and
- FWA from wireless internet service providers (WISPs).[99]

2.67 FWA from MNOs is offered on licensed 4G and 5G networks, usually to an indoor customer premises equipment or router. The performance of the broadband connection is dependent on the quality of the mobile signal that is received indoors. These services share network capacity with mobile users, so the network must be carefully managed to balance the demands of both. In areas of high mobile demand, reliable FWA service may not be possible.

2.68 MNOs such as EE, Three, and Vodafone provide home broadband via their 4G and 5G mobile networks. These services, tailored for home use, offer average download speeds of around 30 Mbit/s on 4G and 150 Mbit/s on 5G, though 5G coverage is more limited. Some FWA packages continue to have data caps, high upfront fees, and prices comparable to fixed broadband with speeds over 300 Mbit/s.[100]

2.69 FWA services from WISPs rely on proprietary solutions that need Line of Sight (LoS) or near-LoS wireless connectivity between the provider's access point (also known as a base station or mast site) and the outdoor antenna on the customer's premises. The outdoor antenna is linked to indoor customer premises equipment via a wired connection. These connections are especially beneficial in remote, hard-to-reach areas with poor network coverage.

2.70 WISPs have traditionally relied on 'licence exempt' and 'light licensed' spectrum. Recently, however, they are starting to use shared access spectrum with 5G technology for residential broadband, allowing them to offer superfast speeds more broadly. Performance can be affected by LoS issues, which are more pronounced at higher frequencies. WISPs choose frequencies based on capacity, performance needs, and available technology and equipment in each band.

Satellite

2.71 Satellite services have traditionally used geostationary orbit (GSO) satellites, which are positioned a significant distance from the Earth, resulting in lower speeds and higher latency. Non-geostationary orbit (NGSO) satellites, including medium Earth orbit (MEO) and low Earth orbit (LEO) satellites, are now available and offer better service quality.[101]

2.72 Services provided on GSO satellites have typically provided commercial broadband with speeds of 2-30 Mbit/s. The cost of subscription packages ranges from £20 to upwards of

[99] See Annex 6 for further detail on FWA from MNOs and WISPs.

[100] For examples of FWA packages from MNOs see: Vodafone. 5G and 4G broadband with GigaCube; Three. 4G & 5G Home Broadband Deals; and, EE. Pay Monthly Mobile Broadband. All accessed on 4 February 2025.

[101] GSO and NGSO satellite services are detailed in Annex 6.

£80.[102] Cheaper deals can be very restrictive in terms of data allowance, with some only offering a few gigabytes per month.[103]

2.73 NGSO satellites, on the other hand, are positioned much closer to the Earth, covering smaller areas than the GSO satellites and allowing for faster response times and higher speeds. Starlink offers one such NGSO satellite broadband service, and in the data submitted to Ofcom for the 2024 Connected Nations report, it indicates average download speeds of over 160 Mbit/s and average upload speeds of around 18 Mbit/s.[104] Prices tend to be above the average price of FTTC or FTTP broadband, for instance, a residential package for a fixed location is priced at £75/month and a range of 'Priority' services, which are more suitable for businesses, at £80-£300/month.[105]

2.74 Relative to other premises in the UK, premises using a satellite broadband connection are more likely to be in a rural area, and less likely to have access to either a decent fixed broadband line or FWA broadband service.[106]

[102] For example, Freedomsat offer home satellite packages costing between £19 to £90. Freedomsat. Home Broadband Internet Without a Phone Line — Freedomsat Broadband Solutions. Accessed on 21 February 2025.
[103] Compare the market.com. 24 April 2024. What is satellite broadband? Accessed on 6 February 2025.
[104] Ofcom. 5 December 2024. Connected Nations 2024. Page 17.
[105] Starlink. Starlink for homes. Accessed on 7 March 2025; Starlink. Starlink for fixed sites. Accessed on 7 March 2025
[106] Ofcom. 5 December 2024. Connected Nations 2024. Page 20.

Leased lines

2.75 In this section we give some additional context on the leased line market.

2.76 Leased lines provide users with high quality business connectivity services between two fixed locations. These services tend to be symmetric (the upload and download speeds are the same), uncontended (either the capacity is not shared with other users, or the provider has otherwise guaranteed the capacity), and provide a guaranteed speed. Additionally, leased lines may provide a dedicated physical connection which is not shared with other users and therefore provides greater security than residential broadband services. As a result, leased lines can be significantly more expensive per end-user than broadband services which are provided over shared infrastructure.

2.77 Leased lines can be used for:

- connectivity between business sites.
- business connectivity to virtual private networks (VPNs), the internet and cloud computing services.
- mobile network connectivity (often referred to as 'mobile backhaul') which provides connectivity from mobile base stations to the MNO's core network.
- broadband network connectivity (often referred to as 'fixed backhaul') which provides connectivity from fixed broadband operators' equipment located either in BT exchanges or in operators' own operational buildings back to the operators' backhaul and core networks.

2.78 In this section, we provide some background information on the following:

- structure of the leased line market
- service take-up and usage of leased lines

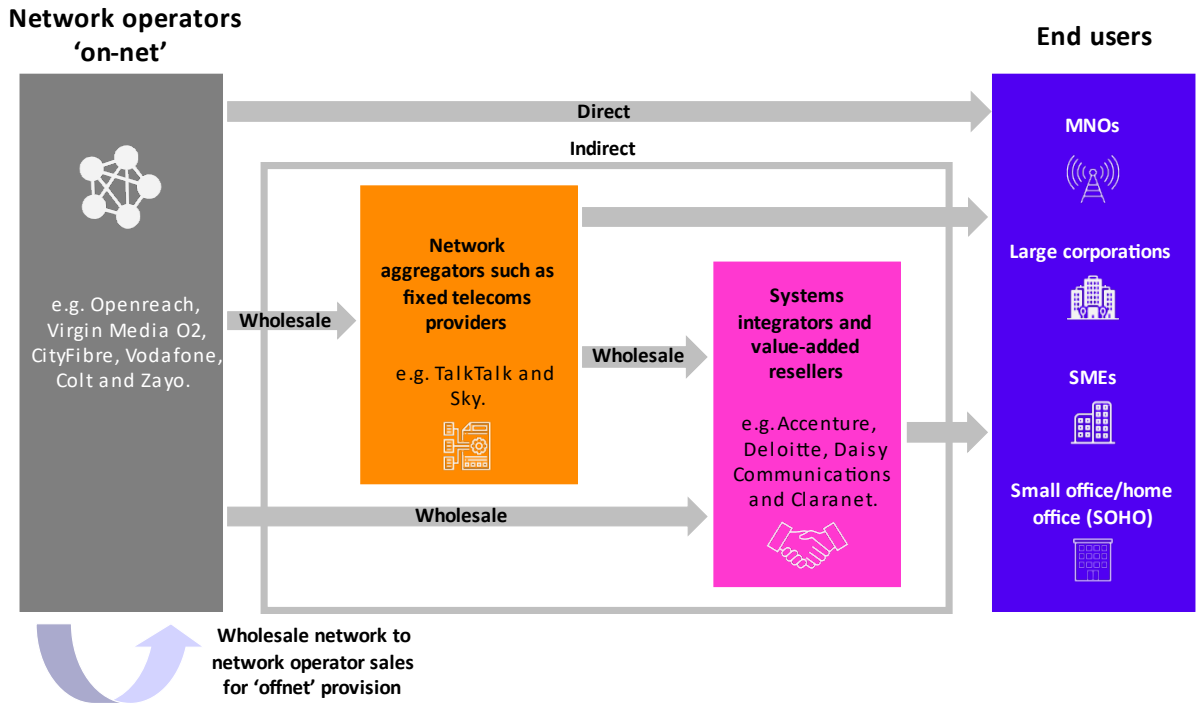
Structure of the leased line market

Leased line suppliers

2.79 Business connectivity is sold to a wide range of customers – including telecoms providers and retail ISPs – and those customers have a number of different supplier options when choosing to buy leased line services, depending on their own preferences and the availability of different services. Some customers choose to purchase different components of a connectivity service separately, for example purchasing infrastructure and additional services from different suppliers, whereas others prefer to purchase all aspects of a connectivity service from one supplier.

2.80 An illustration of the retail supply chain is shown in Figure 2.7 and we provide an explanation of the different types of suppliers in the supply chain below.

Figure 2.7: High level view of the business connectivity supply chain



Source: Ofcom. 2025. Analysis based on various industry sources
Companies included in the diagram are provided as examples only and are not intended to provide an exhaustive picture of the leased line telecoms market.

2.81 **Network operators** use their own networks to provide end-to-end network connectivity services to customers. Different network operators can have different types of services (services used for access or backhaul), nationally or regionally. For example, Openreach and VMO2 have large-scale networks, which include access, backhaul and core connections. As in the broadband market, network operators build their networks using physical infrastructure, such as ducts and poles. They may build this physical infrastructure themselves or deploy network in physical infrastructure of third parties.

2.82 As for the broadband market supply chain described in the previous section, some network operators sell leased line services directly to end-users or sell leased line services to other telecoms providers who then sell them to end-users. Network operators selling to other telecoms providers are **wholesale operators**, like Openreach.

2.83 As for broadband services, some network operators, for instance VMO2, are also **vertically integrated**. This means they control all stages of broadband service delivery, from owning or using physical infrastructure, to selling directly to businesses. Providers selling leased lines directly to end-users are **retail leased line providers** and can be vertically integrated, such as VMO2, or buy services from another operator.

2.84 As only Openreach has nationwide coverage, other network operators can choose to buy leased line services from Openreach or other network operators and use them alongside their own network (this choice is often referred to as **'on-net' versus 'off-net'**). This may be, for example, if it is more cost effective to buy a third-party leased line service than extend their own network by building (this choice is often referred to as **'build versus buy'**). We discuss this in greater detail in Section 5 of this volume.

2.85 Providers who buy wholesale services from network operators can be:

- **Network aggregators,** who buy services from one or more network operators and sell them to customers to provide a national service (which may be particularly valued by customers with multiple sites). Network aggregators can be fixed telecoms providers, such as Sky or TalkTalk. Customers, whether end-users themselves or system integrators and value-added resellers, who purchase leased lines through a network aggregator may therefore use services provided over multiple different networks.
- **Systems integrators,** who often provide an end-to-end service to end-users, where the connectivity provided by leased lines is bundled with computing services such as data storage (e.g. 'cloud' storage) and applications (e.g. email, file management, security, internet connectivity). The 'bespoke' services provided by systems integrators can be managed on behalf of the customer. Examples of systems integrators are Accenture and Deloitte.
- **Value-added resellers,** who buy services from network operators to offer their customers an end-to-end network connectivity solution, such as cloud services and landlines. Examples of these are Daisy Communications and Claranet.

2.86 Finally, some providers, for example BT or Vodafone, are present in all parts of the value chain, from network operator to user of leased line services i.e. for mobile backhaul.

2.87 Leased line providers may specialise in leased lines only, or sell both leased lines and broadband services:

- Specialised leased line providers or 'leased lines only' (LL-only) providers serve large businesses, for instance in the financial sector, utilities, or mobile backhaul. Many LL-only providers are established providers, such as Colt and Zayo, but there have also been altnet new entrants focusing on the leased line market, such as ITS and Vorboss. Networks of LL-only providers tend to be only available in areas where there is a concentration of businesses which are or may become leased line customers.
- Some network operators may choose to build networks that cover both businesses and residential customers. These types of networks tend to have a larger geographic availability and provide a wider range of services, i.e. leased lines and broadband. Examples include the two largest networks in the UK, BT and VMO2. In addition, some altnets are now also selling both broadband services and leased lines (either wholesale or to end-users), such as CityFibre.

Leased line customers

2.88 Generally, larger organisations such as large enterprises, public sector organisations and mobile network operators (MNOs) are more likely to buy leased lines than smaller businesses; as of 2022, few SMEs used leased lines.[107] Leased line customers span different sectors, including finance, utilities, technology, retail, and telecoms. Some, for instance mobile providers, have specific requirements for high bandwidth and high-quality services. Leased line customers can be single or multi-sites, for instance a bank or a chain of retail stores.

[107] Ofcom. 2022. SME consumer experience in the communications market – interactive report. In this report, we found that overall 4% of SMEs were using dedicated internet access (leased line) products – this broke down to 3% of micro businesses, 19% of small businesses, and 35% of medium-sized businesses.

2.89 Overall, leased line customers have a range of different needs, and suppliers offer a range of different services in order to meet these, but the core features of leased lines valued by businesses include the following:

- **Speed (bandwidth):**[108] For many leased line customers, speed that is guaranteed and not subject to fluctuations is critical. Compared to residential consumers, businesses may also require high upload speeds, therefore making symmetry of upload and download speeds more important. Finally, some large businesses may also require substantially higher speeds or capacity than what is available over broadband, e.g. of 10 Gbit/s or more.
- **Continuity of service and reliability:** As discussed above, many large businesses require bandwidth which is guaranteed, ensuring that they have a continuous service and are not subject to fluctuations. Further, businesses typically rely on connectivity to operate, and so outages are significantly more costly to them, compared to residential consumers. As such, they tend to have a stronger requirement for fast repair times and continuous support. For these reasons, we understand that an established reputation with dedicated support services are important features of a leased line provider for leased line customers. We discuss this in greater detail in Section 5 of this volume. While leased line customers particularly value continuity and reliability of service, the relative importance of price and reliability varies depending on the specific requirements of businesses.[109]
- **Security** and **resilience:** Some very large organisations, such as MNOs and large corporates, may particularly value aspects such as security and high levels of resilience.
- **Coverage:** Some leased line customers with multiple sites may take network coverage of operators into account, as higher coverage across the UK means that they can source from fewer providers.

2.90 While there are many different technologies over which leased lines can be delivered, as discussed below, we consider that potential leased line customers will care about the capabilities and additional features of the services that they purchase like speed, continuity of service and reliability, and security and resilience, rather than the specific technology underpinning those services.

[108] Bandwidth typically refers to the capacity of a transmission link i.e., it is the maximum amount of data that can be transmitted over a transmission link in a given period of time; whereas speed refers to the rate at which the data that can be transmitted between two points in a network. Speed may be less than the bandwidth of the transmission link if the link is shared between multiple users. In the context of leased lines, we are often using the term bandwidth since bandwidth is uncontended in leased lines and therefore the speeds delivered over a leased line can be sufficiently close to the bandwidth of the leased line.

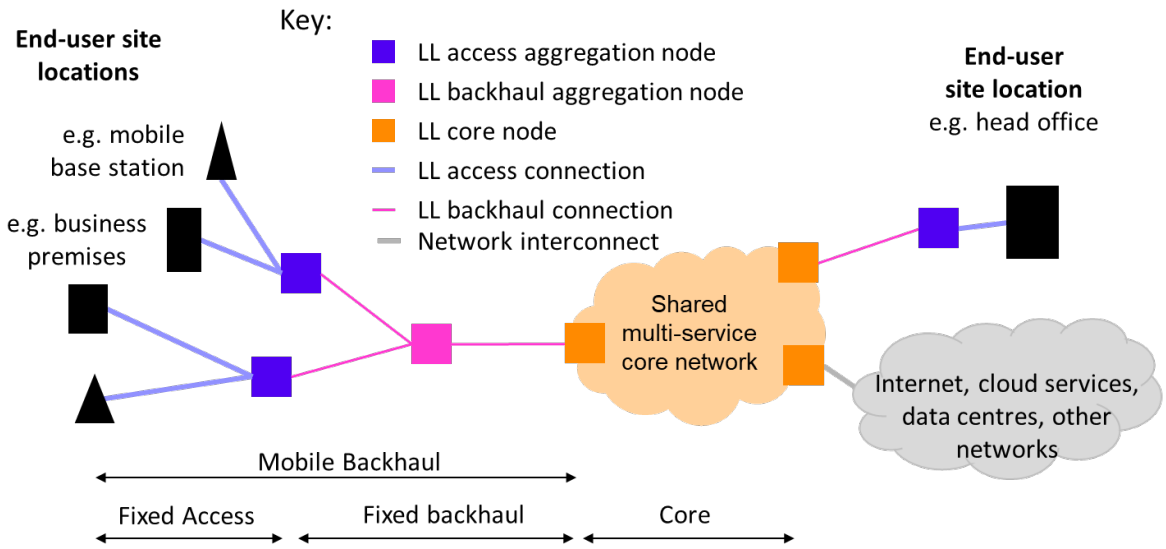
[109] For instance, research by [✂] found that reliability and reputation were the highest ranked factors business consumers considered when choosing a leased line provider (more so than price), and this was especially the case for larger businesses. [✂]. Similarly, 2022 research by [✂] found that among business buyers, reliability was the most important reason for considering switching providers. Additionally, [✂] documents indicate that different aspects of a service may be more valued by certain segments of business consumers. [✂] response dated [✂] to s135 notice dated [✂], question [✂]. Finally, research by [✂] indicated that different features of a service may be more important to consumers within a given industry compared to others. [✂] response dated [✂] to s135 notice dated [✂], question [✂].

2.91 We expect that the main characteristics demanded by leased line customers are unlikely to change during the review period, with the exception of a continuing trend towards higher speeds.

Products offered

2.92 Leased lines generally use optical fibres to make the physical connection between two or more fixed locations, as illustrated in Figure 2.8.

Figure 2.8: An illustration of the components used to provide an end-to-end leased line service



Source: Ofcom.2025.

2.93 Leased lines can be provided with active electronics, which may make use of several different technologies, or without any powered equipment supplied by the network provider; these are often referred to as dark fibre (DF) connections. We use the term leased lines generically to refer to both active leased lines and dark fibre, and explain some of those technologies below, as well as in Section 5 of this volume.

Ethernet

2.94 The widespread use of Ethernet services and the availability of Ethernet equipment means that Ethernet is the preferred technology for the majority of installed leased line circuits in the UK. Point-to-point leased lines are generally based on Ethernet standards[110] and are specified by bandwidth (e.g. 100 Mbit/s, 1 Gbit/s or 10 Gbit/s). Ethernet leased lines are typically delivered over fibre and changing the bandwidth involves changing, or reconfiguring, the electronics at both ends.

2.95 For example, Openreach provides leased line Ethernet services using its range of EAD (Ethernet Access Direct) products with speeds of up to 10 Gbit/s. We understand that

[110] Ethernet as a technology is described by a set of standards (e.g. 802.3) organised by the Institute of Electrical and Electronics Engineers (IEEE). More information can be found at the IEEE website IEEE Standard for Ethernet . Accessed on 6 December 2024. These standards cover many things including: how the data is structured, the transmission medium used (copper, fibre, wireless), and the bandwidth speeds (e.g. 100 Mbit/s, 1 Gbit/s, 10 Gbit/s).

Openreach is planning to launch a pilot of a new variant of EAD, called EAD2.0, in early 2026, and to fully launch it at some point thereafter.[111] VMO2 also offer leased line Ethernet services, including national Ethernet connectivity and Ethernet extensions, with speeds up to 10 Gbit/s.[112]

2.96 There are several LL-only providers that offer Ethernet services. For example, Neos Networks advertises an Ethernet product for businesses with speeds ranging from 10 Mbit/s to 100 Gbit/s.[113] Colt also offers various Ethernet products for businesses, with speeds ranging from 10 Mbit/s to 100 Gbit/s.[114]

Wavelength division multiplexing (WDM)

2.97 WDM is also a fibre-based technology with features suited for high-capacity routes (e.g. between core nodes and to data centres) and for higher capacity backhaul connections. WDM is a technology that uses different wavelengths (colours) of light to create separate virtual circuits over the same fibre, or pairs of fibre. WDM circuits generally require electronics and optical lasers built to a higher specification than lower speed circuits.

2.98 WDM is particularly attractive where demand is expected to grow over time, as extra capacity can be provided quickly without the need to add more fibres. Once the first circuit is installed, additional circuits can be added simply by adding or lighting an extra wavelength. WDM also offers more flexibility for leased line customers by supporting data transmission technologies other than Ethernet. Different transmission technologies can run over different wavelengths on a single fibre. WDM supports network sharing by allowing different wavelengths to be allocated to different end-users.

2.99 WDM systems can provide capacity from 10 Gbit/s to as much as 400 Gbit/s. For example, Openreach offers a WDM product called OSA (optical spectrum access) Filter Connect, which comes with a pre-provided 10 Gbit/s Ethernet service and the option to grow capacity using additional wavelengths and using Ethernet or other transmission technologies as described above. Again, there are several LL-only providers offering WDM products. For instance, Neos offers a product called Optical Wavelengths which enables connections of ranging from 10 Gbit/s to 400 Gbit/s.[115]

Ethernet over symmetric PON

2.100 In the WFTMR21, we found that Ethernet provided using GPON could not offer symmetric 1 Gbit/s services.

2.101 Developments in technology have meant that some types of access networks, notably XGS-PON, can now be configured to offer (typically 1 Gbit/s) symmetric bandwidth services with uncontended capacity. Unlike traditional leased lines, this technology shares ring-fenced capacity among multiple users, rather than providing a dedicated point-to-point service.[116] We understand that some providers are already offering such products, and that these

[111] Openreach Limited response dated 21 February 2025 to s135 notice dated 10 February 2025, question 13.
[112] Virgin Media Business. Ethernet. Accessed on 10 March 2025.
[113] Neos. Business Ethernet services. Accessed on 14 February 2025.
[114] Colt. Ethernet Services. Accessed on 7 March 2025.
[115] Neos. Optical Wavelengths. Accessed on 10 March 2025.
[116] See also Annex 6, Overview of telecoms networks.

include quality of service parameters similar to existing leased line services. This includes ITS[117] and CityFibre.[118]

2.102 The development and rollout of further iterations of this technology (e.g. 50G-PON) appears likely to support even higher speeds in the future.[119]

2.103 We discuss these developments further, and implications for our market definition, in Section 5 of this volume. In the context of leased lines, we collectively refer to XGS-PON and future PON technologies (which may offer speeds faster than XGS-PON), as Ethernet over symmetric PON – this does not include GPON.

Dark fibre

2.104 Dark fibre providers install and sell fibre to connect between two sites, with the purchaser of the dark fibre adding the active electronics to provide services such as Ethernet or WDM. Dark fibre is, therefore, particularly suited to leased line customers who benefit from the flexibility of selecting their own equipment (e.g. if they expect to need to upgrade their bandwidth over time or require very high bandwidths) and can manage the provision and operation of the electronics. Since the electronic equipment is provided by the customer, rather than the fibre provider, it allows greater choice in how services are provided over the fibre than being limited to just Ethernet or WDM services.

Quality of service parameters

2.105 As mentioned in relation to features valued by leased line customers, regardless of the technology over which leased lines are provided, these products have quality of service parameters which distinguish them from residentially-focused broadband services. This includes, for example, better availability service level agreements (e.g. 99.99% or better), faster repair times (e.g. measured in hours rather than days, in the range of 4-6 hours) or longer customer support availability.[120]

Prices

2.106 Leased lines are significantly more expensive per end-user than broadband services, even broadband packages specifically targeted at businesses. This is for several reasons, including that leased line products have uncontended capacity, better quality of service parameters compared to broadband (e.g. faster repair times), are more likely to have symmetric upload and download speeds, and because some products use dedicated infrastructure.

2.107 For example, at the wholesale level, Openreach's EAD1000 leased line product (upload and download speeds of 1 Gbit/s) has an annual rental price of £2,262,[121] compared to the annual rental price of £1,173.36 for an FTTP broadband connection with download speeds of 1 Gbit/s (and upload speeds of 220 Mbit/s).[122]

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[117] ITS. Networks: Improving business connections. Accessed on 11 February 2025.
[118] CityFibre Infrastructure Holdings Limited response dated 19 February 2025 to s135 notice dated 10 February 2025, questions 1a, 1b, 1d, 1e.
[119] Ofcom. September 2023. Evolution of fixed access networks. Figure 5: PON standards evolution.
[120] Product characteristics taken from provider websites: BT Business, Choose your leased line plan; ITS, Product portfolio; CityFibre, Fibre Leased Lines for your business; Vorboss, Business; Colt, Why choose Colt Leased Line? and Colt IP Access Datasheet; All accessed on 6 December 2024.
[121] Openreach, Price list, Ethernet Access Direct (EAD) including EAD Enable. Accessed on 9 December 2024.
[122] Openreach. Price list, Generic Ethernet Access (FTTP). Accessed on 9 December 2024.

2.108 Similarly, at the retail level, VMO2's business broadband products are several times cheaper than leased line services which offer roughly equivalent download speeds. It advertises a 100 Mbit/s leased line product for £185 per month, with a 1 Gbit/s leased line product available at £370 per month.[123] Looking at business broadband products which offer similar download speeds, VMO2's Voom 200 product (download speeds of 200 Mbit/s) is advertised at £29 per month, while their Voom Gig1 product (download speeds of 1 Gbit/s) is advertised at £53 per month.[124]

Service take-up and usage

2.109 Over the WFTMR21 review period, usage and take-up of leased lines has evolved with changing end-user demand, including for different bandwidths, by different end-users (e.g. MNOs) and across the geographic areas that were identified in the WFTMR21. We present some of this indicative data below.

Volumes by bandwidth[125]

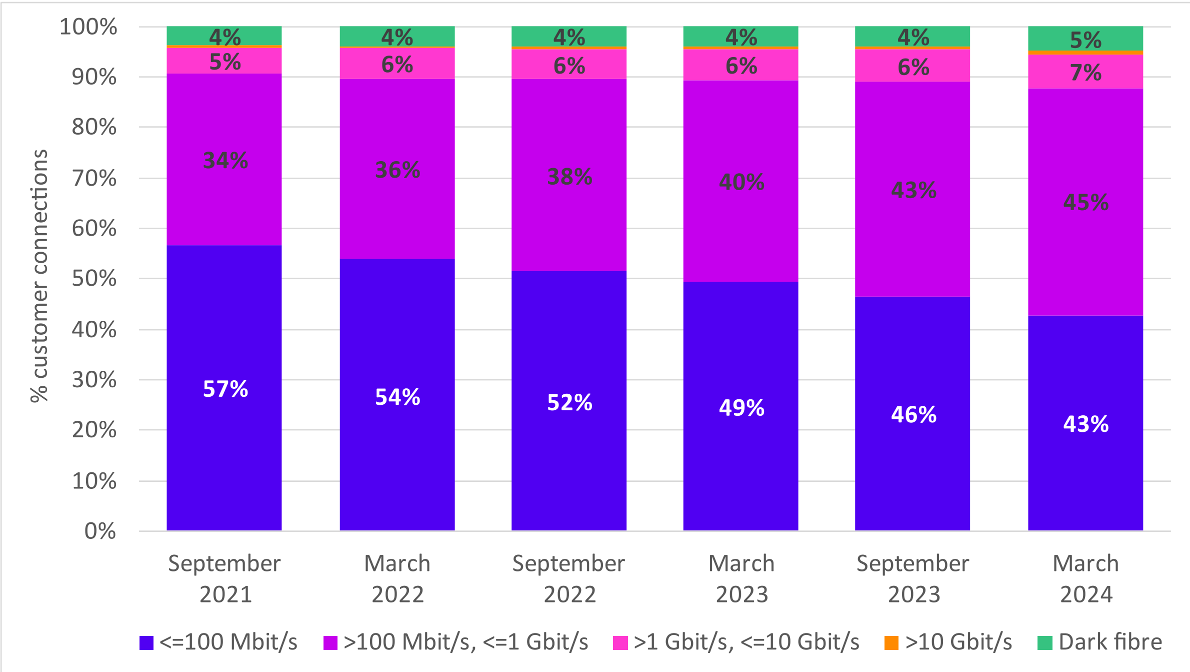
2.110 Figure 2.9 below shows the breakdown of wholesale leased line connections by bandwidth, and dark fibre connections, and how this has evolved over time. Since our March 2021 statement, we have seen a decline in the proportion of leased lines with bandwidths of 100 Mbit/s or less, from 57% in September 2021 to 43% as of March 2024, a decrease of 14 percentage points. The proportion of leased lines with bandwidths greater than 100 Mbit/s up to 1 Gbit/s rose by 11 percentage points from 34% to 45%.

2.111 Demand for bandwidths of greater than 1 Gbit/s ('very high bandwidth' or 'VHB' services) has also continued to increase. However, almost 90% of total leased line access circuits remain at speeds of 1 Gbit/s or below.

2.112 Usage of dark fibre as a proportion of all leased lines has been relatively stable since 2021.

[123] Virgin Media Business. Dedicated Internet Access. Accessed on 6 March 2025.
[124] Monthly prices reflect advertised price after any promotional period. Virgin Media Business, Voom Fibre business broadband and phone deals. Accessed on 9 December 2024.
[125] Data presented in this section includes volumes in the CLA.

Figure 2.9: Wholesale leased line connections by bandwidth and dark fibre, 2021 to 2024



Source: Ofcom analysis of provider data submitted August-October 2024 [126]

Notes: Access connections only – does not include inter-exchange connections. On-net connections only. Dark fibre can be configured to provide any speed. [✂]. [✂]. [✂]. [✂]. [✂]. [127] *[✂].* [128]

2.113 We expect that these trends will continue in the 2026-31 review period. Specifically, we expect that the share of leased lines at bandwidths of 100 Mbit/s or less will continue to fall, and there will be an increase in the usage of leased lines at bandwidths greater than 1 Gbit/s, though we expect that the majority of leased line circuits will still be at 1 Gbit/s and below. We additionally expect demand for dark fibre to increase over the next five years.[129]

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[126] [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂] question [✂].

[127] [✂] responses dated [✂] and [✂] to s135 notice dated [✂], question [✂].

[128] [✂] responses dated [✂] and [✂] to s135 notice dated [✂], question [✂].

[129] Ofcom analysis of provider forecasts, based on the available information.

MNO volumes[130]

2.114 MNOs purchase a substantial volume of leased line access services (including dark fibre).[131] MNOs use these to connect their mobile base stations to a point of aggregation in their core networks, known as mobile backhaul.

2.115 Figure 2.10 below shows a breakdown of the bandwidths of leased lines and dark fibre used for each MNO. Take-up by bandwidth differs by MNO. However, compared to leased line users more generally, MNOs are more likely to use higher bandwidth services. As of March 2024, approximately a third of leased line access services (including dark fibre)[132] used by MNOs were at very high bandwidth, compared with around 10% of all leased line services at very high bandwidth.[133] The majority of circuits used by MNOs remain at 1 Gbit/s or below.

Figure 2.10: MNO leased line volumes by bandwidth, by MNO

[✂]

Source: Ofcom analysis of provider data, submitted August-October 2024.[134]
Note: [✂].[135]

2.116 MNOs also make use of fixed wireless links, such as microwave links for the purposes of mobile backhaul. We understand that a significant minority of mobile backhaul circuits are wireless or microwave links.[136]

Competitor volumes by WFTMR21 geographic area

2.117 In the WFTMR21, we found that the level of material and sustainable competition, both actual and / or potential, varied in different parts of the UK for the leased line access market. We therefore defined four geographic markets for the provision of the wholesale leased line access services:

- the Central London Area (CLA);
- the High Network Reach (HNR) Area: other postcode sectors where there are two or more rival networks to BT in the provision of leased lines;

[130] Data presented in this section includes volumes in the CLA.
[131] In 2021, we estimated that by 2023 they would collectively use over 40,000 leased line circuits. Ofcom. 2021. Promoting investment and competition in fibre networks – Wholesale Fixed Telecoms Market Review 2021-26. Paragraph 2.123.
[132] This excludes wireless backhaul (such as microwave, satellite or other wireless links).
[133] Seven per cent of leased lines are 1 Gbit/s-10Gbit/s. Some of the dark fibre lines may be being used to deliver services between 1 Gbit/s-10 Gbit/s, but only 5% of total leased lines circuits are dark fibre, as shown in Figure 2.9. Therefore, no more than 12% of total leased lines are 1 Gbit/s-10 Gbit/s.
[134] [✂] response dated [✂] and [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂].
[135] [✂] response dated [✂] to s135 notice dated [✂], question [✂] and [✂] response dated [✂] to s135 notice dated [✂], question [✂].
[136] [✂] response dated [✂] and [✂] to s135 notice dated [✂], question [✂] and [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]. [✂].

- LLA Area 2: postcode sectors in which there is, or there is likely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks; and
- LLA Area 3: postcode sectors in which there is not, and there is unlikely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks.

2.118 Figure 2.11 shows the number of leased line connections purchased in the WFTMR21 LLA HNR, Area 2 and Area 3 geographic areas in September 2021 and March 2024, with volumes split by provider. This indicates that there has been growth in the number of leased line connections purchased across all the WFTMR21 LLA geographic areas between 2021 and 2024. Additionally, there has been an increase in the proportion of new leased lines provided by providers other than Openreach across the UK. Between 2021 and 2024, Openreach's share of the volume of new leased lines fell by [✂] percentage points in the HNR Area, [✂] percentage points in Area 2, and [✂] percentage point in Area 3.

Figure 2.11: Leased line provider volumes by WFTMR21 geographic area, 2021 and 2024

[✂]

Source: Ofcom analysis of provider data, provided August-October 2024[137]
Notes: Access connections only – does not include inter-exchange connections. On-net connections only. Includes all leased bandwidths and dark fibre. [✂] [✂]. [✂]. [✂].[138] *[✂].*[139]

2.119 Figure 2.12 shows volumes for the smaller leased line providers included in the 'Other' category in Figure 2.11.

[137] [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[138] [✂] responses dated [✂] and [✂] to s135 notice dated [✂], question [✂].

[139] [✂] responses dated [✂] and [✂] to s135 notice dated [✂], question [✂].

Figure 2.12: Leased line provider volumes by WFTMR geographic area, 2021 and 2024 (excluding [✂])

[✂]

Source: Ofcom analysis of provider data, provided August-October 2024[140]
Notes: Access connections only – does not include inter-exchange connections. On-net connections only. Includes all leased bandwidths and dark fibre. [✂] [✂]. [✂].[141] *[✂].*[142]

Inter-exchange connectivity

2.120 While we have focused on connections to end-user sites so far, we also distinguish leased lines based on whether they are used to connect to an end-user site and carry traffic from that end-user site back to a provider's aggregation node, or they are used for trunk services, and in particular, inter-exchange connectivity ('IEC') services.

2.121 IEC services carry aggregated traffic between BT exchanges located in different geographic areas. BT exchanges act as network nodes, which are used to aggregate traffic and can act as interconnection points between networks and other network nodes. Demand for IEC comes from telecoms providers that need to carry aggregated traffic between BT exchanges to reach their own networks.

2.122 IEC services can be supplied from a range of technologies, Ethernet, WDM or dark fibre connections, and with a range of speeds, though we understand that also understand that higher bandwidths account for a greater proportion of IEC circuits. We discuss IEC services in Section 6 of this volume.

[140] [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[141] [✂] responses dated [✂] and [✂] to s135 notice dated [✂], question [✂].

[142] [✂] responses dated [✂] and [✂] to s135 notice dated [✂], question [✂].

3. Physical infrastructure market

3.1 In this section we explain our proposed market definition and SMP assessment for the physical infrastructure market. The structure is as follows:

a) Product market definition for physical infrastructure
b) Geographic market definition for physical infrastructure
c) SMP assessment.

Product market definition

Our proposals and provisional conclusions

3.2 We provisionally conclude that there is a single product market for the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network.

3.3 We provisionally exclude non-telecoms physical infrastructure and wireless technologies from that product market.

Background

3.4 In the WFTMR21, we defined a single product market for the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network.

3.5 The term physical infrastructure is typically used to refer to all parts of a network which can be used to host elements of a telecoms network. It can include pipes, masts, ducts, inspection chambers, manholes, cabinets, buildings or entries to buildings, antenna installations, towers and poles.

3.6 There are several physical infrastructures in the UK which could potentially support the deployment of telecoms networks by third party access seekers. These vary in their geographic coverage, the type of end-users they connect, and the way in which they connect to end-users.

3.7 Some of these infrastructures were purpose-built to deploy telecoms networks (such as those owned by BT (but operated by Openreach) and VMO2), whereas others were built to supply non-telecoms services such as electricity, gas, water and railways.

Our proposed approach

Choice of focal product

3.8 We propose to define a focal product of wholesale access to telecoms physical infrastructure for deploying a telecoms network.

3.9 As we discuss in more detail below, our proposed focal product includes all physical infrastructure which is:

a) deployed for the purposes of supporting a telecoms network (i.e. we exclude non-telecoms physical infrastructure), irrespective of the owner of that infrastructure; and
b) deployed to host fixed (or 'wired') elements of telecoms networks (e.g. ducts, poles and chambers). We exclude physical infrastructure which is deployed to host the radio

transmission and reception equipment needed for wireless connections in a telecoms network (e.g. masts and antenna installations).[143]

3.10 Potential buyers in the physical infrastructure market are access seekers looking to roll out fixed telecoms networks, including multi-service networks, altnets, and leased line only providers. Therefore, we start with telecoms physical infrastructure, as it is already being used to host telecoms networks and built for that purpose. We propose to include all fixed telecoms physical infrastructure within the focal product, irrespective of the owner of that infrastructure, as the underlying product made available to access seekers is broadly similar and would be used for the same purpose (i.e. deploying a telecoms network).

3.11 We recognise there might be some differences between telecoms physical infrastructures owned by different operators, particularly in relation to geographic coverage of the network, the breadth and contiguity of that coverage, and the types of premises to which they connect. We consider these differences in our analysis of geographic markets, as they are likely to be important factors in determining the competitive constraints posed by different operators.

3.12 In the following subsections, we consider whether other types of physical infrastructure (non-telecoms and wireless) should be included within the relevant product market, by assessing whether they are potential substitutes. As set out in Annex 5, using the hypothetical monopolist test framework, we check whether a hypothetical monopolist of the focal product would find it profitable to impose a small but significant non-transitory increase in price ('SSNIP') above the competitive level.

Non-telecoms physical infrastructure

3.13 We consider that non-telecoms physical infrastructure is a weak substitute for telecoms physical infrastructure for the purposes of deploying telecoms networks.

3.14 We understand there are various practical challenges and complexities to the use of non-telecoms physical infrastructure which limit its substitutability at scale. For example, limited access points due to safety (e.g. electricity infrastructure) or practical reasons (e.g. drinking water pipes and gas pipes), construction incompatibilities (e.g. some infrastructure, such as drinking water pipes and gas pipes, can branch at right-angles, which could present an excessive bend radius to fibre optic cables), and lack of suitable sites for hosting technical facilities. There can also be concerns about maintenance and access that explain the limited use of non-telecoms physical infrastructure for deploying a telecoms network.[144] As result, using non-telecoms physical infrastructure at scale may not always be viable, or involve relatively higher cost and complexity.

3.15 This view is supported by the relatively limited use of non-telecoms infrastructure as part of telecoms network deployments in the UK. No telecoms provider in the UK has used non-telecoms physical infrastructure for scale network deployment, despite non-telecoms physical infrastructure being available through commercial deals arranged by the owners of

[143] We understand that the physical infrastructure intended to support wireless elements of telecoms networks is largely separate from physical infrastructure intended to support fixed elements of telecoms networks (although in the longer term, innovation may lead to there being a higher degree of overlap in the use of these two infrastructures).

[144] [✂] told us that [✂], see [✂] response dated [✂] to s135 notice dated [✂], question [✂].

such infrastructure or through use of the ATI Regulations.[145] The evidence we have gathered shows that the use of non-telecoms physical infrastructure to host fixed telecoms networks is and is likely to remain limited.[146]

3.16 There are instances where providers have used non-telecoms physical infrastructure, but this is complementary to the use of telecoms physical infrastructure.[147] For example, some access seekers use local authority duct only as part of public sector contracts, and would generally use alternatives, such as BT's telecoms physical infrastructure, over non-telecoms physical infrastructure.[148] In addition, the evidence shows access seekers generally minimise the number of alternative infrastructures used to deploy their network.[149] We consider this is due to the costs and uncertainty associated with combining multiple infrastructures, as set out in Paragraph 3.38.

3.17 For the reasons set out above, we expect non-telecoms physical infrastructure to be a weak substitute to telecoms physical infrastructure, and so we would not expect sufficient switching in response to a SSNIP to justify widening our product market definition.

Wireless technologies

3.18 As explained in the WFTMR21, some telecoms networks use wireless connections in place of fixed connections. For those parts of delivery where a wireless connection is used, access to physical infrastructure to house cables is not required. Wireless therefore represents, in principle, a potential constraint on a hypothetical monopolist of access to telecoms physical infrastructure.

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[145] The Communications (Access to Infrastructure) Regulations 2016 (the ATI Regulations) are a set of measures intended to reduce the cost of deploying highspeed electronic communications networks, including sharing the physical infrastructure of telecoms network providers as well as infrastructure operators in other sectors (e.g. gas, electricity). They can be found at [The Communications (Access to Infrastructure) Regulations 2016](#).

[146] [✂] response dated [✂] to s135 notice dated [✂], questions [✂]; [✂] response dated [✂] to s135 notice dated [✂], questions [✂].

[147] See footnote 146.

[148] [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] responses dated [✂] to s135 notice dated [✂], questions [✂].

[149] See footnote 146.

3.19 The constraint could be direct and/or indirect. In particular, wireless technologies could represent a direct constraint if, in response to a SSNIP, access seekers of physical infrastructure would consider deploying their networks using wireless technologies and reduce the use of telecoms physical infrastructure. In addition, wireless technologies could represent an indirect constraint if, for example, in response to a SSNIP, access seekers would pass the price increase onto end-users, and these end-users would consider switching to retail broadband services delivered over wireless technologies. We assess both the direct and the indirect constraints.

3.20 The forms of wireless connections can be grouped into:

a) connections that replace WLA connections. For example, using fixed wireless access (FWA), mobile, or satellite to deliver broadband services; and
b) connections that replace LLA connections. For example, using microwave links or satellite for mobile backhaul.

3.21 Satellite and FWA technology can be used to provide retail broadband services. These wireless technologies can replace WLA connections, which are used to provide fixed retail broadband services and are hosted in telecoms physical infrastructure. Therefore, wireless technologies can also replace the need to use certain elements of telecoms physical infrastructure (e.g. lead-ins). As a result, we consider whether the potential for retail customers to switch to broadband delivered over wireless technologies is an indirect constraint on physical infrastructure, and whether the opportunity for telecoms physical infrastructure access seekers to use wireless technologies instead of physical infrastructure is a direct constraint on physical infrastructure.

3.22 As set out in Section 4 of this volume, our analysis suggests that wireless technologies (in particular FWA, mobile, and satellite) are at this time unlikely to be a substitute to fixed broadband for a sufficiently large number of customers at the retail level. Therefore, we expect any indirect constraint on telecoms physical infrastructure would be limited.

3.23 Given wireless technologies are unlikely to be a substitute to fixed broadband for a sufficiently large number of customers at the retail level, any direct constraint from the opportunity for telecoms physical infrastructure access seekers to deploy an FWA network instead of using telecoms physical infrastructure would also be limited. This is consistent with the evidence we have gathered, which indicates that the large majority of WLA providers do not currently use or plan to use FWA to achieve their planned coverage.[150]

3.24 In relation to LLA connections, satellite and microwave links are sometimes used by mobile network operators for backhaul. These wireless backhaul links can replace leased line connections, which are hosted in telecoms physical infrastructure. We, therefore, consider whether the potential for mobile network operators switching from leased lines to satellite

[150] [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂].

or microwave for backhaul is an indirect constraint on telecoms physical infrastructure, and whether the opportunity for telecoms physical access seekers to use wireless technologies instead of physical infrastructure is a direct constraint on physical infrastructure.

3.25 As set out in below in Section 5, we understand that wireless technologies are not a strong substitute to leased lines for mobile backhaul. Therefore, any indirect constraint on telecoms physical infrastructure would be limited.

3.26 Given that wireless technologies are unlikely to be a strong substitute for leased lines for mobile backhaul at the downstream level, any direct constraint from the opportunity for telecoms physical infrastructure access seekers to use wireless technologies instead of using telecoms physical infrastructure would also be limited.

3.27 For the reasons set out above, any direct or indirect constraint on telecoms physical infrastructure would be limited, and so we would not expect sufficient switching in response to a SSNIP to justify widening our product market definition to include wireless technologies.

Supply-side substitution

3.28 Supply-side substitutability is used to measure the extent to which suppliers other than those offering the product or service in question would have the ability and incentive to rapidly switch, or increase, production to supply the relevant products or services.

3.29 As we also discuss below when assessing barriers to entry and expansion to the physical infrastructure market, potential entry to supply telecoms physical infrastructure access takes considerable time and involves incurring significant sunk costs. Therefore, we propose that there are no supply-side substitutes for access to telecoms physical infrastructure.

Our provisional conclusions

3.30 We provisionally conclude that there is a single product market for the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network.

3.31 We provisionally exclude non-telecoms physical infrastructure and wireless technologies from that product market.

Consultation questions

Question 2.1: Do you agree with our provisional conclusion on physical infrastructure product market definition? Please set out your reasons and supporting evidence for your response.

Geographic market definition

Our proposals and provisional conclusions

3.32 We propose a single national geographic market[151] for wholesale access to telecoms physical infrastructure for deploying a telecoms network.

[151] References to a 'national' geographic market in this section exclude the Hull Area.

Our proposed approach

3.33 Our key consideration in defining geographic market(s) is whether the conditions of competition are sufficiently homogenous across all areas such that we should define a single national market, or whether there are any areas in which competitive conditions are likely to be appreciably different and distinguishable such that we should consider defining sub-national markets.

3.34 As noted in the product market definition section, there are geographic differences between telecoms physical infrastructures owned by different operators, particularly in relation to coverage of the network, the breadth and contiguity of that coverage, and the types of premises to which they connect. These are characteristics that access seekers may consider in deciding which telecoms physical infrastructure to deploy their networks in.

3.35 In practice, outside the regulated provision of PIA by Openreach, there is currently no significant active market in the supply of wholesale access to telecoms physical infrastructure, as physical infrastructure is largely used only for self-supply.[152] Therefore, in order to identify geographic markets, we have undertaken a qualitative assessment of the conditions of competition based on the needs of telecoms physical infrastructure access seekers. This is because, in the absence of an active market, existing market conditions provide limited insight on competitive conditions.

3.36 As we discuss in the following section, we consider that ubiquity is the most important factor for network builders seeking access to physical infrastructure and therefore a key characteristic we consider in assessing the competitive conditions in an area.

Ubiquity is the key factor for access seekers

3.37 We propose that a ubiquitous infrastructure is likely to have material advantages over non-ubiquitous infrastructure for access seekers, wherever and however they seek to deploy. By ubiquitous, we mean an infrastructure which provides the ability to connect to any premises or site within a given geographic area, rather than an infrastructure which provides national coverage (although an infrastructure which provides national coverage will also be ubiquitous).[153]

3.38 We consider ubiquity to be important for two main reasons.

a) The ability to connect any premises or site using a ubiquitous infrastructure allows an access seeker the flexibility to expand the scale and scope of its deployment beyond its initial plans with lower additional connection cost and time lags,[154] compared to using a non-ubiquitous infrastructure and building further physical infrastructure to support new deployments beyond initial plans. This provides an option value to access seekers, reducing the need to pre-specify roll-out plans ex ante. This flexibility is likely to be important for risky investments where demand may evolve over time.

[152] See footnote 146.

[153] For the avoidance of doubt, the advantages we outline below mainly derive from the ability to connect to any premises or site within a given geographic area. However, there are further advantages which derive from national coverage.

[154] For example, [✂] told us that [✂] see [✂] response dated [✂] to s135 notice dated [✂], question [✂]. [✂] stated that [✂], see [✂] response dated [✂] to s135 notice dated [✂], questions [✂]. [✂] told us that [✂], see [✂] response dated [✂] to s135 notice dated [✂], question [✂]. [✂] told us that [✂], see [✂] response dated [✂] to s135 notice dated [✂], question [✂].

b) In addition, we consider access seekers are likely to seek to minimise the number of alternative infrastructures used to deploy their network, due to the costs and uncertainty associated with combining multiple infrastructures. These include the cost and time of undertaking civil works to break in and out of different infrastructures, and the duplication of maintenance costs associated with multiple infrastructures. A ubiquitous infrastructure will allow a provider to reach any set of premises that could be reached by combining multiple alternative telecoms physical infrastructures.

3.39 We recognise that access seekers may combine multiple telecoms physical infrastructures.[155] For example, capacity constraints in the existing network (including directly buried lead-ins which cannot be used by access seekers) may compel an access seeker to use alternatives to provide those connections.[156] However, we understand that use of multiple physical infrastructures is based on necessity rather than preference, complementing the use of a ubiquitous physical infrastructure rather than substituting for it. Indeed, our evidence shows that the majority of a telecoms provider's network tends to be deployed over one physical infrastructure.[157]

3.40 We therefore provisionally conclude that a ubiquitous infrastructure is likely to provide material advantages for most access seekers. Therefore, this is the key characteristic we test in assessing the direct constraint imposed by alternative telecoms physical infrastructure operators.

Identifying physical infrastructure geographic markets

3.41 To identify the relevant geographic markets, we identify areas within which competitive conditions are sufficiently homogeneous to enable them to be grouped together as one geographic market.

3.42 There are geographic differences in the presence of alternative telecoms physical infrastructures across the UK. BT is the only national infrastructure provider which passes virtually all premises. In some areas there are limited alternatives, while in others there are varying degrees of alternatives, in particular those owned by VMO2, altnets and leased line providers that build their own physical infrastructures. We have considered the extent to which competitive conditions vary depending on where these alternatives are present, by assessing the constraint they pose on BT's ubiquitous physical infrastructure (both individually and in aggregate). We do so based on the characteristics of the physical infrastructures that would meet the needs of telecoms physical infrastructure access seekers, the key such characteristic being the ubiquity of that network.

3.43 VMO2 remains the largest alternative physical infrastructure provider. Therefore, as in the WFTMR21, we start by considering the constraint provided by VMO2's telecoms physical infrastructure. In the areas where VMO2 has a material presence, our understanding is that its ubiquity is below that of BT, based on evidence on VMO2's network coverage and the physical infrastructure it uses to deploy its network.[158]

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[155] See footnote 146.

[156] [✂] told us that [✂], see [✂] response dated [✂] to s135 notice dated [✂], question [✂]. [✂] also indicated that [✂], see [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[157] See footnote 146.

[158] VMO2 uses some third-party physical infrastructure, as well as self-built physical infrastructure. This suggests its physical infrastructure coverage is lower than its network coverage. VMED O2 UK Limited response dated 23 August 2024 to s135 notice dated 8 July 2024, questions E1, E2.

3.44 In any event, where VMO2 and BT cover the same individual premises, BT's lead-in infrastructure is likely to offer cost and capacity advantages in terms of connecting premises. As noted in the WFTMR21, this is because BT's infrastructure delivers more lead-ins overhead rather than underground compared to VMO2. This difference in mix of lead-ins means that connecting customers using BT's infrastructure is likely to be quicker and cheaper than using VMO2's infrastructure.[159] In addition, poles offer greater certainty over whether the existing infrastructure is useable as access seekers can more easily assess the state and capacity of a pole than they can an underground duct. Moreover, where VMO2's underground lead-ins are directly buried from a termination box ('Toby box') to outside of the customer's premise, or have been built using narrow trenching techniques, there is effectively no duct network for access seekers to use.[160] Therefore, any constraint from VMO2's physical infrastructure is likely to be limited.

3.45 Next, we consider the constraint offered by altnets who have built their own physical infrastructure, in areas in which they are present. In addition to VMO2's network, there has been significant rollout of fibre networks since the March 2021 Statement was published. While this has resulted in the build of some alternative telecoms physical infrastructures, many use Openreach PIA.[161] Any alternative telecoms physical infrastructure build remains relatively low and significantly less ubiquitous compared to that of BT and VMO2, based on evidence on altnets' network coverage and the physical infrastructure they use to deploy their networks.[162] Therefore, any competitive constraint from alnets' telecoms physical infrastructures is likely to be limited.

3.46 Finally, there are geographic areas with alternative telecoms physical infrastructure deployed to connect to large business and mobile sites. While there may be greater competition for providing connections to large business and mobile sites, we consider that any competitive constraint on BT from such alternative physical infrastructures, individually or in combination with other infrastructures, will be limited in these areas, for the following reasons:[163]

a) The ability to connect to every large business or mobile site in that area using physical infrastructure from an alternative provider is likely to be lower compared to that of BT, given BT's infrastructure is typically ubiquitous. The evidence we have gathered shows that Openreach PIA is being used and/or is planned to be used for network in-fill and/or customer-specific network extensions by leased line providers who have their own

[159] Overhead lead-ins are likely to be the lowest cost means of connecting individual premises to a network. This is because using an aerial cable avoids the costly civil works required to deploy underground lead-ins.
[160] Ofcom. 2019. Promoting competition and investment in fibre networks: review of the physical infrastructure and business connectivity markets. Annex 3.
[161] See footnote 146.
[162] The altnets with the highest network coverage use third-party physical infrastructure in parts of their network. This suggests their physical infrastructure coverage is lower than their respective network coverage. [✂] response dated [✂] to s135 notice dated [✂], questions [✂]; [✂] response dated [✂] to s135 notice dated [✂], questions [✂]; [✂] response dated [✂] to s135 notice dated [✂], questions [✂].
[163] There are areas where presence of these types of alternative telecoms physical infrastructure is higher than in other areas, such as the Central London Area (CLA) and High Network Reach (HNR) Area, as described in Volume 2, Section 5. However, we consider that any competitive constraint on BT from such alternative physical infrastructures, individually or in combination with other infrastructures, will also be limited in these areas for the same reasons.

physical infrastructure.[164] For this reason, in order to deploy throughout an area, or to any given set of sites within that area, an access seeker would face greater costs, time and complexity if it needs to combine multiple infrastructures, as set out in Paragraph 3.38, relative to using BT's ubiquitous infrastructure.

b) Moreover, where BT's duct is already connected, the cost advantage and convenience from being able to readily connect to a customer is likely to be a significant advantage when seeking to attract downstream leased line customers.

c) In terms of using this infrastructure to connect residential premises, telecoms physical infrastructure that has been built by for the sole purpose of supplying leased lines is much less attractive to access seekers as coverage of residential premises is typically lower than BT's ubiquitous infrastructure. The evidence we have gathered shows altnets' use of telecoms physical infrastructure built by leased line providers is limited.[165]

3.47 In aggregate, any competitive constraint on BT from such alternative physical infrastructures will also be limited, particularly due to the costs and challenges associated with combining multiple infrastructures, as set out in Paragraph 3.38. Therefore, competitive conditions are likely to be similar across all areas.

3.48 We also note that fibre network builders may seek access to multiple geographic areas, including areas where the presence of alternative telecoms physical infrastructure is low. The additional costs of combining the use of multiple non-ubiquitous infrastructures, as set out in Paragraph 3.38, are likely to limit the constraint from smaller competing physical infrastructure providers.

3.49 Therefore, although there are geographic variations in the availability of alternative telecoms physical infrastructure, we consider that access to BT's physical infrastructure network has important advantages for potential access seekers. This means that competitive constraints on BT in supplying access to its physical infrastructure are limited in all areas (even where alternative physical infrastructure is available), and so competitive conditions are likely to be similar, such that we should provisionally define a national market.

3.50 We do not foresee any developments in the availability of alternative physical infrastructure that would change this conclusion. We recognise that providers may build some new telecoms physical infrastructure during the review period. However, we do not expect this to be of sufficient scale that it would lead to appreciably different competitive conditions in those areas where it occurs. Additionally, some providers of telecoms physical infrastructure use construction techniques, such as micro-trenching, which may not be

[164] [✂] largely own their own physical infrastructure and have indicated they use or plan to use Openreach for network infill and/or customer-specific network extensions. [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], questions [✂]; [✂] response dated [✂] to s135 notice dated [✂], questions [✂]; [✂] response dated [✂] to s135 notice dated [✂], questions [✂].

[165] See footnote 146.

suitable for use by access seekers. Where suitable build does occur, it is likely to rely on access to BT's telecoms physical infrastructure in some parts of the network.[166]

3.51 Moreover, the choice of which telecoms physical infrastructure to use to deploy a network in a given area is likely to be a one-off permanent decision – once a network is rolled out using a given telecoms physical infrastructure and connected to premises, large business or mobile sites, there are very high barriers to switching that network into a different physical infrastructure.

3.52 Overall, our view is that we can consider all areas of the UK to have sufficiently similar conditions of competition. Differences in the existing presence of alternative telecoms physical infrastructures, individually and in aggregate, do not imply appreciably different competitive conditions between areas. We therefore provisionally define a national market.

Application of the three criteria test

High and non-transitory barriers to entry

3.53 The market we are considering exhibits high and non-transitory barriers to entry. In particular, there are significant structural barriers to entry, as entry would require very high levels of investment and would take considerable time to install new and ubiquitous physical infrastructure. Moreover, the costs associated with such investment are, to a large degree, likely to be sunk.

3.54 We do expect providers to deploy new networks, or expand existing networks, during the review period, as set out in Sections 4 and 5 below. However, these network deployments may, in many cases, rely on access to BT's infrastructure in some areas or parts of the network,[167] and are not, and are unlikely to be, of a significant scale to impose a significant competitive constraint on BT.

A market which does not tend towards effective competition

3.55 We assess competitive conditions in the physical infrastructure market in the SMP assessment section below. In summary, we consider that BT's market power is significant and entrenched, and we have not observed any material changes to this position over time despite rollout of additional alternative physical infrastructure.

3.56 In the forthcoming market review period, we do not consider that deployment of alternative physical infrastructure will occur to a sufficient extent to provide effective competition (as explained in the next section). As mentioned above, access seekers' choice of telecoms physical infrastructure for a given connection is likely to be a permanent one, given the large switching costs and service disruption that would be involved in removing and re-deploying its network in alternative physical infrastructure.

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[166] Most altnet physical infrastructure build is expected to be relatively limited, our evidence suggests that altnets are likely to mostly rely on access to BT's telecoms physical infrastructure. Generally, our evidence suggests that leased line providers expect to build more of their own physical infrastructure compared to altnets, although some plan to largely use BT's telecoms physical infrastructure. See footnote 146. In any event, it remains uncertain the extent to which self-build from leased line providers overcomes the issues described in Paragraph 3.46, such that these alternative physical infrastructures would be able to exert an effective competitive constraint on BT's physical infrastructure.

[167] See footnote 146.

3.57 We are also not aware of factors that may materially reduce the barriers to entry we have identified. For instance, so far, we have not identified any technological developments that will make it easier and cheaper to deploy new telecoms physical infrastructure suitable for access seekers in the foreseeable future. Moreover, once a network is rolled out using a given telecoms physical infrastructure and connected to residential premises, large business or mobile sites, there are very high barriers to switching that network into a different physical infrastructure.

3.58 Therefore we consider that the market we have proposed will not, in the absence of regulation, tend towards effective competition.

Insufficiency of competition law

3.59 We set out in the next section our provisional conclusion that BT has SMP in the market we have identified, and in Section 7 of this volume we explain in more detail our competition concerns arising from BT's SMP in this market.

3.60 Competition law, in particular the rules prohibiting the abuse of a dominant position, is an important part of the legal framework that BT needs to comply with. Given its historic position of SMP (which equates to the competition law concept of dominance) BT has a special responsibility not to allow its actions on the market (where conditions of competition are weak) to distort or impair competition.

3.61 However, we consider that competition law remedies would be insufficient to address the identified competition concerns on their own in this context.

a) First, competition law would focus on tackling the abuse of a dominant position and would not be as effective as *ex ante* regulation in promoting downstream competition.
b) Second, regulation must remain effective for the review period, and *ex ante* regulation better enables us to do this as it can be tailored to the particular circumstances in the market and services provided.
c) Third, competition law does not provide enough regulatory certainty, which itself can undermine downstream competition where there is upstream SMP – and regulatory certainty is important in encouraging long-term investment in competing networks. In contrast, a benefit of *ex ante* regulation is that all industry stakeholders are clear in advance on the regulation that will apply.
d) Fourth, *ex ante* regulation can facilitate more timely enforcement due to the greater certainty and specificity provided.

3.62 On that basis, while competition law enforcement may be used in appropriate circumstances, we do not consider that it would be sufficient to rely on it alone and that *ex ante* regulation is required.

Our provisional conclusions on physical infrastructure market definition and the three criteria test

3.63 We consider that the physical infrastructure market which we are proposing meets the three criteria test and, therefore, is susceptible to *ex ante* regulation.

3.64 We therefore propose to identify the following market for the purposes of making a market power determination: a single national geographic market for wholesale access to telecoms physical infrastructure used for deploying a telecoms network.

Consultation questions

Question 2.2: Do you agree with our provisional conclusion on physical infrastructure geographic market definition? Please set out your reasons and supporting evidence for your response.

Question 2.3: Do you agree with our provisional conclusion on the application of the three criteria test to the physical infrastructure market? Please set out your reasons and supporting evidence for your response.

SMP assessment

3.65 In this section we assess whether any provider has SMP in this market. In doing so we focus on whether BT has SMP in respect of the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network.

3.66 To evaluate the extent to which BT would face a competitive constraint in the physical infrastructure market, we have taken the same approach outlined in the WFTMR21, and assessed the following:

a) **Strength of competition from existing competitors**: we consider whether BT would be constrained by telecoms providers switching to alternative telecoms physical infrastructure already in the market.
b) **Scope for entry and expansion by new or existing operators deploying new telecoms physical infrastructure**, including whether access seekers can enter the market themselves by self-supplying infrastructure.
c) **Countervailing buyer power:** we also consider whether telecoms providers have countervailing buyer power which weakens BT's market power.

3.67 In adopting a modified Greenfield approach, we consider existing market conditions and expected or foreseeable market developments in the absence of existing SMP regulation (see also Annex 5). However, access seekers' recent strategies and plans reflect the existence of that regulation. We therefore use our judgment and inferences from how providers are rolling out their networks to inform our analysis.

Our proposals and provisional conclusions

3.68 We provisionally conclude that BT has SMP in our proposed national geographic market for the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network.

Background

3.69 In the WFTMR21, we concluded that BT has SMP in a national market for the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network.

Our proposed approach and evidence considered

Strength of competition from other owners of telecoms infrastructure

3.70 Generally, in an SMP analysis, we would consider market shares within the market being considered. However, trying to calculate market shares in the supply of access to infrastructure is difficult and not very informative of market position. The reason for this is

that outside of Openreach's PIA products (which are regulated), there is no significant active market in the supply of wholesale access to telecoms physical infrastructure. Physical infrastructure is largely used only for self-supply.[168] This means that like-for-like comparisons of usage of the infrastructure, or revenues from it, cannot easily be assessed. Instead, we focus on assessing the strength of competition to BT from other providers of physical infrastructure based on our understanding from access seekers about what matters to them, including in relation to the characteristics of those networks.

3.71 As set out in the geographic market definition, a ubiquitous telecoms physical infrastructure is likely to be preferred by access seekers to alternative telecoms physical infrastructure which is not ubiquitous. We recognise that telecoms physical infrastructure of other operators could theoretically provide an alternative to BT's telecoms physical infrastructure, where available. However, the importance of ubiquity for access seekers and BT's ability to connect to every premises of any type (i.e. large business sites, mobile sites, residential premises), along with the costs and uncertainty associated with combining multiple infrastructures, means BT is unlikely to face a material competitive constraint even where such alternative infrastructure is present.

3.72 The cost and time benefits of BT's lead-in infrastructure further weakens the competition from alternative physical infrastructure providers.

3.73 As the evidence suggests, use of wholesale access to other providers' telecoms physical infrastructure other than BT's to support further network rollout is, and is expected to remain, limited.[169]

3.74 Therefore, we propose that existing alternative infrastructure is unlikely to exert a material constraint on BT, and that this situation is unlikely to change over the period of this review.

Scope for entry and expansion

3.75 Entry into the market for constructing this kind of physical infrastructure to support large-scale roll-out would require very high levels of investment, a large proportion of which are likely to be sunk costs, and which would take a considerable period of time to deploy. We therefore consider that, in general, there are high entry barriers to constructing new physical infrastructure.

3.76 As mentioned above, we do expect providers to continue to deploy new networks, or expand existing networks, during the review period (see in particular Section 4). However, we understand that many build plans are dependent on:

a) wholesale access to BT's existing telecoms physical infrastructure via the existing PIA remedy[170] (and so is not relevant under a modified Greenfield approach); and/or
b) where practical, faster and more efficient construction techniques, such as micro-trenching, which may not be suitable for use by access seekers (so this entry could, therefore, only exert an indirect constraint on BT).

3.77 We consider these factors to be a reflection of the high barriers facing potential entrants to the infrastructure market.

[168] See footnote 146.
[169] See footnote 146.
[170] See footnote 146.

3.78 Deployment of some new infrastructure is expected. In some cases, some providers may prefer deploying their own infrastructure for self-supply. In addition, there will be parts of network builds where this is either necessary or the above options are not available. But we expect such entry to be geographically limited in scale (and so is unlikely to place a sufficient constraint upon BT).

3.79 For these reasons, we propose that the threat of entry or expansion by new or existing operators would not effectively constrain BT.

Countervailing buying power

3.80 In general, purchasers may have a degree of buyer power where: a) they purchase a significant and material proportion of a supplier's total volumes; and b) they have a credible threat of switching to an alternative supplier, or to self-supply, to an extent that would materially impact the supplier's profitability.

3.81 The largest user of BT's physical infrastructure is BT itself. BT's involvement downstream weakens its incentive to offer supply of its infrastructure at scale, absent regulation. Even if it did, should an access seeker purchase significant volumes of access to infrastructure, it is unlikely that there would be a credible threat of it switching sufficient volumes away quickly, given the large switching costs and service disruption that would be involved in removing and re-deploying its network in alternative physical infrastructure. It is also unclear that an alternative provider would be willing to supply access to its infrastructure in such volumes, reflecting the historical position that there has not been an active wholesale market for telecoms physical infrastructure.

Our provisional conclusions

3.82 For the reasons given above we have provisionally found that BT has SMP in a national market for the supply of wholesale access to telecoms physical infrastructure for deploying a telecoms network.

Consultation questions

Question 2.4: Do you agree with our provisional finding on SMP in the physical infrastructure market? Please set out your reasons and supporting evidence for your response.

4. Wholesale local access market

4.1 In this section we explain our proposed market definition and SMP assessment for the wholesale local access (WLA) market. The structure is as follows:

a) Product market definition for WLA
b) Geographic market definition for WLA
c) SMP assessment.

Product market definition

Our proposals and provisional conclusions

4.2 We provisionally conclude that there is a single product market for the supply of WLA at a fixed location which includes:

a) all fixed networks;
b) all speeds; and
c) residential and business services.

4.3 We provisionally exclude services in the LLA market, and wireless services.

Background

4.4 WLA relates to network assets used to provide telecoms services at a fixed point close to the end-user. Demand for WLA is derived from consumers' retail demand[171] for different products and bundles, including broadband, TV and landline services.

4.5 We first define the focal product. We then consider whether wireless technologies, and separately leased line services, are sufficiently close substitutes to be included in the relevant product market.

Our proposed approach

Choice of focal product

4.6 We propose to define a focal product to be the supply of WLA services by fixed networks to support the delivery of broadband services to consumers.

4.7 This reflects economies of scope inherent in supplying multiple downstream broadband services (i.e. across different speeds) from a single access connection. Having built fibre networks, operators will have a strong incentive to serve the whole of the broadband market including demand for lower and higher bandwidth services. Once a connection is in place, it can be used and adapted to compete to attract customers across a range of fixed broadband services.

[171] When referring to consumers throughout this section, we mean residential consumers and businesses that use broadband services similar to residential consumers.

4.8 This is what we see in practice.[172] VMO2 and new entrant networks will all have the ability to provide a wide range of broadband speeds.[173] Openreach is upgrading its legacy copper network to FTTP, and, once the upgrade is completed, will also be able to offer a wide range of speeds on most of its network.[174] Openreach had deployed FTTP to 17m premises as of January 2025, and has plans to extend its FTTP footprint to 30m premises by the end of 2030.[175]

4.9 Overall, our view is that supply-side considerations point to a single market undifferentiated by speeds. As such, we do not consider it necessary for us to come to a view on the demand-side considerations, that is to say, whether broadband services of different speeds are substitutable from a consumer's perspective.

4.10 We propose to include broadband products targeted at businesses, particularly SMEs, as well as residential customers within our focal product, as the wholesale products used to supply those different retail services are the same. The differentiation between business products and products targeted at residential customers is based on retail market features, for instance longer helpline opening times or Wi-Fi wrap-arounds.

4.11 We therefore consider, as we did in 2021, that defining a single focal product reflects the nature of competition in the WLA market.

4.12 We do not include leased line products in our focal product.[176] Technology continues to evolve, and we understand that some providers offer a range of services over XGS-PON, some of which have equivalent features of leased line products, which we consider in more detail in Section 5 of this volume.[177] While over time, greater economies of scope may emerge between the provision of broadband and leased line services, at this stage we consider it appropriate to start our analysis with separate focal products.

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[172] See Annex 6 for further detail on the speeds that can be provided using different access network technologies.

[173] There will be a technical upper limit on the speeds that can be provided over a given technology, however, all FTTP networks are able to offer gigabit-capable services, which are likely to be sufficient for broadband consumers. There is also an expectation that providers will be able to upgrade their PON systems to higher speed PON systems when demand evolves. Ofcom. September 2023. Evolution of fixed access networks. Figure 5: PON standards evolution.

[174] In most areas, Openreach's FTTC network cannot supply download speeds higher than 80 Mbit/s (in areas where Openreach has deployed G.fast equipment, it can offer services with download speeds of up to 330Mbit/s). See Annex 6. These speeds will continue to be relevant during the review period. See Volume 2, Section 2, and Annex 8.

[175] Openreach. 6 January 2025. A record year for UK broadband build and usage. Accessed 14 January 2025. See Volume 2, Section 2, Paragraph 2.15.

[176] In addition to assessing whether leased lines should be included in the focal product, we consider whether leased lines should be considered part of the WLA market below, and similarly consider whether WLA should be part of the LLA market in Volume 2, Section 5.

[177] For the avoidance of doubt, while in Volume 2, Section 5 we are proposing that some services delivered over XGS-PON are part of the LLA market (namely symmetric bandwidth services with uncontended capacity over symmetric PONs (such as XGS-PON), which have quality of service parameters (such as fast repair times) similar to point-to-point leased lines), where services delivered over XGS-PON do not meet these requirements (for example, because they are contended and do not offer a guaranteed bandwidth), we consider them as part of the WLA market.

Wireless technologies

4.13 We provisionally conclude that wireless technologies are not in the relevant WLA product market.

4.14 Some ISPs use wireless technologies in place of fixed connections to deliver retail broadband services. In circumstances where a wireless connection is used, WLA is not required. Wireless technologies therefore represent, in principle, a potential constraint on a hypothetical monopolist of WLA. In the following sub-sections, we consider the competitive constraint that downstream retail broadband services delivered over wireless technologies exert on those delivered over wired connections.

4.15 As set out in Annex 5, we adopt the hypothetical monopolist test framework. Therefore, to include wireless technologies in the WLA product market, we would need to find that a hypothetical monopolist of the focal product would not find it profitable to impose a small but significant non-transitory increase in price ('SSNIP') above the competitive level. This means that we would need to find that both:

a) a sufficiently large number of customers would be willing to switch to these wireless services, and give up their fixed broadband[178], in response to the SSNIP; and
b) the providers of these wireless services would have the ability and incentive to supply such a large number of customers on their networks.

4.16 In the WFTMR21, we concluded that wireless technologies were not sufficiently close substitutes for fixed connections to be included in the market. In this section we examine whether developments since 2021 mean the product market should be broadened to include wireless technologies. In particular, we examine the demand-side and supply-side substitutability of the following services:[179]

a) fixed wireless access (FWA) services, including those delivered by mobile network operators (MNOs) and wireless ISPs (WISPs);
b) mobile broadband services; and
c) satellite broadband services.

FWA from MNOs

4.17 The evidence shows that product characteristics of FWA broadband services from MNOs have improved since the last review, for example some retail packages offer unlimited data at lower monthly prices and/or lower upfront costs than before. Coverage and capacity have also improved, such that FWA from MNOs is available to more consumers, including 5G FWA.[180]

4.18 However, the evidence suggests take-up is expected to be relatively low compared to fixed broadband. Forecasts from [✂] suggest MNO FWA broadband may reach just over [✂] active connections by 2028/29.[181] Evidence from providers indicates that reasons for

[178] We refer to 'fixed-line broadband' as 'fixed broadband'.
[179] Annex 6 describes these wireless services in more detail.
[180] [✂] response dated [✂] to s135 notice dated [✂], questions [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂].
[181] [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂].

relatively low take-up include low awareness of the product and consumers' views that fixed broadband better meets their needs.[182]

4.19 Further, the evidence shows there may be capacity constraints, particularly in parts of an MNO's network where it is already or close to being congested.[183] This may prevent MNOs from being able to offer a service of sufficient quality to a sufficiently large number of customers, and so they may be unable to constrain a hypothetical monopolist of fixed broadband.

4.20 We have gathered evidence to understand ISPs' and WLA providers' views of the competitive constraint that broadband services delivered over wireless technologies exert on those delivered over wired connections. There is limited evidence from providers, but the evidence we have suggests providers consider the competitive constraint on fixed access is likely to be limited.[184]

4.21 In addition, we note that in practice some of the MNOs who provide FWA also offer fixed broadband. This may impact their incentives to encourage customers to switch away from fixed broadband to FWA, in response to a SSNIP in the price of fixed broadband, where fixed broadband is available. For example, the evidence shows that [✂].[185] Separately, we also note that [✂].[186]

4.22 Therefore, we remain of the view that FWA from MNOs is unlikely to be a substitute to fixed broadband for a sufficiently large number of customers in response to a SSNIP of fixed services, and so we provisionally conclude that FWA from MNOs is not in the WLA product market.

4.23 We recognise the potential impact of ongoing developments in spectrum usage and technological change on the use of FWA from MNOs in the longer term, and that this may develop during the review period.[187] However, it is too early to conclude what this impact will be.

4.24 We also acknowledge that the Vodafone/Three merger may increase the merged entity's ability to supply FWA. However, we consider that the extent to which take-up will increase and the merged entity's incentives to encourage FWA take-up are unclear. This is consistent with evidence set out in the CMA's final report in relation to the merger.[188]

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[182] [✂] response dated [✂] to s13 notice dated [✂], questions [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[183] For example, [✂] indicated that [✂], see [✂] response dated [✂] to s135 notice dated [✂], question [✂]. In addition, [✂] indicated that [✂], see [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[184] For example, [✂] indicated that due to], see [✂] response dated [✂] to s135 notice dated [✂], question [✂]. In addition, [✂] indicated that [✂], see [✂] response dated [✂] to s135 notice dated [✂], question [✂]. [✂] also indicated that [✂], see [✂] response dated [✂] to s135 notice dated [✂], question [✂]; and that [✂], see [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[185] [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[186] [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[187] For example, decisions on the use of 3.9 GHz spectrum may impact the provision of FWA services. Ofcom. 27 January 2025. Consultation: Optimal use of 3.9GHz spectrum – Additional option.

[188] In particular, on the supply side, FWA "only makes economic sense where the Parties have spare network capacity that cannot be commercialised by other means, as FWA customers are very high data users […] BTEE

FWA from WISPs

4.25 Around 7% of all UK premises (residential and SME) have decent broadband coverage from a wireless ISP (WISP) network.[189] Over the last few years, coverage has remained relatively unchanged, and based on previous trends of coverage of WISP FWA networks, we do not expect it to increase during the review period to such an extent that they will become a potential substitute to fixed broadband for a sufficiently large number of customers in response to a SSNIP of fixed services.[190] [191]

4.26 Therefore, we provisionally conclude that FWA from WISPs is not in the WLA product market.

Mobile broadband

4.27 As set out in Annex 6, mobile broadband and FWA from MNOs share many characteristics and use the same 4G/5G mobile networks, but FWA broadband is optimised for home usage. We understand take-up of mobile broadband as an alternative to fixed broadband in homes and businesses is currently – and is expected to remain – relatively low. This is consistent with evidence we have gathered, for example [✂] indicated that the [✂].[192] Consumers who use mobile services also tend to use fixed services,[193] suggesting that mobile services are generally complementary rather than a substitute for fixed services.

4.28 We would not expect mobile broadband to be a substitute for fixed broadband for a sufficiently high number of customers in response to a SSNIP in fixed broadband services. Therefore, we provisionally conclude that mobile broadband is not a sufficiently close substitute to include it in the WLA product market.

Satellite broadband

4.29 As set out in Annex 6, satellite broadband services can be offered using Geostationary Orbit (GSO) satellites, and Low or Medium Earth Orbit (LEO or MEO) satellites, which are collectively known as Non-GSO satellite constellations or NGSO. There are currently seven licensed NGSOs in the UK.[194] Starlink currently offers the only direct-to-consumer LEO service in the UK through its retail product, with Amazon Kuiper expected to also supply these services in the next few years. In addition, business-to-business (B2B) services are

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also submitted that the Merged Entity will have access to both fixed and mobile networks, and presumably will always preferentially sell fixed broadband as it is more profitable." On the demand side, demand for FWA services is relatively limited, and it is an alternative primarily of interest to specific customer segments. Competition and Markets Authority. 5 December 2024. Vodafone / CK Hutchison JV merger inquiry - Final report.

[189] Ofcom. 5 December 2024. Connected Nations 2024.

[190] See Ofcom. 5 December 2024. Connected Nations 2024; Ofcom. 19 December 2023. Connected Nations 2023; Ofcom. 15 December 2022. Connected Nations 2022; Ofcom. 16 December 2021. Connected Nations 2021; and Ofcom. 17 December 2020. Connected Nations 2020.

[191] Our Connected Nations reports indicate that, based on data from MNOs and WISPs, over the planned period up until 2027, around 4,300 further FWA masts are being planned or upgraded across the UK, in addition to around 28,500 existing ones, that may be capable of offering high speed broadband. However, it is not straightforward to extrapolate from this information the number of premises that could receive these high-speed FWA broadband services. Ofcom. 4 September 2024. Connected Nations - Planned Network Deployments 2024.

[192] [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[193] Ofcom. 18 July 2024. The Communications Market 2024.

[194] Ofcom. 19 February 2025. Non-geostationary satellite earth station licences.

available from OneWeb.[195] [196] In this section we will focus on NGSO satellite broadband services, as they can offer higher speeds and lower latency compared to GSO satellite broadband.

4.30 Since the last review, coverage and take-up of satellite broadband services have increased. Nationwide NGSO satellite broadband coverage is now offered direct-to-consumers by Starlink, with over 87,000 broadband customers in 2024 (up from 42,000 in 2023) in the UK.[197] Ofcom has recently increased the amount of spectrum available to NGSO satellite operators in the UK,[198] and is preparing a consultation on making up to 20 GHz of additional spectrum available for satellite gateway use in the UK.[199] We expect these changes to substantially boost the capacity of NGSO operators. As technology advances and more NSGOs begin supplying services in the UK, we expect to see greater take-up of these services during the review period.

4.31 Compared to fixed broadband, however, take-up of satellite broadband services is relatively low. This is likely to be partly because the service is still comparatively new[200] and therefore awareness relatively low.[201] Higher retail prices compared to fixed broadband, as set out in Section 2 of this volume, are also likely to have contributed to relatively low take-up. Fixed broadband providers can often offer a service with better performance at lower retail prices.[202] These factors will limit the competitive constraint that satellite broadband exerts on fixed broadband.

4.32 In addition, we have gathered evidence to understand ISPs' and WLA providers' views of the competitive constraint that broadband services delivered over wireless technologies, including satellite, exert on those delivered over wired connections. There is limited evidence from providers, but the evidence we have suggests providers consider the competitive constraint on fixed broadband is likely to be limited. For example, [✂] indicated that [✂].[203] Consistent with this, we recognise that, although Starlink indicates average download speeds of over 160 Mbit/s and average upload speeds to be around 18 Mbit/s,[204] this will be dependent on the specific deployment, available capacity at the site, and the number and location of users, as set out in Annex 6. Overall, we did not see evidence suggesting providers were concerned about the competitive constraint that satellite broadband may exert on the fixed broadband market.

4.33 Ongoing developments, such as technological change and new entrants in the provision of satellite broadband services, will impact the use of satellite broadband in the longer term.

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[195] Ofcom. 5 December 2024. Connected Nations 2024.

[196] OneWeb is designed to deliver NGSO satellite broadband. Following its merger with Eutelsat, the merged entity also has access to a GSO satellite constellation. Terminals have been developed for multi-orbit broadband services, which use both GSO and NGSO services. These are particularly useful for some applications such as inflight connectivity, but we are not currently aware of any multi-orbit terminals being proposed for consumer services.

[197] Ofcom. 5 December 2024. Connected Nations 2024.

[198] Ofcom. 3 February 2025. Statement: Increasing use of the 27.5-30 GHz and 32 GHz bands - Ofcom.

[199] Ofcom. 17 December 2024. Consultation: Expanding spectrum access for satellite gateways.

[200] Ofcom first issued a licence to Starlink in November 2020. Ofcom. 19 February 2025. Non-geostationary satellite earth station licences.

[201] [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[202] For example, see [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[203] [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[204] Ofcom. 5 December 2024. Connected Nations 2024.

We expect capacity and take-up of these services to increase during the review period. However, we do not expect they will increase to such an extent (or with sufficient certainty) that they will emerge as a mass-market substitute for fixed broadband services during the review period. Therefore, based on the evidence currently available to us and for the reasons set out above, we provisionally conclude that satellite broadband is not in the WLA product market.

Overall conclusion on wireless services

4.34 Wireless technologies will play an increasingly important role in delivering broadband services to some consumers, particularly in hard-to-reach areas. However, we do not consider they will emerge as a mass-market substitute for fixed broadband services during the review period. Take-up of broadband services delivered over wireless technologies remains relatively low compared to that of fixed access broadband, and we expect that to be the case throughout the review period. We therefore do not expect that a sufficiently large number of consumers would be willing and able to switch to wireless services in response to a SSNIP by a hypothetical monopolist of fixed broadband, in order to prevent such a SSNIP from being profitable.

4.35 Based on the evidence set out above, we do not propose to extend the product market to include wireless technologies.

Leased lines as a substitute for broadband

4.36 We do not propose to include leased line services[205] in the WLA product market.

4.37 We expect that residential consumers will not see leased lines as a substitute to their WLA-based service, given that leased lines are in general priced significantly above broadband services and offer many features they may not need.[206] Most businesses that currently take broadband services are also unlikely to see leased lines as a substitute for similar reasons.[207] We therefore do not expect significant switching to leased lines in response to a small increase in the price of broadband services (especially as, in general, we understand that there is a significant price differential between the two types of service).

4.38 On the supply side, the geographic location of networks built to solely provide leased lines is often different to those which also (or only) provide broadband services.[208] Access networks which only supply leased line services generally locate access points near a business district and extend the network to the end-user in response to a retail order. They tend not to focus on covering residential premises and SMEs, which are often located in

[205] As described and defined in more detail in Volume 2, Section 5.

[206] For examples, see Volume 2, Section 2.

[207] It is possible that over time, as demand for their own services increases, business customers may migrate from a residential grade service to a leased line service. However, this migration would arise because broadband services no longer meet their needs, rather than in response to a small change in the price or quality of the broadband products.

[208] Under the hypothetical monopolist test framework, we are considering the constraints on a potential hypothetical monopolist of all networks built for the provision of broadband services. Therefore, here we focus on the ability of a network focused solely on providing leased lines to substitute providing broadband services. We acknowledge that in practice some networks are designed to supply both broadband services and leased lines.

different geographic areas.[209] Therefore, they are unlikely to be able to rapidly deploy broadband to homes in response to a SSNIP of broadband services, as they would need to construct an access network covering residential premises. In addition to any costs that leased line providers would need to incur to construct an access network for the provision of broadband, there may be additional barriers to overcome in order to actually supply and compete in the WLA market.[210] [✂].[211]

4.39 In theory, it may be easier for leased line networks to provide broadband services to businesses where they are already connected to those business sites. However, most of the sites they are connected to are likely to demand leased line services, rather than broadband services.[212] In any case, demand for broadband services from those businesses is likely to account for only a small proportion of overall demand for broadband services, and therefore unlikely to constrain a hypothetical monopolist of all WLA services from profitably sustaining a small price rise.

Consultation questions

Question 2.5: Do you agree with our provisional conclusions on product market definition for WLA? Please set out your reasons and supporting evidence for your response.

Geographic market definition

4.40 In this section we set out the evidence, analysis and reasoning we have undertaken to reach our provisional geographic definitions for the wholesale local access (WLA) market for the 2026-31 market review period. In Annex 7 we discuss in more detail our methodology for assessing altnets' network coverage and WLA market shares.

Our proposals and provisional conclusions

4.41 We propose that there are two geographic markets for the provision of WLA services:

a) WLA Area 2: postcode sectors in which there is, or there is likely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks; and
b) WLA Area 3: postcode sectors in which there is not, and there is unlikely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks.

[209] As we discuss in Volume 2, Section 2, and Volume 2, Section 5, we understand that some providers are supplying symmetric bandwidth services with uncontended capacity over symmetric PONs (such as XGS-PON), which have quality of service parameters similar to point-to-point leased lines. However, the same geographic limitations on extending to residential premises are likely to apply where that network has initially been designed solely to serve leased lines demand.
[210] See below for further explanation of the barriers to entry and expansion faced in the provision of WLA services.
[211] See [✂] response dated [✂] to s135 dated [✂], question[✂], [✂] response dated [✂] to s135 dated [✂], question [✂]; [✂] response dated [✂] to s135 dated [✂] question [✂]; [✂] response dated [✂] to s135 dated [✂], question [✂]; and [✂] response dated [✂] to s135 dated [✂], question [✂].
[212] A leased line customer is unlikely to switch to a broadband service. See Volume 2, Section 5.

4.42 We are proposing to define Area 2 by reference to the existing and planned footprint of any altnet planning to cover at least 50,000 premises by 2031. This is a change to our approach in WFTMR21 where we defined Area 2 by reference to VMO2 and CityFibre footprints only. As detailed in the rest of the section, we believe this reflects how competitive conditions have evolved since 2021 and how these are likely to develop during the 2026-31 review period.

4.43 We have also considered whether we should define an 'Area 1' market where competitive conditions are appreciably different from our proposed Area 2 and Area 3. As set out below, although we identified a number of candidate areas, we consider that competition is not yet sufficiently well established in those areas to differentiate them from Area 2, and therefore we do not propose to define an Area 1 market.

Background

4.44 In the WFTMR 2021 statement we identified two geographic markets for WLA for the purposes of making a market power determination:

a) WLA Area 2: postcode sectors in which there is, or there is likely to be potential for material and sustainable competition to BT in the commercial deployment of competing networks; and
b) WLA Area 3: postcode sectors in which there is not, and there is unlikely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks.

4.45 We also considered defining an 'Area 1' market, where there are at least two established rival networks to BT. Although we identified a small number of areas that had seen investment by two rivals to BT, we considered that competition was not yet sufficiently well established in those areas to differentiate them from Area 2. We did not therefore define an Area 1 market.

4.46 To determine the boundaries of WLA Area 2 and WLA Area 3, we looked at altnets' business plans, altnet business models (e.g. wholesale vs retail), stakeholders' views and BT internal documents, and concluded that the likely competitive constraint on BT posed by each of VMO2 and CityFibre was clearly an order of magnitude different from that posed by the other smaller altnets.

4.47 As such, we assessed that only areas of CityFibre and/or VMO2 presence (existing or planned) provided the potential for material and sustainable competition to BT for WLA services (Area 2). This resulted in the areas set out in Table 4.1.

Table 4.1: Size of Area 2 and Area 3 in WFTMR21 statement [213]

Area	Postcode sectors	% of UK premises
2	6,079	70.2%
3	4,021	29.8%

Source: Ofcom. 18 March 2021. Statement: Promoting investment and competition in fibre networks – Wholesale Fixed Telecoms Market Review 2021-26. Volume 2, page 136.

[213] Excluding the Hull Area.

Our proposed approach to defining geographic markets in WLA

4.48 The key consideration in defining geographic markets is to identify areas within which competitive conditions are sufficiently similar to enable them to be grouped together as one geographic market.

4.49 Since market reviews look ahead to how competitive conditions may change in the future, we need to sufficiently capture the expected competitive conditions during the review period.

4.50 To conduct the geographic market assessment, we have collected information on business models, data on existing and planned build, details about current and potential future wholesale deals, and internal documents detailing stakeholders' competitive strategies as well as their views about current and expected competitive conditions.

4.51 While this evidence is informative, evidence from operators' plans is necessarily prospective. There is also inherent uncertainty in defining geographic markets over the forward look, particularly during a dynamic period in which network rollout and competition is still developing. We have used our regulatory judgment to assess the evidence we have gathered and to take a view on likely developments over the period of the review, but our modelling of geographic markets can only ever be an approximation of reality.

4.52 The rest of this section details our proposed approach to identifying areas within which competitive conditions are sufficiently homogeneous, and defining geographic markets in WLA:

a) First, we identify areas where there is, or there is likely to be potential for, material and sustainable competition to BT and assess whether competitive conditions in these areas are sufficiently different from areas where this potential is unlikely to exist.
b) Second, we assess whether there are any areas where competition is sufficiently well-established or effective and therefore sufficiently different from areas where there is, or there is likely to be potential for, material and sustainable competition to BT.
c) Third, based on the analysis presented under a) and b) we set out our preliminary view on the WLA geographic market definition and detail why we consider competitive conditions would be sufficiently homogeneous within those geographic markets.
d) Fourth, we set out how we allocate postcode sectors to the different geographic markets in practice.

Identifying areas with actual or potential material and sustainable competition

4.53 The first step of our approach is to identify which networks exert, or have the potential to exert, a material and sustainable constraint on BT. This is because we expect that competitive conditions over the review period will differ in areas where these networks are present (or plan to be present) compared to areas where they will not be present.

4.54 To make this assessment, we look at a number of factors which determine the actual or potential competitive strength of different networks. These include:

a) **Business models:** business models can affect competitive strength. For example, wholesale altnets can pose a material direct constraint to BT since these altnets can gain a large share of demand by winning deals with large ISPs. In comparison, retail

altnets can provide more of an indirect constraint, as they can gain end-users from the ISPs Openreach deals with.

b) **Scale of build:** larger networks are likely to be more efficient and more effective competitors (e.g. due to economies of scale, greater brand recognition). Moreover, they may be better positioned to win more demand from (large) ISPs, some of which may be less willing to integrate with smaller networks.

c) **Level of take-up:** a greater level of penetration (either current or future) can be an indicator of competitive strength for various reasons. Firstly, it demonstrates a network's ability to attract and retain customers (i.e. provide competition to BT). Secondly, due to the existence of economies of scale in operating a network, a higher level of take-up would likely reduce altnets' per line costs allowing them to compete more effectively (e.g. through sustainable lower prices). Lastly, higher take-up is critical to achieving financial sustainability and is a key component in raising and accessing funding.

d) **Current and future deals with ISPs:** securing a deal to wholesale to an ISP who can move its existing or new customers onto the altnet's network can help strengthen the competitive position of an altnet, as it is better placed to win significant volumes and erode BT's market position in WLA.[214]

e) **Prospects of consolidation:** consolidation will typically lead to an increase in scale and result in a consolidated entity which may be able to exert a stronger constraint on BT than pre-consolidation.

f) **Views on competition and consolidation:** what BT, rival networks and ISPs believe about competitors and consolidation is likely to inform their strategic decisions (e.g. who does BT consider to be a key competitor, who do ISPs consider to be the main alternatives to Openreach, what do BT and altnets think about prospects of consolidation, and how will they react to this?).

4.55 As detailed in the following paragraphs, we remain of the view that VMO2 and CityFibre will respectively exert, or will likely have the potential to exert, a material and sustainable constraint on BT. In addition, our assessment of the evidence is that other altnets will likely have the potential to exert a material and sustainable constraint on BT. In the following paragraphs, we set out this assessment in more detail.

VMO2 and CityFibre respectively exert or are likely to have the potential to exert a material and sustainable constraint on BT

4.56 In line with our conclusions from our March 2021 statement, we provisionally consider that, over the review period, VMO2 will continue to be a material and sustainable competitor to BT,[215] and CityFibre is likely to have the potential to become a material and sustainable competitor to BT.

VMO2

4.57 As discussed in Section 2 of this Volume, VMO2 and nexfibre have recently entered into an agreement whereby nexfibre will carry out VMO2's new network build (in areas where VMO2 is not already present) with VMO2 operating as a build partner. In areas where

[214] We discuss some of these factors in our SMP assessment below.

[215] As discussed in the following paragraphs, due to the arrangements between them, we use the combined VMO2 and nexfibre data on coverage and active lines for the purpose of defining geographic markets and assessing SMP.

nexfibre is or plans to be present, VMO2 will act as wholesale customer of nexfibre (as the anchor tenant) and use nexfibre network to provide broadband services.

4.58 VMO2 and nexfibre are separate companies, but we use the combined VMO2 and nexfibre data on coverage and active lines for the purpose of defining geographic markets and assessing SMP. Due to the arrangement between them, we consider that this approach accurately reflects the competitive constraint from VMO2 – including in areas where it uses nexfibre.

4.59 It is clear that VMO2 (including through its use of nexfibre's FTTP network) is a material and sustainable competitor to BT:

a) VMO2 has an established network presence that covers around 17m premises[216] and plans to expand to cover around 21m premises by 2026.[217]
b) VMO2 currently has a 11%-30% ([✂]%) share of broadband connections in our proposed Area 2.
c) To date VMO2 has limited itself to retail competition in broadband but has recently announced its intention to compete at the wholesale level.[218] As discussed below, while there is no track record of VMO2 competing in this way, we consider that wholesaling by VMO2 would have a strong potential to create an additional form of direct constraint on BT.
d) VMO2 supplies both broadband and leased lines throughout its network, including for mobile backhaul.

CityFibre

4.60 CityFibre is still in the process of completing network build, gaining take-up and implementing deals with ISPs. However, it has the potential to become a material and sustainable competitor to BT:

a) CityFibre has a network that covers over 3.7m premises as of July 2024[219] and plans to cover around 8m premises ([✂]) by the end of 2031, [✂].[220]
b) As of December 2024, CityFibre supplied around [✂] broadband connections and planned to supply [✂] broadband connections by the end of the review period.[221]

[216] This includes around 16m premises covered by VMO2 as at January 2024 and around 1.3m premises covered by nexfibre as at July 2024. VMO2 response to CN request named CN-FT24, referenced 00926159, dated 29 May 2024. Nexfibre Networks Limited response dated 21 August 2024 to s135 notice dated 8 July 2024, question A2.a.
[217] Network expansion is undertaken by nexfibre who is planning to cover a total of around 5m premises by 2026. VMO2 response dated 19 August 2024 to s135 notice dated 8 July 2024, question A1. Nexfibre Networks Limited response dated 21 August 2024 to s135 notice dated 8 July 2024, question A2c.
[218] Virgin Media O2. 16 February 2024. Virgin Media O2, Liberty Global and Telefónica kick off plans to create a national fixed NetCo in the UK. Accessed on 5 March 2025.
[219] CityFibre Infrastructure Holdings Limited response dated 20 August 2024 to s135 notice dated 8 July 2024, question A2.a.
[220] CityFibre Infrastructure Holdings Limited response dated 24 October 2024 to s135 notice dated 8 November 2024, question A1.b.
[221] CityFibre Infrastructure Holdings Limited response dated 24 October 2024 to s135 notice dated 8 November 2024, question A1.b.

c) CityFibre has entered into agreements with all of the large independent ISPs and many smaller ones.[222] However, as set out below, the deal with Sky is still in the process of being fully implemented.[223]
d) CityFibre supplies both WLA and LLA and has agreements for the provision of mobile backhaul with Vodafone and Three.[224]

Other altnets are also likely to have the potential to exert a material and sustainable constraint on BT

4.61 Since 2021, the market has evolved and a number of additional altnets have reached a considerable amount of network coverage, have gained take-up and have the potential to further strengthen their market position by extending their network, increasing their sales and/or implementing deals with ISPs.

4.62 By way of example, we have identified four altnets in this position (CityFibre and nexfibre are discussed above).[225] These are Gigaclear, Hyperoptic, Community Fibre and Netomnia,[226] and we observe the following:

a) The current coverage of these four altnets ranges between approximately 0.5m (Gigaclear) and 1.5m (Netomnia) premises.[227] Their planned coverage ranges between [✂] premises by 2031.[228] Taken together this group of altnets currently cover nearly 5m premises and plan to reach [✂] premises by 2031.
b) The current take-up of these four altnets ranges between [✂].[229] Taken together these four altnets account for a significant number of active FTTP lines ([✂]).[230]
c) Some of these altnets ([✂]) have been engaging with large ISPs. For example, [✂] and [✂].[231]

[222] CityFibre Infrastructure Holdings Limited response dated 20 August 2024] to s135 notice dated 8 July 2024, question I1.a.
[223] CityFibre Infrastructure Holdings Limited response dated 5 September 2024 to s135 notice dated 8 July 2024, question I1.c.
[224] CityFibre Infrastructure Holdings Limited response dated 20 August 2024 to s135 notice dated 8 July 2024, question B5.
[225] These four altnets have been identified to better illustrate the type of evidence we have considered. However, we believe there are other altnets with a similar market position.
[226] In June 2024, Netomnia and brsk announced a merger. Therefore, for the purpose of this paragraph we have treated them as a single entity and aggregated figures on coverage and take-up.
[227] Brsk Limited response dated 5 August 2024 to s135 notice dated 8 July 2024, question A2.a; Community Fibre Limited response dated 16 August 2024 to s135 notice dated 8 July 2024, question A2.a; Gigaclear Limited response dated 29 August 2024 to s135 notice dated 8 July 2024, question A2.a; Hyperoptic Ltd response dated 16 August 2024 to s135 notice dated 19 June 2024, question D1, Annex 2; Netomnia Limited response dated 2 September 2024 to s135 notice dated 8 July 2024, question A2.a;.
[228] Brsk Limited response dated 5 August 2024 to s135 notice dated 8 July 2024, question A2.f; Community Fibre response dated 16 August 2024 to s135 notice dated 8 July 2024, question A2.d; Gigaclear Limited response dated 29 August 2024 to s135 notice dated 8 July 2024, question A2.f; Hyperoptic Ltd response dated 20 August 2024 to s135 notice dated 16 August 2024, question D1. Netomnia Limited response dated 2 September 2024 to s135 notice dated 8 July 2024, question A2.d.
[229] Ofcom calculations based on Connected Nations data.
[230] Ofcom calculations based on Connected Nations data.
[231] [✂] response dated [✂] to s135 notice dated [✂], question [✂]. [✂] response dated [✂] to s135 notice dated [✂], question [✂].

4.63 This indicates that a range of altnets – the four discussed above and others with a similar market position – can compete with BT by winning end-users' or ISPs' demand in the areas where they are present.

4.64 Currently, these altnets likely lack the required scale or market position[232] to win enough demand to provide a material constraint on BT's behaviour. However, these altnets are likely to have the potential to gain additional scale[233] and further strengthen their market position over the review period.

4.65 Moreover, since many of these altnets typically have a limited degree of geographic overlap, when taken together, they would likely cover a significant portion of the UK and so have the potential to capture – in aggregate – a critical mass of customers sufficient to materially constrain BT.

4.66 For both these reasons, we believe there is a range of altnets which have the potential to exert a material and sustainable constraint on BT.

4.67 There are also many other altnets which are comparatively smaller and are likely to face greater challenges to sustainably compete with BT by winning end-users or ISP demand in the areas where they are present.

4.68 These altnets are planning to build new networks or to extend existing networks often in less densely populated areas. In particular, their (current or expected) footprint is significantly smaller and often targets less densely populated areas where build costs are higher and potential customer demand lower.[234]

4.69 Many of these altnets also make use of public funding to build networks in identified non-commercial areas and consider the threat of being overbuilt by Openreach significantly undermines their investment case.[235]

4.70 This suggests that these smaller altnets are less likely to pose a material and/or sustainable constraint on BT, even when taken together. However, the evidence we have seen indicates that altnet consolidation could significantly strengthen the competitive positioning of these smaller altnets (e.g. by incorporating them into an existing larger network or by creating an additional large network), such that they become material and sustainable competitors to BT. We discuss the competitive impact of potential consolidation in the next section.

Altnets also have the potential to become material and sustainable competitors through consolidation

4.71 Defining geographic markets requires us to consider expected or foreseeable developments and assess whether these are likely to affect competitive conditions over the 2026-31 review period.

[232] For example, as set out below when we discuss SMP, some altnets have started to deal with ISPs but such deals are still in process of being implemented.
[233] This could be through further build, or through consolidation.
[234] For example, [✂]. [✂] response dated [✂] to s135 notice dated [✂], question [✂].
[235] In a pre-consultation submission INCA said that the imposition of "a period of no overbuild by an SMP provider that matches the BDUK 7-year contract period during which the government can claw back subsidies" would be appropriate and proportionate. INCA. May 2024. Supplementary market definitions submission. Paragraph 19.

4.72 We have therefore examined evidence on prospects of consolidation with a view to assessing the likely impact on competitive dynamics over the review period (rather than trying to forecast specific market acquisitions or mergers).[236]

4.73 The evidence indicates that there is consensus that the market is overly fragmented such that some form of consolidation is likely to occur in the foreseeable future. Internal documents we have gathered from operators[237] and publicly available reports[238] consistently support this view. In line with this, we have seen some early signs of consolidation.[239]

4.74 Our review of network operators' internal documents and business plans indicates that some network operators (specifically [✂]) are actively considering options for consolidation and are engaging in exploratory discussions with potential targets. For example:

a) In its internal documents [✂] monitors a variety of altnets for acquisition and discussed three altnets in particular ([✂]) as specific acquisition targets.[240]
b) [✂] periodically updates its list of acquisition targets. In the latest version [✂].[241] Moreover, in its latest business plan [✂] states that it plans to acquire [✂].[242]
c) [✂] submitted initial offers for the acquisition of various altnets, such as [✂] and held exploratory discussions with [✂].[243]

4.75 While the exact timing and form of consolidation remains uncertain, this evidence suggests that there is likely to be some consolidation during the review period which could materially affect competition to BT. This could be, for instance, because the acquisition target is incorporated into an existing larger altnet, or because two (or more) altnets of similar size merge to create a single larger network.

4.76 Even absent actual consolidation, we consider that the fact that consolidation could happen is likely to have an impact on the strategic behaviour of network operators and therefore affect competition over the review period. In particular, the evidence indicates [✂].[244]

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[236] In other words, we do not need to conclude on the exact nature and timing of consolidation events but only assess whether (and where) altnet consolidation is a foreseeable market development and, if so, whether the potential for consolidation to happen in the foreseeable future is likely to materially affect competitive dynamics over the review period.

[237] [✂] considers it likely that the market will either consolidate around three players (namely, Openreach, VMO2 and CityFibre) or around one scale competitor to Openreach (namely, VMO2). [✂] response dated [✂] to s135 notice dated [✂], question [✂].[✂] considers consolidation as inevitable. [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[238] ISP Review. 30 October 2024. Enders Analysis Finds 20 Largest UK Altnet BT Rivals Lost £1.3bn in 2023. Accessed on 7 March 2025.

[239] For example, Netomnia and brsk have recently announced a merger, see: Netomnia. 15 June 2024. Netomnia and Brsk to merge creating the second largest altnet in the United Kingdom. Accessed 7 March 2025. Similarly, Community Fibre announced its acquisition of Box Broadband in 2021, see: Community Fibre. 11 August 2021. Community Fibre announces acquisition of Box Broadband. Accessed on 7 March 2025.

[240] [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[241] [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[242] [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[243] [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[244] Specifically, [✂]. [✂] response dated [✂] to s135 notice dated [✂], question [✂].

4.77 Overall, we believe this evidence indicates that prospects of consolidation represent a foreseeable development which is likely to materially affect competition over the course of the review period.

4.78 We have therefore sought to reflect the potential for consolidation to occur when identifying areas where there is likely to be potential for material and sustainable competition to arise.

4.79 While this is clearly an inherently uncertain assessment, the evidence suggests that coverage is a critical determinant of the attractiveness of an altnet as a potential acquisition target. In particular, we have some evidence of the size of networks that are being considered as acquisition target.

4.80 For example, when identifying potential targets, [✂] sets a threshold of minimum [✂] premises passed.[245] Along the same lines, footprint is one of the criteria informing [✂]'s process of identifying potential targets, with potential targets being generally above [✂] premises passed.[246] Similarly, [✂] submitted that it would be unlikely to acquire an altnet with a footprint of less than [✂] premises because of the costs of integration.[247]

4.81 On the basis of this evidence, we consider that altnets planning to cover at least 50,000 premises by the end of the review period are most likely to be targets for potential acquisition or consolidation.[248] As such, we consider that areas in which these altnets are present, or plan to be present, should be treated as areas in which there is likely to be the potential for material and sustainable competition to arise.[249]

4.82 There are other altnets who cover or plan to cover less than 50,000 premises by the end of the review period. We recognise that these altnets play an important role in providing fibre to rural areas and will continue to contribute towards the goal of providing fibre to most of the UK. We also acknowledge that – notwithstanding what the current evidence indicates – some of these altnets may still consolidate with others. However, we are required to identify markets based on expected or foreseeable developments that may result in geographic differences (or similarities) in competitive conditions. For that purpose, based on the evidence available to us, we think altnets who cover or plan to cover less than 50,000 premises are less likely to be considered attractive targets for consolidation and, absent consolidation, we do not expect them to pose a material and sustainable constraint on BT. Therefore, we have not used their footprint to determine where there is likely to be the potential for material and sustainable competition to arise.

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[245] [✂] response dated [✂] to s135 notice dated [✂], question [✂].
[246] [✂] response dated [✂] to s135 notice dated [✂], question [✂].
[247] [✂] response dated [✂] to s135 notice dated [✂], question [✂].
[248] As detailed in Annex 7, to conduct this assessment, we consider altnets' coverage across the UK, including the Hull Area. This is because we think the potential for an altnet to be considered as an acquisition target will likely depend on their total coverage across the UK, including the Hull Area. However, as further detailed below and discussed in Annex 7, we do not consider any build within the Hull Area for the purpose of delineating the boundaries between Area 2 and Area 3.
[249] We detail how we identify these areas in practice below. However, we note that the results of our modelling and as such the boundaries of the area where there is or there is likely to be potential for material and sustainable competition would not change materially if we were to use, for example, a 100,000 threshold.

Provisional conclusion on material and sustainable competition

4.83 In summary, we provisionally consider that VMO2 and CityFibre will respectively continue to exert, or have the potential to exert, a material and sustainable constraint on BT.

4.84 We have also identified a range of altnets which – due to their potential scale and market position – are also likely to have the potential to exert a material and sustainable constraint on BT.

4.85 Other altnets are less likely to exert a material and sustainable constraint on BT. However, the evidence indicates that those who plan to cover at least 50,000 premises by 2031 may be particularly attractive targets for potential acquisition or consolidation.

4.86 Overall, we provisionally consider that any areas where VMO2, CityFibre or any altnet covering at least 50,000 premises by 2031 is present or plans to be present should be treated as areas where there is, or there is likely to be potential for, material and sustainable competition to BT.

4.87 Any areas where neither VMO2, nor CityFibre, nor any altnets covering at least 50,000 premises by 2031 are present, or plan to be present, should be treated as areas where there is not, or there is unlikely to be, potential for material and sustainable competition to BT.

4.88 We consider that, over the review period, the difference in competitive conditions between these two areas is sufficiently significant to treat them as separate geographic markets.

Assessing whether there are any areas where competition is sufficiently well-established to constitute a separate geographic market

4.89 We recognise that the area in which there is, or there is likely to be potential for, material and sustainable competition is not perfectly homogeneous and that there is likely to be a continuum of competitive conditions across this area. We have therefore considered whether there may be postcode sectors where competition is sufficiently well-established or effective that we should treat them as a separate geographic market. In line with the WFTMR21 statement, we will refer to these postcode sectors collectively as Area 1.

4.90 In the March 2021 Statement, as part of our Area 1 assessment, we identified that two rival networks to BT were already present in 34 postcode sectors across the UK (0.4% of all UK premises). We noted, however, that across these 34 postcode sectors, more than half ([✂]%) of all connections remained on the Openreach network, that CityFibre's share was under [✂]%, and more generally that it was too early to draw firm conclusions about the incremental competitive impact of a second rival network. Based on this, we decided that competitive conditions in these postcode sectors were not sufficiently distinct from those postcode sectors in Area 2 for us to define a separate Area 1 market.

4.91 In the following paragraphs we explain how we propose to approach the Area 1 assessment and set out our provisional conclusions on whether we should define a separate Area 1 market.

Approach

4.92 As outlined above, if we were to identify an Area 1 market, this would be to capture areas where competition is sufficiently well-established or effective such that they could be distinguished from neighbouring areas where competition is or has the potential to become material and sustainable.

4.93 In practice, we consider this would only be the case in areas where the competitive constraint on BT is sufficiently stronger and likely to be sustainable over time, absent regulation.

4.94 In light of this, we remain of the view that it is appropriate to define Area 1 on the basis of there being existing (and not planned) presence from two rival networks which are sufficiently well-established. This is for a number of reasons.

4.95 Firstly, the evidence available to us suggests that a single competitor would not be able to exert a sufficiently strong constraint on BT.[250] The existence of two rival networks to BT would therefore allow us to identify areas where the constraint on BT is more likely to be sufficiently strong.

4.96 We also think rival networks would need to have existing (and not planned) presence for the constraint on BT to be sufficiently strong and sustainable such that competitive conditions are distinguishable from the rest of Area 2. This reflects the uncertainty of prospective build plans, and the fact that it would take time for an operator to gain the necessary scale and take-up so that this operator would be a sufficient and sustainable constraint on BT. We would expect to capture planned build (as it is realised) in future reviews.

4.97 Finally, we would need to find that the observed level of competition is sufficiently well-established that it would be sustainable longer term and in the absence of any WLA regulation.

4.98 In considering this, we are mindful of the fact that altnets compete across their footprint, and, as discussed above, their position as material and sustainable competitors is dependent on reaching sufficient scale and market position (including take-up) overall. Therefore comparatively stronger performance in a minority of their footprint is not necessarily indicative of sufficiently well-established competition.[251] For example, an altnet may still be vulnerable to potential strategic behaviour from BT to undermine competition in the absence of any WLA regulation (as discussed further below in our SMP assessment). As such, where competition is still nascent, we would not expect these areas to be sufficiently distinct from Area 2 absent WLA regulation, even where two rival networks are present.

4.99 To conduct this assessment we have relied on a combination of quantitative data on coverage and take-up as well as qualitative evidence on rival networks' market positions.[252]

[250] For example, as set out in the SMP assessment section, we do not consider that competition from VMO2 alone is sufficient to undermine BT's market position. This is in line with our conclusion from the March 2021 statement (for more detail, see: Ofcom. March 2021. Promoting investment and competition in fibre networks – Wholesale Fixed Telecoms Market Review 2021-26. Volume 2, Paragraphs 8.814-8.149).

[251] Comparatively stronger performance in parts of the footprint – often the oldest parts of the footprint – is however consistent with that competitor having the potential to be a material and sustainable competitor.

[252] Some of the analysis and evidence underlying our geographic market definition will also underpin our SMP assessment. We explain this in the SMP assessment section below.

Findings

4.100 Our analysis indicates that there are now 1,812 postcode sectors where two or more rival networks to BT are currently present (this accounts for 19% of all postcode sectors).[253] We then considered the relative shares of connections across these postcode sectors. Across these postcode sectors, more than half ([✂]%) of all connections are on the Openreach network, 21%-30% ([✂]%) on VMO2's network, and less than 10% ([✂]%) on CityFibre's network.[254] This suggests that, across these postcode sectors, the incremental competitive impact of a second rival network is still likely to be limited.

4.101 We have also considered how the relative shares of connections vary across the 1,812 postcode sectors, to understand if there is evidence that competition is more established in a sub-set of those 1,812 postcode sectors. In particular, we found that, in 321 of those postcode sectors,[255] Openreach's share is below 50%. Across these 321 postcode sectors, 41-50% ([✂]%) of all connections are on the Openreach network, 31%-40% ([✂]%) on VMO2, and CityFibre's share was less than 10% ([✂]%).[256] This again suggests that the incremental constraint exerted by a second rival network is likely to be limited at present.

4.102 We recognise that – within these 321 postcode sectors – there will be pockets of contiguous postcode sectors where altnets' share is higher. For example, there are eight postcode sectors in [✂] and five in [✂] where BT's share is below 50% while both [✂] and [✂] have a share above [✂]%.

4.103 However, the market shares of these rival networks have been achieved with current SMP regulation in the WLA market in place (including certain restrictions on Openreach's commercial flexibility), whereas consistent with a modified Greenfield approach, we need to consider the position of rival networks in the absence of this regulation.

4.104 Moreover, in line with the evidence set out below, we consider that an altnet having a higher share in a limited number of areas is unlikely to be sufficient for competition in those areas to be sufficiently well-established or effective such that they could be distinguished from the rest of Area 2. It is instead a finding we would expect to see in a market where altnet competition is developing.

4.105 In particular, as further detailed as part of our SMP assessment, the evidence indicates that altnets are still in the process of competing to gain sufficient take-up to ensure continued funding, complete any additional build, and sustain ongoing network operations. Increasing take-up has been challenging to date, and absent regulation in the WLA market, this is likely to be even more challenging given BT's incumbency advantages.[257]

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[253] We note that to assess presence we have used the methodology described below. In addition we note that to conduct this analysis we have included the current build of all altnets covering or planning to cover at least 50,000 premises by 2031 (i.e. all the altnets we have identified as having the potential to exert a material and sustainable constraint on BT). As discussed above, some of the smaller altnets have been included in our geographic market assessment primarily based on their potential to exert a material and sustainable constraint on BT through consolidation. The constraint they exert on BT in their current form is likely to be more limited and as such including their presence as part of the Area 1 analysis is likely to over represent the current competitive constraint BT is facing. These results should therefore be treated as an upper bound.

[254] The share of connections on other altnets' networks is even lower.

[255] This accounts for 3% of all postcode sectors.

[256] The share of connections on other altnets' networks is even lower.

[257] As set out below in the SMP assessment section, in the absence of regulation, BT could have the ability and incentive to deter additional network build and make it more difficult for altnets to gain take-up.

4.106 Overall, we find that the above evidence on presence and take-up indicates there has been a material improvement in competitive conditions since 2021 and that there is potential for competition to develop further during the review period.

4.107 However, taken together, this evidence suggests that altnet competition is still developing. We therefore remain of the view that while altnets clearly offer the potential for material and sustainable competition, it would be premature to conclude that their take-up in these postcode sectors means that competition is sufficiently well-established and distinct from Area 2 more generally.

4.108 Therefore, our preliminary conclusion is that, absent regulation in the WLA market, there are no postcode sectors in which competition is or will become sufficiently distinct from other postcode sectors where there is, or there is likely to be potential for, material and sustainable competition. As such, we consider that it is not appropriate to define a separate Area 1 market.

We propose to define two geographic markets for WLA

4.109 Based on the above discussion, we propose to define the following geographic markets:

a) WLA Area 2: postcode sectors in which there is, or there is likely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks. In practice, this is made up of postcode sectors where there is current or planned presence by at least one of VMO2, CityFibre or any altnet that plans to cover at least 50,000 premises by 2031; and
b) WLA Area 3: postcode sectors in which there is not, and there is unlikely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks. This would encompass any postcode sectors not included in Area 2.

4.110 As discussed above, we do not think there are any areas yet where competition is sufficiently well-established or effective (i.e. Area 1).

4.111 We recognise this results in a wide Area 2 where competitive conditions are not completely homogeneous. However, there is no requirement for competitive conditions to be perfectly homogeneous across a geographic market; rather, we should assess whether the level of competition faced by BT is likely to be sufficiently similar across a given market.

4.112 Based on the evidence available, our assessment is that while Area 2 encompasses a continuum of competitive conditions (e.g. areas where both VMO2 and CityFibre are present alongside areas where a single smaller altnet is planning to build), these are all areas where there is, or there is likely to be potential for, material and sustainable competition. As such we are satisfied that, for the purpose of the SMP assessment, the constraint on BT across Area 2 is sufficiently similar, such that it represents a single geographic market.

4.113 Therefore, we do not propose to define an Area 1 or any other geographic markets in addition to Area 2 and Area 3.

Establishing the Area 2 and Area 3 market boundaries

4.114 In this subsection we set out how we propose to analytically identify the boundaries of the Area 2 and Area 3 geographic markets.

4.115 To recap, we are proposing to define the areas where there is, or there is likely to be potential for, material and sustainable competition (Area 2) as those where there is current

or planned presence by at least one of VMO2, CityFibre or any altnets with a coverage equal or greater than 50,000 premises by 2031. These would be separated from the rest of the UK where we consider there is not and there is unlikely to be potential for material and sustainable competition (Area 3).

4.116 We consider that a material and sustainable competitor would provide a constraint across its entire footprint, meaning that competition would operate across larger geographical areas. However, a number of more granular modelling choices and approximations need to be made in order to identify where those who are, or have the potential to be, material and sustainable competitors are present, or plan to be present, and therefore establish the geographic market boundary. In particular:

a) **Geographic unit:** at what level of geographic granularity should the assessment be conducted?
b) **Coverage threshold:** what percentage of premises within a geographic unit does an operator need to cover in order to be considered as present?
c) **Modelling the evidence:** how should we process the information on existing network and build plans that we have obtained from operators?

Geographic unit

4.117 Our first step is to break down the UK into smaller geographic units within which we can examine the presence of BT's competitors. Geographic units that meet our definition of Area 2 and Area 3 (as set out above) can then be aggregated into a single geographic market.

4.118 Geographic units cannot be too large as there could be significant differences in the level of competitors' presence across a large unit. On the other hand, more granular analysis may be impracticable.

4.119 On balance, in line with the approach used in 2021, we propose using postcode sectors as our geographic unit of assessment. We consider that postcode sectors are well-established, relatively stable and strike a good balance between being granular enough to capture variations in the presence of BT's competitors but not so granular that they are impracticable. There are around 10,000 postcode sectors in the UK, with an average of 3,000 premises in each.

Coverage threshold

4.120 As individual network operators' current and planned deployments will not map precisely to postcode sectors (i.e. their rollout in a postcode sector will not always cover 100% of premises in that sector) we must consider a coverage threshold for a network to be regarded as being 'present' in any postcode sector.

4.121 If a high coverage threshold is used then it is possible that many parts of an operator's network would be excluded, and consequently the operator (and the constraint it provides) would be under-represented. Conversely, if a low coverage threshold is used then it is possible that an operator's network would be over-represented.

4.122 In line with our approach in the WFTMR21 statement, we therefore propose using a coverage threshold of 50%, as on average, any under- or over-representation should balance out. This means that an operator will be considered as present in a postcode sector if its existing or planned network covers at least 50% of the premises in that postcode sector.

Modelling evidence on existing networks and build plans

4.123 Having identified the relevant geographic unit and the coverage threshold, we need to process the existing and planned build data that we obtain from network operators to model their expected presence over the review period.

4.124 As discussed above and in Annex 7, we used information on current and planned build gathered for our Connected Nations report and supplemented this with additional data on planned build obtained through our statutory powers.

4.125 In line with the approach used in 2021, we have used all planned deployment to model expected presence over the 2026-31 review period.[258] We are using plans as a way to assess where build is most likely to be attractive and, as a result, where there is the potential for competition to be material and sustainable.

4.126 In addition, our analysis suggests that planned deployment is not an unrealistic representation of the level of future coverage that could be achieved over the review period. This is because our analysis indicates that, in aggregate, the future build rate required to achieve the entirety of all planned build appears to be slightly lower compared to past build rate.[259] That is broadly consistent with other evidence indicating that, over the review period, we might expect further build, albeit at a lower rate.

4.127 While clearly relevant to our forward-looking market analysis, we recognise that evidence from operators' plans is necessarily prospective and can only ever provide an approximation of reality. We note in particular that build plans do not cover the entirety of the review period and can change over time, particularly when looking over the longer term. However, there is always a level of uncertainty in forward-looking assessments, and we believe this is the best information available to us.

4.128 Finally, we note that – to mitigate the level of uncertainty and ensure our forward-looking assessment reflects the best information available to us – for our final Statement we plan to use updated planned deployment data from operators and re-run any relevant modelling.

Outputs of modelling of network presence

4.129 We set out below our results on the presence of at least one of VMO2, CityFibre or any altnet covering at least 50,000 premises by 2031 (we refer to these as 'relevant competitors' in the tables below) taking into account their existing network presence (Table 4.2) and planned presence by 2031 (Table 4.3).

[258] As opposed to, for example, only plans that are fully funded or are in the process of being built.

[259] For example, to complete their plans by May 2027 altnets would need to build, in aggregate, around 1.77m premises every four months. Between May 2023 and July 2024 altnets have built an average of 1.80m premises every four months.

Table 4.2: Summary of results of WLA geographic market analysis based on existing presence of relevant competitors as of July 2024

Relevant competitors	Count of postcode sectors	Count of UK premises	% of UK postcode sectors	% of UK premises
At least one	6,534	24.4m	67%	76%
None	3,253	7.6m	33%	24%
Total	**9,787**	**31.9m**	**100%**	**100%**

Source: Ofcom analysis of Connected Nations data and additional submissions for the TAR (see Annex 7) .
Note: The premises are the total number of premises in the postcode sectors where relevant competitors are deemed to be present, not the number of premises passed by the network/s. All figures exclude 59 Hull Area postcode sectors.

Table 4.3: Summary of results of WLA geographic market analysis based on existing and planned presence of relevant competitors over the review period

Relevant competitors	Count of postcode sectors	Count of UK premises	% of UK postcode sectors	% of UK premises
At least one	8,069	28.7m	82%	90%
None	1,718	3.2m	18%	10%
Total	**9,787**	**31.9m**	**100%**	**100%**

Source: Ofcom analysis of Connected Nations data and additional submissions for the TAR (see Annex 7) .
Note: The premises are the total number of premises in the postcode sectors where relevant competitors are deemed to be present, not the number of premises passed by the network/s. All figures exclude 59 Hull Area postcode sectors. The latest date available for planned coverage is January 2030.

Identification of the postcode sectors that constitute each of the WLA geographic markets

4.130 We now delineate the WLA geographic markets using the results of our modelling.

Area 3

4.131 Area 3 comprises postcode sectors in which there is not, and there is unlikely to be potential for, material and sustainable competition to BT. As discussed above, this equates to postcode sectors which are BT-only, or where the only other networks present are those which do not currently plan to cover more than 50,000 premises by the end of the review period.

4.132 Based on the results of our modelling, Area 3 represents 18% of UK postcode sectors and 10% of UK premises.

Area 2

4.133 Area 2 comprises postcode sectors in which there is, or there is likely to be potential for, material and sustainable competition to BT. As discussed above, this equates to postcode sectors with existing or planned presence by at least one of VMO2, CityFibre or any altnet covering at least 50,000 premises by 2031.

4.134 We find that Area 2 represents 82% of UK postcode sectors and 90% of UK premises.

4.135 As discussed above, we propose not to define an Area 1.

4.136 These results are summarised in Table 4.4 below. The postcode sectors making up those geographic markets that we have provisionally identified can be found in Schedule 2.

Table 4.4: Summary of results of geographic market analysis

WLA geographic market	Count of postcode sectors	Count of UK premises	% of UK postcode sectors	% of UK premises
Area 2	8,069	28.7m	82%	90%
Area 3	1,718	3.2m	18%	10%

Source: Ofcom analysis of Connected Nations data and additional submissions for the TAR (see Annex 7) .
Note that all figures exclude 59 Hull Area postcode sectors.

Application of the three criteria test

4.137 In this subsection, we consider whether the three criteria set out in section 79(2B) of the Act are met in relation to the WLA markets.

4.138 As set out in Annex 5, in determining whether to identify a market for the purpose of making a market power determination, we must consider whether the three criteria set out in in subsection 79(2B) of the Act are met. Where we do not consider that the three criteria are met, we may not identify a market for this purpose.

4.139 In the WLA market, we expect an increase in competition in certain areas of the UK, but not in others, leading us to define sub-national markets. However, we consider it appropriate to assess the three criteria at a more general level, taking into account overall characteristics and structure in the relevant product market, and to leave the assessment of competition at a sub-national level to our SMP assessment. We approach the three criteria test for WLA on this basis.

High and non-transitory barriers to entry

4.140 Where network operators are not present in an area, and there are barriers to entry and expansion, this makes it more difficult for rival networks to compete with BT. Barriers to entry and expansion exist in the WLA markets, arising from the cost of constructing a significant scale local access network and connecting customers. Further, in the WLA market, the existence of high sunk costs in establishing coverage across an area creates significant economies of scale, because once the high fixed cost of investment in network build has been sunk, these can be spread across a large number of active customers.

4.141 There are also other factors that could present some challenges or create uncertainties for the rollout of rival networks across the UK,[260] and in some parts of the UK, low density of premises constitutes a challenge.

4.142 Additional network build is expected to be more limited during the review period, compared to the build we have seen to date. However, the costs associated with

[260] For example, as set out at Paragraph 4.176 of the SMP assessment sub-section, completing the rollout and connecting customers can be affected by the need for wayleaves, availability of resources (including workforce) and the need for street works.

connecting customers will likely be particularly relevant given the need to increase take-up. While PIA can reduce some of these costs, these are likely to remain high over the review period.

4.143 Moreover, even where most of the build has been completed, barriers to sustainable entry remain high. Altnets need to achieve sufficient take-up and revenues, as well as scale, to become an established and sustainable competitor to BT. As discussed as part of the SMP assessment, absent regulation, this is likely to be highly challenging. Competition is also likely to be particularly vulnerable to BT's strategic behaviour, as BT's incentives would be high to deter ISPs from switching and multi-sourcing.

4.144 Accordingly, high and non-transitory barriers to entry are likely to persist in WLA markets at a national level. Where barriers are likely to be lower in sub-national markets, we take this into account in our SMP assessment.

A market which does not tend towards effective competition

4.145 We assess competitive conditions in WLA markets in the SMP assessment section below. In summary, while entry and expansion of alternative network providers over the WFTMR period has started to reduce BT's market share in some parts of Area 2, it is still high and, as further discussed as part of the SMP assessment, is likely to remain so over the review period.

4.146 While there has been significant build by altnets in parts of the UK, altnets need to achieve sufficient take-up and revenues, as well as scale, to become sustainable competitors to BT. This will require further investment. The extent to which these challenges will be overcome remains uncertain, and the potential for sustainable competition is assisted by the existence of continued WLA regulation. In other parts of the UK, we do not anticipate the emergence of sustainable competition to BT.

4.147 Accordingly, we do not consider the market will tend towards effective competition at a national level. We take account of increasing competition at a sub-national level in our SMP assessment.

Insufficiency of competition law

4.148 We set out in more detail in Section 7 below, our competition concerns arising from BT's SMP in WLA markets. Absent regulation, BT's SMP would give it the incentive and ability to engage in forms of conduct that could distort competition and/or harm consumers. These forms of conduct fall into two broad categories:

- **Exclusionary behaviour** by BT to prevent potential competitors from competing in the WLA market or prevent them from gaining market share.
- **Exploitative behaviour** by BT at the expense of its wholesale access customers in the WLA markets, ultimately harming end-users who purchase services from BT's wholesale access customers in the downstream markets.

4.149 Although our concerns vary according to whether the behaviour is exclusionary or exploitative, both ultimately lead to poorer outcomes for end-users.

4.150 Competition law, in particular the rules prohibiting the abuse of a dominant position, is an important part of the legal framework with which BT needs to comply. Given its position of SMP (which equates to the competition law concept of dominance) BT has a special responsibility not to allow its actions on the market (where conditions of competition are weak) to distort or impair competition.

4.151 However, we consider that competition law remedies would be insufficient to address the identified competition concerns on their own in this context.

a) First, competition law would focus on tackling the abuse of a dominant position and would not be as effective as ex ante regulation in promoting and protecting competition from rival networks in the WLA market and in downstream retail markets.
b) Second, regulation must remain effective for the review period, and ex ante regulation better enables us to do this as it can be tailored to the particular circumstances in the markets and services provided.
c) Third, competition law does not provide enough regulatory certainty, which itself can undermine competition – and regulatory certainty is important in encouraging long-term investment in competing networks. In contrast, a benefit of ex ante regulation is that all industry stakeholders are clear in advance on the regulation that will apply.
d) Fourth, ex ante regulation can facilitate more timely enforcement due to the greater certainty and specificity provided. Although significant fines can be levied for breaches of competition law, which do have some reputational and commercial implications, cases often take considerable time, by which point the damage to competition may be irreversible.

4.152 On that basis, while competition law enforcement may be used in appropriate circumstances, we do not consider that it would be sufficient to rely on it alone and so consider that ex ante regulation is required.

Provisional conclusions on WLA market definition and the three criteria test

4.153 We consider that the three criteria test set out in section 79(2B) of the Act is met.

4.154 We therefore propose to identify the following markets for WLA for the purposes of making a market power determination:

a) WLA Area 2 – postcode sectors in which there is, or there is likely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks; and
b) WLA Area 3 – postcode sectors in which there is not, and there is unlikely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks.

Consultation questions

Question 2.6: Do you agree with our provisional conclusions on geographic market definition for the wholesale local access market? Please set out your reasons and supporting evidence for your response.

Question 2.7: Do you agree with our provisional conclusion on the application of the three criteria test to the wholesale local access market? Please set out your reasons and supporting evidence for your response.

SMP assessment

Our proposals

4.155 In this section we assess whether any provider has SMP in any of these markets.

4.156 As detailed below, we have provisionally concluded that BT has SMP in each of WLA Area 2 and WLA Area 3.

4.157 The following sections set out our SMP assessment in more detail and are structured as follows:

a) First, we provide background by outlining the key findings from our WFTMR21 SMP assessment.
b) Second, we set out the analysis and evidence underlying our SMP assessment across WLA markets.
c) Third, we draw on this analysis and evidence to set out our assessment and SMP findings for each geographic market.

Background

4.158 In the WFTMR21 Statement we concluded that BT had SMP in WLA Area 3 and WLA Area 2. More specifically:

a) in Area 3 we found BT's market share was high and considered that barriers to large scale entry were high and likely to be permanent. We therefore expected BT would retain SMP in most parts of Area 3 throughout the review period; and
b) In Area 2 we concluded that BT had SMP due to BT's high market share and the existence of barriers to entry and expansion. While we expected competition to increase and PIA to substantially reduce the sunk costs of network build, we noted that outcomes were uncertain. We also recognised that the existence of continued wholesale local access regulation was still needed to support new entry.

Approach and evidence considered

4.159 We have provisionally defined geographic markets based on where we expect current or potential material and sustainable competitors to be present. Looking at presence of competitors allows us to identify areas within which competitive conditions are likely to be sufficiently similar, but it does not necessarily inform our understanding of how strongly these competitors would constrain BT, and therefore whether it has a position of SMP in any geographic markets. This is the role of the SMP assessment.

4.160 To conduct this assessment, we ultimately need to evaluate the extent to which over the review period – absent regulation in the WLA market – BT would have the power to behave to an appreciable extent independently of competitors, its own customers and ultimately consumers.

4.161 In practical terms, our SMP assessment takes account of a number of factors including: market shares, competition from existing network infrastructure, barriers to entry and expansion, countervailing buyer power, pricing and out-of-market constraints.

4.162 In the rest of this sub-section, we discuss analysis and evidence relating to each of these factors across the two proposed WLA geographic markets. As noted above, some of the analysis and evidence underlying our SMP assessment may also underpin the assessment

we have conducted for the purpose of defining WLA geographic markets. This is because, albeit with a different purpose, both the geographic market definition and the SMP assessment will need to examine competitive conditions. The former with a view to determining geographic areas where competitive conditions are sufficiently similar and the latter with the aim to assess whether, within each of these geographical areas, competitive conditions are indicative of SMP such that ex ante regulation is necessary over the review period.

4.163 In the following sub-sections, we therefore draw on and – where relevant expand on – the analysis and evidence presented in previous sections.

Market shares

4.164 In WLA markets, market shares provide a useful first indicator of competitive conditions. The more competing networks that have managed to attain a material share of connections, the stronger the indication that the intensity of competition is greater.

4.165 Table 4.6 below presents BT's market share in the supply of WLA in Areas 2 and 3.[261]

Table 1.6: Summary of market shares for proposed WLA markets

	Area 2	Area 3
BT's share of connections	61-80% ([✂]%)	91%-100% ([✂]%)
Largest rival (VMO2), share of connections	11-30% ([✂]%)	0%-10% ([✂]%)
Second largest rival (CityFibre), share of connections	0%-20% ([✂]%)	0%-10% ([✂]%)

Source: Ofcom analysis of Connected Nations data (see Annex 7) .

Competition from existing network infrastructure

4.166 Where competing networks have existing infrastructure, they are more able to provide a degree of competition to BT for customers in that area.

4.167 When defining geographic markets, we looked at coverage data to identify altnets that are, or have the potential to be, material and sustainable competitors and determine where they are present with the aim to define the boundaries of WLA Area 2 and WLA Area 3. When setting out our SMP findings, we draw on the same evidence and combine it with other considerations to assess the level of constraint stemming from VMO2 and altnets' coverage in each of those geographic markets.

4.168 Table 4.7 below presents the percentage of premises already covered by BT's largest rivals in each of the proposed geographic markets.

[261] We have estimated market shares in Areas 2 and 3 based on shares of July 2024 active broadband connections. Our analysis is based on data collected from network operators and the same underlying dataset discussed in relation to WLA geographic market definition. We set out more detail on our approach to this analysis in Annex 7.

Table 4.7: Summary of current coverage from VMO2 and CityFibre for proposed WLA markets

	Area 2	Area 3
Total number of premises	28.7m	3.2m
Largest rival (VMO2) % premises passed	51%-60% ([✂]%)	0%-10% ([✂]%)
Second largest rival (CityFibre) % of premises passed	11%-20% ([✂]%)	0%-10% ([✂]%)

Source: Ofcom analysis of Connected Nations data (see Annex 7).

Barriers to entry and expansion

4.169 The economics of building and operating telecoms networks means that altnets' entry may not be viable in all areas, and even in areas where entry is viable, altnets face challenges before they can establish themselves as sustainable competitors to BT.

4.170 In the next paragraphs we assess the nature and scale of these challenges. First, we discuss the costs of rolling out a network. Then, we explain why rolling out a network is not sufficient for sustainable entry into WLA markets. In addition to roll-out, altnets would need to achieve sufficient levels of take-up and revenues, as well as scale, which is a lengthy and challenging process, especially in light of BT's incumbency advantages.

High costs of roll-out

4.171 Building a network that supports WLA services involves significant capital investment to cover the material costs of construction and customer connections. Further, a considerable proportion of the costs of the investment are then sunk because, once built, many components of the network either have low resale value or, where recovery of assets is possible, significant costs would be incurred in order to extract and resell them.

4.172 This creates a large economy of scale because once the high fixed cost of investment in network build has been sunk, these can be spread across a large number of active customers. In a similar fashion, there are also economies of scale arising from the fixed cost of operating a network such as marketing, customer operations and maintenance.

4.173 PIA can be used by networks to reduce build costs, and since the last review we have seen substantial rollout of rival networks supported by PIA. However, even with PIA the costs and time required to complete any additional network build are still likely to be substantial.[262]

4.174 We recognise that additional network build is expected to be more limited (compared to the build we have seen to date); however, the costs associated with connecting customers as they increase take-up are still significant.

4.175 As such, over the review period, build costs are likely to remain a barrier, and a particularly high barrier in some areas of the UK (e.g., in more rural or less densely populated areas).

4.176 In addition to build costs, completing the rollout and connecting customers can be affected by the need for wayleaves, availability of resources (including workforce) and the need for

[262] As discussed in Table A15.4 of Annex 15, our estimates indicate that even using PIA altnets would incur a cost of between £300 and £442.

street works. This means it will take time before rival networks establish themselves as sustainable competitors to BT.[263] For example, a number of providers ([✂]) noted that gaining permission to install new fibre optic cables at properties, [✂], slows down network build while increasing its cost.[264]

4.177 Network operators may also be able to increase scale by consolidating or partnering with other network operators. However, as noted above, the process of consolidation is at an early stage and is likely to involve financial and technical challenges.[265] As such consolidation will not necessarily constitute a materially cheaper or quicker entry option compared to organic build.

Challenges of achieving sufficient take-up

4.178 Even where alternative networks have overcome the barriers to building a network, rollout is not sufficient to become a sustainable competitor to BT. As detailed in Volume 3, Section 1, the evidence indicates that over the 2026-31 review period, most altnets will need to focus on gaining additional take-up and revenues to achieve financial sustainability and attract further investment, which is required to fund any residual build and fund customer connections to the network they have already built.

4.179 To increase take-up, both wholesale and retail altnets are currently pricing competitively to attract ISPs or end-users. For example, [✂] noted that the [✂] offers competitive pricing [✂].[266] Similarly, [✂] noted that [✂] offer an average discount of around [✂] compared to Openreach Equinox 2 prices.[267]

4.180 However, increasing take-up takes time and has been challenging to date (see discussion of take-up rates in Section 2). The evidence indicates that this reflects a number of underlying challenges which we discuss in turn in the next sub-sections, in particular:

a) attracting retail customers can be difficult due to switching costs;
b) securing deals with large wholesale customers can assist new entrants in becoming established, but this a lengthy, complex and uncertain process; and
c) in the absence of SMP regulation of the WLA markets, BT would have the ability to make it more difficult for altnets to gain take-up, as well as deter additional network build.

[263] We recognise BT may face similar costs in rolling out their FTTP network. However, in contrast to altnets, BT would have the advantage of an established legacy network which BT can keep using to compete in the market for WLA services.

[264] [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[265] For example,[✂] indicated that the integration capex incurred from consolidation [✂] was significant, amounting to [✂]. [✂] response dated [✂] to s135 notice dated [✂], question [✂]. [✂] estimated the integration costs [✂] to be material ([✂]). [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[266] [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[267] [✂] response dated [✂] to s135 notice dated [✂], question [✂].

4.181 In contrast, Openreach benefits from having downstream BT (including Plusnet and EE) as an anchor customer and having a large installed base across other ISPs with which it has established relationships.[268]

Customers' switching costs

4.182 One of the core challenges for new entrants is the time and cost it takes to achieve customer switching, as perceived or actual switching costs can deter customers from changing supplier. Changing supplier may involve additional financial costs (such as the cost of a new connection), and some disruption to the end-user. In addition, retail customers can be less likely to take-up a service from brands they are not familiar with.[269] As such, new entrants, especially vertically-integrated network operators, will need to establish brand and reputation which may take some time.

4.183 We recognise that some of these barriers are likely to be lower for customers that have not yet migrated to FTTP. Before customers have migrated, suppliers offering FTTP can seek to attract customers with higher speeds and improved reliability compared to their existing technology.[270] For customers that have already migrated to FTTP, the focus of competition may shift more to pricing, customer service and more incremental improvements in quality.

Challenges in securing deals with large wholesale customers

4.184 One important avenue for new network operators to gain the necessary take-up is through wholesale deals with larger ISPs. Given that these potential wholesale customers currently have large subscriber bases, existing customer relationships and recognised brands, such deals could enable entrants to grow customer penetration quickly and reduce risks.

4.185 However, securing such deals is dependent on ISPs being willing to engage with entrants, and there are factors that suggest it may be challenging for new entrants to secure this engagement, particularly for smaller networks.[271]

4.186 As an example, in order to switch or multi-source, ISPs would typically need to integrate their IT systems with the new network. This is usually a lengthy and costly process which is easier to justify in cases where ISPs can migrate large volumes to the rival networks. For example:

a) [✂] noted that onboarding new providers is complex, resource-heavy and would require significant investments. Specifically, [✂].[272]
b) [✂] said it has to offer significant incentives to ISPs to attract them onto the [✂] network, including payments for systems integration.[273]

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[268] BT has the largest retail market share (32% in 2023) while Openreach also supplies wholesale services to other large retail providers such as Sky, TalkTalk and Vodafone. Ofcom. 18 July 2024. Communications Market Report 2024. Interactive Data, Telecoms and Networks, Fixed telecoms connections by ISP (%). As discussed below, altnets are increasingly dealing with these large retail providers but this is still at an early stage of development and/or not sufficient to constrain BT.

[269] For example, the findings of a customer survey from [✂] indicate that [✂]. [✂] response dated [✂] to s135 notice dated [✂], question ✂]

[270] See Volume 2, Section 2.

[271] For example, analysis by [✂] conducted to decide on wholesale agreements with altnets, namely [✂], identified existing and planned footprint, along with discounted prices as compared to Equinox prices as the two key deciding factors. [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[272] [✂] response dated [✂] to s135 notice dated [✂], questions [✂].

[273] [✂] response dated [✂] to s135 notice dated [✂], question [✂].

c) [✂] internal documents suggest that it might take between three and nine months to onboard a new provider.[274]

4.187 We understand that there have been some initiatives to create a common wholesale platform.[275] Such a platform could create scale by giving access to a combination of several smaller networks and reducing the time and costs needed to switch or multi-source. However, the timing and impact of such a platform remains uncertain.

4.188 Even after a deal has been signed between a network operator and an ISP, successfully implementing it is dependent on a number of additional challenges and uncertainties, including: completing any residual network build; completing any required product, operations, service and/or systems development; maintaining a competitive price offering; gaining a reputation as a wholesale partner; and securing enough orders over time.[276]

4.189 We recognise that some altnets have been able to secure deals with ISPs, some of which have been successfully implemented over the last few years. For example, CityFibre has had active deals with Vodafone and TalkTalk since 2017 and 2020 respectively.[277]

4.190 However, many altnets' wholesale agreements are still at an early stage. For example:

a) CityFibre recently signed a deal with Sky but work is still underway to enable Sky's broadband services on the CityFibre network from 2025.[278]
b) PlatformX Communications recently announced its intention to sign a wholesale agreement with Netomnia (and brsk) with the aim to enable Netomnia (and brsk) to onboard their first customer through the PlatformX platform by February 2025.[279]
c) [✂]'s internal documents indicate they are currently in the process of finalising contracts with [✂].[280]
d) [✂] has recently signed a deal with [✂].[281]

4.191 In addition, while wholesale supply deals can significantly de-risk entry and expansion these may not be readily accessible for smaller networks. Moreover, even where altnets are able to secure a deal, operationalising such a deal can still be a lengthy and challenging process.

[274] [✂] response dated [✂] to s135 notice dated [✂], question [✂].
[275] For example, the Common Wholesale Platform, which is a non-profit member-owned organisation that helps altnets to provide wholesale services to the UK ISP market, has recently agreed a strategic partnership with Fibre Café connectivity aggregation platform, which is designed to tackle the significant integration and automation challenges for broadband ISPs when onboarding new networks. ISP Review. 29 November 2023. The Common Wholesale Platform and Fibre Cafe Join Forces. Accessed on 11 March 2025. We also understand that [✂] is building an altnet aggregation platform to onboard altnets cheaper and more efficiently. [✂] response dated [✂] to s135 notice dated [✂], question [✂].
[276] For example, [✂]. [✂] response dated [✂] to s135 notice dated [✂], questions [✂].
[277] CityFibre Infrastructure Holdings Limited response dated 23 August 2024 to s135 notice dated 8 July 2024, questions B1, B2, and B3.
[278] CityFibre. 20 August 2024. Sky and CityFibre sign partnership to bring Sky Full Fibre Broadband to the CityFibre network. Accessed on 31 January 2025.
[279] PlatformX Communications. 16 September 2024. PXC to Partner with Netomnia and Brsk. Accessed on 31 January 2025.
[280] [✂] response dated [✂] to s135 notice dated [✂], question [✂].
[281] [✂] response dated [✂] to s135 notice dated [✂], question [✂].

BT's ability to deter additional network build and make it more difficult for altnets to gain take-up in the absence of regulation

4.192 Lastly, we note that under the modified Greenfield approach, we assess SMP in the absence of regulation in the WLA market. This means that our assessment includes conduct that could take place if BT faced no regulation in WLA.

4.193 BT accounts for significant wholesale volumes, and although there is the potential for altnets to increase take-up, this will take time for the reasons described above. ISPs will remain reliant on BT across a substantial part of the UK during the review period.

4.194 Given this, BT could have the incentive, and in the absence of regulation the ability, to leverage this incumbency advantage to deter ISPs from switching or multi-sourcing thereby exacerbating barriers to entry and expansion for altnets. This could result from exclusionary behaviour including offering geographic discounts to wholesale prices in areas where it faces potential competition from rival networks, other commercial terms including certain kinds of volume discounts, or targeted overbuild.

4.195 For example, [✂] noted that Openreach's ability to react and punish [✂] decision to multi-source is very strong and could erode the value of a multi wholesale supply model.[282] Moreover, we note that [✂].[283] This may increase BT's ability to implement strategic behaviour to deter ISPs from placing orders under the deal.[284]

Countervailing buyer power

4.196 Purchasers may have a degree of buyer power where: a) they purchase a significant and material proportion of a supplier's total volumes; and b) they have a credible threat of switching to an alternative supplier, or to self-supply, to an extent that would materially impact the supplier's profitability.

4.197 In the WLA market, a number of ISPs have large customer bases which, if switched to a rival network operator, would generate economies of scale and support rival entry or expansion. This means that, in principle, large ISPs could use the threat of switching as leverage in negotiations to obtain more favourable terms from Openreach.

4.198 Whether an ISP has countervailing buyer power in practice will depend on a number of factors including whether rival network provider(s) are present and have sufficient coverage to provide a credible alternative to BT, the time taken and cost involved for new networks to be built, the degree of commitment/risk required from the buyer and the cost and speed of switching to alternative wholesale providers.

4.199 As discussed above, since 2021 several altnets have built FTTP networks and ISPs have started to engage with them. However, over the review period, altnets will still need to overcome substantial challenges before they can become a credible alternative to BT. Moreover, in some parts of the UK, altnet entry will remain less likely to be viable. Overall this means that, over the review period, ISPs will likely need to materially rely on BT, which will limit their ability to credibly threaten to switch and negotiate better terms.[285]

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[282] More specifically, [✂]. [✂] response dated [✂] to s135 notice dated [✂], questions [✂].
[283] [✂] response dated [✂] to s135 notice dated [✂], questions [✂]
[284] We note that BT's incentive to deter ISPs from switching or multi-sourcing to a rival network may be particularly strong during the FTTP migration period. This is because, as noted above, rival networks may find it more challenging to gain take-up once consumers have migrated to Openreach's FTTP network.
[285] For example see footnote 282.

4.200 In addition to entry and expansion from new networks, the level of competition to BT (and as such the degree of ISPs' countervailing buyer power) could increase if, as recently announced, VMO2 – which has a much more mature network compared to new entrants – were to wholesale to ISPs. In the following paragraphs, we therefore assess the extent to which wholesaling by VMO2 might have an impact on ISPs' countervailing buyer power and ultimately constrain BT.

Potential for VMO2 to provide wholesale services

4.201 In February 2024, VMO2 announced its intention to offer wholesale access across its original network footprint (i.e. the network built prior to the establishment of nexfibre), starting in the first half of 2025.[286] [287]

4.202 We consider that entry by VMO2 has a strong potential to create an additional form of direct constraint on BT:

a) VMO2 told us that it is actively exploring the prospect of offering wholesale access across its original network to tier-1 and tier-2 ISPs.[288]
b) [✂] told us that it may look to agree a wholesale deal with VMO2 at some point in the future.[289]

4.203 However, although VMO2 has announced its intention to compete at the wholesale level, there is currently no track record of VMO2 competing in this way, and therefore no evidence on the impact it would have in practice over the review period. For example:

a) VMO2 [✂].[290]
b) We also note that, as mentioned in Section 2, although VMO2 is upgrading its network to offer FTTP, and is the anchor tenant for nexfibre's FTTP footprint, it is currently offering HFC on the majority of its footprint. The evidence suggests that this may add complexity to any future negotiations with other ISPs. For example, in its internal documents, [✂].[291]

4.204 Moreover, VMO2's presence in the retail market means that wholesaling is likely to lead to some cannibalisation of its own customer and revenue base. This may be perceived as a risk by ISPs (e.g. because VMO2 may advantage its retail arm in areas where it is competing with ISPs[292]) and make VMO2's network less attractive compared to other altnets.

4.205 Therefore, while we consider that wholesaling by VMO2 has a strong potential to create an additional form of direct competition to BT, the evidence regarding the actual impact of VMO2 wholesaling is still limited, and it is not clear that it would sufficiently undermine BT's market power over the review period.

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[286] VMO2. 16 February 2024. Virgin Media O2, Liberty Global and Telefónica kick off plans to create a national fixed NetCo in the UK. Accessed 11 March 2025.
[287] nexfibre and VMO2 together intend to wholesale their networks to other ISPs, creating a national-scale operator. See nexfibre network passes 2 million premises - nexfibre Accessed 10 March 2025.
[288] VMED O2 UK Limited response dated 19 August 2024 to s135 notice dated 8 July 2024, question A1, I1 and I2.
[289] [✂] response dated [✂] to s135 notice dated [✂], questions [✂].
[290] [✂]. [✂] response dated [✂] to s135 notice dated [✂], question [✂].
[291] [✂] response dated [✂] to s135 notice dated [✂], questions [✂]. In particular, in its internal documents [✂]. [✂] response dated [✂] to s135 notice dated [✂], questions [✂].
[292] We recognise that these risks may be mitigated by contractual clauses but agreeing such clauses may add to the costs of dealing with VMO2.

Pricing

4.206 While pricing behaviour can in principle inform an assessment of market power, in the markets under review, BT's pricing practices may be driven by a number of factors other than SMP, including regulatory considerations and investment decisions. We therefore consider evidence on BT's pricing practices with these caveats in mind.

4.207 In line with our approach in 2021, we have first considered BT's pricing relative to the cap.[293] Pricing up to the cap might indicate that other constraints are insufficiently strong to hold prices below the level of the cap and therefore be consistent with a finding of SMP.

4.208 We have therefore considered evidence that Openreach has set its headline prices to its regulated caps in 2021/22, 2022/23 and 2023/24. In the case of WLA this includes a charge control on MPF SML1 rentals, FTTC 40/10 rentals and SOGEA 40/10 rentals. For each of these services Openreach has set its headline prices to its regulated caps in 2021/22, 2022/23 and 2023/24.[294]

4.209 We have also looked at BT pricing and Equinox discounts for its FTTP services. Although competition was cited as one factor,[295] pricing decisions were informed by additional factors, including the ability to bring forward the stop sell date,[296] the ability to drive faster adoption of FTTP[297] and the ability to provide more pricing certainty in the long-run.[298]

4.210 Overall, we consider that Openreach's pricing behaviour is not inconsistent with a finding of SMP. However, in light of the evidence and caveats set out above, we do not consider pricing to be a very informative indicator of SMP conditions. As such, we do not consider it further as part of our SMP assessment.

External constraints

4.211 We have also considered the extent to which external constraints may reduce BT's market power i.e. out-of-market products such as fixed wireless access (FWA), satellite broadband and mobile broadband, which may be a demand-side substitute for some consumers.

4.212 As outlined above, while these technologies have been gaining traction since the last review, take-up of these products is still relatively low compared to that of fixed broadband, and we expect that to be the case throughout the review period.

4.213 Given this evidence, we do not consider that these services will exert a significant competitive constraint on BT in Area 2 or in Area 3 within the review period.

Provisional findings

Finding that BT has SMP in WLA Area 3

4.214 As discussed above, we define WLA Area 3 as the area in which there is not, and there is unlikely to be potential for, material and sustainable competition to BT in the commercial

[293] A price cap (or charge control) sets a limit on the maximum amount BT can charge for specific services. In 2021, Ofcom imposed charge controls on MPF rental, FTTC 40/10 rental, and FTTP 40/10 rental.
[294] BT. WFTMR Compliance Model 2023-24, tabs '12B - LLU Comp Outcome' and '12C – VULA'.
[295] Openreach Limited response dated 11 May 2023] to s135 notice dated 22 February 2023], question 10.
[296] Ofcom. September 2021. Statement on Openreach proposed FTTP offer (Equinox). Paragraph 3.15.
[297] Openreach Limited response dated 11 May 2023 to s135 notice dated 22 February 2023, question 10.
[298] Openreach Limited response dated 13 September 2021 to s135 notice dated 16 August 2021, question 4.

deployment of competing networks. Area 3 accounts for 18% of postcode sectors and 10% of premises in the UK.

4.215 In the following paragraphs we consider whether BT has SMP in Area 3.

Market shares

4.216 BT's share of active broadband connections is currently 91%-100% ([✂]%) in Area 3, as shown in Table 4.6. The share of its largest rival VMO2 is less than 10% ([✂]%).

Competition from existing presence of network infrastructure

4.217 Coverage analysis presented in Table 4.7 above shows that BT has significantly larger coverage than any of its rivals in Area 3, with BT's largest rival covering less than 10% ([✂]%) of premises in the proposed Area 3.

Barriers to entry and expansion

4.218 Area 3 includes postcode sectors that are typically less densely populated and where only smaller altnets might be present (i.e. those with a total current or planned coverage below 50,000 premises).

4.219 We have discussed above the nature of the barriers to entry and expansion that altnets are likely to face in WLA markets. In Area 3, the scale of these barriers is likely to be particularly material. This is because in less densely populated areas, completing any additional build and increasing take-up is more challenging. Building networks is more likely to be higher cost due to lower density of customers, and the altnets present in these areas would only be able to spread these costs amongst fewer customers. As a result, over the next review period, we expect limited entry and expansion by altnets in Area 3. Moreover, as discussed above, due to their size, the altnets who are present in Area 3 are less likely to be seen as an attractive partner by ISPs[299] and/or as an attractive target for consolidation.

4.220 Therefore we expect that BT will continue to be the main supplier of WLA services in Area 3 over the next review period.

Absence of countervailing buyer power

4.221 Since rival presence in Area 3 is very limited and consolidation or expansion is unlikely, over the review period ISPs will likely remain heavily reliant on BT, except in small areas and/ or potentially in areas where alternative networks have been built using public subsidies.

4.222 Therefore, we would not expect countervailing buyer power to be a material constraint on BT in Area 3.

Provisional conclusion

4.223 We therefore provisionally consider that BT has SMP in Area 3. As well as BT's high market share, we consider that barriers to entry and expansion in Area 3 are particularly high and unlikely to be transitory. Therefore, we are proposing a market power determination that BT has SMP in WLA Area 3.

Finding that BT has SMP in WLA Area 2

4.224 As set out above, we define WLA Area 2 as the area in which there is, or there is likely to be potential for, material and sustainable competition to BT in the commercial deployment of

[299] As discussed above ISPs are more reluctant to engage with smaller networks.

competing networks. Area 2 accounts for 82% of postcode sectors and 90% of premises in the UK.

4.225 In this sub-section we consider whether BT has SMP in Area 2.

Market shares

4.226 BT's share of active broadband connections is 61-80% ([✂]%) in our proposed Area 2, as shown in Table 4.6. The next largest rival, VMO2, has a share of 11-30% ([✂]%).

4.227 While entry and expansion of altnets over the WFTMR period has started to reduce BT's market share in some parts of Area 2, it is still high and, as further discussed below, is likely to remain so over the review period.

4.228 As discussed above, we recognise that BT's share of connections is below 50% in a limited number of postcodes sectors. However, we are also mindful of the fact that altnets compete across their footprint, and their competitive position is dependent on reaching sufficient scale and market position (including take-up) overall (for the reasons discussed above). Therefore we consider that comparatively stronger performance in some areas of their footprint would not be inconsistent with a finding of market power.

Competition from existing presence of network infrastructure

4.229 Coverage analysis presented in Table 4.7 above shows that BT has significantly larger coverage than any of its rivals in Area 2.

4.230 We recognise that VMO2 and CityFibre play an increasingly important role in wholesale and/or retail competition. However, having passed 51%-60% ([✂]%) and 11%-20% ([✂]%) of Area 2 respectively, VMO2's and CityFibre's potential share of WLA is currently more limited than BT's because of their more limited coverage. Current coverage from other altnets is even more limited by comparison with BT.[300]

4.231 As set out above, we acknowledge that VMO2 already exerts a material and sustainable constraint on BT. However, we consider that this level of competition is not sufficient to undermine BT's market power.

4.232 Specifically, we note that across the postcode sectors where VMO2 is currently present, BT retains a majority ([✂]%) of all connections, which is consistent with a presumption of dominance. Moreover, across the postcode sectors where VMO2 is currently present, BT retains ubiquitous coverage, whereas VMO2 covers less than 100% of premises, which limits its potential share of connections.

4.233 More generally, as detailed below – despite its intention to compete as a wholesaler – VMO2 is currently only competing at retail level and there is uncertainty around how effective wholesale competition from VMO2 might prove to be in future.

4.234 Other altnets are still facing material barriers to achieve sufficient levels of take-up. As discussed below, this is likely to limit their ability to gain market share and sufficiently constrain BT.

4.235 On the contrary, BT has a number of competitive advantages including having a large installed base across other ISPs.

[300] However, as discussed below, some of them have the potential to further expand, gain traction and / or consolidate.

Barriers to entry and expansion

4.236 Since the last review we have seen substantial rollout of rival networks in Area 2 supported by PIA and expect additional – albeit likely more limited – build over the review period. In line with this, we anticipate that over the review period altnets will largely focus on gaining sufficient take-up and revenues to secure continued investment, complete any residual build, sustain ongoing network operations and potentially consolidate, with a view to ultimately establish themselves as material and sustainable competitors to BT.

4.237 However, as discussed above, we believe this competitive process is likely to take time, will involve challenges and – in the absence of WLA regulation - may be particularly vulnerable to BT strategic behaviour aimed at deterring ISPs switching or multi-sourcing.

4.238 As a result, while potentially lower than in Area 3, we expect that even in Area 2 barriers to entry and expansion are likely to persist over the review period.

Absence of countervailing buyer power

4.239 As discussed above, ISPs could in principle leverage their position to get a good deal in Area 2 by switching – or threatening to switch – some (or all) of their customer base to a rival network. However, in practice, this is limited to areas where altnets are present, and even where they are present there are still material challenges rival networks have to address before they can establish their position in the market and represent a sustainable alternative to BT.

4.240 We also discussed that VMO2's plan to provide wholesale access to its network has the potential to create a new form of direct competition to BT thereby promoting greater countervailing buyer power. As mentioned above, so far VMO2 has only announced its intention to compete as a wholesaler, and there is uncertainty around how effective this entry might prove to be in future.

4.241 Overall, we recognise that since 2021, ISPs have been better able to exert countervailing buyer power and have the potential to do so increasingly as competition evolves over the review period. However, for the reasons set out above, we consider that there is insufficient countervailing buyer power to constrain BT's position as a supplier of wholesale local access services in Area 2 over the review period.

Provisional conclusion

4.242 We therefore provisionally consider that BT has SMP in Area 2 due to BT's high market share and the existence of high barriers to entry and expansion, which BT could have the incentive and, absent WLA regulation, the ability to exacerbate through strategic behaviour aimed at deterring ISPs from switching and multi-sourcing.

4.243 As such, we propose to make a market power determination that BT has SMP in WLA Area 2.

Consultation questions

Question 2.8: Do you agree with our provisional findings on SMP in the wholesale local access market? Please set out your reasons and supporting evidence for your response.

5. Leased line access market

5.1 In this section we explain our proposed market definition and SMP assessment for leased line access (LLA) market. The structure is as follows:

a) Product market definition for LLA
b) Geographic market definition for LLA
c) SMP assessment.

Product market definition

Our proposals and provisional conclusions

5.2 We provisionally conclude that there is a single product market for leased line access services at all bandwidths, which includes:

a) all wholesale fibre-based Ethernet and Wavelength Division Multiplexing (WDM) services, at all bandwidths;
b) leased line equivalent services delivered over symmetric PON (e.g. XGS-PON);[301] and
c) dark fibre used to supply or self-supply leased line services.

5.3 The product market excludes:

a) broadband services;
b) wireless technologies (including FWA, satellite and point-to-point wireless links (such as microwave links) used to provide mobile backhaul); and
c) IEC services between BT exchanges.

Background

5.4 Leased line access ("LLA") services are services which connect between end-user sites and the first point of aggregation, or in some cases, between end-user sites. This is different to connections between points of aggregation (such as inter-exchange circuits).

5.5 In the WFTMR 2021, we defined a single product market for LLA services, which:

a) included all wholesale fibre-based Ethernet and WDM services;
b) included dark fibre used to supply or self-supply leased line services;
c) excluded business-grade connectivity services provided over EFM, broadband and microwave links used to provide mobile backhaul; and
d) excluded IEC services between BT exchanges.

5.6 As set out in Section 2 of this volume, typically, LLA services have offered:

a) capacity which is uncontended (and so does not fluctuate and is not subject to reduction) and symmetric (the capacity is the same in both directions);

[301] By 'leased line equivalent' we mean services with features such as uncontended capacity, symmetric download and upload speeds, and quality of service parameters similar to point-to-point leased line services (e.g. fast repair times compared to WLA services). These services can be provided over symmetric PONs e.g. XGS-PON with 10 Gbit/s capacity in both the downstream and upstream direction. GPON technology, which typically has asymmetric capacity (2.5 Gbit/s in downstream and 1.25 Gbit/s in upstream direction), is less able to provide 'leased line equivalent' services. We discuss this in more detail later in this section.

b) additional quality of service features, such as fast repair times and installation times, reserved bandwidth and diverse physical routes (to eliminate single points of failure); and
c) often a dedicated physical connection (providing greater security).

5.7 These are different from other services such as consumer and business broadband connections which tend to be asymmetric and contended. In addition, leased lines tend to be significantly more expensive as costs are less likely to be shared across many users.

5.8 As set out in Section 2 of this volume, we understand that some providers are rolling out an upgraded PON technology, XGS-PON. This can be configured to offer (typically 1 Gbit/s) symmetric bandwidth services with uncontended capacity.[302] We understand that some providers are already offering such services over these networks, and that these are able to replicate many of the key quality of service parameters as point-to-point leased lines, although these will not offer a dedicated physical connection. While it is early days, we expect these services to become an increasing feature of the market over the course of the 2026-31 review period. The development and rollout of further iterations of this technology (e.g. 50G-PON) appears likely to support even higher speeds in the future. We consider whether these services should be considered part of the leased line access market below.

Our proposed approach

5.9 Our starting point for defining the LLA product market is wholesale fibre-based point-to-point leased lines used to connect to customer sites at all bandwidths. This includes fibre-based Ethernet services and WDM services of different bandwidths. Both Ethernet and WDM technologies are used to deliver point-to-point connections able to offer symmetric high bandwidth services with uncontended capacity.[303]

5.10 We first consider the substitutability of different bandwidths of leased lines, to assess whether the product market should include all bandwidths.

5.11 We then consider whether any of the following access services are sufficiently close substitutes that they should be considered in the same product market:

a) dark fibre services;
b) Ethernet services delivered over an XGS-PON;
c) broadband services (including those delivered over GPON); and,
d) wireless technologies.

5.12 Finally, we consider whether IEC services should be considered as part of the LLA market.

5.13 As set out in Annex 5, we adopt the hypothetical monopolist test framework. In this test, a product is considered to constitute a separate market if the hypothetical monopolist supplier could impose a small but significant non-transitory increase in price ("SSNIP") above the competitive level without losing sales to such a degree as to make this price rise unprofitable. If such a price rise would be unprofitable, because consumers would switch to other products or because suppliers of other products would begin to compete with the

[302] Providers are able to offer uncontended capacity services on XGS-PON by 'ringfencing' part of the shared capacity for a particular end-user, to whom the capacity appears uncontended. See Annex 6, Overview of telecoms networks, Paragraph A6.41.
[303] For more detail on Ethernet and WDM see Volume 2, Section 2.

hypothetical monopolist, then the market definition should be expanded to include the substitute products.

Bandwidths

5.14 We provisionally conclude that all bandwidths are part of the same product market, based on supply-side substitutability. In response to a small increase in the price of a given bandwidth, we anticipate that a sufficient number of providers of leased lines at different bandwidths would be willing and able to substitute their current supply for leased lines of that bandwidth in a sufficiently timely manner such as to make a SSNIP by a hypothetical monopolist of a given bandwidth unprofitable.

5.15 Where a provider is offering point-to-point leased lines, it is equally able to supply all bandwidths, and so able to switch between them at low cost and quickly in response to a small increase in the price of a given bandwidth. This is because:

a) The equipment used to supply point-to-point leased lines scales easily up to 100 Gbit/s, and some providers can offer 400 Gbit/s without requiring significant additional investment.[304] Therefore, where a telecoms provider has an existing connection to the customer site, it can be used to provide the full range of leased line bandwidths. We note that in practice most providers offering point-to-point leased lines offer a range of different leased line bandwidths.

b) Where a telecoms provider is not already connected, it will need to extend its network in order to connect to an end-user site. For any customer-specific network extension, the provider will have the same ability to supply any bandwidth. In addition, based on the available data, we find that the digging behaviour is broadly similar for different bandwidths.[305] This suggests that there is no significant difference in either the propensity of providers to extend their networks for different bandwidths, or in the distances that providers are willing to extend their networks for different bandwidths, and so we would not expect nearby networks to act as a greater constraint for one type of bandwidth than another.[306]

5.16 We acknowledge that some leased line customers may have greater demand for higher bandwidth services. For example, MNOs tend to have greater demand for higher bandwidth services,[307] which is likely to grow over time as 5G rollout continues. However, given that we find that there is supply-side substitutability between different bandwidths, we do not consider it necessary for us to come to a view on the demand-side considerations, that is to say, whether leased line services of different bandwidths are substitutable from a consumer's perspective.

5.17 Overall, therefore, we propose that all bandwidths are part of the same product market.

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[304] See [✂] response dated [✂] to s135 notice dated [✂], question [✂], [✂] response dated [✂] to s135 notice dated [✂], question [✂], [✂] response dated [✂] to s135 notice dated [✂], question [✂] and [✂] response dated [✂] to s135 notice dated [✂], question [✂]. [✂] noted that supplying higher bandwidths of leased line may also require additional investment in backhaul capacity. See [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[305] See Annex 9.

[306] We note that providers' actual decisions on extending their networks will reflect the prevailing prices and margins of different bandwidths, which may not reflect the competitive price levels relevant for the SSNIP test.

[307] See Volume 2, Section 2.

Dark fibre

5.18 We provisionally conclude that dark fibre is part of the same product market as leased line access services based on supply-side substitutability:

a) Where networks are already connected to an end-user site, they would be able to switch between supplying dark fibre and LLA services sufficiently quickly and at minimal cost.
b) Where networks are not already connected, dark fibre providers are equally able to supply leased line access services as any other supplier, as the incentives to extend their networks will be broadly similar for both types of services.
c) Dark fibre services can be used to offer a full range of leased line bandwidths because the customer uses its own equipment to determine the bandwidth.

5.19 In practice, we understand that the main dark fibre providers also supply active products.

5.20 We acknowledge that some leased line customers may have greater demand for dark fibre services.[308] However, given that we find that there is supply-side substitutability between dark fibre and leased line access services, we do not consider that differences in demand from different leased line customers imply a significant difference in competitive conditions for supplying to different customer groups.

Ethernet over symmetric PONs (such as XGS-PON)

5.21 As set out above, we understand that some providers are providing symmetric bandwidth fibre services with uncontended capacity over symmetric PONs (such as XGS-PON), which have similar quality of service parameters (such as fast repair times) to existing point-to-point leased line services. Providers are able to offer uncontended capacity services on symmetric PON (such as XGS-PON) by 'ringfencing' part of the shared capacity for a particular end-user, to whom the capacity appears uncontended.[309] For example:

a) CityFibre is providing some of its services for leased line customers over its full-fibre network, which is currently XGS-PON.[310] Going forward, CityFibre intends to typically provision services for leased line customers over this full-fibre network ("FFN").[311] This includes services which offer a 1 Gbit/s symmetric bandwidth and uncontended (guaranteed) capacity, with identical quality of service parameters (such as repair times), and priced the same as, its 1Gbit/s point-to-point leased line services.[312]

[308] For example, Three prefers to use dark fibre compared to active leased lines where possible. See Hutchison 3G UK Limited response dated 9 August 2024 to s135 notice dated 8 July 2024, questions A2a, A2bii, A2c.
[309] See Annex 6, Overview of telecoms networks, Paragraph A6.41.
[310] CityFibre Infrastructure Holdings Limited response dated 19 February 2025 to s135 notice dated 10 February 2025, question 1a.
[311] CityFibre Infrastructure Holdings Limited response dated 20 August 2024 to s135 notice dated 8 July 2024, questions A3a and A4d.
[312] CityFibre Infrastructure Holdings Limited response dated 19 February 2025 to s135 notice dated 10 February 2025, questions 1a, 1b, 1d, 1e.

b) ITS offers its FibreBright product over its XGS-PON.[313] This offers symmetric bandwidth, guaranteed capacity services up to 5 Gbit/s[314] and includes a 6-hour fix time and continuous support.[315]

5.22 We also understand that other providers are intending to launch similar services in the future. For example, nexfibre intends to launch business services over its XGS-PON during the review period, including a service that offers a guaranteed 1 Gbit/s symmetric bandwidth and with quality of service parameters comparable to existing leased line providers in the market.[316]

5.23 These services are differentiated from business-grade broadband services, which may offer asymmetric speeds (i.e. the upload speed is different to the download speed) and/or contended capacity, which is not guaranteed, and which do not have comparable quality of service parameters.

5.24 Further, in the longer-term, providers may upgrade their PON technology, which would allow providers to offer services with higher symmetric bandwidths and uncontended capacity.[317] We expect the incentive to undertake this upgrade will grow as demand for higher bandwidths grows.

5.25 To determine whether these services should be included within the same product market, we consider whether a SSNIP by a hypothetical monopolist of all point-to-point leased lines would be profitable, or whether a sufficiently large number of leased line customers would switch to Ethernet over symmetric PONs (such as XGS-PON), to make such a SSNIP unprofitable. For the reasons set out below, we consider that such a SSNIP would be unprofitable, because we expect that a sufficiently large number of leased line customers are likely to consider these services as reasonable substitutes and so would switch to these services in response to a SSNIP in point-to-point leased lines (of equivalent capacity).

5.26 As set out in Section 2 of this volume, we expect that for many leased line customers, the key service features will be symmetry of upload and download speeds, uncontended capacity, which is not subject to significant fluctuations, and the continuity and reliability of the service, through quality of service parameters such as fast repair times and continuous support to ensure outages are quickly resolved. These features can be offered on a comparable basis by Ethernet over symmetric PONs (such as XGS-PON) for supported bandwidths (such as those explained in Paragraph 5.21 above).

5.27 Evidence from providers suggests that point-to-point leased lines and Ethernet services over symmetric PONs (such as XGS-PON) are competitive constraints on each other. One provider ([✂]) highlights the potential competitive threat to its existing leased line business

[313] ITS Technology Group Limited response dated 19 February 2025 to s135 notice dated 10 February 2025, question 1a.
[314] ITS Technology Group Limited response dated 19 February 2025 to s135 notice dated 10 February 2025, question 1a.
[315] ITS. Partner with us, Channel. Accessed on 14 November 2024.
[316] Nexfibre Networks Limited response dated 19 February 2025 to s135 notice dated 10 February 2025, question 1. It also intends to offer point-to-point leased lines and dark fibre during the review period. Nexfibre Networks Limited response dated 19 February 2025 to s135 notice dated 10 February 2025, question 2.
[317] For example, we believe a provider is likely to be able to offer 10 Gbit/s services with uncontended capacity over a 50G-PON. Some providers may update their technologies in this market review. Ofcom. September 2023. Evolution of fixed access networks. Figure 5: PON standards evolution.

from other providers deploying XGS-PON and also notes [✂].[318] We also understand that some wholesale customers are using or planning to use providers able to offer services over XGS-PON networks to deliver leased lines, for instance, ITS has relationships with both Sky and PlatformX.[319] [320]

5.28 These services do not replicate every feature of a point-to-point leased line. For example, because the fibre itself is not dedicated (even if the provider has guaranteed the capacity of the service offered to the customer), it might not offer the same degree of security. As such, we expect that these services will not be a substitute for point-to-point leased line services for all leased line customers.

5.29 We also recognise that as of today, these services will not be a substitute to point-to-point leased lines at all bandwidths. The uncontended capacity which can be offered on any symmetric PON (such as XGS-PON) will be limited by the type of PON technology installed and will be below the headline bandwidth of that PON technology. An XGS-PON can be configured to offer multiple 1 Gbit/s symmetric bandwidth services with uncontended capacity, but it is not possible to deliver a 10 Gbit/s service with uncontended capacity over XGS-PON.[321] As such, these services might not be directly substitutable for leased line customers that require 10 Gbit/s or higher bandwidth services (such as MNOs). However:

a) From a bandwidth perspective, the majority of demand for leased line services could be supported by symmetric bandwidth services with uncontended capacity over XGS-PON. Currently around 90% of leased lines are 1 Gbit/s or less, and we expect that the majority of circuits will remain at 1 Gbit/s or less by the end of the review period.[322]
b) A provider delivering services over XGS-PON could install a dedicated point-to-point connection (which could either be an active leased line service or dark fibre) to deliver a 10 Gbit/s service with uncontended capacity. For example, we understand that in practice, ITS delivers lower bandwidth symmetric uncontended leased line services over XGS-PON (e.g. 5 Gbit/s and below), and for higher bandwidths (e.g. 6-10 Gbit/s) and/or dark fibre, these are delivered through a point-to-point connection.[323] In addition, CityFibre has indicated that it will continue to consider provisioning point-to-point dark fibre services across its full-fibre network.[324] [325]

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[318] See [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[319] For example, at the time of our data collection, Sky was expecting to use ITS to deliver leased lines, and these could be provided over ITS' XGS-PON. See Sky UK Limited response dated 19 August 2024 to s135 notice dated 8 July 2024, question A3 and Sky UK Limited response dated 21 February 2025 to s135 notice dated 10 February 2025, question 1a.

[320] PlatformX is currently taking leased line circuits from ITS. See TalkTalk Communications Ltd t/a PlatformX response dated 12 February 2025 to s135 notice dated 10 February 2025, question 1c.

[321] See Annex 6, Paragraph A6.41. It may be possible to offer intermediate bandwidths such as 2 Gbit/s, 3 Gbit/s or 5 Gbit/s, but it will not be possible to offer 10 Gbit/s. PON technology shares capacity among multiple end-users, rather than providing a dedicated point-to-point service.

[322] See Volume 2, Section 2, Figure 2.9 and Paragraphs 2.110 – 2.113.

[323] See ITS Technology Group Limited response dated 19 February 2025 to s135 notice dated 10 February 2025, questions 1a and 1d.

[324] See CityFibre Infrastructure Holdings Limited response dated 19 February 2025 to s135 notice dated 10 February 2025, question 3.

[325] We also understand that nexfibre intends to offer point-to-point leased lines and dark fibre during the review period. Nexfibre Networks Limited response dated 19 February 2025 to s135 notice dated 10 February 2025, question 2.

c) As noted above, in the longer term, providers may upgrade their PON technology, which would allow providers to offer services with higher symmetric bandwidths and uncontended capacity. We expect the incentive to undertake this upgrade will grow as demand for higher bandwidths grows.

5.30 We therefore provisionally conclude that services with features such as uncontended capacity, symmetric download and upload speeds, and quality of service parameters similar to point-to-point leased line services (e.g. fast repair times compared to WLA services) delivered over symmetric PON (such as XGS-PON) should be included within the LLA product market.[326] We refer to these services as 'leased line equivalent' (LL-equivalent) services.

Broadband access services

5.31 We recognise that business-specific broadband services could be an alternative to leased line services for some users, and looking forward, quality improvements to full-fibre asymmetric broadband services over time could mean that these services become better able to meet the needs of some leased line customers. The evidence we received from stakeholders was mixed, suggesting that there is currently relatively limited switching from leased line services to FTTP broadband services, and conflicting views on whether this is likely to increase in future.

5.32 Over the period of this review, we expect broadband and leased line services to continue to have distinct features. In particular, broadband services (including those offered over GPON) cannot offer many of the characteristics of leased lines, as they are asymmetric (meaning the upload speed is much lower than the download speed) and contended (and so capacity is not guaranteed). Leased line services also tend to be significantly more expensive than broadband services (as the costs are not shared across many users).[327] Those business customers who are already willing to pay the high prices for a leased line are therefore likely to be doing so due to its non-price characteristics, meaning they are unlikely to consider the cheaper broadband services as a close substitute.

5.33 In any event, to the extent such switching did occur, it would not be informative of the substitutability of broadband by those customers who continue to need and value the distinct features of leased lines which are expected to persist in the review period (discussed above and in Section 2 of this volume). As such, we do not consider that this would be sufficient evidence of a single product market.

5.34 Therefore, from a demand-side perspective, broadband services are unlikely to be a sufficiently close substitute to leased line services to warrant inclusion in the same product market.

5.35 From a supply-side perspective, we have considered whether WLA providers, including those using XGS-PON to offer broadband services, are able to enter the LLA market at the speed required to constrain a hypothetical monopolist. We have identified two reasons why this is unlikely.

5.36 Firstly, these providers would need to invest in their network and operational capability to be able to offer key features of leased lines (discussed above and in Section 2 of this

[326] Services provided over XGS-PON which do not meet these requirements are proposed to be part of the WLA market (see Volume 2, Section 4).
[327] For example, see Volume 2, Section 2.

volume) such as uncontended (guaranteed) capacity and quality of service parameters such as fast repair times.[328] These activities are all fixed costs which must be incurred before a provider is able to provide any leased lines or LL-equivalent services, and may take significant time to complete.

5.37 Secondly, we understand that reputation and credibility of the provider offering leased lines are important characteristics for winning leased line customers, which may be difficult for a WLA-focused provider to acquire quickly. Although in the long-run more providers may be willing to incur these costs to enter or develop their services in the LLA market, they are unlikely to be willing and able do so with such speed as to constrain a hypothetical monopolist of all leased line services from being able to undertake a profitable SSNIP.

5.38 We therefore provisionally conclude that WLA services should not be part of the LLA market.

Wireless technologies

5.39 Some business customers may use wireless alternatives to fixed connections for some of their services. However, we consider that this is likely to be for a limited set of use cases, and mainly where fixed connections are not available. Overall, we provisionally consider that wireless services, including fixed wireless access (FWA) services, satellite connectivity and point-to point wireless links (including microwave links) used to provide mobile backhaul, should not be included in the leased line access product market, for the reasons set out below.

FWA services

5.40 Some business customers may use FWA services instead of leased lines, especially in rural areas. However, in general, leased line customers tend to demand higher bandwidths, uncontended capacity, and higher quality of service parameters than broadband customers, and in Section 4 of this volume, we provisionally find that FWA is unlikely to be a substitute for fixed broadband for a sufficiently large number of broadband customers in response to a SSNIP of fixed broadband services. Although 5G FWA services may be able to provide services with higher bandwidths and uncontended capacity during the review period, this technology is nascent, and we expect that leased line customers are unlikely to be willing to switch to FWA services where leased lines are available, as leased lines provide a greater guarantee of bandwidth.

5.41 Further, we expect that some leased line customers may use these services as backups (i.e. complements) to their fixed connectivity, rather than as substitutes. As discussed in Section 4, there may also be capacity constraints which would prevent FWA operators from being able to supply a service of sufficient quality to a sufficiently large number of customers in response to a SSNIP for all leased line access services to make such a SSNIP by a hypothetical monopolist unprofitable.

[328] For example: to offer uncontended capacity (including through backhaul) the provider will need to invest in systems to carry out network configuration and management to keep traffic separate and to offer fast repair times, the provider will need to invest in diagnostics and fault management, requiring different repair teams with better tools to locate/fix faults, and may mean a dedicated second line support for business customer service agents.

Satellite connectivity

5.42 Some MNOs and large business customers may use satellite connectivity services instead of leased lines.[329] It is possible that over time, as technology advances, the capability of these satellite-based solutions will improve. However, as with other wireless services, satellite-based solutions will also have limitations such as lower capacity and higher latency compared to fibre-based leased line services or even to point-to-point fixed wireless links.[330] These services appear to be used either as temporary solutions,[331] or where fibre is too expensive.[332] Further, we expect that some leased line customers may use these services as backups (i.e. complements) to their fixed connectivity, rather than as substitutes. We therefore do not expect that a sufficiently large number of leased line customers would switch to satellite-based services in response to a SSNIP for all leased line access services to make such a SSNIP by a hypothetical monopolist unprofitable.

Point-to-point wireless links (including microwave links)

5.43 MNOs use point-to-point wireless links (including microwave links) for backhaul.[333] However, as we explain in Annex 6, compared to a leased line, these wireless links have some limitations such as lower capacity compared to fibre based backhaul and requirement for LoS connectivity. Further, MNOs have indicated that they have fibre first strategies, and that they only used point-to-point wireless links where fibre was unavailable, impractical or uneconomic.[334] Looking forward, we expect demand for higher capacity mobile services to increase (especially with the continuing deployment of 5G). Given the lower capacity of point-to-point wireless links (including microwave links) compared to fibre-based backhaul, this is likely to further reduce the effectiveness of these links for mobile backhaul. We therefore expect point-to-point wireless links (including microwave links) would only be used to fill gaps where demand for capacity is lower and it is not cost-effective or practical to use fibre.

IEC services

5.44 IEC services typically use similar products to those in the LLA market (i.e. leased lines and dark fibre), but they are not used for access services. Instead, IEC circuits carry aggregated end-user traffic between specific points of aggregation (BT exchanges) located in geographically separate access areas and do so over larger distances.

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[329] Avanti. Extending EE's 4G network - Avanti Communications. Accessed on 4 March 2025. Virgin Media O2. 16 April 2024. Mobile coverage that's out of this world: Virgin Media O2 looks to Space to boost signal in rural areas - Virgin Media O2. Accessed on 5 February 2025. Analysys Mason. 26 April 2024. Satellite is a cost-effective means for MNOs to reach remote customers. Accessed on 5 February 2025. OneWeb offers business-to-business (B2B) services using NGSO-based satellite broadband. Ofcom. 5 December 2024. Connected Nations 2024.

[330] See Annex 6, Overview of telecoms networks.

[331] [✂] uses [✂] for temporary backhaul for remote mobile cell sites. [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[332] Virgin Media O2. 16 April 2024. Mobile coverage that's out of this world: Virgin Media O2 looks to Space to boost signal in rural areas - Virgin Media O2. Accessed on 5 February 2025.

[333] See Volume 2, Section 2.

[334] Ofcom. September 2024. Review of the use of fixed wireless links and spectrum implications. Paragraphs 2.10 and 2.18.

5.45 As set out in Section 6 of this volume, we consider that this different purpose of IEC services, compared to LLA services, leads to a difference in competitive conditions. We therefore provisionally conclude that IEC services are in a separate market to LLA services.

Provisional conclusions on definition of LLA product market

5.46 We provisionally conclude that there is a single product market for LLA services which includes:

a) all wholesale fibre-based Ethernet and WDM services, at all bandwidths;
b) leased line equivalent services delivered over symmetric PON (e.g. XGS-PON);[335] and
c) dark fibre used to supply or self-supply leased line services.

5.47 We provisionally conclude that the product market for LLA services excludes:

a) broadband services;
b) wireless technologies (including FWA, satellite and point-to-point wireless links (such as microwave links) used to provide mobile backhaul); and
c) IEC services between BT exchanges.

Consultation questions

Question 2.9: Do you agree with our provisional conclusions on product market definition for leased lines? Please set out your reasons and supporting evidence.

Geographic market definition

5.48 In this section we set out the evidence, analysis and reasoning for our proposed approach to defining the geographic markets within the leased line access (LLA) market, as well as the results of our modelling of the boundaries of those markets. In Annex 9 we discuss in more detail our methodology for assessing LLA network coverage.

5.49 We previously found the Central London Area (CLA) to be effectively competitive, and that area does not form part of this review.[336] We will therefore be considering the geographic market definition for leased line services in areas other than the CLA.[337]

Our proposals and provisional conclusions

5.50 We propose to define three geographic markets for the LLA market:

[335] By 'leased line equivalent' we mean services with features such as uncontended capacity, symmetric download and upload speeds, and quality of service parameters similar to point-to-point leased line services (e.g. fast repair times compared to WLA services).
[336] Ofcom. 2021. Promoting investment and competition in fibre networks – Wholesale Fixed Telecoms Market Review 2021-26. Volume 1. Paragraph 2.35
[337] Postcode sectors previously classified as CLA are listed alongside our proposed geographic markets in Schedule 3. We have identified one postcode sector that was not included in the WFTMR21 and is located inside the area of another postcode sector previously classified as CLA; this new postcode sector is treated as part of the CLA. See Annex 9 for more detail. We also note that our analysis excludes all postcodes in the Hull Area as these are subject to a separate market review.

- the High Network Reach (HNR) area: postcode sectors where, due to presence of at least two current material and sustainable competitors, there is sufficiently well-established competition to BT in the commercial deployment of competing networks;[338]
- LLA Area 2: postcode sectors in which there is, or there is likely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks; and
- LLA Area 3: postcode sectors in which there is not, and there is unlikely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks.

5.51 We propose to define those areas primarily by reference to the number of competitors present in particular areas.

5.52 We have also considered whether there are any areas where competition is sufficiently stronger than in the HNR Area, and therefore constitutes a new distinct geographic market. As set out below, we have provisionally concluded that there are not.

5.53 Our provisional findings on the geographic markets are set out in Table 5.1 below.

Table 5.1: TAR 2026 proposed LLA geographic market sizes

	HNR area	Area 2	Area 3
Total postcode sectors (% of UK excl. the Hull Area)	935 (9%)	4,208 (42%)	4,591 (46%)
Demand sites (% of UK excl. the Hull Area)	18,526 (12%)	68,293 (45%)	57,976 (38%)

Source: Ofcom analysis of provider data.
Note: Demand sites include sites of large businesses, mobile cell sites and data centre access sites. Annex 9 provides a more detailed description and explanation of the analysis undertaken.

Background

Our definition of LLA geographic markets in the WFTMR21

5.54 In the March 2021 WFTMR Statement, we defined four geographic areas for LLA:

- the Central London Area;
- the High Network Reach area: other postcode sectors where there are two or more rival networks to BT in the provision of leased lines;
- LLA Area 2: postcode sectors in which there is, or there is likely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks; and

[338] As set out above, this review does not include postcode sectors that form part of the CLA. The HNR Area therefore excludes BT+2 (or more) postcode sectors that are part of the CLA.

- LLA Area 3: postcode sectors in which there is not, and there is unlikely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks.

5.55 We defined the CLA and HNR Area with reference to the presence of LL-only operators, VMO2 and CityFibre. We used the network reach model to assess how many networks were within reach of a sufficiently high proportion of business sites in each postcode sector.

5.56 We defined Area 2 to be those postcode sectors (outside of the CLA and HNR Area) in which at least either VMO2 or CityFibre were present or planning to be present.[339] That meant we determined the geographic boundaries of Area 2 for LLA in the same way as for WLA services. As the footprints were the same for both WLA services and LLA services, we considered the use of common geographic boundaries for these markets to be both reasonable and practical.

5.57 We defined Area 3 as those postcode sectors that were neither the CLA, HNR, or Area 2, as we considered that outside these areas there were no plans for material commercial deployment and therefore it was not likely that there was the potential for material and sustainable competition to emerge.

5.58 Table 5.2 summarises how we allocated postcode sectors to different geographic markets in WFTMR21.

Table 5.2: WFTMR21 leased lines geographic market sizes

WFTMR 2021	CLA	HNR	Area 2	Area 3
Total postcode sectors	278	525	5,430	3,867
(% of UK total)	(3%)	(5%)	(54%)	(38%)
Demand sites	4,202	9,085	94,565	40,041
(% of UK total)	(3%)	(6%)	(64%)	(27%)

Source: Ofcom. March 2021. Statement: Promoting investment and competition in fibre networks – Wholesale Fixed Telecoms Market Review 2021-26 - Ofcom. Table 8.3

LLA market developments since 2021

5.59 There have been a number of market developments which influence how we think about leased lines competition and how we propose to define the geographic markets for the 2026-31 review period.

Competition from LL-only operators

5.60 Since 2021, we have seen LL-only providers further expanding their networks and selling increasing leased lines volumes, as well as additional LL-only providers entering the market.

5.61 For example, ITS entered the market, growing to [✂] leased line access circuits as of March 2024.[340] ITS has proven successful with telecoms providers, having won a contract with Sky

[339] We assessed this using the network presence modelling we had used for our WLA market definition.
[340] [✂]. ITS Technology Group Limited responses dated 18 December 2024 and 5 August 2024 to s135 notice dated 8 July 2024, question B1.

to provide Ethernet services[341], and with PlatformX also currently taking leased line circuits from ITS.[342] [✂] states that it is purchasing more circuits from ITS than [✂].[343]

5.62 As discussed in Section 2, in addition to market entry, we have seen existing LL-only providers expand their networks. This expansion, as well as their ability to win increasing shares of leased lines business, indicates that they are providing increased competition across the LLA markets.

5.63 We reflect this growth by LL-only providers in our approach to defining the geographic markets, as discussed further below.

WLA providers competing in the LLA market

5.64 In the WFTMR21, we identified economies of scope between the provision of leased lines and residential broadband, and considered that gigabit-capable networks would typically provide both broadband and leased line services.[344] [345] Since 2021, as outlined in Volume 1, we have seen substantial FTTP network build by altnets, while CityFibre and VMO2 have continued to operate in both the WLA and LLA markets.

5.65 Many of the altnets that have entered the WLA market have chosen not to provide leased lines to date. Some altnets – such as Zzoomm, Netomnia, brsk and AllPoints – that initially focussed on serving residential premises, have started to offer leased lines, but the volume of circuits supplied have so far been limited.[346]

Our proposed approach to defining geographic markets in LLA

5.66 The key consideration in defining geographic markets is to identify areas within which competitive conditions are sufficiently similar for them to be grouped together as one geographic market.

5.67 As outlined in Section 1, our market reviews are forward-looking. We therefore need to sufficiently capture not only the existing competitive conditions but also the expected or foreseeable developments that may affect competition over the review period, such as new network build.

5.68 We recognise that there is inherent uncertainty in defining forward-looking geographic markets, particularly during a dynamic period in which network competition is still developing. We use our regulatory judgment to assess the evidence available and take a view on likely developments over this review period.

5.69 In the following paragraphs, we explain how we assess competition in the LLA market with a view to identifying geographic markets which we consider to have sufficiently homogeneous competitive conditions.

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[341] ITS. September 2024. Sky Business signs a new long-term agreement with dedicated B2B full fibre provider ITS. Accessed 25 February 2025.

[342] TalkTalk Communications Ltd t/a PlatformX response dated 12 February 2025 to s135 notice dated 10 February 2025, question 1c.

[343] [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[344] For example, see WFTMR21 Statement Volume 1, Paragraph 2.47 and Volume 3, Paragraph 6.38.

[345] We refer to networks that provide both WLA and LLA services as multiservice networks (MSNs).

[346] Zzoomm plc response dated 1 August 2024 to s135 dated 8 July 2024, question B1; Netomnia Limited response dated 2 September 2024 to s135 dated 8 July 2024, question B1; Brsk Limited response dated 5 August 2024 to s135 dated 8 July 2024, question B1; AllPoints Fibre Networks Limited response dated 5 September 2024 to s135 dated 8 July 2024, question B1.

5.70 Competition in LLA relies on the presence of competing networks able to supply a customer who requires a leased line. As discussed above, since WFTRMR21, the number of competing networks has increased in some areas due to entry and expansion, and there is potential for this trend to continue over the review period.

5.71 However, we do not consider that all providers of LLA have the ability or the potential to exert a material and sustainable constraint on BT in this review period. As such, the first step of our geographic market analysis involves an assessment to identify the types of LLA providers that exert, or have the potential to exert, a material and sustainable constraint on BT. This is because we expect that competitive conditions over the review period will differ in areas where these networks are present (or plan to be present) compared to areas where they will not be present.

5.72 We then use the number of relevant competitors that are, or plan to be, nearby a demand site, as a primary way of identifying areas with similar competitive conditions. We then consider the number of competing networks in the context of our wider understanding of competitive dynamics, recognising that there may be factors influencing a providers' ability to supply a customer, thereby constraining BT.

5.73 In light of the above, to identify areas with similar competitive conditions and define geographic markets, we adopt the following analytical framework:

a) First, we identify the types of LLA providers that exert or have the potential to exert a material and sustainable constraint on BT.
b) Second, we build on our assessment of material and sustainable competitors and use our network reach modelling to identify the LLA geographic markets we propose to define.
c) Finally, we summarise our provisional conclusions on geographic market definition in the LLA market.

Identifying actual or potential material and sustainable competitors

5.74 As explained above, we do not consider that all providers of leased lines would be able to exert the same degree of competitive constraint on BT. As such, we first need to identify which types of providers we consider to be, or to have the potential to be, material and sustainable competitors in the LLA market.

5.75 To conduct this assessment, we have looked at evidence on network architecture, business models, volumes sold and business plans across the two main categories of leased lines providers: those who specialise in leased lines only, and those who sell both leased lines and broadband services, which we will refer to as multi service networks (MSNs).

5.76 As detailed in the following paragraphs, we consider that all LL-only providers exert a material and sustainable constraint on BT. In addition to LL-only providers, we also consider that VMO2 exerts, and CityFibre has the potential to exert, a material and sustainable constraint on BT.

LL-only providers

5.77 Across the market, there are a number of LL-only providers who specialise in selling leased lines, and who are not in the WLA market. Because of their business focus, LL-only networks are typically built with the intention of passing sufficiently close to the main business sites

in an area (e.g. industrial parks, business districts, mobile masts, etc.) to be able to provide connections to business premises in the future, on demand.

5.78 As further detailed in the SMP section, the technical and commercial specialisation of LL-only providers may enhance their competitive positioning by reducing the costs to serve customers and by providing them with a greater (actual or perceived) level of expertise in the provision of leases lines.

5.79 In line with this, as discussed above, the evidence indicates that since 2021 existing LL-only providers have been able to expand their networks and increase sales, and additional LL-only providers have successfully entered the market and gained customers.

5.80 We recognise that the exact competitive positioning will differ across providers, depending on factors such as their reputation, footprint or volumes sold. However, taken together, the evidence indicates that all LL-only providers are generally able to overcome at least some of the barriers to entry and expansion in the LLA market and act as a meaningful alternative to BT.

5.81 As such, for the purpose of our geographic market assessment, we consider all LL-only providers to be material and sustainable competitors to BT.

Multi service networks (MSNs)

5.82 As set out above, in addition to LL-only providers there are also some MSNs who sell both LLA and WLA services.

5.83 To date, MSNs have generally prioritised building their networks to reach residential areas for the purposes of selling WLA services. Therefore, although they sell LLA services, we consider that the commercial and operational positions of these providers may not be the same as LL-only providers.

5.84 As such, for these networks, we have more carefully considered their business models, business plans and the volumes of leased lines sold to assess whether they exert or have the potential to exert a material and sustainable constraint on BT.

VMO2

5.85 VMO2 offers a wide range of leased line products, including dark fibre as well as VHB and lower bandwidth products.[347] It is the largest competitor to BT in the HNR Area, LLA Area 2 and LLA Area 3. VMO2's has [✂] connections as of March 2024 across Area 2, Area 3 and the HNR Area.[348]

5.86 As such, we consider that VMO2 is a material and sustainable competitor to BT.

5.87 As discussed in Section 2 of this volume, VMO2 and nexfibre have recently entered an agreement whereby nexfibre will carry out VMO2's new network build (in areas where VMO2 is not already present) with VMO2 operating as a build partner. In areas where nexfibre is, or plans to be present, VMO2 will act as wholesale customer of nexfibre (as the anchor tenant) and use nexfibre network to provide leased line services.

[347] VMO2. Dedicated Internet Access | Leased Lines | Virgin Media Business. Accessed on 10 March 2025; VMO2. Dark Fibre | Virgin Media Business. Accessed on 10 March 2025.

[348] [✂]. [✂] response dated [✂] to s135 notice dated [✂], question [✂]. These markets refer to the WFTMR21 geographic markets.

5.88 VMO2 and nexfibre are separate companies, but we use the combined VMO2 and nexfibre data on coverage and active lines for the purpose of defining geographic markets and assessing SMP. Due to the arrangement between them, we consider that this approach accurately reflects the competitive constraint from VMO2 – including in areas where it uses nexfibre.

Cityfibre

5.89 CityFibre is a wholesale-only network, offering WLA and LLA services.

5.90 As set out in Section 4 in relation to WLA, CityFibre is in the process of completing network build and gaining market traction. We consider CityFibre's leased line business is in a similar position:

a) Over recent years, CityFibre has increased LLA customer volumes, and as of March 2024, CityFibre's leased line business accounts for [✂] connections across Area 2, Area 3 and the HNR Area.[349]
b) CityFibre has agreements for the provision of mobile backhaul with Vodafone and Three.[350]
c) CityFibre's business plans indicate that it is seeking to compete in the LLA market and increase its sales across the 2026-31 review period.[351] Specifically, CityFibre expects both leased lines volumes and absolute revenues from leased lines to increase by 2031.[352]
d) CityFibre submitted that its transition to provide leased lines over XGS-PON will enable it to provide leased lines at a lower cost and with a quicker installation time.[353]

5.91 We recognise that CityFibre is still in the process of establishing its leased lines business across its network footprint. Given CityFibre's increased LLA customer volumes in recent years and its well-developed plans to compete and grow its position in the provision of LLA services, we consider that CityFibre has the potential to exert a material and sustainable constraint on BT.

Other providers

5.92 In addition to CityFibre, there are a small number of other altnets who have started to offer leased lines in addition to their WLA business. As discussed above, the LL volumes sold by these altnets have so far been limited.

5.93 We recognise that volumes could in principle increase going forward. However, in contrast to CityFibre, we have limited evidence of these MSNs being able to increase their volumes over the past years.

5.94 Given the lack of historical evidence and the existence of high barriers to entry and expansion (discussed further below) it is not sufficiently clear that these MSNs, or a new

[349] CityFibre Infrastructure Holdings Limited response dated 20 August 2024 to s135 notice dated 8 July 2024, question B1. These geographic markets refer to our WFTMR21 markets.
[350] CityFibre Infrastructure Holdings Limited response dated 20 August 2024 to s135 notice dated 8 July 2024, question B5.
[351] CityFibre Infrastructure Holdings Limited response dated 8 November 2024 to s135 notice dated 24 October 2024, question A1.b.
[352] CityFibre business plans forecast [✂]. CityFibre Infrastructure Holdings Limited response dated 8 November 2024 to s135 notice dated 24 October 2024, question A1.b.
[353] CityFibre Infrastructure Holdings Limited response dated 10 February 2025 to s135 notice dated 21 February 2025, question 1.f.

entrant MSN, would have the potential to exert a material and sustainable constraint on BT over the review period.

Summary of conclusions

5.95 In summary we provisionally consider that due to their leased lines specialisation and their ability to win LL customers, all LL-only providers to be material and sustainable competitors to BT.

5.96 In addition to LL-only providers, we also consider that due to its mature position in the LLA market and significant volumes sold so far, VMO2 exerts a material and sustainable constraint on BT.

5.97 Lastly, while CityFibre is still establishing its leased line business across its network footprint, it has been able to increase its LLA volumes and has well-advanced plans to further strengthen its position in the LL market. As such, we consider that CityFibre has the potential to exert a material and sustainable constraint on BT.

5.98 In the following paragraphs we explain how we propose to use our provisional findings on who is or has the potential to be a material and sustainable competitor to group together areas with sufficiently similar competitive conditions.

LLA geographic markets

5.99 As discussed above, we consider that competitive conditions in LLA are primarily (but not solely) driven by the number of nearby competing networks. We therefore propose to identify geographic areas with similar competitive conditions by looking at the number of competitors near to demand sites and, where necessary, conduct further analysis to assess the level of constraint these competitors are likely to exert on BT.

5.100 As further detailed below, we propose to identify the following markets:

a) HNR Area: this includes postcode sectors in which at least two current material and sustainable competitors have existing presence. In practice, this would include postcode sectors where at least two LL-only providers, or VMO2 and at least one LL-only provider, are currently present. We consider that, due to existing presence of at least two current material and sustainable competitors, competition in this area is likely to be sufficiently well-established to differentiate it from other areas.
b) Area 2: this includes non-HNR postcode sectors in which there is at least one current or potential material and sustainable competitor who has existing or planned presence. While less strong compared to the HNR Area, we consider in these areas there is, or there is potential for, material and sustainable competition to BT.
c) Area 3: This includes postcode sectors with no existing or planned presence from any of the current or potential material and sustainable competitors. We consider that competition in these areas is limited and there is unlikely to be potential for material and sustainable competition to emerge over the review period.

5.101 We have also considered whether there are any areas where competition is sufficiently stronger than the HNR Area that we should define a new distinct geographic market. As set out below, we have provisionally concluded there are no such areas.

5.102 In the following paragraphs we first set out how we propose to analytically model the boundaries of these geographic markets. We then use the results of our modelling to check that competition is sufficiently homogeneous within the proposed markets. Finally, we summarise our preliminary conclusion on geographic market definition.

Our modelling approach to determining the boundaries of the geographic markets

5.103 In this sub-section, we explain our proposed modelling assumptions and approach for defining the LLA geographic markets. Our modelling approach and the results of the model presented in this section are explained in more detail in Annex 9.

5.104 Our modelling is designed to measure existing and, where applicable, planned build of those operators identified above as current and potential competitors. To do so, we need to make a number of modelling choices and approximations which are explained below in more detail. In particular:

a) We first explain why, in contrast to our WFTMR21 approach, we are planning to use the network reach model (NRM) across the LLA market.
b) We then provide further details about the functioning of the model, including: the geographic units we propose to use, our proposed approach to assess presence, and how we plan to use the evidence on existing and planned build.

Using the network reach model across the LLA market

5.105 In the WFTMR 2021, we used the NRM to determine the HNR Area geographic market. We defined the Area 2 market by reference to the current or planned presence of CityFibre and/or VMO2, which we assessed using the network presence model used for our WLA market definition.

5.106 We now propose to use the NRM to identify all of the different LLA geographic markets i.e. the HNR Area, LLA Area 2 and LLA Area 3. The NRM is the best way available to us to model the presence of networks that offer leased lines, and due to improvements in the data available to us, we are now able to do so both for existing and planned networks.

5.107 Aside from this change, our modelling approach is fundamentally the same as in the WFTMR21. However, as further detailed in Annex 9, we have been able to make some modelling improvements to better approximate presence of relevant LLA networks.

Geographic units

5.108 As we did in the WFTMR21, we break down the UK into smaller geographic units within which we can examine network coverage. This analysis needs to be at a level of granularity that gives a reasonable indication of the degree of competition faced in that geographic unit. Geographic units cannot be too large an area as there would likely be large differences in competition within such a unit (parts of the area may have significant competition but other parts none). On the other hand, more granular analysis may be less practical to apply.

5.109 For this review period, we propose to use postcode sectors. This is in line with what we did for the WFTMR21 and with our WLA modelling approach. We consider that postcode sectors are well-established, relatively stable and strike a good balance between being granular enough to capture the competitive dynamic but not so granular that they are impracticable.

Assessing the presence of rival networks

5.110 Having identified the geographic unit of our analysis, our proposed approach is to group postcode sectors by reference to the number of relevant LLA competitors identified above.

5.111 To assess the presence of relevant LLA competitors, we need to establish how close the networks are to where the demand for leased lines is. As further detailed in Annex 9, we asked LLA providers to supply details of their existing physical networks as well as their

expansion plans.[354] As for the location of demand sites, we have not been able to obtain accurate data on existing demand sites (all the sites that providers' networks are currently connected to); we also recognise that current demand sites may not accurately reflect where future demand will be located. We therefore approximate the location of demand over the review period by combining the current locations of large businesses,[355] mobile cell sites and data centre access sites.

5.112 For each postcode sector, we determine the number of relevant LLA competitors located within 50m of each demand site (we explain below how we treat future build plans when carrying out this step). We then go on to classify each postcode sector based on whether at least 65% of its demand sites were located within 50m of zero, one, or two or more relevant LLA competitors.[356]

5.113 We recognise that this approach to determining geographic market boundaries involves a degree of approximation, and competitive conditions will not be exactly the same within each market. However, as in the WFTMR21, we are of the view that a degree of approximation is inevitable, our approach sufficiently captures the main differences in competitive conditions and it would not be practicable or proportionate to adopt a more granular approach.

5.114 We describe the NRM in more detail in Annex 9.

Modelling evidence on existing networks and build plans

5.115 As discussed above, we use our NRM to determine, for each postcode sector, the number of relevant LLA competitors located within 50m of each demand site.

5.116 As set out above and further explained below, for the purposes of establishing the HNR Area geographic market, we only propose to take into account the existing footprints of current material and sustainable competitors. For the purposes of identifying Area 2, we are proposing to use existing footprint and (where available) expansion plans of all current and potential material and sustainable competitors.[357]

Modelling results

5.117 Our provisional results from our geographic market modelling for the HNR Area, LL Area 2 and LL Area 3 are summarised in Table 5.3 and then set out in more detail below.

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[354] As detailed in Annex 9, we gathered data on existing physical network from CityFibre, Colt, eircom, euNetworks, EXA, FibreSpeed, ITS, KCOM, Lumen, MS3, National Grid Telecoms, Neos, nexfibre, Openreach, Verizon, VMO2, Vodafone, Vorboss, and Zayo. We received data on planned physical network from [✂].

[355] CACI. July 2024. D&B Business Data for Ofcom. The dataset is used subject to the following attributions:
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[356] We recognise that the combination of using postcode sectors and a threshold of less than 100% means that it is possible that some demand sites, within a postcode sector, might be exposed to a lower competitive intensity. However, as discussed above, when defining geographic markets, we are required to make a number of judgments and approximations in reaching a decision that sufficiently captures the competitive conditions and is practical. We believe that the use of a 65% threshold in this situation strikes a reasonable balance. This is also in line with the approach used in WFTMR21 and BCMR 2019.

[357] In practice this means using (i) current footprint from [✂]; and (ii) expansion plans from [✂]. See Annex 9 for more detail on our modelling approach.

5.118 Compared to the geographic markets we determined in 2021, there has been movement of postcode sectors from and to each geographic market. The resulting changes in the sizes of the geographic markets reflect our assessment of the changes in competitive conditions since 2021 and going forward, as well as our updated modelling approach.

Table 5.3: Proposed LLA geographic market sizes

	HNR Area	Area 2	Area 3
Total postcode sectors (% of UK excl. the Hull Area)	935 (9%)	4,208 (42%)	4,591 (46%)
Demand sites (% of UK excl. the Hull Area)	18,526 (12%)	68,293 (45%)	57,976 (38%)

Source: Ofcom analysis of provider data.
Note: Percentages do not sum to 100% as CLA figures are included in the total number of postcode sectors and demand sites.

High Network Reach Area

5.119 As set out above, as a starting point we aim to identify areas where competition is sufficiently well-established to be different to other areas. We refer to these areas collectively as the HNR Area.

5.120 To capture this level of competition, we consider that the HNR Area should include postcode sectors where two or more current material and sustainable competitors to BT have existing presence. This is for a couple of reasons.

5.121 Firstly, the evidence available to us suggests that a single competitor would not be able to exert a sufficiently strong constraint on BT.[358] The existence of two current material and sustainable competitors would therefore be more likely to allow us to identify areas where the constraint on BT is sufficiently strong.

5.122 We also think these rival networks would need to have existing (and not planned) presence for the constraint on BT to be sufficiently well-established and distinguishable from the rest of the UK. This reflects the uncertainty of prospective build plans, and the fact that it would take time for an operator to gain the necessary market traction to exert a sufficiently well-established constraint on BT. We would expect to capture planned build (as it is realised) in future reviews.

5.123 In practice this means we consider the HNR Area to be postcode sectors where at least two LL-only providers, or VMO2 and at least one LL-only provider, are currently present.

5.124 Based on these criteria, we find that the HNR Area includes 935 postcode sectors, which represent 9% of all UK postcode sectors. For comparison, in 2021 the HNR Area included 525 postcode sectors, which represented 5% of all UK postcode sectors.

[358] For example, as set out in the SMP assessment section, we consider that BT faces limited competition in Area 2 where the average number of rival networks is lower than 2.

5.125 The increase in size of the HNR Area reflects the entry and expansion of LLA providers, as well as modelling improvements which have allowed us to better approximate network presence compared to 2021.[359]

5.126 The tables below provide key metrics of HNR Area postcode sectors largely broken down by city and / or metro area where demand sites are often concentrated.

Table 5.4: BT+2 or more postcode sectors grouped by metropolitan area

	Postcode sectors		Demand sites		Leased line access ends provisioned in 2020 to 2023	
Area	Number	Share of total	Number	Share of total	Number	Share of total
Liverpool	73	8%	615	3%	1,474	3%
Manchester	64	7%	1,106	6%	4,522	10%
North London	45	5%	1,003	5%	1,895	4%
Birmingham	43	5%	959	5%	3,193	7%
South West London	37	4%	910	5%	1,948	4%
North West London	33	4%	706	4%	1,778	4%
South East London	33	4%	988	5%	1,894	4%
West London	30	3%	834	5%	1,579	3%
Glasgow	30	3%	871	5%	2,451	5%
East London	27	3%	627	3%	1,162	2%
All other areas	520	56%	9,907	53%	24,997	53%
Total for HNR Area	935	100%	18,526	100%	46,893	100%

Source: Ofcom analysis of provider data.
Note: Percentages presented in this table may not add up to exactly 100% due to rounding.

[359] These are set out in more detail in Annex 9.

Table 5.5: Presence of competing networks in High Network Reach Area postcode sectors grouped by metropolitan area

Area	Average number of competing networks	Proportion of demand sites with N competing networks (cumulative)					
		N = 0 or more	N = 1 or more	N = 2 or more	N = 3 or more	N = 4 or more	N = 5 or more
Liverpool	2.58	100%	98%	87%	48%	20%	5%
Manchester	3.58	100%	94%	85%	72%	52%	34%
North London	2.49	100%	98%	83%	38%	19%	6%
Birmingham	3.05	100%	98%	86%	57%	39%	19%
South West London	2.34	100%	95%	79%	41%	14%	4%
North West London	2.91	100%	97%	85%	54%	27%	15%
South East London	3.07	100%	95%	79%	53%	36%	21%
West London	3.32	100%	96%	81%	61%	45%	28%
Glasgow	2.57	100%	97%	85%	46%	18%	10%
East London	3.23	100%	95%	80%	60%	39%	26%
All other areas	2.39	100%	95%	80%	39%	16%	6%
Total for HNR Area	2.64	100%	96%	82%	46%	23%	11%

Source: Ofcom analysis of provider data.
Note: Table uses current material and sustainable competitors.

Assessing whether there are any areas where competition is sufficiently effective to constitute a separate geographic market

5.127 The above results suggest that there are variations in the degree of rival infrastructure present within the HNR Area. We have therefore considered whether there are some parts of the HNR Area where competitive conditions are sufficiently different (in this case, stronger) to constitute a separate geographic market.

5.128 In practice, given the HNR already captures postcode sectors with a higher number of competing networks, we think competition from those networks would need to be sufficiently effective, including in the absence of regulation, for any parts of the HNR Area to constitute a separate geographic market.

Proposed approach

5.129 To assess whether such a separate geographic market exists, we have firstly singled out postcode sectors where the average number of rival networks present is materially higher than in other HNR postcode sectors.

5.130 However, having a higher number of networks present than the rest of the HNR Area does not automatically mean competitive conditions are sufficiently different. We have therefore

also considered additional factors to assess whether competition in these candidate postcode sectors is sufficiently effective to constitute a separate geographic market from the HNR Area.

5.131 In particular, we consider that a few small clusters of postcode sectors accounting for a limited number of new connections are unlikely to be sufficient to materially affect BT's commercial behaviour and, as a result, create competitive conditions that are sufficiently different and distinct from neighbouring areas. Therefore, we have also considered the level of demand as measured by the number of relevant postcode sectors, the total number of new connections over the period 2020-2023 within these postcode sectors, as well as the share of these new connections that were provided by BT.

Implementation and findings

5.132 As discussed above, in 2021 we found the CLA to be effectively competitive. Therefore, to practically implement the above approach, we have used the average number of rival networks present in the 2021 CLA market (i.e. 5.1 networks) as well as BT's share in the 2021 CLA market (i.e. 50%-60%) as reference points to test whether any potential new geographic areas might be considered effectively competitive.

5.133 Our analysis indicates that there are 10 postcode sectors where the average number of competing networks is the same or higher than the average number of competing networks in the 2021 CLA market (which was 5.1 networks).[360]

5.134 Of these, five postcode sectors are located in various parts of Greater London and between them account for 428 LLA circuit ends provisioned in 2020 to 2023 (representing less than 1% of all LLA circuit ends in the HNR area), while five are in Manchester and between them account for 823 LLA circuit ends provisioned in the same period (this represent less than 2% of all LLA circuit ends in the HNR area).[361]

5.135 Between 2020 and 2023, BT provisioned 71-80% ([✂]) of new leased line connections across the five postcode sectors located in Greater London and 81-90% ([✂]) across the five postcode sectors in Manchester.

5.136 We consider that BT's shares in these areas are high, and considerably higher than BT's share of connections in the 2021 CLA (i.e. 51%-60%). They suggest that despite a high number of networks being present, the overall level of constraint exerted on BT in these areas is still not sufficiently effective to distinguish them from the rest of the HNR Area.

5.137 Moreover, the small size of these clusters of postcode sectors and the limited level of connections they account for, further suggest that this is unlikely to constitute a separate geographic market where competitive conditions are sufficiently different and distinct from neighbouring areas.

Preliminary conclusions on HNR Area

5.138 Given the evidence set out above, we consider that – despite some variability in the average number of networks present – competitive conditions are sufficiently similar across the entire HNR Area such that this should be regarded as a single geographic market.

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[360] Ofcom. March 2021. Promoting investment and competition in fibre networks – Wholesale Fixed Telecoms Market Review 2021-26. Volume 2, Table 7.6.

[361] Annex 9 provides a list of these postcode sectors in Table A9.11.

5.139 Therefore, we propose to define a single HNR market where – due to existing presence of at least two current material and sustainable competitors – there is sufficiently well-established competition to BT in the commercial deployment of competing networks.

LLA Area 2 and Area 3

5.140 Having identified the HNR Area, we then go on to consider the remaining areas.

5.141 As outlined above, we are proposing to group non-HNR postcode sectors in two additional geographic markets, namely:

a) Area 2, which includes non-HNR postcode sectors where there is at least one current or potential material and sustainable competitor who has existing or planned presence.
b) Area 3 which includes postcode sectors with no existing or planned presence from any of the current or potential material and sustainable competitors.

5.142 We consider that areas outside of the HNR Area where there is, or there is potential for, competition on a sufficient scale to have a material and sustainable competitive impact on BT (Area 2) should be distinguished from areas where competition is currently limited and there is unlikely to be potential for material and sustainable competition to emerge over the review period (Area 3).

5.143 The tables below provide key metrics for these geographic areas as well as for the HNR to facilitate a comparison across all three proposed geographic markets.

Table 5.6: Summary of proposed LLA geographic markets

	Postcode sectors		Demand sites		Leased line access ends provisioned in 2020 to 2023	
Area	Number	Share of UK excl. the Hull Area	Number	Share of UK excl. the Hull Area	Number	Share of UK excl. the Hull Area
HNR	935	9%	18,526	12%	46,893	16%
Area 2	4,208	42%	68,293	45%	131,872	45%
Area 3	4,591	46%	57,976	38%	86,149	29%

Source: Ofcom analysis of provider data.
Note: Table uses current material and sustainable competitors.

Table 5.7: Presence of competing networks in HNR Area, Area 2 and Area 3

Area	Average number of current (and potential future) material and sustainable competitors	Proportion of demand sites with N current (and potential future) material and sustainable competitors (cumulative)					
		N = 0 or more	N = 1 or more	N = 2 or more	N = 3 or more	N = 4 or more	N = 5 or more
HNR	2.64 (2.92)	100% (100%)	96% (96%)	82% (84%)	46% (54%)	23% (30%)	11% (15%)
Area 2	1.15 (1.43)	100% (100%)	82% (88%)	24% (38%)	6% (11%)	2% (3%)	1% (1%)
Area 3	0.32 (0.35)	100% (100%)	24% (26%)	6% (7%)	2% (2%)	0% (1%)	0% (0%)

Source: Ofcom analysis of provider data.
Note: Table uses current (and potential) material and sustainable competitors. As explained above, for the purpose of defining the boundaries of the HNR area we only use existing build. To define the boundaries of Area 2 and Area 3 we use existing and planned build.

5.144 The above figures indicate that there are significant differences between Area 2 and Area 3 and between Area 2 and the HNR Area.

5.145 In particular, in relation to the difference between HNR and Area 2, our analysis indicates that the average number of current material and sustainable networks present in the HNR Area is 2.64, with 82% of demand sites having a choice of 2 or more material and sustainable providers. By comparison, in LLA Area 2, the average number of current material and sustainable competitor networks present is 1.15, with 24% of demand sites having a choice of 2 or more providers.

Preliminary conclusions on LLA Area 2 and Area 3

5.146 In addition to the HNR Area, we propose to define LLA Area 2 and Area 3.

5.147 We recognise that competitive conditions are not completely homogeneous within each of the proposed geographic markets. However, there is no requirement for competitive conditions to be perfectly homogeneous across a geographic market, rather we should assess whether the level of competition faced by BT is likely to be sufficiently similar across a given market.

5.148 LLA Area 2 encompasses a continuum of competitive conditions (e.g. areas where both VMO2 and CityFibre are present alongside areas where CityFibre is planning to build), these are all areas where there is, or there is likely to be potential for, material and sustainable competition such that the constraint on BT is broadly similar.

5.149 On the contrary, LLA Area 3 encompasses postcode sectors where competition is currently limited and there is unlikely to be potential for material and sustainable competition to emerge over the review period.

5.150 As such we are satisfied that, for the purpose of the SMP assessment, the constraint on BT is sufficiently similar within the proposed geographic areas and sufficiently different across them such that they represent separate geographic markets.

Application of the three criteria test

5.151 In this subsection, we consider whether the three criteria set out in section 79(2B) of the Act are met in relation to the LLA markets.

5.152 As set out in Annex 5, in determining whether to identify a market for the purpose of making a market power determination, we must consider whether the three criteria set out in subsection 79(2B) of the Act are met. Where we do not consider that the three criteria are met, we may not identify a market for this purpose.

5.153 As discussed above, we assess the three criteria at general level, taking into account overall characteristics and structure in the relevant product market. We consider competition at a sub-national level in our SMP assessment.

High and non-transitory barriers to entry

5.154 The LLA market is characterised by high barriers to entry and to expansion. This is because there are significant economies of scale in building an LLA network, and also because there are barriers to gaining customers once a network is built.

5.155 While the PIA remedy helps to reduce the high barriers to entry in the market to some extent, our evidence shows that PIA is used to differing degrees by different providers, suggesting that it may not be suitable for every use case. For example, [✂] is reluctant to use PIA for business customers due to delays[362] whereas [✂] uses PIA for network infilling as well as customer connections and consider PIA fundamental for network build.[363] Furthermore, the other fixed costs of building networks and of attracting customers are not expected to decrease significantly in the review period. This is one of the reasons why, even with the PIA remedy in place, these barriers take time and significant investment to overcome.

5.156 Accordingly, we propose that high and non-transitory barriers to entry are likely to persist in LLA markets. Where barriers are likely to be lower in sub-national markets, we take this into account in our SMP assessment.

A market which does not tend towards effective competition

5.157 We assess competitive conditions in LLA markets below. In summary, BT generally retains a high market share across all parts of the UK. The evidence we have suggests that there has been substantial investment in the networks that provide leased lines alongside broadband, plus some build by LL-only providers, to rival BT during the review period and beyond, particularly in certain parts of the UK. However, the longer-term impact of this investment on competition across the UK is still uncertain, and where there has been entry and expansion, it has been assisted by the existence of continued wholesale regulation. In other parts of the UK, we do not anticipate the emergence of material and sustainable competition to BT.

[362] [✂] response dated [✂] to s135 dated [✂], question [✂].
[363] [✂] response dated [✂] to s135 dated [✂], question [✂].

5.158 Accordingly, we do not consider the market will tend towards effective competition at a national level. We take account of competition at a sub-national level in our SMP assessment.

Insufficiency of competition law

5.159 We set out in more detail in Section 7 our competition concerns arising from BT's SMP in LLA markets. Absent regulation, BT's SMP would give it the incentive and ability to engage in forms of conduct that could distort competition and/or harm consumers. These forms of conduct fall into two broad categories:

- **Exclusionary behaviour** by BT to prevent potential competitors from competing in the LLA market(s) or prevent them from gaining market share.
- **Exploitative behaviour** by BT at the expense of its wholesale access customers in the relevant market(s), ultimately harming end-users who purchase services from BT's wholesale access customers in the downstream markets.

5.160 Although our concerns vary according to whether the behaviour is exclusionary or exploitative, both ultimately lead to poorer outcomes for end-users.

5.161 Competition law, in particular the rules prohibiting the abuse of a dominant position, is an important part of the legal framework with which BT needs to comply. Given its position of SMP (which equates to the competition law concept of dominance) BT has a special responsibility not to allow its actions on the market (where conditions of competition are weak) to distort or impair competition.

5.162 However, we consider that competition law remedies would be insufficient to address the identified competition concerns on their own in this context.

a) First, competition law would focus on tackling the abuse of a dominant position and would not be as effective as ex ante regulation in promoting and protecting competition from rival networks in the LLA market and in downstream markets.
b) Second, regulation must remain effective for the review period, and ex ante regulation better enables us to do this as it can be tailored to the particular circumstances in the markets and services provided.
c) Third, competition law does not provide enough regulatory certainty, which itself can undermine competition – and regulatory certainty is important in encouraging long-line equiterm investment in competing networks. In contrast, a benefit of ex ante regulation is that all industry stakeholders are clear in advance on the regulation that will apply.
d) Fourth, ex ante regulation can facilitate more timely enforcement due to the greater certainty and specificity provided. Although significant fines can be levied for breaches of competition law, which do have some reputational and commercial implications, cases often take considerable time, by which point the damage to competition may be irreversible.

5.163 On that basis, while competition law enforcement may be used in appropriate circumstances, we do not consider that it would be sufficient to rely on it alone in LLA markets and so consider that ex ante regulation is required.

Provisional conclusions on market definition and the three criteria test

5.164 We consider that the three-criteria test set out in section 79(2B) of the Act is met in relation to LLA markets.

5.165 We now set out the proposed LLA markets using the results of our modelling.

5.166 We propose to identify three geographic markets for LLA[364] for the purposes of making a market power determination:

a) the High Network Reach area: postcode sectors where, due to presence of at least two current material and sustainable competitors, there is sufficiently well-established competition to BT in the commercial deployment of competing networks;
b) LLA Area 2: postcode sectors in which there is, or there is likely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks; and
c) LLA Area 3: postcode sectors in which there is not, and there is unlikely to be potential for, material and sustainable competition to BT in the commercial deployment of competing networks.

5.167 Table 5.8 provides a summary of the proposed leased line geographic markets. The postcode sectors making up those geographic markets that we have provisionally identified can be found in Schedule 3.

Table 5.8: Summary of leased lines geographic markets

	Postcode sectors		Leased line access ends provisioned in 2020 to 2023		Average number of current (and potential future) material and sustainable competitors
LLA area	**Number**	**Share**	**Number**	**Share**	
HNR Area	935	9%	46,893	16%	2.64 (2.92)
Area 2	4,208	42%	131,872	45%	1.15 (1.43)
Area 3	4,591	46%	86,149	29%	0.32 (0.35)

Source: Ofcom analysis of provider data.

[364] As discussed above this excludes postcode sectors in the Hull Area as well as postcode sectors in the CLA market.

Consultation questions

Question 2.10: Do you agree with our provisional conclusions on geographic market definition for the leased line access market? Please set out your reasons and supporting evidence for your response.

Question 2.11: Do you agree with our provisional conclusion on the application of the three criteria test to the leased line access market? Please set out your reasons and supporting evidence for your response.

SMP assessment

Summary of proposals

5.168 In this subsection we assess whether any provider has SMP for each of the leased line access (LLA) markets we have provisionally identified.

5.169 As detailed below, we have provisionally concluded that BT has SMP in each of the following markets:

a) the HNR Area;
b) LLA Area 2; and
c) LLA Area 3.

5.170 The following sections set out our SMP assessment for the LLA market in more detail and are structured as follows:

a) First, we provide background by outlining the key findings from our WFTMR21 SMP assessment.
b) Second, we set out the analysis and evidence underlying our SMP assessment across our proposed LLA markets.
c) Third, we draw on this analysis and evidence to set out our assessment and provisional SMP findings for the HNR Area, LLA Area 2 and LLA Area 3 markets.

Background

5.171 In the March 2021 Statement[365] we concluded that BT did not have SMP in the CLA, and that BT had SMP in the HNR Area, LLA Area 2 and LLA Area 3. More specifically:

a) In the HNR Area, we found BT to have SMP, although we considered this finely balanced. Although the proximity of existing competing network infrastructure provided greater competitive pressure on BT, which we expected to increase over the 2021-26 review period, and although BT's discounts likely reflected a greater level of competition in this market, BT's high market share coupled with limited duct connections from competing networks to demand sites meant we concluded BT had SMP.

[365] Ofcom. March 2021. Promoting investment and competition in fibre networks – Wholesale Fixed Telecoms Market Review 2021-26.

b) In LLA Area 2, we concluded that BT had SMP. We found BT to have a high market share, and the share of its largest rival (VMO2) was found to be materially lower. We considered there to be limited competitive constraint from existing or potential competing network presence. We expected competition in LLA Area 2 to increase over the 2021-26 review period, however the likelihood and extent was not sufficiently certain to reach a no SMP finding.
c) In LLA Area 3, we concluded that BT had SMP. We found BT to have a high market share, as well as limited potential constraint from any existing or potential competing network presence.

Our proposed approach and evidence considered

5.172 Our SMP assessment evaluates the extent to which BT is able to behave to an appreciable extent independently of competitors, customers and ultimately consumers in each of the proposed geographic markets.

5.173 Our SMP assessment takes account of a number of factors which we consider in the round, including market shares, competition from existing infrastructure, barriers to entry and expansion, countervailing buyer power and Openreach pricing.

5.174 In the rest of this subsection, we discuss our analysis and evidence relating to each of these factors across the proposed LLA markets. A more detailed explanation of the analysis undertaken can be found in Annex 9.

Market shares

5.175 Market shares provide a useful indicator of competitive conditions in a market. In our SMP assessment for the LLA market, we consider BT's share of new connections in each geographic market for the period 2020 to 2023.[366] A greater number of competing networks that are managing to gain a material share of new business indicates a higher intensity of competition. We have also estimated market shares based on each supplier's share of all LLA circuit ends provisioned over a four-year period between 2020-2023.

5.176 Table 5.9 below presents our market share evidence for each of the proposed LLA geographic markets.

Table 5.9: BT LLA market share evidence

	HNR Area	Area 2	Area 3
Leased line access ends provisioned in 2020 to 2023	46,893	131,872	86,149
BT market share (leased line access ends provisioned in 2020 to 2023)	61-70% ([✂]%)	61-70% ([✂]%)	81-90% ([✂]%)

Source: Ofcom analysis of provider data.

[366] We take this approach because this is the latest data we have.

Competition from existing presence of network infrastructure

5.177 BT has by far the largest and the only nationwide network in the UK, which is not easily duplicated due to the high sunk costs involved. Where BT has network presence, it has a significant competitive advantage as it will be able to service customers quickly and at a significantly lower cost. We consider competitive constraints from rival networks are likely to be strongest where networks are already connected or very close to demand sites (such that they only require very short network extensions). This reflects the fact that the costs and time to supply will be lower, meaning they are better able to compete for LLA customers. Therefore, a greater number of competing networks already connected to, or very close to, demand sites is likely to lead to a greater competitive constraint on BT.

5.178 As well as our assessment of presence, as discussed above, we have also considered a number of additional indicators of competitive intensity. Table 5.10 below presents the following indicators from the network reach model, based on current and potential material and sustainable competitors.

a) *Density of competing networks within 50m:* This estimates network presence i.e. networks that are either already connected to demand sites or very close such that they only require very short network extensions and are able to compete for a customer.367
b) Distance to *nearest competing network:* This estimates how close competing networks are to demand sites. The average distances that are measured in our metrics will be higher than actual distances.[368] We therefore present these results as ranges.
c) *Proportion of new connections that are on-net (own network or digging) vs off-net (using access to* third-*party infrastructure):* We present a breakdown of whether competing networks supplied customers on-net (i.e. using their own network, either with existing duct connections or where digging is required) or off-net (i.e. using access to third-party infrastructure network). This informs our view on the presence of competing network infrastructure and the ability of competing network operators to use it to compete for customers. A higher proportion of customers supplied on-net suggests a higher presence of competing network infrastructure. On the other hand, a low proportion of customers supplied on-net suggests reliance on access to BT's infrastructure, which is typically much closer to demand sites compared to competing networks.
d) *Build vs buy:* We consider the extent to which competing networks have built, rather than supplied the customer off-net, where a leased line is outside of their existing network reach. Limited build activity is consistent with a weak competitive constraint on BT, as competing networks are more likely to require wholesale access to BT's network to supply customers.
e) *Dig distances:* We consider the extent to which, in practice, competing network operators dig to extend their network. Short dig distances may reflect the greater presence of competing networks in an area. They may also reflect, for example when

[367] This is equivalent to average network presence, i.e. the number of competing networks within 50m of demand sites in a given geographic area.

[368] There are a number of reasons for this. Sites of large businesses that are already connected to networks will likely have a modelled distance greater than zero because their location is approximated by the centroid of their postcode (see Annex 9 for more detail). Even where the postcode centroid is the location of the site, this may overestimate the distance as networks build to the edge, not centre, of sites. For more details see the 2019 BCMR Statement: Ofcom. 2019. Promoting competition and investment in fibre networks: review of the physical infrastructure and business connectivity markets. Volume 2, Paragraph 5.79.

combined with competing networks' lower propensity to dig, BT's greater competitive advantage in competing for new connections.

5.179 In combination, these indicators provide a useful indication of the degree of competition in a particular area.

5.180 For our SMP assessment, we draw on this evidence to identify the extent of competing network infrastructure in the proposed LLA geographic markets, as well as our earlier evidence presented in our geographic market analysis on individual networks.

Table 5.10: Competition from existing LLA network infrastructure

		HNR Area	Area 2	Area 3
Average number of current (and potential future) material and sustainable competitors present within 50m		2.64 (2.92)*	1.15 (1.43)	0.32 (0.35)
Proportion of demand sites with N current (and potential future) material and sustainable competitors	N = 0 or more	100% (100%)	100% (100%)	100% (100%)
	N = 1 or more	96% (96%)	82% (88%)	24% (26%)
	N = 2 or more	82% (84%)	24% (38%)	6% (7%)
	N = 3 or more	46% (54%)	6% (11%)	2% (2%)
	N = 4 or more	23% (30%)	2% (3%)	0% (1%)
	N = 5 or more	11% (15%)	1% (1%)	0% (0%)
Average modelled distance to the N-th nearest current (and potential future) material and sustainable competitor	N = 1	16m (16m)	41m (38m)	2,135m (2,115m)
	N = 2	41m (40m)	294m (274m)	4,708m (4,641m)
	N = 3	123m (119m)	731m (695m)	7,842m (7,749m)
	N = 4	264m (256m)	1,453m (1,344m)	11,253m (10,992m)
BT's proportion of leased line access ends provisioned in 2020 to 2023	On-net (duct connected)	90-100% [✂]%	90-100% [✂]%	90-100% [✂]%
	On-net (digging required)	0-10% [✂]%	0-10% [✂]%	0-10% [✂]%
Rivals' breakdown of leased line access ends provisioned in 2020 to 2023	On-net (duct connected)	61%	49%	28%
	On-net (digging required)	7%	12%	5%
	Off-net	31%	38%	65%
Competing networks' build versus buy	Build	18%	24%	8%
	Buy	82%	76%	92%

Source: Ofcom analysis of provider data.

** The figures presented in brackets in this table have been calculated using data from current and potential future material and sustainable competitors, including current as well as planned deployment (where available).*

Barriers to entry and expansion

5.181 There are a number of barriers to entry and expansion in the LLA market, which impact the competitive constraint from rival networks to BT. These are both barriers to building a network and to gaining customers once a network is built.

5.182 Building a network has very high fixed costs and takes time, which constitutes a barrier to entry to the market. Once the network is built, in those cases where a provider has no physical connection to a site and needs to extend its network to connect a customer, BT will likely have a significant cost and time advantage where it is already connected. As outlined in Section 2, we have seen significant growth from competing networks in the LLA market across the 2021-26 review period, and we recognise that PIA reduces to some extent these barriers arising from the high costs of building a network. However, as outlined above, PIA is used to different degrees by different LLA providers, suggesting that it may not be suitable for every use case.[369] We therefore do not consider that PIA will sufficiently reduce these barriers in this review period to overcome BT's cost and time advantage in the LLA markets where it is already connected.

5.183 Outside of the high costs of building a network, there are a number of additional barriers to entry and expansion in the LLA markets. These include the importance of a track record of service, reliability and various costs in being able to offer the continuity of service (through low repair times and continuous support) that is important to LLA customers, which can all affect suppliers' ability to gain customers.

5.184 Although not insurmountable, these barriers take time and significant investment to overcome, and so will affect the competitive constraints from rival networks in this review period, where they are present.

5.185 We also note that in accordance with the modified Greenfield approach, we assess SMP in the absence of regulation in the LLA market, meaning our assessment assumes BT is not regulated in LLA. We therefore note that BT could have the incentive, and in the absence of regulation the ability, to foreclose the entry or expansion of competing network operators, to limit their competitive threat. This could result from actions such as offering geographic discounts to wholesale prices in areas where it faces potential competition, or other commercial terms including certain types of volume discounts.

5.186 We discuss each of the barriers to entry and expansion further below. Although some are similar to the barriers to entry and expansion that exist in WLA, others are specific to, or more pronounced in, the LLA market.

Network scale

5.187 We consider insufficient network scale to be a barrier to entry and expansion in the LLA market in some cases.

5.188 Our evidence from stakeholders suggests that across the 2021-26 review period, network scale has impacted the ability of competing networks to win LLA business in certain

[369] For example, [✂] is reluctant to use PIA for business customers due to delays whereas [✂] uses PIA for network infilling as well as customer connections and consider PIA fundamental for network build. [✂] response dated [✂] to s135 dated [✂], question [✂]. [✂] response dated [✂] to s135 dated [✂], question [✂].

circumstances.[370] For example, some LLA customers may require a large number of multi-site circuits, and a potential supplier would therefore need a large network to cover enough sites to be considered by these customers. Another example is networks which are trying to secure a wholesale deal with telecoms providers who supply LLA customers, where again greater scale of network may be an advantage.

5.189 However, even where customers may need to purchase LLA circuits across a wide geographic area (e.g. in the case of MNOs, nationwide), this may not all need to be purchased from a single supplier. For example, we note that some customers are able to purchase from more than one provider to meet their needs, and so purchase from competing networks in areas that they do cover.[371] We also note that the need for network scale may not be important for all customers in all cases. This is evidenced by the ability of some MSN and LL-only providers to have successfully won LLA business, to some extent, across the 2021-26 review period.[372]

Customer installation times

5.190 Our evidence from telecoms providers shows that LLA customers are sensitive to business continuity and installation times for new services, and quicker installation times can win LLA business.[373] For example, [✂]'s LLA customers typically expect a short provisioning time.[374]

5.191 BT has an advantage for retaining existing LLA connections as well as winning new LLA connections given its network is already connected to many demand sites across the UK, as evidenced by the high share of BT's new provisions that are duct connected in Table 5.10. It is more likely that competing networks will have to dig to a site they are not already connected to it, which will take additional time, and they will likely incur additional costs, depending on how far their network is from the demand site.

5.192 We expect this barrier to persist, to some extent, for this review period. BT's incumbency advantage of being connected to the majority of demand sites will remain, in contrast to competitors who are more likely to need to extend their network to be connected to new demand sites, given the costs and time required.

5.193 However, we do recognise that there is some variability in how long installation will take between networks (even where dig is required). For example, we understand from [✂] that LLA providers offer varying install times, with [✂] having a quicker average installation time of [✂] days compared to [✂] who have an average installation time of [✂] days.[375]

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[370] [✂] response dated [✂] to s135 notice dated [✂, question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; ITS pre-consultation submission (non-confidential version) dated 31 January 2025, page 1.

[371] For example, we understand that Vodafone and Three use more than one provider for mobile backhaul. Three told us it uses multiple providers for mobile backhaul, while Vodafone told us it uses a small number of providers for mobile backhaul outside of its own capabilities. See Hutchison 3G UK Limited response dated 9 August 2024 to s135 notice dated 8 July 2024, questions A1 and A3 and Vodafone Limited response dated 15 August 2024 to s135 notice dated 8 July 2024, questions J1 and J3.

[372] For example, as set out above in Paragraph 5.189 we understand that some MNOs [✂].

[373] [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂], in a meeting with Ofcom on [✂], said that LLA delivery time is a crucial factor which informs an LLA customer's choice between LLA providers.

[374] [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[375] [✂] response dated [✂] to s135 notice dated [✂], question [✂].

5.194 We also recognise that process and technology developments over this review period may reduce this barrier to some extent. For example, we have been told by CityFibre that leased lines provided over XGS-PON technology may have lower installation times than traditional point-to-point leased lines.[376]

High customer switching costs

5.195 A BT LLA customer considering switching existing circuits to an alternative provider will likely face switching costs, which may act as a barrier to switching. These switching costs might include early termination fees, dual payment while circuits are switched, excess construction charges (ECCs) if the alternative provider must dig to the demand site, as well as new connection charges.

5.196 Contract lengths in the LLA market are often long. For example, we understand from [✂] that typical LLA business customers are on three- or five-year contracts, while public sector can range anywhere up to 20 years.[377] Additionally, as discussed above, Openreach offers certain discounts for LLA (84 months minimum commitment). Given the costs associated with early termination of a contract, these long contract lengths can act as an additional barrier to competing networks being able to win existing customers from other networks (and do so quickly).

5.197 We note that unlike in the WLA market, there is no market-wide upgrade to a new technology in the LLA market which could create a particular opportunity for competing networks to win existing LLA business.[378] Although the general trend of migrating services to higher bandwidths over time may provide an opportunity over the longer term, switching costs mean the existing provider is still likely to have a competitive advantage.

Credibility and reputation are important for LLA customers

5.198 The reputation and credibility of the provider offering leased lines can be important for winning LLA business.[379] For example, [✂] has told us that business customers consider buying from a known brand to be important when buying business connectivity circuits.[380] This will likely impact new entrants' ability to win LLA business, including wholesale contracts with telecoms providers.

5.199 As outlined in Section 2, LLA customers are purchasing a high-end service with high quality of service parameters (such as low repair times), high security requirements and higher costs compared to WLA FTTP products. Given the product characteristics and use cases, we understand that customers actively consider the reputation and credibility of a provider when selecting who to purchase from. Known, established brands will likely have more credibility compared to new, less established alternative providers. For a competitor to improve their credibility and reputation in the LLA market, it will take time as well as additional investment costs.

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[376] CityFibre Infrastructure Holdings Limited response dated 19 February 2025 to s135 notice dated 10 February 2025, question 1f.

[377] [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[378] As explained in Section 4, in the WLA market, the deployment of FTTP creates a window of opportunity for altnets to win customers as they migrate to a new (FTTP) network.

[379] PlatformX. December 2024. TAR26 pre-consultation submission – non-confidential version. Paragraphs 3.2, 3.10 and 3.15.

[380] [✂] response dated [✂] to s135 notice dated [✂], question [✂].

5.200 Given LL-only providers specialise in leased lines, they may be able to more readily build credibility and reputation in the LLA market, compared to MSNs focussed primarily on competing in the WLA market.

Countervailing buyer power

5.201 Whether a customer has countervailing buyer power depends on whether they can credibly switch to an alternative supplier, and whether the volumes they want to buy are large enough to act as a constraint.

5.202 The degree to which there are competing networks present from which customers can choose varies by geographic market, and is addressed below for each LLA market.

Openreach pricing

5.203 In the 2021-26 review period, Openreach is subject to a CPI-0% charge control on all LLA services in LLA Area 2 and LLA Area 3. Openreach is subject to a fair and reasonable pricing condition in the HNR Area (rather than a charge control), reflecting the greater degree of network competition found in 2021 compared to LLA Area 2 and LLA Area 3. As well as charge controls, Openreach is prohibited from introducing discriminatory geographic discounts (except where Ofcom otherwise consents). This provision does not extend to geographic discounts on connection charges in LLA Area 2, or geographic discounts on either rental or connection charges in LLA Area 3 and the HNR Area.[381]

5.204 Pricing can in principle be used as an indicator of market power. Pricing up to the cap, i.e. pricing up to the maximum level allowed under our regulations, may indicate that other constraints are insufficiently strong to hold prices below the level of the cap, which would be consistent with a finding of SMP. However, we recognise that BT's pricing may be driven by factors other than just SMP.

5.205 We discuss below the evidence on Openreach's pricing behaviour across the 2021-26 review period.

Openreach pricing in line with the cap in LLA Area 2 and LLA Area 3

5.206 Looking at overall price growth across the Ethernet basket (which covers LLA Areas 2 and 3[382]), we see that revenue-weighted price growth has been broadly aligned with (i.e. slightly below) CPI growth over 2021-24.[383] Similarly, the simple average price growth for WDM (Optical) price list items has been a little below (but still strongly correlated with) CPI growth.[384]

5.207 For dark fibre access (DFA) services in LLA Area 3, which are subject to cost-based charge controls, Openreach has increased prices by almost the maximum allowed growth rates since 2021/22.[385]

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[381] Although the general prohibition on undue discrimination would apply in these circumstances.

[382] The current Ethernet basket includes combined Ethernet revenue from all LLA SMP markets and all IEC SMP markets, meaning that it also includes Ethernet IEC revenue from BT Only exchanges and BT+1 exchanges.

[383] This can be seen in tab '12E – Ethernet & WDM Outcome' of BT's published WFTMR Compliance Model 2023-24.

[384] For example, in 2023/24 average WDM price growth across the LLA and IEC SMP markets was 8.2%, compared to 11.1% CPI growth. This can be seen in tab 'Compl - Ethernet & WDM' of BT's published WFTMR Compliance Model 2023-24.

[385] This can be seen in tab '12I - DFA Comp Outcome' of BT's published WFTMR Compliance Model 2023-24.

5.208 We note that there has been some variation in the price growth across individual Ethernet and WDM services. Price growth has been relatively high for some lower bandwidth services (such as EAD 10 and EAD 100 services) and relatively low for some higher bandwidth services (such as EAD 10,000 and OSA Filter Connect - XG210 - Single Fibre - 36 month minimum period). Although Openreach charging below the price caps for some services may indicate some constraints from competing networks, we treat this evidence with caution as there may be other strategic decisions at play rather than competition exerting constraints on Openreach pricing. For example, we have collected internal documents from Openreach which suggest that price increases for low bandwidth circuits may be driven by [✂].[386]

Openreach discounts

5.209 In the HNR Area, Openreach has offered some discounts since 2021. These discounts include rental charge term discounts and reductions for connection charges.[387] [388] Op

5.210 In LLA Area 2 and LLA Area 3, Openreach has introduced term discounts for EAD and OSA rental charges. For example, Openreach has offered LLA term discounts (60 months and 84 months minimum periods) for rental charges for circuits above 1Gbit/s.[389] These are substantial term commitments for customers to commit to.

5.211 In LLA Area 3, where Openreach is obliged to provide cost-based dark fibre, Openreach does not offer any discounts (including term discounts) for the regulated dark fibre product.

Conclusion on pricing in LLA services

5.212 Openreach's pricing since 2021 is not inconsistent with a finding of SMP in the HNR Area, LLA Area 2 and LLA Area 3. Openreach has been increasing prices by close to the maximum allowed levels in LLA Area 2 and LLA Area 3, and although BT offers discounts for new connections (specifically in the HNR Area) and term discounts for rental charges in all regulated markets, these require users to commit to long contracts.

5.213 However, in light of the evidence and caveats set out above, we do not consider pricing to be a very informative indicator of SMP conditions. As such, we do not consider it further as part of our SMP assessment and instead place greater weight on the other indicators.

Provisional findings

Provisional finding that BT has SMP in LLA Area 3

5.214 As detailed above, LLA Area 3 is made up of postcode sectors in which there is not, and there is unlikely to be, potential for material and sustainable competition to BT in the commercial deployment of competing networks in this review period.

5.215 LLA Area 3 accounts for 57,976 demand sites, 4,591 postcode sectors and 29% of connections. In the majority of these postcode sectors no alternative leased line provider to Openreach is present. We recognise that some MSNs may be present who offer some

[386] [✂] response dated [✂] to s135 notice dated [✂], question [✂].
[387] For example, see Openreach Special Offer connection charge discount in the HNR Area for EAD 10Gbit/s with a 5Y minimum contract period. Openreach. Price List. Accessed on 11 March 2025.
[388] For example, see Openreach HNR Spread Connection Special Offer for EAD 10Gbit/s with a 60 month minimum contract period. Openreach. Price List. Accessed on 11 March 2025.
[389] Openreach. Price list, Ethernet Access Direct (EAD) including EAD Enable. Accessed on 5 March 2025.

leased lines, but as yet we do not consider these are, or have the potential to be, material and sustainable competitors for this review period.

5.216 Below, we consider whether BT has SMP in LLA Area 3.

Market shares

5.217 Our market share evidence indicates that BT is facing very limited competition in LLA Area 3 from existing or potential rival network presence, as detailed in Table 5.9. We estimate BT's market share to be 81-90% ([✂]%), and the share of BT's largest rival (VMO2) is materially lower, at 1-10% ([✂]%).[390]

Competition from existing presence of network infrastructure

5.218 The infrastructure indicators presented in Table 5.10 above show that there is very limited competing network infrastructure in LLA Area 3. In Area 3, most demand sites have no competing networks present (i.e. within 50m) and, on average, there is substantially fewer than one (0.35) competing network connected or close to demand sites. A very small proportion (just 7%) of demand sites have access to two or more competing networks nearby.

5.219 BT is far more likely to be duct-connected than competitors, and therefore to have a competitive advantage in LLA Area 3. BT had duct in place when connecting between 90-100% ([✂]%) of LLA circuit ends over the period 2020 to 2023, while competing networks, on average, had duct for just 28% of their new connections.

5.220 In addition, competing networks are typically further away from a demand site, with the nearest competing network on average being 2.1km away. Competing networks are unlikely to dig such long distances due to the cost of network extensions outlined in Annex 9. This is reflected in our evidence on how competing networks chose to supply new customer ends. On average, when competing networks were not duct connected, they chose to dig for 8% of new connections.[391]

Barriers to entry and expansion

5.221 The absence of potential competitors shows that the barriers to entry and expansion are particularly high in LLA Area 3, and the market is unlikely to develop enough to materially affect the level of competition. As outlined above, we have identified network scale and the need for significant upfront investment to reduce installation times as barriers to entry in the LLA market. Given the average distance from a demand site to the first nearest competing network is substantially further in LLA Area 3 compared to other LLA markets, these barriers to entry and expansion will likely be more pronounced.

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[390] As outlined above in our approach to LLA geographic modelling, LLA Area 3 is made up of postcode sectors where less than 65% of demand sites have access to a rival network. Therefore, networks such as VMO2 may still have presence in some postcode sectors, however the presence is insufficient to reach our threshold to consider the postcode sector LLA Area 2 or HNR Area.

[391] Ofcom. March 2021. Promoting investment and competition in fibre networks – Wholesale Fixed Telecoms Market Review 2021-26. Volume 2, Table 8.3. Although limited data was provided on the dig distances of competing networks in the period 2020 to 2023, the data we have received is consistent with the findings in the WFTMR21 that the median dig distances tend to be short across all geographic markets (in all cases less than 20m).

Absence of countervailing buyer power

5.222 We do not consider there to be sufficient countervailing buyer power to constrain BT's market position in Area 3. This is because most customers will have no alternative choice to BT across LLA Area 3 (the average number of competing networks present within 50m of a demand site is 0.35) and customers therefore cannot make credible threats to switch volumes to an alternative supplier.

Finding that BT has SMP in LLA Area 3

5.223 Overall, our evidence indicates that BT has SMP in the LLA Area 3 market.

5.224 BT has a persistently high market share in LLA Area 3 and faces limited infrastructure-based competition. The evidence on barriers to entry and expansion suggests that there are limited prospects of networks which are, or have the potential to be, material and sustainable competitors entering this market for this review period, and there is limited countervailing buyer power due to a lack of alternative networks to switch to.

5.225 We therefore provisionally find BT to have SMP in LLA Area 3.

Finding that BT has SMP in LLA Area 2

5.226 As detailed above, LLA Area 2 is made up of postcode sectors in which there is, or is likely to be the potential for, material and sustainable competition to BT in the commercial deployment of competing networks.

5.227 LLA Area 2 accounts for 68,293 demand sites, 4,208 post code sectors and 45% of connections. In these postcode sectors at least 65% of demand sites have, or will potentially have, access to an alternative leased line provider other than BT.

5.228 Below, we consider whether BT has SMP in LLA Area 2.

Market shares

5.229 Our evidence presented in Table 5.9 shows that BT has a high market share in LLA Area 2. We estimate BT's market share to be 61-70% ([✂]%), and the share of BT's largest rival VMO2 is materially lower at 21-30% ([✂]%).

5.230 BT's annual share of LLA circuit ends has declined from ([✂]%) in 2020 to ([✂]%) in 2023.

Competition from existing presence of network infrastructure

5.231 The infrastructure indicators presented in Table 5.10 above show that currently there is limited competing network infrastructure in LLA Area 2. On average, there is 1.43 competing networks connected or close to demand sites in LLA Area 2. Just 38% of demand sites currently have access to two or more competing networks nearby.

5.232 Evidence for LLA Area 2 suggests that, for a large proportion of users, BT will be duct connected whereas competing networks will likely need to extend their networks to connect to customers. BT had duct in place when connecting 90-100% ([✂]%) of LLA circuit ends over the period 2020 to 2023, while competing networks, on average, had duct for 49% of their new connections in the same period.

5.233 BT's competitive advantage from being duct-connected will likely act as a barrier to competing networks' ability to compete in LLA Area 2 to some extent over this review period, and we see this in how competing networks chose to supply new customer ends. Competing networks are typically further away from demand sites in LLA Area 2 than in

HNR Area.[392] On average, demand sites are 38m away from the first nearest competing network. When competing networks were not already duct connected, they chose to dig for 24% of the new connections. Although limited data was provided on the dig distances of competing networks in the period 2020 to 2023, the data we have received is consistent with the findings in the WFTMR21 that the median dig distances tend to be relatively short across all geographic markets (in all cases less than 20m).[393] [394]

5.234 BT faces some competition from established material and sustainable competing networks with existing infrastructure (e.g. VMO2). Additionally, as outlined in our geographic market analysis above, we expect the overall footprint of competing networks, of both current and potential material and sustainable competitors, to grow across the 2026-31 review period. We recognise the constraint from existing networks in LLA Area 2 may therefore increase in the future, but we consider the likelihood and extent of this growth is currently uncertain.

Barriers to entry and expansion

5.235 There has been entry and expansion in the current WFTMR21 LLA Area 2, showing that entry and expansion by current as well as potential material and sustainable competitors (including LL-only providers, VMO2 and CityFibre) can be viable for LLA Area 2. However, the trends in LLA volumes sold and market shares suggest that expanding in the market takes time and that some barriers persist. Therefore we consider that barriers to entry and expansion remain high in LLA Area 2 and will persist for this review period. Moreover, we consider that the extent and success of entry and expansion remains dependent on our existing ex-ante regulation of this market.

5.236 In addition, as discussed above, while PIA has the potential to reduce barriers to entry and substantially increase competition, the use of PIA for LLA is used to differing degrees by different providers, suggesting that it may not be suitable for every use case.[395] The impact of PIA for the barriers to entry and expansion in the LLA market over this review period therefore remains uncertain.

Absence of countervailing buyer power

5.237 We do not consider there to be sufficient countervailing buyer power to constrain BT's position in Area 2. Although most customers will have an alternative provider to BT, many will have limited choice and so we do not consider this sufficient to make a credible threat to switch away from BT to an alternative network.

5.238 In general, we also expect that individual customers will tend to purchase low volumes, which are unlikely to be large enough for them to exert buyer power.

5.239 We therefore do not expect countervailing buyer power to be a material constraint on BT in LLA Area 2.

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[392] Ofcom. March 2021. Promoting investment and competition in fibre networks – Wholesale Fixed Telecoms Market Review 2021-26. Volume 2, Table 8.3.

[393] Ofcom. March 2021. Promoting investment and competition in fibre networks – Wholesale Fixed Telecoms Market Review 2021-26. Volume 2, Table 8.3.

[394] As discussed in Volume 3, Section 5, PIA has the potential to extend the range over which existing networks will be able to compete. However, use of PIA varies by user and some competing networks rely on it more for network expansion in the LLA market than others.

[395] See Paragraph 5.155 for our evidence on use of PIA for the provision of LLA.

Finding that BT has SMP in LLA Area 2

5.240 Overall, our evidence indicates that BT has SMP in LLA Area 2. As well as BT's high market share, there is limited competitive constraint on BT's market power from existing or potential competing network presence.

5.241 We have been encouraged by MSN and LL-only providers increased leased line volumes across the WFTMR21 period, and their plans for future growth across this review period. Additionally, BT's annual share of new LLA circuit ends has declined by -[✂] percentage points between 2000 to and 2023.[396]

5.242 However, BT's market share remains high, and the decline has so far been limited. We recognise barriers to entry and expansion in the LLA market remain, which will take time to overcome. This is likely to limit the extent to which the competitive constraint will increase during this review period. Additionally, there is limited countervailing buyer power to constrain BT's position.

5.243 We also note BT's incentive and ability to undermine the development of competition in the absence of regulation.

5.244 Therefore, the likelihood and extent to which MSNs and LL-only providers can sufficiently increase the competitive constraint they exert in LLA Area 2 in this review period is not sufficiently certain for us to reach a no SMP finding on a prospective basis.

5.245 We therefore propose that BT has SMP in the provision of LLA circuits in LLA Area 2.

Proposal that BT has SMP in the HNR Area

5.246 As detailed above, the HNR Area covers postcode sectors where, due to the presence of at least two current material and sustainable competitors, there is sufficiently well-established competition to BT in the commercial deployment of competing networks to distinguish these postcode sectors from Area 2.

5.247 The HNR Area accounts for 18,526 demand sites, 935 post code sectors and 16% of connections. In these postcode sectors, at least 65% of demand sites have access to at least two alternative LLA providers other than BT. Below, we consider whether BT has SMP in the HNR Area.

Market shares

5.248 Our evidence presented in Table 5.9 indicates that BT maintains a high market share in the HNR Area. BT has a market share of new connections of 61-70% ([✂]%) in the period 2020 to 2023, and the share of BT's largest rival VMO2 is materially lower, at 11-20% ([✂]%). Despite there being multiple networks in the HNR Area, no other competitor has a share above [✂]%.

5.249 Although BT's share of new connections remains high in the HNR Area, we note that its share has declined from [✂]% in 2020 to [✂]% in 2023.

Competition from existing presence of network infrastructure

5.250 The HNR Area is made up of postcode sectors with two or more material and sustainable competitors to BT. On average, almost three (2.92) current and potential future material and sustainable competitors are present in the HNR Area and 54% of sites currently have

[396] See Annex 9, Table A9.14.

access to three or more current and potential future material and sustainable competing networks.[397]

5.251 Nonetheless, evidence for the HNR Area suggests that, for a large proportion of users, BT is still more likely to be duct connected to customers, whereas competing networks are more likely to need to extend their networks to connect to customers compared to BT:

a) BT had duct in place when connecting 90-100% ([✂]%) of LLA circuit ends over the period 2020 to 2023, while competing networks, on average, had duct for 61% of their new connections;
b) 84% of businesses have two competing networks present (i.e. within 50m of demand sites); and
c) Our modelling indicates that on average, the two closest current and potential future material and sustainable competing networks are within 50m of demand sites, but the third closest is over 100m (119m) away from demand sites.

5.252 While BT therefore faces competition from two or more current material and sustainable competitors in the HNR Area, being significantly more duct connected brings a competitive advantage. While PIA has the potential to extend the range over which existing networks will be able to compete,[398] our evidence shows that PIA is used to differing degrees by different providers, suggesting that it may not be suitable for every use case. The impact of PIA for the barriers to entry and expansion in the LLA market over this review period therefore remains uncertain.

5.253 We therefore consider that BT will retain a competitive advantage from being duct-connected more frequently than its rivals. We expect this to affect competing networks' ability to compete effectively to some extent.

Barriers to entry and expansion

5.254 As discussed above, we have seen an increase in competing networks providing LLA services since 2021, and this has contributed to the proposed increase in the geographic scope of the HNR Area. We nonetheless consider the LLA market to have persistent barriers to entry and expansion.

5.255 The HNR Area has a higher presence of LL-only providers, who, as discussed above, may be better placed than providers who are less specialised to overcome some of these barriers. However the trends in volumes sold by existing and new LLA providers (as described in Section 2 of this volume) suggest that expanding in the market takes time and that some barriers persist. Accordingly, while we think that competition in the HNR Area may eliminate BT's SMP at some point in the future, barriers to entry and expansion mean the extent to which it is able to sufficiently develop in this review period is not sufficiently certain for us to propose a no SMP finding on a prospective basis.

[397] For the HNR SMP assessment, we rely on the indicators presented in Table 5.10 which are calculated based on evidence from current, as well as potential material and sustainable, competitors. This differs from our approach to defining the HNR geographic market, which is drawn based on the networks of current material and sustainable competitors only. For completeness, Table 5.10 presents our SMP network infrastructure indicators based on both current material and sustainable competitors as well current and potential material and sustainable competitors.

[398] See Volume 3, Section 5 for more detail on PIA.

Absence of countervailing buyer power

5.256 Most businesses will have a choice of two alternative suppliers to BT in the HNR Area. However, these business customers will likely buy relatively low volumes, as individual customers, which are unlikely to be large enough to exert buyer power.

5.257 Therefore, we do not consider buyer power to be sufficiently strong to counteract BT in the HNR Area.

Finding that BT has SMP in LLA HNR Area

5.258 Overall, we consider that the evidence presented above is indicative of BT retaining SMP in the HNR Area, in particular given BT's continuing high market share.

5.259 The HNR Area has expanded since 2021, and BT's annual share of LLA circuit ends has been trending downwards (-[✂] percentage points) between 2020 to 2023.[399] In addition, our evidence on increased LLA volumes sold by competing networks, presented in Section 2, demonstrates that competing networks are successfully winning LLA business, including wholesale contracts with large telecoms providers (e.g. Sky / ITS deal).

5.260 However, despite BT's market share having decreased since 2021, as well as our evidence suggesting that on average there are more networks present in the HNR Area than there were before, we have yet to see a material decline in BT's market share.

5.261 We consider BT's high market share of [✂]% across the 2020-23 period reflects the persistent barriers to entry and expansion in the LLA market, which will take time for competing networks to overcome.

5.262 In the last review, we concluded that one such persistent barrier to competition becoming more effective was that competing networks were much less frequently duct connected than BT. Our evidence suggests that this remains the case.[400]

5.263 We have also identified persistent barriers to increasing take-up (particularly quickly) which we expect to impact competitive conditions across this review period, such as high switching costs and the importance of credibility and reputation within the LLA market for winning LLA business.

5.264 We therefore propose that BT has SMP in the provision of LLA circuits in the HNR Area for this review period.

Consultation questions

Question 2.12: Do you agree with our provisional findings on SMP in the leased line access market? Please set out your reasons and supporting evidence for your response.

[399] See Table A9.14 in Annex 9 for more detail.

[400] Ofcom analysis of provider data.

6. Inter-exchange connectivity market

6.1 In this section we explain our proposed market definition and SMP assessment for inter-exchange connectivity (IEC) services. The structure is as follows:

a) Product market definition for IEC
b) Geographic market definition for IEC
c) SMP assessment.

Product market definition

Our proposals and provisional conclusions

6.2 We provisionally conclude that there is a single product market for IEC services which:

a) includes active services at all bandwidths provided between BT exchanges;
b) includes dark fibre between BT exchanges;
c) excludes leased line access services; and
d) excludes all trunk services that do not connect between BT exchanges.

Background

6.3 IEC services carry aggregated traffic between BT exchanges located in different geographic areas. IEC services typically use similar products to those in the LLA market, such as leased lines at different bandwidths and dark fibre.

6.4 IEC services are a type of trunk segment. Trunk segments carry aggregated traffic between points of aggregation. We have previously presumed other types of trunk connections[401] to be effectively competitive. We have also previously found a number of exchanges to be effectively competitive. Neither other types of trunk connections nor previously deregulated exchanges form part of this review.[402]

6.5 BT exchanges act as network nodes, which are used to aggregate traffic and can act as interconnection points between networks and other network nodes. Demand for IEC comes from telecoms providers that need to carry aggregated traffic between BT exchanges to reach their own networks.

6.6 Telecoms providers have historically been particularly reliant on access to BT exchanges to be able to use BT's wholesale access services and backhaul this traffic to their own networks. Some altnets are also reliant on connectivity to BT exchanges where they have

[401] Such as connections to telecoms provider network nodes and connections to data centres that can both be used as points of aggregation.
[402] Any reference in this consultation document to 'each BT exchange' or 'BT exchanges' should be taken to exclude BT exchanges that have already been deregulated. However, for completeness and ease of reference, Schedule 4 to our draft SMP conditions in Volume 7 includes a complete list of IEC exchanges, including those exchanges that have already been deregulated.

built their own fixed access network in a BT exchange area and need to backhaul this access traffic to their own core and/or backhaul network.

6.7 Where other operators with nearby networks are connected to BT exchanges (either directly or indirectly), they may provide competition to Openreach as providers of IEC services. In some cases, these providers of IEC services use BT exchanges as a hub to connect to one or more buyers of IEC services rather than requiring buyers of IEC services to connect to their network outside the exchange.

6.8 We see that the market for IEC has been broadly stable since WFTMR21. We have seen limited entry and exit by different providers, and limited expansion by existing providers. As set out below, we expect this to continue over the review period.

6.9 We note that future developments, such as greater competition from altnets in downstream access markets and Openreach's exchange closure programme, may impact competition in the IEC market. However, we do not consider that these developments will happen soon enough to have a material impact on our assessment of competitive conditions in the IEC market for this review period.[403]

Our proposed approach

6.10 As IEC services typically use similar products to those in the LLA market (i.e. leased lines and dark fibre), we consider a similar set of potential substitutes. Specifically, we first consider whether the product market should include all bandwidths of IEC services. We then consider whether LLA services should be considered as part of the IEC market.

6.11 We explain below why we have provisionally concluded that there is a single product market for IEC services, including all bandwidths and dark fibre and excluding LLA.

All bandwidths and dark fibre for IEC are in the same product market

6.12 Where a telecoms provider is already connected to a BT exchange, it can offer a full suite of bandwidths relatively quickly and at little incremental cost, constraining a hypothetical monopolist of a given bandwidth.

6.13 Similarly, an inter-exchange dark fibre provider already connected to a BT exchange would be able to start supplying active IEC services by purchasing and installing equipment at each end of the circuit, relatively quickly and at minimal cost.

6.14 Therefore, we propose that all bandwidths used for IEC services, and dark fibre between BT exchanges, are in the same product market.

Leased line access and IEC as separate markets

6.15 As IEC services typically use similar products to those in the LLA market (i.e. leased lines and dark fibre), we consider the potential for those services to be part of the same product market as IEC services.[404]

[403] We set out Openreach's current exchange exit plan, and its implications, in more detail in Volume 3, Section 3. Given that relatively few exchanges are expected to close during this review period, we do not anticipate there will be a material impact on competition in the IEC market more widely.

[404] As discussed in Section 5 of this volume, we have already proposed a leased line access product market which excludes IEC services.

6.16 However, while IEC services typically use similar products to those in the LLA market, they are used for a different purpose. Specifically, IEC circuits carry aggregated end-user traffic over larger distances than access circuits which connect within, rather than between, geographic areas. We also understand that higher bandwidths account for a greater proportion of IEC circuits, reflecting the greater capacity generally needed to carry the traffic of multiple access circuits and/or backhaul circuits.[405]

6.17 A supplier of LLA services to a particular end-user site would not be able to easily switch to supplying inter-exchange connectivity services as it would need to build a sufficient backhaul network to do so. An access network topology connecting multiple end-users to a single aggregation point within a local geographic area is not set up to deliver IEC circuits - in fact it requires IEC circuits to provide an end-to-end service. Therefore, only LLA service providers with their own backhaul networks and backhaul-focused service providers are able to provide an inter-exchange connectivity service.

6.18 Therefore, the different purpose of IEC services, compared to LLA services, leads to a difference in competitive conditions.

6.19 Accordingly, we provisionally conclude that there is a separate market for IEC services.

Consultation questions

Question 2.13: Do you agree with our provisional conclusions on product market definition for the inter-exchange connectivity market? Please set out your reasons and supporting evidence.

Geographic market definition

Our proposals and provisional conclusions

6.20 We propose to define each BT exchange as a distinct market.

Background

6.21 In WFTMR21 we identified each BT exchange as a distinct geographic market.[406]

Our proposed approach

6.22 Telecoms providers use IEC connections from a given BT exchange in order to backhaul aggregated access traffic from an access network (which could be either BT's or that of a third party) within that local access exchange area. This aggregated access traffic is then carried from the BT exchange to another BT exchange for connection to a wider core/backhaul network. Competition is for the supply of backhaul connectivity between network nodes located at BT exchanges.

6.23 We have considered whether IEC services from a particular BT exchange are likely to be substitutes for IEC services from another BT exchange. Given that IEC links are used for carrying aggregated traffic from a BT exchange, we consider that connections from one BT

[405] [✂].

[406] Ofcom. March 2021. Promoting investment and competition in fibre networks – Wholesale Fixed Telecoms Market Review 2021-26. Volume 2, Paragraph 7.233.

exchange are unlikely to be substituted by a connection from a BT exchange at a different geographic location.

6.24 As result of this, our analysis focuses on competitive conditions at each exchange and the ability of providers other than BT to provide inter-exchange services from that BT exchange. We consider that competitive conditions can vary at each BT exchange, based on the number of rival networks which are present at each exchange.

6.25 We therefore propose to define each BT exchange as a distinct geographic market.

6.26 We also recognise that competitive conditions can vary on a route-by-route basis. However, it is unclear that a route-by-route analysis would necessarily provide better results than a methodology based on presence of rival networks at BT exchanges. For example, an exchange-based approach is more easily able to account for the possibility that buyers may see different routes between BT exchanges, or combinations of routes, as substitutes to meet their backhaul needs than a route-by-route analysis.[407] Further, it would be more onerous and impractical for both us and telecoms providers to assess competitive conditions for each and every current and potential inter-exchange connectivity route.[408]

Application of the three criteria test

6.27 In this subsection, we consider whether the three criteria set out in section 79(2B) of the Act are met in relation to the BT exchanges we are proposing to define as IEC markets.

6.28 As set out in Annex 5, in determining whether to identify a market for the purposes of making a market power determination, we must consider whether the three criteria set out in subsection 79(2B) of the Act are met. Where we do not consider that the three criteria are met, we may not identify a market for this purpose.

6.29 As discussed above, we assess the three criteria at a general level, taking into account overall characteristics and structure in the relevant product market. We consider competition at a sub-national level in our SMP assessment.

High and non-transitory barriers to entry

6.30 As set out below, the sunk costs of constructing an inter-exchange network of significant scale (e.g. long dig distances compared with access connections) act as barrier to entry and expansion in IEC markets. We recognise that in principle, a provider could use PIA to connect to a BT exchange and/or to build an IEC circuit, and this can reduce the time and cost of network build. However, for IEC connections, we expect PIA usage to be limited, given the large distances involved in providing IEC services (meaning they would be more likely to incur excess construction charges and be more difficult to repair). It is possible that PIA may in time have a greater impact in reducing the time and cost for providers near to BT exchanges to connect to those exchanges. However, this is uncertain, and in general, as set out below, PIA does not appear to have had a material impact on providers' future plans

[407] In addition, a route-by-route analysis based on existing routes may reduce buyers' and sellers' incentives to innovate in how they configure their networks. Using an exchange-by-exchange analysis is more likely to reduce this risk.

[408] This is consistent with our view when we have previously considered a route-by-route methodology, in the BCMR 2019, and again in WFTMR21. See Ofcom. March 2021. Promoting investment and competition in fibre networks – Wholesale Fixed Telecoms Market Review 2021-26, Volume 2, Paragraph 8.298.

for the IEC market. We also anticipate that providers may have reduced incentives to invest in further rollout to BT exchanges in the run-up to exchange closures.[409]

6.31 This is consistent with what we have seen in practice. As set out below, we have seen limited entry and exit by different providers, and limited expansion by existing providers, since 2021.[410] We expect this to continue over the review period, based on the evidence we have received from providers on their plans for the market. Most providers told us that they have no firm plans to roll out to additional exchanges during the review period.[411] [412] [✂] indicated plans to expand backhaul and/or core presence to additional BT exchanges, including 50-70 ([✂]) exchanges potentially using own infrastructure to connect to the exchanges ([✂]).[413] However, there were no plans from [✂] to expand wholesale and direct business.[414] [✂]. Where other providers ([✂]) indicated plans to roll out to specific additional exchanges during the review period, [✂], and so we do not consider that these plans will have a material impact of the IEC market during the review period.[415]

6.32 Therefore, high and non-transitory barriers to entry and expansion are likely to persist.

Markets which do not tend towards effective competition

6.33 We assess competitive conditions in IEC markets below. In summary, many BT exchanges have no competitors to BT, or only one competitor is present. We do not expect there to be significant build out to these exchanges during the review period.

6.34 Accordingly, we do not consider that IEC markets will tend towards effective competition at a national level. We take account of sub-national competition in our SMP assessment.

Insufficiency of competition law

6.35 IEC services at these BT exchanges are important to the state of competition in WLA and LLA markets. Our main concerns are:[416]

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[409] This was noted by [✂]. [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[410] Table A10.2 in Annex 10 sets out the number of exchanges where we find an increase in rival PCO presence since 2021. This is a very small proportion of the total number of BT exchanges.

[411] [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 request dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; and [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[412] One provider [✂], noted that while it had no specific plans to connect to additional BT exchanges at this stage, it is likely to pass and connect to more BT exchanges during the period to 2031. [✂]. See [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[413] See [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[414] See [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[415] See [✂] response dated [✂] to s135 notice dated [✂], questions [✂]; [✂] response dated [✂] to s135 notice dated [✂], question [✂]; [✂] response dated [✂] to s135 notice dated [✂], questions [✂]; and [✂] response dated [✂] to s135 notice dated [✂], question [✂].

[416] We set our competition concerns in relation to IEC services in more detail in Volume 2, Section 7.

a) the risk of excessive pricing of IEC services which could result in high prices for end-users; and
b) the risk that providers and altnets would be unable to backhaul traffic from their access networks to their core networks where they need inter-exchange connections.

6.36 We do not consider *ex post* competition law would be sufficient to address these concerns for the following reasons:

a) given that it is unlikely that competitors will build to many of these exchanges, we consider that some form of *ex ante* network access obligation is required to ensure effective competition;
b) there is a need for timely and efficient intervention to avoid adverse effects on those providing services in IEC, as well as WLA and LLA markets, and the end-users of those services;
c) if BT engaged in the behaviour mentioned in Paragraph 6.35 above, there is a risk of long-term, irreversible damage to competition in these markets;
d) *ex ante* regulation provides clarity and certainty to BT and other providers of leased lines; and
e) the response to anti-competitive behaviour may not be sufficient to prevent harm in certain circumstances.

6.37 For these reasons, we consider that competition law would not be sufficient by itself to address concerns in IEC markets at a national level and therefore *ex ante* regulation is necessary to maintain effective competition.

Provisional conclusion on IEC geographic market definition and the three criteria test

6.38 We provisionally conclude that that the three criteria test is met.

6.39 We propose to identify each BT exchange as a distinct market for the purposes of making a market power determination.[417]

Consultation questions

Question 2.14: Do you agree with our provisional conclusions on geographic market definition for the inter-exchange connectivity market? Please set out your reasons and supporting evidence.

Question 2.15: Do you agree with our provisional conclusion on the application of the three criteria test to the wholesale inter-exchange connectivity market? Please set out your reasons and supporting evidence for your response.

[417] For the avoidance of doubt, we propose to define each such BT exchange that is currently active at the date of publication of this document, including those which are scheduled to close during the review period.

SMP assessment

Summary of proposals

6.40 This section presents our significant market power (SMP) assessment for the markets we have provisionally identified. Specifically, we examine whether any provider has SMP in the provision of IEC in the markets identified.

6.41 We provisionally conclude that BT has SMP in wholesale IEC services at each BT Only and at each BT+1 exchange.[418]

6.42 We provisionally conclude that BT does not have SMP in wholesale IEC services at each new BT+2 exchange.

Background

6.43 In 2021, we found BT had SMP in IEC services at BT Only and BT+1 exchanges. We found that no provider had SMP at BT+2 exchanges. These were defined on the basis of the number of PCOs that were present at each exchange.

Approach and evidence considered

6.44 We consider that only a subset of telecoms providers are able to act as effective competitors in the market for wholesale IEC services. We call these providers 'Principal Core Operators' (PCOs). We explain the criteria and evidence used to determine which providers are PCOs below.

6.45 We propose to assess SMP based on presence by Principal Core Operators ('PCOs') at a BT exchange. We consider that this is the best available indicator of competitive conditions in IEC.[419]

Identification of PCOs

6.46 To be an effective constraint, we consider that a provider needs to:

a) own their own infrastructure;
b) have a substantial IEC coverage footprint; and,
c) currently offer wholesale IEC services to other telecoms providers.

6.47 In our judgment these criteria are appropriate as they are indicative of an ability to supply backhaul services in competition with BT.

[418] At 16 of these exchanges, BT has deployed both backhaul and core nodes. We consider the implications of this on the appropriateness of remedies (specifically, on whether the EOI obligation in the IEC market should apply to connections to these exchanges) in Volume 3, Section 4.

[419] We often use market shares in assessing SMP. However, we consider that market shares are a less valuable indicator of market power in the case of markets for IEC services. Once equipment is installed a PCO can quickly increase sales by adding additional customers at minimal incremental cost. Therefore, where present, a PCO provides a competitive constraint, even where it has a limited share of current sales. Conversely, this also means that a PCO with a high share of sales at any individual BT exchange would not necessarily be an indicator of BT not having SMP, especially given BT's other competitive advantages (in particular, its ubiquitous network). Further, there are a number of practical constraints which make the calculation of market shares challenging.

6.48 This means that we do not consider as PCOs providers which are not currently offering IEC services, irrespective of their network footprint. We also do not consider as PCOs providers whose network footprint is insufficient to be able to offer IEC services across a large number of exchanges. We understand that buyers of IEC services will prefer to buy from fewer backhaul providers to minimise the operational complexity associated with purchasing backhaul from multiple providers, and in addition, to potentially benefit from more attractive commercial terms associated with large volume purchases. Therefore, a substantial network footprint is required in order to act as an effective competitor in the market for wholesale IEC services.[420]

6.49 We have gathered evidence to assess which providers should be considered PCOs as part of this market review. We assess whether a provider meets the above criteria to be considered to be a PCO in the round.

6.50 In 2021, we identified eight PCOs – CenturyLink (now Lumen), CityFibre, Colt, eircom, SSE (now Neos Networks), VMO2, Vodafone and Zayo.

6.51 We first consider whether these providers should continue to be considered as a PCO. We provisionally conclude that Neos Networks (previously SSE), VMO2, Vodafone and Zayo continue to meet the criteria for a PCO. We note that Colt and Lumen (previously CenturyLink) have merged, and so no longer act as separate constraints.[421] We therefore consider them to be a single PCO for the purpose of our analysis. We provisionally conclude that this merged entity meets our criteria for a PCO. Separately, we understand that CityFibre and eircom are not currently offering wholesale IEC services to third parties.[422] We therefore provisionally conclude that CityFibre and eircom do not meet the criteria to be a PCO.

6.52 We secondly consider whether any additional providers now meet the criteria to be considered a PCO. Based on information collected from additional providers which are not currently PCOs and our assessment of the market, we provisionally conclude that no other providers meet our criteria for a PCO. In particular, we do not consider that there are any alternative providers of IEC services that have, or are likely to have, a large enough footprint in order to act as a material competitive constraint in the provision of IEC services during the review period.

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[420] We recognise the importance of resilient backhaul solutions for some purchasers in some situations. However, we do not consider that we need to explicitly take this into account in our approach as we consider that IEC links for resilience (or IEC links with an optional resilient path) from Openreach are available to downstream purchasers.

[421] Colt. 2 November 2023. Colt completes $1.8bn acquisition of Lumen EMEA - Colt Technology Services. Accessed 23 December 2024.

[422] eircom confirmed that [✂]. See Eircom (UK) Limited response dated 13 November 2024 to s135 notice dated 23 October 2024, question A6 and Eircom (UK) Limited response dated 20 November 2024 to s135 notice dated 23 October 2024, question A5 and Annex 3. CityFibre does not currently provide connections between BT exchanges to third parties [✂]. See CityFibre Infrastructure Holdings Limited response dated 19 February 2025 to s135 notice dated 10 February 2025, question 4a. Instead, CityFibre is offering dark fibre connections between a BT exchange in one area, and a CityFibre fibre exchange in a separate geographic area, to allow its wholesale customers to backhaul access traffic from the CityFibre access network to the initial BT exchange where the wholesale customer has a point-of-presence. However, we consider this is a different type of trunk connection, not an inter-exchange service. See CityFibre Infrastructure Holdings Limited response dated 19 February 2025 to s135 notice dated 10 February 2025, question 4b.

6.53 We therefore provisionally conclude that the following are classed as PCOs: Colt/Lumen, Neos Networks (formerly SSE), VMO2, Vodafone and Zayo.

Presence at BT exchanges is the key constraint, not nearby networks

6.54 We consider that to compete effectively with BT in the provision of IEC, a PCO needs to be present in the exchange.

6.55 BT has a number of competitive advantages over other telecoms providers, notably that it is present at all BT exchanges (and so can provide IEC quickly) and has a ubiquitous network (so can provide IEC at low incremental cost). Providers already present at the exchange have significant time and cost advantages in the provision of IEC from that exchange compared to a nearby network that would have to dig to install new duct to the exchange.

6.56 As discussed above, we recognise that PIA can reduce the cost and time of network build, and it is possible that this could have a greater impact in reducing the time and cost for providers near to BT exchanges to connect to those exchanges. However, this is uncertain, and in general PIA does not appear to have had a material impact on providers' future plans for the IEC market.

6.57 As also set out above, our evidence suggests there is unlikely to be material rollout by providers to additional exchanges during the review period, and we anticipate that providers may have reduced incentives to invest in further rollout to BT exchanges in the run-up to exchange closures.

6.58 We therefore consider that, in order to effectively compete with BT, other providers need to be already connected to BT exchanges. We do not consider that the potential for nearby networks to connect to a BT exchange could exert an effective constraint during the review period, even taking into account the impact of PIA.

6.59 We determine whether each PCO is present at each BT exchange based on whether that PCO is connected at that exchange via an External Cablelink.[423] See Annex 10 for more detail.

Provisional findings

6.60 In this section, we set out our assessment of whether BT has SMP in any of the geographic markets we have provisionally identified. As set out above, we consider that each BT exchange is its own geographic market.

6.61 The main indicator of competitive presence at each BT exchange is the number of PCOs which are present at that exchange. We also consider that, where present, all PCOs are able to offer an effective competitive constraint, such that the competitive conditions do not vary materially depending on the identity of the PCO present. We therefore consider that the competitive conditions may differ at each exchange based on whether there are no PCOs present, one PCO present, or two or more PCOs present.

6.62 Therefore, for practicality and brevity, we present our SMP assessment for the following groups of exchanges, based on the number of PCOs present at that exchange:

a) BT Only exchanges;
b) BT+1 exchanges; and

[423] This may include legacy variants BT Cablelink-External and LLU Egress-External. The External Cablelink may be purchased by either the PCO or the customer to whom it is supplying IEC services.

c) BT+2 exchanges.[424]

6.63 We have found 4,216 BT Only exchanges, and 731 BT+1 exchanges. We have also found 77 new BT+2 exchanges.[425] Table 6.1 summarises this. A full list of the proposed exchange classifications for the IEC services market can be found in Schedule 4.

Table 6.2: Provisional SMP findings in IEC services markets

	SMP proposal	Number of exchanges
BT Only	SMP	4,216
BT+1	SMP	731
BT+2	No SMP	77

Source: Ofcom analysis of provider data.

6.64 As set out above, we do not consider that the potential for nearby networks to connect to a BT exchange could exert an effective constraint during the review period, even taking into account the impact of PIA. However, for completeness, we have repeated our analysis of PCO network proximity from WFTMR21 on the average and median distance to the nearest PCO networks. We present these results in Annex 9, finding similar results to those found in the WFTMR21.

BT has SMP at BT Only exchanges

6.65 BT is the only provider present at each of the 4,216 BT Only exchanges. This means there is no other choice of provider at these exchanges.

6.66 As set out above, we do not expect there to be significant additional rollout during the review period, and we do not consider that the potential for nearby networks to connect to a BT exchange could exert an effective constraint during the review period, even taking into account the impact of PIA.

6.67 We therefore provisionally conclude that BT has SMP for IEC services at BT Only exchanges.

BT has SMP at BT+1 exchanges

6.68 At each of 731 BT+1 exchanges, a PCO is present. This indicates there is a greater constraint on BT than on routes from BT Only exchanges. However, we do not consider that one competing PCO at an exchange is enough for effective competition in these markets for the following reasons:

a) Providers are still likely to be reliant on BT to some extent for services at BT+1 exchanges.
b) In a market in which one of the two suppliers publishes its prices, the other provider has the ability and incentive to either just match or slightly undercut its prices. This would lead to weak competitive pressure.

[424] As noted above, our SMP assessment is limited to the new BT+2 exchanges (i.e. not those previously found to be effectively competitive).

[425] Among the 77 new BT+2 exchanges, 75 exchanges were BT Only or BT+1 exchanges in the WFMTR21, and 2 exchanges are exchanges that, for reasons set out in Annex 10, are now listed in Schedule 4 but were not listed separately in the list of exchanges in the WFTMR21. See Annex 10.

6.69 As set out above, we do not expect there to be significant additional rollout during the review period, and we do not consider that the potential for nearby networks to connect to a BT exchange could exert an effective constraint during the review period, even taking into account the impact of PIA.

6.70 We therefore provisionally conclude that BT has SMP for IEC services at BT+1 exchanges.

BT does not have SMP at BT+2 exchanges

6.71 At these 77 exchanges, there are at least two PCOs present. In these exchanges, we provisionally consider that BT does not have SMP, because:

a) BT's competitive advantages are likely to be less material where there are two or more PCOs present. Customers have a greater choice of supplier who can meet their specific needs in a timely and cost-effective way.
b) The incentive to just match (or slightly undercut) prices due to one supplier publishing its prices is significantly weaker when there is a third competitor. This is because the winning bid does not only need to slightly undercut the BT price, but also must offer a better bid than the additional competitor.[426]
c) We have previously found evidence of purchasers of IEC services multi-sourcing at these exchanges.[427]

6.72 We therefore provisionally conclude that BT does not have SMP for IEC services at BT +2 exchanges.

Consultation questions

Question 2.16: Do you agree with our provisional conclusions that BT has SMP at BT Only exchanges and BT+1 exchanges, but not at BT+2 exchanges for the wholesale IEC market? Please set out your reasons and supporting evidence.

[426] The 'lumpy' nature of demand and the many instances where telecoms providers sign long-term contracts for IEC services may also make co-ordination more difficult and less viable with three providers.
[427] See Ofcom. March 2021. Promoting investment and competition in fibre networks – Wholesale Fixed Telecoms Market Review 2021-26, Volume 2, Paragraph 8.316.

7. Competition concerns

7.1 This section sets out the competition concerns arising from our proposed findings that BT has SMP in each of the relevant markets.

7.2 Absent regulation, BT's SMP would give it the ability and incentive to engage in forms of conduct in each of the relevant markets that could distort competition and/or harm consumers. This includes the ability for BT to design its network, and make strategic investment decisions, which in the absence of regulatory measures designed to address its SMP, could lead to poor outcomes for consumers.

7.3 Conduct that could distort competition and/or harm consumers fall broadly into two categories:

- **Exclusionary behaviour** by BT to prevent potential competitors from competing in the relevant market(s) or prevent them from gaining market share.
- **Exploitative behaviour** by BT at the expense of its wholesale access customers in the relevant market(s), ultimately harming end-users who purchase services from BT's wholesale access customers in the downstream markets.

7.4 Although our concerns vary according to whether the behaviour is exclusionary or exploitative, both ultimately lead to poorer outcomes for end-users.

7.5 In terms of **exclusionary behaviour**, our concerns include that BT may undermine competition from:

- competing networks in the relevant wholesale access markets, including by preventing them from gaining market share, thereby protecting BT's market position.
- telecoms providers reliant on access to BT's network to provide products and services in competition with BT in the relevant downstream markets.

7.6 Such **exclusionary behaviour** could take a number of forms, including that BT could:

- refuse to supply access and thus restrict competition in the provision of products and services in the relevant downstream markets.
- engage in price squeeze behaviour, whether between wholesale products at different levels of the value chain and/or between wholesale and retail services.
- provide access to its services on less favourable terms than to its own business divisions (Openreach or divisions downstream of Openreach), to the detriment of its competitors in the relevant wholesale and retail markets, by both price and non-price discrimination.
- (in some markets) target price reductions or adopt other commercial terms in relation to access to its network in order to undermine the development of material and sustainable network competition.

7.7 **Exploitative behaviour** we are concerned about includes that:

- BT could set excessively high prices.
- BT may not have sufficient incentives to continuously deliver an adequate level of service quality in relation to network access.

Physical infrastructure market

7.8 Physical infrastructure is a key enabler of the provision of telecoms services, both in terms of the deployment of new telecoms networks as well as innovation in existing networks. This is because the civil engineering works associated with the deployment of physical infrastructure represent a sizeable proportion of the cost and time to deploy and are therefore a barrier to new network rollout on a large scale.

7.9 In practice, as discussed in Section 2, regulated access to Openreach's physical infrastructure through Physical Infrastructure Access (PIA) has supported significant FTTP deployment by altnets in the 2021-26 review period. Continued access to Openreach's physical infrastructure is an important enabler of this new competition. We also anticipate that access to Openreach's physical infrastructure will be an important enabler of further rollout of competing networks.

7.10 As a vertically-integrated network operator, BT's access to its ubiquitous physical infrastructure provides it with a significant commercial advantage in the provision of downstream telecoms services in the UK. This includes the lowest cost delivery path for new network installation and network upgrade, and of doing so more rapidly than competitors (as the ubiquity of its network significantly reduces the need for the construction of new physical infrastructure). This means that in the absence of regulation, BT could sustain and, in some cases, reinforce, its SMP in downstream services.

7.11 In the absence of regulation, BT could engage in the general exclusionary or exploitative behaviours set out above. In particular:

- BT's refusal or restriction to supply access to its physical infrastructure would deter investment in competing networks and/or limit competition from existing altnets, restricting competition in the provision of products and services in downstream markets. For existing PIA users, absent the remedy, BT could restrict providers' ongoing access to BT's physical infrastructure. As a result, BT's SMP in downstream services could be reinforced, leading to poorer outcomes for consumers over time.
- BT's provision of access on less favourable terms compared to those obtained by its own downstream businesses, or setting excessive wholesale charges for access to its physical infrastructure, or engaging in price squeeze behaviour, could have the same impact of deterring investment and limiting competition. In addition, BT could use less favourable terms to gain cost and speed advantages over altnets who are reliant on access to BT's physical infrastructure to rollout their networks. These behaviours may eventually drive out competitors from the market.

7.12 We consider in Volume 3, Section 5, and Volume 4, Section 4, how to address our competition concerns for the physical infrastructure market.

Wholesale local access and leased line access markets

7.13 While network competition develops, or in areas where it is unlikely to emerge, Openreach will remain a key provider of wholesale access services. Openreach's wholesale access services will continue to be essential to maintain retail competition, by enabling retail providers to offer services to end-users in the downstream markets.

7.14 In the absence of regulation, our general concerns about exclusionary and exploitative behaviours as set out above would apply across the WLA and LLA markets. For example,

Openreach could refuse to supply its wholesale access services to providers in the downstream markets and/or offer those on unfavourable terms, including high prices, which would harm end-users throughout the UK.

7.15 Exclusionary behaviours in these markets could also undermine the development of material and sustainable network competition:

- Openreach could geographically target price reductions or retail inducements – which involves charging different prices or providing different inducements for the same wholesale access – in order to undermine altnets' ability to become established competitors to Openreach.
- Openreach could use commercial terms to disincentivise telecoms providers from buying wholesale services from rival networks, for example through terms which induce loyalty (such as volume-based discounts), or could seek to encourage ISPs to significantly accelerate the migration of their existing customer bases on legacy broadband services to Openreach's FTTP network, before ISPs are able to migrate their bases to an altnet instead.
- Openreach could set wholesale FTTP charges at a level which leaves insufficient margin for a reasonably efficient operator (which uses PIA) to compete.

7.16 We recognise that there are variations in competitive conditions between the geographic markets for WLA and for LLA, which may affect the risks of these concerns. For example, in the LLA HNR Area, there is a greater degree of network competition compared to LLA Area 2 and Area 3, and so we consider the risks from exploitative behaviours (such as excessive pricing) are low given that competing leased line networks are already present. Conversely, in areas where network competition is still developing, the risks of exploitative behaviour (alongside exclusionary behaviours) are more material. We reflect variations in competition concerns where relevant in our assessment of potential remedies.

7.17 We consider in Volume 3, Sections 6, 7 and 9, and Volume 4, Sections 1 and 2, how to address our competition concerns in the wholesale leased line access markets.

Inter-exchange connectivity market

7.18 Inter-exchange connectivity backhaul services are an essential part of a supply chain needed to deliver telecoms services. They are a necessary input to allow providers (including altnets) to carry traffic, delivered over the access networks they use, to their core network.

7.19 As with other markets, in the absence of regulation, our general concerns about exclusionary and exploitative behaviours set out above are applicable. In particular, if BT has SMP in certain links between BT exchanges, and these were to remain unregulated, this could undermine our access remedies by leaving providers and altnets unable to backhaul traffic from their access to their core networks where they need inter-exchange connections. BT has the ability and incentive to engage in exclusionary or exploitative behaviours which could undermine our remedies in the PIA and downstream markets by preventing the carrying of aggregated traffic from one exchange to another.

7.20 We consider in Volume 3, Section 8, and Volume 4, Section 3, how to address our competition concerns in the inter-exchange connectivity market.