
Promoting investment and competition in fibre networks

Approach to geographic markets

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CONSULTATION:

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About this document

Our strategy is to promote investment and competition in fibre networks. However, it is recognised that investment and competition will vary by geography. We therefore believe that regulation should also vary by geography.

This consultation document sets out our initial views on how to define geographic markets from 2021, when we carry out our next review of wholesale telecoms networks. It builds on our strategic policy position, published in July 2018.

We plan to consult on a full set of market proposals, including market definition, market power assessment and remedies for wholesale networks, by autumn 2019.

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1. Executive summary

Regulatory certainty to support long-term fibre investment

- 1.1 Ofcom’s strategy is to promote investment and competition, complemented by timely public interventions where there is no commercial case to build networks. This will be facilitated by investment in competing networks that use more fibre technology which will be critical to delivering better broadband for people and businesses: enabling better services through full-fibre networks, dedicated business connections, and providing connections to current 4G, and new 5G, mobile base stations.
- 1.2 We want to enable more fibre investment by alternative network operators and Openreach alike and to ensure that investment is not limited to meeting demand from one set of customers or another.
- 1.3 In July 2018, we set out a roadmap of actions to support competitive investment in fibre networks.¹ It had the following key elements:
- Looking at business and residential markets more holistically.
 - Introducing unrestricted duct and pole access.
 - Different regulatory approaches in different parts of the country – depending on the level of competition.
 - Longer-term certainty, with competition assessments rising from every three years currently, to at least five.
 - Incentivising Openreach to invest by providing the opportunity of higher returns on risky investments.
 - A smooth transition from older copper networks to fibre technology.
- 1.4 By 2021, we intend to implement a consolidated review of residential and business telecoms markets and physical infrastructure. Before then, we are taking certain steps to both facilitate our new consolidated review and to implement certain key elements of our strategy more quickly:
- **Physical Infrastructure Market Review (PIMR):** On 2 November 2018 we set out proposals to give unrestricted access to Openreach’s network of underground ‘ducts’ and telegraph poles, so companies have greater flexibility to lay fibre networks that serve residential or business customers (the ‘2018 PIMR Consultation’).² At present, duct and pole access is restricted to networks focusing primarily on the residential market. We intend to implement unrestricted duct and pole access from spring 2019.

¹ Ofcom, 2018. *Regulatory certainty to support investment in full-fibre broadband – Ofcom’s approach to future regulation*, https://www.ofcom.org.uk/data/assets/pdf_file/0025/116539/investment-full-fibre-broadband.pdf. The ‘July 2018 Strategic Policy Position’.

² Ofcom, 2018. *Physical Infrastructure Market Review – Access to ducts and poles to support investment*. https://www.ofcom.org.uk/data/assets/pdf_file/0014/125420/PIMR-consultation.pdf.

- **Business Connectivity Market Review (BCMR):** On 2 November 2018 we also published our consultation on the BCMR (the '2018 BCMR Consultation').³ Given the regulation in business markets will expire in March 2019, we need to refresh it before we carry out a single market review for business and residential markets holistically in 2021. This is a short review as we transition to our longer-term model for regulation, but we have included elements to ensure consistency with our longer-term direction.

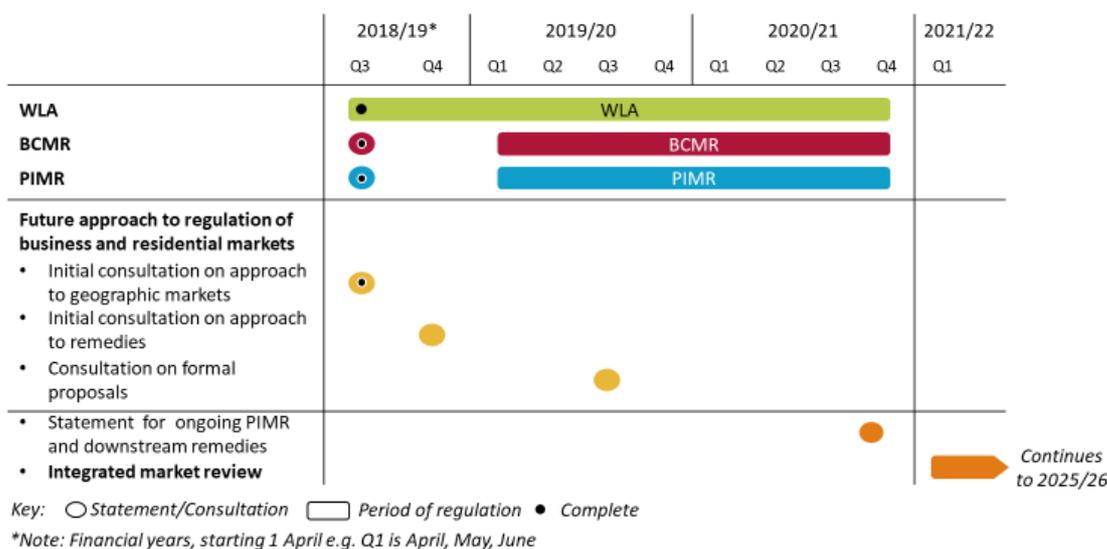
1.5 We will be setting out the different elements of our holistic approach to regulation of business and residential markets, which will take effect from spring 2021, as follows:

- **Initial consultation on geographic markets:** In this document, we set out our initial proposals for how downstream competition assessments and regulation may vary by geography. As set out in our July 2018 Strategic Policy Position, in the markets for wholesale network services, we anticipate proposing that in areas:
 - that are effectively competitive, based on networks already built, Openreach will no longer be required to provide wholesale access to its services;
 - where non-Openreach networks are being built, or are likely to be built, we impose remedies to incentivise investment while ensuring consumers remain protected until this network competition becomes effective; and
 - where non-Openreach networks are unlikely to be built, we protect consumers while supporting investment by Openreach.
- **Initial consultation on approach to remedies:** by spring 2019, we intend to set out in more detail the approach to remedies that we think will best achieve the objectives of our holistic approach.
- **Consultation on formal proposals:** by autumn 2019 we will draw together these threads and consult on our proposed market analysis and full package of remedies, which will replace all existing regulation in PIMR, Wholesale Local Access (WLA)⁴ and BCMR markets from spring 2021.

³ Ofcom, 2018. *Consultation: business connectivity market review*. <https://www.ofcom.org.uk/consultations-and-statements/category-1/business-connectivity-market-review>.

⁴ Ofcom, 2018. *Wholesale local access market review*. <https://www.ofcom.org.uk/consultations-and-statements/category-1/wholesale-local-access-market-review>.

Table 1.1: Expected timing of market regulation



Approach to geographic markets

Our holistic and forward-looking assessment of competition

- 1.6 In this document, we set out our initial thinking on how we will conduct our market assessment of networks from 2021, downstream from the physical infrastructure level.
- 1.7 To date, we have conducted separate regulatory assessments of residential (local access) and business (leased lines) services. However, we expect that the coming years will see major investment in fibre-rich networks that can serve both residential and business markets. In response to this, we propose to assess competition from a network viewpoint, rather than focusing on specific downstream services.
- 1.8 New networks will take time to deploy. This requires a longer-term and more expansive view of the downstream activities affected.
- 1.9 So, we intend to differentiate between geographic areas of the UK based on the availability of networks supporting residential and business services over the period of the review. Where we find significant market power (SMP), we would evaluate what regulation is needed to protect consumers, while considering any implications for network competition across all services in such geographic areas.

Our proposed approach to different geographic areas

- 1.10 We are proposing to categorise areas of the country according to the competitive conditions that exist in those areas. We have identified three categories:
 - **Competitive areas:** where competition is effective and where we would not regulate;

- **Potentially competitive areas:** where there is currently insufficient competition, but further network rollout is possible or underway; and
- **Non-competitive areas:** where there are no material alternative networks to Openreach and significant rollout is unlikely.

1.11 We propose to define those categories as follows:

- **Competitive areas:** where there are at least two existing networks in addition to Openreach supplying ultrafast broadband and leased lines services, we would carry out further analysis, including looking at market share data, to determine whether these alternative networks make those areas effectively competitive. Where this is the case, we would not regulate.
- **Potentially competitive areas:** in areas we have not identified as effectively competitive, we will assess whether there is a prospect for competitive entry. We would consider such a prospect exists if (i) at least one alternative network is already present, (ii) an alternative network provider has announced plans to build in the area, or (iii) we consider there is potential for entry, in particular based on urban density. In potentially competitive areas, our focus will be on promoting competitive entry through the remedies we impose.
- **Non-competitive areas:** where there are no alternative networks and where future network deployment at scale is unlikely, our objectives are to encourage investment by Openreach in new ultrafast networks and to allow access to its networks to promote retail competition and protect consumers from high prices.

Assessing network presence

1.12 In order to assign geographic areas to the three categories explained above, we need to assess the presence of existing, planned and potential future networks. We expect to use the following approach to map these deployments:

- **Existing networks:** we anticipate using data provided by network operators as part of Ofcom's Connected Nations programme to map where existing networks are. We have also considered using data about existing networks that provide only leased lines. Generally, we do not expect to include these in assessing network presence given they do not supply residential services.
- **Planned deployments:** we propose to gather network plans from a number of operators.
- **Potential future rollout:** based on discussions with network operators on key drivers of their investment decisions, we have determined a number of criteria we propose to use to select "clusters" of areas of the UK where network rollout may be economically viable.

1.13 Existing and future network rollout is likely to be targeted at urban areas, but each rollout may cover only part of a particular urban area. In order to be able to identify the number of existing and potential future deployments in any particular area, we have considered what geographic unit we should use to assess network presence. Postcode sectors or the

footprint of Openreach's exchanges would both provide a reasonable balance between practicality and being sufficiently granular to allow us to assess competition. For the purposes of analysis in this document we have used postcode sectors as the relevant geographic unit.

- 1.14 Network rollouts are likely to extend beyond the footprint of postcode sectors (or exchange areas) so that broadly similar conditions of competition exist in a group of sectors. This may mean grouping postcode sectors together to carry out our assessment could be appropriate. However, in this document we have not grouped postcode sectors together. We analyse each postcode sector individually by looking at the presence of existing and planned networks, and whether it covers an area of potential future rollout.
- 1.15 In mapping existing, planned and potential future network rollout to postcode sectors, we have considered how many of the premises within a postcode sector need to be covered by a network before we count that network as being present in that postcode sector. For the purposes of illustrating our proposed approach we have assumed a threshold of 65% as follows:
- **Existing networks:** 65% of premises in a postcode sector would need to be covered by an existing network before considering that the network is already present;
 - **Planned deployments:** Similarly, 65% of premises in a postcode sector would need to be covered by a planned network rollout before considering that the network will be present; and
 - **Potential future rollout:** For potential rollout, where we have determined clusters of premises where future rollout could occur, we have again used a 65% threshold so that 65% of the premises within a postcode sector must be within the identified cluster(s) for us to consider future rollout could occur within the postcode sector.

Illustrative results

- 1.16 We have implemented the proposed approach outlined above, using currently available data.
- 1.17 On the basis of this illustrative analysis:
- we would expect to find that there are currently no areas where there are two competing network operators providers in addition to Openreach for all services.⁵
 - just over two-thirds of UK premises would be in potentially competitive areas. Based on our current analysis and the approach illustrated in this consultation, this is driven by:
 - existing networks in addition to Openreach covering around 46% of UK premises;

⁵ Where conditions of competition vary between specific services, we would expect to resolve this at the remedies stage. For example, we recognise that, for leased lines, there is effective competition in the Central London Area (CLA). Our proposed approach is that we would address this when considering remedies, by not applying regulation for the provision of leased lines within the CLA.

- current plans obtained from network operators would take coverage up to 58%;
and
- our initial view of where further rollout could be viable would extend this to 69% of UK premises
- the remaining c.30% of UK premises would be in areas where we currently expect that any scale commercial rollout by operators other than Openreach is unlikely.

Next steps

- 1.18 We seek stakeholders' views on our initial proposals in this consultation, which will inform the next step of our analysis as we refine our approach. In this consultation, we are particularly interested in stakeholders' views on our approach and methodology.
- 1.19 We are not consulting on remedies in this consultation but will publish an initial consultation on remedies in spring 2019.

2. General approach to regulation and geographic differentiation

Introduction

- 2.1 In this document we set out our initial views on how we will carry out our market analysis in order to set regulation that promotes investment and competition in ultrafast networks. It focuses in particular on how we propose to consider geographic variation across the UK in the potential for investment and competition.⁶
- 2.2 In this section, we set out our general approach to considering the need for regulation and the reasons that mean we need to consider geographic differentiation.
- 2.3 In Section 3 we set out how we propose to assess network presence in different geographic areas of the UK. In Section 4, we provide an illustrative assessment using this proposed approach. Details of how to respond to this consultation are set out in the Annexes.

Our approach to regulation in wholesale telecoms services

Our approach to *ex ante* regulation

- 2.4 The regulatory framework under which we conduct market reviews allows us to impose obligations on telecoms providers who hold a position of SMP. We impose such obligations to improve competitive outcomes in the market(s), with the aim of ultimately furthering the interests of citizens and consumers. The nature of the regulation is *ex ante* with one of the key objectives of our regulation being to promote competition, rather than relying on *ex post* competition law to address concerns arising from identified conduct.
- 2.5 Historically, our approach to markets and imposing regulatory obligations has tended to be service specific. For example, we considered local access and leased lines markets in separate reviews and required BT, through Openreach, to provide wholesale products that were unique to each of these markets.⁷ This reflected our expectation that BT would continue to face limited network competition in markets where it had SMP over the future period covered by our reviews. Based on this expectation, we focused on intervening in wholesale products with the intention of promoting competition in downstream (retail) markets.

⁶ We do not specifically consider the Hull area where KCOM is the incumbent network operator. We intend to set out our proposals for the future regulation of the Hull area by autumn 2019.

⁷ Openreach is the line of business of BT which comprises BT's access and backhaul network assets and the products and services provided using those assets and which Openreach Limited, a wholly owned subsidiary of BT plc, has responsibility for operating and managing on behalf of BT.

- 2.6 However, over the next five to ten years we believe that there will be significant investment in new, fibre rich networks that can support more services, higher speeds and greater reliability than existing copper-based networks. These networks, whilst being largely fibre networks, may provide the final connection to the customer using a variety of technologies, including fibre, cable, certain copper technologies (such as G.Fast⁸) and, potentially, fixed wireless access (FWA).⁹ A single network infrastructure may use a mix of technologies to connect customers.¹⁰ In this consultation, we generally refer to these networks as ‘ultrafast networks’.
- 2.7 Our strategy is to promote investment in and competition between these ultrafast networks. Accordingly, we need to structure the regulatory obligations we will impose under the *ex ante* framework in such a way as to support this strategy. Compared with our historical approach, this will require us to think about the markets that we regulate differently, as explained below.

Our approach to considering networks in this review

- 2.8 Given the greater potential for investment, in our market assessment we expect to place more emphasis on the competitive impact of future network build. This is because the *ex ante* regulations that we are proposing to introduce are intended to support rollout of new ultrafast networks that will fundamentally change the structure of the market. This is a change to our historical approach, which recognised the prohibitively high barriers to network build that have previously existed and so aimed to promote greater competition within the existing market structure rather than promoting entry.
- 2.9 We need to conduct this review in light of the regulation we propose in upstream physical infrastructure markets. Given our preliminary SMP findings for that market, our 2018 PIMR Consultation proposes a package of regulation designed to support new network investment, including unrestricted access to Openreach’s network of ducts and poles.
- 2.10 We also need to think about markets from a network point of view, rather than focusing on specific services. This is because these new ultrafast networks will be capable of providing services in each of the markets we currently review and may also lead to new services being developed. In this context it is no longer appropriate to focus on individual downstream wholesale services in isolation. For example, measures taken in respect of WLA services will have implications for incentives to build new networks, which will in turn

⁸ The name given to a technology which can provide the potential for ultrafast performance over the final copper connection to the premises from a nearby fibre-connected node such as a street cabinet.

⁹ FWA describes a network deployment which uses wireless technology for the final connection to the premises from a nearby mast to potentially provide ultrafast broadband and other services.

¹⁰ In considering networks, we will need to consider the services provided over that network. We have included full-fibre networks and Virgin Media’s network, which uses a mix of cable and fibre to connect end customers. We have not included FWA networks in our analysis in this consultation but will need to consider whether FWA deployments can be used to support the services we are considering in due course. Providers offering FWA services may do so based on purchasing fibre connectivity to their masts from a third-party fibre network operator. We will need to be careful not to double count networks, and to correctly account for FWA in our assessment of the extent of competition.

affect competition for leased lines, and vice-versa. We consider these developments call for a holistic approach.

- 2.11 In carrying out this review, we propose to focus on networks (rather than the individual services supported on these networks) and take into account not only existing networks but also future rollout. However, we will not ignore any significant differences in the level of competition for particular services but will take those into account in how we set our remedies.

Geographic aspect of our analysis

Areas of differing prospects for competition

- 2.12 Whilst the case for network investment and competition is stronger now, investment will be more attractive in some areas than others. In areas where there is the potential for alternative providers to build new ultrafast networks, we want to ensure our regulation supports and encourages their rollout (as well as supporting network investment by Openreach) in order to support increased competition in the future.
- 2.13 In areas where rollout is unlikely to occur, customers will not benefit from the competitive effects of multiple networks. Here, our focus will be on consumer protection and encouraging ultrafast network build by Openreach.
- 2.14 Therefore, in considering how to set regulation to support investment in competing networks whilst protecting consumers that do not benefit from this investment, we need to differentiate between areas with different prospects for competition to evolve over time.
- 2.15 We consider there should be three main categories of geographic area for the purposes of targeting our *ex ante* regulation:
- **Competitive areas:** that are effectively competitive where we would not impose regulation;
 - **Potentially competitive areas:** where non-Openreach ultrafast networks are being built, or where there are reasonable prospects of them being built and therefore *ex ante* regulation needs to reflect this potential for competitive investment; and
 - **Non-competitive areas:** where we think non-Openreach ultrafast networks will not be built to any material extent and therefore *ex ante* regulation should focus on Openreach's investment.
- 2.16 In identifying these main categories of area, we need to determine how we assign different parts of the country to the different areas. We explain below how we propose to take into account existing network deployments, operators' rollout plans, and our own assessment of where network rollout may be economic to make this assessment.

Categorising geographic areas according to network presence

- 2.17 We expect to propose to group areas into the three categories as follows:

- **Category 1 (Competitive areas)** In areas where at least two existing networks are present in addition to BT, supplying ultrafast broadband and leased lines services, we would carry out further analysis, for example by looking at market share data, to determine whether these alternative networks provide sufficient competition to ensure that Openreach does not have SMP. Where this is the case, no regulation of Openreach would be imposed.
- **Category 2 (Potentially competitive areas)** includes areas:
 - with one or more existing alternative ultrafast networks already present that are not included in Category 1;
 - where one or more operator has plans to deploy; and
 - where we consider future rollout could be economic.
- **Category 3 (Non-competitive areas)** includes areas with no existing alternative ultrafast networks, no operator plans and where we do not consider build is likely to be economic.

Category 1 Competitive areas

- 2.18 To identify areas that are effectively competitive, we propose to start with the number of networks already present in addition to Openreach. We expect that two alternative ultrafast networks already present would be the minimum requirement to find effective competition.
- 2.19 Our initial view is that areas where there is one existing network in addition to Openreach and where another alternative ultrafast network deployment is planned (or where two alternative networks are planned) should not be grouped with those where Openreach and two other ultrafast networks are already present. This is because network deployment by alternative telecoms providers is, in general, in its early stages,¹¹ and even where a telecoms provider has a committed plan to deploy a network, there is likely to be some uncertainty, e.g. in terms of the timescale of deployment; the final extent of rollout; and the take-up of services. In areas where we have seen a second rival ultrafast network actually deployed, we will have evidence (market share data, etc.) that will allow us to assess whether rival networks are a competitive constraint on Openreach's network. Therefore, we propose at this stage to identify competitive areas only based on where two alternative ultrafast networks have already been deployed.
- 2.20 Even where two alternative networks are deployed, the result may not be one of effective competition. Where two networks in addition to Openreach are present, we would also need to look at other metrics (such as market share and potential for future competition) to ensure there is sufficient competition and, if so, would categorise the area as effectively competitive.

¹¹ Except when considering Virgin Media's cable network.

Category 2 Potentially competitive areas

- 2.21 We propose to identify areas as potentially competitive if they are not already effectively competitive but:
- An alternative ultrafast network or networks is/are present; and/or
 - Alternative providers have sufficiently specific plans to build in the area; and/or
 - We consider there is a possibility of network build.
- 2.22 We recognise that not all areas in this category may ultimately see sufficient network rollout to be considered effectively competitive.
- 2.23 Category 2 is broad and could include a range of scenarios, from areas with two alternative ultrafast networks already present (but not yet providing effective competition) to areas with no current or planned alternative networks. However, we do not consider it appropriate to identify narrower subcategories. In principle we could distinguish between existing, planned and potential build, and between areas where we expect one two or more alternative networks to be present. However:
- a) we are not in a position to assess the likelihood of network build plans being carried out in part or in full, or the extent to which existing or planned networks will ultimately provide effective competition to Openreach; and
 - b) we do not believe that we can accurately predict the number of networks that will emerge in a given area. In any case we wish to promote alternative ultrafast network build whether this results in BT plus one alternative network or BT plus two (or more) alternative networks in an area. Either outcome would lead to significant improvements in network-level competition and in consumer choice, and so we would expect to have the same approach to remedies in all areas where there are reasonable prospects of such investment occurring.
- 2.24 Therefore, we plan to treat all areas in Category 2 together at this time.

Category 3 Non-competitive areas

- 2.25 We propose that Category 3 will comprise geographic areas that do not meet our assessment of being considered viable for rollout. This will typically be rural areas, villages and smaller towns and will be areas where there is currently no existing alternative network and there are limited prospects of significant network rollout (other than by Openreach).¹²
- 2.26 In the case of some geographic areas it will be clear there are limited prospects of alternative ultrafast network investment in the future. In other areas it will be less clear cut. In line with our strategic aim of promoting investment in network rollout, we want to set a threshold (or thresholds) that err on the side of assuming that there are reasonable

¹² The rollout we have seen, and may see in future, in rural areas tends to be either public funded (for example under Broadband UK (BDUK)) or schemes supported by the local community either in terms of carrying out some of the network build activities and/or via funding arrangements.

prospects of network rollout so that marginal cases are more likely to be considered in Category 2 above.

Approach to categorising areas

- 2.27 To carry out our analysis we need an approach to capture the different footprints of existing networks, planned networks and areas where rollout may be possible in future. We propose to do this by identifying an appropriate:
- geographic unit at which to assess network presence; and
 - threshold which we use to consider whether a network covers sufficient premises within the geographic unit to be considered as present in that unit (for the purposes of determining if the geographic unit is in Category 1, 2 or 3).
- 2.28 The geographic unit needs to be sufficiently granular so that competitive conditions, based on the number of networks present, is similar across the area. If there are too many geographic units, the analysis will become more complex and less practical. We explain in Section 3 why we think postcode sector or the Openreach exchange footprint would be appropriate for this analysis.
- 2.29 We expect existing networks, planned rollout and areas where rollout could be possible will typically cover much wider geographic areas than an individual postcode sector or exchange area. As such, adjacent geographic units could be likely to have similar competitive conditions. At this stage we do not propose to group postcode sectors or exchange areas to form larger geographic units. However, given the nature of network rollout across wider geographic areas, we expect our approach is likely to allocate groups of adjacent postcode sectors/exchange areas into the same category.
- 2.30 In relation to the threshold for counting whether a network is present within the geographic unit, there are several factors to take into account:
- The threshold should be set at a high enough level to ensure the network provides a material coverage within the area, but is unlikely to need to cover the whole area;
 - In the case of deciding whether networks are present, using a lower threshold would count more networks as present:
 - When assessing whether a particular area is effectively competitive, a lower threshold would count more existing networks as present. However, where this identified more areas with two networks in addition to Openreach, it would not necessarily mean more areas would be found to be effectively competitive as we would still carry out a further assessment. Where a network had a lower coverage, this would tend to be reflected in its market share.
 - When assessing whether a particular area should be considered potentially competitive or non-competitive, a lower threshold would include more areas that are partly covered by existing networks, planned rollouts and our assessment of areas where future rollout may be viable.
- 2.31 In Section 3 we explain our approach to selecting this threshold.

- 2.32 We also explain our approach to mapping existing networks, planned rollout, and areas where we think networks could be built in future against our selected geographic unit. We do so in order to identify which areas of the country fall into each of the different categories identified for our geographic assessment.

Question 2.1: What are your views on our general approach to regulation and geographic differentiation in this review?

3. Approach to assessing network presence in different geographic areas

- 3.1 In this section, we set out how we propose to assess network presence in different geographic areas of the UK so we can identify which areas fall into each of our three proposed categories.
- 3.2 As set out in Section 2, we consider that the presence of rival ultrafast networks now and in future is likely to be a key driver of differences in competitive conditions across areas. We therefore need to identify a method of measuring the geographic extent of existing networks and of planned network build by network providers. We also need to consider how to take into account potential future network rollout.
- 3.3 In summary, our approach is:
- Determine the number of networks present (in this document we use a threshold of at least 65% of premises being covered, as discussed below) within each individual geographic unit (which we take to be postcode sector in this document) by:
 - Counting the number of existing networks already present;
 - Assessing whether any networks are planned to be present; and
 - Assessing whether future network rollout is viable.
 - For each postcode sector where two or more networks other than Openreach already exist, carry out an assessment considering the strength of competition by considering factors such as market share:
 - Where competition is effective, allocate the postcode sector to Category 1 (effectively competitive); and
 - Where competition is not effective, allocate the postcode sector to Category 2 (potentially competitive).
 - Allocate postcode sectors where there is one existing network, or where there are plans for network rollout, or where we consider future rollout may be viable to Category 2 (potentially competitive).
 - Allocate remaining postcode sectors to Category 3.
- 3.4 In the rest of this section we discuss:
- our preferred options for our choice of geographic unit for the analysis;
 - our approach to selecting the threshold we apply to decide whether an alternative network has sufficient coverage to be counted as present in each geographic unit; and
 - how we propose to analyse existing, planned and potential future network rollout.
- 3.5 Finally, we discuss how we propose to take into account competition in the supply of leased lines in some parts of the UK.

The geographic units for our analysis

- 3.6 In our geographic market analysis, we need to choose a geographic unit to carry out our assessment. We consider that either postcode sectors or Openreach exchanges would be among the best candidates for carrying out our analysis in this review.

Possible geographic units

- 3.7 Our objective is to differentiate between geographic areas based on the competitive conditions we find in those areas. To carry out our geographic analysis, we first need to break down the UK into smaller areas (geographic units) which we can then examine for actual, planned and potential network coverage. We can then apply a common approach to regulation to geographic units where competitive conditions look the same or sufficiently similar.
- 3.8 The narrowest possible geographic unit is that of individual premises. The choice available to a customer at a particular location depends on which networks pass or are connected to the home or business premises. However, when networks are deployed they are able to serve all premises within the area of deployment, and rollout tends not to focus on covering just certain individual premises. This means similar conditions of competition will exist across a number of premises and it is unlikely that providers would set prices on an individual premises level. Therefore, to assess the impact of existing network rollouts we do not think it is necessary to carry out an assessment at the level of the individual premises.
- 3.9 Similarly, in assessing whether there is potential for competition, rollout is likely to be planned to target the whole of a larger urban area (such as a town) and so we consider it would be reasonable to consider the potential for future competition at a level higher than individual premises. Although a network that is ultimately deployed may not be able to reach all premises, for example due to practical reasons such as wayleaves, we do not consider that we could sensibly predict the prospect for competitive entry at the level of the individual premises. In addition, the information available to us on planned competitor build is at a higher level than a list of all addresses to which the network will be built.
- 3.10 In addition, carrying out an assessment at the level of each of c.29 million premises would be a complex and resource intensive challenge due to the amount of analysis required and the need to share data on all 29 million premises in the UK for the purposes of imposing regulation.
- 3.11 We therefore need a geographic unit which is sufficiently granular (i.e. at a small enough scale) that we do not mix areas that have significantly different competition conditions, but not so small as to make the analysis unmanageable. There are a number of different units we could use, such as those listed in Table 3.1.

Table 3.1: Potential geographic units for analysis

	Potential geographic units	Approximate number of units
Premises	Individual premises (homes, businesses, mobile sites)	29 million
Postcode system	Postcodes	1.6 million
	Postcode sectors	10,000
	Postcode districts	3,000
Serving areas of Openreach's network	Street cabinets	90,000
	Copper exchanges	5,600
	Fibre exchanges	1,100

Sources: Ofcom 2018.

- 3.12 In our previous geographic analyses of telecoms markets, we have used either postcode sectors or Openreach exchanges.
- 3.13 The postcode system or the serving areas of Openreach exchanges both provide a well understood and stable way to group individual premises together, based on local geographic proximity.
- 3.14 In relation to the postcode system, there are different levels of granularity we could choose. There are c.1.6 million unique postcodes in the UK grouped into around 10,000 postcode sectors. In turn these are grouped up to larger postcode districts of which there are around 3,000 and finally into around 120 postcode areas across the UK. Helpfully, there is also a wide availability of tools and information to use the UK postcode system for carrying out geographic analysis.¹³ It is also the geographic unit that we used in our examination of geographic differences in the intensity competition in the supply of leased lines to large businesses.¹⁴
- 3.15 Network deployments are unlikely to be planned to match precisely onto postcode sectors. However, whilst some premises/postcodes within each postcode sector may be missed by any specific deployment, in areas where we are likely to see scale network deployment, we think the footprint of postcode sectors will be sufficiently granular that conditions of competition are not likely to vary widely within a postcode sector. This is because once a network operator starts a network rollout, their plan is likely to cover an area larger than typical postcode sectors in the areas where build is attractive, so the deployment will cover

¹³ Commonly referred to as geographic information systems (GIS).

¹⁴ See, for example, our 2018 BCMR Consultation.

the entirety of several postcode sectors. However, at the edge of the deployment, there could be postcode sectors that are only partially covered.

- 3.16 We have also previously used the serving areas of Openreach copper exchanges as our geographic unit in our review of wholesale access to broadband services reflecting competing network entry.¹⁵ These provide similar benefits to postcode sectors in terms of providing a well understood boundary. There are around 5,600 copper exchanges, as compared to about 10,000 postcode sectors. Whilst an analysis using exchanges would therefore be less granular, it would still provide a manageable and reasonably granular set of geographic units for analysis.
- 3.17 A benefit of using Openreach exchanges over postcode sectors is that in those areas where we find Openreach to have SMP, the remedies we place on Openreach would map to its network and the wholesale services it offers at its exchanges. However, we note that as Openreach deploys fibre services, it is providing these services from a subset of its exchanges (around 1,100). As such, using the 5,600 exchanges may become less relevant over time. This could mean the fibre exchanges would be more relevant in the long term, but they have a larger footprint that may cover a greater mix of competitive conditions in terms of the number of competing networks that are present.
- 3.18 We expect that the Openreach exchange areas will form the basis of its deployment and so would match very closely to its deployment. Rival network deployments are less likely to match precisely to the Openreach exchange area. This may be the case even if alternative networks choose to use Openreach's underground ducts and telegraph poles in their deployment plans.
- 3.19 We therefore think an argument could be made for using either postcode sectors or Openreach exchanges. We recognise that in either case our choice of geographic unit will not precisely align with all network deployments. Hence, our overall approach will need to take this into account.
- 3.20 For the purpose of the illustrative analysis in Section 4 we have used postcode sectors, but we invite stakeholders' views on the appropriate choice of geographic unit.

Coverage threshold for considering a network to be present

- 3.21 Once we choose the appropriate geographic unit (i.e. either postcode sectors or exchanges), we need to map existing, planned and possible future rollout to those areas

¹⁵ As explained from paragraph 4.50 of our 2018 Wholesale Broadband Access (WBA) Statement (https://www.ofcom.org.uk/_data/assets/pdf_file/0021/57810/WBA-Final-statement.pdf), our choice of Openreach exchange in our reviews from 2008 reflected the nature of rival entry into the WBA market. The main competitors to Openreach such as TalkTalk and Sky installed their own telecoms equipment and co-located at Openreach exchanges to access Openreach lines to premises in that exchange area. This is made possible by our upstream WLA regulation - Local Loop Unbundling and Virtual Unbundled Local Access.

and determine whether we consider the existing/planned network or possible future rollout to be available within that particular geographic unit.¹⁶

3.22 We have considered what proportion of the premises within a postcode sector or exchange area would need to be covered for us to count a network as present in that area. It needs to cover sufficient premises in the area to provide a competitive constraint, but we would not expect it would need to achieve complete coverage of every premises within the area to achieve this. This suggests a significant proportion of premises should be covered but we do not consider that it is necessary for 100% of premises to be covered.

3.23 The choice of threshold could influence which areas we identify as effectively competitive, and which we identify as potentially competitive.

- For the effectively competitive test, the choice of threshold needs to be considered alongside other elements of the SMP assessment. In particular, if we set a low threshold we could include more networks as present in an area, but networks which would be excluded under a higher presence threshold will tend to cover fewer premises and so may be expected to have a lower market share across the geographic unit as a whole. So, the choice of a lower threshold does not necessarily lead to more areas being identified as effectively competitive.
- In distinguishing between potentially competitive and non-competitive areas, a lower threshold may be more likely to identify an area as potentially competitive on the basis of current or planned network presence. Given that we want to promote network competition where possible, we consider that a relatively lower threshold – which could identify some areas that ultimately are non-competitive areas as being potentially competitive – may be preferable to a higher threshold which could identify potentially competitive areas as non-competitive.

3.24 This threshold is a judgement. We note that we have used a threshold of requiring a network to cover 65% or more of premises when assessing the competitive constraint of rival network presence in geographic areas in our reviews of various telecoms markets over the last ten years, for example:

- 2008 WBA Statement¹⁷ (and subsequent WBA reviews¹⁸): we used 65% as an appropriate threshold for determining whether Virgin Media's cable network had enough coverage in an Openreach exchange area.

¹⁶ Alternative network deployments may not fully cover the whole postcode sector or exchange area (i.e. be able to connect to every premises in that area).

¹⁷ In our 2008 WBA Statement we first concluded that Virgin Media should be counted as having a presence in a BT exchange area if its network was able to supply 65% or more of the premises in that exchange area. We considered that in order to provide a competitive constraint in an exchange area, Virgin Media's cable network must be able to serve above 50% of premises but not necessarily as many as 90%. We checked a range of sensitivities between these levels (including 65%) and found that the choice of threshold did not make a significant difference to the market sizes.

¹⁸ Ofcom, 2018. *Wholesale broadband access market review 2018*. Statement. Paragraphs 4.65-70. Pages 56-57.

<https://www.ofcom.org.uk/consultations-and-statements/category-1/wholesale-broadband-access-market-review>.

- 2018 WBA Statement: we also concluded that, as with cable, it was appropriate to consider a telecoms provider as present in an exchange area using wholesale fibre access where it is able to serve 65% or more of consumers within that exchange area.¹⁹
- 2018 BCMR Consultation: we also considered that if rival networks are able to supply leased line services to 65% or more of large business sites in an area, the area can be considered covered by rival networks.²⁰

3.25 For the purposes of the illustrative analysis set out in Section 4, we have used a threshold of 65%. We invite stakeholders' views and evidence on the choice of threshold we should adopt for our future proposals.

Approach to assessing existing network presence

3.26 Having identified the relevant geographic unit and the threshold we will apply to determine whether a network is present, we will need to determine the type of networks that we will include as part of our assessment of existing network presence.

3.27 To the extent that alternative networks are currently present in the UK, in most of the country these networks do not provide a sufficient competitive constraint on Openreach such that it does not have market power. In the past we found that:

- BT has SMP nationally (excluding Hull²¹) in the market for WLA services used to provide telephony and broadband services to residential and small and medium-sized enterprises (SME) customers (the WLA market review); and
- BT has SMP in most areas for leased lines (the BCMR), with the exception of the Central London Area (CLA).²²

3.28 Other than the provision of leased lines in the CLA, there has been either no competition to BT (BT only areas), or limited competition such that BT has a high market share consistent with SMP. Where a degree of competition does exist, this generally arises from the Virgin Media network, with some further leased lines competition in selected areas.²³ ²⁴ Because we have found BT to have SMP in both local access and leased lines markets, we

¹⁹ Ofcom, 2018. *Wholesale broadband access market review 2018*. Statement. Paragraphs 4.99-112. Pages 62-65.

<https://www.ofcom.org.uk/consultations-and-statements/category-1/wholesale-broadband-access-market-review>.

²⁰ Our current PIMR consultation considers areas where Virgin Media passes over 90% of premises in contiguous postcode sectors. However, this is in the context of assessing physical infrastructure, where we consider that ubiquity is of particular importance to access seekers. Ofcom, 2018. *Physical Infrastructure Market Review*. Consultation. Paragraph 3.113.

https://www.ofcom.org.uk/data/assets/pdf_file/0014/125420/PIMR-consultation.pdf

²¹ Where KCOM is the incumbent network operator.

²² The CLA is currently defined by reference to the postal sectors listed in Schedule 13 of the Notification of 23 November 2017 (Temporary SMP services conditions and directions for BT) at

https://www.ofcom.org.uk/data/assets/pdf_file/0020/108137/Annex-1-Legal-instruments.pdf. In our 2018 BCMR

Consultation we make no substantive change to the definition of the CLA (see

https://www.ofcom.org.uk/data/assets/pdf_file/0018/124731/bcmr-annex-23-draft-legal-instruments.pdf).

²³ Virgin Media provides both broadband and leased lines services.

²⁴ Our 2018 BCMR Consultation proposals identify a number of high network reach areas other than the CLA where there is competition from two or more networks but where, nonetheless, we propose that BT currently holds a position of SMP.

would not expect our overall assessment to differ depending on whether we treat these services as a single market or as separate markets (as we have to date).

- 3.29 Given our strategy, as set out above, and the types of fibre networks we expect to be built²⁵, our intention is to consider a single product market for downstream wholesale network services, against which we will carry out a competition assessment on a geographic basis, based on the availability of networks over the forward look period of the review. Where we find SMP we would evaluate what remedies to apply in light of their implications for network competition across all services.
- 3.30 Some existing networks are service specific, particularly in terms of some networks that provide leased lines services. These networks may develop into multi-service networks in the longer term, but we do not think there is sufficient evidence to assume this will happen in all cases. As such, as a general rule, we do not consider that existing leased lines networks should be considered to be multi-service networks, or to be substitutable for them, unless there is clear evidence to the contrary.²⁶ Accordingly, when identifying which areas fall into each of the three categories explained above we will not include networks that support only leased lines. We will take into account the impact of those specific networks in our assessment of remedies.
- 3.31 We propose to take this approach to deal with the CLA. Here we have previously found that BT does not have SMP for leased lines in this area (and have proposed a similar finding in our 2018 BCMR Consultation), but at the same time we have found BT does have SMP for wholesale local access services. Whilst our approach is generally to exclude leased lines only networks from our assessment of existing networks, as explained above, we recognise it is important to take account of the competition these networks are currently providing. We discuss our approach to this at the end of this section.
- 3.32 We propose to use the latest data from our Connected Nations report as our source of existing network coverage.²⁷ ²⁸ This provides us with data on which telecoms providers can provide phone and broadband services down to each individual premises in the UK. In general, we assume these networks would also be capable of supporting other services, such as leased lines.
- 3.33 In line with the discussion above, we propose to count a network as present in a postcode sector or exchange area where the Connected Nations data confirms it can serve more premises than our threshold.

²⁵ Described in paragraph 2.6 above.

²⁶ We note that where networks do support both broadband and leased lines services, coverage derived from Connected Nations would show this coverage.

²⁷ Ofcom's Connected Nations and Infrastructure reports are available at <https://www.ofcom.org.uk/research-and-data/multi-sector-research/infrastructure-research>.

²⁸ The Connected Nations is published as a main report on an annual basis and, from this year, it also includes two smaller updates during the year. The latest being an update in October 2018.

Approach to operators' plans

- 3.34 It is also necessary for us to consider how to take account of planned network build by network providers in our assessment.
- 3.35 In the context of our strategy of supporting fibre network investment where it is economic, an important feature of our market analysis will be to take account of network roll out by operators over a longer term. We therefore propose to take into account operators' future network rollout plans for the purposes of assessing competitive conditions. In some cases, providers may initially build their networks to provide a specific service – particularly leased lines. However, as noted in paragraph 2.10, we expect that new fibre networks will be capable of providing services in each of the markets we currently review and may also lead to new services being developed. Therefore, we propose to include all network plans.
- 3.36 We have already seen momentum build behind investment in full-fibre broadband. Some full-fibre operators have attracted new investors including from institutions focused on infrastructure investment. Given the timeframe we are working to of putting new regulatory arrangements in place from 2021, some of these current build ambitions may be in progress or completed during our market review process. Where build is completed before our review concludes we would expect it will largely be captured in our Connected Nations programme and treated, at time of our Statement, as current network presence as explained above.
- 3.37 But where current or future roll out plans have not been realised by 2021 we will need to consider how to take these plans into account.
- 3.38 We recognise that there are differences in build certainty about any operators' ambitions. For example, the certainty of actual build in a location may vary from an operator having:
- initial build plans;
 - an NPV²⁹ positive business case;
 - a signed-off business plan at the relevant level (e.g. CEO and/or Board); to
 - build works having started.
- 3.39 We will need to take a view on how we treat plans with different levels of certainty.
- 3.40 In order to capture the full extent of potential rollout from network plans, we propose to include any plan that is sufficiently detailed to identify the towns/cities in which they will deploy, but would not include anything more general, e.g. an intention to build to a given number of homes but with no location specified.
- 3.41 Where a plan is very certain (such as with a signed-off business plan or where build works have started), we have considered whether we should treat it the same as we treat existing networks, in order to assess whether an area is effectively competitive. However, we understand that there may still be some changes to actual rollout so the network build

²⁹ Net Present Value. A term to describe analysis used to determine whether a project or investment will result in a net profit or a loss.

may not be completed as planned. We think it is more appropriate to treat network plans differently to existing networks and to not include network plans in our assessment of the number of networks already present for the purposes of assessing whether an area should be considered as effectively competitive.

- 3.42 In terms of mapping network plans, where a network plan identifies areas at a more granular level than our chosen unit (postcode sector or exchange area) we would map the planned footprint and apply our threshold to assess whether we should consider the plan covers a sufficient proportion of the geographic unit (i.e. in the case of the illustrative assessment included in this consultation, we would test whether any such plan covers 65% or more of a postcode sector in which it is planned to be deployed).
- 3.43 Where the plan is at a higher level (e.g. a town/city), we would consider the plan covers all premises in that town/city and include all geographic units that have a sufficient proportion of its premises within the boundary of the town/city.
- 3.44 If the plan relates to extending an existing network, we think it is important to capture the true effect of this plan. As such, we expect to add together the existing and planned networks and test this against the threshold for network presence. This means that where existing coverage is less than the threshold, but a plan extends coverage to beyond the threshold level, we capture the combined effect of the existing and planned rollout. At this stage we propose to treat this combined effect as for other networks plans.³⁰

Approach to potential future rollout beyond existing plans

- 3.45 We also need to consider how to determine those areas where we might expect potential future network rollout beyond operators' existing plans, as we wish to capture all possible locations for commercial scale rollout of new networks within our potentially competitive areas.
- 3.46 We have talked to operators about how they determine which areas may be commercially viable for network roll out.³¹ Although the factors they take into consideration or the weight they give to them vary to some extent,³² there are some common considerations in the economics of building or extending fibre networks. They include:
- **Cost and pace of build** which includes many elements e.g. proximity to existing network, size of area, density of premises, surface types, availability of third party assets, cost and availability of labour.³³
 - **Predicted penetration** based on demand, demographics and existence of competitive products etc.

³⁰ Where an existing network already meets the threshold coverage requirement for any postcode sector, we count the network in our assessment of existing networks and do not take further account of the plans.

³¹ Information which we have subsequently collected using our statutory powers.

³² Because their business strategies and commercial models are different.

³³ The use of unrestricted access to Openreach's ducts and poles through the Physical Infrastructure Access remedy (PIA) could impact costs and the pace of build and we would take this into account as operators develop their plans to use PIA.

- **Local Authority support** considering how much cooperation or resistance the local authority will add to the programme and if any additional charges will be levied for permit schemes adding to the cost to build.
- 3.47 In trying to identify a boundary between geographic areas where commercial network build might be viable and areas where this is unlikely, we have considered the above factors as highlighted by operators to see what might best help us identify where we think the boundary may lie. Some of these factors, whilst important for specific deployments, would be difficult for us to include in our analysis. For example, identifying specific local authority areas where build may be easier (or more challenging) would not be practical, as this will depend on factors such as the relationship each operator has with the local authority, and what other street works are being undertaken by other utilities at any given time. Similarly, whilst we accept that surface types are an important consideration in specific build decisions, identifying surface types across the whole UK for the purposes of our analysis would not be practical.
- 3.48 Our provisional view is that identifying geographic areas of sufficient size and density of premises is an approach we can readily calculate and is sufficient to determine a boundary below which any fibre network build at scale is unlikely to be viable. However, we welcome stakeholder views on this approach and the merits or otherwise of using different or additional factors to conduct this assessment.
- 3.49 We have taken the following provisional approach to identify areas where network build may be economic:
- To identify areas of sufficient size and density where rollout could be viable we:
 - select postcodes in urban areas (using the size of the footprint covered by the postcode as a proxy for whether the postcode covers an urban or rural area);
 - group together adjacent urban postcodes to form a cluster; and
 - select the clusters that pass a minimum threshold of size and density (i.e. number of premises passed). In our illustrative analysis set out in Section 4, we have applied a criterion that the cluster must include at least 20,000 premises.
 - To identify the geographic units (postcode sectors in the case of this consultation) covered by this potential rollout we:
 - map the postcode sectors that are wholly or in part within the clusters as identified above. In our illustrative analysis set out in Section 4, where at least 65% of the postcode sector's premises are within the area of the cluster, we include the postcode sector as a potentially competitive area.

Our approach to taking account of leased lines only networks and consideration of the Central London Area

- 3.50 To date, in our separate reviews of business connectivity markets, we have found that the provision of leased lines in the CLA is subject to effective competition. This is due to the uniquely high presence there of existing end-to-end leased line networks, with our analysis

in the BCMR (including the provisional view expressed in the 2018 BCMR Consultation) showing that there are sufficient alternative leased lines networks (i.e. networks other than Openreach) in terms of proximity, as well as actual connections, in the CLA.

- 3.51 However, our overall approach, as outlined above, is based on considering both WLA and leased lines services. We have not included leased lines only networks in our identification of existing network presence, unless already included in our Connected Nations dataset.
- 3.52 Nevertheless, we recognise that networks exist that provide only leased lines services and we need to take this into account in our overall assessment. This is particularly the case in the CLA, where, as per our 2018 BCMR Consultation provisional findings, there is competition for the supply of leased lines in the CLA.
- 3.53 We propose to take this into account in our SMP and remedies assessment. This would mean that even though our approach might indicate there are insufficient networks providing a range of services in the CLA, we would expect to recognise the competition in leased lines and not impose remedies. This would continue to allow Openreach to provide relevant wholesale leased lines services in the CLA without any regulation.
- 3.54 At present, Connected Nations does not include information on the coverage of leased lines. Therefore, we would propose to use the approach set out in our 2018 BCMR Consultation to examine the presence of networks supporting only leased lines and their impact on competition for these services.

Question 3.1: What are your views on our approach to the geographic unit for our analysis?

Question 3.2: What are your views on our approach to the threshold for considering a network to be present within a geographic unit?

Question 3.3: What are your views on our approach to analysing existing, planned and potential future network rollout?

Question 3.4: What are your views on our approach to considering cases where specific services may be competitive but others are not, such as the CLA?

4. Illustrative assessment

Introduction

- 4.1 In this section we provide an illustrative assessment of competitive intensity in different geographic areas of the UK based on the approach set out in the previous sections.
- 4.2 We have included this assessment to enable stakeholders to better understand and engage with our proposed approach. The outputs of this assessment should not therefore be taken to be a definitive view on the appropriate geographic areas.

Results of our illustrative assessment

- 4.3 The results of this illustrative assessment show that:
- there are no areas where competition is currently effective;
 - around 70% of the UK's 29 million premises fall in areas where there is currently insufficient competition but where there may be some networks other than Openreach currently present and/or further fibre network rollout is possible; and
 - the remaining c.30% of premises are in areas where there are no material alternative networks to Openreach and scale rollout may be unlikely.
- 4.4 Table 4.1 below shows the breakdown of our analysis by number of premises and postcode sectors. We have published a list of the postcode sectors in each area alongside this document.³⁴

Table 4.1: Illustrative number of postcode sectors and premises by category of area

	Number of postcode sectors	Percentage of all UK postcode sectors	Number of premises (millions)	Percentage of all UK premises
Competitive areas	0	0%	0	0%
Potentially competitive areas	6,116	61%	20.4	69%
Non-competitive areas	3,912	39%	9.1	31%

Source: Ofcom analysis.

³⁴ Available at https://www.ofcom.org.uk/data/assets/excel_doc/0034/129994/Illustrative-assessment-results-postcode-sectors-by-category.xlsx.

4.5 In the rest of this section we set out a description of the steps which we took to produce this assessment as follows:

- Establishing the geographic footprint for postcode sectors;
- Identifying the number of premises within each postcode sector;
- Identifying existing networks in postcode sectors;
- Identifying planned networks in postcode sectors;
- Identifying postcode sectors in areas of potential economic build; and
- Combining analysis of existing, planned and areas of potential economic build.

Establishing the geographic footprint of postcode sectors (as the geographic unit)

4.6 We selected postcode sectors as the geographic unit for conducting this assessment. There are around 10,000 postcode sectors across the UK. Each postcode sector is a grouping of individual postcodes.

4.7 To determine the geographic boundary of each postcode sector we used data from Ordnance Survey which provides footprints for individual postcodes for Great Britain. For Northern Ireland, we produced our own individual postcode footprints using the same type of process used by Ordnance Survey.³⁵

4.8 We then grouped the individual postcode footprints together into their respective postcode sectors across the UK.

Using Connections Nations data to identify the number of premises in each postcode sector

4.9 The coverage data we collect from fixed broadband network operators for our Connected Nations programme provides network coverage at the premises level. Connected Nations selects premises which are capable of being provided with communications services which we can match to each postcode.³⁶ We have therefore used Connected Nations data to count the number of premises in each postcode sector.

4.10 For this illustration we have used data from Connected Nations from January 2018, but we will update our analysis to use the latest data available in our formal proposals in autumn 2019.

³⁵ Ordnance Survey data does not include footprints for postcodes for Northern Ireland.

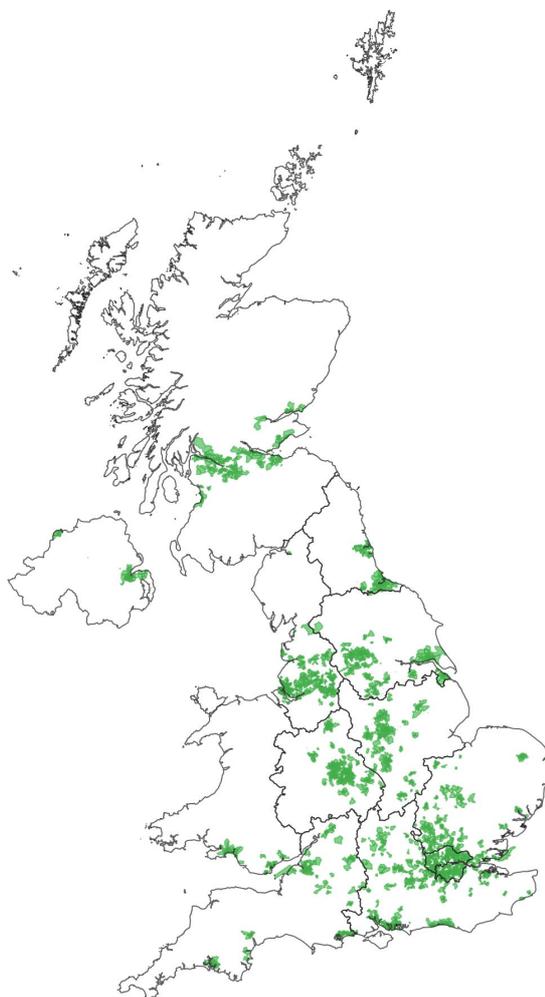
³⁶ For each premises, Connected Nations uses Ordnance Survey's Unique Property Reference Number (UPRN) system which associates the UPRN with an address and postcode as provided from the Ordnance Survey AddressBase® Premium and AddressBase® Islands product, Epoch 55, January 2018.

Identifying existing networks in postcode sectors

- 4.11 We have used the Connected Nations data as discussed above to identify, on a per premises basis, the coverage of each fixed network. We have aggregated this at the postcode sector level.
- 4.12 Using this and the count of total premises by postcode sector, we have calculated the proportion of premises covered by each network in each postcode sector. For the purposes of this illustration, we have counted a network as being “present” in a postcode sector if it can provide service to at least 65% of premises in a postcode sector.
- 4.13 Figure 4.2 below shows a map of 3,545 UK postcode sectors, where at least 65% of premises are served by at least one alternative network to Openreach. These 3,545 postcode sectors include 13.3 million premises.³⁷ There are no areas where at least 65% of premises are served by two or more alternative ultrafast networks.

³⁷ The numbers of premises include 100% of premises in each postcode sector identified, while the postcode sectors have been selected where the number of premises passed may be any number equal to or above 65% of premises in each postcode sector.

Figure 4.2: Map of the UK by postcode sector, with at least one alternative network (coverage \geq 65%)



Source: Ofcom 2018.

Identifying planned network rollout in postcode sectors

- 4.14 We asked a number of operators to provide us with information using our formal information gathering powers about their network rollout plans. For this illustration we used information on rollout plans supplied by [redacted],³⁸ [redacted],³⁹ [redacted],⁴⁰ and [redacted].⁴¹
- 4.15 We mapped these to postcode sectors and considered a network is planned to be present in the postcode sector if at least 65% of premises will be covered. The form and detail about planned network roll out plans which we received varied quite significantly between

³⁸ [redacted] response dated 7 September 2018 to question 2 of the s135 information request dated 30 August 2018.

³⁹ [redacted] response dated 6 September 2018 to questions 5 and 6 of the s135 information request dated 24 August 2018.

⁴⁰ [redacted] response dated 14 September 2018 to questions 1, 2 and 3 of the s135 information request dated 7 September 2018.

⁴¹ [redacted] response dated 14 September 2018 to questions 2 and 3 of the s135 information request dated 30 August 2018.

operators. Some operators provided us with detailed plans at postcode level. Others provided at least the names of specific towns and cities in which they have plans to serve a high proportion of the homes and business premises. As such, we have made some assumptions in our mapping:

- Where data was provided at the level of postcode sector or below, we have mapped the data to postcode sectors;
- Where data identified specific towns/cities, we have mapped this to our own identified 'clusters' (as explained below) for those areas and selected the relevant postcode sectors; and
- Where plans were more general (i.e. did not identify specific towns and cities), we have not included them.

4.16 Figure 4.3 below shows the illustrative outputs of our analysis of existing and planned network rollout.

Figure 4.3: Map of the UK by postcode sector, with at least one alternative network (coverage \geq 65%), including rollout plans

[✂

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Source: Ofcom 2018.

4.17 Table 4.4 below provides the number of postcode sectors with at least one existing or planned alternative network rollout that would cover at least 65% of that postcode sector. This illustrative analysis suggests that the inclusion of planned rollout would increase the number of postcode sectors with at least one alternative ultrafast network. These

additional postcodes with planned rollout of at least one alternative network cover an additional 11.8% of UK premises relative to current rollout.

Table 4.4: Coverage of existing and planned alternative networks

	<i>Existing coverage of one or more alternative networks</i>	<i>Existing and planned coverage of one or more alternative networks</i>	<i>Difference in coverage of alternative networks due to planned rollout</i>
Number of postcode sectors	3,599	4,665	1,066
Number of premises (millions)	13.5	17.0	3.5 ⁴²
Percentage (%) of premises	45.7%	57.6%	11.8%

Source: Ofcom 2018 analysis.

4.18 We will provide more detail on our approach to mapping operator plans when we publish formal proposals.

Assessing potential future rollout in postcode sectors

4.19 As set out previously, we intend to include in Category 2 those areas where operators do not currently have plans, but in which we consider there is a prospect that network build may be economic. We have taken the following steps to identify areas where network build may be economic:

- identify ‘urban’ postcodes where there is a reasonable density of premises;
- group these postcodes into clusters;
- identify which of these clusters meet certain criteria indicating that network build may be economic;
- map those selected clusters onto postcode sectors; and
- select postcode sectors where 65% or more of the premises are included in our clusters.

4.20 We discuss these steps below.

Identifying postcodes where there is a reasonable density of premises

4.21 As noted above, the first step is to identify those postcodes where there is a reasonable density of premises. For this analysis, we need detailed geographic data on the number of

⁴² These figures include 100% of premises in each selected postcode sector.

premises in different postcodes and the area covered by the postcode. We have used premises data from our Connected Nations programme combined with Ordnance Survey (OS) postcode data⁴³ for this purpose.

4.22 Our analysis of these datasets shows a clear correlation between the size of the postcode and the density of premises within the postcode. The smaller the postcode's geographic area, the greater the density of premises. This should be unsurprising as the Royal Mail's postcode sizes are related to delivery volumes.

4.23 We observed that the footprint of postcodes in urban areas typically does not exceed 100,000m². We have used this threshold to identify postcodes which map to residential and business locations. At the postcode footprint level, this technique filters out large green spaces in urban areas (such as large parks and golf courses) and airports as well as rural areas of low population density.

4.24 In Figure 4.5, we present an example, using the Newcastle-upon-Tyne area:

- At top left we show the postcodes within the wider Newcastle area footprint that are below the threshold of 100,000m² in purple, and those above the threshold in white;
- At top right we show the same area with a background map highlighting that the white postcodes reflect non-urban areas (typically rural areas or green space);
- At bottom left, we zoom into an area at the edge of the Newcastle urban area, again showing postcodes with footprint below the threshold of 100,000m² in purple, and those above the threshold in white; and
- At bottom right, we show the same zoomed-in area with a background map to show highlighting that the postcodes covering over 100,000m² typically reflect green space.

⁴³ Ordnance Survey UK, CodePoint with Polygons dataset, July 2018. This dataset excludes Northern Ireland, so we used the same technique as Ordnance Survey to create our own polygons and combined them to cover the whole of the UK.

Figure 4.5: Example showing Newcastle upon Tyne postcodes with high density of premises, identified by postcode's footprint size (threshold equal to 100,000m²)



Source: Ofcom analysis 2018, based on OS and Connected Nations data.⁴⁴

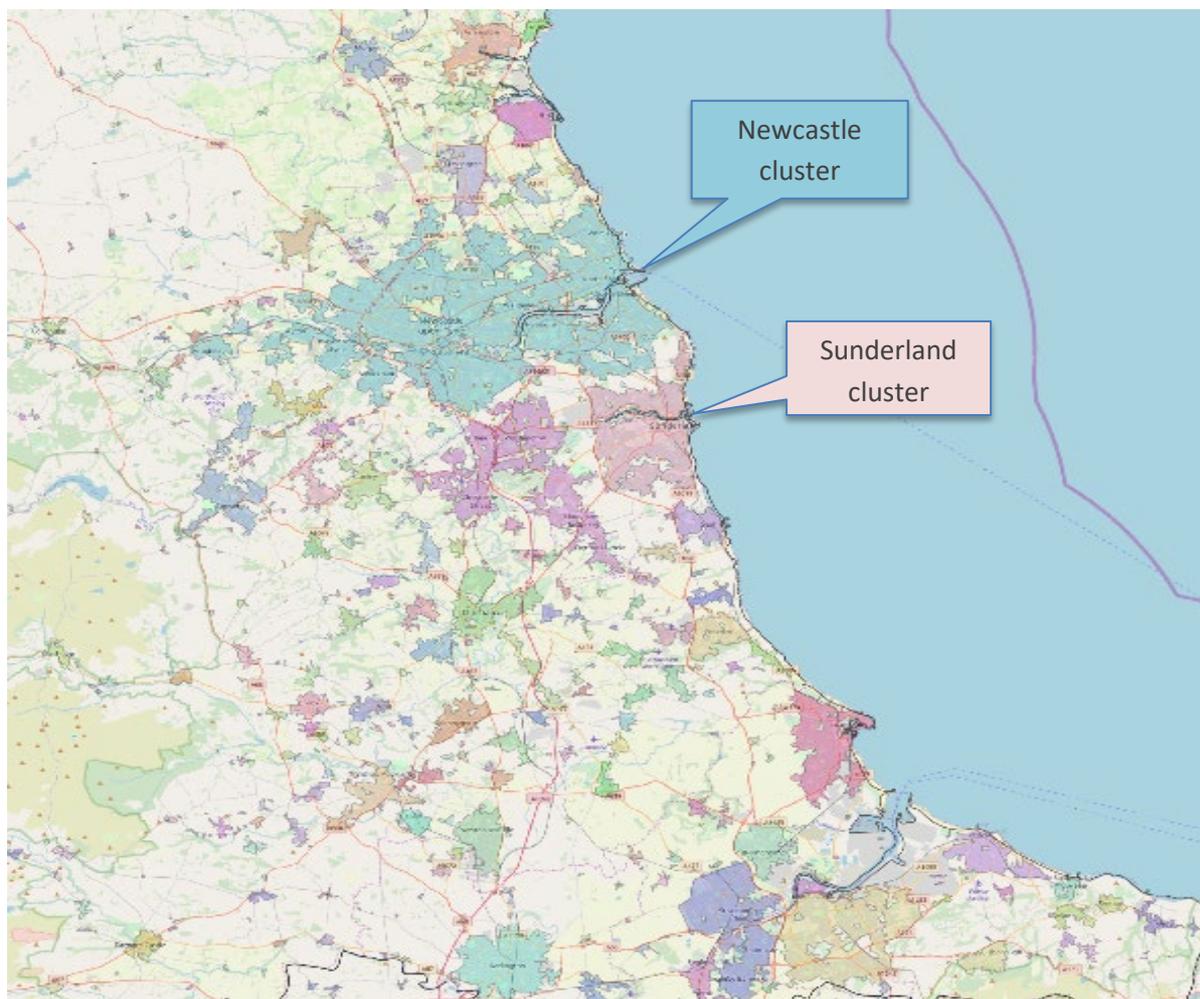
Grouping these postcodes into clusters

- 4.25 Our next step is to group together urban postcodes into clusters.
- 4.26 To identify clusters that form contiguous areas of interest, we looked for common boundaries between postcodes, to determine whether they are neighbours. We repeated this exercise iteratively until we identified all groups of postcodes that form contiguous clusters.⁴⁵ Using this process, we identified 54,928 initial clusters.
- 4.27 In Figure 4.6 below, we illustrate the identified clusters in more detail for Northeast England; different colours are used to distinguish between different clusters of urban postcodes.

⁴⁴ The underlying map, used for illustrative purposes, was obtained from openstreetmaps.org.

⁴⁵ Due to the nature of postcode geography, some areas (“polygons”) representing some postcode units are unavoidably split. In special cases of postcodes allocated to premises far apart, i.e. in case a postcode is mapped to more than one polygon, each polygon was examined separately to preserve the contiguity of the corresponding cluster(s).

Figure 4.6: Each cluster is illustrated with a different colour.



Source: Ofcom 2018 analysis.

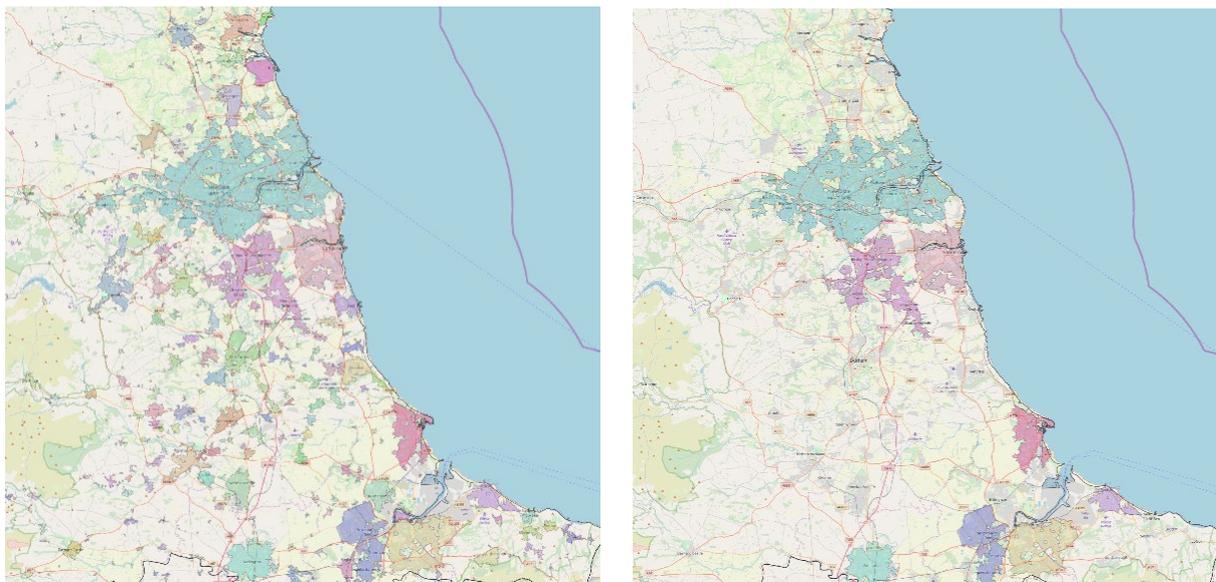
- 4.28 This approach would create a large contiguous cluster for Newcastle-upon-Tyne and a set of distinct clusters for surrounding towns and cities such as Sunderland. The vast majority of clusters identified by this approach are very small and include a limited number of premises.

Filtering clusters to a specified threshold

- 4.29 The clusters identified in the previous step provide contiguous areas of residential and business premises. There are a significant number of much smaller clusters, in some cases of only a few postcodes.

4.30 However, we want to identify which of these ‘candidate areas’ are likely to be economic to serve. We have used a threshold of areas with at least 20,000 premises within that cluster to identify areas where there is potential for economic rollout in this consultation. Figure 4.7 below illustrates this by showing clusters in Northeast England with and without the 20,000 premises filter.

Figure 4.7: Initially identified clusters (left) and those with a minimum of 20,000 premises (right) in Northeast England



Source: Ofcom 2018 analysis.

4.31 On this basis, for the initial set of 54,928 clusters, using a 20,000 threshold would result in 183 clusters where there is the potential for it to be economic for network build. These clusters would represent c. 18.7 million premises.

4.32 We present in Table 4.8 below the impact of alternative thresholds.

Table 4.8: Cluster size (minimum premises), the number of clusters and the total number of premises in these clusters

Minimum number of premises (threshold)	Number of clusters	Total premises in clusters passing threshold (millions)
10,000	341	20.9
15,000	240	19.7
20,000	183	18.7
25,000	149	18.0
30,000	127	17.4

Source: Ofcom 2018 analysis.

4.33 If we applied a lower threshold based on 10,000 premises, then we would identify 341 clusters representing 20.9 million premises. A higher threshold of 30,000 premises would result in us identifying 127 clusters representing 17.4 million premises.

Mapping clusters to our selected geographic unit

4.34 Our overall geographic analysis relies on postcode sectors as the geographic unit. Therefore, as the clusters passing our premises threshold in the previous step are based on contiguous sets of urban postcodes, we need to map each of the clusters we identified to the corresponding postcode sectors.

4.35 However, in some cases, particularly at the boundary of a cluster, a postcode sector may consist of premises that are within the cluster and some that fall outside. We have identified all postcode sectors that are wholly or in part within a cluster. We have then only included a postcode sector as part of a cluster where at least 65% of the postcode sector's premises are within the area of the cluster.

4.36 We identified 5,692 postcode sectors (out of 10,028), which correspond to a total of 19 million premises, where 65% of each postcode sector's premises located in urban cluster(s) of 20,000 or more premises. The postcode sectors include 19 million premises, whereas the clusters include 18.7 million premises (as shown in Table 4.8 above) because:

- In these 5,692 postcode sectors, 553,359 of the 19 million premises included in the selected postcode sectors are outside of the identified clusters; and
- 314,159 premises are physically located in the identified clusters but are excluded as they are in postcode sectors where less than 65% of the postcode sector's total number of premises lie within the cluster.

Categorising geographic areas based on current, planned and potential future network presence

4.37 We set out above our approach to assessing current and planned network rollout as well as areas where it may be economic to rollout network in the future. The final step is to group geographic areas into the three broad categories based on their competitive intensity:

- **Competitive areas:** areas that are effectively competition. As explained in the previous section we would assess areas with at least two competitive networks other than Openreach for whether there is sufficient competition.
- **Potentially competitive areas:** areas where there are existing competitive networks but there is not effective competition, or planned or potential rollout of at least one competitive network; and
- **Non-competitive areas:** areas that are BT only and where rollout by alternative networks is unlikely.

4.38 We set out below the results of our illustrative assessment.

Table 4.9: Illustrative number of postcodes and premises by category of area

		Number of postcode sectors	Percentage of all UK postcode sectors	Number of premises (millions)	Percentage of all UK premises
Competitive areas		0	0%	0	0%
	Existing network presence	3,599	36%	13.5	46%
Potentially competitive areas	Plus planned networks	4,665	47%	17	58%
	Plus potential rollout	6,116	61%	20.4	69%
Non-competitive areas		3,912	39%	9.1	31%

Source: Ofcom 2018 analysis.

4.39 In terms of assessing competitive areas, we have not identified any areas with two or more alternative networks to Openreach.

4.40 In our analysis, potentially competitive areas may represent a large proportion of UK premises. Our results suggest that 6,116 postcode sectors covering 20.4 million premises would fall in this category.⁴⁶

4.41 Based on the thresholds we have chosen for this illustrative assessment, 423 postcode sectors are included as being potentially competitive based on existing or planned rollout but are outside our clusters of potential future rollout. Of these, 418 are included due to existing network presence.⁴⁷

Figure 4.10: Illustrative map of the UK showing potentially competitive and non-competitive postcode sector areas (potentially competitive in green, non-competitive in brown)

⁴⁶ We have run some initial sensitivities to see what illustrative results are produced if we lower or raise our threshold of 65% used to count the presence of existing, planned and potential networks in our analysis. We have used 50% and 80% respectively. We find that Category 2 increases by 3% to cover 72% of UK premises under a reduced threshold of 50%. Whereas using an increased threshold of 80% reduces this by 4% to 65% of UK premises covered.

⁴⁷ This represents existing or planned rollout in areas considered unlikely to be viable for rollout using the thresholds included in this illustration. There are 1.4 million premises, which is just under 5% of UK premises, within the 423 postcode sectors.



Source: Ofcom 2018 analysis.

- 4.42 Our analysis suggests that 3,912 postcode sectors covering 9.1 million premises would fall into the non-competitive area. In these areas we consider it is unlikely that there will be any commercial fibre deployment (at scale) by an alternative operator to Openreach.

Question 4.1: What are your views on the illustrative assessment of our approach?

A1. Responding to this consultation

How to respond

- A1.1 Ofcom would like to receive views and comments on the issues raised in this document, by 5pm on 26 February 2019.
- A1.2 You can download a response form from <https://www.ofcom.org.uk/consultations-and-statements/category-1/promoting-investment-competition-fibre-networks>. You can return this by email or post to the address provided in the response form.
- A1.3 If your response is a large file, or has supporting charts, tables or other data, please email it to geo.analysis@ofcom.org.uk, as an attachment in Microsoft Word format, together with the cover sheet (<https://www.ofcom.org.uk/consultations-and-statements/consultation-response-coversheet>).
- A1.4 Responses may alternatively be posted to the address below, marked with the title of the consultation:
- Geo Analysis Team
Ofcom
Riverside House
2A Southwark Bridge Road
London SE1 9HA
- A1.5 We welcome responses in formats other than print, for example an audio recording or a British Sign Language video. To respond in BSL:
- Send us a recording of you signing your response. This should be no longer than 5 minutes. Suitable file formats are DVDs, wmv or QuickTime files. Or
 - Upload a video of you signing your response directly to YouTube (or another hosting site) and send us the link.
- A1.6 We will publish a transcript of any audio or video responses we receive (unless your response is confidential)
- A1.7 We do not need a paper copy of your response as well as an electronic version. We will acknowledge receipt if your response is submitted via the online web form, but not otherwise.
- A1.8 You do not have to answer all the questions in the consultation if you do not have a view; a short response on just one point is fine. We also welcome joint responses.
- A1.9 It would be helpful if your response could include direct answers to the questions asked in the consultation document. The questions are listed at Annex 4. It would also help if you could explain why you hold your views, and what you think the effect of Ofcom's proposals would be.

- A1.10 If you want to discuss the issues and questions raised in this consultation, please contact Warwick Izzard on 020 7783 4127, or by email to warwick.izzard@ofcom.org.uk.

Confidentiality

- A1.11 Consultations are more effective if we publish the responses before the consultation period closes. In particular, this can help people and organisations with limited resources or familiarity with the issues to respond in a more informed way. So, in the interests of transparency and good regulatory practice, and because we believe it is important that everyone who is interested in an issue can see other respondents' views, we usually publish all responses on our website, www.ofcom.org.uk, as soon as we receive them.
- A1.12 If you think your response should be kept confidential, please specify which part(s) this applies to, and explain why. Please send any confidential sections as a separate annex. If you want your name, address, other contact details or job title to remain confidential, please provide them only in the cover sheet, so that we don't have to edit your response.
- A1.13 If someone asks us to keep part or all of a response confidential, we will treat this request seriously and try to respect it. But sometimes we will need to publish all responses, including those that are marked as confidential, in order to meet legal obligations.
- A1.14 Please also note that copyright and all other intellectual property in responses will be assumed to be licensed to Ofcom to use. Ofcom's intellectual property rights are explained further at <https://www.ofcom.org.uk/about-ofcom/website/terms-of-use>.

Next steps

- A1.15 Following this consultation period, Ofcom plans to publish formal proposals for consultation by autumn 2019.
- A1.16 If you wish, you can register to receive mail updates alerting you to new Ofcom publications; for more details please see <https://www.ofcom.org.uk/about-ofcom/latest/email-updates>

Ofcom's consultation processes

- A1.17 Ofcom aims to make responding to a consultation as easy as possible. For more information, please see our consultation principles in Annex 2.
- A1.18 If you have any comments or suggestions on how we manage our consultations, please email us at consult@ofcom.org.uk. We particularly welcome ideas on how Ofcom could more effectively seek the views of groups or individuals, such as small businesses and residential consumers, who are less likely to give their opinions through a formal consultation.
- A1.19 If you would like to discuss these issues, or Ofcom's consultation processes more generally, please contact the corporation secretary:

Corporation Secretary
Ofcom
Riverside House
2a Southwark Bridge Road
London SE1 9HA
Email: corporationsecretary@ofcom.org.uk

A2. Ofcom's consultation principles

Ofcom has seven principles that it follows for every public written consultation:

Before the consultation

- A2.1 Wherever possible, we will hold informal talks with people and organisations before announcing a big consultation, to find out whether we are thinking along the right lines. If we do not have enough time to do this, we will hold an open meeting to explain our proposals, shortly after announcing the consultation.

During the consultation

- A2.2 We will be clear about whom we are consulting, why, on what questions and for how long.
- A2.3 We will make the consultation document as short and simple as possible, with a summary of no more than two pages. We will try to make it as easy as possible for people to give us a written response. If the consultation is complicated, we may provide a short Plain English / Cymraeg Clir guide, to help smaller organisations or individuals who would not otherwise be able to spare the time to share their views.
- A2.4 We will consult for up to ten weeks, depending on the potential impact of our proposals.
- A2.5 A person within Ofcom will be in charge of making sure we follow our own guidelines and aim to reach the largest possible number of people and organisations who may be interested in the outcome of our decisions. Ofcom's Consultation Champion is the main person to contact if you have views on the way we run our consultations.
- A2.6 If we are not able to follow any of these seven principles, we will explain why.

After the consultation

- A2.7 We think it is important that everyone who is interested in an issue can see other people's views, so we usually publish all the responses on our website as soon as we receive them. After the consultation we will make our decisions and publish a statement explaining what we are going to do, and why, showing how respondents' views helped to shape these decisions.

A3. Consultation coversheet

BASIC DETAILS

Consultation title:

To (Ofcom contact):

Name of respondent:

Representing (self or organisation/s):

Address (if not received by email):

CONFIDENTIALITY

Please tick below what part of your response you consider is confidential, giving your reasons why

Nothing

Name/contact details/job title

Whole response

Organisation

Part of the response

If there is no separate annex, which parts? _____

If you want part of your response, your name or your organisation not to be published, can Ofcom still publish a reference to the contents of your response (including, for any confidential parts, a general summary that does not disclose the specific information or enable you to be identified)?

DECLARATION

I confirm that the correspondence supplied with this cover sheet is a formal consultation response that Ofcom can publish. However, in supplying this response, I understand that Ofcom may need to publish all responses, including those which are marked as confidential, in order to meet legal obligations. If I have sent my response by email, Ofcom can disregard any standard e-mail text about not disclosing email contents and attachments.

Ofcom seeks to publish responses on receipt. If your response is non-confidential (in whole or in part), and you would prefer us to publish your response only once the consultation has ended, please tick here.

Name

Signed (if hard copy)

A4. Consultation questions

Question 2.1: What are your views on our general approach to regulation and geographic differentiation in this review?

Question 3.1: What are your views on our approach to the geographic unit for our analysis?

Question 3.2: What are your views on our approach to the threshold for considering a network to be present within a geographic unit?

Question 3.3: What are your views on our approach to analysing existing, planned and potential future network rollout?

Question 3.4: What are your views on our approach to considering cases where specific services may be competitive but others are not, such as the CLA?

Question 4.1: What are your views on the illustrative assessment of our approach?