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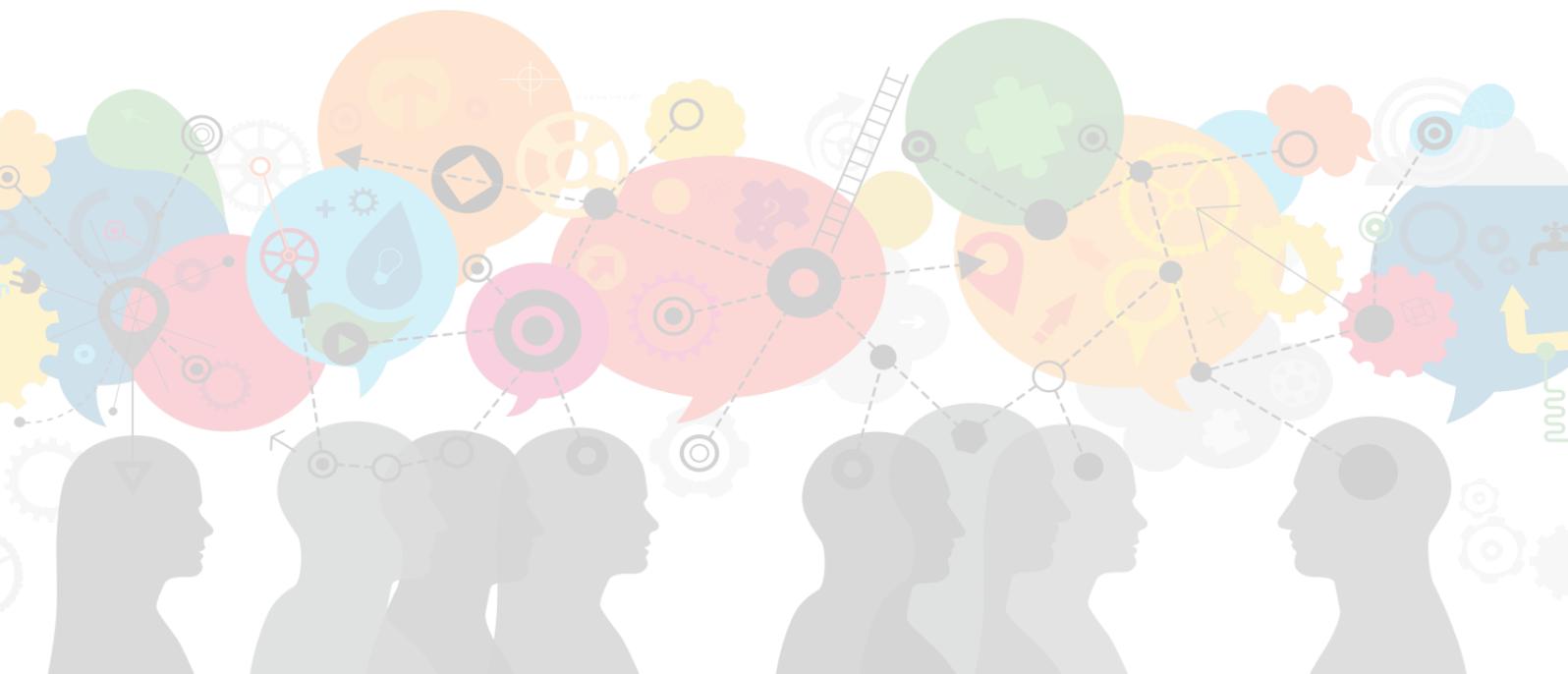
5G Neutral Host Networks

Bevan Brittan

The essential guide for Local Government Version 2.0

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Forward

When we first started to discuss advanced networks with Perform Green and understood the disruptive potential for 5G, the council wanted to make sure that it could be adopted in a way that is fully inclusive and the social and economic benefits could be shared with all who live, work, study and play in Sunderland.

As we began to explore the principle of a neutral host, we felt this model would best meet our objectives of creating a fairer and more equitable Sunderland. We asked Bevan Brittan and Perform Green to be a part of our journey to help us develop a compelling business model, technical specification and support us through the open and robust procurement. The outcome is Sunderland and BAI Communications have agreed to work together creating a joint venture to deliver advanced networks across the city that includes 5G delivered in the form of a Neutral Host.

This essential guide includes some of our key learnings and I commend the work colleagues from Perform Green and Bevan Brittan have done in helping us achieve our goals and ambition - to be the first Council delivering a 5G NH at city scale to the eventual benefit of all our citizens.

Forward by Liz St Louis, Assistant Director of Smart Cities at Sunderland City Council

5G Neutral Host Networks: The Essential Guide for Local Authorities V002

Purpose

This paper seeks to provide senior officials, council leaders, and the wider public sector community with a high-level understanding of the principles, opportunities and potential barriers involved in the provision of a new model of mobile networks delivery and commercialisation called 'Neutral Host'.

Bevan Brittan and Perform Green have spent the last 12 months working with a public sector client developing the business case, specifications, providing procurement support and assurance for a Joint Venture to deliver the UK's first City Scale 5G Neutral Host. This means we have an in-depth understanding of the risks, challenges, and opportunities associated with this new model of connectivity and this version of the guide has been updated to reflect that learning.

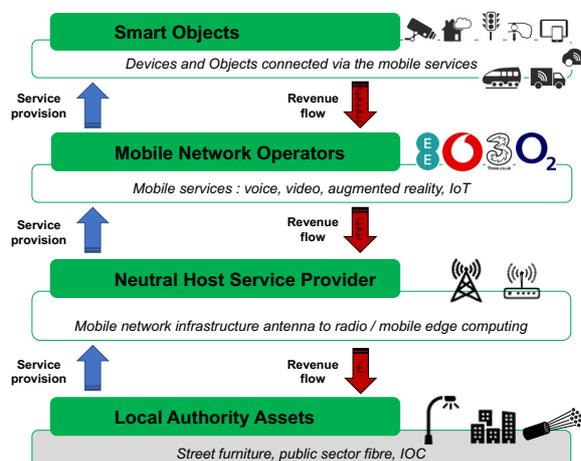
What is a Neutral Host?

A Neutral Host is **where all or a part of the Mobile Network Infrastructure is available as equal access shared service to mobile operators and service providers.**

It can be provided by a single operator on behalf of them all, as evidenced by shared environments mainly in rural areas or by a third party. The network should be open for access to any 'over the top services' provided by or on behalf of the LA or the wider public sector.

This model is supported by DCMS¹ as providing better long-term outcomes for 'place'.

The following diagram shows how the Neutral Host Service Provider provides services to the mobile network operators who in turn are providing services for their customers. The shared network is not perceptible to customers; they continue to receive the service they pay for, and MNOs pay the Neutral Host Provider for an agreed Service Level which they deem fit for their customers. The network itself, the hardware, is utilising Local Authority assets including infrastructure. The LA can become an anchor tenant helping cost-justify the investment.



¹ The Future Telecoms Infrastructure Review was published by DCMS in July 2018 (<https://www.gov.uk/government/publications/future-telecoms-infrastructure-review>) and makes specific mention of the need for 'new models of infrastructure provision' including the 'potential for Neutral Host'. It also suggests that 'all future concession contracts should mandate the provision of the assets on an open access basis, under fair, reasonable and non-discriminatory terms. This approach should deliver better long-term outcomes for local areas.'

5G primer for Local Authorities

The next generation of mobile telecommunications, 5G, delivers high bandwidth, low latency and enables many more devices to connect. It represents a set of opportunities for government such as: -

- The potential to generate new revenue opportunities
- Create inclusive digital infrastructure in support of public service transformation.
- Increase local economic output through digital enterprise.
- Address environmental challenges, such as climate change.

There is 'market failure' in that mobile network operators (MNOs) as commercial entities are interested in public areas with high-value footfall and struggle to justify connecting rural or more economically challenged urban locations.

The opportunity of the 'Neutral Host' model for 'place' is to make it greener and smarter, supporting

- The seismic shift in increased remote working,
- The future high street – re-creating destination
- New economies of diverse SMEs,
- Repopulating rural or semi-urban areas,
- Helping attract inward investment,
- Adaptation to climate change.
- The Creation of location / use specific private networks e.g., Ports, Universities, Hospitals

For Local Authorities, it can transform operations, improving services to citizens at a lower cost.

No single-use case cost justifies the necessary investment so it is essential to engage organisations that can take multiple disparate use cases and weave them together, dependant on the topology to create a compelling Business case that will benefit society.

In the following section, we explain some basic characteristics of 5G network topology and how to make the most of the business opportunity.

If you are looking for a more in-depth view of technology standards and functional features, then please contact the authors who will be happy to share further insights.

New revenue opportunities for a Local Authority

At its heart, a network built using 5G technologies has a several characteristics that will make it **valuable to Local Authorities seeking new revenue streams**, as well as providing opportunities to improve services for citizens and attract new businesses.

The Assets Opportunity

One of the key requirements of a 5G network is the significant increase in network access points (antenna) when compared to 3/4G networks. Additional 5G (including 4G) access points will be "small cell" access points, similar to current public access Wi-Fi endpoints, where site acquisition and civil works are by far the most dominant costs in deployment.

This means that, nationally or locally, it will be prohibitive for a competitive network landscape to emerge where each mobile operator would build their own infrastructure. This is likely to lead to a model of locally operated 5G networks on which the Mobile Network Operators (MNO) will lease capacity rather than establish their own national infrastructure.

This is a game-changer in terms of how networks are implemented and used where the principle of a Neutral Host is gaining favour.

This opportunity means that **Local Authorities are in a prime position** to benefit from 5G and the concepts of Neutral Host, given their localised focus and ownership of street assets that can be used to

mount the necessary antennas. It also addresses the common concerns of the population and stakeholders of keeping money in the local government purse for public benefit in return for “small cells” deployed on local infrastructure, rather than the intrusive masts for MNO gain.

To put it another way, **public sector assets are made available via commercial arrangement to an organisation**, whether a Local Authority trading company, joint venture, special purpose vehicle, or to a third-party network operator, who will operate the network infrastructure. The network capacity can then be leased to anyone for the delivery of enhanced services to generate revenue.

Business Models for a Neutral Host

1. Concession Model

At its most basic level, Local Authorities could simply rent space on street assets (lampposts in the main) for the siting of 5G cells. In a recent trial, a London borough entered into a concession agreement renting space on lampposts for £750 per annum per lamp post.

Work carried out by Perform Green for the Future Cities Catapult’s Hyper Connect Cities project, estimated it would require up to 2,000 new cell sites, dependent on topology, to fully cover a regional city.

This could provide an annual revenue in the region of the low hundreds of thousands of pounds with little effort by the Local Authority as the work and the risk profile will be solely with the operator.

Additionally, to generate additional revenue, Local Authorities should consider:

- a. leasing existing ducting or ‘dark fibre’ it owns to a Neutral Host company as 5G will rely on fibre networks for “backhauling” data traffic into core telecommunication networks; and/or
- b. property space for micro data centres which will also be needed to deliver services over 5G networks.

However, this model would only achieve that level of income in high footfall areas, and it is **unlikely that MNOs will pay the same blanket price for all lampposts**. They will only want to provide coverage in those areas that support their commercial model so this is unlikely to provide you with universal coverage to benefit everyone.

It is worth noting that the Communications Code does provide powers to network operators to require access to land (including street furniture) for the deployment of telecommunication equipment albeit there will still be a rental value to such use. As such, the decision of whether to rent space could be taken away from Local Authorities who do not act quickly enough.

Concession models come with their own challenges, for example, maintaining access rights to your own infrastructure, power, and connectivity.

2. Network Owner:

The more valuable option for Local Authorities is to **install and then operate the 5G network either itself or in partnership utilising a JV model**. This has the potential to:

- deliver **significant revenue streams** from leasing capacity to mobile phone operators and other businesses;
- the availability of an advanced 5G network is **likely to attract businesses to the city and its surrounding communities resulting in the growth of economic activity, job creation, and prosperity**;
- potential for removing costs currently borne by the Local Authorities in terms of existing WiFi and mobile networks being contracted for;
- enable new smart city technologies across its environs at a relatively low or even no-cost basis, and equitably across the population.

Additionally, this can help with other goals:

- help encourage business and innovation in suburban and rural areas, and encourage blended lifestyles of working from home and an office;

- help decarbonisation through smart grids (more efficient use and delivery of energy), adaptation to climate change, and contributing to net-zero plans of reducing the need for transport and commuting.

Offtentimes, the places that need it most are the last to benefit from connectivity, and that costs the public purse. People in receipt of social care may be in remote, rural or sub-urban areas; and MNOs have no plans to roll out to those areas without significant government intervention.

Economy

Current estimates suggest that the roll-out of Full Fibre to the premise and high-speed wireless access will deliver a 3% boost to GVA and 1% boost to business start-up rates http://www.broadbanduk.org/wp-content/uploads/2019/09/Impact-of-full-fibre-and-5G-Publication-12.9.19_complete.pdf

Challenges

There are, however, clear challenges in building and operating a 5G network, not least the significant cost of buying and implementing a 5G network (including the cost of upgrading or building new fibre networks). The estimate for a typical regional city to build a network from nothing could be as much as £30m, so it is essential to pair public investment with private sector funds.

Perform Green has experience in securing funding from national government as seed funding towards the cost of building 5G networks and developing the business case to successfully attract external investment.

In addition, we have identified several investment companies who would be keen to invest in such networks. Such investment could be based on 100% funding for the network with Local Authorities providing the street assets, accommodation, acting as the anchor tenant as well as any existing fibre networks as its contribution.

Further challenges include where street lighting is under a PFI, many of which will prohibit the installation of telecommunications equipment. In such cases, it is essential to work with the PFI provider to resolve this issue as part of any strategy. Bevan Brittan has an experienced PFI team that can support both the strategy and engagement with the PFI provider.

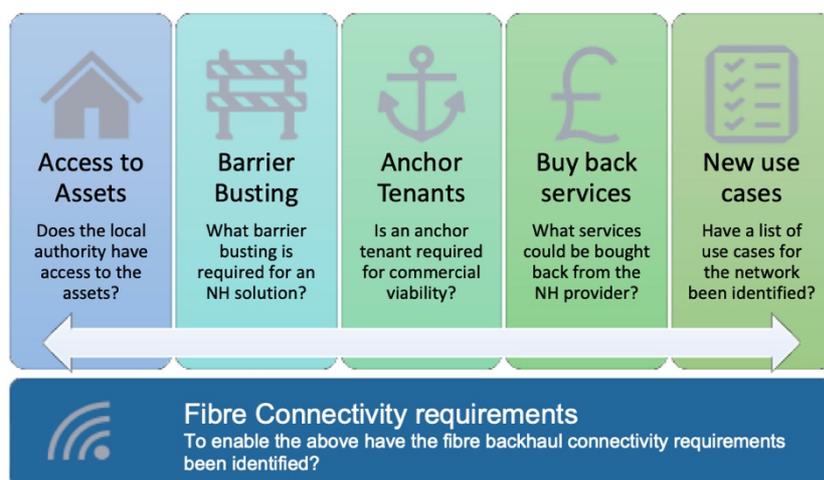
In developing a plan for 5G, it is important to undertake **appropriate due diligence** to identify assets available which can be used to build a network as well as understand the capabilities and capacities available within the organisation to support the delivery of an offer into the market.

Time is critical if you, as a Local Authority, are going to benefit.

- Grant funding opportunities are time constrained.
- Other private sector organisations are looking to establish 5G networks.
- 5G Networks are being rolled out now, but only covering high-value footfall areas.
- The application of the Communications Code may allow operators access to install equipment on street assets.

Therefore, particularly where you are considering operating a Neutral Host model, you need to be working now to ensure that the 5G network in your region is delivered with full consideration of the broader economic and social benefits to your communities.

NH Procurement – Key aspects to consider



Next Steps

Please feel free to contact Perform Green for an initial assessment or feasibility study that will help you understand the value a 5G NH would bring to your organisation or Bevan Brittan to understand some of the legal implications and approaches that can be adopted.

About Perform Green

Perform Green can support the development of your 5G infrastructure and services. We can assist you with asset audits, business case development, and internal stakeholder buy-in as we have the technical, financial, legal skills and experience to complement your internal resources.

We would welcome the opportunity to meet with your senior leadership team to discuss the opportunity in more detail.

Perform Green delivers innovation, productivity, and a connected smart society through digitally inspired change for good. We harness the power of digital technology to deliver positive benefits to individuals, communities, organisations, and cities, whilst keeping people at the heart of what we do. We call this a Smart Society. As a certified B Corporation and Living Wage Employer, we are committed to delivering benefits for all our stakeholders: Our customers, our suppliers, our employees, our shareholders, the communities in which we work, and the environment.

Within our core team, Perform Green is fortunate to have several senior consultants with public sector, Smart City, Mobile telecoms, and fixed communications experience. They are drawn from organisations such as UK Government, NEC, Nokia, Dimension Data, the Royal Signals and are supported by a range of commercialisation specialists.

Perform Green offers a full service from exploratory workshops, business case modelling, procurement ready specifications to service delivery. In the last 12 months, we have helped clients scope new concession agreements, are involved in the public sector procurement of the UK's first city-scale Neutral Host & have written and are partners in a successful 5G funding submission

Perform Green: Creating a Green and Smart Society

www.performgreen.co.uk

About Bevan Brittan

[Bevan Brittan](#) is a UK-Top 100 national law firm providing legal and advisory services, advising businesses across construction, energy & resource management, higher education, and financial services sectors, complementing the firm's market leadership within housing, local government and health and social care. We support local authorities in their 5G and wider smart city programmes, bringing together teams specialising in technology, local authority governance and regulation, procurement, property, PFI and more widely.

Our experience in this area includes supporting the first neutral host deployment partnership in the country and have previously worked with the Connected Places Catapult to develop legal models to support local authorities in developing 5G solutions.

Bevan Brittan is recognised as having unrivalled experience in advising council's nationwide and continues to be ranked tier one for local authority practice by Legal 500.

Bevan Brittan: Legal and advisory services

www.bevanbrittan.com